



**Exploration Results,
Mineral Resources and
Mineral Reserves
Indonesian Joint Committee
for Mineral Reserves**

**KODE – KCM I
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Compiled by:

The Joint Committee of KCM I

IAGI – Indonesian Association of Geologists

**PERHAPI – Indonesian Association of Mining
Professionals**

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PERHAPI

PERHIMPUNAN AHLI PERTAMBANGAN INDONESIA
ASSOCIATION OF INDONESIAN MINING PROFESSIONALS



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FOREWORD

1. The mining industry development in the world demands the existence of transparency, standardization and accountability, including the exploration and mining of mineral and coal in Indonesia. In some parts of the world, several codes have been developed, implemented and used as a reference in the reporting of Exploration Results, Mineral Resources and Mineral Reserves.

In the last two decades, the mining industry (including exploration) in Indonesia has evolved progressively. The need for sources of funds both from stock market and from banks also increases significantly. Consequently, the need for credible reports of Exploration Results, Mineral Resources and Mineral Reserves prepared by competent individual also increases. In such condition, majority of Indonesian mining stake holders believe that a credible report is the report prepared in accordance with the JORC Code (the Australasian Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves). For this reason, Indonesia needs to develop its own Reporting Code for Exploration Results, Mineral Resources and Mineral Reserves to be used as a reference by “Competent Person Indonesia” (CPI).

This code is formulated with the aim of setting the minimum standard for reporting Exploration Results, Mineral Resources and Mineral Reserves for mineral and coal that complies with international standards, such that, it could be used for satisfying the need of mining industry funding.

The initial development of the code was started in late 1990 by the Indonesian Association of Geologists (IAGI) both independently and jointly with Surabaya Stock Exchange (before merged to be Indonesia Stock Exchange) and together with other professional association in Indonesia. This attempt was not completed, but in 2009, Indonesian Association of Economic Geologists (MGEI), a commission under the IAGI, recommenced the effort. In parallel, the Indonesian Association of Mining Professionals (PERHAPI) established collaboration with Australasian Institute of Mining and Metallurgy (AusIMM) in an attempt to construct a Reporting Code for mining industry since 1997. The PERHAPI commitment was strengthened in 2007 in Sydney with collaboration with Mineral Councils of Australia (MICA). The realization of such efforts was started after the establishment of The Joint Committee IAGI and PERHAPI for developing the Competent Person Indonesia System and the Indonesian Reporting Standard for Exploration Results, Mineral Resources and Mineral Reserves. This committee is named *Komite (Bersama) Cadangan Mineral Indonesia – KCM I [editorial: Indonesian words for the Indonesian Committee for Mineral Reserves]*. The Joint Decree IAGI-PERHAPI for this committee establishment is attached in the appendix of this document. Furthermore, the Code developed by KCM I is named as Kode KCM I.

The development of the Kode KCM I is supported by The Chairman of JORC (Joint Ore Reserve Committee), Australasia.



INTRODUCTION

2. This code consists of three main elements; the code itself, the important terminologies and their definitions and the guidelines. The important terminologies and their definitions are marked in **bold**. The guidance is placed in each of Code clauses and written in *italics*. The guidance is aimed to assist and direct readers. The guidance is not part of the Code, but has to be considered while interpreting the Code. Words in *italics* are also used in Appendix 1 - “General Terminologies and Synonyms”, and Table 1 – “Checklist for Assessment and Reporting Criteria” to clarify their position as parts of the explanation, and Table 1 is a compulsory subject in the report preparation.

3. Majority of this Code has been adopted from “the Australasian Code for Reporting of Exploration Results, Mineral Resources and Mineral Reserves – The JORC Code – 2004 Edition.” This Code is implemented to each Competent Person Indonesia, which are registered as the members of the PERHAPI and IAGI. Also it is proposed to be adopted and stated in the regulation of Indonesia Stock Exchange.

The current version of the Code has been updated in order to be in compliance with the CRIRSCO International Template 2013, which includes the standard definitions adopted by all the CRIRSCO members.

SCOPE

4. The main principles governing the operation and application of the Code 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, to understand the report and is not misled.**
- **Materiality requires that a Public Report contain all the relevant 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 judgement 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 persons who are subject to an enforceable professional code of ethics and rules of conduct.**

Transparency and Materiality are guiding principles of the Code, and the Competent Person Indonesia must provide explanatory commentary on the material assumptions underlying the declaration of Exploration Results, Mineral Resources or Mineral Reserves. In the context of complying with the principles of the Code, explanation has to be provided if there is any non-compliance to the KCM Code or material changes in estimates or in the classification of the Mineral Resources or Mineral Reserves. The Competent Person Indonesia must not remain silent on any issue for which the presence or absence of comment could impact the public perception or value of the mineral occurrence.

5. **Reference in the Code to a Public Report or Public Reporting is to report or reporting on Exploration Results, Mineral Resources or Mineral Reserves, prepared for the purpose of informing investors or potential investors and their advisers. They include, but are not limited to, annual and quarterly company reports,**



press releases, information memoranda, technical papers, website postings and public presentations. This includes a report or reporting to satisfy regulatory requirements.

The Code is a required minimum standard for Public Reporting. The code also recommends its adoption as a minimum standard for other reporting. Companies are encouraged to provide information in their Public Reports, which is as comprehensive as possible.

The Code applies to other publicly released company information in the forms of postings on company websites and presentation material that used in briefings for shareholders, stockbrokers and investment analysts. The Code also applies to the following reports if they have been prepared for the purposes described in Clause 5 including but not limited to: Environmental Statements; Information Memoranda; Expert Reports, and Technical Papers referring to Exploration Results, Mineral Resources and Mineral Reserves.

For companies issuing concise annual reports, or other summary reports, inclusion of all material information relating to Exploration Results, Mineral Resources and Mineral Reserves is recommended. In cases where summary information is presented it should be clearly stated that it is a summary, and a reference attached giving the location of the Code-compliant Public Reports or Public Reporting on which the summary is based.

It is recognized that companies can be required to issue reports into more than one regulatory jurisdiction, with compliance standards that may differ from this Code. It is recommended that such reports include a statement alerting the reader to this situation. Where the Competent Person(s) Indonesia of IAGI and PERHAPI are required to report in other jurisdictions, they are obliged to comply with the requirements of those jurisdictions.

The term 'regulatory requirements' as used in Clause 5 is not intended to cover reports provided to Government agencies for statutory purposes, that providing information to the investing public is not the primary intent. If such reports become available to the public, they would not normally be regarded as Public Reports under the Code (see also guidelines to Clauses 19 and 37).

The term of "documentation" in the Code is referring to the-internal company documents prepared as a basis for, or to support, a Public Report.

It is recognized that above situations may arise where documentation prepared by Competent Person(s) Indonesia for internal company or similar non-public purposes does not comply with the Code. In such situations, it is recommended that the documentation include a prominent statement to this effect. This will make it less likely that non-complying documentation will be used to compile Public Reports, since Clause 8 requires Public Reports to fairly reflect Exploration Results, Mineral Resource and/or Mineral Reserve estimates, and supporting documentation, prepared by a Competent Person(s) Indonesia.

While every effort has been made within the Code and Guidelines to cover most situations likely to be encountered in Public Reporting, there may be occasions when doubt exists as to the appropriate form of disclosure. On such occasions, users of the Code and those compiling reports to comply with the Code should be guided by its intent, which is to provide a minimum standard for Public 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 of a reasoned and balanced judgement regarding the Exploration Results, Mineral Resources or Mineral Reserves being reported.

6. The Code is applicable to all solid minerals, including diamonds, other gemstones, industrial minerals and coal, for which Public Reporting of Exploration Results, Mineral Resources and relevant authorities require Mineral Reserves.



7. The Joint Committee IAGI – PERHAPI recognizes and realizes that further review of the Code and its Guidelines will be required from time to time.

COMPETENCE AND RESPONSIBILITY

8. A Public Report concerning a company's Exploration Results, Mineral Resources or Mineral Reserves is the responsibility of the company acting through its Board of Directors. Any such report must be based on, and fairly reflect the information and supporting documentation prepared by a Competent Person(s) Indonesia. A company issuing a Public Report shall disclose the name(s) of the Competent Person(s) Indonesia, state whether the Competent Person Indonesia is a full-time employee of the company, and, if not, name the Competent Person Indonesia's employer. The report shall be issued with the written consent of the Competent Person(s) Indonesia as to the form and context in which it appears.

