

<b>Table 6.0-1 Summary of Environmental Consequences – Lost Creek In Situ Recovery Project</b>	
<b>Preferred Alternative and Other Alternatives (Section 2.0)</b>	<b>No Action Alternative</b>
<b>Land Uses</b>	
<u>Construction Impacts</u> <i>Some reduction in grazing capacity due to installation of roads and facilities.</i>	<i>Current land uses, including stock and wildlife grazing, seasonal hunting, and increased drilling activities for oil/gas/other mineral resources are not expected to change.</i>
<u>Operational Impacts</u> <i>Some reduction in grazing capacity due to use of roads and facilities. Limitations on seasonal hunting to protect workers, prevent damage to facilities, and provide security. Any drilling for oil/gas/other mineral resources will need to be carefully coordinated to prevent damage to facilities, including wells and pipelines and prevent interference with uranium production.</i>	
<u>Monitoring and Mitigation</u> <i>No specific monitoring of land uses is required, but periodic inspections, annual reports, and 5-year permit review required by WDEQ-LQD will allow for evaluation of significant changes in land use in the general area.</i> <i>Impacts, which are expected to be minimal, will be mitigated by reclamation/ restoration of the Permit Area. These activities will include tasks such as well plugging and vegetation re-establishment in accordance with criteria for the approved post-production land uses.</i>	
<u>Unavoidable Environmental Consequences</u> <i>Limited due to requirements for reclamation/restoration to established criteria for the post-project land uses specified in the approved reclamation plan. Future drilling for water, oil, or gas or site excavation will need to take into account presence of abandoned wells at the site, but the presence of the wells will be recorded through a deed notice per WDEQ-LQD requirements.</i>	

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<b>Transportation</b>	
<p><u>Construction Impacts</u>  <i>Impacts will not be significantly greater during construction than during operation, since mine units (with associated increased rig and truck supply traffic) are generally installed sequentially. Primary on-site impacts will be construction of a variety of access roads. Off-site impacts will include slightly increased traffic, although anticipated vehicle size and weight (e.g. drilling rigs and haul trucks) should not differ significantly from current use.</i></p>	<p><i>Current transportation options, primarily paved and dirt roads, are not expected to change other than upgrades and regular maintenance to existing traffic routes.</i></p>
<p><u>Operational Impacts</u>  <i>Primary on-site impacts will be road use, which will require maintenance of the roads, culverts, and related items. Primary off-site impacts will be slightly increased traffic. Containers used for transport of yellowcake slurry will be designed to prevent spills during reasonably foreseeable accidents, but the weight and length of the transport trucks will not differ from typical trucks. Transportation of hazardous materials will be limited.</i></p>	
<p><u>Monitoring and Mitigation</u>  <i>No specific transportation monitoring will be required, but periodic inspections required by NRC and WDEQ-LQD will allow for evaluation of transportation impacts. Mitigation efforts will include: optimizing on-site road networks; constructing roads to weather varying conditions (e.g., snowmelt); avoiding 'driving around' trouble spots such as muddy spots, potholes; and providing program on work procedures and safety for employees and contractors. Reasonable steps will also be taken to ensure transporters are properly licensed, equipped, and staffed.</i></p>	

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<b>Transportation (cont'd)</b>	
<u>Unavoidable Environmental Consequences</u> <i>Limited due to requirements for identification of those roads that will be removed/reclaimed to established criteria after production is complete and identification of those roads that will remain to support the approved post-project land use.</i>	
<b>Soils</b>	
<u>Construction Impacts</u> <i>Soil compaction due to construction trafficking, erosion due to disturbance, or loss due to building placement.</i>	<i>No assessment of the soils in this portion of the Great Basin was available prior to initiation of baseline data collection for this project.</i>
<u>Operational Impacts</u> <i>Potential contamination from spills, soil compaction from operational trafficking.</i>	
<u>Monitoring and Mitigation</u> <i>Baseline assessment of soil resources throughout the Permit Area and in more detail in each mine unit will result in site-specific protection measures, including: stripping where necessary (e.g., plant site, roads, and mud pits for wells); marking short-term topsoil stockpiles; and constructing long-term stockpiles with adequate erosion protection. Reclamation will be staged during all phases of the construction and operation. Areas that are temporarily disturbed will be restored and reseeded immediately after disturbance.</i> <i>Operational monitoring will include periodic checks of topsoil stockpiles for undue erosion. Procedures will also be in place for spill response. Requirements for reclamation/restoration to established criteria for the post-project land uses specified in the approved reclamation plan will result in replacement of any stripped topsoil.</i>	

