

**THE SME GUIDE FOR REPORTING  
EXPLORATION RESULTS, MINERAL RESOURCES,  
AND MINERAL RESERVES**

**(The 2014 SME Guide)**

**PREPARED BY:**

**THE RESOURCES AND RESERVES COMMITTEE  
OF  
THE SOCIETY FOR MINING, METALLURGY, AND EXPLORATION, INC.**

**AND APPROVED BY:**

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**June 2014**

## Foreword

- i. The 2014 SME Guide for Reporting Exploration Results, Mineral Resources, and Mineral Reserves (the 2014 SME Guide) has been adopted by the Society for Mining, Metallurgy, and Exploration, Inc. (SME) and is therefore strongly recommended to be used by members of this organization.
- ii. The Guide is recommended as a minimum standard for reporting Exploration Results, Mineral Resources and Mineral Reserves for public and private purposes. In terms of the Guide, Public Reports are reports prepared for the purpose of informing investors or potential investors and their advisers on Exploration Results, Mineral Resources or Mineral Reserves.
- iii. In this Guide, important terms and their definitions are highlighted in **bold** text. The guidelines are written using regular font. Paragraphs with border on the left side and written in *italics* give directions on how to interpret definitions and guidelines.
- iv. THE UNITED STATES SECURITIES AND EXCHANGE COMMISSION (U.S. SEC) REGULATES THE REPORTING OF EXPLORATION RESULTS, RESOURCES AND RESERVES BY ORGANIZATIONS, INDIVIDUALS OR COMPANIES (“ENTITIES”) SUBJECT TO THE FILING AND REPORTING REQUIREMENTS OF THE U.S. SEC. DECISIONS AS TO WHEN AND WHAT INFORMATION SHOULD BE REPORTED PUBLICLY ARE THE SOLE RESPONSIBILITY OF THE ENTITY OWNING THE INFORMATION, AND ARE SUBJECT TO U.S. SEC RULES AND REGULATIONS. THE REPORTING OF EXPLORATION RESULTS, RESOURCES AND RESERVES MAY ALSO BE SUBJECT TO OTHER NATIONAL AND INTERNATIONAL RULES AND REGULATIONS. THESE RULES AND REGULATIONS VARY FROM TIME TO TIME, AND AT ANY GIVEN TIME MAY NOT BE CONSISTENT WITH THE CONTENT OF THIS GUIDE. THE ADVICE OF SECURITIES COUNSEL SHOULD BE SOUGHT IN PREPARING FILINGS FOR THE U.S. SEC OR OTHER SECURITIES REGULATORY AUTHORITIES, AND IN PREPARING OTHER PUBLIC DISCLOSURES.
- v. It is recognized that further review of the Guide will be required from time to time. Constructive suggestions are solicited from all users of this Guide. Comments should be sent to:

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## History

1. In 1988, at the request of members of the Society for Mining, Metallurgy, and Exploration, Inc. (SME), the President of SME formed Working Party #79, Ore Reserve Definition, with the mission to develop guidelines for the public reporting of Exploration Results, Mineral Resources, and Mineral Reserves. A Subcommittee was appointed by the Working Party to draft these guidelines and to submit recommendations to SME. The Subcommittee's recommendations were published by SME in the April 1991 issue of "Mining Engineering", and as a document entitled "A Guide for Reporting Exploration Information, Resources, and Reserves" (the SME Guide) in January 1992. Work continued on an ad-hoc basis until 1996, when Working Party #79 was renamed the SME Resources and Reserves Committee and became a standing committee.

In 1994, the Council of Mining and Metallurgical Institutions (CMMI) started a concerted international effort to create a set of international definitions for reporting Mineral Resources and Mineral Reserves. An ad-hoc International Definitions Group was formed, with representatives from mining and metallurgical institutions from the United States (SME), Australia (AusIMM), Canada (CIM), the United Kingdom (IMM) and South Africa (SAIMM). A major breakthrough came on October 18, 1997 when the CMMI International Definitions Group met in Denver, Colorado and reached a provisional agreement (the Denver Accord) on definitions of Mineral Resources and Mineral Reserves. Concurrently, and since 1992, the United Nations Economic Commission for Europe (UN-ECE) was developing an international framework classification for Mineral Resources and Mineral Reserves. The first edition was published in 1997. Starting in October 1998, joint meetings were held in Geneva between the CMMI International Definitions Group and the UN-ECE Task Force. These meetings resulted in agreement to incorporate the CMMI definitions into the UN Framework Classification.

In 2002, the Combined Reserves International Reporting Standards Committee (CRIRSCO, now known as the Committee for Mineral Reserves International Reporting Standards) was formed, replacing the CMMI International Definitions Group with the mission to continue coordination between member countries, of the development of international standards for the definition and reporting of Exploration Results, Mineral Resources and Mineral Reserves. Chile joined CRIRSCO in 2002 and developed the first non-English reporting code that follows the international definitions.

The international resources and reserves definitions or their precursors were accepted as part of national reporting codes (or standards) and guidelines by the regulatory agencies of Australia (1989), South Africa (2000), Canada (2001), and the United Kingdom (2001). These definitions were formally adopted by the United Nations in 1999 for the categories common to the two classifications (CRIRSCO and UNFC-1999). Subsequently following a cooperation agreement between the SPE, CRIRSCO and the Expert Group on Reserve Classification (EGRC) of the UN-ECE, the

definitions were slightly modified to suit the broader scope of the UNFC and which were included in a 2009 revision of the United Nations Framework Classification (UNFC-2009). However, the equivalence between the definition categories common to the two classifications remained the same as before. In 2007 the Government of Chile approved a reporting code that includes these definitions. In 2008 the Pan-European Code was issued by the Pan-European Resources and Reserves Reporting Committee (PERC), and in 2011 the Russian Code was issued by the National Association for Subsoil Examination (NAEN).

2. The SME Guide, first published in 1992, was updated in 1999 when the requirement was introduced that the reporting of Mineral Resources and Mineral Reserves be made by a Competent Person. The SME Guide was recommended for use by members of SME. However, some key aspects of the SME Guide were not consistent with requirements of the U.S. Securities and Exchange Commission (U.S. SEC), which are based on the U.S. SEC Industry Guide 7. While the SME Guide was accepted by a number of U.S. and international mining and consulting companies, its usefulness remained limited.

To resolve the differences between the SME Guide and the U.S. SEC rules and regulations, SME opened a dialogue with the U.S. SEC in 2003, and started a renewed effort to better define the industry position with respect to a number of critical issues. In February 2004, SME formed a consortium of mining, consulting and financial auditing organizations known as the SEC Reserves Working Group (the Working Group), whose members formed the SME Resources and Reserves Committee. The SME Guide was updated in 2007. The role of the Competent Person was re-emphasized.

In 2011 and 2012 CRIRSCO members noted that revisions to national reporting codes were diverging from the definitions adopted by the 1997 Denver Accord. Updated standard definitions were proposed and adopted by CRIRSCO, with the agreement that national reporting organizations could provide guidance reflecting technical and regulatory practice in their jurisdictions. The 2014 SME Guide was written to provide the core definitions and reflect practice within the United States.

In 2012, the SME petitioned the SEC to update its Industry Guide 7 using the SME Guide as a model. At present, the position of the U.S. SEC with respect to public reporting remains that stated in Industry Guide 7 as interpreted by U.S. SEC staff. Consequently at any given time some key aspects of the 2014 SME Guide may not be consistent with requirements of the U.S. Securities and Exchange Commission. In 2014, the Chairperson of the SEC recognized the need to update Industry Guide 7.

## **Governing Principles**

3. This Guide was written taking into account industry good practices and the mission of the U.S. Securities and Exchange Commission (U.S. SEC), which is to protect investors and to maintain the integrity of the securities markets. All investors and

their advisors, whether large institutions or private individuals, should have access to material facts presented in a transparent manner about an investment prior to purchasing or selling it. The U.S. SEC requires public entities to disclose meaningful financial and other information to the public, which provides a common pool of knowledge for all investors to use to judge for themselves if a company's securities are a good investment. Only through the steady flow of timely, comprehensive and accurate information can the public make sound investment decisions. To meet the SEC's requirements for disclosure, a entity must make available all material information, whether it is positive or negative, that might be relevant to an investor's decision to buy, sell, or hold the security.

The main principles governing the development and application of this Guide are transparency, materiality and competence.

- **Transparency** requires that the reader of a public report is provided with sufficient information, the presentation of which is clear and unambiguous, so as to understand the report and not to be misled.
- **Materiality** requires that a public report contains all the relevant information which investors and their professional advisers would reasonably require, and reasonably expect to find in a public report, for the purpose of making a reasoned and balanced judgment regarding the Exploration Results, Mineral Resources or Mineral Reserves being reported.
- **Competence** requires that the public report be based on work that is the responsibility of suitably qualified and experienced *Competent Persons* who are subject to an enforceable professional code of ethics<sup>1</sup> and rules of conduct.

*Transparency and Materiality are governing principles of the Guide, and the Competent Person must provide explanatory commentary on the material assumptions underlying the disclosure of Exploration Results, Mineral Resources or Mineral Reserves.*

*In particular, the Competent Person, defined below in Clause 9, must consider that the benchmark of Materiality is the inclusion of all aspects relating to the Exploration Results, Mineral Resources or Mineral Reserves on which investors or their advisers would reasonably expect to be provided explicit comments from the Competent Person. The Competent Person must discuss any material aspect for which the presence or absence of comment could affect the public perception or value of the mineral occurrence. Mineral Resources and Mineral Reserves are estimates with attendant uncertainty. The Competent Person should provide a balanced discussion of risks and opportunities accompanying statements of Mineral Resources and Mineral Reserves.*

*The report should be supported adequately by text, figures, tables, sections, and maps to demonstrate competence by conveying material information in a transparent manner. Figures of any type should contain appropriate explanatory information in the form of titles and/or captions.*

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<sup>1</sup> Registered Members of SME are required by SME to comply with the code of ethics of the SME Registered Members.

The following additional principles should also be taken into account:

- ***Consistency between Financial Reports and Technical Studies:*** Financial reports take into account Mineral Resources and Mineral Reserves and are based on assumptions concerning commodity prices, exchange rates, and other parameters of significance. To be clear and unambiguous, technical and financial information should be published on a comparable basis in terms of assumed parameters.
- ***Consistency between Financial Markets:*** For global entities, transparency can be achieved only if information is reported on a consistent basis in all financial markets. Only then can the information supplied to all investors be comparable, clear and unambiguous.

## Scope

4. **Public reporting:** The Guide is recommended as a minimum standard for reporting Exploration Results, Mineral Resources and Mineral Reserves for public and private purposes. In terms of the Guide, Public Reports are reports prepared for the purpose of informing investors or potential investors and their advisers on Exploration Results, Mineral Resources or Mineral Reserves.
5. **Use of the Guide:** Entities must provide all relevant and material information concerning a mineral deposit that could influence its economic value, which is necessary for an intelligent layman or his professional advisers to make a reasoned and balanced assessment of the Exploration Results, Mineral Resources and Mineral Reserves and attendant risks and opportunities being reported. A mineral deposit (including coal, diamonds and industrial minerals) is defined herein as an accumulation of mineralization of potential economic interest within estimated geologic boundaries.

*While every effort has been made within the Guide to cover most situations likely to be encountered in the reporting of Exploration Results, Mineral Resources and Mineral Reserves, inevitably there will be situations when doubt exists as to the appropriate procedure to follow. In such cases, users of the Guide and those compiling reports under the Guide should refer to the Guide's intent, which is to provide a minimum standard for reporting and to ensure that such reporting contains all information which investors and their professional advisers would reasonably require, and reasonably expect to find in the report, for the purpose of making a reasoned and balanced judgment regarding the Exploration Results, Mineral Resources and Mineral Reserves reported. The principle of transparency requires that the decision process of the Competent Person be explained when the Guide is not explicit as to the appropriate procedure to follow.*

*Table 1, included at the end of the Guide, supplies a checklist of items that should be considered when evaluating a project. The importance of each item will vary with the project, and it is recognized that, for some projects, other items may be relevant which are not on the list. The Table should be considered a guide to facilitate a rational and orderly approach to evaluation; as always, relevance, transparency and materiality are overriding principles that determine what information should be reported publicly.*



*This Guide does not alleviate the need for exploration and mining professionals to make difficult decisions, such as to classify material as a Mineral Resource, and to classify further Mineral Resources (as Inferred, Indicated or Measured), or a Mineral Reserve (as Probable or Proven). Decisions remain a matter of professional judgment based on knowledge, experience, and industry practices using the criteria set forth in Table 1.*

*The relative importance of the items in Table 1 will vary with each project depending on the geological environment and technical constraints, as well as economic, marketing, legal, environmental infrastructure, social and governmental conditions pertaining at the time of evaluation. When evaluating a project, the relative importance of each item should be weighed. All relevant information must be given careful consideration before deciding which information should be reported to the public.*

*Table 2, included at the end of the Guide, provides a range of expected accuracies for capital and operating cost estimates relative to the three study levels outlined in the guide for the reporting of Mineral Resources and Mineral Reserves. Scoping studies are mining studies at a conceptual level, and may be utilized to identify options for project development and to define and support future work programs to enable conversion of Mineral Resources to Mineral Reserves, whereas the more comprehensive Pre-Feasibility and Feasibility studies must be used to support declaration of Mineral Reserves.*

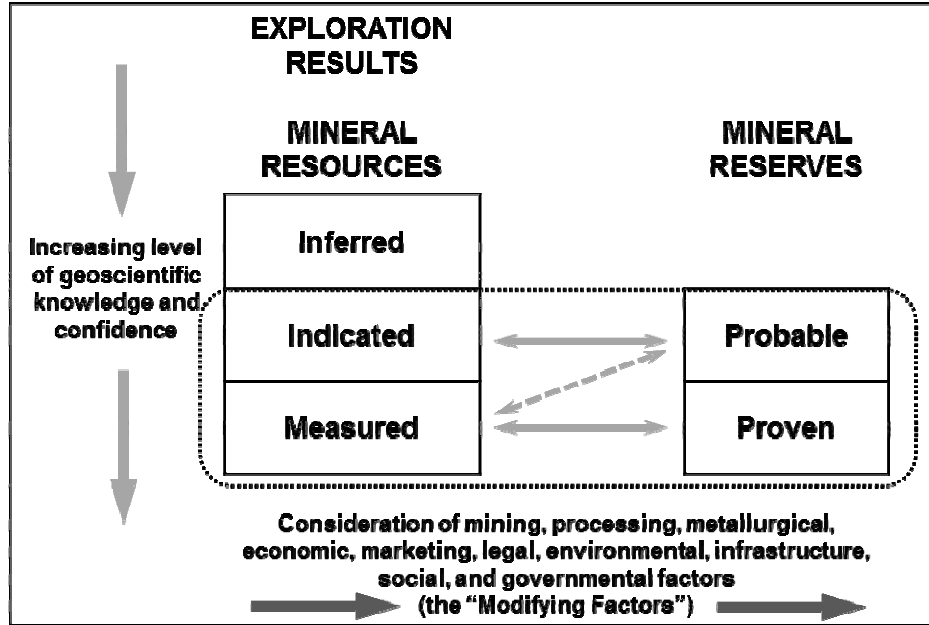
*It is recognized that estimates of Exploration Results and related interpretations, and that estimates of Mineral Resources and Mineral Reserves (being predictions of reality based on imperfect and incomplete information available at the time of estimation) are inherently forward-looking statements, and all will be inaccurate to some degree. It is also recognized that different individuals analyzing the same data may arrive at somewhat differing interpretations and conclusions. Statements concerning Exploration Results, Mineral Resources and Mineral Reserves must have a reasonable basis and be made in good faith.*

*The fact that at some later date a Mineral Resource or Mineral Reserve estimate is misclassified or proven inaccurate when additional information becomes available or economic conditions have changed, does not necessarily mean that the estimate was unreasonable or made in bad faith by a Competent Person taking into account the information available at the time the estimate was made.*

6. **Relationship Between Definitions:** Figure 1 sets out the framework for classifying Exploration Results, Mineral Resources and Mineral Reserves.



