



Taroborah Coal Project

Environmental Impact Statement

Glossary

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GLOSSARY OF TECHNICAL TERMS

Acid Mine Drainage (AMD) – although the production of acid from rocks is a natural phenomenon, the excavation of waste soil and rock during the mining process can result in mineral oxidation and the production of significant volumes of acid, resulting in acid mine drainage from the waste storage areas. AMD is also termed acid rock drainage or acid rock water.

Acid Neutralising Capacity (ANC) – A measure of the buffering capacity or inherent neutralising ability of the material (often due to the presence of carbonate minerals). This is determined by the addition of a known amount of standardised acid (H_2SO_4 or HCl) to an accurately weighed sample, allowing the sample time to react (with heating), then back-titrating the mixture with standardised NaOH to determine the amount of acid consumed by reaction with the sample. Units are in $\text{kg H}_2\text{SO}_4$ per tonne of ore.

Acid-Base Account Plot – a plot of Acid Neutralising Capacity ($\text{kg H}_2\text{SO}_4/\text{tonne}$) against total S (%) with NAPP positive and negative zones included on this graph. This plot indicates which waste soil / rock samples possess the capacity to liberate acid and which samples potentially neutralise such acid.

Acid-Base Accounting (ABA) – is an assessment of the acid-producing and acid-consuming properties of waste soil and rock that is produced during mining. Pyrite minerals often produce sulphuric acid when oxidised due to the presence of sulphides in this material.

Alkalinity - A pressure and temperature independent property of water that determines in part the carbon content. Formally defined as the equivalent sum of the bases that are titratable with strong acid.

Alluvial – Of or pertaining to alluvium: sand, silt, clay, gravel, or other matter deposited by flowing water, as in a riverbed, floodplain, delta, or alluvial fan. Alluvium is generally considered a young deposit in terms of geologic time.

Ambient Noise – The sum of (background) noise at a particular location.

ANABAT – Specialised electronic bat call recorder that allows for bats to be unobtrusively surveyed and identify.

Annual Exceedance Probability (AEP) – The probability (or likelihood) that a given total rainfall accumulated over a given duration will be exceeded in any one year rainfall event.

Annual Recurrence Interval (ARI) – The expected period between exceedances of a given rainfall total, accumulated over a given duration. For example, if there is a 1 in 50 chance that 170 millimetres of rain will fall in a catchment in a 24-hour period during any given year, a rainfall total of 170 millimetres in a consecutive 24-hour period is said to have a 50-year ARI.

Anthropogenic – Produced by humans or human-related activity.

ANZECC 2000 Guidelines – Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000). These guidelines provide a summary of the water quality guidelines proposed to protect and manage the environmental values supported by the water resources. The guideline also provides advice on designing and implementing water quality monitoring and assessment programs.



Aquifer – A geological formation bearing groundwater that is permeable (unconfined) or impermeable (confined) to the transmission of groundwater.

Australian Height Datum (AHD) - The datum that sets mean sea level as zero elevation. Mean sea level was determined from observations recorded by 30 tide gauges around the coast of the Australian continent for the period 1966–1968.

A-weighted – The filtering of sound to correlate to the frequency response of a human ear.

Backfill – Fill up with soil.

Bank Cubic Metre – A traditional unit of volume in coal mining that represents the contents of a cubic metre of rock in place, before it is drilled and blasted.

Beneficiation – a combination of processes through which ore is reduced to particles that can be separated into mineral and waste, the former suitable for further processing or direct use.

Bioregion – A specific bio-geographic zone with a repeating or similar pattern biotic (flora and fauna) and abiotic (soils, terrain, geography, climate and rainfall) factors.

Borrow Pit – An area that is excavated to provide earth / material for use in construction.

Bund – Also called a bund wall and bunding, is an embankment that is constructed around an area and/or structure that is designed to prevent inflow or outflow of various liquid types, or create a physical barrier to noise or views.

