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VARIOUS GEOLOGY TERMS

REFERENCE:- <http://resourceopportunities.com/geology-processes-explained/>

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Porphyry Deposits

Every investor in the mining industry has heard about porphyry deposits, yet few understand the significance of the term. Porphyry deposits are often enormous in size, representing the most important source of copper and one of the leading sources of gold. The largest supplier of gold in the world, which yields 2.5 million ounces annually, is a porphyry deposit.

Crushing Grindings and Heavy Media Separation

Separating the metal-bearing minerals from the barren rock, or gangue, is typically the most expensive part of the mining process. Effectiveness of metal recovery (of which crushing and grinding is a major component) often determines if a mine will be profitable.

Creation Of a Gold Deposit

Most gold deposits are created when gold is carried to the surface in solutions. Water heated to about 250 degrees centigrade dissolves gold readily, carrying it to various locations where it cools into ore.

IP Surveys Explained

Induced polarization, or IP surveys, is a common technique used to detect the presence of metal underground.

Concentrating, Smelting and Refining

Steps required for converting an ore body into sellable metal. Most ores are usually bound to other elements, most commonly sulfur. Other common elements found with metallic minerals include arsenic, antimony, tellurium and even other metals, such as iron.

The Geology Of Platinum Group Metal Deposits Or: Why is it so hard to find new PGM deposits?

Platinum metals are usually mined from mafic or ultra-mafic intrusive complexes—masses of rock that originated as metal-rich magma (molten rock). Metals in the magma are derived from the inaccessible base of the earth's crust.

Geology Glossary

Abyssal Plain

Flat or very gently sloping areas of the deep ocean basin floor

Acid Mine Drainage

Acidic run-off water; also refers to ground water pumped to surface from mines.

Acidic Rain

Rain that has a low pH, caused by sulphur dioxide and nitric oxide from internal combustion engines and from industrial activity.

Acidic Rocks

Igneous rocks containing greater than 65% silica.

Active Layer

The seasonally thawed zone above permafrost.

Active Workings

Any place in a mine where miners are normally required to work or travel and which are ventilated and inspected regularly.

Adit

A horizontal to subhorizontal passage driven into a mine from a hill or mountainside usually designed to extract ore; also called a drift.

Advance Royalty

The prepayment of a designated amount (the advance royalty) prior to actual mine production. The advance royalty payments may be deductible from future production royalties.

Advance

The linear distance driven during tunnelling or mine development measured in metres.

Aerial magnetometer

An instrument used to measure strength of the Earth's magnetic field.

Aeromagnetic survey

A geophysical survey using a magnetometer aboard, or towed behind, an aircraft.

Agglomerate

A breccia composed largely or entirely of fragments of volcanic rocks; also known as volcanic breccia.

Agglomeration

A method of concentrating valuable minerals or coal based on their adhesion properties.

Agitation leaching

Extraction of gold from mined rock accomplished by agitation in a cyanide solution.

Agitation

Mechanical stirring or shaking. In metallurgy, agitation promotes the dissolution of ore minerals.

Airborne survey

Exploration work conducted from an aircraft that may include aerial photographic surveys and geophysical surveys to measure magnetism or radioactivity.

Alloy

A compound of two or more metals. Common alloys include brass (copper and zinc) and bronze (copper and tin).

Alluvial Deposit Material

Typically sands and gravels, transported by a river and deposited at points on the river's flood plain relatively recently in geologic time . These deposits can contain economically viable mineral resources.

Alluvial Fan

The land counterpart of a delta. See Alluvial Deposit.

Alteration

Changes in the chemical composition of a rock or mineral due to heat, pressure weathering or exposure to chemicals in hydrothermal solutions. Milder and more localized than metamorphism.

Amortization

The process of gradually writing off the value of an intangible asset over a period of time.

Angular unconformity

An unconformity in which underlying strata dip at a different angle.

Annual Report

Formal yearly financial statements issued by a corporation to shareholders at its fiscal year-end. A 10-K annual report is also filed by the company at the fiscal year-end to the Securities and Exchange Commission (SEC).

Anode

In electrolytic metallurgy, a rectangular metal plate, or anode, is dissolved in an acidic solution with atoms of the desired metal being recaptured at a cathode.

Anomaly

A deviation from normal geologic features.

Anticline

An upward arch or fold in rock strata, which can trap mineralized fluids or petroleum.

Any Part Order

A type of order in which the client will accept all stock in odd, broken or board lots up to the full amount of the order.

Apex

The highest point or terminal edge of a vein on surface or at the closest point to the surface.

Arching

Fracture processes around a mine opening, leading to stabilization by an arching effect by transferring rock stress or load from an active mining area.

Area Play

An area play is a region that has become a temporary hot zone for property acquisition and exploration because of a new discovery.

Arrears

Interest or dividends that were not paid when due and are still owed.

Assay map

Schematic view of an area showing sampling locations and assay grades on a property.

Assay

Geochemical analyses of soil, rock, sediment, water, etc for the purpose of determining its chemical composition and/or economic potential. Assay results can be given in percentages (%) or parts per million (ppm). To convert from one to the other, 10,000 ppm equals 1.0%.

Assessment report

Reports on work performed on a property during a prior period that is filed by companies and prospectors to keep claims in good standing.

Assessment work

The amount of work that must be completed by a company on a property to retain legal control of the claim.

Auger

A screw shaped drill used to break apart rock and transport it to the surface.

Autogenous Grinding

The process of grinding ore by means of placing it in a rotating cylinder with large pieces of mined rock. If steel balls are used, this is called semi-autogenous grinding.

Azimuth

A mathematical concept that is used in surveying to denote direction. It is defined as the horizontal angle measured clockwise from any meridian (the established line of reference).

Azurite

Product of oxidation of copper sulfide minerals; bright blue copper rich mineral.

Backfill

Waste material used to fill a void created by mining.

Backwardation

A market condition in which the future price of a metal is lower than the current price.

Ball mill

A device used to grind ore that consists of a rotating steel cylinder filled with steel balls.

Banded iron Formation

A sedimentary deposit consisting of alternating bands of iron minerals and beds of silica.

Barren

Rock that has no economic value.

Basal till

A deposit found at the base of a glacier that is formed from unsorted debris.

Basalt

A dark coloured extrusive igneous rock.

Base Metal

Elemental metal commodity (e.g. iron, copper, lead, zinc, tin, or nickel) used primarily in industrial applications; often occurs as a sulfide or oxide mineral.

Basic Rocks

A generally dark coloured, silica poor (45-50%) igneous rock; rich in magnesium, iron and/or calcium.

Batholith

A large mass of igneous rock that extends to great depth and generally has a lateral extent of more than forty square miles. It is dome shaped and forms along colliding tectonic plates by rising magma. Smaller masses of igneous rocks are known as bosses or plugs.

Bauxite

A rock composed of aluminum hydroxides and impurities in the form of silica, clay, silt, and iron hydroxides; a residual weathering product and the principal ore for aluminum.

Bearing plate

A plate used to distribute a load over a broader area.

Bearing

A term used to denote direction.

Bed

A stratum of sedimentary deposit.

Bedding

The layering of sedimentary rocks in layers.

Bedrock

Solid rock that is either exposed at the Earth's surface or overlain by unconsolidated material, such as rocks and boulders.

Bench

A ledge created in an open pit, which forms the surface for extraction. The size of the bench will reflect the strength of the rock, slope stability, pit economics and the machinery employed.

Beneficiate

The treatment of mined material to concentrate or enrich it.

Bessemer

Iron ore with a very lower phosphorous content (<0.045%).

Bio-leaching

A process for recovering metals in solution by using bacterial action.

Biotite

A potassium-magnesium-iron mica common in igneous and metamorphic rocks.

VARIOUS GEOLOGY TERMS

Bit

The cutting end of a drill.

Black Smoker

A seafloor vent from which hydrothermal fluids over 350 degrees centigrade are emitted. The name refers to the black colour of the precipitates that are formed when the hot, sulphide laden fluids come in contact with the cold seawater.

Blast furnace

A metallurgical furnace used for smelting to produce metals, generally iron.

Blaster

A mine employee who loads, primes, and detonates blastholes.

Blasthole

A drillhole that is filled with explosives in order to blast rock loose.

Blasting agent

Any material or mixture consisting of a fuel and an oxidizer.

Blasting cap

A small device used to detonate explosives.

