BLM

Record of Decision for the Lost Creek Uranium *In-Situ* Recovery Project, Sweetwater County, Wyoming

October 2012

High Desert District – Rawlins Field Office, Wyoming

Mission Statement

The BLM's multiple-use mission, set forth in the Federal Land Policy and Management Act of 1976, mandates that we manage public land resources for a variety of uses, such as energy development, livestock grazing, recreation, and timber harvesting, while protecting a wide array of natural, cultural, and historical resources.

BLM Publication Index Number: BLM/WY/PL-12/034+1330

RECORD OF DECISION

for the

LOST CREEK URANIUM *IN-SITU* RECOVERY PROJECT

BLM Publication Index Number: BLM/WY/PL-12/034+1330

October 2012

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Cooperating Agencies:
State of Wyoming and its Agencies
Carbon County Commissioners
Sweetwater County Commissioners

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Acronyms and Abbreviations

AQD	Air Quality Division
BCA	Biodiversity Conservation Alliance
BLM	Bureau of Land Management
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
DDCT	Density Disturbance Calculation Tool
DEIS	Draft Environmental Impact Statement
DOI	Department of the Interior
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
EPACT	Energy Policy Act
EQC	Environmental Quality Council
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act
FR	*Federal Register*
GEIS	Generic Environmental Impact Statement
HEA	Habitat Equivalency Analysis
IBLA	Interior Board of Land Appeals
IM	Instruction Memorandum
ISL	*In-Situ* Leach
ISR	*In-Situ* Recovery
LCI	Lost Creek ISR, LLC
LQD	Land Quality Division
MIT	Mechanical Integrity Test
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NOA	Notice of Availability
NOI	Notice of Intent
NRC	Nuclear Regulatory Commission
Permit Area	Lost Creek Permit Area
PIAA	project impact analysis area
Plant	the processing facilities
PLSS	Public Land Survey System
Project	Lost Creek Uranium *In-Situ* Recovery Project
RMP	Resource Management Plan
ROD	Record of Decision
SEIS	Supplemental Environmental Impact Statement
SER	Safety Evaluation Report
SGIT	Sage Grouse Implementation Team
SHPO	State Historic Preservation Office
SWCBCC	Sweetwater County Board of County Commissioners
SWPPP	Storm Water Pollution Prevention Plan

TAC	Technical Advisory Committee
UIC	Underground Injection Control
URL	Uniform Resource Locator
U.S.	United States
USC	United States Code
USFWS	United States Fish and Wildlife Service
USGS	Unites States Geological Survey
WDEQ	Wyoming Department of Environmental Quality
WDEQ-AQD	Wyoming Department of Environmental Quality-Air Quality Division
WDEQ-LQD	Wyoming Department of Environmental Quality-Land Quality Division
WGFD	Wyoming Game and Fish Department
WOC	Wyoming Outdoor Council
WQD	Water Quality Division
WSEO	Wyoming State Engineer's Office
WYPDES	Wyoming Pollutant Discharge Elimination System

Summary

Pursuant to Title 43 of the United States (U.S.) Code of Federal Regulations (CFR) Subpart 3809, which applies to operations authorized by mining laws on public lands, Lost Creek ISR, LLC (LCI) submitted a Plan of Operations to the Bureau of Land Management (BLM) in November 2009. LCI is proposing the construction, commercial operation, and reclamation of facilities for the Lost Creek Uranium *In-Situ* Recovery Project (Project) in Sweetwater County, Wyoming. Planned facilities include well pads for injection, production and monitoring, wellhead houses, a central processing facility, an access road network and pipeline system. Approximately 345 acres of actual surface disturbance is expected within the approximately 4,250-acre project boundary, with most of the surface disturbance related to construction of the well fields used to extract the uranium from the site.