Appropriate forms of compliance statements may be as follows (delete bullet points which do not apply):

- *If the required information is in the report:*

"The information in this report that relates to Exploration Results, Mineral Resources or Mineral Reserves is based on information compiled by (insert name of Competent Person Indonesia), who is a Member of the IAGI or PERHAPI and listed as the CPI IAGI or PERHAPI

- *If the required information is included in an attached statement:*

"The information in the report to which this statement is attached that relates to Exploration Results, Mineral Resources or Mineral Reserves is based on information compiled by (insert name of Competent Person Indonesia), who is a Member of the IAGI or PERHAPI and listed as the CPI IAGI or PERHAPI

- *If the Competent Person is a full-time employee of the company:*

"(Insert name of Competent Person Indonesia) is a full-time employee of the company".

- *If the Competent Person Indonesia is not a full-time employee of the company:*

"(Insert name of Competent Person Indonesia) is employed by (insert name of Competent Person Indonesia's employer)".

- *For all reports:*

"(Insert name of Competent Person Indonesia) has sufficient experience which is relevant to the style of mineralization and type of deposit under consideration and to the activity which he (or she) is undertaking to qualify as a Competent Person Indonesia as defined in the Kode KCM for Reporting of Exploration Results, Mineral Resources and Mineral Reserves'. (Insert name of Competent Person Indonesia) consents to the inclusion in the report of the matters based on his (or her) information in the form and context in which it appears".

9. 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(s) Indonesia. The documentation must provide a fair representation of the Exploration Results, Mineral Resources or Mineral Reserves being reported.



10. A 'Competent Person Indonesia' (CPI) is a minerals industry professional who is a Member of and registered as the CPI IAGI or CPI PERHAPI or 'Recognized Professional Organizations' (RPO) based on the rules of each of these professional organizations. These organizations have enforceable disciplinary processes including the power to suspend or expel a member. The RPOs are recognized by the Komite Bersama KCM I as included in a list promulgated from time to time.

CPI must have a minimum of five-years relevant experience, in the style of mineralization or type of THE deposit under consideration and in the activity, which that person is undertaking.

If the CPI is preparing a report on Exploration Results, the relevant experience must be in exploration. If the CPI 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 CPI is estimating, or supervising the estimation of Mineral Reserves, the relevant experience must be in the estimation, assessment, evaluation and economic extraction of Mineral Reserves.

The key qualifier in the definition of a Competent Person Indonesia is the word 'relevant'. Determination of what constitutes relevant experience can be a difficult area and common sense has to be exercised. For example, 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) massive base metal deposits may not be.

As a second example, to qualify as a Competent Person Indonesia in the estimation of Mineral Reserves for alluvial gold deposits, considerable (probably 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 Indonesia 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 five years specific experience in (say) porphyry copper deposits in order to act as a Competent Person Indonesia. Relevant experience in the other deposit types could count towards the required experience in relation to porphyry copper deposits.

In addition to experience in the style of mineralization, a Competent Person Indonesia 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 important.

As a general guidance, persons being called upon to act as Competent Person Indonesia should be clearly satisfied in their own minds that they could face their peers and could demonstrate competence in the commodity, type of deposit and situation under consideration. If any doubt exists, the person should either seek opinions from appropriately experienced colleagues or should decline to act as a Competent Person Indonesia.

Estimation of Mineral Resources may 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 very commonly a team effort involving several technical disciplines. It is recommended that, where there is clear division of responsibility within a team, each Competent Person Indonesia and his or her contribution should be identified, and responsibility accepted for that particular contribution. If only one Competent Person Indonesia signs the Mineral Resource or Mineral Reserve documentation, that person is



responsible and accountable for the whole of the documentation under the Code. It is important in this situation that the Competent Person Indonesia accepting overall responsibility for a Mineral Resource or Mineral Reserve estimate and supporting documentation prepared in whole or in part by others, is satisfied that the work of the other contributors is acceptable.

Complaints made in respect of the professional work of a Competent Person Indonesia will be dealt with under the disciplinary procedures of the professional organization to which the Competent Person Indonesia belongs.

When a company with overseas interests wishes to report overseas Exploration Results, Mineral Resource or Mineral Reserve estimates in Indonesia prepared by a person who is not a member of The IAGI, PERHAPI, or an RPO, it is necessary for the company to nominate a Competent Person or Persons to take responsibility for the Exploration Results, Mineral Resource or Mineral Reserve estimate. The Competent Person or Persons undertaking this activity should understand that they are accepting full responsibility for the estimate and supporting documentation.

REPORTING TERMINOLOGY

11. Public Reports dealing with Exploration Results, Mineral Resources or Mineral Reserves must only use the terms set out in Figure 1.

Figure 1 sets out the framework for classifying tonnage and grade estimates to reflect different levels of geological confidence and different degrees of technical and economic evaluation. Mainly a geologist on the basis of geoscientific information can estimate Mineral Resources with some input from other disciplines. Mineral Reserves, which are a modified sub-set of the Indicated and Measured Mineral Resources (shown within the dashed outline in Figure 1), require consideration of the Modifying Factors affecting extraction, and should in most instances be estimated with input from a range of disciplines.

‘Modifying Factors’ are considerations used to convert Mineral Resources to Mineral Reserves. These include, but are not restricted to, mining, processing, metallurgical, economic, marketing, legal, environmental, infrastructure, social and governmental factors.

Measured Mineral Resources may be converted to either Proved Mineral Reserves or Probable Mineral Reserves. The CPI may convert Measured Mineral Resources to Probable Mineral Reserves because of uncertainties associated with some or all of the Modifying Factors, which are taken into account in the conversion from Mineral Resources to Mineral Reserves. The broken arrow in Figure 1 shows this relationship. Although the trend of the broken arrow includes a vertical component, it does not, in this instance, imply a reduction in the level of geological knowledge or confidence. In such a situation, these Modifying Factors should be fully explained.

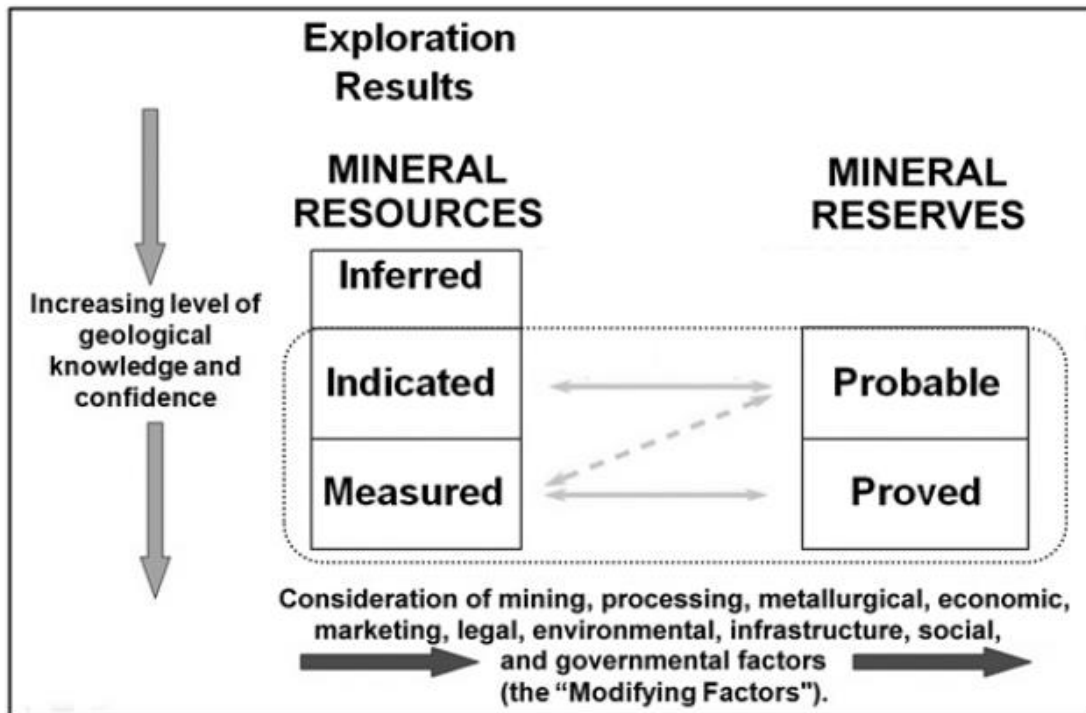


Figure 1. General relationship between Exploration Results, Mineral Resources and Mineral Reserves

REPORTING - GENERAL

12. Public Reports concerning a company's Exploration Results, Mineral Resources or Mineral Reserves should include a description of the style and nature of the mineralization.
13. A company must disclose any relevant information concerning a mineral deposit that could materially influence the economic value of that deposit to the company. A company must promptly report any material changes in its Mineral Resources or Mineral Reserves.
14. Companies must review and publicly report on their Mineral Resources and Mineral Reserves at least annually.
15. Throughout the Code, if appropriate, 'quality' may be substituted for 'grade' and 'volume' may be substituted for 'tonnage'. (Refer Appendix 1 – Table of Generic Terms and Equivalents).