Capillary Break – A space or layer between two surfaces which is purposely made wide enough to prevent the movement of moisture through the space by capillary action.

Catchment – A structure or land feature which collects water.

Conductivity – The ease with which a material easily transmits an electrical current.

Decibel (Weighted) dB(A) – The measurement of sound pressure level in which the amplitude of the sound signal is negatively weighted in frequencies below 1000 Hz in accordance with a weighing scale known as the 'A' weighing scale. This scale was established to closely simulate human perception of the relative level of pure tone sounds.

Decline – A sloping tunnel large enough for vehicles, loaders and trucks to drive up and down to remove ore.

Decommissioning – Close down a mine after mining has finished. This involves taking away buildings, equipment and rehabilitating the mine site area.

Design Storage Allowance (DSA) – Excess water storage required at November 1 each year that will be filled by the process inputs and runoff from a critical wet period, should it occur.

Drawdown – A lowering of the water level of a confined or unconfined aquifer resulting from the pumping of groundwater.

Ecosystem – A dynamic complex of plants, animal and microorganism communities and their non-living environment interacting as a functional unit.



Effluent – Water discharged into the environment from a man-made structure.

El Niño - Extensive warming of the central and eastern tropical Pacific Ocean results in a major shift in weather patterns every three to eight years. During this period drier conditions are observed in eastern Australia.

El Niño Southern Oscillation – the oscillation between El Niño and La Niña conditions.

Electrical Conductivity – Measure of a material to conduct electricity. Electricity conductivity of water is a measure of impurity (dissolved ions) in water.

Embankment - A ridge constructed of earth, fill, rocks, or gravel and used most commonly to retain water. The length of an embankment exceeds both its width and its height.

Environmental Authority – Licence or Approval issued under the *Environmental Protection Act 1994* to conduct specified 'Environmentally Relevant Activities'.

Environmentally Relevant Activities – Activities that have the potential to release contaminants to the environment.

Ephemeral – Watercourse flows that are short-lived, often reliant upon direct precipitation input.

Equivalent Persons – Unit of measurement used to determine the demand for sewerage reticulation services.

Evaporation – The process of liquid water becoming water vapour. Includes vaporisation from water surfaces and land surfaces.

Exchangeable Sodium Percentage – the proportion of sodium absorbed onto a material surface as a proportion of the total cation exchange capacity.

Exploration – The work of identifying areas that may contain viable mineral resources. This work can include surface mapping, remote sensing, exploratory drilling, geophysical testing, geochemical testing and other activities.

Exploratory Drilling - Drilling done to locate mineral deposits in an area where little subsurface data about those minerals is available.

Flood – An overflow of water onto lands that are normally above local water levels. Floods can be caused by stream discharge exceeding the capacity of the stream channel, storm winds and reduced pressure drawing water from a lake or ocean onto the coastline, dam failure, lake level increase, local drainage problems or other reasons.

Fugitive Emissions – Temporary or transient emissions of gases or particulate matter.

Geochemistry – Chemical composition and changes of the Earth.

Geomorphology - The science of Earth's landforms, their description, classification, distribution, origin and significance.

Greenhouse Gas – The gases present in the Earth's atmosphere which reduce the loss of heat into space and therefore contribute to global temperatures through the greenhouse effect.



Groundwater – Water that exists below the water table in the zone of saturation. Ground water moves slowly in the same direction that the water table slopes.

Hazard – The capacity of a substance, an activity or an event to produce an adverse health, safety or environmental effect.

Hazardous Waste – Any substance, whether liquid, solid or gaseous, derived by or resulting from, the process of minerals that tends to destroy life or impair or endanger health.

Hydrology – The science of Earth's water, its movement, abundance, chemistry and distribution on, above and below Earth's surface.

Impermeable Layer - A layer of rock, sediment or soil that does not allow water to pass through.

Infiltration - The movement of surface water into porous soil.

