

DEFINITIONS - METALLIC MINERAL DEPOSITS

- **Mineral:** A naturally occurring inorganic crystalline compound with a definite chemical composition.
- **Natural resource:** a useful and valuable natural material.
- **Mineral resources:** natural metallic and non-metallic or industrial minerals that are useful and valuable.
- **Polymorph:** is a mineral that has the same composition but occurs in different crystal forms.
- **Reserves:** are the amount of a natural resource that can be extracted at a profit given existing technology.
- **Ore:** the rock containing valuable metal(s) that is economic to mine as well as some low-value gangue minerals.
- **Ore deposit:** an accumulation of metal that can be economic to mine.
- **Ore mineral:** is a mineral containing valuable metal(s).
- **Gangue mineral:** low-value waste mineral (e.g. quartz, calcite and pyrite)
- **Average crustal abundance:** The average amount of metal in the continental crust (%)
- **Concentration factor:** The amount by which the metal has been concentrated above its average crustal abundance to form an ore deposit (unitless).

$$\text{Concentration factor} = \frac{\text{Grade}}{\text{Average crustal abundance}}$$

- **Grade:** The concentration of metal present in an ore deposit(%).

$$\text{Grade} = \text{Concentration factor} \times \text{Average crustal abundance}$$

- **Cut-off grade:** the minimum amount/grade that is economic to mine.

$$(\text{Cut - off}) \text{ grade} = (\text{Minimum}) \text{ concentration factor} \times \text{Average crustal abundance}$$

- **Hydrothermal fluid:** a hot, aqueous fluid containing dissolved metals in solution.
- **Country rock:** the older rock into which an igneous intrusion is injected.
- **Precipitation:** when solid minerals come out of solution
- **Mineral vein:** when minerals precipitate out in a fracture.
- **Cumulate layer:** A layer of dense minerals formed by gravity settling at the base of an igneous intrusion.
- **Magmatic segregation:** when ore minerals become separated and concentrated during cooling and crystallisation of magma; a type of magmatic differentiation.
- **Immiscible:** describes liquids that do not mix (an emulsion)
- **Temperate climate:** a moderate climate without extremes in temperature or rainfall. Occurs in latitudes 23.5 to 66.5 degrees N and S of the Equator.
- **Tropical climate (hot and humid):** is hot with temperatures > 21°C and wet, with little variation throughout the year. Occurs near the Equator.
- **Laterite:** is a red tropical soil made of hydrated iron and aluminium oxides.
- **Residue:** The insoluble products of chemical weathering.
- **Hydraulic mining:** Uses high pressure water jets to dislodge material.
- **Dredging:** is where material is scraped or sucked from the river or sea bed.
- **Placer deposits:** are surface deposits formed by the result of weathering, erosion transportation and then deposition of dense, chemically inert and physically resistant minerals that become concentrated into an ore deposit.
- **Secondary enrichment:** An ore concentrating process that occurs when metals are leached from rocks and carried downwards in solution.
- **Leaching:** is when elements/compounds from rocks are dissolved and carried downwards in solution.
- **Gossan:** is an insoluble cap of iron oxides at the surface.
- **Reducing:** describes oxygen-poor anoxic conditions.
- **Oxidising:** describes oxygen-rich conditions, allowing elements to combine with oxygen.
- **Enriched deposit:** is a zone of high grade ore just below the water table, formed by secondary enrichment.
- **Porphyry:** a large igneous intrusion below a volcano with a porphyritic texture.
- **A geochemical anomaly:** is when the concentration of metal is above the normal background value.
- **Dispersion:** is when the small amounts of metals are spread out around the ore deposit by surface processes of weathering, erosion and transport.
- **Catastrophic dilution:** is when more water and sediment is added from other sources, reducing metal concentration in a stream/river, as tributaries meet.

- **Tailings:** are the fine-grained waste produced during mineral processing.
- **In situ:** means 'in place' with no transport having occurred.
- **Pregnant solution:** is a metal-laden solution produced by in situ or heap leaching.
- **Smelting:** is the process by which an ore mineral is reduced to a metal by heating it with a reducing agent such as carbon.