GLOSSARY

Aquifer
An underground geological formation or group of formations containing water, which may be a source of groundwater for wells and springs.

Background Radiation
The natural radiation that is always present in the environment. It includes cosmic radiation which comes from the sun and stars; terrestrial radiation which comes from the Earth; and internal radiation which exists in all living things.

Background (Baseline) Water Quality
The constituents or parameters and the concentrations or measurements which describe water quality and water quality variability prior to the injection of lixiviant.

Borehole
A hole that is drilled into the earth for exploration (exploration hole or drill hole) and/or for completion as a well (wellbore).

Casing
The pipe material, slightly smaller than the diameter of the drilled hole (the wellbore), placed inside the wellbore and cemented in place to prevent collapse of the wellbore. Casing seals off water-bearing strata that have been drilled through, preventing the wellbore from filling with water from that strata and the completed well from introducing water into that strata.

Checkerboard Land Pattern
Alternating sections of federally owned lands and private or state lands on either side of the UPRR in southwestern Wyoming. This pattern of land ownership looks like a checkerboard on maps, using different colors to show land status.

Cone of Depression
Depression of the water table (in an unconfined aquifer) or potentionmectic surface (in a confined aquifer) that develops around a well (or wells) from which water is being pumped.

Confined Aquifer
An aquifer that is overlain by a confining bed, where the hydrostatic pressure at the top of the aquifer is greater than atmospheric pressure.

Confining Zone
A geological formation (or part of a formation or group of formations) capable of limiting fluid movement out of an injection zone. The ideal confining zone has low permeability and sufficient thickness to prevent upward movement of the injected fluid.

Decommissioning
The process of removing a facility or site from operation, followed by decontamination, and license termination (or termination of authorization for operation) if appropriate. The objective of decommissioning is to reduce the residual radioactivity or contaminants in structures, materials, soils, groundwater, and other media at the site so that the concentration of each radionuclide contaminant that contributes to residual radioactivity is within the cleanup limits established for the site.

Decontamination
A process used to reduce, remove, or neutralize radiological, chemical, or biological contamination to reduce the risk of exposure. Decontamination may be accomplished by cleaning or treating surfaces to reduce or remove the contamination; filtering contaminated air or water; subjecting contamination to evaporation and precipitation; or covering the contamination to shield or absorb the radiation. The process can also simply allow adequate time for natural radioactive decay to decrease the radioactivity.

Dispersed Recreation
Recreation activities of an unstructured type that are not confined to specific locations such as recreation sites. An example of these activities may be hunting, fishing, OHV use, hiking, and sightseeing.

Drawdown
The distance between the static water level and the water level during pumping.

Drilling Fluid
A water- or air-based fluid used in well drilling to remove cuttings from the borehole, to clean and cool the bit, to reduce friction between the drilling equipment and the sides of the borehole, and to seal the borehole. Water-based fluids are usually referred to as drilling mud.

Effective Porosity
The volume of the void spaces through which water or other fluids can travel in a rock or sediment divided by the total volume of the rock or sediment.

Excursion
Any unwanted and unauthorized movement of recovery fluid out of the production zone as a result of in situ mining activities.

Exempted Aquifer
An aquifer or its portion that meets the criteria in the definition of "Underground Source of Water" but which has been exempted according to specific regulatory procedures.

Fire Suppression
All work and activities associated with fire-extinguishing operations, beginning with discovery and continuing until the fire is completely extinguished.

Forage
All browse and herbaceous foods available to grazing animals that may be grazed or harvested for feeding.

Fugitive Dust
Airborne emissions of visible and nonvisible fine, dry particulate matter smaller than 100 micrometers (microns) that result from surface disturbance activities.

Greater Sage-grouse Core Area
Areas delineated by the State of Wyoming with the intent of protection of greater sage-grouse populations and habitat as established in State of Wyoming Executive Order 2011-05, Greater Sage-grouse Core Area Protection.

Groundwater Restoration
The condition achieved when the quality of all groundwater affected by the injection of recovery fluids is returned to a quality of use equal to or better than, and consistent with the uses for which the water was suitable prior to the operation by employing the best practicable technology;"

Grout
A fluid mixture of cement and water (neat cement) of a consistency that can be forced through a pipe and placed as required. Various additives, such as sand, bentonite, and hydrated lime, may be included in the mixture to meet certain requirements.

Grouting
Placement of grout between the casing and the side of the wellbore to secure the casing in place and exclude water and other fluids from the wellbore.

Health Physics
The science concerned with recognizing and evaluating the effects of ionizing radiation on the health and safety of people and the environment, monitoring radiation exposure, and controlling the associated health risks and environmental hazards to permit the safe use of technologies that produce ionizing radiation.

Hydraulic Conductivity
A measure of the capacity of a porous medium to transmit fluid, governed by the characteristics of the medium (porosity and permeability) and the physical properties of the fluid.

Hydraulic Gradient
The change in static head or hydraulic potential per unit distance in a given direction.

Injection Well
For the purposes of in situ mining, a well or conduit through which recovery fluid is introduced into the subsurface. If a well is used for both injection and recovery, it is considered an injection well.

