



## 2011 JORC Code Review Issues Paper

For the proposed revision of the

“Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves – The JORC Code 2004 Edition”

Deadline for submissions: JORC invites responses to this issues paper by DECEMBER 16 2011. All contributions should be submitted online via the JORC website under the title ‘2011 JORC Code Issues Paper Submissions’. All submissions may be published following the close of the response period; unless the contributor clearly indicates that their submissions or any part thereof is confidential. The responses received will be included in the documentation provided to ASX in support of the request for any changes to the JORC Code to be included in the ASX Listing Rules.

**October 2011**

Reference: 20111017 JORC Issues Paper.doc

The Joint Ore Reserves Committee (JORC) invites submissions and comments on specific areas from the 2004 JORC Code and additional issues that are under consideration for inclusion in an updated JORC Code.

To ensure that your submission is received, please forward it in electronic format to:

[JORC@ausimm.com.au](mailto:JORC@ausimm.com.au) under the subject heading '2011 JORC Code Issues Paper Submission'.

Include:

- your full name,
- professional association (if applicable) or the name of the company on whose behalf you are making the submission, or any other relevant interest in the JORC Code and
- the date of your submission.

Readers will be aware that Australian Securities Exchange (ASX) on 5 October issued a public consultation document which also seeks comments on issues 1, 2, 3, 4, 5 and 6 of this issues paper, see [http://www.asxgroup.com.au/media/PDFs/ASX LR\\_ Review Issues Paper mining and oil gas reserve and resource reporting\\_20111005.pdf](http://www.asxgroup.com.au/media/PDFs/ASX_LR_Review_Issues_Paper_mining_and_oil_gas_reserve_and_resource_reporting_20111005.pdf).

A correlation table follows to relate the common issues in the two papers:

| Brief Title of Issue   | JORC Issues Paper Issue No | ASX Consultation Paper Issue No |
|--|----------------------------|---------------------------------|
| Exploration Results (disclosure of additional information)                   | 1                          | 1                               |
| Exploration targets (greater clarity on guidance for disclosure)             | 2                          | 2                               |
| Disclosure of Key Assumptions for Mineral Resource and Ore Reserve reporting | 3 & 4                      | 3                               |
| Minimum Level of Study for an initial Ore Reserve statement                  | 5                          | 4                               |
| Reporting of Production Targets  | 6                          | 5                               |
| Annual Reporting of Mineral Resources and Ore Reserves                       | 7                          | 6                               |

Persons making responses on those items in this issues paper should also send their responses to ASX as requested in the ASX consultation paper. Conversely persons who make submissions to the ASX on those issues are encouraged to also provide submissions to JORC. Whether changes (if any) are made to the Listing Rules or the JORC Code or both may depend on the quality and strength of the submissions received by both JORC and ASX.

Note however that this JORC Issues Paper contains further issues for comment, Issues 8, 9 & 10. JORC will also accept comment on any other matters related to the Code and its operation that interested persons may wish to offer, These comments should clearly set out JORC Code current clause or guideline, the proposed revision recommended including the changes to the clause or guideline (additions, changes underlined) and the reasons for the suggested change and any supporting discussion.

JORC acknowledges assistance provided by Diane Lewis of ASX in preparing initial drafts of this issues paper.

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# Executive Summary

The Joint Ore Reserves Committee (JORC) has commenced a focussed review of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code) 2004 Edition. This review has focused on 10 main issues including incorporating the changes introduced through ASX Companies Updates 03/07 and 03/08, as Attachment 1, a draft of the 2012 JORC Code. In addition, this review process presents some other matters detailed in the body of this paper.

Submissions are called from stakeholders and interested parties on the 10 main issues presented and comment on other matters listed in section 11. This document provides appropriate background for consideration by those making submissions.

The review aims to ensure that the JORC Code provides clarity regarding the requirements for Public Reporting and remains at the forefront of international public reporting best practice with respect to companies' exploration and development activities.

The key issues examined in this paper are:

1. **Disclosure of Exploration Results**– whether Table 1 guidance should be expanded to include greater detail when reporting Exploration Results to improve the ability of potential investors to assess the significance of those results (see pages 7-8);
2. **Disclosure of exploration targets** – whether modified guidance is required to minimise the potential for the disclosure of Exploration Results to not fully inform investors (see pages 8-9);

Specifically comment is sought on:

- Clarifying the appropriate use of Clause 18 to report on exploration programme target size and type, including the use of a clearly referenced proximate cautionary statement when Exploration Results are reported; and
  - Clarifying that use of Clause 18 of the JORC Code as a mechanism to report low confidence resource estimates, outside of approved Mineral Resource categories is in breach of the intent of the clause and of the Code
3. **Guidance on 'reasonable prospects for eventual economic extraction' for the purpose of estimating Mineral Resources** – whether additional guidance on this test should be provided to facilitate greater consistency in its interpretation and application by Competent Persons for the purpose of classifying and estimating Mineral Resources (see pages 9-10);
  4. **Disclosure of key assumptions underpinning Mineral Resource and Ore Reserve estimates** – whether the key assumptions and certain key criteria from Table 1 of the JORC Code should be required to be disclosed when a company reports an initial, or materially upgraded, Mineral Resource or Ore Reserve to facilitate due diligence assessments by investors and their advisors (see pages 10-12);
  5. **Minimum level of study required to support and initial Ore Reserve estimate and reporting** – whether the completion of at least a Pre-Feasibility study to support an initial Ore Reserve determination should be required to provide greater transparency with respect to the level of study that must be satisfied in converting a Mineral Resource to an Ore Reserve (see pages 13-14);
  6. **Disclosure of production targets** – whether, when reporting a production target or forecast financial information derived from a production target, a company should be required to:
    1. disclose the key assumptions underpinning the production target;
    2. disclose the key contingencies and risks in converting any Measured or Indicated Mineral Resources into an Ore Reserve or putting any Measured or Indicated Mineral Resources into production in order for the company to achieve the production target; and

3. disclose the proportion of the production target based on Inferred Mineral Resources and/or an exploration target and include a proximate cautionary statement highlighting the low level of geological confidence of these estimates and the implications for realising the target,
4. ensure that investors are provided with information to assess the risks, reliability and basis for the reported production target or forecast financial information derived from a production target (see pages 14-16);
7. **Annual reporting and reconciliation of Mineral Resources and Ore Reserves** – whether inclusion of an annual statement and reconciliation with estimates from the previous years should be included in, or cross-referenced in the company annual report (see pages 16-17).
8. **Accountability of Competent Persons** – whether disclosure of a Competent Person’s equity interests or options to acquire equity interests in the company should be required in the Competent Person statement when a company discloses Exploration Results, Mineral Resources or Ore Reserves to provide for greater transparency of the full nature of a Competent Person’s interests in the company (see pages 17-19).
9. **Inclusion of relevant material from ASX Companies Updates issued in collaboration with JORC since the release of the 2004 JORC Code** – whether the marked-up amendments to the 2004 JORC Code in a draft of the 2012 JORC Code at Attachment 1 reflecting the relevant material from ASX Companies Updates 03/07 and 03/08, and minor housekeeping matters should be included in the JORC Code (see page 19).
10. **Adoption of proposed Committee for Mineral Reserves International Reporting Standards (CRIRSCO) concise standard definitions** – whether the proposed core standard definitions developed by CRIRSCO should be adopted in the JORC Code to provide for greater international harmonisation in the CRIRSCO family of Standards and Codes (see pages 19-20).
11. **Other issues for feedback** - this paper also seeks feedback on a number of other issues including the requirements for including presentations made at conferences and other public gatherings within the definition of a Public Report, the potential to modify the Competent Person sign-off for such presentations, discussion on the continued existence of the Australian Coal Guidelines, additional explanatory information on the requirement to report all material information relevant to a project subject of a Public Report and whether the requirements for the reporting of Marketable Reserves should apply to all bulk commodities (see page 20).

Following the receipt of submissions in response to this paper, JORC will analyse the feedback received and draft any proposed amendments to the JORC Code. Proposed amendments will then be subject to a further round of public consultation consistent with JORC’s public consultation process and ASX’s usual regulatory process for amending the Listing Rules.

All submissions received will be included in the documentation provided to ASX in support of the request for any changes to the JORC Code to be included in the ASX Listing Rules.

## Introduction

The JORC Code is a principles-based Code for the Public Reporting of Exploration Results, Mineral Resources and Ore Reserves to the ASX or any other relevant reporting environments. The Committee recognises that there are a number of international reporting standards and The JORC Committee is represented on the CRIRSCO and maintains its commitment to continuing convergence of international reporting codes.

The primary drivers for revision of the 2004 JORC Code are increased stakeholder interest in improving standards of Public Reporting of Exploration Results, Mineral Resources and Ore Reserves and the evolution of reporting standards that has been witnessed globally over the last decade or so, together with the implications of what appears to be a prolonged resources boom for the Australian mining industry. This review aims to examine opportunities for improving the adequacy of information disclosed by resources companies, so that investors and potential investors and their advisors are fully informed.

The JORC Code and the Listing Rules have played a significant role in providing for consistency, credibility and confidence in the Public Reporting of Exploration Results, Mineral Resources and Ore Reserves, the important assets of listed resources companies. In light of the globalisation of the mining industry and the rapid pace of change in the reporting requirements and standards for minerals that has occurred around the world since the JORC Code was last revised in 2004, it is both timely and important for the JORC Code to be reviewed to ensure that it continues to respond to investor and listed company stakeholder needs.

## **Objectives and approach of the Issues Paper**

This review is aimed at ensuring that companies reporting under the JORC Code provide sufficient information relevant to Exploration Results and the key technical parameters and other assumptions underlying Mineral Resource and Ore Reserve estimates for investors and their advisors to understand the report and make informed decisions on the basis of the information provided in the report.

The review and any subsequent amendments to the JORC Code are guided by the following principles:

Fundamentally the Code must ensure that investors and their advisors are fully informed and that any changes to the Code result in efficient and effective reporting.

The JORC Code is a principles-based Code for Public Reporting. This review seeks to maintain the principles-based approach.

The Code must remain applicable to the vast range of exploration, development and production scenarios. It must also function irrespective of the company size or jurisdiction of operation. The Code is also recognised in a variety of overseas jurisdictions. Compliance with the JORC Code is also a requirement on members of the AusIMM and AIG that sign off on reports as Competent Persons regardless of the regulatory environment in which the company publishing the report is listed.

This review seeks to consult with Competent Persons, investors and resources companies to ensure that changes to the Code result in improved disclosure coupled with efficient and effective reporting.

The outcomes of the review will seek to maintain alignment with recognised foreign Codes and remain consistent with international requirements for reporting where this is achievable.

Any resultant changes to the Code will be made after consideration that companies may wish to maintain certain information as Commercial in Confidence.

The review also aims to seek input on the increased usage of the term “production target” and define the requirement for the inclusion of information used in determining the production target particularly where the production target has been based on estimates of tonnage and grade of mineralisation at the lower end of the confidence range, for instance Inferred Resources or exploration targets.

## **Overview of reporting regimes in other jurisdictions**

The reporting regimes in the majority of major mining countries are generally based on Standards and Codes similar to the JORC Code, which is referred to as the CRIRSCO family of Standards and Codes. The jurisdictions that have adopted CRIRSCO style reporting systems include Canada, South Africa, Chile, Philippines, Peru, the United Kingdom and Europe and Russia. The Society for Mining, Metallurgy & Exploration (SME) in the United States has prepared the SME Guide (a CRIRSCO style reporting system, but which is not yet recognised by the US SEC).

Greater alignment with the best practice reporting requirements in other developed mining markets would reduce the compliance costs associated with different or inconsistent reporting requirements for companies operating in and dual listed in these markets. Any readers interested in more details on these Codes and standards can find links on the CRIRSCO website at <http://www.criusco.com/national.asp>

# Issues for review

## Issue 1: Disclosure of Exploration Results

The level of geological confidence associated with Exploration Results is generally not sufficient for the estimation of Mineral Resources or in providing an economic value. However, the disclosure of certain data and information related to mineralisation widths and drill hole intercepts generated by exploration programmes is important for investors seeking to understand the significance of the Exploration Results and assess the likelihood that a Mineral Resource may be identified following further exploration drilling and geological interpretation. It is recognised by JORC that the identification of a Mineral Resource and subsequent Ore Reserve is one of the main drivers of value creation for companies primarily involved in exploration.

While the disclosure of drill hole and intercept information should generally be reported under Table 1 of the JORC Code through the application of the principles of transparency and materiality, the JORC Code does not explicitly set out that specific drill hole and intercept data such as the drill hole location (northing, easting, elevation), azimuth, the dip, the down hole widths and depths and the end of hole - should be disclosed when Exploration Results are reported.

Clause 17 of the JORC Code quite clearly requires that the company must report “relevant sample locations” and that can only be done by providing relevant plans and sections, collar coordinates, surveyed orebody intersections and sample locations. The lack of specific guidance and failure to comprehend what is required by the Code for drill hole and intercept information which should be disclosed when Exploration Results are reported has led to a significant variation in the information that is disclosed to the market across the industry. This is likely to be largely the result of companies adopting differing interpretations of the transparency and materiality principles underpinning Table 1, with some failing to appreciate the importance of the disclosure of this information for investors seeking to assess the significance of the Exploration Results.

### **Current requirements**

Clause 16 of the JORC Code defines Exploration Results as including data and information generated by exploration programmes that may be of use to investors. It provides that Exploration Results may or may not be part of a formal declaration of Mineral Resources or Ore Reserves and indicates that the reporting of Exploration Results is common in the early stages of a project when the quantity and interpretation of data is not of a sufficiently high confidence to allow a reasonable estimate of an Inferred Mineral Resource to be reported.