REPORTING EXPLORATION RESULTS

16. **Exploration Results include data and information generated by mineral exploration programs that may be of use to investors but which do not form part of a declaration of Mineral Resources or 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 a company reports Exploration Results in relation to mineralization not classified as a Mineral Resources or a Mineral Reserves, then estimates of tonnages and average grade must not be assigned to the mineralization unless the situation is covered by Clause 18, and then only in strict accordance with the requirements of that clause.

Examples of Exploration Results include results of outcrop sampling, assays of drill hole intercepts, geochemical results and geophysical survey results.

17. Public Reports of Exploration Results must contain sufficient information to allow a considered and balanced judgement 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 data, data aggregation methods, land tenure status plus information on any of the other criteria listed in Table 1 that are material to an assessment.

Public Reports of Exploration Results must not be presented so as to unreasonably imply that potentially economic mineralization has been discovered. If true widths of mineralization are not 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 Indonesia:

- 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.

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 is unacceptable.

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

18. It is recognized that it is common practice for a company to comment on and discuss its exploration in terms of target size and type.

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 tonnes and a range of grade or quality, relates to mineralization for which there has been insufficient exploration to estimate Mineral Resources.

Any such information relating to exploration targets must be expressed so that it cannot be misrepresented or misconstrued as an estimate of Mineral Resources or Mineral Reserves. The terms Resource(s) or Reserve(s) must not be used in this context. Any statement referring to potential quantity and grade of the target must be expressed as ranges and must include (1) a detailed explanation of the basis for the statement, and (2) 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.



REPORTING OF MINERAL RESOURCES

19. A 'Mineral Resource' is a concentration or occurrence of material of intrinsic economic interest in or on the Earth's crust in such form, quality and quantity that there are reasonable prospects for eventual economic extraction.

The location, quantity, grade, geological characteristics and continuity of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.

Portions of a deposit that do not have reasonable prospects for eventual economic extraction must not be included in a Mineral Resource. If the judgement as to 'eventual economic extraction' relies on untested practices or assumptions, this is a material matter, which must be disclosed, in a public report.

The term 'Mineral Resource' covers mineralization, including dumps and tailings, which has been identified and estimated through exploration and sampling and within which Mineral Reserves may be defined by the consideration and application of the Modifying Factors.

The term 'reasonable prospects for eventual economic extraction' implies a judgement (albeit preliminary) by the CPI in respect of the technical and economic factors likely to influence the prospect of economic extraction, including the approximate mining parameters. 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. It is a realistic inventory of mineralization, which, under assumed and justifiable technical and economic conditions, might, in whole or in part, become economically extractable.

Where considered appropriate by the Competent Person Indonesia, Mineral Resource estimates may include material below the selected cut-off grade to ensure that the Mineral Resources comprise bodies of mineralization of adequate size and continuity to properly consider the most appropriate approach to mining. Documentation of Mineral Resource estimates should clearly identify any diluting material included, and Public Reports should include commentary on the matter if considered material.

Any material assumptions made in determining the 'reasonable prospects for eventual economic extraction' should be clearly stated in the Public Report.

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. However for the majority of gold deposits, application of the concept would normally be restricted to perhaps 10 to 15 years, and frequently to much shorter periods of time.

Any adjustment made to the data for the purpose of making the Mineral Resource estimate, for example by cutting or factoring grades, should be clearly stated and described in the Public Report.

Certain reports (e.g.: inventory coal reports, exploration reports to government and other similar reports not intended primarily 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 or Mineral Reserves in terms of the Code (refer also to the guidelines to Clauses 5 and 37).



20. 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 reasonable expected that the majority of Inferred Mineral Resources could be upgraded to Indicated Mineral Resources with continued exploration.

An Inferred Mineral Resource has a lower level of confidence than that applying to an Indicated Mineral Resource.

The Inferred category is intended to cover situations where a mineral concentration or occurrence has been identified and limited measurements and sampling completed, but where the data are insufficient to allow the geological and/or grade continuity to be confidently interpreted. Commonly, it would be reasonable to expect that the majority of Inferred Mineral Resources would upgrade to Indicated Mineral Resources with continued exploration. However, due to the uncertainty of Inferred Mineral Resources, it should not be assumed that such upgrading would always occur.

Confidence in the estimate of Inferred Mineral Resources is usually not sufficient to allow the results of the application of technical and economic parameters to be used for detailed mine planning. For this reason, there is no direct link from an Inferred Resource to any category of Mineral Reserves (see Figure 1).

Caution should be exercised if this category is considered in technical and economic studies.

21. 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.

An Indicated Mineral Resource has a lower level of confidence than that applying to a Measured Mineral Resource, but has a higher level of confidence than that applying to an Inferred Mineral Resource.

Mineralization may be classified as an Indicated Mineral Resource when the nature, quality, amount and distribution of data are such as to allow confident interpretation of the geological framework and to assume continuity of mineralization.

Confidence in the estimate is sufficient to allow the application of technical and economic parameters, and to enable an evaluation of economic viability.

22. 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 Proved Mineral Reserve or to a Probable Mineral Reserve.

Mineralization 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 Indonesia determining the Mineral Resource, that the tonnage and grade of the mineralization can be estimated to within close limits, and that any variation from the estimate would be unlikely to significantly affect potential economic viability.

This category requires a high level of confidence in, and understanding of, the geology and controls of the mineral deposit.

Confidence in the estimate is sufficient to allow the application of technical and economic parameters and to enable an evaluation of economic viability that has a greater degree of certainty than an evaluation based on an Indicated Mineral Resource.

23. The choice of the appropriate category of Mineral Resource depends upon the quantity, distribution and quality of data available and the level of confidence that attaches to those data. A Competent Person or Persons must determine the appropriate Mineral Resource category.

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

In deciding between Measured Mineral Resources and Indicated Mineral Resources, Competent Persons Indonesia may find it useful to consider, in addition to the phrases in the two definitions relating to geological and grade continuity in Clauses 21 and 22, the phrase in the guideline to the definition for Measured Mineral Resources: ‘... any variation from the estimate would be unlikely to significantly affect potential economic viability’.

In deciding between Indicated Mineral Resources and Inferred Mineral Resources, Competent Persons Indonesia may wish to take into account, in addition to the phrases in the two definitions in Clauses 20 and 21 relating to geological and grade continuity, the guideline to the definition for Indicated Mineral Resources: ‘Confidence in the estimate is sufficient to allow the application of technical and economic parameters and to enable an evaluation of economic viability’, which contrasts with the guideline to the definition for Inferred Mineral Resources: ‘Confidence in the estimate of Inferred Mineral Resources is usually not sufficient to allow the results of the application of technical and economic parameters to be used for detailed planning.’ and ‘Caution should be exercised if this category is considered in technical and economic studies’.

The Competent Person should take into consideration issues of the style of mineralization and cut-off grade when assessing geological and grade continuity.

Cut-off grades chosen for the estimation should be realistic in relation to the style of mineralization.

24. Mineral Resource estimates are not precise calculations, being dependent on the interpretation of limited information on the location, shape and continuity of the occurrence and on the available sampling results. Reporting of tonnage and grade figures should reflect the relative uncertainty of the estimate by rounding off to appropriately significant figures and, in the case of Inferred Mineral Resources, by qualification with terms such as ‘approximately’.

In most situations, rounding to the second significant figure should be sufficient. For example 10,863,000 tones at 8.23 per cent should be stated as 11 million tones at 8.2 per cent. There will be



occasions, however, where rounding to the first significant figure may be necessary in order to convey properly the uncertainties in estimation. This would usually be the case with Inferred Mineral Resources.

