6.0 REFERENCES

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MBMG, Well Log Database, July 14, 1994.

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GLOSSARY

Abandoned Mine; Abandoned Workings - Excavations, either open, caved, or sealed, that are deserted and in which further mining is not intended.

Acid Mine Water - Mine water which contains sulfuric acid, mainly due to the oxidation of iron pyrite.

Acidity - Estimate of the capacity for a neutral water to neutralize caustic wastes without disturbing biological activities.

Activator (floatation mill) - A reagent that facilitates floatation of selected mineral species in a flotation cell.

Acute Aquatic Life Criteria - EPA's maximum acute toxicity concentrations for protection of aquatic life and its uses as established under Section 304(a)(1) of the Clean Water Act, as amended.

Adit - A horizontal or nearly horizontal passage driven in rock from the surface of the working or dewatering of a mine.

Alkalinity - Estimate of the capacity for a neutral water to neutralize acidic wastes without disturbing biological activities.

Alluvium - Sediments deposited on land by streams and rivers.

AIMSS - Abandoned and Inactive Mines Scoring System.

Amalgamation - The process by which mercury is alloyed with some other metal to produce an amalgam. Used at one time for the extraction of gold and silver from pulverized ores.

Attribution - To document an observed release of a hazardous substance(s) to the environment, the presence of the hazardous substance(s) must be attributable to a waste source at the site. For example, if an observed release to surface water can be established for copper, the concentration of copper in any waste source at the site must exist at greater than three times the background concentration of copper to establish attribution to the site.

BLM - United States Department of Interior, Bureau of Land Management.

Ball Mill - A rotating horizontal cylinder in which nonmetallic materials are ground using various types of grinding media, such as quartz pebbles, porcelain balls, or steel balls.

Barren Solution - Leaching solution that has been chemically stripped of metal values. Typically, the barren solution is recharged with leaching agent and recycled.

Benefication - The processing of ores for the purpose of: (1) regulating the size of a desired product, (2) removing unwanted constituents, and (3) improving the quality, purity, or assay grade of a desired product.

Bore Hole - An exploratory or prospecting hole made by drilling.

CECRA - The Comprehensive Environmental Cleanup and Responsibility Act.

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act of 1980, also known as Superfund: Amended in 1986 by the Superfund Amendments and Reauthorization Act (SARA).

Claim - An area of land claimed by an individual or corporation for the ultimate purpose of mineral extraction. The dimensions of a lode claim are 600 by 1,500 feet; for a placer claim, 600 by 1,320 feet.

Chronic Aquatic Life Criteria - EPA's maximum chronic toxicity concentrations for protection of aquatic life and its uses as established under Section 304(a)(1) of the Clean Water Act, as amended.

Collar - The term applied to the timbering or concrete around the mouth or top of a shaft. The junction of a mine shaft with the surface.

Collector (floatation mill) - A reagent that aids or facilitates the attraction of mineral particles to the froth in a floatation cell.

Comminution - To reduce solids to minute particles by crushing and grinding to liberate metals.

Concentrate - To separate metal or ore from the associated gangue or barren rock.

Concentrate (mineral concentrate) - Enriched ore after the removal of waste in a benefication mill.

Concentrator - Mill or plant in which ore is concentrated by removing unwanted constituents.

Containment - Engineered structures designed to prevent releases to groundwater, such as liners, covers, and run-on diversions.

Country Rock - General term applied to the rock surrounding and penetrated by mineralized veins; in a wider sense applied to the rocks invaded by and surrounding an igneous intrusion.

Cribbing - A method of timbering used primarily to rectify the removal of too great a percentage of the rock on the advance, and has the effect of replacing part of the rock.

Crosscut - (1) a passageway driven at right angles to the main entry to connect it with a parallel entry of air course. (2) A horizontal opening driven across the course of a vein or in general perpendicular to the direction of the main workings.