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<b>Soils (cont'd)</b>	
<u>Unavoidable Environmental Consequences</u> <i>Limited due to requirements for topsoil protection during construction &amp; operation, and for topsoil replacement &amp; vegetation re-establishment in accordance with approved reclamation plan.</i>	
<b>Geology</b>	
<u>Construction and Operational Impacts</u> <i>None foreseeable.</i>	<i>Subsurface information for the Great Basin in Wyoming is generally somewhat limited and data collection efforts are generally limited except for exploration work associated with projects such as this.</i>
<u>Monitoring and Mitigation</u> <i>Not required.</i>	
<u>Unavoidable Environmental Consequences</u> <i>None foreseeable.</i>	
<b>Hydrology – Surface Water</b>	
<u>Construction Impacts</u> <i>The lack of surface water in the Permit Area significantly reduces the potential for impacts. Facility and road construction and well installation could result in disturbance to existing drainage patterns and an increased sediment load in runoff if appropriate procedures are not followed for installation of culverts and protection of areas which have been stripped of topsoil or in which vegetation has been disturbed.</i>	<i>Information on surface water quantity and quality in the Great Divide Basin is generally limited, particularly due to the limited number of major drainages, and data collection efforts are generally limited.</i>

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<b>Hydrology – Surface Water (cont'd)</b>	
<p><u>Operational Impacts</u>  <i>Impacts will not be significantly greater during construction than during operation, since mine units (with associated increased rig and truck supply traffic) are generally installed sequentially. In addition to the limited occurrence of surface water, there are no surface water rights in and around the Permit Area that could be impacted.</i></p>	
<p><u>Monitoring and Mitigation</u>  <i>Baseline assessment of surface water quantity and quality throughout the Permit Area and in more detail in each mine unit allows for development of site-specific surface water protection measures, including: installation of culverts; sediment ponds; and other facilities that may be necessary to minimize erosion.</i>  <i>Operational monitoring will include continuation of surface water quantity and quality monitoring as necessary. However, the only surface water at the site is ephemeral flow in response to stormwater runoff and snowmelt. Procedures will also be in place for spill response.</i></p>	
<p><u>Unavoidable Environmental Consequences</u>  <i>Limited due to lack of surface water and low topographic relief in Permit Area. In addition, requirements for surface water monitoring as necessary, proper construction, maintenance, and reclamation of roads and facilities in accordance with approved operation and reclamation plans will minimize any potential consequences.</i></p>	

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Preferred Alternative and Other Alternatives (Section 2.0)	No Action Alternative
<b>Hydrology – Ground Water</b>	
<p><u>Construction Impacts</u>  <i>Exploration drilling and well installation will impact ground water quantity slightly due to use of ground water. Ground water quality could be impacted due to introduction of drilling mud and potential for connection of aquifers.</i></p>	<p><i>Information on ground water quantity and quality in the Great Divide Basin is generally limited, despite the presence of significant quantities of ground water in the Basin, and data collection efforts are generally limited.</i></p>
<p><u>Operational Impacts</u>  <i>In situ recovery, by definition, changes the water quality in the ore zone, in particular the oxidation/reduction conditions, and mobilizes uranium by introducing lixiviant (bicarbonate solution) and circulating it through the aquifer. Impacts to ground water quantity are limited due to re-use of the water, and &lt;1.5% of the water in the ore zone is generally removed to help ensure the production fluids do not migrate from the ore zone. Ground water restoration after production is designed to re-establish the pre-production ground water class of use, as defined by WDEQ/WQD. The 1<sup>st</sup> restoration phase, ground water sweep, may require removal of an equivalent quantity of water to that in the ore zone. The later phases of restoration have less impact on ground water quantity and are designed to re-establish oxidation/reduction conditions and precipitate metals that may have been mobilized during production.</i></p>	<p><i>At present, there are no federal or state restrictions on water quality for private wells in Wyoming, although some guidelines exist. Also, there are no regulatory requirements for sampling private wells prior to use. There are guidelines provided, but these generally do not cover radionuclides, except in areas where near-surface natural radon emissions may impact building use. Occasionally, a lending institution may require sampling, but again, radionuclides are often not covered.</i></p>
<p><u>Monitoring and Mitigation</u>  <i>Baseline assessment of water quantity and quality has been essential for design of efficient production, including choosing appropriate lixiviants, design of production/injection well patterns and monitoring programs, and selecting optimal pumping rates. Review of existing water rights has also provided information for determining if mitigation measures are necessary.</i></p>	