Invasive Weed
A species that is not native (or is alien) to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.

Ion Exchange
A common method for concentrating uranium from a solution. The uranium solution is passed through a resin bed where the uranium-carbonate complex ions are transferred to the resin by exchange with a negative ion like chloride. After build-up of the uranium complex on the resin, the uranium is eluted with a salt solution and the uranium is precipitated in another process.

Lixiviant
A liquid medium that selectively extracts the desired metal from the ore or material to be leached rapidly and completely, and from which the desired metal can then be recovered in a concentrated form. A liquid medium used to selectively extract (or leach) uranium from ore bodies where they are normally found underground (in other words, in situ). This liquid medium, which typically contains an oxidant such as oxygen and/or hydrogen peroxide mixed with sodium carbonate or carbon dioxide, is injected through wells into the ore body in a confined aquifer to dissolve the uranium. The resulting solution is then pumped via other wells to the surface, where the uranium is recovered from it in a concentrated form for processing.

Mechanical Integrity
The absence of significant leakage within the injection tubing, casing, or packer (known as internal mechanical integrity), or outside of the casing (known as external mechanical integrity). Mechanical Integrity Tests (MITs), conducted in accordance with approved methods, are required before well use to measure the adequacy of the construction of an injection well, and periodic MITs are needed

to confirm that an injection well maintains internal and external mechanical integrity.

Mill Tailings
Primarily, the sandy process waste material from a conventional uranium recovery facility. This naturally radioactive ore residue contains the radioactive decay products from the uranium chains (mainly the U-238 chain) and heavy metals.

Mineral Right
The ownership of the minerals under a given surface, with the right to enter thereon, mine, and remove them. It may be separated from the surface ownership.

Mine Unit (Wellfield)
The area of an in situ recovery operation that encompasses the array of injection and production wells (the Pattern Area) and the area out to the surrounding monitor well ring.
Mining (Mineral) Lease
A legal contract for the right to work a mine and extract the mineral or other valuable deposits from it under prescribed conditions of time, price, rental or royalties.

Mitigation (Mitigating Measure)
An action aimed at reducing the severity, avoiding, or controlling impacts of a project through design alternatives, scheduling, or other means. A method or process by which impacts from actions can be made less injurious to the environment through appropriate protective measures.

Monitoring
Continuous or periodic measurement of a parameters or set of parameters to determinate of the status of a system.

Monitor Well
A well used to measure the water level in an aquifer and/or the chemical and radiological composition of the water in the aquifer. For the purposes of in situ mining, a monitor well ring is usually located around the pattern area in a mine unit, and monitor wells are also completed in overlying or underlying aquifers to detect lixiviant migration outside the pattern area (see Excursion). Monitor wells are also used to establish baseline conditions with and outside of the potential mine units.

Multiple Use
Coordinated management of various surface and subsurface resources so that they are used in the combination that will best meet present and future needs.

National Register of Historic Places (NRHP)
The official register of districts, sites, buildings, structures, and objects significant in American history, architecture, archaeology, and culture, established by the National Historic Preservation Act of 1966, as amended, and maintained by the National Park Service on behalf of the Secretary of the Interior.

Natural Uranium
Uranium containing the relative concentrations of isotopes found in nature (0.7 percent uranium-235, 99.3 percent uranium-238, and a trace amount of uranium-234 by mass). In terms of radioactivity, however, natural uranium contains approximately 2.2 percent uranium-235, 48.6 percent uranium-238, and 49.2 percent uranium-234.

Noxious Weed
A plant species designated by federal or state law as generally possessing one or more of the following characteristics: aggressive and difficult to manage; parasitic; a carrier or host of serious insects or disease; or non-native, new, or not common to the United States.

Ore
A mixture of ore minerals and gangue from which at least one of the metals can be extracted at a profit. The term 'ore' denotes economically recoverable quantities of one or more of the ore minerals.

Oxidation
A chemical reaction caused by exposure to oxygen that results in a change in the chemical composition of a mineral and involves the formal transfer of electrons, a net gain in electrons being a reduction and a net loss of electrons being an oxidation.

Pattern Area
The area of an in situ recovery operation that encompasses the array of injection and production wells.

Perched Water
Unconfined groundwater separated from an underlying body of groundwater by an unsaturated zone, such as a clay lens.

Permeability
The ability of rock or soil to transmit water (or other fluid) under a hydraulic gradient.

Potentiometric Surface
The level to which water will rise in a well completed in a confined aquifer.

Porosity
The voids or openings in a rock. Porosity may be expressed quantitatively as the ratio of the volume of openings in a rock to the total volume of the rock.

Production Zone
The geologic interval into which recovery fluids are to be injected or extracted.

Pump Test
A test involving the withdrawal of measured quantities of water form a well and the measurement of resulting changes in head in the aquifer both during and after the pumping.

Radionuclide
An unstable isotope of an element that decays or disintegrates spontaneously, thereby emitting radiation. Approximately 5,000 natural and artificial radioisotopes have been identified.