**Figure 1. General relationship between Exploration Results, Mineral Resources and Mineral Reserves**



*The relationships in Figure 1 reflect different levels of geoscientific knowledge and different degrees of technical and economic evaluation. Mineral Resources can be estimated on the basis of geoscientific information with input from other disciplines to establish reasonable prospects for eventual economic extraction. Mineral Reserves, which are a modified sub-set of the Indicated and Measured Mineral Resources, require consideration of those factors affecting extraction, including mining, metallurgical, economic, marketing, legal, environmental, infrastructure, social and governmental factors, and should in most cases be estimated with input from a range of disciplines.*

*In certain situations, Measured Mineral Resources could convert to Probable Mineral Reserves rather than to Proven Mineral Reserves because of uncertainties associated with Modifying Factors which are taken into account in the conversion from Mineral Resources to Mineral Reserves. This relationship is shown by the broken arrow in Figure 1. In such situations, these Modifying Factors should be fully explained.*

*In certain situations, previously reported Mineral Reserves could convert back to Mineral Resources because of new Modifying Factor 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. The Modifying Factors that resulted in reclassification of a Mineral Reserve should be fully explained.*

7. **Modifying Factors** are considerations used to convert Measured and Indicated Mineral Resources to Proven and Probable Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, economic, marketing, legal, environmental, infrastructure, social and governmental factors.

*Mineral Resources are supported by Modifying Factors based on benchmarks and/or the opinion and experience of the Competent Person. For Mineral Reserves, Modifying Factors are defined and applied by studies completed at "Pre-Feasibility Study" or "Feasibility Study" level.*

## Competence and Responsibility

8. Any Public Report concerning an entity's Exploration Results, Mineral Resources and Mineral Reserves is the responsibility of the entity's management. Any such report, usually only for properties of material value to the entity, must be based on, and fairly reflect the information and supporting documentation prepared by a Competent Person<sup>2</sup>, as defined below.

An entity issuing a Public Report shall make publicly available the name(s) of the Competent Person. This information should include whether the Competent Person is a full-time employee of the entity, and, if not, name the Competent Person's employer, its relationship with the entity, and whether the Competent Person and his/her employer are independent with respect to the entity or project that is the subject of the Public Report.

Issuance of the Public Report requires the written consent of the Competent Person as to the form and context in which it appears prior to release of the report. The entity must provide to the Competent Person the entity's public disclosure of information prepared by the Competent Person, and seek approval for its context and the use of the Competent Person's name in connection with that disclosure. Reasonable time must be allowed for the Competent Person to review these materials prior to approving.

*The requirement for, and the naming of, a Competent Person is aimed at improving and ensuring the quality of the information being released, and thus increasing investor confidence.*

9. A **Competent Person** is a minerals industry professional who is a Registered Member of the SME or an eligible member of an approved "Recognized Professional Organization" ("RPO") included in a list promulgated by the SME from time to time (Appendix A). A requirement for a professional organization to be recognized as an RPO is that it has enforceable disciplinary processes including the powers to suspend or expel a member.

**A Competent Person must have a minimum of five years relevant experience in the style of mineralization and type of deposit under consideration and in the activity which that person is undertaking.**

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<sup>2</sup> Note that various CRISCO members use different terms for the Competent Person; e.g., Canada (Qualified Person) and Chile (Qualified Competent Person). These alternative terms are considered to be directly equivalent to Competent Person. As used herein a Competent Person can be singular or plural.

If the Competent Person is preparing a report on Exploration Results, the relevant experience must be in exploration. 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, and economic evaluation of Mineral Reserves.

*The key qualifier in the definition of a Competent Person is the word "relevant". Determination of what constitutes relevant experience can be difficult, and common sense has to be exercised. Different experience is required to evaluate coal, base metal, industrial mineral, iron ore, sand and gravel, or gold deposits. Other differences are less obvious. In estimating Mineral Resources for vein-gold mineralization, experience in a high-nugget, vein-type mineralization such as tin, uranium, etc. will probably be relevant, whereas experience in (say) a low grade disseminated gold deposit may not be. To qualify as a Competent Person in the estimation of Mineral Reserves for alluvial gold deposits, considerable (at least five years) experience in the evaluation and economic extraction of this type of mineralization would be needed. This is due to the characteristics of gold in alluvial systems, the particle sizing of the host sediment, and the low grades involved. Experience with placer deposits containing minerals other than gold may not necessarily provide appropriate relevant experience.*

*The key word "relevant" also means that it is not always necessary for a person to have five years experience in each and every type of deposit in order to act as a Competent Person if that person has relevant experience in other deposit types. For example, a person with (say) 20 years experience in estimating Mineral Resources for a variety of metalliferous hard-rock deposit types may not require as much as five years specific experience in (say) porphyry-copper deposits in order to act as a Competent Person. Relevant experience in the other deposit types could count towards the experience in relation to porphyry-copper deposits.*

*In addition to experience in the style of mineralization, a Competent Person taking responsibility for the compilation of Exploration Results or Mineral Resource estimates should have sufficient experience in the sampling and analytical techniques relevant to the deposit under consideration to be aware of problems which could affect the reliability of data. Some appreciation of extraction and processing techniques applicable to that deposit type may also be required.*

*When applying the Modifying Factors to convert Mineral Resources to Mineral Reserves, the Competent Person must have sufficient knowledge and experience in the application of these factors to the mineral deposit. Collaboration of Competent Persons with geology, geostatistics, mining, and extraction/processing experience that is applicable to that deposit type is required.*

10. Persons being called upon to act as Competent Persons should be 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 opinions from appropriately experienced colleagues or should decline to act as a Competent Person.

Both reports and documentation must be well organized and archived such that competence is clearly demonstrated, and any forthcoming reviews (e.g., internal or external audits) can be conducted efficiently.

*Estimation of Mineral Resources should be a team effort (for example, involving one person or team collecting the data and another person or team preparing the estimate). Estimation of Mineral Reserves is always a team effort involving several disciplines. Where there is a clear division of responsibility within a team, each Competent Person and his or her contribution should be identified, and responsibility accepted for that particular contribution. However, the definitions have been specifically written to allow an appropriate degree of latitude for entities to define the organizational structure within which they apply the role of the Competent Person. If only one Competent Person signs the Mineral Resource or Mineral Reserve documentation, that person is responsible and accountable for the whole of the documentation under the Guide. It is important in this situation that the Competent Person accepting overall responsibility for a Mineral Resource or Mineral Reserve estimate and supporting documentation prepared in whole or in part by others, is satisfied, in his/her professional opinion, that the work of the other contributors is reliable. However, the Competent Person who prepares or supervises the preparation of all or part of a report may include a limited disclaimer of responsibility if the Competent Person is relying on a report, opinion or statement of another expert who is not a Competent Person, or on information provided by the issuer, concerning marketing, legal, political, environmental or tax matters relevant to the report.*

*A Competent Person may be an employee of the entity reporting Exploration Results, Mineral Resources and Mineral Reserves, or an independent consultant. When the Competent Person's findings and recommendations are likely to have material consequences (such as development of a new mining or processing facility, or significant decreases or increases in Mineral Resources and/or Mineral Reserves), it is important that these findings and recommendations be reviewed independently before the recommendations are finalized. The independent reviewer must qualify as a Competent Person in the context of the project being reviewed.*

11. An entity's management is responsible for having a Competent Person review documents supporting Mineral Resource and Mineral Reserve estimates on at least an annual basis. Public Reports must be updated by a Competent Person if there are material changes in Mineral Resources, Mineral Reserves, and/or other scientific, technical and economic parameters.

*If such review results in material changes in, or reclassification of, Mineral Resources and Mineral Reserves, timely disclosure is required. In operating mines, reconciliation reports, which compare depleted Mineral Resources and Mineral Reserves with actual production, should be reviewed at least annually.*

12. Complaints made in respect of the professional work of a Competent Person must follow procedures of the professional organization such that they can be investigated and dealt with, when required, under the disciplinary procedures of the professional organization to which the Competent Person belongs.
13. When a U.S.-listed entity with foreign interests wishes to report foreign Exploration Results, Mineral Resources and Mineral Reserves, whose estimates were prepared by a person who is not a Registered Member of the SME or a member or fellow of a Recognized Professional Organization, it is necessary for the entity to nominate a Competent Person to take responsibility for the Exploration Results, Mineral Resources or Mineral Reserves estimate. The Competent Person undertaking this activity should appreciate that they are accepting full responsibility for the estimate

and supporting documentation and should not treat the procedure merely as a “rubber-stamping” exercise.

*Rules, regulations or guidelines concerning the Competent Person and public reporting differ from country to country. When Exploration Results, Mineral Resources and Mineral Reserves are reported in the United States or in countries other than the United States, it is the responsibility of the Competent Person and the entity making a public report to ensure that the applicable local disclosure rules, regulations and guidelines are followed.*

14. Documentation detailing Exploration Results, Mineral Resources and Mineral Reserves estimates, on which a Public Report on Exploration Results, Mineral Resources and Mineral Reserves is based, must be prepared by, or under the direction of, and signed by, a Competent Person. If documentation detailing Exploration Results, Mineral Resources or Mineral Reserves is signed by an independent firm or company, a partner, officer or director of that firm or company, must be a Competent Person and must also sign this documentation.

*A partner, officer or director of a company, or any individual who signs a document accepts overall responsibility for this document and must be satisfied, in his/her professional opinion, that the work of the other contributors is reliable. It is recommended that when a document is signed by a firm, company, or individual, a list is included of all contributors who acted as Competent Persons in the preparation of parts of the document and the particular responsibility of each contributor is listed.*

*As stated in Clause 8 above, issuance of a Public Report must be based on documentation prepared by a Competent Person, and requires the written consent of the Competent Person. If the documentation used to prepare the Public Report was signed by a firm or company, the partner or director who signed the document assumes the responsibilities of the Competent Person and must meet the criteria described in Clause 9 above.*

15. If documentation was signed by a partner, officer or director of a firm or company, who is no longer a member of the firm or company, another partner or director can take responsibility for the documentation. This partner, officer or director must satisfy the Competent Person criteria set out in Clauses 8-14. Before signing this documentation, the partner, officer or director must complete sufficient work to be satisfied, in his/her professional opinion, that the content of the documentation remains reliable.
16. The Competent Person(s) must visit the property if accessible and/or sample preparation facilities, analytical laboratories and metallurgical testing laboratories as appropriate, before initial disclosure of Exploration Results, Mineral Resources or Mineral Reserves, and subsequently at a frequency that is appropriate to the risks, opportunities and level of work being completed (exploration, resource definition, or reserve definition) and in consideration of access to the property. The documentation should contain the date(s) that the Competent Person visited the property.

## Public Reporting - General

17. **Public Reports** are reports prepared for the purpose of informing investors or potential investors and their advisers on Exploration Results, Mineral Resources or Mineral Reserves. They include, but are not limited to annual and quarterly company reports, press releases, information memoranda, technical papers, website postings, and public presentations.
18. Public Reports dealing with Exploration Results, Mineral Resources and/or Mineral Reserves must only use the terms set out in Figure 1.

*Reports are prepared for different reasons and may contain more or less detail according to their intended purpose and readership. The contents of a report should be determined by the Competent Person to be appropriate for its use on the basis of relevance (materiality and transparency) and, where appropriate, backup documentation (such as audit reports) should be referred to or made available.*

*Public disclosure of factors and relevant assessment criteria listed in Table 1 that are most likely to affect the accuracy of estimates made in the report is required. The authors of reports should both identify and evaluate these important factors within their reports. A Mineral Resource and/or Mineral Reserve statement is a summary report of the Resource and/or Reserve estimates, and must include discussion of key assumptions used in their derivation as per the guidelines in Table 1. Mineral Resource statements must include descriptions of the assumptions made and justification for reasonable prospects for eventual economic extraction.*

*Where a particular report addresses only some of the items in Table 1, the report should disclose its limited scope and should refer to other information required for a complete evaluation of the Exploration Results, Mineral Resources and Mineral Reserves being reported. While such limited scope reports are commonly prepared as part of the overall preparation of an evaluation, such reports may contain information warranting public disclosure independent of the results of other studies, and the authors of such reports should be aware of their responsibilities with respect to public disclosure with regard to the principles of transparency, materiality and competency.*

*Demonstrating feasibility of economic extraction is not required for reporting Exploration Results or Mineral Resources. However, Mineral Resources must be supported by reasonable prospects of eventual economic extraction. Particular attention should be given to all relevant information that increases or decreases the reasonable prospects that the project will result in eventual economic extraction.*

*An entity may disclose an historical estimate of Mineral Resources and Mineral Reserves, using the original terminology, if the disclosure:*

- identifies the source and date of the historical estimate, including any existing technical report,*
- comments on the relevance and reliability of the historical estimate,*
- to the extent known, provides the key assumptions, parameters, and methods used to prepare the historical estimate,*
- states whether the historical estimate uses categories other than those set out in Figure 1 and if so includes an explanation of differences,*
- includes any more recent estimates or data available to the entity,*



- *comments on what work needs to be done to upgrade or verify the historical estimate as current Mineral Resources or Mineral Reserves, and*
- *states with equal prominence that a Competent Person has not done sufficient work to classify the historical estimate as current Mineral Resources or Mineral Reserves and that the entity is not treating the historical estimate as current Mineral Resources or Mineral Reserves.*

19. Public Reports concerning an entity's Exploration Results, Mineral Resources or Mineral Reserves must include effective dates. All reports must include a description of the style and nature of mineralization, and reports based on more advanced technical studies should include descriptions of geological interpretation, sampling and assaying, interpolation methods utilized, mining and processing methods, as well as discussion of other Modifying Factor assumptions and results.

20. An entity must disclose relevant information concerning the status and characteristics of a mineral deposit which could materially influence the entity's value. To meet disclosure obligations, an entity must promptly report any material changes in its Mineral Resources or Mineral Reserves.

21. Reports must contain an assessment of the critical risks to geometry, grade/quality, tonnage, or contained metal or product in the estimated Mineral Resources or Mineral Reserves. Risks associated with uncertainties in the Modifying Factors must also be identified. Opportunities for expanding the Mineral Resource or Mineral Reserves or for reducing the uncertainty of the Modifying Factors must also be discussed.

22. An entity must review and publicly report on its Mineral Resources and Mineral Reserves at least annually.

*Reviews of Mineral Resources and Mineral Reserves should include the relevance of current technical and economic conditions compared to those which may have been applied when the Mineral Resources and Mineral Reserves were estimated. Relevant Assessment Criteria listed in Table 1 and Modifying Factors should be reviewed. If necessary, technical and economic studies including Pre-feasibility and Feasibility studies should be updated when there are material changes of a long-term nature (see Clause 38 below).*

23. The reporting of Mineral Resources or Mineral Reserves for polymetallic deposits in terms of metal equivalents (a single equivalent grade of one major metal) is strongly discouraged. If used, the report must show details of all material factors needed to calculate the contribution of each metal constituent. The following minimum information must be reported in reference to metal equivalents:

- individual grades for all metals included in the metal equivalent calculation,
- commodity prices (Clause 51) for all metals, adjusted for smelter/refinery terms,
- metallurgical recoveries for all metals and discussion of the basis on which the recoveries are derived and used (metallurgical test work, detailed mineralogy, similar deposits, etc.),



- a clear statement that it is the entity’s opinion that all the elements included in the metal equivalents calculation have a reasonable potential to be recovered and sold,
- any other relevant parameters useful for understanding the equivalent grade, and
- the calculation formula used.

*In most circumstances, the metal chosen for reporting on an equivalent basis should be the one that contributes most to the metal equivalent calculation. If this is not the case, a clear explanation of the logic of choosing another metal must be included in the report.*

*Reporting on the basis of metal equivalents is never appropriate if metallurgical recovery information is not available or able to be estimated with reasonable confidence. For many projects at the Exploration Results stage, metallurgical recovery information may not be available or able to be estimated with reasonable confidence.*

24. Mineral Resource reports must specify one or more of the classes of “Inferred”, “Indicated” and “Measured”. Reports must not contain Inferred Mineral Resource figures combined with either of the other two classes. The Measured and Indicated classes can be combined only if also reported separately. A Mineral Resource must not be reported in terms of contained metal or product unless corresponding tonnage and grade figures are also presented. When Mineral Resource figures are reported exclusive of Mineral Reserves, the Mineral Resources must not be aggregated with Mineral Reserve figures.
25. Mineral Reserve reports must specify one or both of the classes of “Proven” and “Probable”. Reports that combine Proven and Probable Mineral Reserve figures must provide estimates for each class. Reports must not present contained or recovered metal figures unless corresponding tonnage and grade figures are also presented.
26. Mineral Resource and Mineral Reserve estimates in some cases are reported after adjustment by cutting of high grades, the application of Modifying Factors such as dilution, ore loss, mine or mill recovery and “call factors”. If Mineral Resource and Mineral Reserve estimates, or the data on which the estimates are based, are materially adjusted or modified for the purpose of making the estimate, this should be clearly stated in a public report. The nature of the adjustment or modification should be clearly described and quantified if possible.
27. Public reporting of specific tonnage and grade estimates other than Mineral Resources and Mineral Reserves is not permitted under the Guide. As stated in Clause 30, for more preliminary estimates such as target definition, only ranges of estimated tonnages and grades are allowed and are to be accompanied by sufficient transparent justifying and qualifying language.