Interburden – meaning rock material positioned between the coal seams.

Kinetic NAG Testing - The NAG test provides a direct assessment of the potential for a material to produce acid after a period of exposure and weathering and is used to refine the results of the theoretical ABA predictions. This method involves the addition of hydrogen peroxide to a prepared sample of mine waste to oxidise contained reactive sulfides. This is followed by measurement of the pH of the reaction solution and titration of any net acidity produced by the acid generation and neutralisation reactions occurring in the sample. Units are in kg H₂SO₄ per tonne of ore.

Köppen classification - founded on the view that native vegetation reflects climate zone boundaries and can be used as an expression of the climate for a particular area.

L₁₀ – the A-weighted noise level which is exceeded 10% of the time.

L₉₀ – commonly referred to as the background noise level. The A-weighted sound pressure level that is equalled or exceeded for 90% of that part of the interval in which the investigated noise is absent.

La Niña – refers to the extensive cooling of the central and eastern tropical Pacific Ocean, often accompanied by warmer than normal sea surface temperatures in the western Pacific, and to the north of Australia. La Niña events are associated with increased probability of wetter conditions over much of Australia, particularly over eastern and northern areas. La Niña events have been correlated with higher numbers of tropical cyclones during the cyclone season (November to April).

Leachate – In the context of this EIS leachate is a solution resulting from groundwater percolating through tailings or waste rock.

Leaching - Chemical reactions that occur during the percolation of liquid through tailings or other materials. It may occur unintentionally, as when rainwater passes through waste heaps, or it may be used deliberately, such as to recover metals from a low-grade ore.

Leq - The Leq is the energy average noise level containing the same acoustic energy as the actual fluctuating noise level.

Macroinvertebrate – An invertebrate large enough to be seen without magnification.



Macropod - (large-foot) – a member of the family macropodidae, i.e. wallabies and kangaroos.

Madden-Julian Oscillation (MJO) - is the major fluctuation in tropical weather on weekly to monthly timescales. The MJO can be characterized as an eastward moving 'pulse' of cloud and rainfall near the equator that typically recurs every 30 to 60 days.

Material Safety Data Sheets - Contain information on the hazards associated with a chemical, along with guidance on its safe use.

Mine Life / Project Life – The life of the Project refers to the length of time the Project will be in operation.

Net Acid Generation (NAG) – The NAG value measures the acidity after oxidation and is expressed as kilograms of sulphuric acid per tonne of rock.

Net Acid Producing Potential (NAPP) – This is also a theoretical calculation value commonly used to indicate if a material has potential to generate ARD. It represents the balance between the capacity of a sample to generate acid (TAPP) and its capacity to neutralise acid (ANC). The NAPP is also expressed in units of kg H₂SO₄ per tonne ore and is calculated as follows:

$$\text{NAPP} = \text{TAPP} - \text{ANC}$$

Non Acid Forming (NAF) – A sample of soil is usually defined as NAF when it has a negative NAPP and the NAG pH \geq 4. Material classified as NAF is considered unlikely to be a source of acidic drainage. Where there is significant total S (>1%), more detailed investigation may be required to confirm that the ANC measured is available at the same rates as acid production through sulphide oxidation.

Outcrop – An exposure of bedrock.

Overburden – (also called waste or spoil) is the rock material overlying the coal deposit.

Oxidation - A chemical reaction in which substances combine with oxygen.

Pacific Decadal Oscillation - is a pattern of change in the Pacific Ocean's climate. It can last twenty to thirty years, is located in the North Pacific (with secondary signatures evident in the tropics) and represents a long-lived version of the El Niño Southern Oscillation.

Particulate Matter (PM) – Dust particles in the air.

Peak Flow - The maximum instantaneous discharge of a stream at a specific location.

Peak Particle Velocity – A measure of ground vibration magnitude which is the maximum rate of change of ground displacement with time, usually measured in millimetres / second.