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<b>Hydrology – Ground Water (cont'd)</b>	
<p><u>Monitoring and Mitigation (cont'd)</u></p> <p><i>During operation and restoration, regular monitoring of wells within and around each mine unit, and in overlying and underlying aquifers, will be conducted to ensure there has not been any movement of lixiviant outside the ore zone and to determine production or restoration progress. In addition, production and injection rates and volumes will be balanced to help ensure the lixiviant circulation is within the ore zone. Well integrity testing will also be conducted, and all drill hole and well plugging will be done in accordance with applicable requirements. In addition, water levels will be monitored in wells outside the Permit Area that could be impacted by operations, based on projected drawdowns. If necessary, alternate water sources will be obtained for those well users should water levels decline sufficiently to interfere with adequate supply.</i></p>	
<p><u>Unavoidable Environmental Consequences</u></p> <p><i>Economic incentives for efficient production and regulatory requirements for ground water restoration help reduce impacts. In Wyoming, the restoration requirements are to return ground water quality to that commensurate with the uses for which the water could have been used before production. Removal of the uranium may even result in improved post-production water quality, due to the reduction in radionuclides, if production and restoration are conducted efficiently. Based on restoration progress at other ISR operations in Wyoming, long-term changes in ground water quality are generally limited to elevated concentrations of one or two parameters compared to pre-production concentrations. A deed notice of the mine unit boundaries also is required to help ensure future subsurface activities, such as drilling of oil and gas wells, can avoid interference with the abandoned drill holes and wells.</i></p>	

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<b>Ecological Resources – Vegetation</b>	
<u>Construction Impacts</u> <i>Facility and road construction and well installation will result in removal of vegetation in specific, limited portions of the Permit Area.</i>	<i>Current vegetation communities are not expected to change except in response to change in other site characteristics, such as land use or transportation routes.</i>
<u>Operational Impacts</u> <i>Minimal, especially if monitoring and maintenance traffic stays on designated routes.</i>	
<u>Monitoring and Mitigation</u> <i>Baseline assessment of vegetation communities throughout the Permit Area and in more detail in each mine unit allows for identification of areas where disturbance should be prevented or minimized, but no such areas have been found to date. In addition, the disturbance will not impact either of the vegetation communities present on-site disproportionately. The baseline assessment also allowed for design of a reclamation seed mix suited for site conditions and usage.</i> <i>During operations, weed control and erosion protection will reduce the potential for adverse impacts to existing vegetation.</i> <i>During reclamation, proper seed bed preparation and seeding practices, weed control, grazing control on newly reseeded areas, and monitoring of the seed expression and plant growth will allow for vegetation re-establishment to complement existing conditions.</i>	
<u>Unavoidable Environmental Consequences</u> <i>Limited due to requirements for minimizing disturbance during mine unit installation, for establishing traffic patterns during operations, for weed control, and for topsoil replacement and vegetation re-establishment in accordance with approved reclamation plan.</i>	