Crusher - A machine for crushing rock or other materials. Among the various types of crushers are the ball-mill, gyratory crusher, Hadsel mill, jaw crusher, rod mill, rolls, stamp mill, and tube mill.

Cyanide - A salt or ester of hydrocyanic acid. In aqueous solution, cyanide is used to dissolve metal from gangue material for later recovery.

Cyclone - A device for classification by centrifugal means of fine particles suspended in water, whereby the coarser grains collect and are discharged at the apex of the vessel, while the finer particles are eliminated with the bulk of the water at the discharge orifice.

Depressant (floatation mill) - A reagent that causes selected mineral species to sink in a floatation cell.

Drift - A horizontal passage underground. A drift follows the vein, as distinguished from a crosscut, which intersects it.

Drainage Basin Code - Code assigned to each discrete hydrologic unit by the U.S. Geological Survey.

DHES/SHWB - Montana Department of Health and Environmental Sciences, Solid and Hazardous Waste Bureau.

DHES/WQB - Montana Department of Health and Environmental Sciences, Water Quality Bureau.

DNRC - Montana Department of Natural Resources and Conservation.

DSL/AMRB - Montana Department of State Lands, Abandoned Mine Reclamation Bureau.

Dump - A pile or heap of waste rock material or other non-ore refuse near a mine.

Electrowinning - Recovery of a metal from an ore or solution by electrochemical processes.

EPA - United States Environmental Protection Agency.

Face - the surface exposed by excavation. the working face, front, or forehead is the face at the end of the tunnel heading, or at the end of the full size excavation.

Floodplain - An alluvial plain caused by the overbank deposition of alluvial material. They typically appear as flat expanses of land bordering a stream or river. Most floodplains are accompanied by a series of alluvial terraces of varying levels.

Fluvial - Pertaining to or produced by the action of a stream or river.

Floatation - The method of mineral separation which a froth created in water by a variety of reagents floats some finely crushed minerals, whereas other mineral sink.

Floatation Cell - Device in which froth floatation of ores is performed. It has provisions for receiving conditioned pulp, aerating the pulp, and for separate discharge of the resulting mineralized froth and impoverished tailings.

Frother - A reagent which serves to stabilize the froth in a floatation cell until it can be scraped off into the concentrate launder.

Glory Hole - Large, open hole typically associated with a mined-out or widened shaft.

Gravity Mill - A process in which heavy metals or minerals are separated from waste by the action of agitation and gravity on materials suspended in a liquid, usually water.

Grizzly - A devise used for coarse screening of bulk materials. A rugged screen for rough sizing at a comparatively large size (for example, 6-inches); it can comprise fixed or moving bars, disks, or shaped tumblers or rollers.

Hand Auger - A large tool modeled after the carpenter's drill used in soil sampling.

Hazardous Substance - CERCLA hazardous substances, pollutants, and contaminants as defined in CERCLA Sections 101(14) and 101(33).

Headframe - The vertical steel or timber frame at the top of a shaft, which carries the sheave or pulley for the hoist.

Heavy Metal - Principally the metals zinc, copper, cobalt, and lead; however, may include one or more of the following metals: bismuth, cadmium, gold, indium, iron, manganese, mercury, nickel, palladium, silver, thallium, and tin (often included, though not a metal).

Highwall - The unexcavated face of exposed overburden and coal or ore in an open-cast mine or the face or bank on the uphill side of contour strip mine excavation.

Hoist - (1) A drum on which wire rope is wound in the engine house, as the cage or skip is raised in the hoisting shaft. (2) An engine with a drum used for winding up a load from a shaft.

HRS - EPA's Hazard Ranking System (Federal Register, Vol. 55, No. 241, pp. 51532-51667).

Inclined Shaft or Incline - A non-vertical shaft; usually along the dip of a vein.

Intermittent Stream - A stream or stretch of stream which flows only at certain times of the year when it receives water from springs, snow melt or storm runoff.