Blister Copper

An intermediate product in the copper refining process (assaying about 99%) produced in a smelter.

Block caving

An inexpensive method of bulk mining in which large blocks of ore are undercut and the supporting pillars are blasted away, causing the ore to cave under its own weight.

Borehole

A narrow shaft drilled into the ground.

Boulder Train

Clusters of erratics from same source, with some distinctive characteristic that makes their common source easily recognizable.

Box hole

A short raise or opening driven above a drift for the purpose mining overlying ore, or to permit access.

Break

An abrupt geologic discontinuity, such as structural fault, fracture or unconformity.

Breccia

Rock consisting of fragments, more or less angular, in a matrix of finer-grained material or of cementing material.

Brecciation

The formation of a breccia.

Broken Reserves

Ore that has been broken up, but not yet transported to the surface.

Brownfields Exploration

Exploration of areas of favourable geology extending from adjacent to mines and mineral deposits to distances limited only by the economic transport of ore to an existing mill.

Bulk Mining

Large-scale, mechanized extraction of many thousands of tonnes of ore per day.

Bulk Sample

A large rock sample, frequently hundreds of tonnes, that is selected to be representative of an orebody. Used to determine metallurgical characteristics.

Bushveld Igneous Complex

Formed about 2 billion years ago, the Bushveld Igneous Complex (BIC) in South Africa, is a large igneous intrusion that contains some of the richest ore deposits on Earth.

By-product

Material of some economic value recovered in a process which is focused on extracting another material. For example, palladium is produced as a by-product of platinum mining in South Africa. Silver is a common by-product of lead, zinc, copper and gold.

Cable Bolt

A device for reinforcing the ground prior to mining that consists of a steel cable cemented into a drillhole.

Cage

A platform used to transport workers and equipment vertically between the surface and the mine

Cairn

A man-made mound of rocks or stones used as a reference point for surveyors.

Cap Rock

A comparatively impervious stratum immediately overlying an oil- or gas-bearing rock.

Carbonate

Calcium, magnesium and/or iron carbonate rich sedimentary rock; often contains fossils.

Cathode

Impure copper is dissolved in an electrified solution of copper sulphate and sulphuric acid, and is redeposited at the cathode, a plate of copper, in a purer form (99.9%).

Channel Sample

Thin strips of rock (few centimetres wide) cut by a portable rock saw across a width of an outcrop or specific location; representative of location from one side to other.

Chip Sample

Fragmented rock taken over a width of an outcrop or specific location (e.g. vein); representative of location from one side to other.

Cinder Cone

A conical volcano formed by the accumulation of pyroclastic debris around a vent.

Circulating Load

A closed circuit grinding system that returns over-sized chunks of ore to the beginning of the treatment loop for further processing.

Claim

A portion of land held either by a prospector or a mining company. In Canada, the common size is 1,320 ft. (about 400 m) square, or 40 acres (about 16 ha).

Classifier

A mineral-processing machine which separates minerals according to size and density.

Clast/Clastic

Coarse, rounded or angular fragments of rock.

Cleavage

The tendency of a mineral to split along planes determined by the crystal structure.

Closed Circuit

A type of ore processing where over-sized chunks of ore are returned to the beginning of the treatment loop for further treatment.

Column floatation

Valuable minerals are separated from waste rock, or gangue, by using chemicals that cause them to either float or sink. So-named because it occurs in a tall, cylindrical column.

Comminution

The breaking, crushing, or grinding of coal, ore, or rock.

Complex Ore

Ore containing more than one economic mineral. Complex ores are more difficult to process due to the varying chemical properties of the target minerals. For example, some copper minerals interfere with the cyanidation of gold by absorbing excess amounts of cyanide.

Concentrate

A fine, powdery product of the milling process containing a high percentage of valuable metal.

Concentrating

The process of separating milled ore into two streams; one greatly enriched in the valuable

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mineral (concentrate) and another of waste material (tailings). Concentration is a vital economic step in the production process because it reduces the volume of material which must be transported to and processed in a smelter and refinery.

Concentrator

The plant that produces concentrate.

Concordant

Lying parallel to, rather than cutting across surrounding strata.

Concretion

A compact mass of mineral matter, usually spherical or disk-like in shape and embedded in a host rock of different composition.

Conglomerate

Sedimentary rock that consists of rounded rock fragments cemented together by sand or silt into a solid mass.

Contact Metamorphism

Metamorphic changes that occur in rocks that are heated by surrounding magma.

Contact

A geological term used to describe the line or plane along which two different rock formations meet.

Contango

A market scenario in which the future delivery prices for metals are higher than the cash or spot price.

Convergent Boundary

A boundary between two plates of the Earth's crust that are pushing together.

Converter

A furnace that is used to separate copper metal from matte, a less pure form of copper that contains sulphur.

Copper Sulfides

Minerals containing copper and sulfur (eg chalcopyrite, chalcocite, bornite).

Co-product

A mineral commodity that is recovered from a mining operation for some other mineral product. Example Platinum is commonly a co-product of nickel mining.

Core

A cylindrical piece of rock that is brought to surface by diamond drilling.

Country Rock

Rock surrounding an ore body. Also known as host rock.

Creep

The very slow, generally continuous downslope movement of soil and debris under the influence of gravity.

Crusher

A machine that crushes rock and other materials.

Custom Smelter

A smelter which processes concentrates from independent mines. Concentrates may be purchased or the smelter may be contracted to do the processing for the independent company.

Cut-and-fill

A method of stoping in which ore is removed in slices, or lifts, and then the excavation is filled with rock or other waste material (backfill), before the subsequent slice is extracted.

Cut-off Grade

The lowest grade of mineralized material considered economic; used in the calculation of the ore reserves in a given deposit.

Cut-Value

Applies to assays that have been reduced to some arbitrary maximum to prevent erratic high values from inflating the average.

Cyanidation

A method of extracting exposed gold or silver grains from crushed ore by dissolving the ore in a weak cyanide solution of sodium or calcium cyanide. Also known as leaching.

Cyanide

A chemical species containing carbon and nitrogen used to dissolve gold and silver from ore.

Decline

An inclined shaft used to transport workers, materials and ore to and from the underground working area in a mine. Also called a ramp.

Deposit

Means a mineralized body which has been physically delineated by sufficient drilling, trenching, and/or underground work, and found to contain a sufficient average grade of metal or metals to warrant further exploration and/or development expenditures. Such a deposit does not qualify as a commercially mineable ore body or as containing ore reserves, until final legal, technical, and economic factors have been resolved.

Development

Underground work carried out for the purpose of opening up a mineral deposit. Includes shaft sinking, crosscutting, drifting and raising.

Development Drilling

Drilling to establish accurate estimates of mineral reserves.

Diamond drill

A type of rotary drill in which the cutting is done by abrasion rather than by percussion. The drill cuts a core of rock which is recovered in long cylindrical sections.

Dike

See Dyke.

Dip Needle

A compass with the needle mounted so as to swing in a vertical plane, used for prospecting to determine the magnetic attraction of rocks.

Dip

The angle at which a vein, structure or rock bed is inclined from the horizontal as measured at right angles to the strike. It ranges from 0^0 to 90^0 .

Directional Drilling

A method of drilling involving the use of stabilizers and wedges to direct the orientation of the hole.

Discovery Drilling

The process of drilling the first few holes to test for new mineral discoveries.

Disseminated

Minerals that are fine grained and often occurring uniformly throughout host rock; generally used to describe economic mineralization.

Dor Bar

The final saleable product of a gold mine. Usually consisting of gold and silver.

Drag Fold

The result of the plastic deformation of a rock unit where it has been folded or bent back on itself.

Drawpoint

An underground opening at the bottom of a stope through which broken ore from the stope is extracted.

Drift

A horizontal underground opening that follows along the length of a vein or rock formation as opposed to a crosscut which crosses the rock formation.

Drifter

A hydraulic rock drill used to drill small-diameter holes for blasting or for installing rock bolts.

Drill

A cutting tool that produces a circular hole in rock or metal.

Drill-indicated reserves

The size and quality of a potential orebody as suggested by widely spaced drillholes; more work is required before reserves can be classified as probable or proven.

Dump

A pile of broken rock or ore on surface.

Dyke

A long, thin body of intrusive rock (felsic or mafic) that, while in the molten state, intruded a fissure in older rocks. Dykes vary from a few centimetres to many tens of meters in thickness and may extend for several kilometres.

