Glossary of Technical Terms

Acid-Base Accounting - A general term referring to the quantification of acid generating potential and acid neutralization potential by static testing.

Acid General Potential (AGP) - The amount of acid that can be generated by weathering of minerals in a rock without considering *Acid Neutralization Potential*. The AGP is measured by static acid-base accounting procedures and is usually expressed in calcium carbonate equivalence (e.g., tons CaCO per kiloton of materials). AGP must be considered in conjunction with *Acid Neutralization Potential* to determine the net potential for production of acid.

Acid Mine Drainage (AMD) - A condition of surface runoff or infiltration of water with low pH and elevated concentrations of dissolved natural constituents (e.g., metal salts) resulting from weathering of certain rock-forming minerals. Both a source of acid generation and a supply of water adequate for transport of the acid must be present for this phenomena to occur. AMD may be most frequently attributed to mining sites (thus the term Acid "Mine" Drainage), but can occur from any area where there is adequate water in contact with unoxidized (i.e., sulfide) rock that has been excavated and moved to a location where oxidation is rapid compared to its natural state. A term sometimes used as a synonym is *acid rock drainage*.

Acid Neutralization Potential (ANP) - The amount of acid that can be consumed by minerals in a rock or soil. The ANP is measured by static acid-base accounting procedures and is usually expressed in calcium carbonate equivalence.

Active Fault - an *Active Fault* is a fault that has experienced rupture in the past 35,000 years.

Adsorption - A chemical process where a molecule attaches to the surface of another phase, without becoming incorporated into that phase.

Alluvium - A general term for unconsolidated geologic materials deposited by running water (e.g., streams and rivers).

Anoxic Limestone Drain - A seepage treatment system comprised of a crushed limestone filled french drain designed to result in through flow under oxygen deficient (reducing) conditions to remove metals and acidity.

Anticline - A geologic structure consisting of a fold in which rock strata decrease in age away from the core of the fold. (i.e., an arch-shaped fold unless the structure has been overturned).

Aquifer - A geologic unit that contains sufficient saturated permeable material to yield usable quantities of water to a well or spring.

Aquifer Loading - The quantity of a potential pollutant or pollutants able to migrate downward to the uppermost aquifer underlying a facility or site, usually expressed in mass per unit area per unit time.

Aquitard - A natural zone of low permeability that inhibits the migration of groundwater.

Attenuation (Natural) - The process by which a compound is reduced in concentration over time, through adsorption, degradation, dilution, and/or transformation.

Atterberg Limits - Water content boundaries between the states of consistency of a soil (e.g., plastic limit).

Barren Solution - Solution applied to ore to dissolve mineral commodities. Leaching operations in arid climates such as Nevada are usually a closed-loop recirculating system, where the barren solution is reconstituted from pregnant solution after processing, with make-up water added as necessary.

Batch Test - A test involving reacting or leaching a quantity of representative material (e.g., soil ore, tailing) to obtain empirical data.

Beach - The sloping surface of hydraulically deposited tailing material.

Bedrock - A general term for consolidated and lithified geologic materials.

Borrow - Earth materials used for construction.

Bulk Density - The density of a material measured in mass per unit volume.

Buttress - An engineered structure and/or compacted earth support system for stabilizing over steepened slopes at their toe.

Column Test - A test designed to simulate the leaching or reaction of a liquid percolated through a granular material (e.g., soil, ore, tailing). The granular material is normally contained in a vertical pipe or column, with liquid added at the top and effluent collected at the bottom.

Composite Liner - A liner comprised of two or more low permeability components in direct contact with each other (e.g., a layer of clay and a geomembrance).

Cone of Depression - The depression produced in a water table or piezometric surface by pumping.

Design Earthquake - An earthquake utilized as the basis for developing appropriate ground motion characteristics for seismic design of a facility.