Clause 17 of the JORC Code requires that public reporting of Exploration Results must contain sufficient information to allow a considered and balanced judgement of the significance of the results. Public Reporting of Exploration Results 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 and any other information relevant to the criteria listed in Table 1 that is material to the assessment.

Additionally, Clause 17 sets out a number of requirements in relation to how assay and analytical results are reported to minimise the potential for misleading investors through selective disclosure of isolated assays and drill holes. It also requires that an appropriate qualification must be included in the disclosure of Exploration Results if the true widths of mineralisation are not reported.

Table 1 includes a number of criteria relevant to the reporting of Exploration Results that would capture drill-hole and intercept information. In particular, the criterion ‘Diagrams’ suggests that tabulations of intercepts should be reported for any material discovery if such diagrams would significantly clarify the report. Table 1 does not identify specific drill hole and intercept information that should generally be disclosed when reporting Exploration Results. However without clear diagrams or collar location, azimuth and dip of the drill hole is it difficult to see how the required **relevant sample locations** can be transparently disclosed as required by Clause 17.

**Focussing Question**

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| 1.a. What other information should be included in Table 1 to make the reporting of Exploration Results more transparent? |
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**Issue 2: Disclosure of exploration targets**

The concept of an 'exploration target' was introduced as Clause 18 in the JORC Code 2004 Edition to provide the opportunity for a company to report on its exploration programme in terms of a target size and type of mineralisation sought. In many cases this was publicly reported prior to a physical exploration programme being undertaken and as such, an 'exploration target' for the purposes of Clause 18 is considered to be conceptual in nature, with the subsequent Exploration Results serving to confirm or deny its existence. Other than for the reporting of an initial exploration target size in terms of the potential quantity and grade expressed as ranges, Clause 18 is not intended to provide an opportunity for the reporting of a very low confidence estimate of tonnes and grade before there is sufficient data and confidence to report an Inferred Mineral Resource.

A number of public reports have inappropriately used Clause 18 of the JORC Code and the ability to report exploration targets to report historical resources where no Competent Person is available to sign off as well as very low confidence resource estimates based on preliminary drilling results or pre-existing historical wide spaced drilling conducted for other purposes (for example, coal occurrences in historical oil wells).

The reporting or continual updating of preliminary tonnes and grade presented as an exploration target is in breach of the JORC Code and an unacceptable disclosure practice because there is a significant risk that investors and their advisors may not understand the limitations of the data. As a result, investors and their advisors would be unlikely to fully appreciate the very low level of confidence and the high geological risks associated with such estimates. In addition, the disclosure of information relating to exploration targets that does not include a clear cautionary statement that is consistent with Clause 18 and is proximate to the stated exploration target is not only in breach of the JORC Code, but could be construed as misleading.

**Current requirements**

Clause 18 of the JORC Code permits the public reporting of exploration targets subject to a number of reporting conditions being satisfied. The reporting conditions applicable to the disclosure of exploration targets under Clause 18 are:

1. any information disclosed relating to an exploration target must be expressed in a way that it cannot be misrepresented or misconstrued as an estimate of Mineral Resources or Ore Reserves, with the use of the terms resource(s) or reserve(s) prohibited in this context; and
2. any statement referring to potential quantity and grade of the target must be expressed as ranges and must include:
  - 2.1. a detailed explanation of the basis for the statement; and
  - 2.2. 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.

ASX issued Companies Update 03/08 on 18 March 2008 on the reporting requirements that must be satisfied under Clause 18 when reporting exploration targets. The Update provided guidance on the requirement for the cautionary statement to be of the same prominence and proximate to the reported exploration target. It also indicated that such statements must be included in presentation slides that report exploration targets.

**Focussing Questions**

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| 2.a. | Are there any other reasons behind the non-compliance with Clause 18 that has been observed? |
| 2.b. | Should consideration be given to removing Clause 18 from the JORC Code?                      |

**Issue 3: Guidance on ‘reasonable prospects for eventual economic extraction’ and cut-off grade for the purpose of estimating Mineral Resources**

Concerns have been raised regarding the potential for, and perception of, the inconsistent interpretation and application of the ‘reasonable prospects for eventual economic extraction’ test underpinning Mineral Resource estimates. This creates a difficulty for investors and their advisors in seeking to evaluate and compare the economic prospects of Mineral Resources across different investment opportunities.

**Current requirements**

Under Clause 19 of the JORC Code, a Mineral Resource is a concentration or occurrence of material of intrinsic economic interest in or on the Earth’s crust in such a form, quality and quantity that there are ‘reasonable prospects for eventual economic extraction’. Clause 19 also requires that if a judgement in relation to ‘eventual economic extraction’ relies on untested practices or assumptions, it must be disclosed in public reports.

The guidance associated with Clause 19 indicates that a Mineral Resource is not an inventory of all mineralisation drilled or sampled regardless of the cut-off grade, likely mining dimensions, location or continuity. Instead, it is a realistic inventory of mineralisation which, under assumed and justifiable technical and economic assumptions, might, in whole or in part, become economically extractable at some time in the future. The guidance further indicates that the term ‘reasonable prospects for eventual economic extraction’ involves a judgement (albeit preliminary) by the Competent Person with respect to the technical and economic factors likely to influence the prospect of economic extraction. It is suggested that any material assumptions made in determining that there are ‘reasonable prospects for eventual economic extraction’ should be clearly stated in public reports.

Guidance is also provided on the interpretation of the word ‘eventual’ for different commodities for the purpose of the reasonable prospects test.

Table 1 of the JORC Code includes a criterion on cut off parameters, which, if material to the estimation of a Mineral Resource, requires the disclosure of the basis of the adopted cut off grade(s) or quality parameters applied. However it is increasingly common for consideration of ‘economic criteria’ of various types, for instance a net smelter return which considers throughput, revenue and costs, to be used instead of a simple grade cut-off parameter.

Evaluation of reasonable prospects does not always relate only to an economic or cut-off test. Prospects of economic extraction can be equally extinguished by metallurgy, topography, strip ratio or population proximity to name a few. Transparent disclosure of key assumptions supporting the reasonable prospects test should also be available in Mineral Resource reports.

**Focussing Questions**

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| 3.a. | Should additional guidance on ‘reasonable prospects for eventual economic extraction’ be provided? If so, what are the main facets of this test that require additional guidance and what would you suggest? |
| 3.b. | Do you agree with the interpretation of ‘reasonable’ to generally mean more likely than not in relation to the prospects of economic extraction? (i.e. greater than 50% probability)                         |
| 3.c. | Should additional guidance on the disclosure of the derivation and application of the cut-off or economic criteria used in estimating a Mineral Resource be provided?  |

3.d. Should additional guidance on the disclosure of the supporting technical and economic factors used in estimating a Mineral Resource be provided?

## **Issue 4: Disclosure of greater technical and modifying factor information particularly when reporting an initial, or a materially changed Mineral Resource and Ore Reserve estimate**

It is important to focus on what information is material for investors and their advisors for the purpose of making informed investment decisions. This is important in ensuring that any new disclosure requirements do not simply result in the reporting of large quantities of technical information that may not be useful to, or understood by, investors and their advisors.

The Table 1 criteria in the JORC Code relate to material information such as the geology of the deposit, the drilling and sampling information, the estimation and modelling techniques and the mining and metallurgical factors. Currently, there is significant variation across the industry with regard to the level of technical and scientific information that is disclosed to support Mineral Resource and Ore Reserve estimates.

Similarly the key assumptions underpinning an initial or materially changed (either up or down graded) Mineral Resource and Ore Reserve estimate are not consistently disclosed across the industry. Industry practice in this area has, to some extent, been to take a minimalist approach to the disclosure of key assumptions underpinning the estimates and revisions.

Some stakeholders have expressed the view that the disclosure of more technical and modifying factor information underpinning Mineral Resource and Ore Reserve estimates by way of the public release of a technical report, is worthy of consideration. A requirement for the disclosure of a technical report could also be considered as providing a further mechanism for facilitating greater discipline and transparency around the disclosure of Mineral Resources and Ore Reserves particularly when reporting initial or materially upgraded or downgraded Mineral Resources and Ore Reserves.

The guidance in the JORC Code clearly indicates that it is not necessary to report on every item in Table 1 and that what is reported is a matter of a materiality judgement by the Competent Person. The JORC Code includes guidance which indicates that it is particularly important that there is disclosure where there is inadequate or uncertain data that may affect the reliability of the estimate (for example, poor sample recovery). It does not however, explicitly set out minimum disclosure requirements or provide guidance encouraging the disclosure of what could be expected to represent the key assumptions underpinning Mineral Resource and Ore Reserve estimates, apart from the requirement to report all the material information necessary for the reader to understand the report.

### ***Current requirements***

There is currently no specific requirement for the disclosure of a technical report or for the disclosure of specific technical and modifying factor information to support Mineral Resource and Ore Reserve estimates under the JORC Code or the ASX Listing Rules. However, technical and modifying factor information related to the criteria in Table 1 must be disclosed when it is material to the estimation or classification of Mineral Resources/Ore Reserves

In the guidance associated with Clause 19 of the JORC Code, it is suggested that “Any material assumptions made in determining the ‘reasonable prospects for eventual economic extraction’ should be clearly stated in the public report”. Guidance is provided as to how the term ‘eventual’ could be interpreted and that any adjustment to the data relevant to making a Mineral Resource estimate (for example, by cutting or factoring grades) should be disclosed in a public report.

Clauses 26 and 35 of the JORC Code indicate that Table 1 provides the main criteria which should be considered in preparing reports on Exploration Results, Mineral Resources and Ore Reserves.

Clause 26 provides guidance that “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”.

Clause 35 indicates similarly that these criteria do not need to be discussed in Public Reports unless they materially affect estimation or classification of the Ore Reserves. The Clause also indicates that changes in economic or political factors as a subset of the modifying factors alone may be the basis for significant changes in Ore Reserves and should be reported accordingly.

The commentary in Table 1 and Clause 2 of the JORC Code indicate that Table 1 forms part of the guidelines, but is not mandatory for reporting purposes, save as required under clause 26 and 35 as discussed above. The Table 1 criteria are grouped into categories reflecting a logical progression from exploration to the estimation and reporting of Ore Reserves, with the criteria listed in preceding groups often being applicable to succeeding groups. The criteria groupings are: Sampling techniques and data; Reporting of exploration results; Estimation and reporting of Mineral Resources; Estimation and reporting of Ore Reserves and Estimation and reporting of diamonds and gemstones.

The Table 1 check list is not prescriptive and the overriding JORC principles of transparency and materiality determine what information should be publicly reported. Consistent with the guidance associated with Clause 26, the commentary also suggests that matters relevant to the Table 1 criteria that might materially affect the reader’s understanding or interpretation of the results or estimates should also be included in the report. Beyond the guidance referred to in the paragraphs above, no additional guidance is provided as to what information at a minimum should be disclosed about the material assumptions when initial, upgraded or downgraded Mineral Resource and Ore Reserve estimates are reported to the market.

One option is to report against a minimum subset of Table 1 with other information being included if material to the report.

A possible subset, as suggested in ASX’s consultation paper is shown below:

- geology;
- sampling techniques;
- quality of assay data and laboratory tests;
- drilling techniques;
- logging
- data spacing and distribution;
- estimation and modelling techniques;
- cut-off parameters;
- mining factors or assumptions;
- metallurgical factors or assumptions; and
- cost and revenue factors.

The level of detail required to be reported would clearly vary dependent upon whether the company was reporting a Mineral Resource or Ore Reserve, whether it was a first time report or a materially upgraded report, the commercial sensitivity of the information.

One of the subsequent issues identified by ASX is what guidance, if any, to provide to make it clear that, notwithstanding any prescribed minimum reporting requirements relating to a subset of Table 1 information, any other criteria and information from Table 1 that is relevant and material to understanding the reported Exploration Results and estimates of Mineral Resources and Ore Reserves must also be reported.

ASX has also canvassed several other alternative options for achieving greater disclosure of the key assumptions as follows:

- A requirement for the disclosure of the key assumptions relied on in the relevant study underpinning the Mineral Resource and Ore Reserve estimates when initial or materially changed Mineral Resource and Ore Reserve estimates are reported. Companies would not be required to publicly release the study underpinning the Mineral Resource/Ore Reserve estimates, but they would be required to disclose a summary of the key assumptions relied on in the study when initial, or a material change to, Mineral Resource and Ore Reserve estimates are reported.
- A requirement for companies reporting initial or materially changed Mineral Resource and Ore Reserve estimates to disclose a brief summary of the information under each of the criterion in Table 1 or, if a particular criterion is not relevant or material, disclose that it is not relevant or material and provide a brief explanation of why this is the case, that is a requirement for 'if not, why not' reporting against Table 1.
- A requirement for a technical report to be disclosed to the market to support the disclosure of an initial or materially changed Mineral Resource and Ore Reserve estimate on a mineral property material to a company. The content of the technical report would be prescribed, similar to the way in which the Canadian National Instrument Standards of Disclosure for Mineral Projects (NI 43-101) sets out the requirements for a technical report. The information requirements for the technical report would be largely modelled on those set out in NI 43-101.