Electrolysis

An electric current is passed through a solution containing dissolved metals, causing the metals to be deposited onto a cathode.

Electrolytic refining

The process of purifying metal ingots that are suspended as anodes in an electrolytic bath, alternated with refined sheets of the same metal which act as starters or cathodes.

Electromagnetic Survey

A geophysical survey method which measures the electromagnetic properties of rocks. Also known as EM Surveys.

En echelon

Staggered, but roughly parallel structures.

Environmental impact study

A written report, compiled prior to a production decision, that examines the effects proposed mining activities will have on the natural surroundings.

Epigenetic

Orebody formed by hydrothermal fluids and gases that were introduced into the host rocks from elsewhere, filling cavities in the host rock.

Epigenetic

Mineral deposits that were formed at a different time than the surrounding rock

Epithermal

Type of hydrothermal mineral deposit formed within one kilometre of the Earth's surface that often result in extensive vein systems known as epithermal veins or in broad areas of low grade, bulk tonnage precious metal deposits.

Era

A large division of geologic time.

Erosion

The breaking down and subsequent removal of either rock or surface material by wind, rain, wave action, freezing and thawing and other processes.

Erratic

Either a piece of visible gold or a large glacial boulder.

Evaporite

A mineral or rock deposited directly from a solution (commonly seawater) during evaporation. For example, gypsum and halite are evaporite minerals.

Expansion Drilling

The process of drilling to test for the expansion of a deposit.

Exploitation concession

A right granted by a governmental entity to exploit or develop a prescribed area for a specified period.

Exploration

The process of searching for mineral deposits that involves prospecting, mapping, and drilling.

Extractable metal

The part of the total content of a metal in a sample that can be extracted by a given chemical treatment.

Extrusive Rock

Igneous rock (magma) that has erupted onto the surface of the earth. Also called volcanics.

Face

The end of a drift, crosscut or stope in which work is taking place.

Fault breccia

Refers to the crushed, angular rock fragments found in a fault zone.

Fault

A fracture or set of fractures formed as a result of bedrock that has moved relative to each other. Faults can occur on a centimetre to kilometre scale and often create spaces through which fluids can flow.

Feasibility study

An assessment of the economic viability of a potential mining project. The study must consider all aspects of the project, including mine and processing plant design, waste disposal, environmental management and permitting. A feasibility study will only be undertaken after an extensive series of desk studies, exploration and trial mining and processing projects have been completed.

Feldspar

A group of common rock-forming minerals that includes microcline, orthoclase, plagioclase and others.

Felsic

Term used to describe light-coloured rocks containing feldspar, feldspathoids and silica.

Ferrous

Containing iron.

Fill

Material that is put back in place of the extracted ore to provide ground support.

Fine gold

Fineness is the proportion of pure gold or silver in jewellery or bullion expressed in parts per thousand. Thus, 925 fine gold indicates 925 parts out of 1,000, or 92.5% is pure gold.

Fissure

An extensive crack, break, or fracture in the rocks.

Float

Pieces of rock that have been broken off and moved from their original location by natural forces such as frost or glacial action.

Flotation

A method of concentration that separates various minerals by utilising their differing surface properties. Separation occurs when valuable minerals adhere to air-bubbles that form the froth floating on the surface of a mixture of water, chemicals and ground-up ore. The metal-rich flotation concentrate is then skimmed off the surface.

Flowsheet

An illustration showing the sequence of operations, step by step, by which ore is treated in a milling, concentration or smelting process.

Flux

A chemical substance that reacts with gangue minerals to form slags, which are liquid at furnace temperature and low enough in density to float on the molten bath of metal or matte.

Fluxgate magnetometer

An instrument used in geophysics to measure total magnetic field.

Fold

A bend in the rock as a result of pressure on the bedrock; occurs on a centimetre to kilometres scale; often spaces are created along which fluids can flow.

Footwall

The rock on the underside of a geological structure, such as an orebody or fault.

Fracture

A break in the rock, the opening of which allows mineral-bearing solutions to enter. A “cross-fracture” is a minor break extending at more-or-less right angles to the direction of the principal fractures. Types of fractures include faults, shears, joints and planes of fracture cleavage.

Free milling

Ores of gold or silver from which the precious metals can be recovered by concentrating methods without resorting to pressure leaching or other chemical treatment.

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Gabbro

A dark, coarse-grained igneous rock.

Galena

Lead sulfide, the most common ore mineral of lead.

Gamma

A unit of measurement of magnetic intensity.

Gangue

Non-profitable waste rock associated with economic minerals.

Geiger counter

An instrument used to measure the radioactivity that emanates from certain minerals by means of a Geiger-Mueller tube.

Geochemical Techniques

The study of the chemical composition and distribution of elements and isotopes in rocks, soil, sediments, water, and vegetation; used in exploration for the purpose of identifying alteration and economic minerals.

Geological Techniques

Techniques that include mapping, trenching and drilling.

Geophysical Conductor

A mineral which conducts electricity when an electromagnetic field is applied.

Geophysical survey

A scientific method of prospecting that measures the physical properties of rock formations. Common properties investigated include magnetism, specific gravity, electrical conductivity and radioactivity.

Geophysics

The study of the physical properties of rocks and minerals.

Geothermal

Pertains to the heat of the Earth's interior.

Glacial drift

Sedimentary material that has been transported by glaciers.

Glacial striations

Lines or scratches on a smooth rock surface caused by glacial abrasion.

Gneiss

A layered or banded crystalline metamorphic rock, the grains of which are aligned or elongated into a roughly parallel arrangement.

Goethite

A red, yellow, or brown coloured iron oxide; often occurring in weathered gossans.

Gossan

Accumulations of yellow, red, brown, black, rusty coloured rocks that is formed by the oxidation or alteration of iron sulphides.

Gouge

Fine, putty-like material composed of ground-up rock found along a fault.

Grab Sample

A sample from a rock outcrop that is assayed to determine if valuable elements are contained in the rock. A grab sample is not intended to be representative of the deposit, and usually the best-looking material is selected.

Graben

A downfaulted block of rock.

Grade

Concentration of a metal in an ore; usually measured as grams per tonne or ounces per ton, or as a percentage.

Grain

Refers to the size of a mineral or rock particle. A grain often has a diameter of less than a few millimetres. Grain can also refer to the plane of parting in slate that is perpendicular to the flow cleavage or for a direction of parting in massive rock.

Granite

A coarse-grained intrusive igneous rock consisting of quartz, feldspar and mica.

Gravity meter

An instrument for measuring the gravitational attraction of the earth; gravitational attraction varies with the density of the rocks in the vicinity.

Gravity Separation

A method of recovering gold from crushed rock by using gold's high specific gravity to separate it from lighter material.

Grass-roots Exploration

See Greenfields Exploration.

Greenfields Exploration

Early stage or grassroots work embracing prospecting, geoscientific surveys, drilling, sample collection and testing on broad target areas selected on the basis of favourable geology with little or no evidence of target mineralization. Also known as Grass-roots Exploration.

Greensheet

The highlights for a firm's sales representatives of the salient features of a new issue to successfully solicit interest to the general public.

Greenstone Belt

An area underlain by metamorphosed volcanic and sedimentary rocks, usually in a continental shield.

Grinding Media

Material used to finely grind ore material to a size which allows recovery of the desired contained material.

Grizzly (or mantle)

A grating, usually constructed of steel rails, placed over the top of a chute or ore pass for the purpose of stopping large pieces of rock or ore that may hang up in the pass.

Grizzly

Coarse screening device that prevents oversized bulk material from entering a material transfer system; constructed of rails, bars, beams, etc.

Grouting

The process of sealing off a water flow in rocks by forcing a thin slurry of cement or other chemicals into the crevices; usually done through a diamond drill hole.

Guides

The timber rails installed along the walls of a shaft for steadying, or guiding, the cage or conveyance.

Gypsum

A sedimentary rock consisting of hydrated calcium sulfate.

Gyratory crusher

A machine that crushes ore between an eccentrically mounted crushing cone and a fixed crushing throat. Typically has a higher capacity than a jaw crusher.

Halite

Rock salt

Hanging wall

The wall or rock on the upper side of an ore deposit or vein.

Head Grade

The average grade of the ore leaving the mine and entering the processing plant. Also termed mill head grade, which is the grade of ore as it enters the milling process.