*Other estimates may be useful for an entity in its internal calculations and evaluation processes, but their inclusion in public reports could cause confusion and is not permitted.*

28. Mineral Resource and Mineral Reserve estimates are not precise calculations. Tonnage and grade figures in reports should be expressed so as to convey the order of accuracy of the estimates by rounding off to appropriately significant figures.

*To emphasize the imprecise nature of a Mineral Resource or Mineral Reserve, the final result should always be referred to as an estimate based on information available at the time of estimation, not a calculation.*

*Competent Persons are encouraged, where appropriate, to discuss the relative accuracy and/or confidence of the Mineral Resource and Mineral Reserve estimates. The statement should specify whether it relates to overall or local estimates, and, if local, state the applicable tonnage or volume. Where a statement of the relative accuracy and/or confidence is not possible, a qualitative discussion of the uncertainties should be provided.*

*Depending on the accuracy of the estimate, rounding to the second or third significant figure should be sufficient. For example, 10,863,425 tons at 8.23 per cent zinc could be stated as 11 million tons at 8.2 percent or 10.9 million tons at 8.23 percent zinc.*

29. In addition to the various metals and other commodities that are being reported, the presence of material deleterious elements, contaminants or minerals that may affect workplace safety and environmental conditions, and processing and/or marketing of the saleable product must be disclosed to the extent known. Examples of such deleterious elements and minerals may include (but are not limited to) talc, asbestos, iron, arsenic, antimony, fluorine, mercury, thorium, uranium, beryllium, bismuth, cadmium, cobalt, chromium and lead (where these are not a primary focus of exploration). In addition to these elements, the presence, or potential presence, of significant amounts of unwanted potential acid-generating iron sulfides (pyrite, pyrrhotite) and iron sulfates in the product or waste materials should be reported if direct test work has been completed.

## Exploration Targets

30. An **Exploration Target** is a statement or estimate of the exploration potential of a mineral deposit in a defined geological setting where the statement or estimate, quoted as a range of tons and a range of grade or quality, relates to mineralization for which there has been insufficient exploration to estimate Mineral Resources.

*It is recognized that it is common practice for an entity to comment on and discuss its exploration strategy in terms of target size and type. Any such information relating to exploration target size must not be expressed in a way that could be confused as an estimate of Mineral Resources or Mineral Reserves. Any statement referring to potential quantity and grade of the target must be expressed as ranges and must include a detailed explanation of the basis for the assumptions made and procedures used to estimate ranges of tonnage and grade or quality, and extent. There must also be a proximate statement that the potential quantity and grade is conceptual in nature, that there has been insufficient exploration to define a Mineral Resource, and that it is uncertain if further exploration will result in the determination of a Mineral Resource. The detailed explanation of the basis for the statement of a target*

*must specifically discuss the geological setting and exploration strategy, exploration activity already completed and the presence of or lack of the following attributes:*

- *mineralized outcrops and assays,*
- *surface geochemical and physical sampling results,*
- *surface and subsurface geophysical survey results, and*
- *drill holes, test pits, and underground workings.*

*Proposed exploration activities designed to test the validity of an exploration target should be detailed and include the timeframe within which they are expected to be completed.*

## **Exploration Results**

### **31. Exploration Results include data and information generated by mineral exploration programs that might be of use to investors but which do not form part of a declaration of Mineral Resources or Mineral Reserves.**

Exploration Results may or may not be part of a formal declaration of Mineral Resources and Mineral Reserves.

*The reporting of such information is common in the early stages of exploration when the quantity of data available is generally not sufficient to allow any reasonable estimates of Mineral Resources.*

*If an entity reports Exploration Results in relation to mineralization not classified as a Mineral Resource or a Mineral Reserve, then estimates of tonnages and average grade or quality must not be assigned to the mineralization unless the situation is covered in Clause 30 above, and then only in strict accordance with the requirements of that clause.*

*Examples of Exploration Results include results of outcrop sampling, geological mapping, assays of drill hole intercepts, geochemical and physical test results, and geophysical survey results.*

### **32. Public Reports of Exploration Results must contain sufficient information to allow a considered and balanced judgment of their significance. Reports must include relevant information such as exploration context, type and method of sampling, sampling intervals and methods, relevant sample locations, distribution, dimensions and relative location of all relevant assay and physical data, data aggregation methods, land tenure status plus information on any of the other criteria listed in Table 1 that are material to such an assessment.**

Public reports of Exploration Results must not be presented so as to unreasonably imply that potentially economic mineralization has been discovered. If appropriate to the deposit type, true widths of mineralized zones must be reported. Where true widths cannot be reported, an appropriate qualification must be included in the public report.

*Where assay and analytical results are reported, they must be reported using one of the following methods, selected as the most appropriate by the Competent Person:*

- either by listing all results, along with sample intervals (or size, in the case of bulk samples), or
- by reporting weighted average grades of mineralized zones, indicating clearly how the grades were calculated.

*Clear diagrams and maps designed to represent the geological context must be included in the report. These must include, but not be limited to a plan view of material drill hole collar locations with geological features and appropriate sectional views including these geologic boundaries. If drill holes are not considered to be material by the Competent Person, this must be explained in the Public Report.*

*Reporting of selected information such as isolated assays, isolated drill holes, assays of panned concentrates or supergene enriched soils or surface samples, without placing them in perspective in the report is unacceptable.*

*Table 1 contains a checklist and guideline to which those preparing reports on Exploration Results should refer. The checklist is not prescriptive and, as always transparency and materiality are overriding principles, which determine what information should be reported publicly.*

## **Mineral Resources**

33. A **Mineral Resource** is a concentration or occurrence of solid material of economic interest in or on the Earth's crust in such form, grade or quality and quantity that there are reasonable prospects for eventual economic extraction. The location, quantity, grade or quality, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.

Mineral Resources are subdivided, in order of increasing geoscientific confidence, into Inferred, Indicated and Measured classes.

Portions of a deposit that do not have reasonable prospects for eventual economic extraction must not be included in a Mineral Resource.

*The term "Mineral Resource" encompasses mineralization (including, in certain instances, dumps and tailings) which has been identified within reasonable spatial limits and estimated through exploration and sampling and within which Mineral Reserves may be defined by the detailed consideration and application of Modifying Factors. Mineral Resources are based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes.*

*In some cases both grade and quality are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. An example would be nickel and the silica/magnesia ratio in lateritic nickel deposits.*

*The term "reasonable prospects for eventual economic extraction" implies a judgment (albeit preliminary) by the Competent Person with respect to the technical and economic factors likely to influence the prospect of economic extraction, including the approximate mining parameters, such as dilution, mining recovery, and minimum mining thickness. In other words, a Mineral Resource is not an inventory of all mineralization drilled or sampled, regardless of cut-off grade, likely mining dimensions, location, or continuity; rather it is a realistic estimate of mineralization which, under assumed and justifiable technical and economic conditions, might become economically extractable. Portions of a*

deposit that do not have potential for eventual economic extraction, or which contain significant amounts of deleterious elements/minerals for which adequate test work has not been carried out, cannot be included.

The term “reasonable prospects” implies that Measured, Indicated, and Inferred Mineral Resources are constrained within pit shells for surface mining methods and constrained to coherent zones for underground extraction, both of which support mining, processing and future development cost estimates. A deposit model is required, which may be a computer-generated block model or a model based on maps, plans or sections. If necessary, viable beneficiation process(es) must be identified to meet the criteria for reasonable prospects. Economic criteria should be applied in like manner to all classes of Mineral Resources (Measured, Indicated and Inferred). All material assumptions made in determining the reasonable prospects for eventual economic extraction must be documented and justified.

Interpretation of the word “eventual” in this context may vary depending on the commodity or mineral involved. For example, for some coal, iron ore, bauxite and other bulk minerals or commodities, it may be reasonable to envisage eventual economic extraction as covering time periods in excess of 50 years. For many smaller deposits, application of the concept would normally be restricted to perhaps 10-15 years and frequently to much shorter periods of time. Interpretation and judgement of the word “eventual” is the responsibility of the Competent Person.

Commodity prices used in Mineral Resource reporting should be based on a reasonable and supportable range of commodity prices. If prices used for Mineral Resource estimation differ from those used for Mineral Reserve reporting, these differences should be documented and justified.

Mineralized stope fill, mineralized in situ remnants, shaft and stope pillars left for ground support purposes, and stockpiles of mineralized material, old dumps and tailings can be considered when reporting Mineral Resources provided they have reasonable prospects for eventual economic extraction.

When publishing Mineral Resource estimates, a statement should be made that, while the estimate of Mineral Resources is based on the Competent Person’s judgment that there are reasonable prospects for eventual economic extraction, no assurance can be given that Mineral Resources will eventually convert to Mineral Reserves. Consideration should also be given to publication of the reasons why a reported Mineral Resource was not reported as a Mineral Reserve, e.g. capital requirement to develop the project may not have been approved.

Certain reports (e.g., inventory reports, exploration reports to a government and other similar reports not intended for providing information for investment purposes) may require full disclosure of all mineralization, including some material that does not have reasonable prospects for eventual economic extraction. Such estimates of mineralization would not qualify as Mineral Resources by this definition and therefore are not reportable publicly.

The terms “Coal Resources” and Mineral Resources can be used interchangeably where it is customary to do so, for coal deposits.

Table 1 contains a checklist and guidelines to which those preparing reports on Mineral Resources should refer (in particular, uncertainties with respect to geological interpretations, the geometry of mineralization boundaries, sampling and assay data, and estimates of grade and tonnage). The checklist is not prescriptive and, as always transparency and materiality are overriding principles which determine what information should be reported publicly.



34. An **Inferred Mineral Resource** is that part of a Mineral Resource for which quantity and grade or quality are estimated on the basis of limited geological evidence and sampling. Geological evidence is sufficient to imply but not verify geological and grade or quality continuity.

**An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to a Mineral Reserve. It is reasonably expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.**

*The "Inferred" class is intended to cover situations where a mineral concentration or occurrence has been identified and limited measurements and sampling completed, but the data are sufficient to allow the inference of geological (and grade or quality) continuity. An Inferred Mineral Resource can be based on interpolation between widely spaced data where there is reason to expect geological continuity of mineralization, but not excessively extrapolated from the data. The proportion of extrapolated Mineral Resource outside the nominal drill grid spacing must be limited and disclosed.*

*Confidence in the estimate is sufficient to allow the application of assumed but not verified technical and economic parameters for conceptual planning. However, confidence is often not sufficient to allow the results of the application of these technical and economic parameters to be used for incremental planning and production scheduling. For this reason, there is no direct link from an Inferred Mineral Resource to any class of Mineral Reserves (see Figure 1). Caution should be exercised if Inferred Mineral Resources are considered in technical and/or economic studies. This class of material should not be used to economically support Mineral Reserves.*

*Inferred Mineral Resources should exclude material for which there are insufficient data to allow the inference of geological and grade continuity. Inferred Mineral Resources are intended to be sufficiently defined that their overall tonnages, grades and mineral contents can be estimated with a reasonable level of confidence.*

35. An **Indicated Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics are estimated with sufficient confidence to allow the application of Modifying Factors in sufficient detail to support mine planning and evaluation of the economic viability of the deposit. Geological evidence is derived from adequately detailed and reliable exploration, sampling and testing and is sufficient to assume geological and grade or quality continuity between points of observation.

**An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource and may only be converted to a Probable Mineral Reserve.**

*A deposit or part of 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 determining the Mineral Resource to confidently interpret the geological framework and to assume physical continuity of mineralization. Confidence in the estimate is sufficient to allow the appropriate application of technical and economic parameters to prepare incremental mine plans (typically annual or phases) and*

*production schedules and to enable an evaluation of economic viability. Overall confidence in the estimates is high, while local confidence is reasonable. The Competent Person must recognize the importance of the Indicated Mineral Resource class to the advancement of the feasibility of the project. An Indicated Mineral Resource estimate is of sufficient quality to support detailed technical and economic studies leading to Probable Mineral Reserves which can serve as the basis for major development decisions.*

*In assessing continuity between points of observation, the Competent Person must consider the likely cut-off grade and geometric limits that would be used to prepare incremental (e.g. annual or phases) mine plans.*

36. A **Measured Mineral Resource** is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, and physical characteristics are estimated with confidence sufficient to allow the application of Modifying Factors to support detailed mine planning and final evaluation of the economic viability of the deposit. Geological evidence is derived from detailed and reliable exploration, sampling and testing and is sufficient to confirm geological and grade or quality continuity between points of observation.

**A Measured Mineral Resource has a higher level of confidence than that applying to either an Indicated Mineral Resource or an Inferred Mineral Resource. It may be converted to a Proven Mineral Reserve or to a Probable Mineral Reserve.**

*A deposit or part of 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 determining the Mineral Resource, that the tonnage, grade, and geometry of production planning and scheduling increments can be estimated within close limits and that any variation from the estimate would not significantly affect potential economic viability of individual increments (typically quarterly or smaller). This class requires a high level of confidence in, and understanding of, the geology and controls of the mineral deposit. A Measured Mineral Resource estimate is of sufficient quality to support detailed technical and economic studies leading to Mineral Reserves which can serve as the basis for major development decisions with no additional sampling or other geological definition required to support these decisions.*

37. The choice of the appropriate class of Mineral Resource depends upon the quantity, distribution and quality of data available, the level of confidence that attaches to those data, and the specific details of the estimation methodology applied. The appropriate Mineral Resource class must be determined by the Competent Person.

*Mineral Resource classification is a matter for skilled judgment, and the Competent Person should take into account those items in Table 1 which relate to confidence in Mineral Resource estimation.*

*In deciding between Measured Mineral Resource and Indicated Mineral Resource, the Competent Person may find it useful to consider, in addition to the phrases relating to geological and grade continuity in Clauses 35 and 36, (i) the phrase in the guideline to the definition for Measured Mineral Resource: "... any variation from the estimate would not significantly affect potential economic viability of individual increments (typically quarterly or smaller)" and (ii) the guideline to the definition for Indicated Mineral Resource in Clause 35 "Confidence in the estimate is sufficient to allow the*



*appropriate application of technical and economic parameters to prepare incremental plans (typically annual or phases) and production schedules and to enable an evaluation of economic viability”, which contrasts with the guideline to the definition for Inferred Mineral Resource in Clause 34: “Confidence in the estimate is sufficient to allow the application of assumed but not verified technical and economic parameters for conceptual planning”.*

*Where deleterious elements/minerals are present that may have an impact on application of the Modifying Factors; their impact must be taken into account when classifying the Mineral Resources as Inferred, Indicated, or Measured.*

38. The words “ore” and “reserves” must not be used in stating Mineral Resource estimates as the terms imply that technical feasibility and economic viability have been demonstrated and are only appropriate when all relevant mining, processing, metallurgical, economic, marketing, legal, environmental, infrastructure, social and governmental factors have been considered. Reports and statements should continue to refer to the appropriate class or classes of Mineral Resources until technical feasibility and economic viability have been established by appropriate studies. If re-evaluation indicates that the Mineral Reserves are no longer viable, the Mineral Reserves must be reclassified as Mineral Resources or removed from Mineral Resource/Mineral Reserve statements altogether.

*It is not intended that reclassification 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 decrease expected to be of short duration, mine emergency of a non-permanent nature, transport strike, etc.*

## **Mineral Reserves**

39. A **Mineral Reserve** is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined or extracted and is defined by appropriate level of study at Pre-Feasibility, Feasibility, or equivalent, that includes the application of Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified. The reference point at which Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported.