### ***Focussing Questions***

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| <p>4.a. Would a requirement for the disclosure of a smaller subset of criteria and information from Table 1 of the JORC Code provide investors with greater transparency on the key technical and modifying assumptions underpinning the report, particularly when it reports an initial or materially changed Mineral Resource and Ore Reserve estimate?</p>  |
| <p>4.b. Does the subset of Table 1 as shown above represent the key information and assumptions underpinning Mineral Resource and Ore Reserve estimates that should, as a minimum, be reported? In particular:</p> <p>4.b.1. Does the information identified include the key information and assumptions underpinning Mineral Resource and Ore Reserve estimates that would be generally applicable to most minerals (with the exception of the metallurgical assumptions)?</p> <p>4.b.2. Does the subset of Table 1 include the key technical information that investors and their advisors would reasonably require in seeking to understand the basis of the estimates and in undertaking their due diligence on a project and a company? What, if any, additional technical information that is not captured under the proposal do you consider should be disclosed because it would significantly aid investors and their advisors in seeking to understand the basis of the estimates?</p> <p>4.b.3. Are there other criteria specific to diamond and other gemstones and other non-metallic minerals for which disclosure should be required when initial or changed Mineral Resource and Ore Reserve estimates are reported?</p> |
| <p>4.c. For commodities that are not exchange traded and for which the price assumptions underpinning Mineral Resource and Ore Reserve estimates are commercially sensitive information, would a requirement for the disclosure of an explanation of the methodology used to determine the price assumptions and the disclosure of a range of prices for which there would not be a significant impact on the Mineral Resource/Ore Reserve estimate:</p> <p>4.c.1. Provide for the disclosure of adequate information to allow analysts to understand and assess the Mineral Resource and Ore Reserve estimates? and</p> <p>4.c.2. Adequately address concerns about disclosing commercially sensitive information?</p>  |

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| 4.d.   | Would the requirement for the disclosure of projected capital and operating expenses raise commercial sensitivity concerns? If so, would a requirement that allows reports to provide a narrative disclosure and a range of values address these concerns and, at the same time, provide useful information to the market? |
| 4.e.   | When a material change (either an up or down grade) to a Mineral Resource or an Ore Reserve is reported, should the report cross-reference the relevant key assumptions (which remain unchanged) in the preceding report relating to the initial Mineral Resource/Ore Reserve disclosure. In particular:                   |
| 4.e.1. | Would you generally expect that there would be significant changes to most of the key assumptions and information when Mineral Resources and Ore Reserves are upgraded? and  |
| 4.e.2. | Would allowing companies to cross-reference the key assumptions and information in the disclosure of the initial Mineral Resource/Ore Reserve estimate create the potential for unnecessary confusion for users?   |
| 4.f.   | Should greater guidance be provided on which of the key assumptions should be reported and in how much detail when a company reports an initial or materially upgraded, Mineral Resource and Ore Reserve estimate?   |
| 4.g.   | What is the likely effectiveness of a requirement for 'if not, why not' reporting against Table 1 when initial, or materially upgraded, Mineral Resource and Ore Reserve estimates are reported?   |
| 4.h.   | What are your views on the respective costs and benefits of a requirement for the disclosure of a technical report similar to that required in Canada to support the disclosure of initial, or a material change to, Mineral Resource and Ore Reserve estimates for material properties?                                   |
| 4.i.   | If a requirement for the disclosure of a technical report was to be implemented, do you agree that:  |
| 4.i.1. | the provision of a 45 day delay in the disclosure of the technical report is necessary and that 45 days provides an adequate period to be able to comply with the requirement?   |
| 4.i.2. | the information to be included in the technical report should be prescribed, similar to that in NI 43-101F1, to provide companies with clear requirements and to promote standardised reporting?   |
| 4.i.3. | the key assumptions relied on in the relevant studies undertaken to classify and estimate the relevant Mineral Resource and Ore Reserve estimates should be required to be disclosed at the time the relevant estimates are reported given the delay in the disclosure of the technical report?                            |

## Issue 5: Minimum level of study required to support an initial Ore Reserve estimate and reporting

Over recent years, a consensus has emerged within the industry and amongst regulators that a properly scoped Pre-Feasibility study is adequate to support initial Ore Reserve reporting. Most jurisdictions with comparable reporting standards for the reporting of Mineral Resources and Ore Reserves define the different levels of study that are undertaken at different stages of development of a project. They also generally require that at least a Pre-Feasibility study is completed to support an initial reporting of an Ore Reserve. The introduction of a requirement for at least a Pre-Feasibility study to support the reporting of an initial Ore Reserve would provide greater clarity around the requirements that must be satisfied in reporting these estimates and it would also increase the alignment between the JORC Code and comparable reporting standards.

### **Current requirements**

Clause 28 of the JORC Code requires that appropriate assessments and studies, which include consideration of realistically assumed modifying factors, have been carried out in converting Mineral Resources to Ore Reserves. It requires that the relevant assessments and studies must take into account all modifying factors – mining, metallurgical,

economic, marketing, legal, environmental, social and governmental - and they must demonstrate that extraction could reasonably be justified at the time of reporting in order to determine Ore Reserves. While the JORC Code does not prescribe a particular level of study for the purpose of converting Mineral Resources to Ore Reserves, the guidance associated with Clause 28 indicates that it may not be necessary for these studies to be at the level of a final Feasibility study. However, the guidance does suggest that the relevant studies will have determined a mine plan, which is technically achievable and economically viable, from which Ore Reserves can be derived.

Additionally, the terms Pre-Feasibility study and Feasibility study are not formally defined in the current JORC Code, although the CRIRSCO core definitions are included in the marked up draft of the 2012 JORC Code, Attachment 1, for adoption into the revised Code.

A scoping study, Conceptual Study or Order of Magnitude Study is not defined in the CRIRSCO core definitions, but it is commonly thought of as being carried out very early in the project life. For example it may be used as a basis for acquiring exploration areas or making a commitment for exploration funding. At this stage the investment risk may be relatively small but it is obviously undesirable to expend further funds on something that has no chance of being economic.

It is generally considered acceptable for scoping studies to be based on very limited information or speculative assumptions in the absence of hard data. The study is directed at the potential of the property rather than a conservative view based on limited information.

***Focussing Questions***

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| 5.a. Should the terms and scope of a scoping, Pre-Feasibility and Feasibility study be defined in the JORC Code? |
| 5.b. Should the level of study required for the conversion of a Mineral Resource to an Ore Reserve be defined?   |

**Issue 6: Disclosure of production targets**

Over the last 12 months or so, JORC has been increasingly concerned by the reporting of production targets and forecast financial information, including net present value, internal rate of return and other cash flow information, by resources companies particularly when based on exploration targets or Inferred Resources. This concern is not related to general statements of companies' aspirations to become a producer in due course.

In its Corporate Finance Liaison meetings of November 2009 and June 2010, ASIC emphasised that forward looking statements, such as production targets, must have a reasonable basis, otherwise the disclosure of such information risks being misleading to investors and may be in breach of the Corporations Act. In this regard, ASIC specifically expressed concern about the disclosure of production targets where the company concerned has yet to commence mining or has not declared an Ore Reserve. ASIC was also of the view that the provision of sufficient information is important for investors to be able to judge the reliability of the forecast information.

There have been cases over the last 12 months where ASIC has required companies to issue corrective disclosures to support the disclosure documentation for specific corporate actions because of concerns relating to the inclusion of production targets in the initial disclosure (made under Listing Rule 3.1) based on lower confidence estimates, in particular, estimates of Inferred Mineral Resources and exploration targets.

The areas of concern regarding current disclosure practices for production targets and forecast financial information derived from such production targets relate to:

1. companies generally not disclosing sufficient information on the assumptions underpinning the production targets/forecast financial information and the risks associated with achieving the stated production target to enable investors and their advisers to properly evaluate the forward looking information. Disclosure of information on the significant risks associated with realising the stated production targets/forecast financial

information could be considered to be particularly important when the production target/financial forecast is based on Mineral Resources rather than Ore Reserves given that Mineral Resources are not deemed to be economically mineable at the time of reporting; and

2. the significant risk that the disclosure of production targets and forecast financial information derived from production targets based on exploration results and exploration targets may mislead investors.

The JORC Code or the Listing Rules do not currently cover the reporting of production targets and forecast financial information derived from production targets. However, there may be merit in considering options to bring the reporting of production targets and forecast financial information derived from production targets within the scope of either the JORC Code or the Listing Rules to provide for improved disclosure practices in this area and to reduce the potential for such disclosures to not fully inform investors. Apart from seeking to provide for a better informed market, the other main benefit of such an approach is that it would provide for transparent reporting requirements applicable to all listed mining companies equally and it may also lead to the need for fewer corrective disclosures.

### **Current requirements**

As mentioned above, the JORC Code and the Listing Rules do not directly address the reporting of production targets and forecast financial information derived from production targets. However, some of the core definitions and guidance included in the JORC Code do address the issue of when it may be appropriate from a geological confidence perspective, to apply economic parameters to the different categories of mineralisation delineated under the JORC Code. This may be a relevant factor for the purpose of considering when there may be a reasonable basis for the disclosure of production targets. The relevant definitions and guidance included in the JORC Code are:

1. the definition of a Mineral Resource for which there must be 'reasonable prospects for eventual economic extraction';
2. The definition of an 'Inferred Mineral Resource' indicates that it is part of a Mineral Resource for which the tonnage, grade and mineral content can be estimated with a low level of confidence. The guidance associated with Clause 20 of the JORC Code also indicates that '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 that 'caution should be exercised if this category is considered in technical and economic studies';
3. The definition of an 'Indicated Mineral Resource' indicates that it is part of a Mineral Resource for which the tonnage, grade and mineral content can be estimated with a reasonable level of confidence. The guidance associated with Clause 21 of the JORC Code also indicates that 'confidence in the estimate is sufficient to allow the application of technical and economic parameters, and to enable an evaluation of economic viability';
4. The definition of a 'Measured Mineral Resource' indicates that it is part of a Mineral Resource for which the tonnage, grade and mineral content can be estimated with a high level of confidence. The guidance associated with Clause 22 of the JORC Code also indicates that the tonnage and grade of the mineralisation can be estimated to within close limits and that any variation from the estimate would be unlikely to significantly affect potential economic viability. The guidance indicates that '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'; and
5. The definition of an 'Ore Reserve' provides that an Ore Reserve is the economically mineable (at the time of reporting) part of a Measured and/or Indicated Mineral Resource. Appropriate assessments and studies, which include the application of economic factors, are required to have been undertaken to declare Ore Reserves; and
6. the reporting requirements included in Clause 18 of the JORC Code for the reporting of exploration targets, in particular, the requirement for a proximate statement which indicates that the 'potential quality 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'.

ASX has canvassed options for the reporting of production targets and forecast financial information derived from production targets. These options can be briefly summarised as a requirement to provide the financial assumptions underpinning the forecast financial information, and the basis of the production target that is the Ore Reserves, Mineral Resources (and perhaps exploration targets in some circumstances) and the relative quantities of each classification included in the production target. The options require an explanation of the reasonable basis on which the production target is derived.

Alternative options include the prohibition on the disclosure of production targets and any forecast financial information derived from production targets where estimates of potential quantity and grade from an exploration target are included. An additional option raised is the prohibition on the disclosure of production targets and any forecast financial information derived from production targets based solely on Inferred Mineral Resources (or a combination of Inferred Mineral Resources and an exploration target) in a greenfield project

Those making submissions to both the ASX and JORC on the production target issue should be aware that there are important differences between the two documents. Those making submissions are encouraged to carefully read the text in **BOTH** documents.

**Focussing Questions**

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| <p>6.a. Would a proposal for the disclosure of the assumptions, risks and a cautionary statement provide investors with a better basis to evaluate the reported forward looking information and reduce the potential for it to not fully inform investors?</p>   |
| <p>6.b. What are your views on whether specific disclosure requirements, including the requirement for a cautionary statement, would be effective in reducing the potential for the disclosure of production targets that include some exploration potential to confuse investors?</p>   |
| <p>6.c. Would it be preferable for the introduction of a prohibition on the disclosure of a production target and/or forecast financial information derived from a production target that includes or is based on estimates of potential tonnage and grade from an exploration target? Do you agree that given these estimates are conceptual in nature and that there is a very low level of geological confidence associated with the mineralisation that there is significant potential for the disclosure of production targets including exploration potential to confuse or mislead investors in a wide range of circumstances such that a prohibition may be justified?</p> |
| <p>6.d. Should it be a requirement that a company must have either reported Ore Reserves or be a demonstrated producer with Indicated and/or Measured Mineral Resources to be able to report production targets and forecast financial information? Further, could restricting such disclosure to these circumstances produce unintended consequences whereby there may be a wide range of circumstances outside the scope of the circumstances for which disclosure would be permitted where there may be a reasonable basis for the disclosure of production targets and for which the market would be better informed if the information had been disclosed?</p>                |
| <p>6.e. Should prohibiting the disclosure of production targets and forecast financial information derived from that production target based on a mix of Inferred, Indicated and Measured Mineral Resources (where the company is not a demonstrated producer) create an inconsistency with the continuous disclosure requirements under Listing Rule 3.1 because the information would be material?</p>   |

**Issue 7: Annual reporting of Mineral Resources and Ore Reserves**

Currently Clause 14 requires companies to review and publicly report, at least annually, on their Mineral Resources and Ore Reserves, but there is no requirement for them to report this information in their annual report.

Given the Mineral Resource and Ore Reserve holdings are such significant assets for mining companies and that the value of such assets are generally not reflected on the balance sheet in current value, there would appear to be a strong case for requiring the inclusion of relevant information relating to the Mineral Resource and Ore Reserve

holdings of a company in the annual report. It appears that perhaps companies do not all report an annual mineral resource and ore reserve statement in conjunction with their annual reports.

The reporting of the results of the annual review and of the company's Mineral Resources and Ore Reserves in the annual report would provide for additional transparency and investor accessibility to the estimates of all the Mineral Resources and Ore Reserves held by a company. It may also make it easier for investors to make year on year comparisons on the Mineral Resource and Ore Reserve holdings of the company and the company's performance in relation to converting exploration into Mineral Resources and converting Mineral Resources to Ore Reserves.

