GLOSSARY OF TERMS AND ACRONYMS

Abiotic	Occurring without the action of living things.
Acid mine drainage (AMD)/ Acid rock drainage (ARD)	Oxidation of sulphidic mine wastes, typically occurring as runoff or seepage from waste rock stockpiles, tailings impoundments or coal rejects.
Acid sulphate soils (ASS)	Low-lying, coastal, sulphide rich soils. If these are disturbed or drained, the sulphide can be oxidised to give rise to extremely acidic runoff.
Albedo	The ability of a surface to reflect short wave radiation to the atmosphere.
Algal bloom	A dense growth of algae or cyanobacteria in rivers, lakes or the ocean stimulated by input of nutrients such as phosphates. Algal blooms have an adverse effect on the aquatic ecosystem. They often pollute the water with toxins so the water cannot be used for drinking or swimming.
AMD	See Acid mine drainage.
Annual exceedance probability (AEP)	The likelihood that an event of a nominated magnitude/intensity or larger will occur in any one year, eg there is a 5% likelihood (chance) that in any year, the largest flood will be equal to or greater than the 5% AEP flood event.
Aquifer	Rocks that have the capacity to store and yield groundwater at levels that can be brought to the surface through wells.
ARD	See Acid rock drainage; term used in North America for acid mine drainage. It is broader than acid mine drainage since it includes drainage from any site where soil and rock have been disturbed.
Artificial recharge	The addition of surface waters to aquifers in order to store water underground in an aquifer for future use.
Artificial wetland	A constructed area that attempts to reproduce the environmental benefits of natural wetlands. These benefits may include slowing the rate of water flow, which encourages the sedimentation of suspended solids and removal of dissolved materials. Artificial wetlands can be used to provide a water cover for sulphidic mine wastes thus preventing the development of acid drainage.
Background noise	A noise level that is exceeded 90% of the time.
Barren pond	Storage pond for solution from which gold has been extracted.
Baseline information	Monitoring data acquired prior to the beginning of a project such as mining. This provides a basis for comparison and identification of changes caused by the mining process.

Best practice environmental management (BPEM)	Best practice is simply the best way of doing things. BPEM in mining protects the environment and reduces the impacts of mining by following the principles of sustainable development.
Biodiversity	The variety of all life-forms; the different plants, animals and micro-organisms, the genes they contain and the ecosystems they form; often considered at three levels: — genetic diversity, species diversity and ecosystem diversity. Maintenance of biodiversity is considered a key goal of environmental management.
Biotic	Relating to living things.
Blue green algae	Bacteria that grow in bodies of water. They are photosynthetic and can form dense **algal blooms**. Their correct name is cyanobacteria.
Borrow areas	Areas used for excavating soil, clay or rock to be used in the construction of roads or embankments.
BPEM	Best practice environmental management; also used to refer to the Best Practice Environmental Management in Mining series of booklets and trainers' kits.
Buffer	A substance that resists changes to the pH of a solution.
Bunds, bunding	Retaining walls built to contain spills of chemicals from a primary container or any contaminated water resulting from such a spill. Bunds are low embankments constructed around potential spillage areas to reduce the risk of environmental contamination. It is important these structures can retain the volume of any potential spillage.
Catalyst (catalyse)	A substance that speeds up a chemical reaction without being used up in the reaction.
Catchment	An area that drains all the rain falling on it into one stream.
CIP / CIL	Carbon-in-Pulp / Carbon-in-Leach: Processes used to recover gold into activated carbon during the agitation leach process.
Cleaner production	The term used to describe the systematic process a business undertakes to avoid waste production and environmental harm through better process management. Cleaner production looks at a business's material flows from purchasing through to disposal and assesses ways that waste can be avoided and environmental impacts minimised.
Co-disposal	The joint disposal of different classes of waste material, e.g. acid and non-acid producing waste rock or tailings and coarse waste rock.
Commercial and industrial waste	Solid and inert wastes generated by business and industry (including shopping centres, restaurants and offices) and institutions (such as schools, hospitals and government offices), excluding building and demolition waste and municipal waste.