*Mineral Reserves are those portions of Mineral Resources that result in an estimated tonnage and grade which, in the opinion of the Competent Person making the estimates, can be the basis of an economically viable project after taking account of all relevant Modifying Factors. Mineral Reserves are subdivided in order of increasing confidence into Probable Mineral Reserves and Proven Mineral Reserves. The term “economically viable” implies that extraction of the Mineral Reserve has been established or analytically demonstrated (e.g. such as by a cash flow in the report) to be viable and*

*justifiable under reasonable investment and market assumptions. The term Mineral Reserve need not necessarily 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 timely approvals.*

*This guidance does not imply that an economic operation must have Proven Mineral Reserves. Situations arise where Probable Mineral Reserves alone may be sufficient to justify development and operation.*

*At operating properties (brownfield projects) an economic life of mine plan can be considered as the appropriate level of study for the reporting of Mineral Reserves, unless those reserves require significant new infrastructure, such as a new shaft or a new processing method and associated plant.*

*The terms "Ore Reserves" and "Mineral Reserves" can be used interchangeably where it is customary to do so, usually for metallic deposits and some industrial minerals. The terms "Coal Reserves" and "Mineral Reserves" can be used interchangeably where it is customary to do so, for coal deposits.*

*Table 1 contains a checklist and guidelines to which those preparing reports on Mineral Reserves should refer. The checklist is not prescriptive and, as always transparency and materiality are overriding principles that determine what information should be reported publicly.*

- 40. A Probable Mineral Reserve is the economically mineable part of an Indicated and, in some circumstances, a Measured Mineral Resource. The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proven Mineral Reserve.**

*When the confidence in the Modifying Factor(s) becomes lower, a Measured Mineral Resource may be reclassified as a Probable Mineral Reserve.*

*A Probable Mineral Reserve has a lower level of confidence than a Proven Mineral Reserve but is sufficient to serve as the basis for a decision to develop the deposit.*

- 41. A Proven Mineral Reserve is the economically mineable part of a Measured Mineral Resource. A Proven Mineral Reserve implies a high degree of confidence in the Modifying Factors.**

*A Proven Mineral Reserve represents the highest degree of confidence in the estimate. The style of mineralization or other factors could mean that a Proven Mineral Reserve cannot be demonstrated in some deposits. Competent Persons should be aware of the consequences of declaring a Proven Mineral Reserve before satisfying themselves that all of the relevant Mineral Resource parameters and Modifying Factors have been established at a similarly high level of confidence. Subsequent retraction of a publicly reported Proven Mineral Reserve can lead to investor uncertainty and lack of corporate confidence.*

*Issues with the confidence in the Modifying Factors could mean that some Measured Mineral Resources may not be converted to a Proven Mineral Reserve.*

- 42. The choice of the appropriate class of Mineral Reserve is determined primarily by the classification of the corresponding Mineral Resource and after considering any uncertainties in the Modifying Factors. Allocation to the appropriate class must be made by the Competent Person.**

*The Guide provides for a direct relationship between Indicated Mineral Resources and Probable Mineral Reserves and between Measured Mineral Resources and Proven Mineral Reserves. In other words, the level of geoscientific confidence for Probable Mineral Reserves is at least as high as that required for the determination of Indicated Mineral Resources, and the level of geoscientific confidence for Proven Reserves is the same as that required for the determination of Measured Mineral Resources.*

*The Guide provides for a two-way relationship between Measured Mineral Resources and Probable Mineral Reserves. This is to cover the situation where uncertainties associated with any of the Modifying Factors considered when converting Mineral Resources to Mineral Reserves may result in there being a lower degree of confidence in the Mineral Reserves than in the corresponding Mineral Resources. Such a conversion would not imply a reduction in the level of geoscientific knowledge or confidence.*

*If the uncertainties in the Modifying Factors that prevented the Measured Mineral Resource being converted to a Proven Mineral Reserve are removed, then the Measured Mineral Resource may be converted to a Proven Mineral Reserve. No amount of confidence in the Modifying Factors for conversion of a Mineral Resource into a Mineral Reserve can override the upper level of confidence which exists in the Mineral Resource. Under no circumstances can an Indicated Mineral Resource be converted to a Proven Mineral Reserve, unless new information first justifies conversion to a Measured Mineral Resource. Under no circumstances can an Inferred Mineral Resource be converted to a Mineral Reserve unless first converted to an Indicated or Measured Mineral Resource.*

43. Mineral Reserve reports must specify one or both of the classes of “Proven” and “Probable”. Reports that combine Proven and Probable Mineral Reserve figures must provide estimates for each class as well. When reporting a Mineral Reserve, tonnages, grades and mineral or metal contents must be reported after taking into account mining loss and mining dilution. Saleable contents including the point of sale (reference point) can be reported after taking into account processing recoveries. If processing recoveries are not taken into account, the percentage expected to be recovered or lost during processing must be reported.
44. In situations in which figures for both Mineral Resources and Mineral Reserves are reported, the Public Report must include a statement that clearly indicates whether the Mineral Resources are inclusive of, or exclusive of those Mineral Resources that have been modified to produce Mineral Reserves.

*For transparency, it is preferred that Mineral Resources be reported as exclusive of Mineral Reserves. However, in some situations, there are reasons for reporting Mineral Resources inclusive of Mineral Reserves. It must be made clear which form of reporting has been adopted. Appropriate forms of clarifying statements may be:*

*“The Measured and Indicated Mineral Resources are exclusive of (in addition to) Mineral Reserves.”  
OR “The Measured and Indicated Mineral Resources are inclusive of those modified to produce Mineral Reserves.”*

*In the latter instance, if any portions of Measured and Indicated Mineral Resources have not been modified to produce Mineral Reserves, the relevant details (primarily grade and tonnage) of these unmodified Mineral Resources should be included in the report. This is to assist the reader of the*

*report in making a judgment of the likelihood of the unmodified Measured and Indicated Mineral Resources eventually being converted to Mineral Reserves.*

*Mineral Resources (whether inclusive or exclusive of Mineral Reserves) must be tabulated separately from Mineral Reserves. If Mineral Resources are reported exclusive of Mineral Reserves, they must not be aggregated because the resulting total will be misleading and may be misunderstood or, more seriously, misused to give a false impression of the prospectivity of a project.*

45. Public reporting of a Mineral Reserve will normally indicate an entity has intent to mine, or that a tangible asset has been defined for potential sale or lease.

*Where Mineral Reserves have been defined but are scheduled to be mined at a date some distance in the future, sufficient assurance should be available on an annual basis that, in the judgment of the Competent Person, and endorsed by the reporting entity, that application of the Modifying Factors can still support the publicly reported reserves.*

46. A Reserve Test is conducted at least annually for mineral properties to verify that the future undiscounted cash flow from reserves is positive. The cash flow ignores all sunk costs and only considers future operating (including royalties and severance taxes) and closure expenses as well as future capital costs. The Reserve Test uses commodity price(s) as discussed in Clause 52 and un-inflated costs.

*If the Reserve Test has a negative cash flow, part of the higher cost sections in the Mineral Reserve estimate will need to be eliminated to achieve positive cash flow. If a positive cash flow cannot be achieved, a Mineral Reserve can no longer be reported.*

## Technical Studies

47. Study definitions are included in the Guide to provide clarity on what is expected when reporting using the terms “Scoping Study”, “Pre-Feasibility Study”, or “Feasibility Study”. The definition of a Scoping Study has been included because of the common usage of the term in Public Reports.

*Attention is drawn to the requirement for a Pre-Feasibility Study or a Feasibility Study to have been completed for the Public Reporting of a Mineral Reserve in Clause 39. A Mineral Reserve must not be reported based on the completion of a Scoping Study. Table 1 shows typical assessment criteria for Technical Studies. Table 2 shows the range of accuracy of cost estimates for Technical Studies.*

*Formal assessment of relevant criteria, as listed in Tables 1 and 2, is required in order to determine how much available Measured and Indicated Mineral Resource may be converted to Mineral Reserves.*

48. A **Scoping Study** is an order of magnitude technical and economic study of the potential viability of Mineral Resources that includes appropriate assessments of realistically assumed Modifying Factors together with any other relevant operational factors that are necessary to demonstrate at the time of reporting that progress to a Pre-Feasibility Study can be reasonably justified.

*Scoping Studies are commonly early economic evaluations of a project and may be based on a combination of directly gathered project data together with assumptions sourced from similar deposits or operations to the case envisaged. Scoping Studies are also commonly used internally by entities for comparative and planning purposes. Reporting the general results of a Scoping Study needs to be undertaken with care and should include appropriate cautionary statements to ensure there is no implication that Mineral Reserves have been established or that economic development is assured. In this regard it may be appropriate to indicate the Mineral Resource inputs to the Scoping Study and the processes applied. If the Scoping Study is partially or wholly supported by Inferred Mineral Resources, this must be clearly stated, and a cautionary statement must be included. A Scoping Study must not be used as a basis for estimation of Mineral Reserves.*

*Scoping Studies also have been called Preliminary Economic Assessments or Conceptual Studies. "Order of magnitude" as used herein typically implies that cost estimates will have an accuracy level of approximately  $\pm 50\%$  (see Table 2).*

49. A **Pre-Feasibility Study** is a comprehensive study that may include a range of options for the technical and economic viability of a mineral project that has advanced to a stage where a preferred mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, is established and an effective method of mineral processing is determined. It includes a financial analysis based on the Modifying Factors and the evaluation of any other relevant factors which are sufficient for a Competent Person, acting reasonably, to determine if all or part of the Mineral Resource may be converted to a Mineral Reserve at the time of reporting. A Pre-Feasibility Study is at a lower confidence level than a Feasibility Study.

*A Pre-Feasibility Study will consider the application and description of all Modifying Factors to demonstrate economic viability of Measured and Indicated Mineral Resources to support declaration of a Mineral Reserve. Inferred Mineral Resources must be excluded from demonstration of economic viability in support of declaration of a Mineral Reserve. A Pre-Feasibility Study will identify the preferred mining, processing, and infrastructure requirements and capacities, but may not have finalized these matters. Assessments of environmental and socio-economic impacts and requirements will be well advanced (refer to Table 1, Articles G and H). The Pre-Feasibility Study will highlight areas that require further refinement within the final study stage.*

50. A **Feasibility Study** is a comprehensive technical and economic study of the selected development option for a mineral project that includes appropriately detailed assessments of applicable Modifying Factors together with any other relevant operational factors and detailed financial analysis that are necessary to demonstrate at the time of reporting that extraction is reasonably justified (economically mineable). The results of the study may reasonably serve as the basis for a final decision by a proponent or financial institution to proceed with, or finance, the development of the project. The confidence level of the study will be higher than that of a Pre-Feasibility Study.

*A Feasibility Study is of a higher degree of accuracy than a Pre-feasibility Study and would normally contain mining, infrastructure, and process designs completed with sufficient rigor to serve as the basis for an investment decision or to support project financing. The Feasibility Study will contain the*



*application and description of relevant criteria (as outlined in Tables 1 and 2) in a more detailed form or with more certainty than the Pre-feasibility Study, and will address detailed mining schedules, construction and production ramp up, and project execution plans.*

*Terms such as "Full, Final, Comprehensive, Bankable, Definitive" Feasibility Study are noted as being equivalent to a Feasibility Study.*

*The Guide does not require that a Feasibility Study has been undertaken to convert Mineral Resources to Mineral Reserves, but it does require that at least a Pre-feasibility Study will have determined that the mining project is technically and economically feasible, and that relevant Modifying Factors have been considered for such a conversion. However, there may be some projects for which the Competent Person determines that a Feasibility Study, instead of a Pre-Feasibility Study, is required before the Mineral Resources may be converted to Mineral Reserves due to uncertainties in the Modifying Factors.*

## **Commodity Pricing and Marketing**

51. Commodity prices and sales volume expectations used for the determination of Mineral Resources and Mineral Reserves should be based on forward-looking estimates reflecting management's reasonable and supportable short- and long-term expectations as supported by all available evidence, which may include consensus forecasts. The basis for the selected prices and sales volumes must be justified and supported by appropriate documentation. The Competent Person must ascertain that these prices and volumes are consistent with historical prices or with sales agreements and marketing determinations.
52. For current mining operations, the price and volume profile used for Mineral Resources and Mineral Reserve estimation can reflect current market conditions for short-term forecasts, while trending with time upward or downward toward the long-term price and volume estimates based on management's expectations. For undeveloped Mineral Reserves, management should use their long-term price and volume expectations.
53. For commodities sold under existing contracts, Mineral Resources and Mineral Reserves should be determined based on contract terms. For Mineral Reserves whose production would extend beyond the quantities specified in existing contracts, reasonable and supportable assumptions should be made to determine the likelihood of contract renewal and prices applicable for the estimation and reporting of these Mineral Resources and Mineral Reserves.
54. To demonstrate the economic feasibility of a Mineral Reserve, the estimated prices, combined with other engineering parameters and Modifying Factors, must be applied to only Measured and Indicated Mineral Resources.

*Mineral Reserves are the economically mineable part of a Measured or Indicated Mineral Resource; hence, appropriate assessments must demonstrate at the time of reporting that extraction is reasonably*

*justified. This requires that assumptions are made concerning the price of the commodity or product that will be sold when the mine is in production.*

*Mineral Reserves are estimated and published to supply information to investors concerning the value of the deposit and the risk which may be associated with its development. Mineral Reserves are used by management, in conjunction with Mineral Resources, for short-term, long-term and strategic planning. They play a critical role in accounting, including impairment testing, fair value accounting, calculation of depreciation, depletion and accumulated retirement obligation provision rates. To supply investors with information which is consistent with management's plans and financial reporting, commodity prices used for the determination of Mineral Reserves should be based on forward-looking estimates reflecting management's reasonable expectations as supported by all available evidence.*

*Most commodities, whether sold using publicly quoted prices (e.g., base metals and precious metals) or under long term contract (e.g., coal and iron ore), experience long-term price cycles. Price expectations should reflect current prices as well as long-term trends. Overly optimistic or pessimistic price expectations could result in significant over or underestimation of Mineral Reserves. It is the responsibility of management and the Competent Person to determine whether the prices used for Mineral Reserve estimation are reasonable and supportable, given all available information.*

*During periods of low prices, a mining company may choose to temporarily curtail operations and conserve the asset until prices recover. When such actions are taken, this information must be publicly disclosed. In such circumstances, previously published Mineral Reserves may not have to be written off, provided, in the opinion of management and the Competent Person, higher future prices can be reasonably and supportably assumed, and it can reasonably be expected that operations will be resumed..*

*The documentation supporting management's expectations should include: comparison of prices with historical and current prices and forward curves, contracts and market considerations, currency exchange rates where applicable, third party sources, and supplemental information.*

55. Public disclosure of prices used for Mineral Reserve estimation is required except in the case of exemptions discussed here. It is recognized that in some cases, such as when a product is sold under long term contract, the terms of which must be kept confidential, there can be valid commercial reasons for non-disclosure of prices. There are circumstances where disclosure of long term price assumptions used for business planning and Mineral Reserve reporting can be detrimental to the entity and the investors, such as when bidding for sales contracts or property acquisitions. If prices are not published, the reasons must be documented. Supporting documentation may be treated as confidential but should be available for review by auditors or regulators when required. Whether or not commodity prices used to estimate Mineral Reserves are published, the overall methodology used to determine those prices should be disclosed. Such disclosure should be in a form which helps investors determine whether, in their own opinion, prices used represent reasonable views of future prices.

## **Permitting and Legal Requirements**

56. For a mineral deposit to be considered a Mineral Reserve, it is required that legally enforceable mineral title sufficient to have access to the mineral rights for exploration,



development and extraction, is controlled by the reporting entity at the time of determination. If the reporting entity is leasing or sub-leasing the mineral, the lease or sub-lease should be from an entity which has control of the necessary mineral titles. There must be no known material obstacles to mining, such as those which could cause shut down of mines or processing plants, or failure to get permits or social license to operate. There must be a reasonable expectation by the Competent Person, often through reliance on legal and permitting experts that all permits, ancillary rights (including water rights) and authorizations required for mining, and to the extent applicable, processing and marketing, can be obtained in a timely fashion, and maintained for ongoing operations.