### ***Current requirements***

Currently Clause 14 requires companies to review and publicly report, at least annually, on their Mineral Resources and Ore Reserves, but there is no requirement for them to report this information in their annual report.

### ***Focussing questions***

- 7.a. Would a requirement for the disclosure of the results of the annual review and the Mineral Resources and Ore Reserves held by companies in the annual report provide additional accessibility of this information and generally be useful to investors?
- 7.b. Would a reconciliation and brief explanation of the main reasons for material changes in estimates of Mineral Resources and Ore Reserves from the preceding year in the annual report provide a useful source of information for investors on the Mineral Resources and Ore Reserves across the operations of a company?
- 7.c. Would a requirement for a reconciliation of the estimates of Mineral Resources and Ore Reserves in the annual report involve a significant compliance cost?
- 7.d. Should a requirement for a reconciliation of the estimates of Mineral Resources and Ore Reserves in the annual report prescribe the form which it takes, that is, tabular or narrative, or is it more appropriate to allow the company to determine the most effective method of communicating this information based on the level of detail adopted in reporting the estimates?

## **Issue 8: Accountability of Competent Persons**

Some stakeholders have raised some concerns about the potential for, and the perception of, a conflict of interest or impartiality on the part of Competent Persons in classifying and estimating Mineral Resources and Ore Reserves, and in the Competent Persons' roles in providing consent to the inclusion of information on Mineral Resources and Ore Reserves (in relation to the form and context in which it appears) in public reports by companies.

These concerns largely stem from the critical role the Competent Person plays in determining what is likely to be the most significant assets of the company and the fact that they have considerable freedom to apply their experience and judgement under the JORC Code in performing this role.

The JORC Code provides a mandatory system for the classification of tonnage/grade estimates according to geological confidence and technical and economic considerations in public reporting and it provides extensive criteria to be considered in preparing such Public Reports. However, it does not regulate the procedures used by Competent Persons to estimate and classify Mineral Resources and Ore Reserves.

The scope for Competent Persons to exercise discretion and apply their judgement is necessitated by the fact that it would be practically impossible and unreasonably prescriptive to have guidelines that would be applicable to all the different commodities, deposit types and companies. The current approach works under the JORC Code not only

because it prescribes minimum criteria to be a Competent Person, but because Competent Persons are accountable for their actions.

Competent Persons are subject to professional codes of ethics and the disciplinary procedures of the professional organisations to which they belong. They may also be subject to statutory liability under the Corporations Act. However, there may be scope to better manage the perception of conflicts in relation to Competent Persons and to strengthen the accountability of Competent Persons by requiring greater transparency around the public reporting process.

### **Current requirements**

Clause 8 of the JORC Code states A Public Report concerning a company's Exploration Results, Mineral Resources or Ore 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 or Persons. A company issuing a Public Report shall disclose the name(s) of the Competent Person or Persons, state whether the Competent Person is a full-time employee of the company, and, if not, name the Competent Person's employer. The report shall be issued with the written consent of the Competent Person or Persons as to the form and context in which it appears.

The JORC Code also requires that the Competent Person statement of consent include the disclosure of the professional organisation to which the Competent Person belongs, the employment details of the Competent Person (i.e. whether the Competent Person is a full-time employee of the company and, if not, who the employer is) and an attestation that the Competent Person has sufficient experience that is relevant to the style of mineralisation and the type of deposit to qualify as a Competent Person consistent with the requirements in the JORC Code.

Under Clause 10 of the JORC Code, a Competent Person must meet the following criteria:

- is a Member or Fellow of the AusIMM or AIG or of a 'Recognised Overseas Professional Organisation' (which is published on the ASX and JORC websites); and
- have a minimum of five years experience which is relevant to the style of mineralisation, the type of deposit under consideration and to the activity that is being undertaken (e.g. whether it be exploration or estimating Mineral Resources or estimating Ore Reserves).

The guidelines associated with Clause 10 outline what is meant by the term 'relevant experience'.

Complaints made with respect to the professional work of a Competent Person are dealt with under the disciplinary procedures of the professional organisation to which the Competent Person belongs. Complaints may be made by any person or organisation to the relevant professional society. The AusIMM, AIG and the ROPO organisations have complaints and ethics committee processes to consider such complaints and the AusIMM, AIG and ROPO organisations have a range of powers from a reprimand through to expulsion of the member.

A range of additional disclosure measures may provide greater transparency and reduce the perception of possibility of potential conflicts of interest.

### **Focussing Questions**

- 8.a. Would the introduction of a requirement for the disclosure of the equity interests, or options or other rights to acquire such interests, held by a Competent Person in the company or a related party of the company or in another company with an interest in the mineral project provide a useful mechanism for managing perceptions of conflict of interest on the part of Competent Persons? Should such disclosure be provided in the Competent Person statement included in, or attached to, the disclosure of Exploration Results, Mineral Resources and Ore Reserves?
- 8.b. Would a requirement for the disclosure of the key assumptions and the key scientific and technical information

relevant to Exploration Results and underpinning estimates of Mineral Resources and Ore Reserves strengthen the accountability of Competent Persons by providing for the disclosure of sufficient information to enable peer scrutiny?

- 8.c. Should there be an additional requirement for an independent Competent Person sign-off when determining and reporting initial Mineral Resources and Ore Reserves?

## Issue 9: Inclusion of relevant material from the ASX Companies Updates issued in collaboration with JORC since the release of the 2004 JORC Code

A marked-up version of the 2004 JORC Code incorporating proposed amendments to the JORC Code resulting from the ASX Companies Updates 03/08 and 03/07 is included as a draft of the 2012 JORC Code, Attachment 1. In addition, the draft of the 2012 JORC Code includes some minor 'housekeeping' type amendments, for example, to update the names of organisations and ensure consistency in the use of the terms 'report' and 'documentation'. Principal changes include:

1. a Competent Person's Consent Form (see page 5 and Appendix 2 at page 30 of Attachment 1);
2. guidance on the need for sampling information to estimate a Mineral Resource (see page 10 of Attachment 1);
3. the requirement for sufficient supporting information to be disclosed to the market for the purpose of evaluating and assessing risk when an Inferred Mineral Resource is reported (see page 11 of Attachment 1);
4. guidance relevant to circumstances where the estimation of an Inferred Mineral Resource is on the basis of extrapolation, that is, an estimation that extends to an area beyond that of the sample data (see page 11 of Attachment 1);
5. requirements and guidance for the reporting of metal equivalents (see page 22 of Attachment 1);
6. requirements and guidance for the reporting of In Situ or In-Ground value (see page 22 of Attachment 1); and
7. explanatory material on sampling techniques in the section "Sampling Techniques and Data" in Table 1 (see page 24 of Attachment 1).

JORC notes that these issues have already been the subject of industry consultation in 2005 and also associated with the introduction of the ASX Companies Updates, hence JORCs inclusion of these amendments directly into the amended JORC Code.

### ***Focussing Question***

- 9.a What are your views on the inclusion of the material set above from ASX Companies Updates 03/08 and 03/07 in the JORC Code?

## Issue 10: Adoption of proposed CRIRSCO core standard definitions

It is proposed that the definitions of Public Report, Competent Person, Modifying Factors, Exploration Results, Mineral Resources (Measured, Indicated and Inferred), Mineral (Ore) Reserves (Proved and Probable) in the JORC Code be replaced by the CRIRSCO core standard definitions for these terms together with the CRIRSCO definitions of Pre-Feasibility Study and Feasibility Study to facilitate greater international harmonisation in reporting standards.

CRIRSCO has established a set of core standard definitions for inclusion in the reporting standards of all CRIRSCO members subject to the agreement of the respective National Reporting Organisations (NROs). The definitions were agreed in principle at the CRIRSCO meetings on 28<sup>th</sup> and 29<sup>th</sup> October 2010 in Moscow. The purpose of the CRIRSCO initiative is to realign the core definitions through all the CRIRSCO family of Standards and Codes following the departure from the 1998 Denver Accord definitions by all NROs over the last decade. Harmonisation of the core standard definitions will also facilitate uniform reference to these Codes and the CRIRSCO Template by the IASB in a potential international financial reporting standard for the extractive industries and the UNECE in the UN Framework Classification. The CRIRSCO core standard definitions are marked-up on the draft of the 2012 JORC Code included as Attachment 1.

### ***Focussing Question***

10.a. What are your views on the adoption of the CRIRSCO core standard definitions in the JORC Code as marked-up in Attachment 1?

## **Other issues for feedback**

Feedback is also sought on the following issues.

1. **Whether the definition of a Public Report should be amended to explicitly include presentations used in briefing investors, their advisers and analysts.** Some companies have previously questioned whether a presentation used in briefing investors, their advisers and analysts is a Public Report for the purposes of complying with the JORC Code, in particular, in relation to the requirement for Competent Person sign-off. Both ASX and JORC consider that these presentations are Public Reports, since they are **prepared for the purpose of informing investors or potential investors and their advisers** and, as such, the disclosure of Exploration Results and estimates of Mineral Resources and Ore Reserves in PowerPoint presentations must be in compliance with the JORC Code.
2. **Whether consideration should be given to amending the Competent Person sign-off requirements for investor presentations.** Some Competent Persons have raised concerns in relation to the appropriateness of the requirement for the same type of Competent Person sign-off for investor presentations as that required for all other Public Reports disclosing Exploration Results and estimates of Mineral Resources and Ore Reserves given the inherent limitations to ensuring a PowerPoint presentation fully complies in its own right with the JORC Code (for example, the difficulty of including all material information relevant to the results or estimate in a PowerPoint presentation). It has been suggested that with the increasing use of PowerPoint presentations for Public Reporting since the publication of the 2004 JORC Code, the requirement for the full Competent Person sign-off has created difficulties for both Companies and Competent Persons. Consideration is being given to whether the full Competent Person sign-off should continue to be required for investor presentations or whether a modified Competent Person sign-off and statement should be introduced. Consideration could be given to allowing a modified Competent Person statement for investor presentations (for instance PowerPoint presentations where no new information is being presented similar to the following:
 

“Information in this presentation regarding Exploration Results, Mineral Resources and/or Ore Reserves has previously been disclosed by the company in a Public Report (include reference). No new information is being disclosed. The Exploration Results, Mineral Resources and/or Ore Reserves are considered by (...Competent Person name...), who is a Competent Person as defined in the JORC Code to be a fair and reasonable summary of the information extracted from the referenced Public Report(s).”
3. **Whether the Australian Coal Guidelines continue to be relevant and, if so, whether they should be reviewed and updated for reference in the revised JORC Code.** A group has been formed to review the Australian Guidelines for Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves (Coal Guidelines). At seminars held in the Hunter Valley and Brisbane in late 2010, significant consideration was given to whether the Coal Guidelines should be updated or abandoned. While there was considerable support

for the Guidelines being abandoned, there was general agreement that a best practice volume should be prepared prior to their abandonment. In the event that a best practice volume cannot be developed in prior to the revisions to the JORC Code taking effect, should the Coal Guidelines be reviewed and updated for reference in the revised JORC Code.

4. **Whether it would be beneficial to have additional explanation of the requirement under the JORC Code to report all material information relevant to a project the subject of a Public Report.** It has been suggested that there is some confusion between when a company is required to disclose information related to a mineral project in accordance with its continuous disclosure obligations (i.e. the company's obligation under Listing Rule 3.1 to announce to the market "...any information concerning it that a reasonable person would expect to have a material effect on the price or value of the [company's] securities...") and what information should be included in a Public Report (once a company has taken the decision to publicly report on a mineral project) for the purpose of complying with the JORC Code. Whenever a company publicly reports on a mineral project (whether as a result of fulfilling its continuous disclosure obligations or because the company decides to voluntarily report on a project even if that report is not one that would have to be made under the continuous disclosure obligations), a company is required under the JORC Code to include all material information relevant to what is being reported in the said Public Report.
5. **Whether the requirements for the reporting of Marketable Reserves should apply to all bulk commodities.** Under Clause 39 of the JORC Code, the reporting requirements for Marketable Reserves currently only apply to coal. Given the marketable material may be different to the relevant Ore Reserve estimate and the importance of this information to investors, it is proposed that Clause 39 of the JORC Code relating exclusively to coal be deleted, that a new paragraph be added to Clause 28 on the reporting requirements of Marketable Reserves and that additional guidance be provided setting out the bulk commodities covered:
  1. proposed Clause 28 text – For bulk commodities, 'Marketable Reserves', representing beneficiated or otherwise enhanced 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 Ore Reserves. The basis of the predicted yield to achieve Marketable Reserves must be stated.
  2. proposed guidance associated with Clause 28 – Bulk commodities include coal, iron ore, bauxite, phosphate and certain industrial minerals. This term does not apply to the reporting of metal produced from traditional metallurgical plants. The purpose of reporting Marketable Reserves is to provide investors with a more realistic report of the potential economics of the project.

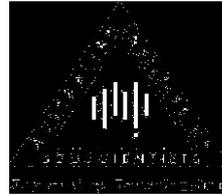
**ATTACHMENT 1 – DRAFT OF 2012 JORC CODE**

# Draft 2004-2012 Edition

MODIFIED MAY 2011

## **Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (The JORC Code)**

**AusIMM**  
AUSTRALASIAN INSTITUTE OF MINING & METALLURGY



**Prepared by the Joint Ore Reserves Committee of The Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia (JORC)**

Effective [???? 200412](#)

## Foreword

1. The *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves* (the 'JORC Code' or 'the Code') sets out minimum standards, recommendations and guidelines for Public Reporting in Australasia of Exploration Results, Mineral Resources and Ore Reserves. The Joint Ore Reserves Committee ('JORC') was established in 1971 and published several reports containing recommendations on the classification and Public Reporting of Ore Reserves prior to the release of the first edition of the JORC Code in 1989.