Permeability - A measure of how well a material can transmit water. Materials such as gravel, that transmit water quickly, have high values of permeability. Permeability is primarily determined by the size of the pore spaces and their degree of interconnection.



pH - A relative measure of the acidity or alkalinity of a water based upon a scale that ranges between 0 and 14 with 7 being neutral. Values of pH below 7 indicate acid solutions and values of pH above 7 indicate basic solutions.

Piezometric level – Measurement of potential groundwater pressure in aquifers.

Plant Available Water Content – is an indicator of the water storage capacity of individual soils.

PM₁₀ – Fine airborne particles with an aerodynamic diameter of less than 10 µm (PM₁₀) are small enough to be breathed into the lungs. Fine particles are most commonly implicated as causing health effects. Health and amenity impacts of dust are regulated by setting limits on ambient levels of Total Suspended Particulates, PM₁₀ and dust deposition.

PM_{2.5} – Particles with an aerodynamic diameter of less than 2.5 µm (PM_{2.5}) or fine particles are generally produced by combustion processes and can penetrate deep into the lung where their removal rate is slow.

Potentially Acid Forming (PAF) – A sample is usually defined as PAF when it has a positive NAPP and the NAG pH < 4. A sample classified as PAF always has a significant sulphur content, the acid generating potential of which exceeds the inherent acid neutralising capacity of the material.

Pre-strip – The waste rock material stripped from the sites to be mined. It is referred to as 'pre-strip' as the stripping is done before an open cut pit is excavated and before mining commences.

Process Water - Water out of the treatment plant which has chemicals in it.

RAMSAR – Ramsar sites are wetlands of international importance designated under the Ramsar Convention.

Raw water - Fresh water that has not been used in the process and does not contain process reagents salts or fine particulates.

Reduced Level (RL) – Elevation relative to a specific datum point.

Regional Ecosystem – Regional ecosystems were defined as vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil.

Remnant Vegetation – Remnant vegetation is defined in the Vegetation Management Act 1999 as vegetation shown on a regional ecosystem or remnant map. Woody vegetation is mapped as remnant where the dominant canopy has greater than 70% of the height and greater than 50% of the cover relative to the undisturbed height, and cover, of that stratum and dominated by species characteristic of the vegetation's undisturbed canopy. An undisturbed stratum (or layer) is defined as one that shows no evidence of extensive mechanical or chemical disturbance (logging, clearing, poisoning, etc.) evident in field inspections or on the available historical aerial photographic record.

Riparian – Pertaining to the riverine zone or area of vegetation associated with a water course.

Run of Mine - The unscreened output of a mine.

Runoff – The portion of precipitation (rain and snow) that ultimately reaches streams.