Community consultation	Community consultation includes listening to people's needs, their fears and their feelings about threats and opportunities. It is about principled negotiation and working toward satisfactory results for all the people and groups involved.
Compliance	Action in accordance with legislation.
Consequence(s)	The intermediate or final outcome(s) of an event or situation.
Continual improvement	The process of enhancing the environmental management system to achieve improvements in overall environmental performance in line with the organisation's environmental policy.
Contractor	An external operator who carries out work under contract or agreement.
Creek	In Australia, a creek generically means a small river tributary, often non-perennial. However the term is often interchangeable with 'river'. Indeed, some 'creeks' with reliable flow are larger than some named rivers.
Cyanobacteria	Photosynthetic bacteria sometimes called blue green algae.
Cyclone	A device used to separate particles from a suspension using centrifugal force.
Decant water	Water on the surface of tailings storage facilities after the solids have settled. This may be removed and recycled for use in mineral processing.
Decibel (dB)	A measurement of noise: the decibel scale is a logarithmic scale. The most commonly used scale is dB(A) which is weighted to give a correlation with noise as perceived by people. An increase of 8 to 10 dB will be perceived as twice as loud as the original noise.
Dirty water	Water contaminated by excessive quantities of pollutants.
Discharge area	A point where water leaves the groundwater system.
Downstream dam	A dam where the crest moves progressively down stream (i.e. away from the impoundment basin) as the embankment/s is/are raised.
Drainage basin	A basin for containing drainage waters from a mine site.
Dust	A generic term used to describe fine particles suspended in the atmosphere. The term is non-specific with respect to the size, shape or chemical composition of the particles. Particle size can range from 100 microns to a fraction of a micron.

Ecologically Sustainable Development (ESD)	A term used in Australasia to mean development that meets the needs of the present generation without compromising the ability of future generations to meet their needs. **Sustainable development** is the term more commonly used throughout the world. The term ESD was coined to counter interpretations of sustainable development by some people which placed undue emphasis on economic sustainability alone.
Ecology	The scientific study of living organisms (plants, animals and micro-organisms) and their relationships to one another and their environment.
Ecosystem	A living community (plants animals and micro-organisms) together with the physical environment with which its members interact.
Effluent	Industrial or domestic wastewater or other liquid. The term also applies to the water released after treatment of waste water.
Eh	Reduction potential (in units of volts or millivolts): a measure of how oxidising or reducing a system is (more positive values tend to indicate oxidising environments, more negative values are found in reducing environments).
EMS	See Environmental Management System.
EMS audit	Systematic and documented verification process to objectively obtain and evaluate evidence to determine whether an organisation's EMS conforms to the EMS audit criteria set by the organisation and the communication of this process to management.
Endemic	Native to a particular area and found nowhere else.
Environment	The natural or man-made surroundings at any place, comprising air, water, land, natural resources, plants, animals including human, buildings and other constructions and their inter-relationships. The scale of the environment ranges from local to regional, national and global. All of these scales interact with one another.
Environmental aspect	Term used in the ISO 14000 series of environmental management standards to mean an element of an organisation's activities, products or services that can interact with the environment.
Environmental flow	The minimum amount of water flow needed in a watercourse to avoid significant degradation of the natural aquatic and riparian ecosystems.
Environmental impact	Term used in the ISO 14000 series of environmental management standards to mean any change to the environment, either beneficial or adverse, wholly or partly resulting from an organisation's activities, products or services. There are also naturally occurring environmental impacts. In mining it is sometimes very important to discriminate between those which occur naturally and those associated with mine activities.