Design Peak Flow - The maximum flow rate calculated for the design storm at a given point in an engineered drainage system. Design peak flow is used in sizing components that convey flow (e.g., ditches and channels)

Design Storm - The storm size (usually identified by recurrence interval and duration) utilized in the design and sizing of engineered drainage systems.

Design Storm Volume - The total runoff volume that discharges to an engineered pond or impoundment during the design storm.

Detoxification - The treating of spent ore or other mine waste to reduce or eliminate its toxicity. Detoxification procedures can include rinsing and physical, chemical or biological treatment.

Discharge - The addition of a pollutant from a facility either directly to an aquifer or to the land surface or the vadose zone in such a manner that there is reasonable probability that the pollutant will reach an aquifer.

Dry Unit Weight - The weight of mineral matter divided by the volume of the entire element. Also referred to as dry density.

Ecological Survey – for the purposes of this IM, Ecological Survey means inventorying wildlife, vegetation, and wildlife habitat within a defined area proposed for a specific activity, such as a land application.

End Dumping - The process of dumping material from the back of a dump truck. Dump leach piles, heap leach piles and overburden rock piles are commonly constructed by end-dumping the material over the top edge of the pile slope.

Evaporative Depth - The depth below the ground surface to which water can be removed through evapotranspiration.

Factor of Safety - The ratio of forces contributing to slope stability (e.g., due to intergranular friction and cohesion) versus forces working against slope stability (e.g., gravity, seismic acceleration) estimated in seismic stability analyses.

Fixation - A process by which chemical constituents are immobilized or chemically bound in a matrix.

Freeboard - Height of containment above the surface of a contained liquid.

Gabion - A cylinder or cage, usually constructed of metal mesh, filled with rocks and used for erosion protection in storm water control channels, at dam foundations, etc.

Geocomposite - A general term for a premanufactured composite material (e.g., geosynthetic clay liner) designed for use in engineered structures.

Geomembrance - A low permeability plastic liner.

Geonet - A coarse plastic net designed for use as a drainage layer in engineered systems.

Geosynthetic - A general term for synthetic materials (e.g., geomembranes or geotextiles) used in engineered earth structures.

Geosynthetic-Clay Liner (GCL) - A factory-manufactured hydraulic barrier typically consisting of bentonite clay or other very low permeability material supported by geotextiles or geomembranes which are held together by needling, stitching or chemical adhesives.

Geotextile - A fabric designed for various uses in engineered earth structures. Common uses include wrapping or covering of materials to be buried to prevent their physical damage, incorporation into fills to spread load distribution, and use as a filter medium to capture fine particles.

Head or Hydraulic Head - The height of a fluid above a reference point (e.g., a plastic liner). Head is the driving force that exerts pressure causing water to migrate.

Heap Leach Pad - A lined relatively flat constructed area and solution containment features, on which ore is loaded and then leached with a solution to dissolve and recover minerals.

Hydraulic Conductivity - A measurement of the relative ease with which a porous medium can transmit water under a potential gradient. It is dependent on physical properties of the porous medium (i.e., the size, shape and degree of connection between openings through which liquid can flow).

Hydrograph - A water level or rate of flow record as a function of time.

Hydrolysis - Decomposition or alternation of a chemical substance by water.

Infiltration - Downward movement of water through the soil surface into the ground. Some or all of the water than infiltrates may still be removed through evapotranspiration.

Injection Well - A well which receives discharge through pressure injection or gravity flow. Injection wells are commonly used to deliver leaching solution to an ore body for insitu leaching operations.

In-Situ Leaching - The application of leaching solution to an ore body that is in-place, for the purpose of extracting a mineral commodity.

Interface Strength - The shear strength at the interface of two materials (e.g., the contact between a plastic liner and a clay layer).

Invert - The low point of drainage collection or conveyance system.

Kinetic Acid-Base Analysis - Laboratory tests designed to initiate what happens in nature and run over a period of time to determine the potential for rock to be acid-generating. Kinetic testing methods include humidity cell tests, column tests, etc.