*The reporting entity must complete a review of all legal and permitting requirements and document the results of this review. Local environmental laws and processes must be taken into account. To demonstrate reasonable expectation that all permits, ancillary rights and authorizations can be obtained, the reporting entity must show understanding of the procedures to be followed to obtain such permits, ancillary rights and authorizations. Demonstrating earlier success in obtaining the necessary permits can be used to document the likelihood of future success. If permits are required, but there is no defined procedure to obtain such permits, reasonable expectation of success may be difficult to support.*

*Information that materially increases or decreases the risk that the necessary legal rights or permits will be obtained must be publicly disclosed. It is recognized that the legal and permitting environment may change over time and that such changes could have an impact on Mineral Reserve estimation. If it is determined that obstacles arise or are eliminated, the Mineral Reserve estimates must be adjusted accordingly.*

*It is recognized that some permits cannot be obtained until after a Mineral Reserve has been declared. There might be sound business reasons why obtaining some permits should be postponed. It is also recognized that waiting for all permits to be on hand could result in critical information not being released to the investors in a timely fashion, and therefore it is recommended that disclosure of material information occur prior to obtaining permits as appropriate.*

*Documentation should include a brief description of the title, claim, lease or option under which the reporting entity has the right to hold or operate the property, indicating any conditions that the registrant must meet in order to obtain or retain the property. Royalty terms and clawback rights of former claim holders also must be disclosed. If held by leases or options, the expiration dates of such leases or options should be stated. If extension of leases or options will be needed to mine the Mineral Reserves, there should be reasonable expectation that such extension will be granted.*

*Information relating to this review of legal and permitting issues must be documented either in full or by reference. The information may remain confidential to the reporting entity. However, when required, it may be released to regulators or auditors on a confidential basis.*

57. If the reporting entity has title to a mineral deposit that meets all the Mineral Reserve criteria, and the reporting entity licenses, leases, or subleases the Mineral Reserves to another entity for economic consideration, the Mineral Reserves that have been licensed, leased, or subleased, must be reported by the reporting entity (the lessor) as a subset of the entity's total Mineral Reserves.

If the reporting entity has licensed, leased, or subleased Mineral Reserves from another entity, the Mineral Reserves that have been licensed, leased, or subleased, must be reported by the reporting entity (the lessee) as a subset of the entity's total Mineral Reserves.

*This requirement for additional disclosure is particularly relevant to mineral holding companies whose business is leasing mineral properties, acquiring royalty streams, or production sharing.*

## **Environmental, Social and Health and Safety Considerations**

58. Public reports should discuss environmental, social (sustainability), and health and safety impacts that are expected during development, operation and after closure. These impacts will affect employees, contractors, neighboring communities, and customers. Past achievements should be used to engage all stakeholders and to plan for continued benefits for all concerned parties.

*The Competent Person should ensure the report discusses reasonably available information on environmental, permitting, and social or community factors related to the project. Consideration should be given to include, where relevant:*

- *a summary of the results of any environmental studies and a discussion of any known environmental issues that could materially impact the issuer's ability to extract the mineral resources or mineral reserves,*
- *requirements and plans for waste and tailings disposal, site monitoring, and water management both during operations and post mine closure,*
- *project permitting requirements, the status of any permit applications, and any known requirements to post performance or reclamation bonds,*
- *a discussion of any potential social or community related requirements and plans for the project and the status of any negotiations or agreements with local communities,*
- *a discussion of mine closure (remediation and reclamation) requirements and costs, and*
- *"Conflict Minerals" should be considered and addressed.*

## **Mineralized Fill, Pillars, Low-Grade Mineralization, Stockpiles, Dumps and Tailings**

59. This clause of the Guide applies to the reporting of all potentially economic mineralized material including mineralized fill, pillars, low-grade mineralization, stockpiles, dumps, and tailings.

*For the purposes of the Guide, mineralized stope fill and stockpiles of mineralized material can be considered to be similar to in situ mineralization when reporting Mineral Resources and Mineral Reserves. Consequently the Competent Person carrying out the assessment of the fill or stockpiles must use the basis of classification outlined in the Guide. The Competent Person should make a judgment about the mineability of fill, remnants and pillars.*

*Stockpiles are defined to include both surface and underground stockpiles, including broken ore in stopes, and can include ore currently in the ore storage system. Stockpiles in the course of being processed (including leaching), if reported and of material importance, should be reported separately together with the basis for estimation. If some portion is currently sub-economic, but there is a reasonable expectation that it will become economic, then this material may be classified as a Mineral Resource. Such stockpile material may include old dumps and tailings storage facility material. If technical and economic studies have demonstrated that economic extraction could reasonably be justified under realistically assumed conditions, then the material may be classified as a Mineral Reserve.*

*Mineralized remnants, shaft pillars and mining pillars which are potentially mineable and meet the requirements of having reasonable prospects for eventual economic extraction are in situ mineralization and consequently are included in the Guide definitions of Mineral Resources and Mineral Reserves. Because processing recoveries for previously mined material (mineralized fill, stockpiles, dumps, and tailings) are usually different from those expected from un-mined in situ material, the Competent Person should make a judgment regarding the required direct sampling and test work to support processing recoveries that can be expected from these types of materials.*

*For historic tailings, surface or underground stockpiles and waste dumps, production records may not be available describing these materials in sufficient detail. In these cases, the contained grade(s) of the material must be defined by additional sampling. In some cases it may be difficult to define the grade adequately due to sampling issues. In such cases the Competent Person should use caution in defining the estimated grade and the classification of this material. For clarity of understanding, it is recommended that tonnage and grade estimates of such materials be itemized separately in Public Reports if they are of material quantity.*

*The above guidelines apply equally to low-grade in situ mineralization, sometimes referred to colloquially as “mineralized waste” or “marginal-grade material”, and often intended for stockpiling and treatment towards the end of mine life. For clarity of understanding, it is recommended that tonnage and grade estimates be itemized separately in Public Reports.*

## **Exploration Results for Coal, Coal Resources and Coal Reserves**

60. The clauses in this section of the Guide address matters that relate specifically to the Public Reporting of Mineral Resources and Mineral Reserves for coal. Coal generally is sold on the basis of product specifications and market acceptance. Such factors as quality and marketability are therefore important and should be considered carefully before declaring Coal Resources or Coal Reserves. Unless otherwise stated, all other clauses in this Guide, including Figure 1 and Tables 1 and 2, apply to Exploration Results, Exploration Targets, Mineral Resources and Mineral Reserves for coal.

*When reporting information and estimates for coal deposits, the key principles and purpose of the Guide apply and should be borne in mind. The requirements for coal are generally similar to those for other commodities with the replacement of terms such as “mineral” by “coal” and “grade” by “quality”. Because of coal-specific characteristics – including (i) geological continuity over large areas, (ii) the strategic value of controlling long-term reserves, and (iii) product pricing highly dependent on deposit location and coal quality – the most significant requirements which must be satisfied before a Coal*

*Resource or a Coal Reserve is declared are not necessarily the same for coal as they are for other minerals.*

61. The terms “Mineral Resource” and “Mineral Reserve”, and the subdivisions of these terms as illustrated on Figure 1, apply also to coal reporting, but if preferred by the reporting entity, the terms “Coal Resource” and “Coal Reserve” and the appropriate subdivisions may be substituted.

*When reporting Coal Reserves, a clear distinction must be made between reserves where mining losses have been taken into account (sometimes described as “recoverable” or “run-of-mine”) and saleable product where both mining and processing losses have been included (sometimes referred to as marketable reserves). All reserves, by definition, include mining losses and dilution, and the use of superfluous description is discouraged. In situ coal is, also by definition, a Coal Resource. For Coal Resources, the Competent Person should comment on the expected dilution and mining recovery that would occur during operations.*

62. As for all minerals, it is the responsibility of the Competent Person to determine in each particular situation which specific requirement must be satisfied before a Coal Resource or a Coal Reserve can be declared. The Competent Person should determine which evaluation criteria in Table 1 are applicable, which additional evaluation criteria should be taken into account if any, and the materiality of such criteria.

*Many criteria listed in Table 1 which may be critical to the evaluation of other mineral deposits, such as base metals or precious metals, will not apply to the evaluation of coal deposits. Such criteria as coal quality, cost to markets including transportation cost, location and quality of competing coal reserves, and ability to compete with such Coal Reserves to access the market, are important and should be carefully considered before declaring a Coal Reserve.*

*Geological similarity between neighboring coal deposits can greatly simplify demonstration of a new Coal Resource, as well as reduce the technical and economic study requirements needed to demonstrate a Coal Reserve next to an operating mine. Geological similarity must be demonstrated by means of drill holes, mapping or other deposit-specific geoscientific evidence to a suitable level of confidence required to declare Measured and/or Indicated Resources. Mere inference of the continuity of coal thickness and quality from an operating mine onto a neighboring block or property is not sufficient to declare Measured and Indicated Resources and subsequently a Proven and Probable Reserve.*

*Demonstration of geological similarity or analogy with an operating mine is usually not sufficient to demonstrate technical and economic feasibility. Factors such as access to the deposit and permitting constraints are likely to be project specific. It is the responsibility of the Competent Person to ascertain that there is sufficient information to demonstrate geological similarity and to determine which Modifying Factors must be taken into account to demonstrate technical and economic feasibility with a reasonable level of confidence.*

*When a coal deposit is scheduled to be mined at a date some distance in the future, declaration of a Coal Reserve implies reasonable expectation at the time of reporting that the necessary permits could be obtained as needed.*

*Coal reserves may be held and reported by mineral property owners or managers for their strategic asset value with the specific intent for future mining by themselves or others.*

63. Coal Reserves should be reported as saleable product (washed coal) in addition to run-of-mine coal, or as run-of-mine coal where this is the saleable product.

*For coal deposits, it is common practice to report a saleable product rather than the "as mined" product, which is traditionally regarded as the Mineral Reserve for most minerals. It is important that a clarifying statement is included to ensure that the reader is fully informed as to what is being reported and the reference point at which the sale occurs. Some coal deposits may be capable of yielding products suitable for more than one application and/or specification. If considered material by the reporting entity, such multiple products should be quantified and reported.*

64. Coal may be exempt from price disclosure recommendations made in this Guide.

*Coal is sold in a highly competitive national and international market. A credible market entry strategy must be part of coal price assumptions, and commitments from prospective buyers on price, quantities, and quality of product should support Coal Reserve statements. Price disclosure can be viewed as price signaling and interpreted as anticompetitive. For business and legal reasons, disclosure of price assumptions made when estimating Coal Resources and Coal Reserves may be detrimental to the interest of the entity. Other requirements concerning pricing which are included in the Guide are applicable to coal. This includes the requirement that prices be based on forward-looking estimates reflecting management's reasonable and supportable short- and long-term expectations, and that justification for such prices be documented.*

## **Exploration Results, Mineral Resources and Mineral Reserves for Industrial Minerals**

65. The clauses in this section of the Guide address matters that relate specifically to the Public Reporting of industrial minerals, stone and aggregates of all forms. Industrial minerals are sold as mineral products that must meet customer specifications and volume demands. As a result, establishing the market for mineral products becomes the first step in evaluating an industrial mineral property. Customer physical and chemical specifications must be met for most industrial minerals. Specialty clays, fillers and extenders may require additional health and safety testing, plant trials, and consumer marketing tests. Such factors as quality and marketability are therefore very important and should be carefully considered before declaring Mineral Reserves. Unless otherwise stated, all other clauses in this Guide, including Figure 1 and Tables 1 and 2, apply to Exploration Results, Mineral Resources and Mineral Reserves for industrial minerals.

*When reporting Exploration Results or Mineral Resource and Mineral Reserve estimates for industrial minerals, the key principles and purpose of the Guide apply and should be borne in mind. Chemical analyses may not always be relevant, and other physical and chemical quality criteria may be more applicable (e.g., volume percent mineral). If criteria such as deleterious minerals or physical properties are of more relevance than the composition of the bulk mineral itself, then they should be reported accordingly.*



*The factors underpinning the estimation of Mineral Resources and Mineral Reserves for industrial minerals are the same as those for other deposit types covered by the Guide. It may be necessary, in preparing to report a Mineral Resource or Mineral Reserve, to take particular account of certain key characteristics or qualities such as likely product specifications, proximity to markets, and present access to market or ability to obtain access to market. Material aspects should be discussed in the Public Report. The market for industrial minerals and specialty metals frequently has supply and demand in a tight balance, and there are significant barriers to market entry. Reliability of continuous supply and quality is of as much if not more importance to the buyer as price. A credible market entry strategy must be part of any commodity price assumptions for mineral resources, and commitments from prospective buyers on price, quantities, and quality of product should support mineral reserve statements.*

*For some industrial minerals, it is common practice to report the saleable product rather than the “as-mined” product, which is traditionally regarded as the Mineral Reserve for base and precious metals and other minerals. It is important that, in all situations where the saleable product is reported, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported.*

*Some industrial mineral deposits may be capable of yielding products suitable for more than one application and/or specification. If considered material by the reporting entity, such multiple products should be quantified either separately or as a percentage of the bulk deposit.*

66. With respect to industrial minerals, stone and aggregate, the Modifying Factors may be significantly more critical than geoscientific knowledge in determining Mineral Reserves. Such factors as quality, transportation, cost to markets, location and quality of competing deposits and ability to compete with such deposits to access the market, are important and should be carefully considered before declaring Mineral Resources and Mineral Reserves.
67. As a general rule, a Mineral Reserve cannot be declared unless there are reasonable expectations that all permits, ancillary rights and authorizations required for mining can be obtained and a viable market identified. For some minerals such as sand, gravel and aggregates, permitting requirements may be such that reasonable expectations can only be defined by comparison with competing reserves. When a deposit is scheduled to be mined at a date some distance in the future, declaration of a Mineral Reserve implies reasonable expectation at the time of reporting that the necessary markets and permits could be obtained when needed.
68. Industrial minerals may be exempt from price disclosure recommendations made in the guide.

*Some industrial minerals are sold in a highly competitive local, national and/or international market. For business and legal reasons, disclosure of price assumptions may be detrimental to the interest of shareholders and may not be advisable. Other requirements concerning pricing which are included in the Guide are applicable to industrial minerals. This includes the requirement that prices be based on forward-looking estimates reflecting management's reasonable and supportable short- and long-term expectations, and that justification for such prices be documented. For properties producing more than one product, a combined product revenue stream should be used for economic evaluation.*

## Exploration Results, Mineral Resources and Mineral Reserves for Diamonds

69. Clauses 69 to 73 of the Guide address matters that relate specifically to the Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves for diamonds. Unless otherwise stated, Clauses 1 to 59 of this Guide (including Figure 1) apply. Table 1, as part of the guidelines, should be considered when reporting Exploration Results, Exploration Targets, Mineral Resources and Mineral Reserves for diamonds. Diamond deposits can be subdivided into (i) igneous-hosted deposits (ii) marine and alluvial placers, and (iii) tailings and stockpiles. A combination of the particulate nature of diamonds and generally low-grade nature of diamond deposits present specific problems in sampling, estimation and development of such deposits, which are discussed in the following sections and in Table 1. The points discussed in the guidelines are not equally applicable to primary and secondary diamond deposits. For example, the use of micro-diamonds for grade estimation is not relevant in the placer environment.

*For the purposes of Public Reporting, the requirements for diamonds have some similarity to those of other commodities with the replacement of terms such as 'mineral' by 'diamond'. The term grade refers specifically to diamond content and should always be quoted in conjunction with a bottom cut-off for diamond size expressed in mm or equivalent diamond sieve. Information on diamond value (related to color, shape, clarity and size) should be quoted in conjunction with grade estimates at the same bottom cut-off. A grade estimate may be disclosed in early stage sampling using macro diamond estimation to give a global estimate of grade before an estimate of diamond value can be made.*

*Micro-diamonds typically are less than 1 mm in size and are recovered by total liberation methods applied to small samples only. Total liberation generally refers to acidization or caustic fusion of samples for micro-diamond recovery. Micro-diamond grade estimation may be used to support macro-diamond estimation once a robust micro- to macro-diamond relationship has been established.*

*Diamond grade is generally quoted in carats per tonne (cpt), carats per hundred tonnes (cpht); or in the case of offshore and some onshore alluvial deposits carats per m<sup>3</sup>, or the term "planar grade" in carats per m<sup>2</sup> may be used.*

*As used in the Guide diamond value represents the estimated producer price in US dollars per carat at a specified time for a parcel or a deposit. The term diamond price can also be used.*

*The term "quality" should not be substituted for "grade", since in diamond deposits these have distinctly separate meanings.*

70. For Public Reports dealing with diamonds it is a requirement that any reported valuation of a parcel of diamonds be accompanied by a statement verifying the source of the valuation and that the accompanying value (price) estimate is based on a report from a demonstrably reputable and qualified expert, with beyond the usual experience of a Competent Person. The timing of the valuation must be stated, and it must be clearly stated whether the reported estimated value (price) is actual or modeled and, in the latter case, how the modeling was carried out and by whom. Reports of diamonds recovered from sampling programs must provide material information



relating to the basis on which the sample was taken and the method of recovery of the diamonds. The valuation of diamonds must state the bottom cut-off of the diamond recovery process and if the diamond value includes all categories of diamonds recovered above a bottom cut-off. The bottom cut-off should coincide with that used to disclose diamond grade. Values should not be reported for parcels of micro-diamonds.