Environmental impact assessment	The critical appraisal of the likely effects of a proposed project, activity or policy on the environment.
Environmental management	The management of human activity that has the potential to impact on the environment.
Environmental management program (EMP)	An organisation-wide program for developing and achieving objectives and targets that includes goals, general methods, time lines and accountabilities.
Environmental management system (EMS)	That part of the overall management program which includes organisational structure, planning, activities, responsibilities, procedures, processes and resources for developing, implementing, achieving, review and maintaining the environmental policy.
Environmental monitoring	The gathering and evaluation of information for assessment of performance of the EMS and the adequacy of the level of environmental protection being achieved.
Environmental objective	Overall environmental goal, arising from the environmental policy that an organisation sets itself to achieve, and which is quantified and measurable.
Environmental performance	A measure of the success of strategies implements when compared to environmental objectives.
Environmental performance evaluation	A process to measure, analyse, assess and describe an organisation's environmental performance against agreed criteria for appropriate management purposes. It provides a current evaluation as well as trends over time.
Environmental policy statement	A statement by the organisation of its intentions and principles in relation to its overall environmental performance which provides a framework for action and the setting of its environmental objectives and targets (AS/NZS ISO 14001, 1996).
Environmental risk management	The systematic application of management policies, procedures and practices to the task of identifying, analysing, assessing, treating and monitoring environmental risk.
Environmental target	Detailed and measurable performance requirement, quantified where practicable, applicable to the organisation or parts thereof, that arises from the environmental objectives and that need to be set and met in order to achieve those objectives (AS/NZS ISO 14001, 1996).

Environmental value/s — Environmental values are particular attributes of the environment that are conducive to public benefit, welfare, safety or health and are critical to maintaining biodiversity and ecosystem integrity in the region and require protection from the effects of pollution, waste discharges and deposits. Several environmental values may be designated for a specific water body. Some specific environmental values are: ecosystem protection; recreation and aesthetics; drinking water; agricultural water and industrial water.

ERM — See Environmental Risk Management.

Estuary — The widening channel of a river where it nears the sea, that is influenced by the tides and also by fresh water from the land so that fresh and salt water mix.

Eutrophication — The enrichment of a water body with an excess of plant nutrients (especially compounds of nitrogen and phosphorous) that enables a rapid increase in bacterial, phytoplankton, algal or plant populations that may deplete available oxygen and render water and bottom sediments anaerobic. This may lead to fish kills and reduction in biodiversity in the water body.

Evapotranspiration — Plants' ability to extract water from the soil profile and respire it as water vapour through their leaves to the atmosphere.

Exotic species — An animal or plant that has been introduced to a region (compare with native or indigenous species).

Fauna — All the animal life in a region.

Filterable residue — Suspended solids (ie can be filtered out) compared to *non-filterable residue* (dissolved solids).

Flora — All the plant life in a region.

Flow regime — Relative flow frequency (of different magnitudes) at a location in a watercourse. Constructing a dam across a watercourse alters the natural flow regime by reducing the small and moderate flows passing downstream and increasing the relative frequency of high flows in the downstream part of the watercourse.

Fly ash — Fine solid particles of non-combustible ash with or without accompanying combustible particles, produced from the combustion of coal in a furnace and deposited in the furnace and flues or boiler or carried out of the chimney with the waste gases. It is often recovered for use as a constituent in commercial products such as cement.

Frequency — The number of occurrences of a defined event in a given time (ie the rate).

Geographical information systems (GIS)	Computer programs designed to store and analyse data that varies spatially. These programs are like computer maps, and have the ability to illustrate the relationships between different attributes such as elevation, climate, environmental attributes and monitoring data.
Gross pollutant trap	A structure in a stream, drain or pipe that is designed to filter out floating material and large particles; usually used in small urban catchments.
Ground water	Water occurring below the ground surface.
HACCP	Hazard Analysis at Critical Control Points: A formal procedure designed to identify the hazards associated with particular stages in a given process.
Hazard	A potential cause of harm to people, property or the biophysical, social or cultural environment.
Hazardous waste	Wastes defined as "hazardous wastes" in the Regulatory Impact Statement. This is usually due to characteristics of the waste such as flammability, toxicity or chemical reactivity.
Heap leach	To dissolve minerals or metals out of an ore heap using chemicals. During heap leaching of gold a cyanide solution percolates through crushed ore heaped on an impervious pad or base pads.
Herbicide/pesticide	Chemicals applied for the control of pest plants or animals, respectively.
Hydraulic conductivity	Velocity of groundwater flow under a unit of hydraulic gradient. Greater for sands and coarse grained materials than for clays.
Hydraulic gradient	The change in water pressure (or strictly, potential energy) between two points divided by the distance between the points. This may be three-dimensional. Under normal circumstances water movement is proportional to and along a hydraulic gradient from areas of higher to areas of lower potential. The measure is commonly applied to the slope on a water table, where it shows the direction of groundwater movement.
Hydraulic head	In a groundwater system water moves from areas of 'high hydraulic head' to areas of lower hydraulic head, under gravity or external pressure.
Hydro-meteorological data	General weather information relevant to the hydrological cycle plus streamflow information.
Indicator species	It is difficult to measure the complete set of factors that provides a total picture of the health of a complex ecosystem. Indicator species are chosen to provide a good sense of the ecosystem's status. For example, a species of frog might act as an indicator species to provide insight into the health of a certain wetland area.
Indigenous species	Species that are native to and occur naturally in a region.

