

*THE AUSTRALASIAN INSTITUTE OF  
MINING AND METALLURGY*  
*and*  
*AUSTRALIAN MINING INDUSTRY  
COUNCIL*

**REPORT BY JOINT COMMITTEE  
ON ORE RESERVES**

*REVISED AND ENDORSED WITHOUT CHANGE BY THE JOINT  
COMMITTEE ON ORE RESERVES IN APRIL, 1975*

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## FOREWORD

The Committee was set up to consider, on behalf of both The Aus.I.M.M. and A.M.I.C., the following two situations—

- (a) in September, 1971 the Melbourne Stock Exchange asked A.M.I.C. for its opinion on a proposal that one of the listing requirements applicable to mining companies should be the use "when reporting on an orebody" of "the terms currently employed by the U.S. Bureau of Mines", i.e. measured ore, indicated ore, inferred ore.

The Exchange indicated it would welcome alternative recommendations.

- (b) in late 1971 the Senate Select Committee on Securities and Exchange invited The Aus.I.M.M. to comment on a transcript of evidence which indicated that within the Australian mining industry there were no recommended or required standards or terminology for expression of ore reserves.

## BACKGROUND

The principal modern events in this field are—

1. 1943—U.S. Bureau of Mines adopts a three-fold classification—measured, indicated, inferred (in order of increasing degree of risk)—for estimation of national resources. It was explicitly stated (Sub-Committee on Public Lands, May 1947) that the classification was not adapted to "a mining operation".
2. 1950/54—Institution of Mining and Metallurgy (London) has a Committee looking into the question of standard terminology. No decision reached and no action by Council.
3. 1953/55—The Australasian Institute of Mining and Metallurgy has a Committee studying the same question. Diversity of opinion among members of The Institute found to be too great for standardisation. No further action.
4. 1953/56—Society of Economic Geologists has Committee studying same question. Committee has representatives from South America, Europe, United States, Great Britain, Africa, Australia, North America and Asia. For use in mines, it recommends the traditional terms, "proved", "probable", "possible". It recommends that "measured", "indicated", "inferred" and equivalent terms are appropriate only for assessing "the reserve or resource position of a whole industry or of a region or a nation".
5. Current practice of the U.S. Securities Exchange Commission recognises two categories of ore reserves—"proven" and "probable".
6. Proposed Canadian legislation includes definition of three categories—"proven", "probable", "possible".

## CONCLUSIONS

The Committee reached four principal conclusions—

- A. Whilst the enquiries of the Melbourne Stock Exchange and of the Senate Committee referred to classification and definition of ore reserves, the Committee felt that the concern of these bodies was not primarily with ore reserves in general, for example in producing mines, nor with the diversity of terminology employed in those circumstances. They were, the Committee thought, concerned with instances of significant divergence between estimates or opinions given at an early stage and the results of subsequent testing.
- B. The Committee considered that some standardisation of classification and nomenclature of ore reserves was desirable but, because estimation of ore reserves involved a factor of judgment, standardisation of procedure would not of itself yield improved estimates.
- C. It followed therefore that estimates of ore reserves and reports on related matters at earlier stages should be prepared by "responsible professionally qualified" persons (quoting the Institution of Mining and Metallurgy, 1954) of appropriate experience.
- D. That the Committee should make recommendations as to standards and terminology that could be recommended to its members by The Australasian Institute of Mining and Metallurgy, in its capacity as a professional organisation, and that the Committee should also make additional recommendations as to conditions of reporting which could be recommended by A.M.I.C. to companies and to the Stock Exchanges.

## RECOMMENDATIONS

### 1. *General*

The Committee believes that reports on ore or mineralisation should be standardised as far as possible and that the mining industry should in its own interests assist the Australian Associated Stock Exchanges in their efforts to eliminate unsatisfactory reporting.

### 2. *Responsibility for Reports*

The Committee believes that any statement on a company's ore or mineralisation position is and must remain the sole responsibility of the Board of Directors. That is, a Board should not be required compulsorily to attach to its reports supporting documents signed by any other personnel.

Where, however, a Board of Directors chooses to include supporting documents on its ore or mineralisation situation, it should be a requirement that the signatory to any such document be a competent person as defined below.

### 3. *Requirement Regarding Competence*

The Committee considers that competence and experience are the most important factors involved in reporting on an ore or mineralisation situation. Because of this, it would not, in the opinion of the Committee, be unreasonable to expect any company exploring for minerals to meet a required level of competence, as a condition of listing with the Stock Exchanges.

The Stock Exchanges should require companies exploring for minerals

to establish their competence with the Australian Associated Stock Exchanges according to the definitions below. The onus would be on each company, once its competence has been established, not only to maintain its status in this regard but also to ensure that any reports in the context of mineral exploration and assessment issued by the company, are based on work compiled by competent persons as defined.

(a) **Competent Person**

Where reports on a company's ore or mineralisation situation are concerned, a person responsible for the compilation of such reports would be acceptable as "competent" if he is a Corporate Member of The Australasian Institute of Mining and Metallurgy, and also has a minimum of five years' experience in the field of activity in which he is reporting.