Heap-leaching

A process whereby gold is recovered from ore by heaping broken ore on sloping impermeable pads, repeatedly spraying the heaps with a diluted cyanide solution which dissolves the gold or silver content in the ore, collecting the metal laden solutions, and stripping the solution.

Hectare

A square of 100 meters on each side (10,000 square metres), or 2.471 acres.

Hematite

An oxide of iron, and one of that metal's most common ore minerals.

High grade

Rich ore. As a verb, it refers to selective mining of the best ore in a deposit.

High-grader

One who steals rich ore, especially gold, from a mine.

Hornfels

A fine-grained contact metamorphic rock.

Horse

A mass of waste rock lying within a vein or orebody.

Host Rock

Rock surrounding an ore body. Also known as country rock.

Hydrometallurgy

The treatment of ore by wet processes, such as leaching, resulting in the solution of a metal and its subsequent recovery.

Hydrothermal Alteration

The process of hydrothermal metamorphism. Important in the formation of many mineral deposits.

Hydrothermal Metamorphism

Develops when hot fluids, which often contain elevated concentrations of elements such as gold, react with rock and change their chemical composition. The elements contained in the fluids precipitate out of the fluids and can produce economic mineralization and intense vein systems.

Igneous

Rock formed by the cooling of molten material.

Ilmenite

An ore mineral of titanium, being an iron-titanium oxide.

In situ

In the natural or original position.

Incompetent

Applied to strata, a formation, a rock, or a rock structure not combining sufficient firmness and flexibility to transmit a thrust and to lift a load by bending.

Indicated Mineral Resource

An 'Indicated Mineral Resource' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape and physical characteristics, can be estimated with a level of confidence sufficient to allow the appropriate application of technical and economic parameters, to support mine planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and

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drill holes that are spaced closely enough for geological and grade continuity to be reasonably assumed. Source: Canadian Institute Of Mining, Metallurgy And Petroleum

Induced Polarization

A method of ground geophysical surveying employing an electrical current to determine indications of mineralization. Often abbreviated IP.

Industrial minerals

Non-metallic, non-fuel minerals used in the chemical and manufacturing industries. Examples are asbestos, gypsum, salt, graphite, mica, gravel, building stone and talc.

Inferred Resource

Valuable mineralization not sampled enough to accurately estimate its tonnage and grade, or even verify its existence. Also called Possible Resource.

Infill Drilling

The process of drilling additional holes between existing holes in order to better define a known mineral deposit.

Information Circular

A document that is sent to shareholders with a proxy, providing details of matters to come before a shareholder's meeting.

Inferred Mineral Resource

An 'Inferred Mineral Resource' is that part of a Mineral Resource for which quantity and grade or quality can be estimated on the basis of geological evidence and limited sampling and reasonably assumed, but not verified, geological and grade continuity. The estimate is based on limited information and sampling gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes. Source: Canadian Institute Of Mining, Metallurgy And Petroleum

Intermediate rock

An igneous rock containing 52% to 66% quartz.

Intrusion

A general term for a body of igneous rock formed below the surface.

Intrusive

A body of igneous rock formed by the consolidation of magma intruded into other rocks.

IP

See induced polarization

Jaw crusher

A machine in which rock is broken by the action of steel plates.

Jig

A piece of milling equipment used to concentrate ore on a screen submerged in water, either by the reciprocating motion of the screen or by the pulsation of water through it.

Kilogram

Equivalent to 2.205 pounds.

Kimberlite

A variety of peridotite; the most common host rock of diamonds.

Lagging

Planks or small timbers placed between steel ribs along the roof of a stope or drift to prevent rocks from falling, rather than to support the main weight of the overlying rocks.

Lake Sediments

Mud at the bottom of lakes and ponds that comes from the entire watershed in the area. Samples of mud taken from lakebeds can be used as an indicator to detect the presence of minerals in the lakeshed area. Lake sediment geochemistry is a general, non-specific method of determining any economic mineralization or alteration in the area.

Lamprophyre

An igneous rock, composed of dark minerals, that occurs in dykes; sometimes contains diamonds.

Laterite

Red residual soil developed in humid, tropical, and subtropical regions of good drainage. It is leached of silica and contains concentrations particularly of iron oxides and hydroxides and aluminum hydroxides. Laterites produce virtually all the world's aluminum ore and laterite nickel deposits are a significant source of the world's nickel.

Launder

A chute or trough for conveying pulp, water or powdered ore in a mill.

Lava

A general name for the molten rock ejected by volcanoes.

Leach

The dissolution of soluble constituents from a rock or orebody by the natural or artificial action of percolating solutions.

Leachable

Extractable by chemical solvents.

Leaching

A method of extracting exposed gold or silver grains from crushed ore by dissolving the ore in a weak cyanide solution of sodium or calcium cyanide. Also known as cyanidation.

Lens

Generally used to describe a body of ore that is thick in the middle and tapers towards the ends.

Lenticular

A deposit having roughly the form of a double convex lens.

Level

The horizontal openings on a working horizon in a mine; it is customary to work mines from a shaft, establishing levels at regular intervals, generally about 50 meters or more apart.

Limestone

A bedded, sedimentary deposit consisting chiefly of calcium carbonate. Limestone is commonly grey, white, or off-white, and less commonly brownish, red or black.

Limonite

Yellow, brown iron oxide produced from weathered gossans or iron rich rocks and clays.

Line cutting

Straight clearings through the bush to permit sightings for geophysical and other surveys.

Lithification

The process by which an unconsolidated deposit of sediments is converted in to solid rock. Compaction, cementation and recrystallization are involved.

Lithology

The character of a rock described in terms of its structure, color, mineral composition, grain size, and arrangement of its component parts; all those visible features that in the aggregate impart individuality of the rock.

Load

To place explosives in a drill hole. Also, to transfer broken material into a haulage device.

Load-Haul-Dump Vehicles

Vehicles used in some underground mines to transport ore from the working areas to the main haulage system.

Loading pocket

Transfer point at a shaft where bulk material is loaded by bin, hopper, and chute into a skip.

Lode

A mineral deposit in solid rock.

Logging

The process of recording geological observations of drill core either on paper or on computer disk.

Long ton

2,240 lbs. avoirdupois (compared with a short ton, which is 2,000 lbs.).

Low voltage

Up to and including 660 volts by federal standards.

Mafic

Igneous rocks composed mostly of dark, iron- and magnesium-rich minerals.

Magma

The molten material deep in the Earth from which rocks are formed.

Magmatic segregation

An ore-forming process whereby valuable minerals are concentrated by settling out of a cooling magma.

Magmatic Mineral Deposit

See Magmatic Segregation.

Magnetic gradient survey

A geophysical survey using a pair of magnetometers a fixed distance apart, to measure the difference in the magnetic field with height above the ground.

Magnetic separation

A process in which a magnetically susceptible mineral is separated from gangue minerals by applying a strong magnetic field; ores of iron are commonly treated in this way.

Magnetic survey

A geophysical survey that measures the intensity of the Earth's magnetic field.

Magnetic susceptibility

A measure of the degree to which a rock is attracted to a magnet.

Magnetite

Black, magnetic iron ore, an iron oxide.

Magnetometer

An instrument used to measure the magnetic attraction of underlying rocks.

Malachite

A product of copper sulfide oxidation; bright green mineral.

Manto

A flat-lying, bedded deposit; either a sedimentary bed or a replacement strata-bound orebody.

Map-staking

A form of claim-staking practised in some jurisdictions whereby claims are staked by drawing lines around the claim on claim maps at a government office.

Marble

A metamorphic rock derived from the recrystallization of limestone under intense heat and pressure.

Marginal deposit

An orebody of minimal profitability.

Massive Sulphide

Rock that consists mainly or wholly of sulphide minerals such as pyrite, pyrrhotite or chalcopyrite.

Matte

A product of a smelter, containing metal and some sulfur, which must be refined further to obtain pure metal.

Measured Mineral Resource

A 'Measured Mineral Resource' is that part of a Mineral Resource for which quantity, grade or quality, densities, shape, physical characteristics are so well established that they can be estimated with confidence sufficient to allow the appropriate application of technical and economic parameters, to support production planning and evaluation of the economic viability of the deposit. The estimate is based on detailed and reliable exploration, sampling and testing information gathered through appropriate techniques from locations such as outcrops, trenches, pits, workings and drill holes that are spaced closely enough to confirm both geological and grade continuity. Source: Canadian Institute of Mining, Metallurgy & Petroleum

Meridian

A surveying term that establishes a line of reference.