Revised and updated editions of the Code were issued in 1992, 1996 and 1999. This 2004 edition supersedes all previous editions.

Concurrently with the evolution of the JORC Code, the [Committee for Mineral Reserves International Reporting Standards Combined Reserves International Reporting Standards Committee](#) ('CRIRSCO'), initially a committee of the Council of Mining and Metallurgical Institutions ('CMMI'), has, since 1994, been working to create a set of standard international definitions for reporting Mineral Resources and Mineral (Ore) Reserves, modelled on those of the JORC Code.

Representatives of bodies from participating countries (Australia, Canada, South Africa, USA and UK) reached provisional agreement on standard definitions for reporting in 1997. This was followed in 1998 by an agreement to incorporate the CMMI definitions into the International Framework Classification for Reserves and Resources – Solid Fuels and Mineral Commodities, developed by the United Nations Economic Commission for Europe ('UN-ECE').

As a result of the CRIRSCO/CMMI initiative, considerable progress has been made towards widespread adoption of consistent reporting standards throughout the world. These are embodied in the similar codes, guidelines and standards published and adopted by the relevant professional bodies in Australia, Canada, [Chile](#), [Philippines](#), South Africa, USA, UK, Ireland and many countries in Europe. The definitions in this edition of the JORC Code are either identical to, or not materially different from, those international definitions.

**Comment [p1]:** The current name for CRIRSCO

**Comment [p2]:** Added for completeness.

## Introduction

2. In this edition of the JORC Code, important terms and their definitions are highlighted in **bold** text. The guidelines are placed after the respective Code clauses using *indented italics*. They are intended to provide assistance and guidance to readers. They do not form part of the Code, but should be considered persuasive when interpreting the Code. Indented italics are also used for Appendix 1 – '*Generic Terms and Equivalentents*', and Table 1 – '*Check List of Assessment and Reporting Criteria*' to make it clear that they are also part of the guidelines, and that the latter is not mandatory for reporting purposes.
3. The Code has been adopted by The Australasian Institute of Mining and Metallurgy ('The AusIMM') and the Australian Institute of Geoscientists ('AIG')

and is therefore binding on members of those organisations. It is endorsed by the Minerals Council of Australia, and the Securities Institute of Australia as a contribution to good practice. The Code has also been adopted by and included in the listing rules of the Australian [Securities Exchange](#) ('ASX') and the [New Zealand Stock Exchanges](#) ('NZX').

*The ASX and NZX have, since 1989 and 1992 respectively, incorporated the Code into their listing rules. Under these listing rules, a Public Report must be prepared in accordance with the Code if it includes a statement on Exploration Results, Mineral Resources or Ore Reserves. The incorporation of the Code imposes certain specific requirements on mining or exploration companies reporting to the ASX and NZX. The 2004 edition of the Code has included much of the relevant*

material previously found only in the listing rules concerning the reporting of Exploration Results and the naming of the Competent Person. Despite the inclusion of this material in the Code it is strongly recommended that users of the Code familiarise themselves with those listing rules which relate to Public Reporting of Exploration Results, Mineral Resources and Ore Reserves.

The JORC Code requires the Competent Person(s), on whose work the Public Report

of Exploration Results, Mineral Resources or Ore Reserves is based, to be named in the report. The report or attached statement must say that the person consents to the inclusion in the report of the matters based on their information in the form and context in which it appears, and must include the name of the person's firm or employer. Refer to Clause 8 of the Code.

## Scope

4. The main principles governing the operation and application of the JORC 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 contains 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 Ore 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.

5. Reports comprise reports prepared for the purpose of informing investors or potential investors and their advisers on Exploration Results, Mineral Resources or Ore Reserves.

They include, but are not limited to annual and quarterly company reports, press releases, information memoranda, technical papers, website postings and public presentations.

~~Reference in the Code to a Public Report or Public Reporting is to a report or reporting on Exploration Results, Mineral Resources or Ore Reserves, prepared for the purpose of informing investors or potential investors and their advisers.~~

**This includes a report or reporting to satisfy regulatory requirements.**

*The Code is a required minimum standard for Public Reporting. JORC 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.*

*Public Reports include but are not limited to: company annual reports, quarterly reports and other reports to the Australian Securities Exchange and the New Zealand Stock Exchanges, or as required by law. The Code applies to other publicly released company information in the form of postings on company web sites and 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: environmental statements; Information Memoranda; Expert Reports, and technical papers referring to Exploration Results, Mineral Resources or Ore Reserves.*

*For companies issuing concise annual reports, ~~or other summary reports,~~ inclusion of all material information relating to Exploration Results, Mineral Resources and Ore 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-*

**Comment [p4]:** It was resolved that we would remove reference to "other summary reports" as the term was vague and created issues with whether reports of this type are not public reports.

**Comment [p3]:** CRIRSCO proposed core standard definition.

*compliant Public Reports or Public Reporting on which the summary is based.*

*It is recognised 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 members of The AusIMM and the AIG 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 State and Federal Government agencies for statutory purposes, where 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 JORC Code (see also guidelines to Clauses 19 and 37).*

*Reference in the Code to 'documentation' is to internal company documents prepared as a basis for, or to support, a Public Report.*

*It is recognised that situations may arise where documentation prepared by Competent Persons for internal company or similar non-public purposes does not comply with the JORC Code. In such situations, it is recommended that the documentation includes 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 Ore Reserve estimates, and supporting documentation, prepared by a Competent Person.*

*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 Ore 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 Ore Reserves is required by the Australian [Securities Exchange](#) and [the](#) New Zealand Stock Exchanges.

*The JORC Code is cited by the 'Code and Guidelines for Technical Assessment and/or Valuation of Mineral and Petroleum Assets and Mineral and Petroleum Securities for Independent Expert Reports' (the 'VALMIN Code') as the applicable standard for the public reporting of Exploration Results, Mineral Resources and Ore Reserves. References to 'technical and economic studies' and 'feasibility studies' in the JORC Code are not intended as references to Technical Assessments or Valuations as defined in the VALMIN Code.*

7. JORC recognises that further review of the Code and Guidelines will be required from time to time.

## Competence and Responsibility

8. A Public Report concerning a company's Exploration Results, Mineral Resources or Ore 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 or Persons. A company issuing a Public Report shall disclose the name(s) of the Competent Person or Persons, state whether the Competent Person is

a full-time employee of the company, and, if not, name the Competent Person's employer. The report shall be issued with the written consent of the Competent Person or Persons 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 Ore Reserves is based on information compiled by (insert name of Competent Person), who is a Member or Fellow of The Australasian Institute of Mining and Metallurgy or the Australian Institute of Geoscientists or a ‘Recognised Overseas Professional Organisation’ (‘ROPO’) included in a list promulgated by the ASX from time to time (select as appropriate and if a ROPO insert name of ROPO)”:* or

- 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 Ore Reserves is based on information compiled by (insert name of Competent Person), who is a Member or Fellow of The Australasian Institute of Mining and Metallurgy or the Australian Institute of Geoscientists or a ‘Recognised Overseas Professional Organisation’ (‘ROPO’) included in a list promulgated by the ASX from time to time (select as appropriate and if a ROPO insert name of ROPO)”.*

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

*“(Insert name of Competent Person) is a full-time employee of the company”.*

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

*“(Insert name of Competent Person) is employed by (insert name of Competent Person’s employer)”.*

- For all reports:

*“(Insert name of Competent Person) has sufficient experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which he (or she) is undertaking to qualify as a Competent Person as defined in the 2004 Edition of the ‘Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves’. (Insert name of Competent Person) 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”.*

*In order to assist Competent Persons and companies to comply with these*

*requirements a Competent Person’s Consent Form has been devised that incorporates the requirements of the Code. The Competent Person’s Consent Form is provided in Appendix 2.*

*The completion of a consent form, whether in the format provided or in an equivalent form, is recommended as good practice and provides readily available evidence that the required written consent has been obtained.*

*The Competent Person’s Consent Form(s), or other evidence of the Competent Person’s written consent, should be retained by the company and the Competent Person to ensure that the written consent can be promptly provided if required.*

9. Documentation detailing Exploration Results, Mineral Resource and Ore Reserve estimates, on which a Public Report on Exploration Results, Mineral Resources and Ore Reserves is based, must be prepared by, or under the direction of, and signed by, a Competent Person or Persons. The documentation must provide a fair representation of the Exploration Results, Mineral Resources or Ore Reserves being reported.

10. **A ‘Competent Person’ is a minerals industry professional who is a Member or Fellow of The Australasian Institute of Mining and Metallurgy, or of the Australian Institute of Geoscientists, or of a ‘Recognised Overseas Professional Organisation’ (‘ROPO’) included in a list promulgated from time to time, with enforceable disciplinary processes including the powers to suspend or expel a member.**

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

~~**A ‘Competent Person’ is a person who is a Member or Fellow of The Australasian Institute of Mining and Metallurgy, or of the Australian Institute of Geoscientists, or of a ‘Recognised Overseas Professional**~~

**Comment [p5]:** CRIRSCO proposed core standard definition.

**Organisation' ('ROPO') included in a list promulgated from time to time.**

~~A 'Competent Person' must have a minimum of five years experience which is relevant to the style of mineralisation and type of deposit under consideration and to the activity which that person is undertaking.~~

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

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

*The key qualifier in the definition of a Competent Person 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 mineralisation, experience in a high-nugget, vein-type mineralisation 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 in the estimation of Ore Reserves for alluvial gold deposits, considerable (probably at least five years) experience in the evaluation and economic extraction of this type of mineralisation would be needed. This is due to the characteristics of gold in alluvial systems, the particle sizing of the host sediment, and the low grades involved.*

*Experience with placer deposits containing minerals other than gold may not necessarily provide appropriate relevant experience.*

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

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

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

*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 Ore 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 and his or her contribution should be identified, and responsibility accepted for that particular contribution. If only one Competent Person signs the Mineral Resource or Ore 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*

**Comment [p6]:** The Competent Person prepares the documentation, the company prepares the report. An oversight in the 2004 Code.

accepting overall responsibility for a Mineral Resource or Ore 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 will be dealt with under the disciplinary procedures of the professional organisation to which the Competent Person belongs.

When an Australian *Securities Exchange* or New Zealand Stock Exchange listed company with overseas interests wishes to

report overseas Exploration Results, Mineral Resource or Ore Reserve estimates prepared by a person who is not a member of The AusIMM, the AIG or a ROPO, it is necessary for the company to nominate a Competent Person or Persons to take responsibility for the Exploration Results, Mineral Resource or Ore Reserve estimate. The Competent Person or Persons undertaking this activity should appreciate that they are accepting full responsibility for the estimate and supporting documentation under ~~Stock~~ *Securities* Exchange listing rules and should not treat the procedure merely as a 'rubber-stamping' exercise.

## Reporting Terminology

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

**'Modifying Factors' are used to convert Mineral Resources to Mineral Reserves and include mining, processing, metallurgical, economic, marketing, legal, environmental, social and governmental considerations.**

**The term 'Modifying Factors' is defined to include mining, metallurgical, economic, marketing, legal, environmental, social and governmental considerations.**

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. Mineral Resources can be estimated mainly by a geologist on the basis of geoscientific information with some input from other disciplines. Ore Reserves, which are a

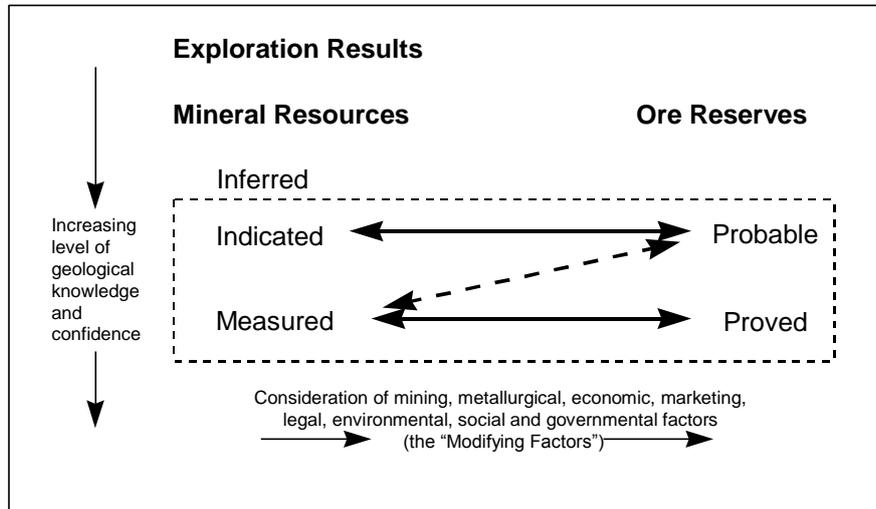
modified sub-set of the Indicated and Measured Mineral Resources (shown within the dashed outline in Figure 1), require consideration of the Modifying Factors affecting extraction, and should in most instances be estimated with input from a range of disciplines.

Measured Mineral Resources may convert to either Proved Ore Reserves or Probable Ore Reserves. The Competent Person may convert Measured Mineral Resources to Probable Ore 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 Ore Reserves. This relationship is shown by the broken arrow in Figure 1. 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.

Refer also to the guidelines to Clause 31.