The Lost Creek Uranium *In-Situ* Recovery Project Environmental Impact Statement (EIS) analyzed the proposed development and recovery of uranium by the *in situ* mining process where a solution is injected into a well to dissolve the mineral, then the solution bearing mineral is pumped back to the surface for processing. The EIS disclosed to the public the direct, indirect, and cumulative environmental impacts of authorizing the proposal. Comments received following the issue of the Final Environmental Impact Statement (FEIS) have been addressed in this Record of Decision (ROD).

The BLM High Desert District Manager selects the Agency-Preferred Alternative (the Proposed Action with Drying Yellowcake On-Site). The BLM has determined that implementation of this Decision, with the specified environmental protection measures and monitoring, will allow LCI to mine a valuable uranium deposit under the authority of the U.S. mining laws, while ensuring that operations are conducted in a manner that prevents unnecessary or undue degradation of public lands in conformance with BLM requirements.

The BLM has worked closely with the other permitting agencies. The Nuclear Regulatory Commission (NRC) issued LCI a license in August 2011. The Wyoming Department of Environmental Quality (WDEQ) issued the project a permit in October 2011.

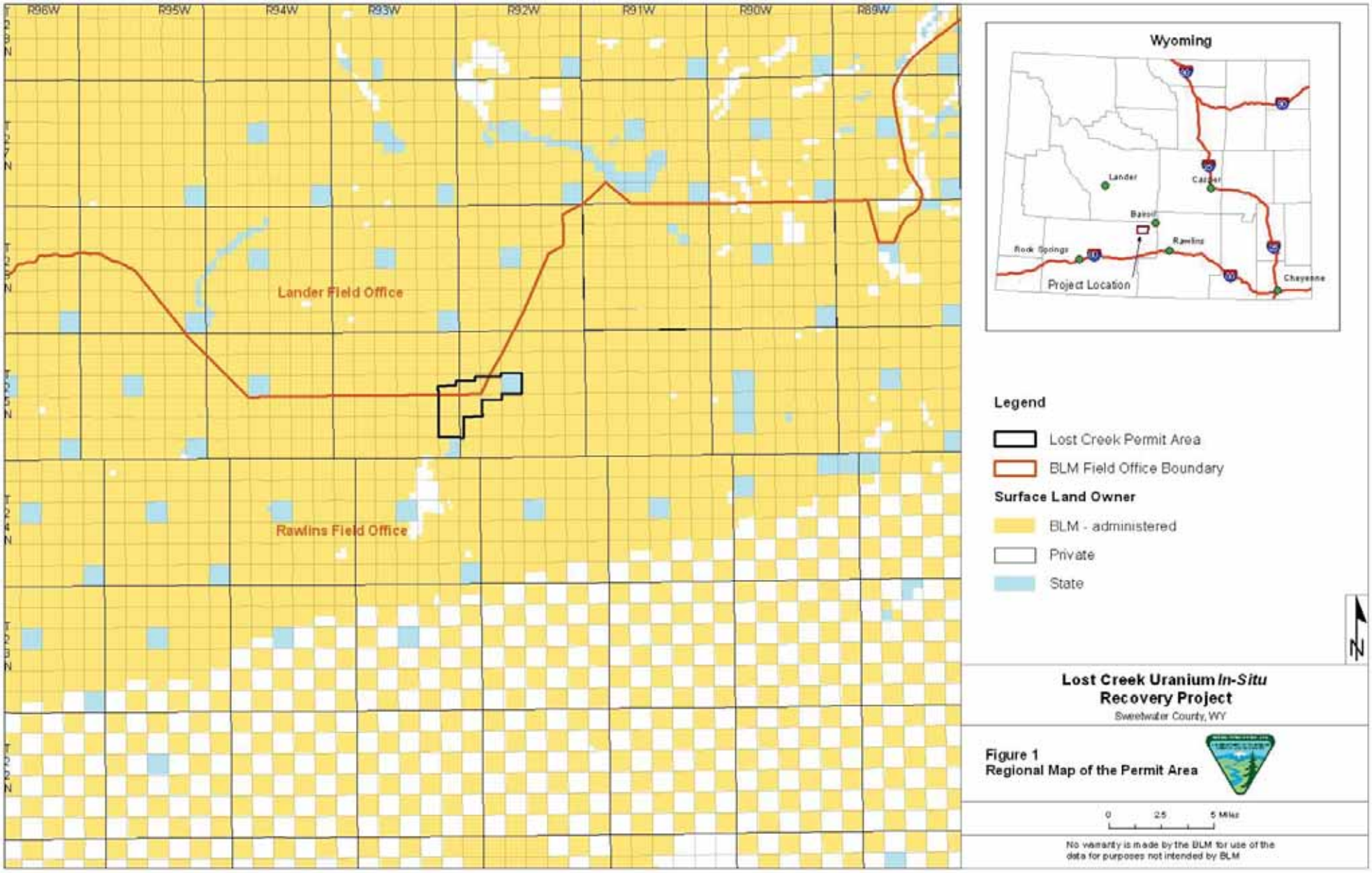
1.0 Introduction

This ROD summarizes the BLM's decision regarding the Project and provides the justification for the decision, per the requirements of NEPA. An EIS was prepared in compliance with NEPA, as amended (42 United States Code [USC] 4321 *et seq.*), and its implementing regulations found in 40 CFR Parts 1500 to 1508. The BLM issued the DEIS on April 27, 2012 and the FEIS on August 17, 2012.