To emphasize the imprecise nature of a Mineral Resource estimate, the final result should always be referred to as an estimate not a calculation.

Competent Persons Indonesia are encouraged, where appropriate, to discuss the relative accuracy and/or confidence of the Mineral Resource estimates. The statement should specify whether it relates to global or local estimates, and, if local, state the relevant 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 (refer to Table 1).

25. Public Reports of Mineral Resources must specify one or more of the categories of ‘Inferred’, ‘Indicated’ and ‘Measured’. Categories must not be reported in a combined form unless details for the individual categories are also provided. Mineral Resources must not be reported in terms of contained metal or mineral content unless corresponding tonnages and grades are also presented. Mineral Resources must not be aggregated with Mineral Reserves.

Public Reporting of tonnages and grades outside the categories covered by the Code is not permitted unless the situation is covered by Clause 18, and then only in strict accordance with the requirements of that clause.

Estimates of tonnage and grade outside of the categories covered by the Code may be useful for a company in its internal calculations and evaluation processes, but their inclusion in Public Reports could cause confusion.

26. Table 1 provides, in a summary form, a list of the main criteria, which should be considered when preparing reports on Exploration Results, Mineral Resources and Mineral Reserves. These criteria need not be discussed in a Public Report unless they materially affect estimation or classification of the Mineral Resources.

It is not necessary, when publicly reporting, to comment on each item in Table 1, but it is essential to discuss any matters, which might materially affect the reader’s understanding or interpretation of the results or estimates being reported. This is particularly important where inadequate or uncertain data affect the reliability of, or confidence in, a statement of Exploration Results or an estimate of Mineral Resources or Mineral Reserves; for example, poor sample recovery, poor repeatability of assay or laboratory results, limited information on bulk densities etc.

If there is doubt about what should be reported, it is better to err on the side of providing too much information rather than too little.

Uncertainties in any of the criteria listed in Table 1 that could lead to under- or over-statement of resources should be disclosed.

Mineral Resource estimates are sometimes reported after adjustment from reconciliation with production data. Such adjustments should be clearly stated in a Public Report of Mineral Resources and the nature of the adjustment or modification described.

27. The words ‘ore’ and ‘reserves’ must not be used in describing Mineral Resource estimates as the terms imply technical feasibility and economic viability and are only appropriate when all relevant Modifying Factors have been considered. Reports and statements should continue to refer to the appropriate category or categories of Mineral Resources until technical feasibility and economic viability



have been established. If reevaluation 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.

It is not intended that re-classification from Mineral Reserves to Mineral Resources or vice versa should be applied as a result of changes expected to be of a short term or temporary nature, or where company management has made a deliberate decision to operate on a non-economic basis. Examples of such situations might be commodity price fluctuations expected to be of short duration, mine emergency of a non-permanent nature, transport strike etc.



REPORTING MINERAL RESERVES

28. A Mineral Reserve is the economically mineable part of a Measured and/or Indicated Mineral Resource.

It includes diluting materials and allowance for losses, which may occur when the material is mined or extracted and is defined by studies at Pre-Feasibility or Feasibility level as appropriate that include application of Modifying Factors.

Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.

The reference point at which Reserves are defined, usually the point where the ore is delivered to the processing plant, must be stated. It is important that, in all situations where the reference point is different, such as for a saleable product, a clarifying statement is included to ensure that the reader is fully informed as to what is being reported.

In reporting Mineral Reserves, information on estimated mineral processing recovery factors is very important, and should always be included in Public Reports.

Mineral Reserves are those portions of Mineral Resources which, after the application of all mining factors, result in an estimated tonnage and grade which, in the opinion of the Competent Person Indonesia making the estimates, can be the basis of a viable project, after taking account of all relevant Modifying Factors.

Mineral Reserves are reported as inclusive of marginally economic material and diluting material delivered for treatment or dispatched from the mine without treatment.

The term 'economically mineable' implies that extraction of the Mineral Reserve has been demonstrated to be viable under reasonable financial assumptions. What constitutes the term 'realistically assumed' will vary with the type of deposit, the level of study that has been carried out and the financial criteria of the individual company. For this reason, there can be no fixed definition for the term 'economically mineable'.

In order to achieve the required level of confidence in the Modifying Factors, appropriate Feasibility or Pre-Feasibility level studies will have been carried out prior to determination of the Mineral Reserves. The studies will have determined a mine plan that is technically achievable and economically viable and from which the Mineral Reserves can be derived.

The term 'Mineral Reserve' need not necessarily signify that extraction facilities are in place or operative, or that all necessary approvals or sales contracts have been received. It does signify that there are reasonable expectations of such approvals or contracts. The Competent Person should consider the materiality of any unresolved matter that is dependent on a third party on which extraction is contingent. If there is doubt about what should be reported, it is better to err on the side of providing too much information rather than too little.

Any adjustment made to the data for the purpose of making the Mineral Reserve estimate, for example by cutting or factoring grades, should be clearly stated and described in the Public Report.

Where companies prefer to use the term 'Ore Reserves' in their Public Reports, they should state clearly that this is being used with the same meaning as 'Mineral Reserves', defined in this Code. If preferred by the reporting company, 'Mineral Reserve' and 'Mineral Resource' estimates for coal may be reported as 'Coal Reserve' and 'Coal Resource' estimates.

The Code prefers the term 'Mineral Reserve' because it assists in maintaining a clear distinction between a 'Mineral Resource' and a 'Mineral Reserve'.



29. A Probable Mineral Reserve is the economically mineable part of an Indicated and in some circumstances, a Measured Mineral Resources.

The confidence in the Modifying Factors applying to a Probable Mineral Reserve is lower than that applying to a Proved Mineral Reserve.

A Probable Mineral Reserve has a lower level of confidence than a Proved Mineral Reserve but is of sufficient quality to serve as the basis for a decision on the development of the deposit.

30. A Proved Mineral Reserve is the economically mineable part of a Measured Mineral Resource. A Proved Mineral Reserve implies a high degree of confidence in the Modifying Factors.

A Proved Mineral Reserve represents the highest confidence category of reserve estimate. The style of mineralization or other factors could mean that Proved Mineral Reserves are not achievable in some deposits.

31. The choice of the appropriate category of Mineral Reserve is determined primarily by the relevant level of confidence in the Mineral Resource and after considering any uncertainties in the Modifying Factors. A Competent Person (s) Indonesia or CPIs must make allocation of the appropriate category.

The Code provides for a direct two-way relationship between Indicated Mineral Resources and Probable Mineral Reserves and between Measured Mineral Resources and Proved Mineral Reserves. In other words, the level of geological confidence for Probable Mineral Reserves is similar to that required for the determination of Indicated Mineral Resources, and the level of geological confidence for Proved Mineral Reserves is similar to that required for the determination of Measured Mineral Resources.

The Code also provides for a two-way relationship between Measured Mineral Resources and Probable Mineral Reserves. This is to cover a 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 geological knowledge or confidence.

A Probable Mineral Reserve derived from a Measured Mineral Resource may be converted to a Proved Mineral Reserve if the uncertainties in the Modifying Factors are removed. No amount of confidence in the Modifying Factors for conversion of a Mineral Resource to a Mineral Reserve can override the upper level of confidence that exists in the Mineral Resource. Under no circumstances can an Indicated Mineral Resource be converted directly to a Proved Mineral Reserve (see Figure 1).

Application of the category of Proved Mineral Reserve implies the highest degree of confidence in the estimate, with consequent expectations in the minds of the readers of the report. These expectations should be borne in mind when categorizing a Mineral Resource as Measured.

Refer also to the guidelines in Clause 23 regarding classification of Mineral Resources.

32. Mineral Reserve estimates are not precise calculations. Reporting of tonnage and grade figures should reflect the relative uncertainty of the estimate by rounding off to appropriately significant figures. Refer also to Clause 24.

To emphasize the imprecise nature of a Mineral Reserve, the final result should always be referred to as an estimate not a calculation.

Competent Person(s) Indonesia are encouraged, where appropriate, to discuss the relative accuracy and/or confidence of the Mineral Reserve estimates. The statement should specify whether it relates to global or local estimates, and, if local, state the relevant 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 (refer to Table 1).