**Comment [p7]:** CRIRSCO proposed concise core standard definition.

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



## Reporting – General

12. Public Reports concerning a company’s Exploration Results, Mineral Resources or Ore Reserves should include a description of the style and nature of the mineralisation.
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 Ore Reserves.
14. Companies must review and publicly report on their Mineral Resources and Ore 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 of Exploration Results

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

~~Exploration Results include data and information generated by exploration programmes that may be of use to investors. The Exploration Results may or may not be part of a formal declaration of Mineral Resources or Ore 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 mineralisation not classified as a Mineral Resource or an Ore Reserve, then estimates of tonnages and average grade must not be assigned to the mineralisation 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.*

**Comment [p8]:** CRIRSCO proposed core standard definition.

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 mineralisation has been discovered.

If true widths of mineralisation 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:

- either by listing all results, along with sample intervals (or size, in the case of bulk samples), or
- by reporting weighted average grades of mineralised 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 check list and guideline to which those preparing reports on Exploration Results, Mineral Resources and Ore Reserves should refer. The check list is not prescriptive and, as always, relevance and materiality are overriding principles which determine what information should be publicly reported.*

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

- 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 Ore 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.

**Comment [p9]:** Reformatted cautionary statements

## Reporting of Mineral Resources

19. **A ‘Mineral Resource’ is a concentration or occurrence of material of 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, continuity and other geological characteristics of a Mineral Resource are known, estimated or interpreted from specific geological evidence and knowledge, including sampling.**

~~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. Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.~~

**Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories.**

**Comment [p10]:** CRIRSCO proposed core standard definition.

All reports of Mineral Resources must satisfy the requirement that there are reasonable prospects for eventual economic extraction, regardless of the classification of the resource.

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.

Geological evidence and knowledge required for the estimation of Mineral Resources must include sampling data of a type, and at a spacing, appropriate to the geological, chemical, physical, and mineralogical complexity of the mineral occurrence, for all classifications of Inferred, Indicated and Measured Mineral Resources.

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

A Mineral Resource cannot be estimated in the absence of sampling information.

*The term 'reasonable prospects for eventual economic extraction' implies a judgement (albeit preliminary) by the Competent Person in respect of the technical and economic factors likely to influence the prospect of economic extraction, including the approximate mining parameters. In other words, a Mineral Resource is not an inventory of all mineralisation drilled or sampled, regardless of cut-off grade, likely mining dimensions, location or continuity. It is a realistic inventory of mineralisation 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, Mineral Resource estimates may include material below the selected cut-off grade to ensure that the Mineral Resources comprise bodies of*

*mineralisation 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 (eg: 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 mineralisation, including some material that does not have reasonable prospects for eventual economic extraction. Such estimates of mineralisation would not qualify as Mineral Resources or Ore Reserves in terms of the JORC 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 evidence and sampling.**

**Geological evidence is sufficient to imply but not verify geological and grade continuity.**

**An Inferred Resource has a lower level of confidence than that applying to an Indicated Mineral Resource and must not be converted to an Ore Reserve.**

**Comment [p11]:** CRIRSCO proposed core standard definition, as amended 2010507 by removing "directly" from the first modification.

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

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

It is based on information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes which may be limited or of uncertain quality and reliability.

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

Where the Mineral Resource being reported is predominantly an Inferred Mineral Resource, sufficient supporting information must be provided to enable the reader to evaluate and assess the risk associated with the reported 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 will 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 planning. For this reason, there is no direct link from an Inferred*

*Resource to any category of Ore Reserves (see Figure 1).*

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

*In circumstances where the estimation of the Inferred Resource is presented on the basis of extrapolation, that is, an estimation that extends to an area beyond that of the sample data, the principles of Materiality and Transparency require the report to contain sufficient information to inform the reader of:*

- the maximum distance that the resource is extrapolated beyond the sample points;*
- the proportion of the resource that is based on extrapolated data;*
- the basis on which the resource is extrapolated to these limits; and*
- a diagrammatic representation of the Inferred Resource showing clearly the extrapolated part of the estimated resource.*

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 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 Ore Reserve.**

~~An ‘Indicated Mineral Resource’ is that part of a Mineral Resource for which tonnage, densities, shape, physical characteristics, grade and mineral content can be estimated with a reasonable level of confidence. It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The~~

**Comment [p12]:** CRIRSCO proposed core standard definition.

~~locations are too widely or inappropriately spaced to confirm geological and/or grade continuity but are spaced closely enough for continuity to be assumed.~~

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

~~It is based on exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are too widely or inappropriately spaced to confirm geological and/or grade continuity but are spaced closely enough for continuity to be assumed.~~

~~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.~~

*Mineralisation 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 mineralisation.*

*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 continuity.**

**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 Ore Reserve or under certain circumstances to a Probable Ore Reserve.**

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

It is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. The locations are spaced closely enough to confirm geological and grade continuity.

*Mineralisation may be classified as a Measured Mineral Resource when the nature, quality, amount and distribution of data are such as to leave no reasonable doubt, in the opinion of the Competent Person determining the Mineral Resource, that the tonnage and grade of the mineralisation 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. The appropriate Mineral Resource category must be determined by a Competent Person or Persons.

Comment [p13]: CRIRSCO proposed core standard definition.

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*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 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 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 mineralisation 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 mineralisation.*

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 tonnes at 8.23 per cent should be stated as 11 million tonnes 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 emphasise the imprecise nature of a Mineral Resource estimate, the final result should always be referred to as an estimate not a calculation.*

*Competent Persons 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 Ore 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 Ore 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 Ore 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.*

*It is not intended that re-classification from Ore 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.*

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 re-evaluation indicates that the Ore Reserves are no longer viable, the Ore Reserves must be reclassified as Mineral Resources or removed from Mineral Resource/Ore Reserve statements.

## Reporting of Ore Reserves

28. **An 'Ore Reserve' is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined and is defined by studies at**

**Pre-Feasibility or Feasibility level as appropriate that include consideration of realistically assumed Modifying Factors. Such studies demonstrate that, at the time of reporting, extraction could reasonably be justified.**

**Comment [p14]:** CRIRSCO proposed core standard definition.

~~An 'Ore Reserve' is the economically mineable part of a Measured and/or Indicated Mineral Resource. It includes diluting materials and allowances for losses, which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified. Ore Reserves are sub-divided in order of increasing confidence into Probable Ore Reserves and Proved Ore Reserves.~~

Ore Reserves are sub-divided in order of increasing confidence into Probable Ore Reserves and Proved Ore Reserves.

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

Pre-feasibility and Feasibility studies are defined in Paragraphs 35 and 36 below.

*Ore 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 making the estimates, can be the basis of a viable project, after taking account of all relevant Modifying Factors.*

*Ore 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 Ore 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 studies will have been carried out prior to determination of the Ore Reserves. The studies will have determined a*

*mine plan that is technically achievable and economically viable and from which the Ore Reserves can be derived. It may not be necessary for these studies to be at the level of a final feasibility study.*

*The term 'Ore 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 Ore 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 'Mineral Reserves' in their Public Reports, e.g. for reporting industrial minerals or for reporting outside Australasia, they should state clearly that this is being used with the same meaning as 'Ore Reserves', defined in this Code. If preferred by the reporting company, 'Ore Reserve' and 'Mineral Resource' estimates for coal may be reported as 'Coal Reserve' and 'Coal Resource' estimates.*

*JORC prefers the term 'Ore Reserve' because it assists in maintaining a clear distinction between a 'Mineral Resource' and an 'Ore Reserve'.*

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

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

~~**A 'Probable Ore Reserve' is the economically mineable part of an Indicated, and in some circumstances, a Measured Mineral Resource. It includes diluting materials and allowances for losses**~~

**Comment [p15]:** CRIRSCO proposed core standard definition.

~~which may occur when the material is mined. Appropriate assessments and studies have been carried out, and include consideration of and modification by realistically assumed mining, metallurgical, economic, marketing, legal, environmental, social and governmental factors. These assessments demonstrate at the time of reporting that extraction could reasonably be justified.~~

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

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

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

31. The choice of the appropriate category of Ore Reserve is determined primarily by the relevant level of confidence in the Mineral Resource and after considering any uncertainties in the Modifying Factors. Allocation of the appropriate category must be made by a Competent Person or Persons.

*The Code provides for a direct two-way relationship between Indicated Mineral*

*Resources and Probable Ore Reserves and between Measured Mineral Resources and Proved Ore Reserves. In other words, the level of geological confidence for Probable Ore Reserves is similar to that required for the determination of Indicated Mineral Resources, and the level of geological confidence for Proved Ore 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 Ore Reserves. This is to cover a situation where uncertainties associated with any of the Modifying Factors considered when converting Mineral Resources to Ore Reserves may result in there being a lower degree of confidence in the Ore 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 Ore Reserve derived from a Measured Mineral Resource may be converted to a Proved Ore 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 an Ore 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 Ore Reserve (see Figure 1).*

*Application of the category of Proved Ore 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 categorising a Mineral Resource as Measured.*

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

32. Ore 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 emphasise the imprecise nature of an Ore Reserve, the final result should always*

**Comment [p16]:** CRIRSCO proposed core standard definition.

*be referred to as an estimate not a calculation.*

*Competent Persons are encouraged, where appropriate, to discuss the relative accuracy and/or confidence of the Ore 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 Ore Reserves must specify one or other or both of the categories of 'Proved' and 'Probable'. Reports must not contain combined Proved and Probable Ore 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.*

*Ore 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 Ore Reserves is borne in mind and caution exercised if attempting to draw conclusions from a comparison of the two.*

*When revised Ore 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 Ore 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 Ore Reserves.

Ore 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 Ore Reserves and in other situations for reporting Mineral Resources additional to Ore 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 Ore Reserves.'* or

*'The Measured and Indicated Mineral Resources are additional to the Ore Reserves.'*

*In the former case, if any Measured and Indicated Mineral Resources have not been modified to produce Ore 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 Ore Reserves.*

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

*For reasons stated in the guidelines to Clause 33 and in this paragraph, the reported Ore 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. **A Preliminary Feasibility Study (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, in the case of underground mining, or**

the pit configuration, in the case of an open pit, is established and an effective method of mineral processing is determined. It includes a financial analysis based on reasonable assumptions on the Modifying Factors and the evaluation of any other relevant factors which are sufficient for a Competent Person, acting reasonably, to determine if all or part of the Mineral Resource may be converted to a Ore Reserve at the time of reporting. A Pre-feasibility Study is at a lower confidence level than a Feasibility Study.

**36. 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 realistically assumed Modifying Factors together with any other relevant operational factors 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.

37. 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 Ore Reserves. These criteria need not be discussed in a Public Report unless they materially affect estimation or classification of the Ore Reserves. Changes in economic or political factors alone may be the basis for significant changes in Ore Reserves and should be reported accordingly.

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

**Comment [p18]:** CRIRSCO proposed core standard definitions.

**Comment [p17]:** Added "at the time of reporting" to match with Feasibility Study and Ore Reserve definitions. That still requires discussion in CRIRSCO.

## Reporting of Mineralised Fill, Remnants, Pillars, Low Grade Mineralisation, Stockpiles, Dumps and Tailings

3638. The Code applies to the reporting of all potentially economic mineralised material. This can include mineralised fill, remnants, pillars, low grade mineralisation, 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 Ore Reserves. Unless otherwise stated, all other clauses of the Code (including Figure 1) apply.

*Any mineralised material as described in this clause can be considered to be similar to in situ mineralisation for the purposes of reporting Mineral Resources and Ore Reserves. Judgements about the mineability of such mineralised material should be made by professionals with relevant experience.*

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

*The above guidelines apply equally to low grade in situ mineralisation, sometimes referred to as 'mineralised 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 itemised separately in Public Reports, although they may be aggregated with total Mineral Resource and Ore 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. Mineralised material in the course of being processed (including leaching), if reported, should be reported separately.*

# Draft ~~2004~~ 2012 Edition

MODIFIED MAY 2011

## Reporting of Coal Resources and Reserves

~~37~~39. Clauses ~~37-39~~ to ~~39-41~~ of the Code address matters that relate specifically to the Public Reporting of Coal Resources and Reserves. Unless otherwise stated, Clauses 1 to 36 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 the 2003 edition of the 'Australian Guidelines for Estimating and Reporting of Inventory Coal, Coal Resources and Coal Reserves'. These guidelines do not override the provisions and intentions of the JORC Code for Public Reporting.*

*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 JORC Code does not cover such estimates. Refer also to the guidelines to Clauses 5 and 19.*

~~38~~40. The terms 'Mineral Resource(s)' and 'Ore 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.

~~39~~41. '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 Ore (Coal) Reserves. The basis of the predicted yield to achieve Marketable Coal Reserves should be stated.

## Reporting of Diamond Exploration Results, Mineral Resources and Ore Reserves

~~40~~42. Clauses ~~40-42~~ to ~~43-45~~ of the Code address matters that relate specifically to the Public Reporting of Exploration Results, Mineral Resources and Ore Reserves for diamonds and other gemstones. Unless otherwise stated, Clauses 1 to 36 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 Ore 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 JORC 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 specialised requirement for diamond valuation and the inherent difficulties and uncertainties in the estimation of diamond resources and reserves.*

~~44~~43. 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.*

**4244.** Where diamond Mineral Resource or Ore Reserve grades (carats per tonne) 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.