(b) **Competent Company**

For the purposes of reporting on its ore or mineralisation situation, a company would be acceptable as "competent" if it employs or has engaged the services of a competent person or persons.

(c) **Competent Report**

Any report or statement of technical fact, interpretation or assessment, made on behalf of a competent company, is assumed to conform to a desirable standard of competence. Provided that where a company's competence depends on its having engaged the services of an outside competent person, it shall for each such report or statement made hold a supporting document signed by that competent person.

4. *Pre-Ore Reserve Terminology*

The Committee considers that the pre-ore reserve stage extends from the earliest exploratory investigations to the stage at which an actual ore reserve can be estimated with reasonable assurance by a competent person as defined.

The Committee believes that the words "ore" and "reserves" should not be used in reports and statements within the pre-ore reserve stage. These terms imply economic viability and hence are not appropriate to early stage terminology.

In lieu of such terms, early stage reports and statements should refer to "mineralisation" or some similar term having no economic connotation.

Reports and statements in the field of mineral exploration and assessment which may be made by the Directors of a company up to and including the initial ore reserve statement should include relevant basic data such as—the type and method of sampling, and the distribution, dimensions, assay results and relative location of all relevant samples. If true dimensions, particularly widths of mineralisation, are not stated the report should be qualified accordingly.

References to geophysical or geochemical results should be only to "anomalies" and not to "mineralisation", "ore", "reserves" and the like.

5. *Ore Reserve Terminology*

The Committee believes that no mining company should be required compulsorily to report an estimate of its ore reserves position at any time, but that where it so chooses, it should do so in accordance with recommended definitions for "ore reserves".

The Committee considers, however, that no one set of ore reserve definitions would suffice for all cases, and recommends the use of the four sets of definitions below. The Committee wants it clearly understood that if a company elects to report only its "proved" reserves it should not be required to state a "probable" reserve as well.

**A. Proved/Probable/Possible.**

The definitions below follow closely those recommended by the Committee of the Society of Economic Geologists in 1956.

**Proved ore reserves** are those in which the ore has been blocked out in three dimensions by excavation or drilling, but include in addition minor extensions beyond actual openings and drill holes, where the geological factors that limit the ore body are definitely known and where the chance of failure of the ore to reach these limits is so remote as not to be a factor in the practical planning of mine operations.

**Probable ore reserves** cover extensions near at hand to proved ore where the conditions are such that ore will probably be found but where the extent and limiting conditions cannot be so precisely defined as for proved ore. Probable ore reserves may also include ore that has been cut by drill holes too widely spaced to assure continuity.

**Possible ore (NOT RESERVES)** is that for which the relations of the land to adjacent ore bodies and the geologic structures warrant some presumption that ore will be found, but where the lack of exploration and development data precludes its being classed as probable.

**NOTE**—The "possible" category of ore should not be included as reserves. Where the category is used publicly, it should never stand alone, but should be used only when "proved" or "probable" reserves have also been reported.

**B. Measured/Indicated/Inferred**

The definitions below closely follow those adopted by the U.S. Bureau of Mines in 1943.

**Measured ore reserves** are those for which tonnage is computed from dimensions revealed in outcrops, trenches, workings and drill holes and for which the grade is computed from the results of detailed sampling. The sites for inspection, sampling and measurement are spaced so closely and the geologic character is so well defined that size, shape and mineral content are well established. The computed tonnage and grade are judged to be accurate within close limits.

**Indicated ore reserves** are those for which tonnage and grade are computed partly from specific measurements, samples or production data and partly from projection for a reasonable distance on geologic evidence. The sites available for inspection, measurements and sampling are too widely or otherwise inappropriately spaced to permit the mineral bodies to be outlined completely or the grade to be established throughout.

**Inferred ore (NOT RESERVES)** is that for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few samples or measurements. The estimates are based on an assumed continuity or repetition of which there is geologic evidence; this evidence may include comparison with deposits of similar type.

**NOTE**—The "inferred" category of ore should not be included as reserves. Where the category is used publicly, it should never stand alone, but should be used only when "measured" or "indicated" reserves have also been reported.

**C. Unclassified**

The Committee recommends that where a company feels it cannot sensibly classify its reserves as in A. or B. above, it may report them as "ore reserves" or "reserves" with the proviso that the estimate involves no greater uncertainty than the "probable" or "indicated" categories.

Where a company elects so to describe its ore reserves it should clearly define the basis of the estimate.

**D. Traditional**

The Committee believes that where a company has established over a number of years a method of reporting on ore reserves peculiar to its operation its practice should be recognised.

**6. Definition of "Ore"**

The Committee recommends that for the purposes of the above ore reserve classifications, the term "ore" be defined as follows—

"Ore is defined as a solid naturally occurring aggregate from which one or more valuable constituents may be recovered, and which is of sufficient economic interest to require estimation of tonnage and grade."

**7. Continuing Review**

The Committee is conscious of the fact that the above recommendations have been the subject of much debate over a great number of years without any international agreement.

It realises, however, that in the present circumstances, positive recommendations are required. These have been made, however, in the knowledge that they may need review from time to time.