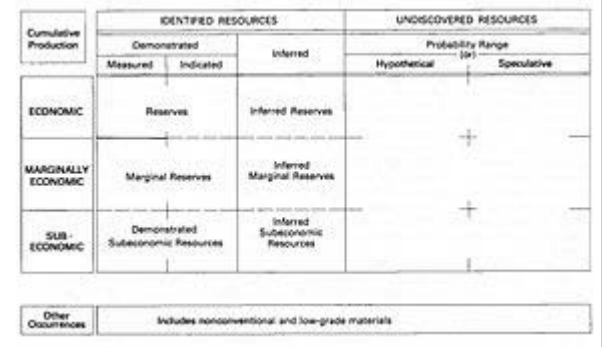
Mineral resource classification

From Wikipedia, the free encyclopedia

Mineral resource classification is the classification of mineral deposits based on their geologic certainty and economic value.

Mineral deposits can be classified as:

- **Mineral occurrences** or prospects of geological interest but not necessarily of economic interest
- **Mineral resources** that are potentially valuable, and for which reasonable prospects exist for eventual economic extraction.
- **Mineral reserves** or **Ore reserves** that are valuable *and* legally and economically and technically feasible to extract



A "McKelvey diagram" showing the relationship of mineral resource classifications to economics and geologic certainty.[1]

In common mining terminology, an "ore deposit" by definition must have an 'ore reserve', and may or may not have additional 'resources'.

Classification, because it is an economic function, is governed by statutes, regulations and industry best practice norms. There are several classification schemes worldwide, however the Canadian CIM classification (see NI 43-101), the Australasian Joint Ore Reserves Committee Code (JORC Code), and the South African Code for the Reporting of Mineral Resources and Mineral Reserves (SAMREC)[2] are the general standards.

Contents

Mineral occurrences, prospects

Main article: mineral exploration

These classifications of mineral occurrences are generally the least important and least economic. They include all known occurrences of minerals of economic interest, including obviously uneconomic outcrops and manifestations. However, these are often mentioned in a company prospectus because of "proximity"; a concept that something valuable may be found near these occurrences because it has been in the past due to a similar geological environment. Often, such occurrences of mineralisation are the peripheral manifestations of nearby ore deposits. "Ore deposit"

applies specifically to economic mineral occurrences that could be mined at a profit after consideration of all factors affecting a mining operation. Note that this distinction between amounts of raw material available as either a resource or reserve also applies to other materials considered to be minerals. This can include natural gas (legally defined as a mineral in some states of the United States) and hydrocarbons.

Mineral resources

Mineral resources are those economic mineral concentrations that have undergone enough scrutiny to quantify their contained metal to a certain degree. None of these resources are ore, because the economics of the mineral deposit may not have been fully evaluated.

Indicated resources are simply economic mineral occurrences that have been sampled (from locations such as outcrops, trenches, pits and drillholes) to a point where an estimate has been made, at a reasonable level of confidence, of their contained metal, grade, tonnage, shape, densities, physical characteristics[3].

Measured resources are indicated resources that have undergone enough further sampling that a 'competent person' (defined by the norms of the relevant mining code; usually a geologist) has declared them to be an acceptable estimate, at a high degree of confidence, of the grade, tonnage, shape, densities, physical characteristics and mineral content of the mineral occurrence.

Resources may also make up portions of a mineral deposit classified as a mineral reserve, but:

- Have not been sufficiently drilled out to qualify for Reserve status; or
- Have yet to meet all criteria for Reserve status [3]

Mineral reserves

Mineral reserves are resources known to be economically feasible for extraction. Reserves are either **Probable Reserves *or* Proven Reserves**. Generally the conversion of resources into reserves requires the application of various modifying factors, including:

- mining and geological factors, such as knowledge of the geology of the deposit sufficient that it is predictable and verifiable; extraction and mine plans based on ore models; quantification of geotechnical risk—basically, managing the geological faults, joints, and ground fractures so the mine does not collapse; and consideration of technical risk—essentially, statistical and variography to ensure the ore is sampled properly:
- metallurgical factors, including scrutiny of assay data to ensure accuracy of the information supplied by the laboratory—required because ore reserves are *bankable*. Essentially, once a deposit is elevated to reserve status, it is an economic entity and an asset upon which loans and equity can be drawn—generally to pay for its extraction at (hopefully) a profit;
- economic factors;
- environmental factors;
- marketing factors;
- legal factors;
- governmental factors;and
- social factors [4]

See also

- Mineral exploration
- Ore genesis
- Ore
- Drilling rig
- National Instrument 43-101

References

1. ^ US Geological Survey, 1980, *Principles of a Resource/Reserve classification for Minerals*, Circular 831.
2. ^ http://www.samcodes.co.za The South African SAMVAL and SAMREC Codes
3. ^ *a b* http:www.samcodes.co.za The South African Mineral Codes
4. ^ http://www.samcodes.co.za The South African Mineral Codes

External links

- JORC Code (http://www.jorc.org/main.php)
- University of Western Australia Mining Law Centre (http://www.cmenrl.law.uwa.edu.au/about_the_centre)
- U.S. Geological Survey Circular 831, Principles of a Resource/Reserve Classification for Minerals (http://pubs.er.usgs.gov/usgspubs/cir/cir831)
- Canadian Institute of Mining, Metallurgy and Petroleum - CIM Definition Standards - On Mineral Resources and Mineral Reserves (PDF Format) (http://www.cim.org/committees/CIMDefStds_Dec11_o5.pdf)
- The Canadian Council of Professional Geoscientists CCPG (http://www.ccpg.ca/index.html)
- NI 43-101 Guidelines (http://www.osc.gov.on.ca/Regulation/Rulemaking/Current/Part4/rule_20051007_43-101_sd-mineral-projects.jsp)
- The South African SAMVAL and SAMREC Codes (http://www.samcodes.co.za)

Categories: Economic geology | Mineral economics