Industrial wastewater	Water that has been used in the course of carrying on a business (including water used in the irrigation of plants) that has been allowed to run to waste or has been disposed of or has been collected for treatment or disposal.
Intertidal zone	Area between the levels of low and high tide.
Land application	Applying a waste or other substance to soil.
Land sterilisation	Rendering land unusable for crops or other vegetation.
Leachates	Solutions of chemicals leached out by water percolating through wastes landfills, overburden dumps, soil stockpiles or e stockpiles or contaminated, undisturbed ground such as that around underground storage tanks. Leachate may cause damage if it enters local streams or groundwater reserves.
Likelihood	A qualitative term commonly used to describe both frequency and probability.
Lixiviants	Chemical leaching agents.
Mangrove	Plant or community of plants that grows in sediment regularly inundated by seawater.
MEND	Mine Environment Neutral Drainage Project in Canada. A source of useful information on acid mine drainage. See *References and Further Reading* for website.
Mining cycle	The entire process of mining including exploration, mine planning, operation, closure and rehabilitation.
Native species	Species occurring naturally in a region. Also called indigenous species.
NGO - non-government organisation	An NGO is any non-profit, voluntary citizens' group which is organised on a local, national or international level. NGOs perform a variety of services and humanitarian functions, bring citizens' concerns to Governments, monitor policies and encourage political participation at the community level. Some are organised around specific issues, such as human rights, the environment or health.
Non-filterable residue	Dissolved solids (ie cannot be filtered out).
Overburden	Material overlying a mineable deposit, up to, but not including, the topsoil.
Oxidation	Chemical reaction involving the removal of one or more electrons from an ion or atom. Combustion or burning is an example of rapid oxidation. The conversion of sulphide ion to sulphate ion is another form of oxidation.

Oxidising agent	A substance that is not itself flammable, but speeds up the rate of oxidation. Examples include oxygen, hydrogen peroxide and ferric salts.
Paddock dam	See turkey's nest dam.
Pest	An animal or plant that occurs where it is not wanted by humans.
pH	The measure of acidity (or alkalinity) defined as being the negative log (to base 10) of the free hydrogen ion concentration. The pH scale ranges from 0 to 14; a pH of 7 is neutral, less than 7 acidic and more than 7 alkaline.
Phreatic line (or phreatic surface)	The upper surface of the zone of saturation in a tailings dam.
Plate separator	A pollution control device that uses the difference in density between oil or petroleum products and water to remove the oil or associated chemicals from the water. It is used to reduce the amount of effluent water contaminated with oil or other petroleum products released into the environment and to purify water for reuse.
Pollutant	Any solid, liquid or gas (or combination thereof) including waste, smoke, dust, fumes and odour or noise, heat or anything declared by regulation to be a pollutant.
Pollute	To discharge, emit, deposit or disturb pollutants; or to cause or fail to prevent the discharge, emission, depositing, disturbance or escape of pollutants.
Pollution	Too high a concentration of a pollutant in the wrong place at the wrong time. Pollution commonly involves a misuse of resources, which implies that reducing pollution will often save money.
Pore pressure	A measure of water pressure for water existing in pores of soils, sediments or rocks.
Precautionary approach	In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.
Precipitate	To crystallise out of solution.
Precipitation	Water falling as rain, hail, snow or sleet.
Preferential purchasing	Taking into account a supplier's environmental impact when awarding contracts. The aim is to replace suppliers who are ignorant or wilfully negligent with those that demonstrate concern and good environmental performance.