33. Public Reports of Mineral Reserves must specify one or other or both of the categories of 'Proved' and 'Probable'. Reports must not contain combined Proved and Probable Mineral Reserve figures unless the relevant figures for each of the categories are also provided. Reports must not present metal or mineral content figures unless corresponding tonnage and grade figures are also given.

Public Reporting of tonnage and grade outside the categories covered by the Code is not permitted unless the situation is covered by Clause 18, and then only in strict accordance with the requirements of that clause.

Estimates of tonnage and grade outside of the categories covered by the Code may be useful for a company in its internal calculations and evaluation processes, but their inclusion in Public Reports could cause confusion.

Mineral Reserves may incorporate material (dilution), which is not part of the original Mineral Resource. It is essential that this fundamental difference between Mineral Resources and Mineral Reserves is borne in mind and caution exercised if attempting to draw conclusions from a comparison of the two.

When revised Mineral Reserve and Mineral Resource statements are publicly reported they should be accompanied by reconciliation with previous statements. A detailed account of differences between the figures is not essential, but sufficient comment should be made to enable significant changes to be understood by the reader.

34. In situations where figures for both Mineral Resources and Mineral Reserves are reported, a statement must be included in the report which clearly indicates whether the Mineral Resources are inclusive of, or additional to the Mineral Reserves.

Mineral Reserve estimates must not be aggregated with Mineral Resource estimates to report a single combined figure.

In some situations there are reasons for reporting Mineral Resources inclusive of Mineral Reserves and in other situations for reporting Mineral Resources additional to 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 inclusive of those Mineral Resources modified to produce the Mineral Reserves.' or *'The Measured and Indicated Mineral Resources are additional to the Mineral Reserves.'*

In the former case, if any Measured and Indicated Mineral Resources have not been modified to produce Mineral Reserves for economic or other reasons, the relevant details of these unmodified Mineral Resources should be included in the report. This is to assist the reader of the report in making a judgement of the likelihood of the unmodified Measured and Indicated Mineral Resources eventually being converted to Mineral Reserves.

Inferred Mineral Resources are by definition always additional to Mineral Reserves.

For reasons stated in the guidelines to Clause 33 and in this paragraph, the reported Mineral Reserve figures must not be aggregated with the reported Mineral Resource figures. The resulting total is misleading and is capable of being misunderstood or of being misused to give a false impression of a company's prospects.

35. Table 1 provides, in a summary form, a list of the criteria, which should be considered when preparing reports on Exploration Results, Mineral Resources and Mineral Reserves. These criteria need not be discussed



in a Public Report unless they materially affect estimation or classification of the Mineral Reserves. Changes in economic or political factors alone may be the basis for significant changes in Mineral Reserves and should be reported accordingly.

Mineral Reserve estimates are sometimes reported after adjustment from reconciliation with production data. Such adjustments should be clearly stated in a Public Report of Mineral Reserves and the nature of the adjustment or modification described.



TECHNICAL STUDIES

36. 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.

37. A Pre-Feasibility Study is a comprehensive study of 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 of mineral processing is determined. It includes a financial analysis based on reasonable assumptions on the Modifying Factors and the evaluation of any other relevant factors which are sufficient for a Competent Person(s) Indonesia, 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.

38. 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.

39. Table 1 provides, in a summary form, a list of the criteria which should be considered when preparing reports on Exploration Results, Mineral Resources and Mineral Reserves. These criteria need not be discussed in a Public Report unless they materially affect estimation or classification of the Mineral Reserves. Changes in economic or political factors alone may be the basis for significant changes in Mineral Reserves and should be reported accordingly.



REPORTING OF MINERALIZED FILL, REMNANTS, PILLARS, LOW GRADE MINERALIZATION, STOCKPILES, DUMPS and TAILINGS

40. The Code applies to the reporting of all potentially economic mineralized material. This can include mineralized fill, remnants, pillars, low grade mineralization, stockpiles, dumps and tailings (remnant materials) where there are reasonable prospects for eventual economic extraction in the case of Mineral Resources, and where extraction is reasonably justifiable in the case of Mineral Reserves. Unless otherwise stated, all other clauses of the Code (including Figure 1) apply.

Any mineralized material as described in this clause can be considered to be similar to in situ mineralization for the purposes of reporting Mineral Resources and Mineral Reserves. Professionals with relevant experience should make judgements about the mineability of such mineralized material.

If there are no reasonable prospects for the eventual economic extraction of all or part of the mineralized material as described in this clause, then this material cannot be classified as either Mineral Resources or Mineral Reserves. If some portion of the mineralized material 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. 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.

The above guidelines apply equally to low grade in situ mineralization, sometimes referred to 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 of such material be itemized separately in Public Reports, although they may be aggregated with total Mineral Resource and Mineral Reserve figures.

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. Mineralized material in the course of being processed (including leaching), if reported, should be reported separately.



REPORTING OF COAL RESOURCES AND RESERVES

41. Clauses 41 to 43 of the Code address matters that relate specifically to the Public Reporting of Coal Resources and Reserves. Unless otherwise stated, Clauses 1 to 40 of this Code (including Figure 1) apply. Table 1, as part of the guidelines, should be considered persuasive when reporting on Coal Resources and Reserves.

For purposes of Public Reporting, 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'.

For guidance on the estimation of Coal Resources and Reserves and on statutory reporting not primarily intended for providing information to the investing public, readers are referred to Indonesian Nasional Standard for Reporting Coal Resources and Coal Reserves. These guidelines do not override the provisions and intentions of the Kode KCMI.

Because of its impact on planning and land use, governments may require estimates of inventory coal that are not constrained by short to medium term economic considerations. The Code does not cover such estimates. Refer also to the guidelines to Clauses 5 and 19.

42. The terms 'Mineral Resource(s)' and 'Mineral Reserve(s)', and the subdivisions of these as defined above, apply also to coal reporting, but if preferred by the reporting company, the terms 'Coal Resource(s)' and 'Coal Reserve(s)' and the appropriate subdivisions may be substituted.

43. 'Marketable Coal Reserves', representing beneficiated or otherwise enhanced coal product where modifications due to mining, dilution and processing have been considered, may be publicly reported in conjunction with, but not instead of, reports of Coal Reserves. The basis of the predicted yield to achieve Marketable Coal Reserves should be stated.



REPORTING OF DIAMOND EXPLORATION RESULTS, MINERAL RESOURCES and MINERAL RESERVES

44. Clauses 44 to 47 of the Code address matters that relate specifically to the Public Reporting of Exploration Results, Mineral Resources and Mineral Reserves for diamonds and other gemstones. Unless otherwise stated, Clauses 1 to 40 of this Code (including Figure 1) apply. Table 1, as part of the guidelines, should be considered persuasive when reporting Exploration Results, Mineral Resources and Mineral Reserves for diamonds and other gemstones.

For the purposes of Public Reporting, the requirements for diamonds and other gemstones are generally similar to those for other commodities with the replacement of terms such as 'mineral' by 'diamond' and 'grade' by 'grade and average diamond value'. The term 'quality' should not be substituted for 'grade,' since in diamond deposits these have distinctly separate meanings. Other industry guidelines on the estimation and reporting of diamond resources and reserves may be useful but will not under any circumstances override the provisions and intentions of the Code.

A number of characteristics of diamond deposits are different from those of, for example, typical metalliferous and coal deposits and therefore require special consideration. These include the generally low mineral content and variability of primary and placer deposits, the particulate nature of diamonds, the specialized requirement for diamond valuation and the inherent difficulties and uncertainties in the estimation of diamond resources and reserves.

45. Reports of diamonds recovered from sampling programs must provide material information relating to the basis on which the sample is taken, the method of recovery and the recovery of the diamonds. The weight of diamonds recovered may only be omitted from the report when the diamonds are considered to be too small to be of commercial significance. This lower cut-off size should be stated.

The stone size distribution and price of diamonds and other gemstones are critical components of the resource and reserve estimates. At an early exploration stage, sampling and delineation drilling will not usually provide this information, which relies on large diameter drilling and, in particular, bulk sampling.

In order to demonstrate that a resource has reasonable prospects for economic extraction, some appreciation of the likely stone size distribution and price is necessary, however preliminary. To determine an Inferred Resource in simple, single-facies or single-phase deposits, such information may be obtainable by representative large diameter drilling. More often, some form of bulk sampling, such as pitting and trenching, would be employed to provide larger sample parcels.