**4345.** For Public Reports dealing with diamond or other gemstone mineralisation, it is a requirement that any reported valuation of a parcel of diamonds or gemstones be accompanied by a statement verifying the independence of the valuation. 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 Ore Reserves, the valuation must be based on a parcel representative of the size, shape and colour 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 Ore Reserves for diamonds and other gemstones.*

## Reporting of Industrial Minerals Exploration Results, Mineral Resources and Ore Reserves

**4446.** Industrial minerals are covered by the JORC Code if they meet the criteria set out in Clauses 5 and 6 of the Code. For the purpose of the JORC 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 JORC 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 Ore Reserves for industrial minerals are the same as those for other deposit types covered by the JORC Code. It may be necessary, prior to the reporting of a Mineral Resource or Ore 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 Ore Reserve.*

*JORC's preference is that, if the saleable product is reported, it should be in conjunction with, not instead of, reporting of the Ore Reserve. However, it is recognised 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.*

## Reporting of Metal Equivalents

**47.** The reporting of Exploration Results, Mineral Resources or Ore Reserves for polymetallic deposits in terms metal equivalents (a single equivalent grade of one major metal) may be misleading unless additional details such as estimates of metal recoverability are also provided.

The metal equivalent grade is usually obtained by taking the *in situ* "value" (grade times price) of each of the individual metals, adding these "values" and calculating the grade of the same "value" of the primary reported metal.

The assumptions used for any reporting of metal equivalent values must be clearly stated. The reporting of metal equivalents must also adhere to the principles of Transparency, Materiality and Competence, as set out in Clause 4.

The following minimum information must accompany any report that includes reference to metal equivalents, in order to conform with these principles:

- individual assays—grades for all metals included in the metal equivalent calculation;
- assumed commodity prices for all metals. (Companies should disclose the actual

assumed prices. It is not sufficient to refer to a spot price without disclosing the price used in calculating the metal equivalent);

- assumed metallurgical recoveries for all metals and the basis on which the assumed recoveries are derived (metallurgical test work, detailed mineralogy, similar deposits, etc.);
- a clear statement that it is the company's opinion that all the elements included in the metal equivalents calculation have a reasonable potential to be recovered; and,
- the calculation formula used.

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

*Note, estimates of metallurgical recoveries for each metal are particularly important to calculate meaningful metal equivalents.*

*For many projects at the Exploration Results stage, metallurgical recovery information may not be available or able to be estimated with reasonable confidence.*

*Therefore, for many projects at the Exploration Results stage, reporting in terms of metal equivalents may not be appropriate.*

**Comment [p19]:** While the companies update says assays what was really intended was the grades for all metals making up the equivalent grade.

## Reporting of *In Situ* or *In-Ground* Values

48. The publication of 'in-situ' or 'in-ground values' breaches the principles of the Code (Clause 4) as the use of these terms is not transparent and lacks material information, it is also contrary to the intent of Clause 27 of the Code, and the terms should not be reported by companies in relation to Exploration Results, Mineral Resources or deposit size.

*The use of 'in-ground values' has little to no relationship to economic viability, value or potential returns to investors.*

*The term implies economic viability without considering the application of the Modifying Factors, (Clauses 11 and 28), in particular, the mining, metallurgical, economic, marketing, legal, environmental, social, and governmental considerations.*

*In determining project viability it is necessary to include all reasonable Modifying Factors (Clause 28) to determine the economic value that can be extracted from the mineralisation.*

*Many deposits with large 'in-ground values' are never developed because they have a negative Net Present Value when all reasonable Modifying Factors are considered.*

*By reporting an 'in-ground value' or 'in situ value' for Exploration Results or when evaluating deposits that commonly include large portions of Inferred Resources, companies are not necessarily representing the economic viability of the project, or the net economic value that can be extracted from the mineralisation.*

*The economically viable portion of a Mineral Resource is converted to Ore Reserves only after taking into account all Modifying Factors.*

## Table 1 Check List of Assessment and Reporting Criteria

Table 1 is a check list and guideline which those preparing reports on Exploration Results, Mineral Resources and Ore Reserves should use as a reference. The check list 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 Ore Reserves.

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  |
|--|--|
| <b>Sampling Techniques and Data</b><br>(criteria in this group apply to all succeeding groups) |  |
| Sampling techniques.   | <ul style="list-style-type: none"> <li>▪ <u>Nature and quality of sampling (eg. cut channels, random chips, or specific specialised industry standard measurement tools appropriate to the minerals under investigation, such as downhole gamma sondes, or handheld XRF instruments, etc).</u></li> <li>▪ <u>Include reference to measures taken to ensure sample representivity and the appropriate calibration of any measurement tools or systems used.</u></li> <li>▪ <u>Nature and quality of sampling (eg. cut channels, random chips etc.) and measures taken to ensure sample representivity.</u></li> </ul>   |
| Drilling techniques.   | <ul style="list-style-type: none"> <li>▪ <u>Drill type (eg. core, reverse circulation, open-hole hammer, rotary air blast, auger, Bangka etc.) and details (eg. 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.).</u></li> </ul>   |
| Drill sample recovery.   | <ul style="list-style-type: none"> <li>▪ <u>Whether core and chip sample recoveries have been properly recorded and results assessed.</u></li> <li>▪ <u>Measures taken to maximise sample recovery and ensure representative nature of the samples.</u></li> <li>▪ <u>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.</u></li> </ul>  |
| Logging.   | <ul style="list-style-type: none"> <li>▪ <u>Whether core and chip samples have been logged to a level of detail to support appropriate Mineral Resource estimation, mining studies and metallurgical studies.</u></li> <li>▪ <u>Whether logging is qualitative or quantitative in nature. Core (or costean, channel etc.) photography.</u></li> </ul>  |
| Sub-sampling techniques and sample preparation.  | <ul style="list-style-type: none"> <li>▪ <u>If core, whether cut or sawn and whether quarter, half or all core taken.</u></li> <li>▪ <u>If non-core, whether riffled, tube sampled, rotary split etc. and whether sampled wet or dry.</u></li> <li>▪ <u>For all sample types, the nature, quality and appropriateness of the sample preparation technique.</u></li> <li>▪ <u>Quality control procedures adopted for all sub-sampling stages to maximise representivity of samples.</u></li> <li>▪ <u>Measures taken to ensure that the sampling is representative of the in situ material collected.</u></li> <li>▪ <u>Whether sample sizes are appropriate to the grainsize of the material being sampled.</u></li> </ul> |
| Quality of assay data and laboratory tests.  | <ul style="list-style-type: none"> <li>▪ <u>The nature, quality and appropriateness of the assaying and laboratory procedures used and whether the technique is considered partial or total.</u></li> <li>▪ <u>Nature of quality control procedures adopted (eg. standards, blanks, duplicates, external laboratory checks) and whether acceptable levels of accuracy (ie. lack of bias) and precision have been established.</u></li> </ul>   |
| Verification of sampling and assaying.   | <ul style="list-style-type: none"> <li>▪ <u>The verification of significant intersections by either independent or alternative company personnel.</u></li> <li>▪ <u>The use of twinned holes.</u></li> </ul>   |
| Location of data points.   | <ul style="list-style-type: none"> <li>▪ <u>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.</u></li> <li>▪ <u>Quality and adequacy of topographic control.</u></li> </ul>  |
| Data spacing and distribution.   | <ul style="list-style-type: none"> <li>▪ <u>Data spacing for reporting of Exploration Results.</u></li> <li>▪ <u>Whether the data spacing and distribution is sufficient to establish the degree of geological and grade continuity appropriate for the Mineral Resource and Ore Reserve estimation procedure(s) and classifications applied.</u></li> <li>▪ <u>Whether sample compositing has been applied.</u></li> </ul>  |

| <b>Criteria</b>  | <b>Explanation</b>  |
|--|---|
| <i>Orientation of data in relation to geological structure.</i>  | <ul style="list-style-type: none"> <li>▪ <i>Whether the orientation of sampling achieves unbiased sampling of possible structures and the extent to which this is known, considering the deposit type.</i></li> <li>▪ <i>If the relationship between the drilling orientation and the orientation of key mineralised structures is considered to have introduced a sampling bias, this should be assessed and reported if material.</i></li> </ul>  |
| <i>Audits or reviews.</i>  | <ul style="list-style-type: none"> <li>▪ <i>The results of any audits or reviews of sampling techniques and data.</i></li> </ul>  |
| <p><b>Reporting of Exploration Results</b><br/>(criteria listed in the preceding group apply also to this group)</p>   |   |
| <i>Mineral tenement and land tenure status.</i>  | <ul style="list-style-type: none"> <li>▪ <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></li> <li>▪ <i>The security of the tenure held at the time of reporting along with any known impediments to obtaining a licence to operate in the area.</i></li> </ul>  |
| <i>Exploration done by other parties.</i>  | <ul style="list-style-type: none"> <li>▪ <i>Acknowledgment and appraisal of exploration by other parties.</i></li> </ul>  |
| <i>Geology.</i>  | <ul style="list-style-type: none"> <li>▪ <i>Deposit type, geological setting and style of mineralisation.</i></li> </ul>  |
| <i>Data aggregation methods.</i>   | <ul style="list-style-type: none"> <li>▪ <i>In reporting Exploration Results, weighting averaging techniques, maximum and/or minimum grade truncations (eg. cutting of high grades) and cut-off grades are usually material and should be stated.</i></li> <li>▪ <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></li> <li>▪ <i>The assumptions used for any reporting of metal equivalent values should be clearly stated.</i></li> </ul> |
| <i>Relationship between mineralisation widths and intercept lengths.</i>   | <ul style="list-style-type: none"> <li>▪ <i>These relationships are particularly important in the reporting of Exploration Results.</i></li> <li>▪ <i>If the geometry of the mineralisation with respect to the drill hole angle is known, its nature should be reported.</i></li> <li>▪ <i>If it is not known and only the down-hole lengths are reported, there should be a clear statement to this effect (eg. 'downhole length, true width not known').</i></li> </ul>  |
| <i>Diagrams.</i>   | <ul style="list-style-type: none"> <li>▪ <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></li> </ul>  |
| <i>Balanced reporting.</i>   | <ul style="list-style-type: none"> <li>▪ <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></li> </ul>  |
| <i>Other substantive exploration data.</i>   | <ul style="list-style-type: none"> <li>▪ <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></li> </ul>  |
| <i>Further work.</i>   | <ul style="list-style-type: none"> <li>▪ <i>The nature and scale of planned further work (eg. tests for lateral extensions or depth extensions or large-scale step-out drilling).</i></li> </ul>  |
| <p><b>Estimation and Reporting of Mineral Resources</b><br/>(criteria listed in the first group, and where relevant in the second group, apply also to this group)</p> |   |
| <i>Database integrity.</i>   | <ul style="list-style-type: none"> <li>▪ <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></li> <li>▪ <i>Data validation procedures used.</i></li> </ul>   |
| <i>Geological interpretation.</i>  | <ul style="list-style-type: none"> <li>▪ <i>Confidence in (or conversely, the uncertainty of) the geological interpretation of the mineral deposit.</i></li> <li>▪ <i>Nature of the data used and of any assumptions made.</i></li> <li>▪ <i>The effect, if any, of alternative interpretations on Mineral Resource estimation.</i></li> <li>▪ <i>The use of geology in guiding and controlling Mineral Resource estimation.</i></li> <li>▪ <i>The factors affecting continuity both of grade and geology.</i></li> </ul>   |
| <i>Dimensions.</i>   | <ul style="list-style-type: none"> <li>▪ <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></li> </ul>   |

| <b>Criteria</b>   | <b>Explanation</b>  |
|---|---|
| <i>Estimation and modelling techniques.</i>   | <ul style="list-style-type: none"> <li>▪ <i>The nature and appropriateness of the estimation technique(s) applied and key assumptions, including treatment of extreme grade values, domaining, interpolation parameters, maximum distance of extrapolation from data points.</i></li> <li>▪ <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></li> <li>▪ <i>The assumptions made regarding recovery of by-products.</i></li> <li>▪ <i>Estimation of deleterious elements or other non-grade variables of economic significance (e.g. sulphur for acid mine drainage characterisation).</i></li> <li>▪ <i>In the case of block model interpolation, the block size in relation to the average sample spacing and the search employed.</i></li> <li>▪ <i>Any assumptions behind modelling of selective mining units.</i></li> <li>▪ <i>Any assumptions about correlation between variables.</i></li> <li>▪ <i>The process of validation, the checking process used, the comparison of model data to drillhole data, and use of reconciliation data if available.</i></li> </ul> |
| <i>Moisture.</i>  | <ul style="list-style-type: none"> <li>▪ <i>Whether the tonnages are estimated on a dry basis or with natural moisture, and the method of determination of the moisture content.</i></li> </ul>   |
| <i>Cut-off parameters.</i>  | <ul style="list-style-type: none"> <li>▪ <i>The basis of the adopted cut-off grade(s) or quality parameters applied.</i></li> </ul>   |
| <i>Mining factors or assumptions.</i>   | <ul style="list-style-type: none"> <li>▪ <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></li> </ul>   |
| <i>Metallurgical factors or assumptions.</i>  | <ul style="list-style-type: none"> <li>▪ <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></li> </ul>   |
| <i>Bulk density.</i>  | <ul style="list-style-type: none"> <li>▪ <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></li> </ul>   |
| <i>Classification.</i>  | <ul style="list-style-type: none"> <li>▪ <i>The basis for the classification of the Mineral Resources into varying confidence categories.</i></li> <li>▪ <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></li> <li>▪ <i>Whether the result appropriately reflects the Competent Person(s)' view of the deposit.</i></li> </ul>  |
| <i>Audits or reviews.</i>   | <ul style="list-style-type: none"> <li>▪ <i>The results of any audits or reviews of Mineral Resource estimates.</i></li> </ul>  |
| <i>Discussion of relative accuracy/confidence.</i>  | <ul style="list-style-type: none"> <li>▪ <i>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. 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.</i></li> <li>▪ <i>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.</i></li> <li>▪ <i>These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.</i></li> </ul>   |
| <b>Estimation and Reporting of Ore Reserves</b>   |   |
| <b>(criteria listed in the first group, and where relevant in other preceding groups, apply also to this group)</b> |   |
| <i>Mineral Resource estimate for conversion to Ore Reserves.</i>  | <ul style="list-style-type: none"> <li>▪ <i>Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.</i></li> <li>▪ <i>Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.</i></li> </ul>  |
| <i>Study status.</i>  | <ul style="list-style-type: none"> <li>▪ <i>The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.</i></li> <li>▪ <i>The Code does not require that a final feasibility study has been undertaken to convert Mineral Resources to Ore Reserves, but it does require that appropriate studies will have been carried that will have determined a mine plan that is technically achievable and economically viable, and that all Modifying Factors have been considered.</i></li> </ul>  |
| <i>Cut-off parameters.</i>  | <ul style="list-style-type: none"> <li>▪ <i>The basis of the cut-off grade(s) or quality parameters applied.</i></li> </ul>   |