Probability	The likelihood of a specific outcome measured by the ratio of specific outcomes to the total number of possible outcomes. Probability is expressed on a scale of 0 to 1, where 0 indicates an impossible outcome and 1 indicates that an outcome is certain.
Raise (also known as lift)	An increase in the height of a tailings facility retaining wall.
Recharge	A point where surface water enters the groundwater system.
Recycling	The process by which waste otherwise destined for disposal is collected, reprocessed or remanufactured and used to make a product. The product usually differs from the original material. Compare reuse.
Regulatory Impact Statement	A Regulatory Impact Statement (RIS) is a method of review for determining whether regulation is warranted according to the aims of increasing consumer and business choice, improving efficiencies and creating a more competitive business environment.
Rehabilitation	Work during or at the end of a mining project which reduces the physical and chemical hazards on the site, and which may also improve visual aesthetics and the potential for some other beneficial use of the land. Good rehabilitation practice normally comprises three stages: (1) removal or burial of hazardous materials and removal of unwanted infrastructure, (2) land form design and the reconstruction of a stable land surface and (3) revegetation or development of an alternative land use on the reconstructed landform.
Remediation	Cleaning up contaminated land; sometimes used as a synonym for rehabilitation.
Residual risk	The level of risk remaining after risk control measures have been implemented.
Resource	A deposit or concentration of natural, solid, inorganic or fossilised organic substance in such quantity and at such grade or quality that extraction of the material at a profit is currently or potentially possible.
Reuse	To use an item again for its original purpose. Compare with recycle.
Riparian	Of or adjacent to a riverbank; e.g. riparian vegetation, riparian landholders. "Riparian flows' are flows available for riparian landholders to use.
Riparian zone	Area of land adjoining a stream, this includes the banks and floodplains.
Risk	Where hazard denotes a potential cause of harm, risk describes the likelihood of the harm becoming real.
Risk analysis	The systematic use of available information to identify hazards and estimate the likelihood and consequences of those hazards being realised.

Risk assessment	The evaluation of the results of risk analysis against criteria or objectives to determine the acceptability of risks and to determine management priorities.
Risk characterisation	Characterisation of risk is applied when the work is substantially qualitative. Qualitative outputs may be described by rankings such as very low to extreme risk.
Risk estimation	Estimation of risk when the analysis has a large quantitative component. Risk estimates are can be expressed as the chances per year of the defined outcome or as the number of years over which the defined outcome is considered to occur once, eg “a 1 in 100 year flood”.
Risk management	The application of policies, procedures and practices to the identification of hazards; analysing the consequences and likelihoods associated with those hazards; eliminating risk levels; assessing those levels of risk against relevant criteria and objectives and making decisions and acting to reduce risk levels.
Salinisation	Salinisation is the build-up of salt within the soil. It occurs when salt gets moved around and concentrated in the soil.
Seagrass	Flowering plants adapted to living wholly submerged in seawater; not true grasses, but many have a grass-like appearance.
Sediment	Suspended solids that settle to the bottom to the bottom of a liquid.
Sensitivity analysis	The examination and testing of the results/outcomes of a calculation or model; or analysis by changing assumptions and/or the values of individual or groups of related variables.
Sign off	Agree in writing (‘signoff’ is the act of agreeing in writing).
Siltation	Accumulation of sediment (of any size) in a stream, lake, estuary or reservoir.
Slimes	The finest particles suspended in a tailings slurry.
Soil erosion	The wearing away and transportation of soil by the action of water, ice, wind etc.
Sparging	A procedure designed to minimise operator exposure to cyanide during transfer from transport container to storage facility at a minesite. Solid sodium cyanide (98% in tablet form) is transported in 20 tonne containers. Sparging comprises flushing the tablets with water through a system of open valves and pipes directly into storage tanks.
Species	A group of plants, animals or micro-organisms that are very similar and can generally interbreed only amongst themselves to produce fertile offspring.
Spigot	Small discharge pipe off the main tailings pipeline.