In order to progress to an Indicated Resource, and from there to a Probable Reserve, it is likely that much more extensive bulk sampling would be needed to fully determine the stone size distribution and value. Commonly such bulk samples would be obtained by underground development designed to obtain sufficient diamonds to enable a confident estimate of price.

In complex deposits, it may be very difficult to ensure that the bulk samples taken are truly representative of the whole deposit. The lack of direct bulk sampling, and the uncertainty in demonstrating spatial continuity of size and price relationships should be persuasive in determining the appropriate resource category.



46. Where diamond Mineral Resource or Mineral Reserve grades (carats per ton) 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 cut-off sieve size for micro-diamonds reported.

47. For Public Reports dealing with diamond or other gemstone mineralization, it is a requirement that a statement verifying the independence of the valuation accompany any reported valuation of a parcel of diamonds or gemstones. The valuation must be based on a report from a demonstrably reputable and qualified expert.

If a valuation of a parcel of diamonds is reported, the weight in carats and the lower cut-off size of the contained diamonds must be stated and the value of the diamonds must be given in US dollars per carat. Where the valuation is used in the estimation of diamond Mineral Resources or Mineral Reserves, the valuation must be based on a parcel representative of the size, shape and color distributions of the diamond population in the deposit.

Diamond valuations should not be reported for samples of diamonds processed using total liberation methods.

Table 1 provides in summary form, a list of the main criteria which should be considered when preparing reports on Exploration Results, Mineral Resources and Mineral Reserves for diamonds and other gemstones.



REPORTING OF INDUSTRIAL MINERALS EXPLORATION RESULTS, MINERAL RESOURCES and MINERAL RESERVES

48. Industrial minerals are covered by the Code if they meet the criteria set out in Clauses 5 and 6 of the Code. For the purpose of the Code, industrial minerals can be considered to cover commodities such as kaolin, phosphate, limestone, talc etc.

When reporting information and estimates for industrial minerals, the key principles and purpose of the Code apply and should be borne in mind. Assays may not always be relevant, and other quality criteria may be more applicable. 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 Code. It may be necessary, prior to the reporting of 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 general product marketability.

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. The Code's preference is that, if the saleable product is reported, it should be in conjunction with, not instead of, reporting of the Mineral Reserve. However, it is recognized that commercial sensitivities may not always permit this preferred style of reporting. 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 company, such multiple products should be quantified either separately or as a percentage of the bulk deposit.

Table 1 – Check List of Assessment and Reporting Criteria

Table 1 is a checklist and guideline, which those preparing reports on Exploration Results, Mineral Resources and Mineral Reserves should use as a reference. The checklist is not prescriptive and, as always, relevance and materiality are overriding principles that determine what information should be publicly reported. It is, however, important to report any matters that might materially affect a reader’s understanding or interpretation of the results or estimates being reported. This is particularly important where inadequate or uncertain data affect the reliability of, or confidence in, a statement of Exploration Results or an estimate of Mineral Resources or Mineral Reserves. Explanation has to be provided if there is any non-compliance to the KCM Code.

The order and grouping of criteria in Table 1 reflects the normal systematic approach to exploration and evaluation. Criteria in the first group ‘Sampling Techniques and Data’ apply to all succeeding groups. In the remainder of the table, criteria listed in preceding groups would often apply to succeeding groups and should be considered when estimating and reporting.

Criteria	Explanation
Sampling Techniques and Data (criteria in this group apply to all succeeding groups)	
<i>Sampling techniques.</i>	<ul style="list-style-type: none"> • Nature and quality of sampling (e.g. cut channels, random chips etc.) and measures taken to ensure representativeness of the samples.
<i>Drilling techniques.</i>	<ul style="list-style-type: none"> • Drill type (e.g. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka etc.) and details (e.g. core diameter, triple or standard tube, depth of diamond tails, face-sampling bit or other type, whether core is oriented and if so, by what method, etc).
Sampling Techniques and Data (criteria in this group apply to all succeeding groups)	
<i>Drill sample recovery.</i>	<ul style="list-style-type: none"> • Whether core and chip sample recoveries have been properly recorded and results assessed. • Measures taken to maximize sample recovery and ensure representative nature of the samples. • Whether a relationship exists between sample recovery and grade and whether sample bias may have occurred due to preferential loss/gain of fine/coarse material.



<i>Logging.</i>	<ul style="list-style-type: none">• Whether core and chip samples have been logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.• Whether logging is qualitative or quantitative in nature. Core (or trench, channel etc.) photography.
<i>Sub-sampling techniques and sample preparation.</i>	<ul style="list-style-type: none">• If core, whether cut or sawn and whether quarter, half or all core taken.• If non-core, whether riffled, tube sampled, rotary split etc. and whether sampled wet or dry.• For all sample types, the nature, quality and appropriateness of the sample preparation technique.• Quality control procedures adopted for all sub-sampling stages to maximize the representativeness of the samples.• Measures taken to ensure that the sampling is representative of the in situ material collected.• Whether sample sizes are appropriate to the grain size of the material being sampled.• A statement as to the security measures taken to ensure sample integrity is recommended.
<i>Quality of assay data and laboratory tests.</i>	<ul style="list-style-type: none">• The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.• Nature of quality control procedures adopted (e.g. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (i.e.. lack of bias) and precision have been established.
<i>Verification of sampling and assaying.</i>	<ul style="list-style-type: none">• The verification of significant intersections by either independent or alternative company personnel.• The use of twinned holes.
<i>Location of data points.</i>	<ul style="list-style-type: none">• Accuracy and quality of surveys used to locate drill holes (collar and down-hole surveys), trenches, mine workings and other locations used in Mineral Resource estimation.• Quality and adequacy of topographic control.
<i>Data spacing and distribution.</i>	<ul style="list-style-type: none">• Data spacing for reporting of Exploration Results.• Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Mineral Reserve estimation procedure(s) and classifications applied.• Whether sample compositing has been applied.
<i>Reporting Archives</i>	<ul style="list-style-type: none">• Documentation of primary data, data entry procedures, data verification, data storage (physical and electronic) for preparing the report
<i>Orientation of data in relation to geological structure.</i>	<ul style="list-style-type: none">• Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.• If the relationship between the drilling orientation and the orientation of key mineralized structures is considered to have introduced a sampling bias, this should be assessed and reported if material.
<i>Audits or reviews.</i>	<ul style="list-style-type: none">• The results of any audits or reviews of sampling techniques and data.



Reporting of Exploration Results

(criteria listed in the preceding group apply also to this group)

<i>Mineral rights and land ownership.</i>	<ul style="list-style-type: none">• <i>Type, reference name/number, location and ownership including agreements or material issues with third parties such as joint ventures, partnerships, overriding royalties, native title interests, historical sites, wilderness or national park and environmental settings.</i>• <i>The security of the tenure held at the time of reporting along with any known impediments to obtaining a license to operate in the area</i>• <i>Location plans of mineral rights and titles. It is not expected that the description of mineral title in a technical report should be a legal opinion but should be a brief and clear description of such title as understood by the author.</i>
<i>Exploration done by other parties.</i>	<ul style="list-style-type: none">• <i>Acknowledgment and appraisal of exploration by other parties.</i>
<i>Geology.</i>	<ul style="list-style-type: none">• <i>Deposit type, geological setting and style of mineralization.</i>• <i>Reliable geological maps and cross sections should exist to support interpretations.</i>
<i>Data aggregation methods.</i>	<ul style="list-style-type: none">• <i>In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (e.g. cutting of high grades) and cut-off grades are usually material and should be stated.</i>• <i>Where aggregate intercepts incorporate short lengths of high-grade results and longer lengths of low grade results, the procedure used for such aggregation should be stated and some typical examples of such aggregations should be shown in detail.</i>• <i>The assumptions used for any reporting of metal equivalent values should be clearly stated.</i>
<i>Relationship between mineralization widths and intercept lengths.</i>	<ul style="list-style-type: none">• <i>These relationships are particularly important in the reporting of Exploration Results.</i>• <i>If the geometry of the mineralization with respect to the drill hole angle is known, its nature should be reported.</i>• <i>If it is not known and only the down-hole lengths are reported, there should be a clear statement to this effect (e.g. 'downhole length, true width not known').</i>
<i>Diagrams.</i>	<ul style="list-style-type: none">• <i>Where possible, maps and sections (with scales) and tabulations of intercepts should be included for any material discovery being reported if such diagrams significantly clarify the report.</i>
<i>Balanced reporting.</i>	<ul style="list-style-type: none">• <i>Where comprehensive reporting of all Exploration Results is not practicable, representative reporting of both low and high grades and/or widths should be practiced to avoid misleading reporting of Exploration Results.</i>