Mesothermal

Said of a hydrothermal mineral deposit formed at considerable depth and in the temperature range of 200 to 300 degrees C.

Metallurgical Coal

Coal used to make steel.

Metallurgy

The study of extracting metals from their ores.

Metamorphic rocks

Rocks which have undergone a change in texture or composition as the result of heat and/or pressure.

Metamorphism

The process of chemical alteration and deformation of a rock during a change of increased temperature and pressure over time.

Migmatite

Rock consisting of thin, alternating layers of granite and schist.

Mill

A plant in which ore is treated and metals are recovered or prepared for smelting; also a revolving drum used for the grinding of ores in preparation for treatment.

Milling ore

Ore that contains sufficient valuable mineral to be treated by milling process.

Milling

The first stage of mineral processing. Ore pieces from the mine are further mechanically reduced in size to maximise efficiency of the concentration process. In general two types of

mills are used. Autogenous mills simply tumble the ore to achieve the desired grains size, whilst other mills which use an additional media, such as steel balls or rods to aid milling.

Milling Royalty

A specific royalty on the ore throughput at a mill.

Minable reserves

Ore reserves that are known to be extractable using a given mining plan.

Mine development

The term employed to designate the operations involved in preparing a mine for ore extraction. These operations include tunnelling, sinking, cross-cutting, drifting, and raising.

Mineral

An inorganic compound occurring naturally in the earth's crust, with a distinctive set of physical properties, and a definite chemical composition.

Mineral Resource

Mineral Resources are sub-divided, in order of increasing geological confidence, into Inferred, Indicated and Measured categories. An Inferred Mineral Resource has a lower level of confidence than that applied to an Indicated Mineral Resource. An Indicated Mineral Resource has a higher level of confidence than an Inferred Mineral Resource but has a lower level of confidence than a Measured Mineral Resource. Source: Canadian Institute Of Mining, Metallurgy And Petroleum

Mineral Reserve

A Mineral Reserve is the economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. A Mineral Reserve includes diluting materials and allowances for losses that may occur when the material is mined. Source: Canadian Institute Of Mining, Metallurgy And Petroleum

Mineralization

Material containing minerals of value.

Mineralized deposit

A mineralized body which has been physically delineated by drilling, underground work, surface trenching and other workings or drill holes and found to contain a sufficient amount of mineralized material with an average grade sufficient to warrant further evaluation. Such deposit does not qualify as a commercially minable (or viable) ore body until technical, economic and legal factors have been sufficiently satisfied to classify the mineralized material as a reserve.

Mineralized zone

Any mass of host rock in which minerals of potential commercial value occur

Mining Engineer

A person qualified by education, training, and experience in mining engineering. A trained engineer with knowledge of the science, economics, and arts of mineral location, extraction,

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concentration and sale, and the administrative and financial problems of practical importance in connection with the profitable conduct of mining.

Monzonite

Fairly common members of the granite family defined as having certain proportions of quartz, orthoclase, and plagioclase.

Muck Sample

A representative piece of ore that is taken from a muck pile and then assayed to determine the grade of the pile.

Muck

Ore or rock that has been broken by blasting.

Nanotesla

The international unit for measuring magnetic flux density.

Native metal

A metal occurring in nature in pure form, not combined with other elements.

NEX

A relatively new and separate board of the TSX Venture Exchange that provides a trading forum for companies that have fallen below the Venture Exchange's listing standards.

Non-cumulative

A preferred dividend that does not accrue or accumulate if unpaid.

Norite

A coarse-grained igneous rock that is host to copper/nickel deposits in the Sudbury area of Ontario.

Nugget

A small mass of precious metal, found free in nature.

Open Cast Mine

See Open Pit.

Open Cut Mine

See Open Pit.

Open end pillaring

A method of mining pillars in which no stump is left; the pockets driven are open on the gob side and the roof is supported by timber.

Open pit mining

The process of mining an ore body from the surface in progressively deeper steps. Sufficient waste rock adjacent to the ore body is removed to maintain mining access and to maintain the stability of the resulting pit.

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Open pit

A mine that is entirely on surface. Also referred to as open-cut or open-cast mine.

Ore pass

Vertical or inclined passage for the downward transfer of ore connecting a level with the hoisting shaft or a lower level.

Ore Reserves

The calculated tonnage and grade of mineralization which can be extracted profitably; classified as possible, probable and proven according to the level of confidence that can be placed in the data.

Ore

A mixture of minerals and gangue from which at least one of the minerals can be extracted at a profit.

Orebody

A natural concentration of valuable material that can be extracted and sold at a profit.

Oreshoot

The portion, or length, of a vein or other structure that carries sufficient valuable minerals to be extracted profitably.

Organic maturation

The process of turning peat into coal.

Orogeny

A period of mountain-building characterized by the folding of a portion of the earth's crust.

Orthoclase

Common rock-forming mineral made up almost entirely of silicates.

Ounces

Troy ounces of a fineness of 999.9 parts per 1,000 parts, equal to 31.1034 grams

Outcrop

An exposure of rock or mineral deposit that can be seen on surface that is, not covered by soil or water.

Oxidation

A chemical reaction caused by exposure to oxygen that results in a change in the chemical composition of a mineral.

Oxidized Ore

The alteration of metalliferous minerals by weathering and the action of surface waters and their conversion, partly or wholly into oxides, carbonates or sulphates.

Pan

A shallow metal dish used to wash gravel, sand or crushed rock samples in order to isolate gold or other valuable metals by their higher density.

Parting

A small joint in coal or rock, or a layer of rock in a coal seam.

Patent

The ultimate stage of holding a mineral claim, after which no more assessment work is necessary because all mineral rights have been earned.

Pegmatite

A coarse-grained, igneous rock, generally coarse, but irregular in texture, and similar to a granite in composition; usually occurs in dykes or veins and sometimes contains valuable minerals.

Pellet

A marble-sized ball of iron ore fused with clay for transportation and use in steelmaking.

Pentlandite

Nickel iron sulfide, the most common nickel ore.

Peralkaline

An igneous rock with less aluminum than sodium and potassium oxides combined.

Percussion drill

A drill, usually air powered, that delivers its energy through a pounding or hammering action.

Peridotite

An intrusive igneous rock consisting mainly of olivine.

Permit

As it pertains to mining, a document issued by a regulatory agency that gives approval for mining operations to take place.

PGE

See Platinum Group Metals.

PGM

See Platinum Group Metals.

Phaneritic

A term used to describe the coarse-grained texture of some igneous rocks.

Phyllite

Scaly minerals, micas, chlorites and clays; a term more recently applied to minerals with a layered crystal structure

Picket line

A reference line, marked by pickets or stakes, established on a property for mapping and survey purposes.

Pig iron

Crude iron from a blast furnace.

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Pillar

A block of solid ore or other rock left in place to structurally support the shaft, walls or roof of a mine.

Pilot scale

A small scale bulk processing plant that gives a company an idea of the mineral values.

Pitch

The inclination of a seam; the rise of a seam.

Pitchblende

An important uranium ore mineral. It is black in color, possesses a characteristic greasy lustre and is highly radioactive.

Placer

A deposit of sand and gravel containing valuable metals such as gold, tin or diamonds.

Plan

A map showing features such as mine workings or geological structures on a horizontal plane.

Plant

A building or group of buildings in which a process or function is carried out; at a mine site it will include warehouses, hoisting equipment, compressors, maintenance shops, offices and the mill or concentrator.

Plate tectonics

A geological theory which postulates that the Earth's crust is made up of a number of rigid plates which collide, rub up against and spread out from one another.

Platinum Group Metals

The six metallic elements platinum, palladium, rhodium, ruthenium, iridium and osmium. Also referred to as platinum group elements (PGE).

Plug

A common name for a small offshoot from a large body of molten rock.

Plunge

The vertical angle a linear geological feature makes with the horizontal plane.

Plutonic

Refers to rocks of igneous origin that have come from great depth.

Point

Unit of value of a stock as quoted by a stock exchange. May represent one dollar, one cent or one-eighth of a dollar, depending on the stock exchange.

Polishing pond

The last in a series of settling ponds through which mill effluent flows before being discharged into the natural environment.