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<b>Ecological Resources – Aquatic Life and Wetlands</b>	
<i>The baseline field investigations indicate aquatic life and wetlands do not exist within the Permit Area; therefore, there will be no impacts to aquatic wildlife and wetlands.</i>	
<b>Ecological Resources - Wildlife</b>	
<u>Construction Impacts</u> <i>Facility and road construction and well installation will disturb wildlife in specific, limited portions of the Permit Area, such as the facilities area.</i>	<i>Current wildlife communities are not expected to change except in response to change in other site characteristics, such as land use or transportation routes.</i>
<u>Operational Impacts</u> <i>Outside of the facility area, the structures and equipment at ISR facilities do not generally interfere with wildlife and often provide additional cover. Monitoring and maintenance traffic may impact wildlife.</i>	
<u>Monitoring and Mitigation</u> <i>Baseline assessment of the species and their use of the Permit Area (e.g., feeding, nesting, cover, and/or migration route) allows for development of site-specific protection measures, and regulatory requirements in place at the time of construction and operations, such as timing restrictions on drilling and related activities will be implemented. For reclamation, use of a seed mix reflective of pre-project conditions will help develop post-project habitat. Monitoring will include periodic assessment of wildlife for comparison with baseline conditions.</i>	
<u>Unavoidable Environmental Consequences</u> <i>Limited due to requirements for reclamation to established criteria for the post-project land uses specified in the approved reclamation plan.</i>	

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<b>Air Quality</b>	
<u>Construction Impacts</u> <i>Facility and road construction and well installation will generate dust and engine emissions from equipment.</i>	<i>Current dust contributions from travel on dirt roads, and emissions from heavy equipment and drilling operations (e.g. uranium exploration by other operators) will continue.</i>
<u>Operational Impacts</u> <i>Similar to impacts during construction, plus the emission of radon during processing. Radon emissions are discussed in more detail under Public and Occupational Health. Radionuclide particulates are not anticipated because no yellowcake dryer will be used on-site and because the Storage Ponds will be kept wet.</i>	
<u>Monitoring and Mitigation</u> <i>Baseline assessment of meteorological conditions allows for development of site-specific air quality protection measures. The primary protection measure for dust will be wetting of roads with water or chemical dust suppressants (such as magnesium chloride which is commonly used at mines in Wyoming) as necessary. The primary protection measure for engine emissions will be proper engine maintenance. Limitations for road use on an as-needed basis, speed limits, and similar measures will also help reduce dust and engine emissions. Radon emissions are discussed in more detail under Public and Occupational Health.</i>	
<u>Unavoidable Environmental Consequences</u> <i>Limited due to mitigation requirements.</i>	

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<b>Noise</b>	
<u>Construction and Operational Impacts</u> <i>Temporary increase due to construction activities, but noise will be similar to that present during on-going exploration activities.</i>	<i>Current noise contributions from truck traffic, heavy equipment, and drilling operations (e.g., uranium exploration by other operators) will continue.</i>
<u>Monitoring and Mitigation</u> <i>None considered necessary.</i>	
<u>Unavoidable Environmental Consequences</u> <i>None anticipated.</i>	
<b>Historic and Cultural Resources</b>	
<u>Construction and Operational Impacts</u> <i>None anticipated due to requirements for baseline delineation of historic and cultural resources, including determination of specific resource sites for which mitigation will be necessary prior to any disturbance. Baseline studies indicate only a limited number of sites within the Permit Area, and of those sites, prevalence of relatively modern, industrial artifacts (e.g., old mineral exploration artifacts) rather than older archeological and paleontological artifacts. In addition, the operator will request that all resource information will be held confidential by reviewing regulatory agencies to avoid providing information to the public that could lead to unauthorized disturbance of the resource sites.</i>	<i>Possible inadvertent or intentional disturbance or destruction of sites because sites are not fenced or otherwise protected.</i>

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<b>Historic and Cultural Resources (cont'd)</b>	
<u>Monitoring and Mitigation</u> <i>Mitigation plans for resource sites specified by the State Historic Preservation Office (SHPO), after their review of the baseline resource survey, will be developed by the operator and approved by SHPO as part of the permit application process. After mitigation, the operator must submit a report to SHPO identifying the steps taken in accordance with the approved plan. Based on current plans, only a limited number of sites are present within the Permit Area and of those, only two or three may require mitigation.</i>	
<u>Unavoidable Environmental Consequences</u> <i>Limited due to requirement for baseline assessments and mitigation plans for any sites determined to be of particular significance by SHPO.</i>	
<b>Visual/Scenic Resources</b>	
<u>Construction and Operational Impacts</u> <i>Minimal due to: 'wide-open' spaces; limited presence of local residents and/or regular visitors to the area who might be affected; similarity of existing 'intrusions' on the landscape (e.g., drilling rigs and compressors) to those in the Permit Area; and limited height of Process Plant.</i>	<i>None.</i>
<u>Monitoring and Mitigation</u> <i>None considered necessary.</i>	
<u>Unavoidable Environmental Consequences</u> <i>None anticipated.</i>	