Pump Test
A test involving the withdrawal of measured quantities of water form a well and the measurement of resulting changes in head in the aquifer, in the pumped well and adjacent monitoring wells, during and after the pumping.

Reclamation
The ‘reconstruction’ of a site, after mining or exploration activity is completed, to a condition appropriate for the approved post-exploration or post-mining land use. Activities may include equipment removal, well plugging, surface contouring, topsoil replacement, and revegetation.

Resource Management Plan (RMP)
A land use plan, as prescribed by the FLPMA, that establishes, for a given area of land, land-use allocations, coordination guidelines for multiple use, and objectives and actions to be achieved.

Reduction
The addition of hydrogen, removal of oxygen, or addition of electrons to an element or compound resulting in a net gain in electrons.

Reverse Osmosis
The act of reversing a diffusion through a semipermeable membrane, typically separating a solvent and a solution, that tends to equalize their concentrations.

Roll Front
A type of uranium deposition localized as a roll or interface separating an oxidized interior from a reduced exterior. The reduced side of this interface is significantly enriched in uranium.

Site Characterization
Detailed surface and subsurface investigations and activities to obtain information to determine the suitability of the site for the proposed action.

Storage Coefficient
The volume of water release from storage in a unit prism of an aquifer when the head is lowered a unit distance.

Surface Disturbance
Any action created through mechanized or mechanical means that would cause soil mixing or result in alteration or removal of soil or vegetation and expose the mineral soil to erosive processes. Used in the literal context of actual, physical disturbance and movement or removal of the land surface and vegetation. Examples of surface disturbance include construction of well pads, pits, reservoirs, pipelines, and facilities (e.g., parking lot and tanks).

Transmissivity
Rate at which water is transmitted through a unit width of the aquifer under a unit hydraulic gradient. It is expressed as the product of the hydraulic conductivity and the thickness of the saturated portion of the aquifer.

Trend Well
A monitor well (or series of monitor wells) installed to provide more detailed information in a specific area of a mine unit.

Unconfined Aquifer
Upper limit of the aquifer is defined by the water table (level) itself. At the water table (the top of the saturated portion of the geologic formation), the water in the pores of the aquifer is at atmospheric pressure (as if it were in an open tank).

Unconformity
The contact between older rocks and younger sedimentary rocks in which at least some erosion has removed some of the older rocks before deposition of the younger. The boundary between the two different rock sequences represents an interval of time during which new strata were not deposited and/or were eroded.

Underream
To enlarge the wellbore below the casing.

Unsaturated Zone
The zone in which the pore openings of the functional permeable rocks are not (except temporarily) filled with water under hydrostatic pressure; the interstices are either not filled with water or are filled with water that is held by capillarity.

Upper Control Limit (UCL)
A value greater than the maximum value of a chemical or physical parameter that can be attributed to natural fluctuations and analytical variability. UCL parameters and amounts are determined from the baseline sampling and agreed upon by the WDEQ-LQD and the operator prior to initiation of mining. UCLs are used to determine when there is movement of recovery fluid out of authorized areas or unapproved changes to a chemical or physical parameter. For certain parameters, such as pH, a UCL may be defined as an acceptable range of values.

Viewshed
Total visible area from a single observer's position or the total visible area from multiple observer positions. Viewsheds are accumulated seen areas from highways, trails, campgrounds, towns, cities, or other view locations. Examples are corridors, feature, or basin view-sheds.

Visual Resource
Visible feature of the landscape, such as land, water, vegetation, and other features that make up the scenery of an area.

Visual Resource Inventory (VRI)
An inventory of visual resources in a defined area that serves as a baseline for BLM resource management decisions. The inventory determines the visual (scenic) values within a defined area at a specific point in time. The three primary components to a visual resource inventory include: scenic quality evaluation, sensitivity level analysis, and distances zones.

Visual Resource Management (VRM)
The system by which the BLM classifies and manages scenic values and visual quality of public lands. The system is based on research that has produced ways of assessing aesthetic qualities of the landscape in objective terms. After inventory and evaluation, lands are given relative visual ratings (management classes) that determine the amount of modification allowed for the basic elements of the landscape.

Wellbore
A hole drilled and completed as a well for the purpose of exploration or extraction of natural resources, such as an injection, production, or monitoring well, where the well may be produced or monitored for some period of time.

Wellfield (see Mine Unit)

Yellowcake
The solid form of mixed uranium oxide produced from uranium ore. The material is a mixture of uranium oxides, varying in proportion and color from yellow to orange to dark green (blackish) depending on the temperature at which the material is dried (which affects the level of hydration and impurities), with higher

drying temperatures producing a darker and less soluble material. (The yellowcake produced by most modern mills is actually brown or black, rather than yellow, but the name comes from the color and texture produced by early milling operations.) Yellowcake is commonly referred to as U3O8, because that chemical compound comprises approximately 85 percent of the yellowcake produced by uranium recovery facilities. Yellowcake must be transported to a uranium conversion facility, for conversion into uranium hexafluoride (UF6), in preparation for fabricating fuel for nuclear reactors.