*There may be cases where valuation of macro-diamonds recovered from total liberation processes may be useful to the Competent Person and may have been used in the estimation of a modeled diamond value. If such valuations were to be disclosed then this disclosure must be done in the correct context and carefully qualified so as not to be misleading.*

*In order to demonstrate that a resource has reasonable prospects for eventual economic extraction, some appreciation of the likely stone-size frequency distribution and size-value distribution is necessary, however preliminary.*

*The stone size distribution and value of diamonds per sieve-size class are critical components in the estimation of diamond value. At an early exploration stage, sampling and delineation drilling usually will not provide the required information on diamond value, which relies initially on large diameter drilling. As a project moves beyond the conceptual stage, conventional bulk sampling such as pitting, trenching or exploratory underground development will be done. It is recognized, however, that even bulk sampling will likely not recover sufficient diamonds to establish a representative diamond value, and modeling will still be required.*

*Ideally the valuation parcel should be representative of size, shape, quality and color assortment of the diamonds in each geological unit of the resource. This representivity is rarely achieved and in most instances the diamond value used in a resource estimate is a "modeled value" which should be derived by a qualified expert. The expert should provide evidence to demonstrate the geological representivity of the value by for example, stating the proportion of carats attributed to each geological unit in the resource and in the parcel being valued or modeled.*

*It is also important to qualify whether a parcel for which value is to be publicized, is "run-of-mine", if any selection has taken place, and if the parcel has been separated into different categories e.g. gem, near-gem, industrial or by "selling mix", prior to valuation.*

71. Where Diamond Resource or Diamond Reserve grades are based on correlations between the frequency of occurrence of micro-diamonds and of commercial-size stones, this must be stated, the reliability of the procedure must be explained, and the bottom cut-off sieve-size for micro-diamonds reported. Details of the laboratory facilities used for the processing of samples and the method for recovery of micro-diamonds should also be disclosed.

Diamond grade estimation using micro-diamond sampling would not be sufficient to declare a Diamond Resource unless sufficient macro-diamonds were also recovered to enable a robust estimate of diamond value and size frequency distribution. However, in the case of a producing mine or advanced development property, where Diamond Resources have been declared and sufficient macro-diamonds have been recovered to allow estimation of diamond value, and a preliminary size-frequency distribution can be modeled, it is permissible to extrapolate diamond values and size-

frequency distribution if geological homogeneity and continuity can be demonstrated. The Competent Person must comment on the adequacy of the quantity of recovered macro-diamonds to estimate diamond value.

*Key issues in the micro-macro diamond grade modeling approach are the use of appropriate sampling protocols to ensure that dilution in the sample is sufficiently understood. The relationship between the micro- and macro-diamond portions of the total content curve (in situ size-frequency distribution) is critically affected by country rock dilution, diamond liberation, and diamond damage. The relative diamond recovery efficiencies of the sampling and subsequent mining and processing technologies must be addressed. This requirement is particularly relevant for sampling and mining marine placer deposits.*

*It is also important to understand that the diamond value and size-frequency distribution may change as additional diamonds are recovered and added to the parcel used to estimate the value and size-frequency distribution.*

72. Diamond sampling does not provide a “total” assay as with many other mineral commodities. Conventional macro-diamond sample processing will not liberate or recover all the contained diamonds, and micro-diamond sample processing only reports diamonds above a cut-off size which varies between laboratories. The relative efficiencies of micro-diamond sampling and full-scale treatment and recovery technologies must be considered, through granulometry and ore dressing studies, to derive appropriate Modifying Factors in the estimation of Diamond Reserves from Diamond Resources.

*In the case of marine placers it is common practice, during the conversion of resources to reserves, to apply mining recovery factors (based on analysis of the realized grades to estimated grades for the types and combination of sampling and mining tools used, and for the type of footwall present in the mined area).*

73. Diamond resource classification is based on Clauses 33 to 38 and on the following diamond-specific criteria:

*An Inferred Diamond Resource would be declared when the diamond parcel (the recovered stones from samples) is too small to be a reasonable representation of the full diamond assortment, Global grade and value estimates may be permissible if supported by adjacent Indicated Resources.*

*An Indicated Diamond Resource would be declared when sufficient diamonds have been recovered so that the shape, physical characteristics, grade and diamond value can be estimated with a reasonable level of confidence.*

*A Measured Diamond Resource would be declared when sufficient diamonds have been recovered so that the shape, physical characteristics, grade and diamond value can be estimated with a high level of confidence. As a result of the complexity of Diamond Resource estimation, diamond deposits rarely achieve Measured Resource (or Proven Reserve) status. Sampling and estimation of marine placer deposits is particularly difficult and expensive, and thus even the assignment of Indicated status may prove difficult.*

## **TABLE 1. Checklist of Assessment Criteria**

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Evaluation of mineral projects involves judgment predicated on knowledge and experience. Such Mineral Resource and Mineral Reserve estimates are more than arbitrary determinations; they seek to attach confidence as a consequence of method and the data. The methods employed must be valid, tested, use accepted definitions of terms and procedures, and best suited to the making of reliable estimates for the project in question. Evaluation of mineral projects requires periodic examination and analysis of all new and existing data. The dynamic nature of the valuation of mineral projects implies that a valid estimate made at a given time may be significantly changed when new information becomes available. Evaluation and supporting documentation should consider all the criteria listed below and such additional criteria that may be viewed as significant. When considering the criteria outlined below, material items that are not applied should be accompanied by clear explanation in the documentation as to why they have been excluded or that the work is incomplete. It is the responsibility of the Competent Person to determine which criteria listed below and which additional criteria should apply to the study of a particular project. The relative importance of the criteria will vary with the particular project and the technical, economic and legal conditions pertaining at the time of determination. Publicly reported information must be sufficient to enable an intelligent layman or his professional advisor(s) to make a reasonable and balanced assessment of the significance of this information. When and whether information should be released publicly is subject to current laws and regulations in the relevant jurisdictions.

The assessment criteria for Mineral Resource would normally apply to Scoping Studies; the assessment criteria for Mineral Reserve would normally apply to Pre-Feasibility and Feasibility Studies.

In some cases it will be appropriate for a Public Report to exclude some commercially sensitive information. A decision to exclude commercially sensitive information would be a decision for the entity issuing the Public Report, and such a decision should be made in accordance with any relevant regulations in that jurisdiction. In cases where commercially sensitive information is excluded from a Public Report, the report should provide summary information (for example, the methodology used to determine economic assumptions where the numerical value of those assumptions are commercially sensitive) and context for the purpose of informing investors or potential investors and their advisors.

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Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
<b>A. General</b>			
1. Purpose of report	<ul style="list-style-type: none"> <li>• Statement of entity for whom the report was prepared, whether it was intended as a full or partial evaluation, what work was conducted, what work remains to be done.</li> <li>• Report's author and relationship to reporting entity.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>
2. Project Description	<ul style="list-style-type: none"> <li>• Description of commodity, magnitude of project, background, and business arrangement.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>
3. Project Location	<ul style="list-style-type: none"> <li>• Description of location (country, state or province, county, latitude and longitude, etc.).</li> <li>• A map showing location and access should exist.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>
4. Property Ownership	<ul style="list-style-type: none"> <li>• Description of ownership of mineral rights, surface rights, access rights, leases, concessions, royalties, agreements, and other encumbrances and liabilities.</li> <li>• Nature of reporting entity's existing rights or those still to be obtained to prospect or mine, plus any obligations to earn those rights and time limits.</li> <li>• Disclosure of back-in agreements or rights and, to the extent known, historic or current environmental</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
5. Accessibility, Climate, Local Resources, Infrastructure and Physiography	<ul style="list-style-type: none"> <li>• liabilities.</li> <li>• Discussion of relevant adjacent properties.</li> <li>• Topography, elevation, and flora and fauna.</li> <li>• Means to access the property.</li> <li>• Proximity of project to population centers and restricted use areas.</li> <li>• Climate and length of operating season.</li> <li>• Sufficiency of surface rights for mining and processing.</li> <li>• Availability and sources of power, water, mining personnel, potential tailings and waste storage areas, heap leach and processing plant sites.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>
6. Project History	<ul style="list-style-type: none"> <li>• Description of prior ownership and ownership changes.</li> <li>• Exploration and/or production history.</li> <li>• Significant historical Mineral Resource and Mineral Reserve estimates.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> <li>• Comparison of historical production performance statistics to current and planned operations, including the reliability of these and how they relate to the current estimates.</li> </ul>
7. Site Visits	<ul style="list-style-type: none"> <li>• Comment on any site visits and date undertaken by the Competent Person and outcome of those visits.</li> <li>• Reviews of surface sampling, geophysics and mapping programs.</li> <li>• If no visits were undertaken, state why.</li> </ul>	<ul style="list-style-type: none"> <li>• Comment on site visits and dates undertaken by the Competent Person and outcome of those visits.</li> <li>• Visits during major drilling programs and metallurgical sample selection.</li> <li>• Review logging, sampling, drill hole locations.</li> </ul>	<ul style="list-style-type: none"> <li>• See Mineral Resource.</li> <li>• Multiple visits during Pre-Feasibility and Feasibility Studies to view aspects of infrastructure layout sites, road access, village meetings.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
8. Units of Measure	<ul style="list-style-type: none"> <li>Units of measure, currency, and relevant exchange rates used should be stated.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> </ul>
<b>B. Project Data</b>			
1. Location	<ul style="list-style-type: none"> <li>Maps and cross sections and other two- or three-dimensional representation of results should exist, showing location of samples, drill holes, exploration pits, underground workings, geological data, etc.</li> <li>When evaluating drill hole results, consideration should be given to depth to top and bottom of mineralization, to total length and grade of intercepts, and to the accuracy of survey information including down-hole surveys.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> <li>Particular attention should be given to drill-hole and other sample survey information including down-hole surveys.</li> <li>If the sample locations are not well known, the effect on the resource estimates should be considered.</li> <li>The location of drill-hole collars should be accurate, and the adequacy of the down-hole surveying technique should be reviewed and commented on.</li> <li>If more than one coordinate system is in use on the project, the relationship between the systems needs to be established and verified.</li> <li>Changes in magnetic declination with time should be accounted for and documented.</li> </ul>	<ul style="list-style-type: none"> <li>See Mineral Resource.</li> <li>The location of samples and other relevant features (property lines, mine workings, etc.) should be well-known.</li> </ul>
2. Geology	<ul style="list-style-type: none"> <li>Description of the nature and reliability of geological information (rock types, structure, alteration, mineralization, and relation to known mineralized zones, etc.).</li> <li>Description of the deposit type and physical continuity of</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> <li>Particular attention should be given to drill-hole logging and other sample information used in resource evaluation.</li> <li>A description of the thoroughness with which all significant lithologic,</li> </ul>	<ul style="list-style-type: none"> <li>See Mineral Resource.</li> </ul>



Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
	<ul style="list-style-type: none"> <li>• mineralization.</li> <li>• Description of drill-hole logging and mapping procedures.</li> <li>• Description of geophysical and geochemical data, including dimension, type, results and implications.</li> <li>• Reliable geological maps and cross sections of appropriate scales should exist to support interpretations.</li> <li>• Preliminary assessments or observations of geotechnical and hydro-geological conditions that can impact mining and processing assumptions.</li> </ul>	<p>stratigraphic, structural, mineralogical, alteration, or other geological or geotechnical characteristics were recorded.</p> <ul style="list-style-type: none"> <li>• Significant data, or data that could materially influence the estimated quantity and quality of the resource, should be discussed.</li> </ul>	
3. Topography	<ul style="list-style-type: none"> <li>• General topographic map is sufficient.</li> </ul>	<ul style="list-style-type: none"> <li>• Topographic map in sufficient detail to support mine planning and conceptual infrastructure layout.</li> </ul>	<ul style="list-style-type: none"> <li>• Detailed topographic map.</li> <li>• Aerial surveys must be checked with ground controls and surveys, particularly in areas of rugged terrain, dense vegetation or high altitude</li> </ul>
4. Sampling	<ul style="list-style-type: none"> <li>• Description of sample type and sample collection method (hand, grab, trench, channel, or chip sample; core hole, rotary hole, or reverse circulation; bulk sample, etc.).</li> <li>• Discussion of sample quality, size, and representativeness (sample recovery, high grading, selective losses or contamination, and any other factors that may have resulted in sample biases, etc.).</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> <li>• The quantity and quality of sample information is critical to the reliability of resource estimates and should be documented.</li> <li>• Particular attention should be given to this information.</li> </ul>	<ul style="list-style-type: none"> <li>• See Mineral Resource.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
	<ul style="list-style-type: none"> <li>• QA/QC procedures adopted for sample collection including core cutting and splitting as required and should be implemented early in exploration of a mineral prospect.</li> <li>• Discussion of whether duplicate samples or alternative methods of sampling were used to verify sample quality.</li> <li>• Description of indirect methods of measurement (geophysical methods), with attention given to potential or actual errors or biases in interpretation.</li> </ul>		
b. Preparation	<ul style="list-style-type: none"> <li>• Description of laboratory and method used for sample preparation, sub-sampling and size reduction, and likelihood of inadequate or non-representative samples (improper size reduction, contamination, etc.).</li> <li>• Discussion of whether tests were performed to verify the suitability of sample preparation and the magnitude of sample preparation error.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> <li>• Verification of the suitability of sample preparation is required.</li> </ul>	<ul style="list-style-type: none"> <li>• See Mineral Resource.</li> </ul>
c. Analysis	<ul style="list-style-type: none"> <li>• Identification of laboratory and analytical method (fire assay, AA assay, emission spectroscopy, etc.).</li> <li>• Discussion of laboratory accreditation, precision and accuracy, including the use of</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> <li>• Verification of analytical techniques and quality control programs are required.</li> <li>• Check sampling and assaying must have been performed by independent</li> </ul>	<ul style="list-style-type: none"> <li>• See Mineral Resource.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
	<ul style="list-style-type: none"> <li>quality control programs (blanks, duplicates, certified or standard reference materials), and submission of samples to other laboratories for verification.</li> <li>Collection of baseline trace element, whole-rock analyses, and evaluation for possible deleterious elements.</li> </ul>	<ul style="list-style-type: none"> <li>laboratories.</li> <li>Quantitative evaluation of QA/QC data.</li> <li>Assaying of all payable and penalty elements; physical tests as required by product specifications.</li> <li>Discussion of methods used to detect the presence of deleterious elements or minerals that will affect mining, processing, environmental programs, or worker safety.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> <li>See Exploration Results.</li> </ul>
d. Sample Verification	<ul style="list-style-type: none"> <li>Collection of independent samples (witness samples) under the supervision of the Competent Person.</li> <li>Can include channel samples, twin holes, visual inspection, resampling split core, etc.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> </ul>
e. Bulk Density	<ul style="list-style-type: none"> <li>Generally based on preliminary test work or benchmarking.</li> </ul>	<ul style="list-style-type: none"> <li>Discussion of how the bulk density was determined (assumed, measured, or estimated).</li> <li>If assumed, which assumptions were made and on which basis.</li> <li>If measured, by what method and how abundant and representative are the bulk density data.</li> <li>If estimated, what methodology was used to estimate the density.</li> <li>Discussion of whether different bulk densities were used in different parts of the deposit and why.</li> <li>Bulk density should be stated as on a dry or wet basis.</li> </ul>	<ul style="list-style-type: none"> <li>See Mineral Resource.</li> <li>The bulk density must account for void spaces (vugs, porosity, etc.) and for differences between rock types, structural and alteration zones within the deposit.</li> <li>Waste bulk densities should be well defined.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
f. Sample Security	<ul style="list-style-type: none"> <li>Measures taken to ensure sample security and chain of custody should be documented.</li> <li>Retention of sample rejects, pulps and remaining core.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> </ul>
g. Database Management	<ul style="list-style-type: none"> <li>Measures taken to ensure data have not been corrupted by, for example, transcription or keying errors. QA/QC and data validation procedures used.</li> <li>Security of project data (backups). Protocols for changing data in database.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> <li>Methods used to verify primary data and to validate the database should be described.</li> </ul>	<ul style="list-style-type: none"> <li>See Mineral Resource.</li> </ul>
<b>C. Interpretation</b>			
1. Geological Interpretation and Model	<ul style="list-style-type: none"> <li>Description of genetic model and inferences made from this model.</li> <li>Discussion of adequacy of data density and reliability, and whether the quality and quantity of information are sufficient to support statements made or inferred concerning potential for significant economic discovery.</li> <li>Orientation of drill holes and other samples in relation to the geological structures and mineralization to ensure unbiased interpretation of true widths.</li> <li>If true widths are unknown, there should be a clear statement to this effect.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> <li>Discussion of sufficiency of data density to assure continuity of mineralization, geological boundaries, and provide an adequate database for the estimation procedure used.</li> <li>Discussion of the extent to which the interpretation is based on data or on assumptions and whether consideration was given to alternative interpretations or models.</li> <li>Geologic models of key attributes (e.g. lithology, structure, alteration, stratigraphy).</li> </ul>	<ul style="list-style-type: none"> <li>See Mineral Resource.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
2. Resource Model	<ul style="list-style-type: none"> <li>• Not required, but preliminary model may exist to assist in quantification of potential tonnage and grade ranges.</li> <li>• Weight averaging techniques, grade capping, and cut-off grades.</li> <li>• Assumptions used for any reporting of metal equivalent values.</li> <li>• If possible, establish Exploration Target ranges for grades and tonnages.</li> </ul>	<ul style="list-style-type: none"> <li>• Detailed description of the method and reasons used, and the assumptions made, to estimate tonnages and grades (section, polygon, inverse distance, geostatistical, or other method).</li> <li>• Description of how the geological interpretation was used to develop domains and control the resource estimates.</li> <li>• Discussion of basis for using, or not using, grade cutting or capping.</li> <li>• Compositing or data aggregation methods used should be described.</li> <li>• If a computer method was chosen, description of programs and parameters used.</li> <li>• Geostatistical methods are extremely varied and should be described in detail.</li> <li>• The method chosen should be justified.</li> <li>• The geostatistical parameters, including the variogram, and their compatibility with the geological interpretation should be discussed.</li> <li>• Experience gained in applying geostatistics to similar deposits should be taken into account.</li> <li>• Description of methods used to verify and validate models.</li> <li>• Assumptions used for any reporting of net smelter returns or metal equivalent values.</li> </ul>	<ul style="list-style-type: none"> <li>• See Mineral Resource.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
<b>D. Resource and Reserve Classification</b>			
1. Criteria	<ul style="list-style-type: none"> <li>• Not applicable.</li> </ul>	<ul style="list-style-type: none"> <li>• Description and justification of criteria used to classify the resource, including relationship to cut-off grade assumptions.</li> <li>• To classify a resource as Measured or Indicated, there must be a reasonably high level of confidence with respect to the quality of the information used to estimate this resource, as well as the interpretation of this information.</li> <li>• If Inferred Mineral Resources are used in economic evaluations, this should be disclosed.</li> <li>• Reconciliation with previous Mineral Resource estimates.</li> <li>• A conceptual analysis to justify reasonable prospects for eventual economic extraction; Scoping Study preferred.</li> </ul>	<ul style="list-style-type: none"> <li>• Description and justification of criteria used to classify the reserves, and confirmation of resource classification assumptions with respect to cut-off grades used in the production schedule.</li> <li>• Description of all Modifying Factors used to demonstrate economic viability of Measured and Indicated Mineral Resources to support declaration of a Mineral Reserve.</li> <li>• Inferred Mineral Resources must be excluded from demonstration of economic viability to support declaration of a Mineral Reserve</li> <li>• Discussion of the level of confidence in the Modifying Factors.</li> <li>• Uncertainty in Modifying factors may reduce all or part of the Proven Mineral Reserve to a Probable Mineral Reserve.</li> <li>• Reconciliation with previous Reserve estimates.</li> </ul>
2. Risks and Opportunities	<ul style="list-style-type: none"> <li>• Opportunity expressed as Exploration Target ranges of tonnages and grades.</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion of uncertainty of geological boundary assumptions and their risk and opportunity for overall Mineral Resource estimates.</li> <li>• Address uncertainties on the tonnage and grade of production increments.</li> <li>• Determine work programs to upgrade classification or increase resources.</li> </ul>	<ul style="list-style-type: none"> <li>• Determine work programs to upgrade Probable Mineral Reserves to Proven Mineral Reserves.</li> </ul>



Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
<b>E. Extraction</b>			
1. Mining			
a. Method	<ul style="list-style-type: none"> <li>Description of any Modifying Factors that could have a significant impact on the project viability.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> <li>Discussion of mining method to be used, and selective mining criteria assumed that supports the declared resource.</li> <li>Discussion of the dilution implicit in the resource model.</li> </ul>	<ul style="list-style-type: none"> <li>Mining method(s), mine plans and production schedules defined for the life of the project.</li> <li>Description and justification of mining method(s) to be used.</li> <li>Discussion of mining rate, equipment selected, ore control methods, geotechnical and hydrogeological considerations, staffing requirements, health and safety of the workforce, dilution, and recovery.</li> </ul>
b. Costs	<ul style="list-style-type: none"> <li>Generally not determined.</li> </ul>	<ul style="list-style-type: none"> <li>State basis for assumptions.</li> <li>Currency, exchange rates and dates of estimates. See Table 2.</li> </ul>	<ul style="list-style-type: none"> <li>For open-pit mines, discussion of pit slopes, slope stability, and strip ratio.</li> <li>For underground mines, discussion of mining method, rock mechanics considerations, mine design characteristics, and ventilation/cooling requirements.</li> <li>Consideration of waste rock issues related to impacts on surface and ground water systems.</li> <li>Description and justification of capital and operating costs.</li> <li>All capital items identified.</li> <li>Detailed equipment list.</li> <li>Price quotes for all major equipment items.</li> <li>Major components of operating costs itemized and justified by functions</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
<p>2. Processing</p> <p>a. Method</p>	<ul style="list-style-type: none"> <li>• Description of any factors that could have a significant impact on mineral processing and/or the project viability.</li> <li>• See Exploration Results.</li> <li>• Discussion of possible processing methods and any preliminary processing or metallurgical test work completed.</li> <li>• A full definition of the minerals, or at least the assays, to ensure that the process is suitable and that any contaminants / pollutants / possible by-products are recognized, and suitable process steps have been included in the flow sheet.</li> <li>• Description, to the extent known, of the degree to which the test samples are representative of the various types and styles of mineralization and the mineral deposit as a whole.</li> <li>• Discussion of whether the process method is widely used and if uncommon or novel, then describe the risks and test work designed to mitigate the risk.</li> </ul>	<ul style="list-style-type: none"> <li>• Capital (including sustaining) and operating budgets defined by year.</li> <li>• See Table 2.</li> </ul>	<p>and elements.</p> <ul style="list-style-type: none"> <li>• Description and justification of processing method(s) to be used, equipment, plant capacity and personnel requirements.</li> <li>• State whether the process method selected is well-tested or new technology.</li> <li>• Detailed flow sheet and mass balance based on comprehensive metallurgical program.</li> <li>• Justification of estimated recovery (proportion of material sent to the processing plant that will be recovered) by geologic zone, whether based on historical information, laboratory test, or pilot plant results.</li> <li>• Assumptions or allowances made for deleterious elements or variability in the ore feed to the process.</li> <li>• Known environmental and health and safety risks associated with the flow sheet, with those sections dealing with hazardous materials or operations covered in more detail.</li> <li>• For mineral products that are defined by specification, discussion of the basis for the reserve estimate in accordance with the appropriate</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
b. Costs	<ul style="list-style-type: none"> <li>• Generally not determined.</li> </ul>	<ul style="list-style-type: none"> <li>• State basis for assumptions taking into account processing method on extraction design and rock/mineralogical character.</li> <li>• See Table 2.</li> </ul>	<p>mineralogy, testing, and processing requirements to meet the specification.</p> <ul style="list-style-type: none"> <li>• Description and justification of capital and operating costs.</li> <li>• All capital items identified.</li> <li>• Detailed major equipment list.</li> <li>• Price quotes for all major equipment items.</li> <li>• Major components of operating costs by functions and elements itemized and justified.</li> <li>• Capital and operating budgets defined by year.</li> <li>• See Table 2.</li> </ul>
3. Recovery			
a. Mining	<ul style="list-style-type: none"> <li>• Generally not determined.</li> </ul>	<ul style="list-style-type: none"> <li>• State typical dilution and mining recovery that would result from application of Modifying Factors</li> </ul>	<ul style="list-style-type: none"> <li>• Reported tonnages, grades and mineral contents must take into account mining dilution and mining recovery.</li> <li>• Description and justification of mining dilution and mining recovery is required.</li> </ul>
b. Processing	<ul style="list-style-type: none"> <li>• Generally not determined.</li> </ul>	<ul style="list-style-type: none"> <li>• Provide insight gained from preliminary testing and insight into differences between laboratory and commercial scales.</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion of whether the reported tonnages and grades consist of material in place or whether processing recoveries are included.</li> <li>• If in-place metal or quantity are reported, information must be supplied concerning expected processing losses or recoveries.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
4. Cut-off Grade	<ul style="list-style-type: none"> <li>Typically reported in terms of minimum true thickness and cut-off grade criteria.</li> </ul>	<ul style="list-style-type: none"> <li>Justification of the cut-off grade used to report resources including but not limited to assumptions made for costs, prices, recoveries, by-product credits if based on revenue, net smelter return.</li> </ul>	<ul style="list-style-type: none"> <li>Justification of processing recoveries is required.</li> <li>Description of methods used to calculate cut-off grades, including but not limited to costs, prices, recoveries, and by-product credits if based on revenue, net smelter return.</li> </ul>
<b>F. Supporting Infrastructure and General and Administrative</b>			
1. Facilities	<ul style="list-style-type: none"> <li>See A.5.</li> </ul>	<ul style="list-style-type: none"> <li>See A.5.</li> <li>It is reasonable to assume that necessary facilities could be built or accessed.</li> </ul>	<ul style="list-style-type: none"> <li>Necessary facilities have been designed (which may include processing plant, tailings dam, leaching facilities, waste dumps, road and/or rail accesses, ports, power supply, pipelines, offices, housing, security, etc.).</li> <li>Detailed map showing location of facilities.</li> <li>Construction schedule developed.</li> </ul>
2. Staffing	<ul style="list-style-type: none"> <li>See A.5.</li> <li>Safety plan.</li> <li>Emergency evacuation plan.</li> </ul>	<ul style="list-style-type: none"> <li>See A.5.</li> <li>Safety plan.</li> <li>Emergency evacuation plan.</li> </ul>	<ul style="list-style-type: none"> <li>Detailed staffing plan.</li> <li>Training.</li> <li>Salary scale.</li> <li>Work schedule.</li> <li>Operating days.</li> <li>Safety plan.</li> <li>Emergency evacuation plan.</li> </ul>
3. Supplies	<ul style="list-style-type: none"> <li>Generally not determined.</li> </ul>	<ul style="list-style-type: none"> <li>Reasonable assumption that necessary supplies can be obtained.</li> </ul>	<ul style="list-style-type: none"> <li>Necessary supplies have been identified (electricity, reagents, fuels, etc.).</li> <li>Demonstration that supplies are</li> </ul>

<b>Evaluation Criteria</b>	<b>Exploration Results</b>	<b>Mineral Resource</b>	<b>Mineral Reserve</b>
			available as needed.
<b>4. Water Issues</b>	<ul style="list-style-type: none"> <li>• Preliminary investigations to support exploration activities.</li> </ul>	<ul style="list-style-type: none"> <li>• Stated reasonable assumptions.</li> </ul>	<ul style="list-style-type: none"> <li>• Water quantity and quality requirements specified and sources of water identified.</li> <li>• Dewatering requirements estimated on the basis of hydrologic and climatic studies.</li> <li>• Water treatment and disposal, water balance and management, and quality control plans in place.</li> </ul>
<b>5. Costs</b>	<ul style="list-style-type: none"> <li>• Generally not determined.</li> </ul>	<ul style="list-style-type: none"> <li>• Stated reasonable assumptions.</li> </ul>	<ul style="list-style-type: none"> <li>• Description and justification of capital and operating costs.</li> <li>• All capital items identified with sufficient detail for costing.</li> <li>• Construction schedule and capital and operating budgets defined by year.</li> </ul>
<b>G. Environmental Compliance and Reclamation</b>	<ul style="list-style-type: none"> <li>• Description of environmental factors likely to prohibit the project proceeding, including contaminants in material to be disturbed and deleterious elements likely to occur in products.</li> </ul>	<ul style="list-style-type: none"> <li>• Description of environmental factors that could have a significant impact on the project feasibility and possible means of mitigation.</li> <li>• Progress of environmental, cultural, and archeological baseline studies.</li> </ul>	<ul style="list-style-type: none"> <li>• The necessary permits have been obtained, or there is reasonable basis to believe that all permits required for the project can be obtained in a timely manner.</li> <li>• Description of yearly environmental compliance methods and costs, including reclamation, bonding, and closure plan and costs.</li> </ul>
<b>H. Social License</b>	<ul style="list-style-type: none"> <li>• Preliminary review with stakeholders in exploration and project development areas.</li> <li>• Consideration of “Conflict</li> </ul>	<ul style="list-style-type: none"> <li>• Discussion of potential social or community related requirements and plans for the project and the status of negotiations or agreements with local</li> </ul>	<ul style="list-style-type: none"> <li>• Social management plan and program, and community and other stakeholder related requirements and agreements.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
	<ul style="list-style-type: none"> <li>• Minerals” regulations.</li> <li>• Sustainable development to support exploration.</li> <li>• Formal contact with local inhabitants.</li> </ul>	<ul style="list-style-type: none"> <li>• communities and other stakeholders.</li> <li>• Consideration of “Conflict Minerals” regulations.</li> <li>• Sustainable development to support advanced project drilling and sampling.</li> <li>• Training programs.</li> </ul>	<ul style="list-style-type: none"> <li>• Consideration of “Conflict Minerals” regulations.</li> <li>• Sustainable development to support construction and operation.</li> <li>• Training programs, local vendor development plan.</li> <li>• Evaluation of political risk and mitigation.</li> </ul>
<b>I. Economic Viability</b>	<ul style="list-style-type: none"> <li>• Description of valuable and potentially valuable product(s) including suitability of products to market.</li> <li>• For minerals products where a market is needed prior to beginning exploration, a description of the customer specifications, testing, and acceptance requirements.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> <li>• Stated reasonable assumptions concerning likely product value.</li> <li>• Potential markets and ability to enter the market.</li> <li>• Penalties likely incurred for contaminants and conversely, by-product credits if estimated in resource model or assumptions made if based on metallurgical testwork.</li> </ul>	<ul style="list-style-type: none"> <li>• See Mineral Resource.</li> <li>• Description of product to be sold.</li> <li>• Discussion of whether there exists a market for the product, its impact on that market, and whether contracts for the sale of the product are in place or expected to be obtained.</li> <li>• Demand, supply and inventories for the particular commodity, consumption trends and factors likely to affect supply and demand in the future, resulting in commodity price profiles.</li> <li>• Demonstration that the price assumptions are reasonable and supportable.</li> <li>• Justification of assumptions made concerning production cost and value of product at sale point.</li> <li>• Transportation, marketing, downstream processing, and other costs or losses should be considered.</li> </ul>



