

IMM Definitions of reserves and resources and Guidelines and criteria (approved 1991)

Definitions

Reserves

- A mineral reserve is that portion of a mineral resource on which technical and economic studies have been carried out to demonstrate that it can justify extraction at the time of the determination and under specified economic conditions.
- A proved mineral reserve is that portion of a measured mineral resource as defined on which detailed technical and economic studies have been carried out to demonstrate that it can justify extraction at the time of the determination and under specified economic conditions.
- A probable mineral reserve is that portion of a measured and/or indicated resource as defined on which sufficient studies have been carried out to demonstrate that it can justify extraction at the time of the determination and under specified economic conditions.

Resources

- A mineral resource is a tonnage or volume of rock or mineralization or other material of intrinsic economic interest the grades, limits and other appropriate characteristics of which are known with a specified degree of knowledge.
- A measured mineral resource is that portion of a mineral resource for which tonnage or volume is calculated from dimensions revealed in outcrops, pits, trenches, drill-holes or mine workings, supported where appropriate by other exploration techniques. The sites used for inspection, sampling and measurement are so spaced that the geological character, continuity, grades and nature of the material are so well defined that the physical character, size, shape, quality and mineral content are established with a high degree of certainty.
- An indicated mineral resource is that portion of a mineral resource for which quantity and quality are estimated with a lower degree of certainty than for a measured mineral resource. The sites used for inspection, sampling and measurement are too widely or inappropriately spaced to enable the material or its continuity to be defined or its grade throughout to be established.

Mineral potential

- Mineral potential describes a body of rock or mineralization or other material or an area for which evidence exists to suggest that it is worthy of investigation but to which neither volume, tonnage nor grade shall be assigned.

Guidelines and criteria

The following notes accompany the Definitions of reserves and resources and are intended as guidance for practitioners when applying these definitions in the preparation of statements concerning reserves and resources.

1. The Definitions shall apply to all statements concerning reserves or resources of non-petroleum minerals, including coal, constructional raw materials, industrial minerals and metalliferous minerals.
2. All statements based on the Definitions shall be signed by the practitioner making the assessment, who should be a competent person, as defined below.
3. A competent person must be professionally qualified and a member in good standing of a self-regulating professional association or institution with professional standards similar to those of the Geological Society, the Institution of Mining Engineers and the Institution of Mining and Metallurgy.
4. A competent person shall have a minimum of five years' relevant experience in the estimation,

- assessment and evaluation of mineral resources and mineral reserves.
5. Any statement prepared by a company or consultant that refers to reserves and/or resources must be prepared under the direction of, and signed by, a competent person.
 6. The qualifications and experience of the competent person who signs a report shall be stated in detail. It will not be sufficient to say that the qualifications and experience are appropriate.
 7. The competent person who prepares a report that is to be used by a company for a public prospectus or listing for the purpose of raising finance for the property being reported on shall, in addition to the above, meet the requirements of the relevant Stock Exchange as regards the disclosure of financial interests in the property or company concerned.
 8. Statements of reserves and resources must disclose fully the sources of data, methods, parameters and assumptions that have been used in making the assessment. S.I. units should be used whenever possible; if not, the units of measurement should be clearly defined.
 9. Whether in terms of volume or mass, a clear distinction should be made between estimates of mineral in the ground and estimates of the extractable or saleable mineral that can be produced from what is in the ground.
 10. Statements concerning a proved mineral reserve should be supported by a full [feasibility study](#)* or by current operating experience. It is also expected that statements concerning a probable mineral reserve will be supported by a study of the economics of working the deposit, although this does not have to be as detailed as the full feasibility study for a proved mineral reserve.
 11. Although a clear demonstration of economic workability is required to define reserves, this does not necessarily apply to resources; however, portions of a deposit that are unlikely to be demonstrable as worth extracting in the foreseeable future should not be included in resources.
 12. In all statements concerning mineral reserves and resources the current status of the legal title to the deposit should be stated. Details of the status of the permits and permissions required from the relevant authorities to extract the deposit should also be provided.
 13. It should be noted that there is no exact correspondence between proved mineral reserve and measured mineral resource, or between probable mineral reserve and indicated mineral resource. A measured mineral resource may not be designated as a proved mineral reserve if the scope of the economic feasibility study is insufficient to warrant proved status: instead it would become a probable mineral reserve. Thus, the distinction between proved and probable is based on a combination of geological and economic criteria, and it is up to the practitioner to use his or her judgement on the correct category to apply.
 14. Confidence limits should be used with care in assigning categories of reserve and resource as much may depend on the assumptions made in determining confidence limits and on custom and practice in the industry concerned.
 15. 'Other exploration techniques' (see measured mineral resource) include geophysical techniques and other remote sensing methods. These indirect techniques may be used to support estimations of reserves and resources, but under no circumstances are they sufficient to justify the designation of a resource or reserve without direct physical evidence of the presence of the mineral.
 16. The term 'ore' has fallen out of use in large sections of the extractive industry and it is recommended that the term no longer be used in reserve/resource estimation.
 17. If, in defining reserves or resources, it is necessary to use additional terms that are not covered in the Definitions and Guidelines and criteria, they must be clearly defined in the report. For example, in an operating mine there may be a desire to define mining reserves as part of proved reserves.
 18. The Definitions and Guidelines and criteria are intended to be read in conjunction with the Code of professional conduct issued by the institution of which the practitioner is a member. Failure to adhere to the standards of professional conduct set out in the relevant Code can lead to disciplinary action and, in certain circumstances, to expulsion from the institution concerned.

**Feasibility study is defined as an assessment of all aspects of a mineral project, including geological, mining, metallurgical, infrastructural, environmental, legislative and commercial factors, that is sufficiently detailed to support a decision on implementation.*

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