LCI is proposing the construction, commercial operation, and reclamation of facilities for *In-Situ* Recovery (ISR) operations within the Lost Creek Permit Area (Permit Area). ISR involves the use of a recovery solution, known as a lixiviant, to extract the mineral from the geologic formation without physically removing the ore-bearing strata, and the mineral is removed from the solution using ion exchange resins at the processing facility (the Plant). Under the Proposed Action, about six million pounds of uranium will be produced from the Permit Area. The Proposed Action will extend over a 12-year period, including about seven months for initial construction, seven years for production, and the remaining time for final reclamation.

Eighty-five percent of the Permit Area is public land (**Figure 1**) managed by the BLM Rawlins and Lander Field Offices. The remaining 15 percent of the Permit Area is owned by the State of Wyoming and subject to state mineral lease. The Permit area is located in Township 25 North and Ranges 92 and 93 West, and encompasses a total of 4,254 acres of land. Under the Proposed Action, the projected surface disturbance is about 345 acres, and the majority of the Project's activities will be on public land. The proposed facilities include: mine units; improved and newly constructed roads; the Plant, office, and associated structures; pipelines and transmission lines; and equipment for air and water quality monitoring. **Figure 2** maps the facilities associated with the Project.

The BLM's decision is presented in **Section 2**, and management considerations are summarized in **Section 3**. The Proposed Action for the Project and the alternatives are discussed in **Section 4**, where the BLM also specifies its Preferred Alternative. Environmental protection measures and monitoring are summarized in **Section 5**. **Section 6** discusses the public and agency consultation that the BLM conducted during the NEPA process. A list of errata, or corrections, from the FEIS is included in Appendix A.