Porphyry Copper

Disseminated copper deposit formed in a large porphyry body; usually low grade (less than 1% Cu), high tonnage. Porphyry copper deposits have large mineral grains surrounded by finer mineral grains.

Porphyry

A common igneous rock type that contains relatively large crystals, called phenocrysts in a fine-grained ground mass.

Portal

The surface entrance to a tunnel or adit.

Possible Resource

Valuable mineralization not sampled enough to accurately estimate its tonnage and grade, or even verify its existence. Also called inferred resource.

Potash

Potassium compounds mined for fertilizer and for use in the chemical industry.

Precambrian Shield

The oldest, most stable regions of the earth's crust, the largest of which is the Canadian Shield. Older than the Cambrian period.

Precious Metals

Rare elements of high economic value, such as gold, silver, and platinum group metals

Preliminary Study

See Scoping Study.

Preliminary Feasibility Study

A Preliminary Feasibility Study is a comprehensive study of the viability of a mineral project that has advanced to a stage where the mining method, in the case of underground mining, or the pit configuration, in the case of an open pit, has been established, and where an effective method of mineral processing has been determined. This Study must include a financial analysis based on reasonable assumptions of technical, engineering, operating, and economic factors and evaluation of other relevant factors which are sufficient for a Qualified Person acting reasonably, to determine if all or part of the Mineral Resource may be classified as a Mineral Reserve. Source: Canadian Institute of Mining, Metallurgy & Petroleum

Primary deposits

Valuable minerals deposited during the original period or periods of mineralization, as opposed to those deposited as a result of alteration or weathering.

Probable ore

Term used to describe ore where the mineralization has been extensively explored and the size, shape, grade and tonnage are reasonably well known.

Probable Mineral Reserves

A 'Probable Mineral Reserve' is the economically mineable part of an Indicated, and in some circumstances a Measured Mineral Resource demonstrated by at least a Preliminary

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Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction can be justified. Source: Canadian Institute of Mining, Metallurgy & Petroleum

Prospect

A mining property, the value of which has not been determined by exploration.

Proterozoic

The younger of two Precambrian systems or eras.

Proton precession magnetometer

A geophysical instrument which measures magnetic field intensity in terms of vertical gradient and total field.

Proved ore

A term used to describe ore where the mineralization has been thoroughly explored and sampled so that the size, shape, grade and tonnage are known accurately.

Proven Mineral Reserves

A 'Proven Mineral Reserve' is the economically mineable part of a Measured Mineral Resource demonstrated by at least a Preliminary Feasibility Study. This Study must include adequate information on mining, processing, metallurgical, economic, and other relevant factors that demonstrate, at the time of reporting, that economic extraction is justified.

Source: Canadian Institute of Mining, Metallurgy & Petroleum

Proxy

A power of attorney given by the shareholder so that his stock may be voted by his nominee(s) at shareholders' meetings.

Proxy

A vote cast on behalf of another person.

Public Float

Issued shares that are outstanding and available for trading by the public, and are not held by company officers, directors or investors who hold a controlling interest in the company.

Pulp

Pulverized or ground ore in solution.

Pyramiding

The use of increased buying power to increase ownership arising from price appreciation.

Pyrite

Shiny, iron sulfide found in many rock types, often in cubic form; common non-economic mineral; also known as "fool's gold".

Pyroclastic Rock

Rocks consisting of consolidated rock fragments which erupted explosively on surface; e.g. tuff, breccia, agglomerate.

Pyrrhotite

A bronze-coloured, magnetic iron sulfide mineral.

Qualified Person

A “Qualified Person” means an individual who is an engineer or geoscientist with at least five years of experience in mineral exploration, mine development, production activities and project assessment, or any combination thereof, including experience relevant to the subject matter of the project or report and is a member in good standing of a Self-Regulating Organization. Source: Canadian Institute of Mining, Metallurgy & Petroleum

Quartz

Common silica rich, hard mineral; variety of colors (e.g. white, pink, brown); found in many rock types; common gangue mineral; often associated with gold; consists of silicon and oxygen.

Quartzite

A metamorphic rock formed by the transformation of a sandstone by heat and pressure.

Radioactivity

The property of spontaneously emitting alpha, beta or gamma rays by the decay of the nuclei of atoms.

Radon survey

A geochemical survey technique which detects traces of radon gas, a product of radioactivity.

Raise

A vertical or inclined underground working that has been excavated from the bottom upward.

Rake

The trend of an orebody along the direction of its strike.

Ramp

A secondary or tertiary inclined opening, driven to connect levels, usually driven in a downward direction, and used for haulage. Also called a decline.

Rare earth elements

Metallic elements (eg zirconium, niobium, yttrium), as the name implies, are rare in nature in great concentrations; associated with specialized igneous (peralkaline) rocks.

Reagent

A chemical used in the mineral recovery process.

Reaming shell

A component of a string of rods used in diamond drilling, it is set with diamonds and placed between the bit and the core barrel to maintain the gauge (or diameter) of the hole.

Reclamation bond

Used to reclaim any workings or put right any damage, if the reclamation does not satisfy applicable regulatory requirements. The amount of the bond is set largely on the basis of the amount of surface disturbance proposed; the bond is returned, plus accumulated interest, if the clean-up is satisfactory.

Reclamation

The process by which lands disturbed as a result of mining activity are reclaimed back to a beneficial land use. Reclamation activity includes the removal of buildings, equipment, machinery, other physical remnants of mining, closure of tailings impoundments, leach pads and other mine features, and contouring, covering and revegetation of waste rock piles and other disturbed areas

Reconnaissance

A preliminary survey of ground.

Recovery

The percentage of valuable metal in the ore that is recovered by metallurgical treatment.

Refining

See smelting.

Refractory ore

Ore that resists the action of chemical reagents in the normal treatment processes and which may require pressure leaching or other means to effect the full recovery of the valuable minerals.

Regional metamorphism

Metamorphism caused by both the heat of igneous processes and tectonic pressure.

Replacement ore

Ore formed by a process during which certain minerals have passed into solution and have been carried away, while valuable minerals from the solution have been deposited in the place of those removed.

Reserves

The estimated quantity of ore that can be economically mined and legally extracted. There are two types proven and probable.

Resistivity survey

A geophysical technique used to measure the resistance of a rock formation to an electric current.

Resource

The calculated amount of material in a mineral deposit, based on limited drill information.

Resuing

A method of stoping in narrow-vein deposits whereby the wallrock on one side of the vein is blasted first and then the ore.

Retreat mining

A system of robbing pillars in which the robbing line, or line through the faces of the pillars being extracted, retreats from the boundary toward the shaft or mine mouth.

Reverberatory furnace

A long, flat furnace used to slag gangue minerals and produce a matte.

Reverse circulation drill

A rotary percussion drill in which the drilling mud and cuttings return to the surface through the interior of the drill pipe.

Rhyolite

A fine-grained, extrusive igneous rock which has the same chemical composition as granite.

Rib samples

Ore taken from rib pillars in a mine to determine metal content.

Robbed out area

Describes that part of a mine from which the pillars have been removed.

Rock factor

The number of cubic meters of a particular rock type required to make up one tonne of the material. One tonne of a highly siliceous ore may occupy 0.40 cubic meters, while a tonne of dense sulfide ore may occupy only 0.25 cubic meters.

Rock mechanics

The study of the mechanical properties of rocks, which includes stress conditions around mine openings and the ability of rocks and underground structures to withstand these stresses.

Rock

Any natural combination of minerals; part of the earth's crust.

Rockbolting

The act of supporting openings in rock with steel bolts anchored in holes drilled especially for this purpose.

Rockburst

A violent release of energy resulting in the sudden failure of walls or pillars in a mine, caused by the weight or pressure of the surrounding rocks.

Rocker

A device for washing gold-bearing earth to recover the precious metal.

Rod mill

A rotating steel cylinder that uses steel rods as a means of grinding ore.

Roof bolt

A long steel bolt driven into the roof of underground excavations to support the roof, preventing and limiting the extent of roof falls.

Room-and-pillar mining

A method of mining flat-lying ore deposits in which the mined-out area, or rooms, are separated by pillars of approximately the same size.

Rotary drill

A machine that drills holes by rotating a rigid, tubular string of drill rods to which is attached a bit. Commonly used for drilling large-diameter blastholes in open-pit mines.

Royalty

An amount of money paid at regular intervals by the lessee or operator of an exploration or mining property to the owner of the ground. Generally based on a certain amount per tonne or a percentage of the total production or profits. Also, the fee paid for the right to use a patented process.