<b>Evaluation Criteria</b>	<b>Exploration Results</b>	<b>Mineral Resource</b>	<b>Mineral Reserve</b>
2. Cash Flow Analysis	<ul style="list-style-type: none"> <li>• Generally not applied.</li> </ul>	<ul style="list-style-type: none"> <li>• Application of simple cash flow.</li> <li>• Consideration of order of magnitude capital cost, operating costs and revenue to indicate reasonable prospect of eventual economic extraction.</li> </ul>	<ul style="list-style-type: none"> <li>• Detailed cash flow analysis for the life of the project, including a summary of taxes, royalties and government levies.</li> <li>• Sensitivity analysis and simulations of risk related to grade, prices, capital costs, and operating costs, and any additional significant variables.</li> <li>• Discount rate, internal rate of return, payback period and other metrics.</li> </ul>
3. Study Accuracies	<ul style="list-style-type: none"> <li>• Preliminary Studies often applied to justify exploration targets.</li> </ul>	<ul style="list-style-type: none"> <li>• See Table 2 in reference to Scoping Studies that may be used to support a Mineral Resource statement.</li> </ul>	<ul style="list-style-type: none"> <li>• See Table 2 in reference to Pre-Feasibility and Feasibility Studies that are used to support a Mineral Reserve statement.</li> </ul>
<b>J. Risk and Opportunity Analysis</b>	<ul style="list-style-type: none"> <li>• Generally not applied.</li> <li>• High-level risk and opportunities reviewed.</li> </ul>	<ul style="list-style-type: none"> <li>• Sufficient risk assessment completed to confirm reasonable prospects of eventual economic extraction.</li> <li>• Resource enhancement opportunities.</li> </ul>	<ul style="list-style-type: none"> <li>• Project technical, social, environmental and economic risk in the form of a risk register describing likelihood of occurrence and cost.</li> <li>• Description of actions which will be taken to mitigate risk.</li> <li>• No known significant risk of project failure.</li> <li>• Future options to enhance project value.</li> </ul>
<b>K. Other Considerations and Recommendations</b>	<ul style="list-style-type: none"> <li>• Description of any other significant information that is likely to prevent or facilitate the economic viability of the project.</li> <li>• Identification of work or conditions required to establish a Mineral Resource.</li> </ul>	<ul style="list-style-type: none"> <li>• Description of any other material information that could prevent or facilitate the potential economic viability of the resource.</li> <li>• Identification of work or conditions required to convert the Mineral Resource to a Mineral Reserve.</li> </ul>	<ul style="list-style-type: none"> <li>• While any other material information affecting the project should be discussed, no material impediments to the profitable exploitation of the property should remain.</li> <li>• Material uncertainties about the geology, extraction, processing,</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
<b>L. Diamonds</b>		<ul style="list-style-type: none"> <li>• Known information that significantly reduces or increases the probability of economic feasibility should be reported.</li> <li>• Resource statements should be reviewed annually.</li> </ul>	<p>metallurgical, environmental, infrastructure, marketing, social license, and legal requirements have been mitigated or eliminated so that a Competent Person, acting reasonably, can determine if all or part of the Mineral Resource may be converted to a Mineral Reserve at the time of reporting.</p> <ul style="list-style-type: none"> <li>• It is not required that all permits be issued or that mining and processing facilities have been constructed.</li> <li>• However, there should be a reasonable basis to believe that permitting and construction of the necessary facilities can be accomplished in a timely manner.</li> <li>• Reserve statements should be reviewed annually.</li> </ul>
<b>L. Diamonds</b>			
1. Exploration	<ul style="list-style-type: none"> <li>• Reports of collection and analysis of indicator minerals such as chemically/physically distinctive garnet, ilmenite, chrome spinel and chrome diopside which distinguish them as being sourced from potentially diamondiferous rocks should be prepared by a suitably qualified and accredited laboratory.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>
2. Sample Collection	<ul style="list-style-type: none"> <li>• Type of sample and purpose, e.g. core drilling for micro-diamond</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
	<p>sampling and geology, large diameter drilling to establish stones per unit of volume, and grade or bulk samples to establish diamond value.</p> <ul style="list-style-type: none"> <li>• Sample size, distribution and representivity.</li> </ul>		
3. Sample Treatment	<ul style="list-style-type: none"> <li>• Type of facility, treatment rate, and accreditation.</li> <li>• Sample size reduction protocol.</li> <li>• Bottom screen cut-size, top screen cut-size and re-crush screen cut-size.</li> <li>• Processes (dense media separation, magnetic separation, grease recovery, X-ray sorting, hand-sorting etc.).</li> <li>• Process efficiency, tailings auditing, spike recovery and granulometry analysis.</li> <li>• Sample head feed and tailings particle granulometry.</li> <li>• Percent concentrate and undersize per sample.</li> <li>• Sample density determination.</li> <li>• Laboratory used and type of process for micro diamond recovery (e.g. caustic fusion or acidization).</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>
4. Sample Grade	<ul style="list-style-type: none"> <li>• Sample grade in this section of Table 1 is used in the context of carats per units of mass, area or volume.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
	<ul style="list-style-type: none"> <li>The sample grade above the specified lower cut-off sieve size should be reported as carats per dry metric ton and/or carats per 100 dry metric tons.</li> <li>For placer deposits, sample grades quoted in carats per m<sup>2</sup> or carats per m<sup>3</sup> are acceptable.</li> <li>In the marine placer environment reserve grades are reconciled on a per m<sup>2</sup> basis. Volume estimates are inherently inaccurate and are used primarily to assist with estimating mining rates and costs.</li> </ul>		
5. Sample Characteristics	<ul style="list-style-type: none"> <li>Micro and macro diamond sample results per facies.</li> <li>The weight of diamonds may only be omitted from the report when the diamonds are considered too small to be of commercial significance.</li> <li>The lower cut-off size should be stated.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> <li>Bulk sampling results, global sample grade per facies and local block estimates in the case of Indicated and Measured resources.</li> <li>Spatial structure analysis and grade distribution.</li> <li>Stone size/weight and size/number distribution.</li> <li>Effect on sample grade with change in bottom cut-off screen size.</li> </ul>	<ul style="list-style-type: none"> <li>See Exploration Results.</li> <li>Adjustments made to diamond size/weight distribution for sample plant performance versus performance on a commercial scale (reserve Modifying Factors).</li> </ul>
6. Grade Estimation	<ul style="list-style-type: none"> <li>Generally not applied.</li> </ul>	<ul style="list-style-type: none"> <li>Grade estimation (including geostatistical) and interpolation techniques applied.</li> <li>Adjustments made to diamond size/weight distribution for sample plant performance and performance on a commercial scale.</li> </ul>	<ul style="list-style-type: none"> <li>See Mineral Resource.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
7. Value (Price) Estimation	<ul style="list-style-type: none"> <li>• Generally not applied.</li> </ul>	<ul style="list-style-type: none"> <li>• Accreditation of Valuer and date of valuation.</li> <li>• Details of parcel(s) sorted and valued, number of stones, carats and size/weight distribution using a standard progression of sieve sizes for each identified facies, geological unit or domain.</li> <li>• Value per sieve size.</li> <li>• Estimation of value with size.</li> <li>• Assessment of diamond damage (insignificant, moderate, severe).</li> <li>• Value with change in bottom cut-off size.</li> <li>• Estimate of the uncertainty in the value estimate due to parcel size and comment on the spatial representivity of the valuation parcel.</li> <li>• Clarification as to whether a strict bottom cut-off been applied or does the modelled value include incidental diamonds below the bottom cut-off?</li> </ul>	<ul style="list-style-type: none"> <li>• See Mineral Resource.</li> </ul>
8. Security and Integrity	<ul style="list-style-type: none"> <li>• Chain of custody.</li> <li>• Site security.</li> </ul>	<ul style="list-style-type: none"> <li>• Accredited process audit.</li> <li>• Whether samples were sealed after excavation.</li> <li>• Valuer location, escort, delivery, cleaning losses, reconciliation with recorded sample carats and number of stones.</li> <li>• Core samples washed prior to treatment for micro diamonds.</li> <li>• Audit samples treated at alternative</li> </ul>	<ul style="list-style-type: none"> <li>• See Mineral Resource.</li> </ul>

Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
		<ul style="list-style-type: none"> <li>• facility.</li> <li>• Results of tailings checks.</li> <li>• Recovery of tracer monitors used in sampling and treatment.</li> <li>• Geophysical (logged) density and particle density.</li> <li>• Cross validation of sample weights, wet and dry, with borehole volume and density, moisture factor.</li> </ul>	
9. Classification	<ul style="list-style-type: none"> <li>• Not applicable.</li> </ul>	<ul style="list-style-type: none"> <li>• Consider the elements of uncertainty in estimates and develop classification accordingly.</li> <li>• Key elements to consider for resource classification are the geology, drill-hole and sample spacing/interval, spatial representivity and accuracy of estimates of volume, density, grade, diamond value.</li> </ul>	<ul style="list-style-type: none"> <li>• See Mineral Resource.</li> </ul>

#### M. Qualification of Estimator(s)

- |                   |  |  |  |
|-------------------|--|--|--|
| 1. Qualifications | <ul style="list-style-type: none"> <li>• Name and qualification of the Competent Person preparing and reviewing the report, and whether the Competent Person is independent with respect to the entity or project that is the subject of the report.</li> <li>• Include description of at least five years' relevant experience in style of mineralization and type of deposit.</li> </ul> | <ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul> | <ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul> |
|-------------------|--|--|--|



Evaluation Criteria	Exploration Results	Mineral Resource	Mineral Reserve
2. Reliance on other experts	<ul style="list-style-type: none"> <li>• Include statement that the Competent Person's RPO has jurisdiction over the Competent Person's actions with regard to the mineral deposit being publicly reported and the Competent Person is subject to the code of ethics of the RPO.</li> <li>• Reliance on experts applies to information in areas where the experience of the Competent Person is insufficient.</li> <li>• Identification of: <ul style="list-style-type: none"> <li>- the source of the information relied upon, including the date, title, and author of any report, opinion, or statement,</li> <li>- the extent of reliance, and</li> <li>- the portions of the Public Report to which the reliance applies.</li> </ul> </li> <li>• References cited with author, date, title and source.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>
<b>N. References</b>	<ul style="list-style-type: none"> <li>• References cited with author, date, title and source.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>	<ul style="list-style-type: none"> <li>• See Exploration Results.</li> </ul>

**TABLE 2. Study Accuracy Ranges for Capital and Operating Cost Estimates**

Levels of effort required for components of Technical Studies and their attendant accuracy levels have been the subject of considerable debate and difference of opinion within the mining community. The SME Guide has drawn on the 3<sup>rd</sup> Edition of the Mining Engineering Handbook (2011) to provide standards to be used by the Competent Person in preparing Technical Studies. As used in the table, “historic” implies information that may be available and still relevant from similar projects. The term “benchmark” could also be interchangeably used if current data from similar projects are used. In Technical Studies, the Competent Person should provide the basis for capital and operating cost estimates and an assessment of the level of accuracy for at least the categories listed below.

<b>Capital Cost Category</b>	<b>Scoping Study</b>	<b>Prefeasibility Study</b>	<b>Feasibility Study</b>
Basis of Estimate to include the following areas: Civil/structural, architectural, piping/HVAC, electrical, instrumentation, construction labor, construction labor productivity, material volumes/amounts, material/equipment, pricing, infrastructure	Order-of-magnitude, based on historic data or factoring. Engineering < 5% complete.	Estimated from historic factors or percentages and vendor quotes based on material volumes. Engineering at 5-15% complete.	Detailed from engineering at 15% to 25% complete, estimated material take-off quantities, and multiple vendor quotations
Contractors	Included in unit cost or as a percentage of total cost	Percentage of direct cost by area for contractors; historic for subcontractors	Written quotes from contractor and subcontractors
Engineering, procurement, and construction management (EPCM)	Percentage of estimated construction cost	Percentage of detailed construction cost	Calculated estimate from EPCM
Pricing	FOB mine site, including taxes and duties	FOB mine site, including taxes and duties	FOB mine site, including taxes and duties
Owner’s costs	Historic estimate	Estimate from experience, factored from similar project	Estimate prepared from detailed zero-based budget
Environmental compliance	Factored from historic estimate	Estimate from experience, factored from similar project	Estimate prepared from detailed zero-based budget for design engineering and specific permit requirements

Escalation	Not considered	Based on entity's current budget percentage	Based on cost area with risk
Accuracy Range	± 50%	± 25%	± 15%
Contingency Range (Allowance for items not specified in scope that will be needed)	± 25%	± 15%	± 10% (actual to be determined based on risk analysis)
<b>Operating Cost Category</b>	<b>Scoping Study</b>	<b>Prefeasibility Study</b>	<b>Feasibility Study</b>
Basis	Order-of-magnitude estimate	Quantified estimates with some factoring	Describes the basis of the estimate; detailed from zero-based budget; minimal factoring
Operating quantities	General	Specific estimates with some factoring	Detailed estimates
Unit costs	Based on historic data for factoring	Estimates for labor, power, and consumables, some factoring	Letter quotes from vendors; minimal factoring
Accuracy Range	± 35%	± 25%	± 15%
Contingency Range (Allowance for items not specified in scope that will be needed)	± 25%	± 15%	± 10% (actual to be determined based on risk analysis)

*Modified from SME Mining Engineering Handbook, 3<sup>rd</sup> Edition, 2011, pages 300 and 301, Tables 5.1-1, 5.1-2 and 5.1-3.*

## APPENDIX A

### List of Recognized Professional Organizations (RPOs)

This list is updated from time to time by the Society for Mining, Metallurgy, and Exploration, Inc. Organizations which wish to be added to the list should contact the SME at the following address:

Chairman, Resources and Reserves Committee  
Society for Mining, Metallurgy and Exploration, Inc.  
12999 E. Adam Aircraft Circle  
Englewood, CO 80112  
U.S.A.

Professional Organization	Member Designation
Society for Mining, Metallurgy, and Exploration, Inc. (SME)	Registered Member
American Institute of Professional Geologists (AIPG)	Certified Professional Geologist
Any state or territory in the United States of America	Licensed or Registered as a Professional Engineer
National Association of State Boards of Geology (ASBOG)	Licensed, Certified or Registered in: Alabama, Arizona, Arkansas, California, Delaware, Florida, Georgia, Idaho, Illinois, Indiana, Kansas, Kentucky, Maine, Minnesota, Mississippi, Missouri, Nebraska, New Hampshire, North Carolina, Oregon, Pennsylvania, Puerto Rico, South Carolina, Texas, Utah, Virginia, Washington, Wisconsin or Wyoming
Mining and Metallurgical Society of America (MMSA)	Qualified Professional
Australasian Institute of Mining and Metallurgy (AusIMM)	Fellow or Member
Australian Institute of Geoscientists (AIG)	Fellow or Member
Engineering Council of South Africa (ECSA)	Professional Engineer
South African Council for Professional and Technical Surveyors (PLATO)	Professional Surveyor
South African Institute of Mining and Metallurgy (SAIMM)	Fellow or Member
South African Council for Natural Scientific Professions (SACNASP)	Professional Natural Scientist
Geological Society of South Africa (GSSA)	Member
European Federation of Geologists (EFG)	European Geologist (EurGeol)
Institute of Materials, Minerals and Mining (IOM3)	Fellow or Professional Member
Institute of Geologists of Ireland (IGI)	Professional Member
Geological Society of London (GSL)	Chartered Geologist
Chilean Comision Minera (ChCM)	Qualified Competent Person in the relevant subject area
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<b>Professional Association</b>	<b>Member Designation</b>
Any organization or association of engineers and/or geoscientists given authority or recognition by statute in a jurisdiction of Canada	Licensed, certified, registered or accepted by: Professional Engineers Ontario, Association of Professional Engineers and Geoscientists of British Columbia, Association of Professional Engineers and Geoscientists of Manitoba, Association of Professional Geoscientists of Ontario, Association of Professional Engineers and Geoscientists of Newfoundland, Association of Professional Engineers, Geologists and Geophysicists of the Northwest Territories, Association of Professional Geoscientists of Nova Scotia, Association of Professional Engineers and Geoscientists of New Brunswick, Association of Professional Engineers and Geoscientists of Saskatchewan, Association of Professional Engineers, Geologists and Geophysicists of Alberta, Ordre des Géologues du Québec, Ordre des Ingénieurs du Québec
Russian Society of Subsoil Use Experts (OERN)	Expert class

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