Leaching - The process of dissolving mineral commodities from ore. For copper ores, leaching is usually accomplished by treating the ore with and acidic solution. For precious metals ores, leaching is usually accomplished using a basic solution with additional reagents to dissolve the mineral commodity (e.g., sodium cyanide).

Lithology - The physical and mineralogical makeup of geologic materials.

Liquefaction - The sudden large decrease of shearing resistance of cohesionless soil caused by a collapse of the structure by shock or strain (such as an earthquake) and associated with an increase of pore water pressure.

Lixiviant - A fluid used for leaching or extracting mineral or other components from solid material.

Lysimeter - A device used to measure the quantity or rate of movement of water through soil, or to collect such water.

Maximum Credible Earthquake (MCE) - The maximum earthquake that appears capable of occurring based on the presently known tectonic framework.

Maximum Probable Earthquake (MPE) - The maximum earthquake likely to occur during a 100-year interval (80 percent probability of not being exceeded in 100 years).

Mine Pit - An area from which ore and overburden are excavated.

Non-Storm Water Pont - A pond that contains seepage or inflow from a tailing impoundment, waste dump, process area, etc., where potential pollutant constituents in the seepage or inflow have concentrations that are relatively low (e.g., compared to process solutions) but exceed Arizona surface water quality standards. Non-storm water ponds also include secondary containment structures and overflow ponds that contain process solution for short periods of time due to process upsets or rainfall events.

Optimum Moisture Content - The moisture content at which the greatest degree of compaction is obtained.

Ore - Rock that can be mined for extraction of a minerals commodity under conditions that allow a profit to be made.

Outcrop - A bedrock exposure at the ground surface.

Overburden - Non-Ore rock and soil overlying an ore body. Non-ore rock that is interspersed with ore is also often referred to as overburden. For surface mining operations, overburden must usually be excavated to access ore material for removal. Mining operations characteristically minimize the amount of overburden excavated to control mining costs. Overburden is also referred to as *waste rock.*

Oxidation - Any process which increases the proportion of oxygen or acid-forming or radical in a compound.

Oxide Ore - Ore material that has been oxidized through natural geologic processes and no longer contains significant quantities of sulfide minerals.

Packer - A tool used to seal a well or boring at a specific location to isolate a given vertical zone (e.g., for testing or production).

Passive Containment - Natural or engineered topographical, geological or hydrological control measures that can operate without continuous maintenance.

Peak Flow - The maximum flow rate for a given storm at a given point in an engineered drainage system.

Perched Water Table - The top surface of a local zone of saturation located above the regional water table. Perched water table usually occur immediately above a low permeability stratum within the vadose zone that intercepts downward-percolating water and causes some of it to accumulate above the stratum.

Percolation - Downward movement of water is the vadose zone. Percolation occurs when the moisture content exceeds the specific retention.

Permeability - A measurement of the relative ease with which a porous medium can transmit liquid under a potential gradient. It is dependent on physical properties of the liquid (i.e., viscosity and density) and the porous medium (i.e., the size, shape and degree of connection between openings through which liquid can flow).

Phreatic Surface - The water table or top surface of a zone saturated with water with an engineered earthen structure (e.g., an embankment).

Pore Pressure - Pressure present within the pore fluid of a soil.

Porosity - The percentage of the total volume of rock or soil that is occupied by void space.

Pseudo static Analysis - State analysis of slope stability that incorporates a simulated horizontal force equal to the horizontal acceleration of the design earthquake times the mass of the potentially sliding material.

Pregnant Solution or Pregnant Leach Solution (PLS) - Mineral-laden solution recovered from a leaching operation. Leaching operations in arid climates such as Nevada are usually a closed-loop recirculation system, where the mineral commodity of interest is recovered from the pregnant solution and residual liquid is refortified with leaching reagent to make barren solution.

Process Solution Pond - A pond that contains pregnant, barren or recycling process solutions. An overflow pond that continually contains process solution as a normal function of facility operations is also considered a process solution pond.