Run of mine ore

Uncrushed ore in its natural state just as it is when blasted

Run of mine

Raw material as it exists in the mine; average grade or quality.

Salting

The act of introducing metals or minerals into a deposit or samples, resulting in false assays. Done either by accident or with the intent of defrauding the public.

Sample

A small portion of rock or a mineral deposit taken so that the metal content can be determined by assaying.

Sampling

Selecting a fractional but representative part of a mineral deposit for analysis.

SAMREC Code

The South African Mineral Resources Committee's code sets a required minimum standard for Public Reporting on exploration results, mineral resources, or mineral reserves in South Africa.

Sandstone

A sedimentary rock consisting of quartz sand united by some cementing material, such as iron oxide or calcium carbonate.

Scaling

The act of removing loose slabs of rock from the back and walls of an underground opening, usually done with a hand-held scaling bar or with a boom-mounted scaling hammer.

Scarp

An escarpment, cliff or steep slope along the margin of a plateau, mesa or terrace.

Schist

A foliated metamorphic rock the grains of which have a roughly parallel arrangement; generally developed by shearing.

Scintillation counter

An instrument used to detect and measure radioactivity by detecting gamma rays; more sensitive than a geiger counter.

Scoop

A rubber tired-, battery- or diesel-powered piece of equipment designed for cleaning runways and hauling supplies.

Scoping Study

The first level of study that is conducted using industry standards for items such as mining methods, rates of production, recovery and equipment. Also called a Preliminary Study.

Secondary enrichment

Enrichment of a vein or mineral deposit by minerals that have been taken into solution from one part of the vein or adjacent rocks and redeposited in another.

Section

A portion of the working area of a mine.

Sedimentary Exhalative Deposits (SEDEX)

A sediment hosted sulphide deposit that is formed by the discharge of hydrothermal fluids onto the sea floor.

Sediment

Solid grains and clasts of weathered pre-existing rock that have been eroded over time and deposited in unconsolidated layers.

Sedimentary rocks

Secondary rocks formed from material derived from other rocks and laid down under water. Examples are limestone, shale and sandstone.

Seismic prospecting

A geophysical method of prospecting, utilizing knowledge of the speed of reflected sound waves in rock.

Selective mining

The object of selective mining is to obtain a relatively high-grade mine product; this usually entails the use of a much more expensive stopping system and high exploration and development costs in searching for and developing the separate bunches, stringers, lenses, and bands of ore.

Self-potential

A technique, used in geophysical prospecting, which recognizes and measures the minute electric currents generated by sulfide deposits.

Semi-autogenous grinding (SAG)

A method of grinding rock into fine powder whereby the grinding media consist of larger chunks of rocks and steel balls.

Semi-autogenous mill

A mill in which rock is reduced to smaller particles partially by grinding against other pieces of rock

Semi-Massive

A 'visual' descriptive term of mid range concentrations, (16% – 59%) of 'peppered' minerals that are fine grained and often occurring uniformly throughout rock; typically used to describe economic mineralization.

Serpentine

A greenish, metamorphic mineral consisting of magnesium silicate.

Severance

The separation of a mineral interest from other interests in the land by grant or reservation. A mineral dead or grant of the land reserving a mineral interest, by the landowner before leasing, accomplishes a severance as does his execution of a mineral lease.

Shaft mine

An underground mine in which the main entry or access is by means of a vertical shaft.

Shaft

Vertical passageway to an underground mine for moving personnel, equipment, supplies and material including ore and waste rock.

Shale

Sedimentary rock formed by the consolidation of mud or silt.

Shear / shearing

The deformation of rocks by lateral movement along innumerable parallel planes, generally resulting from pressure and producing such metamorphic structures as cleavage and schistosity.

Shear zone

A zone in which shearing has occurred on a large scale.

Sheave wheel

A large, grooved wheel in the top of a headframe over which the hoisting rope passes.

Shoot

A concentration of mineral values; that part of a vein or zone carrying values of ore grade.

Shrinkage stoping

A stoping method which uses part of the broken ore as a working platform and as support for the walls of the stope.

Siderite Iron carbonate

When pure, contains 48.2% iron; must be roasted to drive off carbon dioxide before it can be used in a blast furnace. Roasted product is called sinter.

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Silica

Silicon dioxide. Quartz is a common example.

Siliceous

A rock containing an abundance of quartz.

Sill

An intrusive sheet of igneous rock of roughly uniform thickness that has been forced between the bedding planes of existing rock.

Silt

Muddy deposits of fine sediment usually found on the bottoms of lakes.

Sinking

The process by which a shaft is driven.

Sinter

Fine particles of iron ore that have been treated by heat to produce blast furnace feed.

Skarn

The metamorphic rocks surrounding an igneous intrusive where the latter has come in contact with limestone or dolomite rocks.

Skid

A track-mounted vehicle used to hold trips or cars from running out of control.

Skip

A self-dumping bucket used in a shaft for hoisting ore or rock.

Slag

The vitreous mass separated from the fused metals in the smelting process.

Slash

The process of blasting rock from the side of an underground opening to widen the opening.

Slate bar

The proper long-handled tool used to pry down loose and hazardous material from roof, face, and ribs.

Slate

A metamorphic rock; the metamorphic equivalent of shale.

Slickenside

A smooth, striated, polished surface produced on rock by friction.

Slip

A fault. A smooth joint or crack where the strata have moved on each other.

Slope

Primary inclined opening, connection the surface with the underground workings.

Sloughing

The slow crumbling and falling away of material from roof, rib, and face.

Sludge

Rock cuttings from a diamond drill hole, sometimes used for assaying.

Smelting

Extracting metals from the ore concentrate by pyrometallurgical processes.

Sodium cyanide

A chemical used in the milling of gold ores to dissolve gold and silver.

Solid

Mineral that has not been undermined, sheared out, or otherwise prepared for blasting.

Solvent extraction-electrowinning (SX-EW)

A metallurgical technique, so far applied only to copper ores, in which metal is dissolved from the rock by organic solvents and recovered from solution by electrolysis.

Sounding

Knocking on a roof to see whether it is sound and safe to work under.

Span

The horizontal distance between the side supports or solid abutments along sides of a roadway.

Specific gravity

The weight of a substance compared with the weight of an equal volume of pure water at 4 degrees Celsius.

Spelter

The zinc of commerce, more or less impure, cast from molten metal into slabs or ingots.

Sphalerite

A zinc sulfide mineral; the most common ore mineral of zinc.

Split

The shareholder-approved division of a company's outstanding common shares into a larger number of new common shares.

Spot price

Current delivery price of a commodity traded in the spot market, also called the cash price

Spread

The difference between the bid and ask price in the quotation of a security.

Squeeze

The settling, without breaking, of the roof and the gradual upheaval of the floor of a mine due to the weight of the overlying strata.

Stamp mill

A machine for crushing ore by the weight of constantly falling pieces of iron, stone, or wood. The action approximates the pulverizing of material with a mortar and pestle.

Station

An enlargement of a shaft made for the storage and handling of equipment and for driving drifts at that elevation.

Stemming

The non-combustible material used on top or in front of a charge or explosive.

Step-out drilling

Holes drilled to intersect a mineralization horizon or structure along strike or down dip.

Stock exchange

An organized market concerned with the buying and selling of common and preferred shares and warrants by stockbrokers who own seats on the exchange and meet membership requirements.

Stock Split

An increase in the number of shares outstanding in a company without any change in the shareholder's equity or total market value.

Stockpile

Broken ore heaped on surface, pending treatment or shipment.

Stockwork

A large number of closely spaced planar and irregular veinlets, which are narrow and filled with economic and/or gangue minerals.

Stope

An excavation in a mine from which ore is, or has been, extracted.

Stoping

Activity of extracting ore underground.

Stratiform Copper

A copper rich deposit formed by copper rich fluids flowing in red or grey sedimentary rock and later crystallizing; mineralization often forms in layers within the sedimentary rock.

Stratiform

Bedded or layered.

Stratigraphy

Strictly, the description of bedded rock sequences; used loosely, the sequence of bedded rocks in a particular area.

Streak

A diagnostic characteristic of minerals, where scratching a sample on a piece of unglazed porcelain leaves powder of a characteristic color.

Striations

Prominent parallel scratches left on bedrock by advancing glaciers.