<i>Other substantive exploration data.</i>	<ul style="list-style-type: none">• <i>Other exploration data, if meaningful and material, should be reported including (but not limited to): geological observations; geophysical survey results; geochemical survey results; bulk samples – size and method of treatment; metallurgical test results; bulk density, groundwater, geotechnical and rock characteristics; potential deleterious or contaminating substances.</i>
<i>Further work.</i>	<ul style="list-style-type: none">• <i>The nature and scale of planned further work (e.g. tests for lateral extensions or depth extensions or large-scale step-out drilling).</i>
<i>Estimation and Reporting of Mineral Resources</i> <i>(criteria listed in the first group, and where relevant in the second group, apply also to this group)</i>	
<i>Database integrity.</i>	<ul style="list-style-type: none">• <i>Measures taken to ensure that data has not been corrupted by, for example, transcription or keying errors, between its initial collection and its use for Mineral Resource estimation purposes.</i>• <i>Data validation procedures used.</i>
<i>Geological Interpretation.</i>	<ul style="list-style-type: none">• <i>Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.</i>• <i>Nature of the data used and of any assumptions made.</i>• <i>The effect, if any, of alternative interpretations on Mineral Resource estimation.</i>• <i>The use of geology in guiding and controlling Mineral Resource estimation.</i>• <i>The factors affecting continuity both of grade and geology.</i>
<i>Dimensions.</i>	<ul style="list-style-type: none">• <i>The extent and variability of the Mineral Resource expressed as length (along strike or otherwise), plan width, and depth below surface to the upper and lower limits of the Mineral Resource.</i>
<i>Estimation and modelling techniques.</i>	<ul style="list-style-type: none">• <i>The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domain, interpolation parameters, maximum distance of extrapolation from data points.</i>• <i>The availability of check estimates, previous estimates and/or mine production records and whether the Mineral Resource estimate takes appropriate account of such data.</i>• <i>The assumptions made regarding recovery of by-products.</i>• <i>Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterization).</i>• <i>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</i>• <i>Any assumptions behind modelling of selective mining units.</i>• <i>Any assumptions about correlation between variables.</i>• <i>The process of validation, the checking process used, the comparison of model data to drill hole data, and use of reconciliation data if available.</i>• <i>Detailed description of the method used and the assumptions made to estimate tonnages and grades (section, polygon, inverse distance, geostatistical, or other method)</i>• <i>Description of how the geological interpretation was used to control the</i>



	<p><i>resource estimates.</i></p> <ul style="list-style-type: none">• <i>Discussion of basis for using or not using grade cutting or capping. If a computer method was chosen, description of programs and parameters used.</i>• <i>Geostatistical methods are extremely varied and should be described in detail. The method chosen should be justified. The geostatistical parameters, including the variogram, and their compatibility with the geological interpretation should be discussed. Experience gained in applying geostatistics to similar deposits should be taken into account.</i>
<i>Moisture.</i>	<ul style="list-style-type: none">• <i>Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.</i>
<i>Cut-off parameters.</i>	<ul style="list-style-type: none">• <i>The basis of the adopted cut-off grade(s) or quality parameters applied.</i>
<i>Mining factors or assumptions.</i>	<ul style="list-style-type: none">• <i>Assumptions made regarding possible mining methods, minimum mining dimensions and internal (or, if applicable, external) mining dilution. It may not always be possible to make assumptions regarding mining methods and parameters when estimating Mineral Resources. Where no assumptions have been made, this should be reported.</i>• <i>In order to demonstrate realistic prospects for eventual economic extraction, basic assumptions are necessary. Examples include access issues (shafts, declines, etc.), geotechnical parameters (pit slopes, stope dimensions etc.), infrastructure requirements and estimated mining costs. All assumptions should be clearly stated.</i>
<i>Metallurgical factors or assumptions.</i>	<ul style="list-style-type: none">• <i>The basis for assumptions or predictions regarding metallurgical amenability. It may not always be possible to make assumptions regarding metallurgical treatment processes and parameters when reporting Mineral Resources. Where no assumptions have been made, this should be reported.</i>
<i>Bulk density.</i>	<ul style="list-style-type: none">• <i>Whether assumed or determined. If assumed, the basis for the assumptions. If determined, the method used, whether wet or dry, the frequency of the measurements, the nature, size and representativeness of the samples.</i>
<i>Classification.</i>	<ul style="list-style-type: none">• <i>The basis for the classification of the Mineral Resources into varying confidence categories.</i>• <i>Whether appropriate account has been taken of all relevant factors. i.e. relative confidence in tonnage/grade computations, confidence in continuity of geology and metal values, quality, quantity and distribution of the data.</i>• <i>Whether the result appropriately reflects the CPI's view of the deposit.</i>
<i>Audits or reviews.</i>	<ul style="list-style-type: none">• <i>The results of any audits or reviews of Mineral Resource estimates.</i>



<i>Discussion of relative accuracy/confidence.</i>	<ul style="list-style-type: none">• Where appropriate a statement of the relative accuracy and/or confidence in the Mineral Resource estimate using an approach or procedure deemed appropriate by the Competent Person Indonesia. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the resource within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.• The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages or volumes, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.• These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.
<i>Estimation and Reporting of Mineral Reserves</i> <i>(criteria listed in the first group, and where relevant in other preceding groups, apply also to this group)</i>	
<i>Mineral Resource estimate for conversion to Mineral Reserves.</i>	<ul style="list-style-type: none">• Description of the Mineral Resource estimate used as a basis for the conversion to a Mineral Reserve.• Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Mineral Reserves.
<i>Study status.</i>	<ul style="list-style-type: none">• The type and level of study undertaken to enable Mineral Resources to be converted to Mineral Reserves.• The Code does not require that a final feasibility study has been undertaken to convert Mineral Resources to Mineral Reserves, but it does require that at least Pre-Feasibility level will have determined a mine plan that is technically achievable and economically viable, and that all Modifying Factors have been considered.
<i>Cut-off parameters.</i>	<ul style="list-style-type: none">• The basis of the cut-off grade(s) or quality parameters applied.
<i>Mining factors or assumptions.</i>	<ul style="list-style-type: none">• The method and assumptions used to convert the Mineral Resource to a Mineral Reserve (i.e. either by application of appropriate factors by optimization or by preliminary or detailed design).• The choice of, the nature and the appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.• The assumptions made regarding geotechnical parameters (e.g. pit slopes, stope sizes, etc.), grade control and pre-production drilling.• The major assumptions made and Mineral Resource model used for pit optimization (if appropriate).• The mining dilution factors, mining recovery factors, and minimum mining widths used.• The infrastructure requirements of the selected mining methods.
<i>Metallurgical factors or</i>	<ul style="list-style-type: none">• The metallurgical process proposed and the appropriateness of that process to the style of mineralization.• Whether the metallurgical process is well-tested technology or novel in nature.• The nature, amount and representativeness of metallurgical test work undertaken and the metallurgical recovery factors applied.• Any assumptions or allowances made for deleterious elements.