Quality Assurance - A planned system of activities that provide assurance that a facility was constructed as specified in the design.

Quality Control - A planned system of inspections that are used to directly monitor and control the quality of a construction project.

Raveling - Rolling of loose surficial rocks down a slope due to gravity.

Recovery Well - A well utilized to recover mineral-laden solution as part of an in-situ leaching process.

Riprap - Rock placed in channels, on embankments, etc. to prevent erosion.

Risk Assessment – An organized process used to describe and estimate the likihood of an adverse exposure to toxic constituents in soil, water, and air.

Risk Management – Risk Management is a practice with processes, methods, and tools for managing risk in a project or action. It provides a disciplined environment for proactive decision making to assess risk, determine which risks are important to deal with, and implement strategies to deal with those risks.

Rubbilization - The engineered blasting of in-place rock to increase its permeability for the purpose of facilitating in-situ leaching.

Run of Mine - Uncrushed rock, broken only by blasting and excavation.

Run-On - Surface flow onto or into a given area caused by precipitation.

Run Off - Surface flow from a given area caused by precipitation that does not infiltrate or evaporate.

Run-Out - Transport of soil or rock beyond the toe of a slope due to momentum from dumping from the top of the slope.

Seismicity - Movement of the ground caused by an earthquake.

Settlement - The gradual downward movement of a structure due to loading and compression of the soil below the foundation.

Sliding Block Failure - A form of landslide movement in which an entire large block of materials, typically rock, moves as a unit for some distance out of a slope.

Slime Sealing - The hydraulic placement of finely ground tailing in a manner designed to create a hydraulic barrier/layer (e.g., against the up gradient side of a tailing impoundment embankment).

Specific Retention - Ration of the volume of water a soil or rock can retain against gravity drainage to the total volume of the soil or rock.

Static Water Elevation - The equilibrium elevation of standing water in a well or piezometer not affected by pumping.

Static Stability - The relative stability of a slope or structure under static (non-seismic) conditions.

Sub aerial Deposition - The hydraulic deposition of tailing in thin layers for defined periods of time over a beach in a manner that promotes rapid dewatering and evaporative drying of the deposited tailing.

Subsidence - Mass movement involving gradual downward sinking of the ground surface.

Sulfide Ore - Ore material that contains significant quantities of sulfide minerals.

Surface Pond - An impoundment other than a tailing impoundment that is used to collect or store fluids at a mining operation.

Syncline - A geologic structure consisting of a fold in which rock strata increase in age away from the core of the fold. (i.e., a trough-shaped fold unless the structure has been overturned).

Tailing - Finely ground ore residue remaining after milling and mineral extraction.

Tailing Impoundment - An impoundment designed to receive and contain finely ground ore residue particles and residual leach or chemical solutions remaining after milling and minerals extraction.

Talus - Unconsolidated rock or soil fragments deposited at the base of slopes due to gravity.

Unnecessary and Undue Degradation – Means conditions, activities, or practices that:

(1) Fail to comply with one or more of the following: the performance standards in 43CFR 3809.420, the terms and conditions of an approved plan of operations, operations described in a complete notice, and other Federal and state laws related to environmental protection and protection of cultural resources;
(2) Are not "reasonably incident" to prospecting, mining, or processing operations as defined in 43CFR 3715.0-5 of this chapter; or
(3) Fail to attain a stated level of protection or reclamation required by specific laws in areas such as the California Desert Conservation Area, Wild and Scenic Rivers, BLM-administered portions of the National Wilderness System, and BLM-administered National Monuments and National conservation Areas.

Vadose Zone - A zone below the ground surface containing water under pressure that is less than atmospheric pressure. Also referred to as the *unsaturated zone.*

Waste Rock - *See Overburden.*

Water Balance - The net sum of liquid inflows and outflows for a given system.

Watershed - The area that contributes surface runoff to a given system.