Strike Price

The price, as specified in an option contract, at which an underlying security will be purchased in the case of a call, or sold in the case of a put. Also called an Exercise Price.

Strike

The line of intersection of the tilted surface of a mineral deposit or vein with the horizontal plane. It is the trend of the horizontal line on the structure and is measured as an angle from north. For example, an east strike is a 90⁰ strike and a south strike is an 180⁰ strike.

Stringer

A narrow vein or irregular filament of a mineral or minerals traversing a rock mass.

Strip mine

An open-pit mine, usually a coal mine, operated by removing overburden, excavating the coal seam, then returning the overburden.

Strip

To remove the overburden or waste rock overlying an orebody in preparation for mining by open pit methods.

Stripping ratio

The stripping ratio refers to the ratio of waste removed to ore processed. In the first bench of an open pit mine, the ratio will be higher (because of the overburden) but should improve with depth. A 3 1 stripping ratio means that, over the lifetime of a mine, the company will have to move 3 tons of waste to extract one ton of ore. The trick is to keep the cost of removing the waste below the value of the ore... thus, the lower the stripping ratio, and the more accessible the ore body, the more profitable the mine

Sublevel

A level or working horizon in a mine between main working levels.

Subsidence

The gradual sinking, or sometimes abrupt collapse, of the rock and soil layers into an underground mine. Structures and surface features above the subsidence area can be affected.

Sulfide dust explosions

An underground mining hazard involving the spontaneous combustion of airborne dust containing sulfide minerals.

Sulfide

A sulfur rich mineral with an associated metal element forming minerals of economic interest {eg pyrrhotite, pyrite (iron sulfides), chalcopyrite (copper iron sulfide), chalcocite (copper sulfide), sphalerite (zinc iron sulfide), galena (lead iron sulfide)}.

Sulfur dioxide

A gas liberated during the smelting of most sulfide ores; either converted into sulfuric acid or released into the atmosphere in the form of a gas.

Sump

The bottom of a shaft, or any other place in a mine, that is used as a collecting point for drainage water.

Supergene Enrichment

This occurs after the primary copper porphyry deposit has formed. Weathering processes leach copper out of the upper parts of the deposit; the copper bearing solution travels downward through fractures and pore spaces until it meets the water table. Because the copper is no longer in contact with the air, it is no longer stable in solution and so precipitates, forming very copper-rich minerals like bornite, chalcocite, and cuprite and even native copper. This enriched zone can have substantially higher ore grades than the primary mineralization.

Support

The all-important function of keeping the mine workings open. As a verb, it refers to this function; as a noun it refers to all the equipment and materials—timber, roof bolts, concrete, steel, etc.—that are used to carry out this function.

Suspension

Weaker strata hanging from stronger, overlying strata by means of roof bolts.

Syenite

An intrusive igneous rock composed chiefly of orthoclase.

Sylvite

Potassium chloride, the principal ore of potassium mined for fertilizer manufacturing.

Syncline

A downward arching fold.

Syngenetic

A term used to describe when mineralization in a deposit was formed relative to the host rocks in which it is found. In this case, the mineralization was formed at the same time as the host rocks. (The opposite is epigenetic.)

Taconite

A highly abrasive iron ore.

Tailings

Finely ground rock that is left over from the milling process.

Tailings pond

A low-lying depression used to confine tailings, the prime function of which is to allow enough time for heavy metals to settle out or for cyanide to be destroyed before water is discharged into the local watershed.

Tailings

Material rejected from a mill after the valuable minerals have been recovered.

VARIOUS GEOLOGY TERMS

Talus

A heap of broken, coarse rock found at the base of a cliff or mountain.

Telluride

A chemical compound consisting of the element tellurium and another element, often gold or silver.

Thermal coal

Coal burned to generate the steam that drives turbines to generate electricity.

Thickener

A large, round tank used in milling operations to separate solids from liquids; clear fluid overflows from the tank and rock particles sink to the bottom.

Ton

A short or net ton is equal to 2,000 pounds; a long or British ton is 2,240 pounds; a metric ton is approximately 2,205 pounds.

Tonne

Means a metric tonne (2204.6 pounds)

Tonnes-per-vertical-meter

Common unit used to describe the amount of ore in a deposit; ore length is multiplied by the width and divided by the appropriate rock factor to give the amount of ore for each vertical metre of depth.

Tram

Used in connection with moving self-propelled mining equipment.

Trench

A long, narrow excavation dug through overburden, or blasted out of rock, to expose a vein or ore structure.

Trend

The direction, in the horizontal plane, of a linear geological feature, such as an ore zone, measured from true north.

Triassic

The earliest of the three geologic periods comprised in the Mesozoic era.

Trip

A train of mine cars.

Troy ounce

31.1034768 grams

Tube mill

An apparatus consisting of a revolving cylinder about half-filled with steel rods or balls and into which crushed ore is fed for fine grinding.

Tuff

A finer grained pyroclastic rock made up mostly of ashes.

Tunnel

A horizontal, or near-horizontal, underground passage, entry, or haulageway, that is open to the surface at both ends. A tunnel (as opposed to an adit) must pass completely through a hill or mountain.

Tunnel-boring machine

A machine used to excavate a tunnel through soil or rock by mechanical means as opposed to drilling and blasting.

Umpire sample or assay

An assay made by a third party to provide a basis for settling disputes between buyers and sellers of ore.

Unconformity

A buried erosion surface that separates two rock masses, which often provide good pathways for hydrothermal fluids to flow along.

Uncut value

The actual assay value of a core sample as opposed to a cut value which has been reduced by some arbitrary formula.

Uraninite

A uranium mineral with a high uranium oxide content. Frequently found in pegmatite dykes.

Uranium

A radioactive, silvery-white, metallic element.

Variography study

A statistical evaluation of drill assay data to determine the variability of assay results by their spatial relationships.

Vein deposit

A deposit that is narrow compared to its length and depth and usually occurs in fault openings or in fault or shear zones.

Vein

A fracture or space in bedrock that have been filled by fluids which have later crystallized; often filled with quartz, calcite, and/or economic mineralization.

Vesicle

A rounded hole or cavity in a fine grained igneous rock; formed as a result of gas escaping from the cooling body lying near surface.

Visible gold

Native gold which is discernible, in a hand specimen, to the unaided eye.

Volcanic Massive Sulfides

A type of metal sulfide ore deposit that contains varying amounts of pyrite, copper, gold, silver lead and zinc sulfide mineral in layers. They form when hot fluids circulate through rocks of the seafloor, dissolving various metals, and then come into contact with cold seawater, causing the metals to precipitate as piles of tiny mineral grains. VMS ores are often located near “black smokers”, jets of superheated water shooting from the ocean floor.

Volcanic Redbed Copper

Mineralization which occurs in red (iron rich) sedimentary rocks of volcanic origin; often laterally extensive (stratiform) along the sedimentary layers; generally low grade and high tonnage.

Volcanic

Fine grained igneous rocks which poured out or erupted near or on surface; also describes clastic rock and ash (pyroclastic) that was ejected on the surface and later consolidated (extrusive); can be of mafic or felsic composition.

Volcanogenic

A layered deposits formed when hot, sulphide laden fluids erupt through fractures in the sea floor. These are typically an important source of zinc, copper & lead. ‘

Vug

A small cavity in a rock, frequently lined with well-formed crystals. Amethyst commonly forms in these cavities.

Wall Rock

The rock immediately surrounding a vein or ore deposit; also called country rock.

Waste

Unmineralized, or sometimes mineralized, rock that is not minable at a profit.

Wedge

A technique of directing a diamond drill hole in a desired direction away from its current orientation.

Whittle pit

A specific brand of computer software used for floating cone evaluations.

Winning

The excavation, loading, and removal of coal or ore from the ground; winning follows development.

Winze

An internal shaft.

Witness post

A claim post placed on a claim line when it cannot be placed in the corner of a claim because of water or difficult terrain.

VARIOUS GEOLOGY TERMS

Working face

Any place in a mine where material is extracted during a mining cycle.

Workings

The entire system of openings in a mine for the purpose of exploitation.

Xenocryst

A crystal foreign to the igneous rock in which it occurs. Often refers to diamond formation.

Xenolith

A fragment of country rock enclosed in an intrusive rock.

Zone of oxidation

The upper portion of an orebody that has been oxidized.

Zone

An area of distinct mineralization.