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<b>Socioeconomic Impacts</b>	
<u>Construction and Operational Impacts</u> <i>Increased employment opportunities and corresponding increase to tax base, but limited work force and infrastructure such as housing may strain existing resources. Compared to other development projects in the region, the Lost Creek Project will employ relatively few workers, and the majority of those will need to be skilled.</i>	<i>Continued strain on existing infrastructure due primarily to increased oil and gas development, but also due to increased tourism and public land use for a variety of activities (e.g., hunting and off-road recreational vehicles).</i>
<u>Monitoring and Mitigation</u> <i>Communication with state and local agencies evaluating socioeconomic conditions.</i>	
<u>Unavoidable Consequences</u> <i>No disproportionate consequences are anticipated.</i>	
<b>Public and Occupational Health</b>	
<u>Construction Impacts</u> <i>Typical of those for any construction site and primarily related to mechanical health and safety issues, such as working on drilling rigs and driving heavy equipment.</i>	<i>Current public and occupational health concerns are primarily mechanical health and safety issues typical of the extractive industries, including oil and gas drilling and coal mining, in Wyoming.</i>
<u>Operational Impacts</u> <i>Primarily related to mechanical health and safety issues. Radon emissions associated with the uranium processing will be vented from any enclosed spaces, such as Header Houses and the Process Plant.</i>	

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<b>Public and Occupational Health (cont'd)</b>	
<u>Monitoring and Mitigation</u> <i>Worker education and training for all workers, designation of areas in which only those workers with additional education and training on radionuclides may enter, and health and air monitoring targeted to the work areas. Preparation for reasonably foreseeable accidents, including mechanical accidents and those accidents with potential chemical releases to the environment. Calculation of radon emissions from uranium processing and designation of restricted areas based on calculations and other factors which require restricted access. Analysis of dose consequences from reasonably foreseeable accidents.</i>	<i>Exposure rates to naturally occurring radioactivity are relatively high in the region due to the geologic conditions.</i>
<u>Unavoidable Consequences</u> <i>None anticipated, especially as exposure rates to naturally occurring radioactivity far exceed projected radon emissions from the project.</i>	
<b>Waste Management</b>	
<u>Construction Impacts</u> <i>Other than removal of trash typically associated with construction and drilling projects, no additional waste management impacts are anticipated.</i>	<i>None.</i>
<u>Operational Impacts</u> <i>Trash typically associated with mine operations, e.g., office waste, will be collected for disposal at a landfill. Sewage will be disposed of in septic system. Storage Ponds, will provide for storage of waste water from uranium processing prior to disposal in UIC Class I wells and will be constructed with leak detection system to reduce possibility of impacts. Use of UIC Class I wells will change quality and pressure in the injection formation.</i>	

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<b>Waste Management (cont'd)</b>	
<p><u>Monitoring and Mitigation</u>  <i>Regular inspection of waste storage areas and review of waste disposal practices to ensure proper containers, labels, storage, and segregation. Reasonable efforts to ensure any contracted waste haulers are properly licensed, equipped, and staffed. Regular inspection of piping systems used to route waste water. For Storage Ponds, regular inspection of liner and leak detection system. Installation of system to discourage birds from pond area if necessary. During reclamation, disposal of any pond sludge, liner, impacted material under the ponds, and associated equipment as 11(e)(2) byproduct material, and revegetation of the pond site in accordance with approved reclamation plan. For the UIC Class I wells, baseline assessment of water quantity and quality to determining operating pressures and waste compatibility and to ensure selected injection formation provides for appropriate waste isolation. During operation, monitoring of injection rates and pressures, and periodic well integrity testing. Well plugging after wells no longer needed.</i></p>	
<p><u>Unavoidable Environmental Consequences</u>  <i>None anticipated except for changes to the quality and pressure in the injection formation.</i></p>	