R96W
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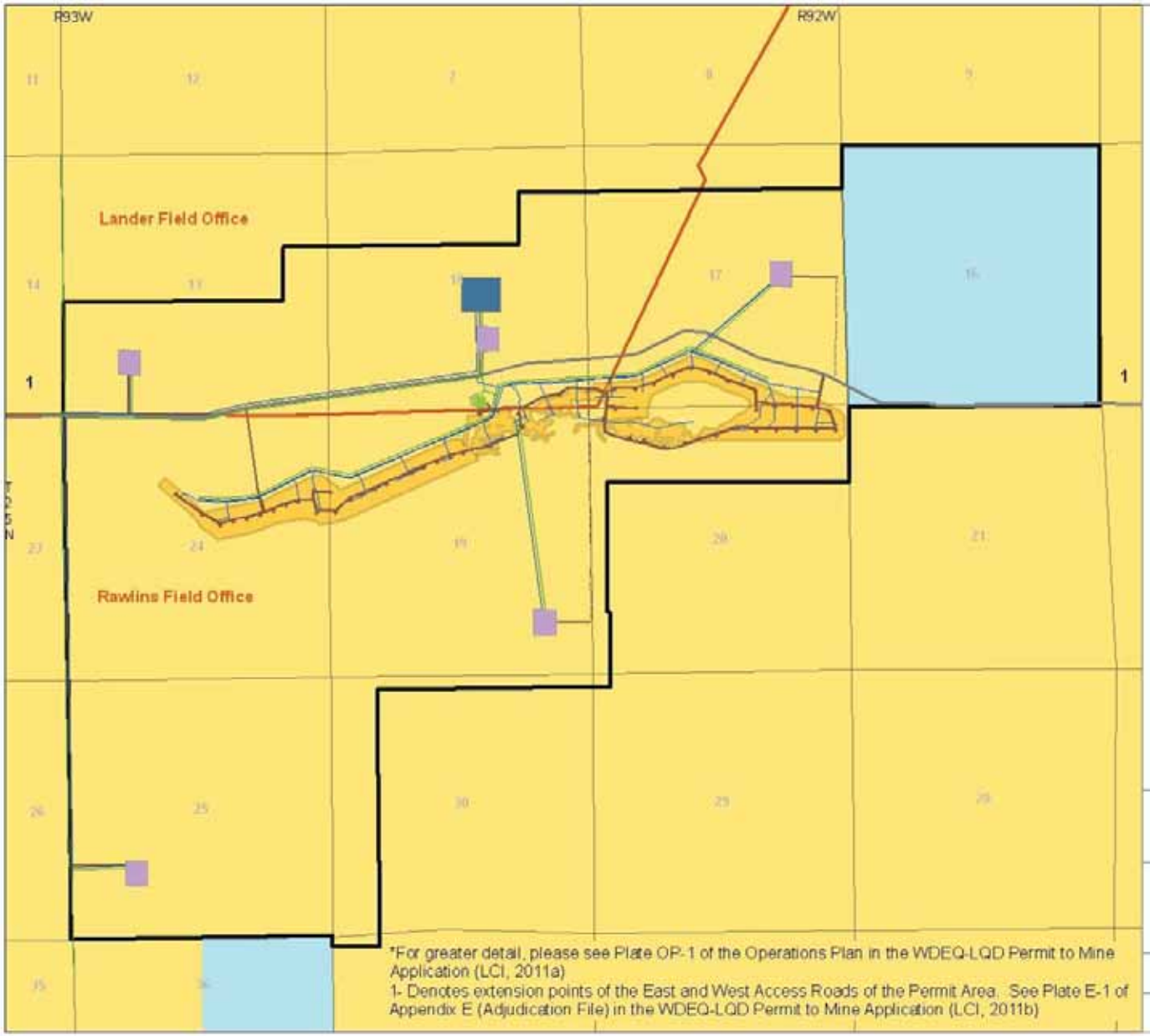
Lander Field Office
Rawlins Field Office
Wyoming
Lander
Casper
Baiolf
Rawlins
Rock Springs
Cheyenne
Project Location
Legend
Lost Creek Permit Area
BLM Field Office Boundary
Surface Land Owner
BLM - administered
Private
State
N
Lost Creek Uranium In-Situ Recovery Project
Sweetwater County, WY
Figure 1
Regional Map of the Permit Area
0
2.5
5 Miles
No warranty is made by the BLM for use of the data for purposes not intended by BLM



*For greater detail, please see Plate OP-1 of the Operations Plan in the WDEQ-LQD Permit to Mine Application (LCI, 2011a)