<i>assumptions.</i>	<ul style="list-style-type: none">• <i>The existence of any bulk sample or pilot scale test work and the degree to which such samples are representative of the orebody as a whole.</i>
<i>Cost and revenue factors.</i>	<ul style="list-style-type: none">• <i>The derivation of, or assumptions made, regarding projected capital and operating costs.</i>• <i>The assumptions made regarding revenue including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, etc.</i>• <i>The allowances made for royalties payable, both Government and private.</i>
<i>Market assessment.</i>	<ul style="list-style-type: none">• <i>The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.</i>• <i>A customer and competitor analysis along with the identification of likely market windows for the product.</i>• <i>Price and volume forecasts and the basis for these forecasts.</i>• <i>For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.</i>
<i>Other.</i>	<ul style="list-style-type: none">• <i>The effect, if any, of natural risk, infrastructure, environmental, legal, marketing, social or governmental factors on the likely viability of a project and/or on the estimation and classification of the Mineral Reserves.</i>• <i>The status of titles and approvals critical to the viability of the project, such as mining leases, discharge permits, government and statutory approvals.</i>
<i>Classification.</i>	<ul style="list-style-type: none">• <i>The basis for the classification of the Mineral Reserves into varying confidence categories.</i>• <i>Whether the result appropriately reflects the CPI's view of the deposit.</i>• <i>The proportion of Probable Mineral Reserves, which have been derived from Measured Mineral Resources (if any).</i>
<i>Audits or reviews.</i>	<ul style="list-style-type: none">• <i>The results of any audits or reviews of Mineral Reserve estimates.</i>



<i>Discussion of relative accuracy/confidence .</i>	<ul style="list-style-type: none">• Where appropriate a statement of the relative accuracy and/or confidence in the Mineral Reserve estimate using an approach or procedure deemed appropriate by the Competent Person Indonesia. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.• The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages or volumes, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.
<i>Estimation and Reporting of Diamonds and other Gemstones</i> <i>(criteria listed in other relevant groups also apply to this group; additional guidelines are available in the 'Guidelines for the Reporting of Diamond Exploration Results' issued by the Diamond Exploration Best Practices Committee established by the Canadian Institute of Mining, Metallurgy and Petroleum.)</i>	
<i>Indicator minerals.</i>	<ul style="list-style-type: none">• A suitably qualified laboratory should prepare reports of indicator minerals, such as chemically/physically distinctive garnet, ilmenite, and chrome spinel and chrome diopside.
<i>Source of diamonds.</i>	<ul style="list-style-type: none">• Details of the form, shape, and size and color of the diamonds and the nature of the source of diamonds (primary or secondary) including the rock type and geological environment.
<i>Sample collection.</i>	<ul style="list-style-type: none">• Type of sample, whether outcrop, boulders, drill core, reverse circulation drill cuttings, gravel, stream sediment or soil, and purpose, e.g. large diameter drilling to establish stones per unit of volume or bulk samples to establish stone size distribution.• Sample size, distribution and representativeness.
<i>Sample treatment.</i>	<ul style="list-style-type: none">• Type of facility, treatment rate, and accreditation.• Sample size reduction. Bottom screen size, top screen size and re-crush.• Processes (dense media separation, grease, X-ray, hand-sorting etc.).• Process efficiency, tailings auditing and granulometry.• Laboratory used, type of process for micro diamonds and accreditation.
<i>Carat.</i>	<ul style="list-style-type: none">• One fifth (0.2) of a gram (often defined as a metric carat or MC).
<i>Sample grade.</i>	<ul style="list-style-type: none">• Sample grade in this section of Table 1 is used in the context of carats per units of mass, area or volume.• The sample grade above the specified lower cut-off sieve size should be reported as carats per dry metric tonne and/or carats per 100 dry metric tonnes. For alluvial deposits, sample grades quoted in carats per square meter or carats per cubic meter are acceptable if accompanied by a volume to weight basis for calculation.• In addition to general requirements to assess volume and density there is a need to relate stone frequency (stones per cubic meter or tonne) to stone size (carats per stone) to derive sample grade (carats per tonne).



<i>Reporting of Exploration Results.</i>	<ul style="list-style-type: none">• Complete set of sieve data using a standard progression of sieve sizes per facies. Bulk sampling results, global sample grade per facies. Spatial structure analysis and grade distribution. Stone size and number distribution. Sample head feed and tailings particle granulometry.• Sample density determination.• Percent concentrate and undersize per sample.• Sample grade with change in bottom cut-off screen size.• Adjustments made to size distribution for sample plant performance and performance on a commercial scale.• If appropriate or employed, geostatistical techniques applied to model stone size, distribution or frequency from size distribution of exploration diamond samples.• The weight of diamonds may only be omitted from the report when the diamonds are considered too small to be of commercial significance. This lower cut-off size should be stated.
<i>Grade estimation for reporting Mineral Resources and Mineral Reserves.</i>	<ul style="list-style-type: none">• Description of the sample type and the spatial arrangement of drilling or sampling designed for grade estimation.• The sample crush size and its relationship to that achievable in a commercial treatment plant.• Total number of diamonds greater than the specified and reported lower cut-off sieve size.• Total weight of diamonds greater than the specified and reported lower cut-off sieve size.• The sample grade above the specified lower cut-off sieve size.
<i>Value estimation.</i>	<ul style="list-style-type: none">• Valuations should not be reported for samples of diamonds processed using total liberation method, which is commonly used for processing exploration samples.• To the extent that such information is not deemed commercially sensitive, Public Reports should include:<ul style="list-style-type: none">- Diamonds quantities by appropriate screen size per facies or depth.- Details of parcel valued.- Number of stones, carats, lower size cut-off per facies or depth.- The average \$/carat and \$/tonne value at the selected bottom cut-off should be reported in US Dollars. The value per carat is of critical importance in demonstrating project value.- The basis for the price (e.g. dealer buying price, dealer selling price etc.).- An assessment of diamond breakage.
<i>Security and integrity.</i>	<ul style="list-style-type: none">• Accredited process audit.• Whether samples were sealed after excavation.• Valuer location, escort, delivery, cleaning losses, reconciliation with recorded sample carats and number of stones.• Core samples washed prior to treatment for micro diamonds.• Audit samples treated at alternative facility.• Results of tailings checks.• Recovery of tracer monitors used in sampling and treatment.• Geophysical (logged) density and particle density.• Cross validation of sample weights, wet and dry, with hole volume and density, moisture factor.



<i>Classification.</i>	<ul style="list-style-type: none"> • <i>In addition to general requirements to assess volume and density there is a need to relate stone frequency (stones per cubic meter or tonne) to stone size (carats per stone) to derive grade (carats per tonne). The elements of uncertainty in these estimates should be considered, and classification developed accordingly.</i>
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Appendix 1 – Generic Terms and Equivalents

Throughout the Code, certain words are used in a general sense when particular commodity groups within the industry might attach a more specific meaning to them. In order to avoid unnecessary duplication, a non-exclusive list of generic terms is tabulated below together with other terms that may be regarded as synonymous for the purposes of this document.

Generic Term	Synonyms and Similar Terms	Intended Generalized Meaning
<i>Mining</i>	<i>Quarrying</i>	<i>All activities related to extraction of metals, minerals and gemstones from the earth whether surface or underground, and by any method (e.g. quarries, open cast, open cut, solution mining, dredging etc.)</i>
<i>Tonnage</i>	<i>Quantity, Volume</i>	<i>An expression of the amount of material of interest irrespective of the units of measurement (which should be stated when figures are reported)</i>
<i>Grade</i>	<i>Quality, Assay, Analysis (Value)</i>	<i>Any physical or chemical measurement of the characteristics of the material of interest in samples or product. Note that the term quality has special meaning for diamonds and other gemstones. The units of measurement should be stated when figures are reported.</i>
<i>Metallurgy</i>	<i>Processing, Beneficiation, Preparation, Concentration</i>	<i>Physical and/or chemical separation of constituents of interest from a larger mass of material. Methods employed to prepare a final marketable product from material as mined. Examples include screening, flotation, magnetic separation, leaching, washing, roasting etc.</i>
<i>Recovery</i>	<i>Yield</i>	<i>The percentage of material of initial interest that is extracted during mining and/or processing. A measure of mining or processing efficiency.</i>
<i>Mineralisation</i>	<i>Type of deposit, orebody, style of mineralization.</i>	<i>Any single mineral or combination of minerals occurring in a mass, or deposit, of economic interest. The term is intended to cover all forms in which mineralization might occur, whether by class of deposit, mode of occurrence, genesis or composition.</i>



<i>Mineral Reserves</i>	<i>Ore Reserves</i>	<i>'Mineral Reserves' is preferred under the Code but 'Ore Reserves' is in common use in other countries and is generally acceptable. Other descriptors can be used to clarify the meaning e.g. coal reserves, diamond reserves etc.</i>
<i>Cutoff grade</i>	<i>Product specifications</i>	<i>The lowest grade or quality of mineralized material that qualifies as economically mineable and available in a given deposit. May be defined on the basis of economic evaluation, or on physical or chemical attributes that define an acceptable product specification.</i>
<i>Diamond</i>	<i>Gemstones</i>	<i>Diamonds and other gemstones with the same characteristics.</i>