Jaw Crusher - A primary crusher designed to reduce large rocks or ores to sizes capable of being handled by a secondary crusher. It consists of a moving jaw, hinged at one end, which swings toward and away from a stationary jaw in a regular oscillatory cycle.

Jig (Mineral Jig) - A machine in which the feed is stratified in water by means of a pulsating motion and from which the stratified products are separately removed, the pulsating motion usually being obtained by alternate upward and downward currents of water.

Latitude - The angular distance north or south from the equator of a point on the earth's surface, expressed in degrees.

Leaching - (1) The removal in solution of the more soluble minerals by percolating waters. (2) Extracting a soluble metallic compound from an ore by selectively dissolving it in a suitable solvent, such as water, sulfuric acid, hydrochloric acid, cyanide, etc.

Legal Description - The Township, Range, Section, and typically quarter/quarter section location.

Level - A main underground roadway or passage driven along the level course to afford access to the stopes or workings and to provide ventilation and haulageways for the removal of ore.

Loadout - A receptacle for ore awaiting treatment or shipment, also referred to as an ore bin.

Longitude - An angular distance east or west from the meridian of some particular place to the prime meridian at Greenwich, England.

MCL - Maximum contaminant level: Established under the Safe Drinking Water Act.

MCLG - Maximum contaminant level goal: Established under the Safe Drinking Water Act.

MBMG - Montana Bureau of Mines and Geology.

Master Inventory - Inventory of all identifiable abandoned or inactive hardrock mine sites in Montana conducted by the MDSL/AMRB.

Mesh - The number of openings per unit area of a screen (sieve).

Mill - A mineral treatment plant in which crushing, grinding, and further processing of ore is conducted to produce a product.

Milling - The processing of ore to produce a product.

Mine - Excavation of earth for the extraction of ore or other economic minerals.

Mine Development - The term used to describe the operations involved in preparing a mine for ore extraction. These operations may include tunneling, sinking, crosscutting, drifting, and raising.

Mineral - An inorganic substance occurring in nature, though not necessarily of inorganic origin, which has: (1) a definite chemical composition or, more commonly, a characteristic range of composition, and (2) distinctive physical properties or molecular structure.

Mineral Dressing - Physical and chemical concentration of raw ore into a product from which a metal can be recovered for a profit.

Mineral Deposit - A surface or underground body of mineral matter that may be utilized for its industrial mineral or metal content.

Observed Release - Concentration of hazardous substance(s) has increased significantly (greater than three times) above the background concentration for the site for that specific type of sample. For example, to document an observed release to surface water, a contaminant concentration detected in a surface water sample collected downstream from a site must exceed the concentration detected in a surface water sample collected upstream from the site by more than three times. See also "Attribution".

Open Pit Mining - A form of operation designed to extract minerals that lie near the surface.

Open Stope Method - Stoping in which no regular artificial method of support is employed, although occasional props or cribs may be used to hold local patches of insecure ground. Usually confined to relatively small, narrow ore bodies.

Ore - A mineral, or mineral aggregate, containing precious or useful metals, and which occurs in such quantity, grade, and chemical combination as to make extraction commercially profitable.

Ore Bin - A receptacle for ore awaiting treatment or shipment, also referred to as a loadout.

Ore Body - A solid and fairly continuous mass of ore, which may include low-grade ore and waste, as well as high-grade material.

Ore Deposit - A general term applied to rocks containing minerals of economic value in such amount that they can be profitably tracted.

Oxidation/Reduction Potential - The hypothetical electron activity at equilibrium. A measurement of the relative tendency (potential) of a solution to accept or transfer electrons, measured in volts.

PA No. - Problem Area Number established by the MDSL/AMRB.

Perennial Stream - A stream or stretch of a stream that flows continuously throughout the year.

pH - A measure of the degree of acidity or basicity of a solution. At 25°C, a pH of 7 is neutral. Acidity increases as measurements decrease below 7, and basicity increases as measurements increase above 7.