Spigotting	Discharging tailings into the storage facility through spigots.
Stakeholder	Someone who may be a winner or loser of a decision that influences (positively or negatively) that person or group's wellbeing now or in the future. Stakeholders can include indigenous people, neighbouring communities, special interest groups, mine operators, local and regional governments, unions, shareholders and regulatory bodies.
Stormwater	Run-off from roofs, roads and other hard surfaces after rainfall that eventually enters creeks, rivers and the sea. This may contain varying amounts of amounts of pollutants.
Subsidence	Gradual sinking of landforms to a lower level as a result of earth movements or mining operations.
Sulphide	Sulphur occurring in the oxidation state of negative two (S^{-2}). Sulphides have the potential to oxidise and cause acid mine drainage.
Surface runoff	Water that flows off a site when rainfall reaches the ground faster than it can infiltrate the underlying soil.
Surface water	Water flowing over land (except in a watercourse) after rising to the surface naturally from underground, or originating as rain, hail, snow or other precipitation or such water that has been collected in a dam or reservoir.
Sustainable development	Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.
Tailings	Material rejected from a mill after the recoverable valuable minerals have been extracted.
Temporal pattern	Variation in rainfall intensity during the course of a storm event.
Toe (of dam wall)	The change of slope where the outer wall of a dam meets the original ground surface.
Topsoil	The surface layer (or A1 horizon) of the soil. It contains the majority of seeds, soil micro-organisms organic matter and plant nutrients.
Total catchment management	The integrated management of all land used within a catchment by all involved bodies and individuals in such a way that none adversely impinges on the water quality of the stream.
Trade waste	Waste that is generated in industrial or non-domestic processes.
Treatment (Risk treatment)	The term used to mean the action taken to eliminate, minimise or monitor risk. This is sometimes also called 'management'. 'Risk treatment' is used to avoid confusion with the concept of 'risk management' which refers to the overall ERM process.
TSF	Tailings storage facility.

Turbidity	The cloudy condition caused by suspended particles in water.
Turkey's nest dam	A dam constructed on flat or relatively flat ground with walls on all sides.
Uncertainty of ignorance	Hazards and risks have not been investigated so are not known.
Uncertainty of the unknown	Uncertainty derived from the current limits to our knowledge.
Uncertainty of unpredictability	Uncertainty due to inherent unpredictability such as weather and earthquakes.
Upstream dam	A dam constructed by progressively advancing the crest of the embankment upstream (i.e. toward the impoundment basin) as the embankment/s is/are raised.
Valley dam	A cross valley impoundment in which a single embankment is constructed across a valley.
Volatilisation	Release of gaseous phase of a chemical.
WAD cyanide	Weak acid dissociable cyanide that is readily released from cyanide-containing complexes when the pH is lowered.
Waste	Any solid, liquid or gas (or combination thereof) that is left over, surplus or is an unwanted by product from any business or domestic activity, whether of value or not. Any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such a volume, constituency or manner as to cause an alteration in the environment.
Wastewater	Any water (including stormwater) whose quality has been significantly impacted from use in a human activity or from contact with a human activity such as wash-down water, process water used on a minesite, roof runoff or runoff from disturbed ground. Depending on quality, it may require treatment before disposal.
Water balance	A calculation of all water gains and losses related to an operation such as a mine site. These include precipitation, surface water flow, groundwater discharge, evaporation, water consumption (eg in mill, road watering, workshops and ablution blocks) and controlled discharges designed to balance overall water flows in a way that provides for operational needs and minimises risk of environmental pollution. The water balance is commonly based upon a diagram or table incorporating all known and possible water vectors, and will include allowances for variation in hydro-meteorological conditions such as floods or droughts.
Water course	Any natural or man-made course along which water flows or flows through, including a river, creek, channel, dam, reservoir that collects water flowing into a watercourse, a lake through which water flows or a channel into which natural water flow has been diverted.

Water quality	A general term used to indicate the suitability of water for a particular use such as drinking, swimming or industrial process water. Poor quality can be caused by the presence of a wide range of chemical, physical or microbiological contaminants.
Water table	The upper boundary of the zone of groundwater saturation.
Weed	A plant species growing where it is not wanted by humans.
Wetlands	These areas used to be called swamps, bogs or marshes. This land is usually alongside fresh or salt waters, and is flooded all or part of the time and characterised by plentiful water tolerant plants. Wetlands are important in slowing the flow of water and allowing the removal of suspended and dissolved pollutants. Many artificial wetlands are now being built to improve the quality of storm water runoff.