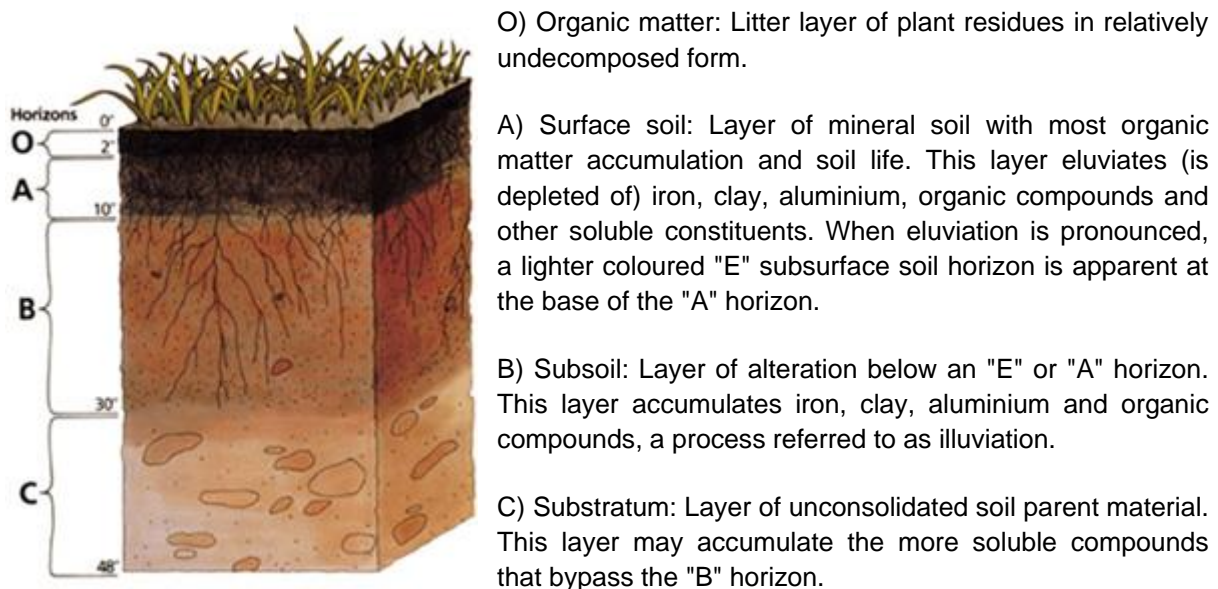


Scat – Dung left by animals aiding in identification.

Seed Bank – A store of viable seed buried and dormant in the soil or underwater sediments.

Spoil - the waste rock that is removed to the surface for disposal normally close to the shaft or pit, on an allocated dump.

Soil Profile - Soil generally consists of visually and texturally distinct layers, which can be summarized as follows, from top to bottom:



Stockpiles - Piles where ore that has been taken out of the pit and has been dumped. These are usually near the processing plant and away from the pit.

Stockpiling - Putting the ore and crushed ore into piles ready to be used.

Stratigraphy – The study of the sequence of layered geologic deposits based on their spatial positions, depositional sequence in time, and correlations across different localities.

Subcrop – Part of a geological formation (e.g. a coal seam) that is close to the surface but does not outcrop, as it is covered by the unconformable weathered profile or alluvial sediments.

Syncline – In terms of structural geology, a syncline is a downward-curving fold, with layers that dip toward the centre of the structure.

Taxa – Taxonomic units describing organisms in a hierarchical grouping. The level of taxa commonly referred to in the description of flora and fauna are: Family, *Genus* and *species*.

Thermal coal - A term used to describe coal which is used primarily to generate heat.

Topography - The shape of Earth's surface or the geometry of landforms in a geographic area.

Total Suspended Particulate (TSP) – Tiny airborne particles or aerosols that are less than 100 micrometers are collectively referred to as total suspended particulate matter

Total Suspended Solids (TSS) – refers to the identical measurement: the dry-weight of particles trapped by a filter, typically of a specified pore size.

Transformer - is an electrical device that transfers energy from one circuit to another by magnetic coupling with no moving parts. A transformer comprises two or more coupled windings, or a single tapped winding and, in most cases, a magnetic core to concentrate magnetic flux. A changing current in one winding creates a time-varying magnetic flux in the core, which induces a voltage in the other windings.

Turbidity – The cloudiness or haziness of a fluid caused by the individual particles (suspended solids) that are generally invisible to the naked eye, similar to smoke in air. The measurement of turbidity is a key test of water quality.

Uncertain Classification (UC) – UC is used when there is an apparent conflict between the NAPP and NAG results (i.e. when the NAPP is positive and NAG pH > 4; or when the NAPP is negative and NAG pH < 4). Uncertain samples require more detailed investigation, such as kinetic NAG or column leaching, to determine the acid potential.

Water Table - A level beneath the Earth's surface, below which all pore spaces are filled with water and above which the pore spaces are filled with air. The top of the zone of saturation in a subsurface rock, soil or sediment unit

Yield - The quantity of water or resource that can be produced from a deposit.