Placer - A mineral concentration resulting from weathering processes, usually involving water. Placer deposits are typically composed of heavy minerals, with gold, platinum, tin, and diamonds being the most important.

Ponded - A condition in which free water covers the soil surface, as in a closed depression.

Portal - (1) The surface entrance to a drift, tunnel, or adit; (2) The entrance to a mine.

Pregnant Solution - Metal-laden solution (cyanide, acid, etc.) resulting from a leach process.

Primary Drainage - The primary drainage is the smallest named stream segment/drainage basin that is locatable on the USGS Hydrologic Unit Map within which the mine site is located.

Prospect - (1) A mineral property, the value of which has not been proved by exploration. (2) Non-producing mining property under development or considered worthy of such attention.

PRP - Potentially Responsible Party.

Pulp - A mixture of ground ore and water capable of flowing through suitably graded channels as a fluid.

QA/QC - Quality Assurance/Quality Control.

Raise - A vertical or inclined opening driven upward from a level to connect with the level above, or to explore the ground for a limited distance above one level.

Reagent - A chemical or solution used to produce a desired chemical reaction; a substance used in assay or floatation.

Rod Mill - A mill for fine grinding, employing long steel rods to grind the material.

Secondary Drainage - The secondary drainage is the smallest named stream segment/drainage that is locatable on the USGS Quadrangle Map within which the mine site is located.

Sediment - Solid material, both mineral and organic, that is in suspension, is being transported, or has been moved from its site of origin by air, water, or ice and has come to rest on the earth's surface either above or below the water level.

Sedimentation - The settling of solid particles of soil, coal, or mineral from liquid as a result of gravity or centrifuging.

Shaft - An excavation of limited area compared with its depth, made for access to underground mine workings.

Sluice (Sluice Box) - A long trough-like box set at an incline of about 1:20 through which placer gravel is carried by a stream of water. The gravel is washed away while most of the gold or other heavy materials are caught by riffles or blankets on the floor of the sluice.

Slurry - Fine solid particles suspended in a liquid, typically water, of a consistency that allows flow by gravity or pumping.

Source - Any area where a hazardous substance has been deposited, stored, disposed, or placed, plus those soils that have become contaminated from migration of a hazardous substance.

Specific Conductance - The specific conductance or conductivity of water (or other substance measured) is the electrical conductance of the material between opposite sides of a cube 1 centimeter in each direction.

Stamp Mill - An apparatus in which rock is crushed by a stamp battery.

Stope - An underground excavation from which ore has been removed.

Subsidence - A sinking down of a part of the earth's surface due to the collapse of underlying underground openings.

Surface Mining - The mining in surface excavations, including placer mining, mining in open pits, mining and removing ore from open cuts by hand or with mechanical excavating and transportation equipment, and the removal of overburden to uncover the ore.

Tailings Pond - A pond with a constraining wall or dam to which mill effluents are run.

Tailings - The refuse material resulting from the washing, concentration, or treatment of ground ore.

Tunnel - A horizontal or nearly horizontal underground passage that is open to the atmosphere at both ends.

USFS - United States Department of Agriculture, Forest Service.

USGS - United States Department of Interior, Geological Survey.

Waste - The rock that is too low in grade to be of economic value.

Waste Dump (Spoil Pile) - The area where mine wastes or spoil materials are discarded.

Wetlands - Areas that under normal circumstances have hydrophytic vegetation, hydric marshes, and wetland hydrology. It includes landscape units, such as bogs, marshes, and lowlands, covered with shallow ephemeral or intermittent waters. Permanent waters of streams and water deeper than 9 feet in lakes or reservoirs are not considered wetlands.

Winze - A vertical or inclined opening, or excavation, connecting two levels in a mine, differing from a raise only in construction. A winze is driven downward and a raise is excavated upward.

X-ray Fluorescence (XRF) Spectrometer - Instrument used for metals analysis of solid media by energy dispersive X-ray fluorescence.