| <b>Criteria</b>  | <b>Explanation</b>  |
|--|---|
| <i>Mining factors or assumptions.</i>  | <ul style="list-style-type: none"> <li>▪ <i>The method and assumptions used to convert the Mineral Resource to an Ore Reserve (ie either by application of appropriate factors by optimisation or by preliminary or detailed design).</i></li> <li>▪ <i>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.</i></li> <li>▪ <i>The assumptions made regarding geotechnical parameters (eg. pit slopes, stope sizes, etc.), grade control and pre-production drilling.</i></li> <li>▪ <i>The major assumptions made and Mineral Resource model used for pit optimisation (if appropriate).</i></li> <li>▪ <i>The mining dilution factors, mining recovery factors, and minimum mining widths used.</i></li> <li>▪ <i>The infrastructure requirements of the selected mining methods.</i></li> </ul>   |
| <i>Metallurgical factors or assumptions.</i>   | <ul style="list-style-type: none"> <li>▪ <i>The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.</i></li> <li>▪ <i>Whether the metallurgical process is well-tested technology or novel in nature.</i></li> <li>▪ <i>The nature, amount and representativeness of metallurgical testwork undertaken and the metallurgical recovery factors applied.</i></li> <li>▪ <i>Any assumptions or allowances made for deleterious elements.</i></li> <li>▪ <i>The existence of any bulk sample or pilot scale testwork and the degree to which such samples are representative of the orebody as a whole.</i></li> </ul>   |
| <i>Cost and revenue factors.</i>   | <ul style="list-style-type: none"> <li>▪ <i>The derivation of, or assumptions made, regarding projected capital and operating costs.</i></li> <li>▪ <i>The assumptions made regarding revenue including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, etc.</i></li> <li>▪ <i>The allowances made for royalties payable, both Government and private.</i></li> </ul>  |
| <i>Market assessment.</i>  | <ul style="list-style-type: none"> <li>▪ <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></li> <li>▪ <i>A customer and competitor analysis along with the identification of likely market windows for the product.</i></li> <li>▪ <i>Price and volume forecasts and the basis for these forecasts.</i></li> <li>▪ <i>For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.</i></li> </ul>   |
| <i>Other.</i>  | <ul style="list-style-type: none"> <li>▪ <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 Ore Reserves.</i></li> <li>▪ <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></li> </ul>  |
| <i>Classification.</i>   | <ul style="list-style-type: none"> <li>▪ <i>The basis for the classification of the Ore Reserves into varying confidence categories.</i></li> <li>▪ <i>Whether the result appropriately reflects the Competent Person(s)' view of the deposit.</i></li> <li>▪ <i>The proportion of Probable Ore Reserves which have been derived from Measured Mineral Resources (if any).</i></li> </ul>   |
| <i>Audits or reviews.</i>  | <ul style="list-style-type: none"> <li>• <i>The results of any audits or reviews of Ore Reserve estimates.</i></li> </ul>   |
| <i>Discussion of relative accuracy/confidence.</i>   | <ul style="list-style-type: none"> <li>▪ <i>Where appropriate a statement of the relative accuracy and/or confidence in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. 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.</i></li> <li>▪ <i>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.</i></li> <li>▪ <i>These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.</i></li> </ul> |
| <p><b>Estimation and Reporting of Diamonds and Other Gemstones</b></p> <p><b>(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.)</b></p> |   |
| <i>Indicator minerals.</i>   | <ul style="list-style-type: none"> <li>▪ <i>Reports of indicator minerals, such as chemically/physically distinctive garnet, ilmenite, chrome spinel and chrome diopside, should be prepared by a suitably qualified laboratory.</i></li> </ul>   |
| <i>Source of diamonds.</i>   | <ul style="list-style-type: none"> <li>▪ <i>Details of the form, shape, size and colour of the diamonds and the nature of the source of diamonds (primary or secondary) including the rock type and geological environment.</i></li> </ul>  |

| <b>Criteria</b>  | <b>Explanation</b>   |
|--|--|
| Sample collection.   | <ul style="list-style-type: none"> <li>▪ <i>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.</i></li> <li>▪ <i>Sample size, distribution and representativity.</i></li> </ul>  |
| Sample treatment.  | <ul style="list-style-type: none"> <li>▪ <i>Type of facility, treatment rate, and accreditation.</i></li> <li>▪ <i>Sample size reduction. Bottom screen size, top screen size and re-crush.</i></li> <li>▪ <i>Processes (dense media separation, grease, X-ray, hand-sorting etc.).</i></li> <li>▪ <i>Process efficiency, tailings auditing and granulometry.</i></li> <li>▪ <i>Laboratory used, type of process for micro diamonds and accreditation.</i></li> </ul>  |
| Carat.   | <ul style="list-style-type: none"> <li>▪ <i>One fifth (0.2) of a gram (often defined as a metric carat or MC).</i></li> </ul>  |
| Sample grade.  | <ul style="list-style-type: none"> <li>▪ <i>Sample grade in this section of Table 1 is used in the context of carats per units of mass, area or volume.</i></li> <li>▪ <i>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 metre or carats per cubic metre are acceptable if accompanied by a volume to weight basis for calculation.</i></li> <li>▪ <i>In addition to general requirements to assess volume and density there is a need to relate stone frequency (stones per cubic metre or tonne) to stone size (carats per stone) to derive sample grade (carats per tonne).</i></li> </ul>   |
| Reporting of Exploration Results.                                  | <ul style="list-style-type: none"> <li>▪ <i>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.</i></li> <li>▪ <i>Sample density determination.</i></li> <li>▪ <i>Percent concentrate and undersize per sample.</i></li> <li>▪ <i>Sample grade with change in bottom cut-off screen size.</i></li> <li>▪ <i>Adjustments made to size distribution for sample plant performance and performance on a commercial scale.</i></li> <li>▪ <i>If appropriate or employed, geostatistical techniques applied to model stone size, distribution or frequency from size distribution of exploration diamond samples.</i></li> <li>▪ <i>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></li> </ul> |
| Grade estimation for reporting Mineral Resources and Ore Reserves. | <ul style="list-style-type: none"> <li>▪ <i>Description of the sample type and the spatial arrangement of drilling or sampling designed for grade estimation.</i></li> <li>▪ <i>The sample crush size and its relationship to that achievable in a commercial treatment plant.</i></li> <li>▪ <i>Total number of diamonds greater than the specified and reported lower cut-off sieve size.</i></li> <li>▪ <i>Total weight of diamonds greater than the specified and reported lower cut-off sieve size.</i></li> <li>▪ <i>The sample grade above the specified lower cut-off sieve size.</i></li> </ul>   |
| Value estimation.  | <ul style="list-style-type: none"> <li>▪ <i>Valuations should not be reported for samples of diamonds processed using total liberation method, which is commonly used for processing exploration samples.</i></li> <li>▪ <i>To the extent that such information is not deemed commercially sensitive, Public Reports should include:</i> <ul style="list-style-type: none"> <li>– <i>Diamonds quantities by appropriate screen size per facies or depth.</i></li> <li>– <i>Details of parcel valued.</i></li> <li>– <i>Number of stones, carats, lower size cut-off per facies or depth.</i></li> </ul> </li> <li>▪ <i>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.</i></li> <li>▪ <i>The basis for the price (e.g. dealer buying price, dealer selling price etc.).</i></li> <li>▪ <i>An assessment of diamond breakage.</i></li> </ul>   |
| Security and integrity.  | <ul style="list-style-type: none"> <li>▪ <i>Accredited process audit.</i></li> <li>▪ <i>Whether samples were sealed after excavation.</i></li> <li>▪ <i>Valuer location, escort, delivery, cleaning losses, reconciliation with recorded sample carats and number of stones.</i></li> <li>▪ <i>Core samples washed prior to treatment for micro diamonds.</i></li> <li>▪ <i>Audit samples treated at alternative facility.</i></li> <li>▪ <i>Results of tailings checks.</i></li> <li>▪ <i>Recovery of tracer monitors used in sampling and treatment.</i></li> <li>▪ <i>Geophysical (logged) density and particle density.</i></li> <li>▪ <i>Cross validation of sample weights, wet and dry, with hole volume and density, moisture factor.</i></li> </ul>   |
| Classification.  | <ul style="list-style-type: none"> <li>▪ <i>In addition to general requirements to assess volume and density there is a need to relate stone frequency (stones per cubic metre 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></li> </ul>  |

## Appendix 1

### Generic Terms and Equivalent

Throughout the Code, certain words are used in a general sense when a more specific meaning might be attached to them by particular commodity groups within the industry. 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 generalised meaning   |
|-----------------------|--|--|
| <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 mineralisation.</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 mineralisation might occur, whether by class of deposit, mode of occurrence, genesis or composition.</i>                  |
| <i>Ore Reserves</i>   | <i>Mineral Reserves</i>                                      | <i>'Ore Reserves' is preferred under the JORC Code but 'Mineral Reserves' is in common use in other countries and is generally accepted. Other descriptors can be used to clarify the meaning e.g. coal reserves, diamond reserves etc.</i>  |
| <i>Cut off grade</i>  | <i>Product specifications</i>                                | <i>The lowest grade, or quality, of mineralised 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>  |

## Appendix 2

### Competent Person's Consent Form

*Companies reporting Exploration Results, Mineral Resources or Ore Reserves are reminded that while a public report is the responsibility of the company acting through its Board of Directors, Clause 8 requires that any such report "must be based on, and fairly reflect the information and supporting documentation prepared by a Competent Person or Persons". Clause 8 also requires that the " report shall be issued with the written consent of the Competent Person or Persons as to the form and context in which it appears".*

*In order to assist Competent Persons and companies to comply with these requirements, and to emphasise the need for companies to obtain the **prior** written consent of Competent Persons for their material to be included in the form and context in which it appears in the public report, ASX, together with JORC, have developed a Competent Person's Consent Form that incorporates the requirements of the JORC Code.*

**Comment [p20]:** Added for emphasis, the written consent must logically be prior to the issue of the report.

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[Letterhead of Competent Person or Competent Person's employer]

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**Competent Person's Consent Form**

*Pursuant to the requirements of ASX Listing Rule 5.6 and clause 8 of the 2004 JORC Code (Written Consent Statement)*

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**Report Description**

.....  
*(insert name or heading of report to be publicly released) ("Report")*

.....  
*(insert name of company releasing the Report)*

.....  
*(insert name of the deposit to which the Report refers)*

*If there is insufficient space, complete the following sheet and sign it in the same manner as this original sheet.*

.....  
*(Date of Report)*

**Statement**

I, ..... confirm that:  
*(insert full name)*

- I have read and understood the requirements of the 2004 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves ("2004 JORC Code").
- I am a Competent Person as defined by the 2004 JORC Code, having five years experience which is relevant to the style of mineralisation and type of deposit described in the Report, and to the activity for which I am accepting responsibility.
- I am a Member or Fellow of *The Australasian Institute of Mining and Metallurgy* or the *Australian Institute of Geoscientists* or a 'Recognised Overseas Professional Organisation' ("ROPO") included in a list promulgated by ASX from time to time.
- I have reviewed the Report to which this Consent Statement applies.

• I am a full time employee of ..... (*insert company name*)

OR

• I am a consultant working for ..... (*insert company name*) and have been engaged by  
..... (*insert company name*) to prepare the documentation for  
..... (*insert deposit name*) on which the Report is based, for the period ended  
..... (*insert date of resource/reserve statement*)

I verify that the Report is based on and fairly and accurately reflects in the form and context in which it appears, the information in my supporting documentation relating to Exploration Results, Mineral Resources and/or Ore Reserves (*select as appropriate*).

**CONSENT**

I consent to the release of the Report and this Consent Statement by the directors of:

.....  
(*insert reporting company name*)

\_\_\_\_\_  
Signature of Competent Person:

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Professional Membership:  
(*insert organisation name*)

\_\_\_\_\_  
Membership Number:

\_\_\_\_\_  
Signature of Witness:

\_\_\_\_\_  
Print Witness Name and Residence (eg. Town/Suburb):

Additional Deposits covered by the Report for which the Competent Person signing this form is accepting responsibility:

.....  
.....  
.....  
.....  
.....

Additional Reports related to the deposit for which the Competent Person signing this form is accepting responsibility:

.....  
.....  
.....  
.....  
.....

\_\_\_\_\_  
Signature of Competent Person:

\_\_\_\_\_  
Date:

\_\_\_\_\_  
Professional Membership:  
*(insert organisation name)*

\_\_\_\_\_  
Membership Number:

\_\_\_\_\_  
Signature of Witness:

\_\_\_\_\_  
Print Witness Name and Residence (eg. Town/Suburb):