1- Denotes extension points of the East and West Access Roads of the Permit Area. See Plate E-1 of Appendix E (Adjudication File) in the WDEQ-LQD Permit to Mine Application (LCI, 2011b)

Legend

- Deep Disposal Well
- Main Access Road
- Existing Two Track
- Secondary Access Road
- Lost Creek Permit Area
- BLM Field Office Boundary
- Mine Unit Area
- Plant
- Staging Area
- Powerline
- Pipeline

Surface Land Owner

- BLM - administered
- State

N

Lost Creek Uranium *In-Situ* Recovery Project

Sweetwater County, WY

Figure 2
Site Layout

0 0.5 1 Miles

No warranty is made by the BLM for use of the data for purposes not intended by BLM

2.0 Decision

The decision of the District Manager, BLM High Desert District, is to select the Preferred Alternative, which is the Proposed Action (**Section 4.1**) with Drying Yellowcake On-Site (**Section 4.2.3** and **4.3**) inclusive of the required environmental protection measures and monitoring (**Section 5**). The Decision is based on the final Plan of Operations submitted to the BLM November 2009 pursuant to 43 CFR 3809 and 3715, and the analysis in the FEIS and NRC SEIS. Development of the Project is authorized by this Decision subject to compliance with all pertinent federal, state, and local laws or requirements.

3.0 Management Considerations

In making the decision to approve the Preferred Alternative, described in **Section 3.5**, the BLM has carefully considered the following factors:

- The Preferred Alternative is the alternative that best fulfills the agency's statutory mission and responsibilities, considering economic, environmental, technical, and other factors.
- Other federal, state, and local agencies have jurisdiction (including inspection responsibilities) over certain aspects of the Proposed Action. **Table 1** lists additional federal, state, and local permits, policies, and actions that have been or will need to be approved as a part of this Project.
- **Tables 2, 3,** and **4** summarize the environmental protection measures and monitoring which will be implemented in accordance with the various agency requirements and guidance.
- Implementation of this Decision will not cause unnecessary or undue degradation of the public lands and is consistent with other legal requirements.
- Resource Management Plan Conformance: This decision is in conformance with the Rawlins Resource Management Plan (December 2008), Lander Resource Management Plan (June 1987), the 43 CFR 3809 regulations, and the 1872 Mining Law, as amended.
- The Decision conforms to the new Council on Environmental Quality (CEQ) guidance in that: the Proponent has committed to the environmental protection measures; monitoring will be performed and the results will be available to the public; and effectiveness of environmental protection measures will be considered and revisited through mechanisms such as the required Annual Reports (covering a broad range of resources) to the agencies and the Adaptive Management Program (more specific to wildlife as described in Section 4.9.1.10 of the FEIS).
- Per the provisions of the Federal Land Policy and Management Act (FLPMA), public lands are to be managed in accordance with the balance of several considerations including "in a manner that will protect the quality of scientific, scenic, historical, ecological, environmental, air and

atmospheric, water resource, and archeological values" and "in a manner which recognizes the Nation's need for domestic sources of minerals" (FLPMA, Sec. 102((8) and (12)). The Decision is in accordance with this mandate.

- The Preferred Alternative is consistent with the Governor's Executive Order (EO 2011-5) for the protection of Greater Sage-Grouse, as supported by the EQC hearing, conducted as part of the WDEQ-LQD permitting process (Wyoming EQC, 2011) and the letter of July 18, 2012 from Mathew H. Mead, Governor of Wyoming, to Dennis J. Carpenter, BLM Rawlins Office Field Manager (Appendix B).
- The Preferred Alternative will help maintain revenue for local government and generate full-time and contract positions.
- A reclamation bond to provide for reclamation of both private and public lands will continue to be required and regularly reviewed and updated in compliance with both the 43 CFR 3809 regulations and the requirements of the NRC and the Wyoming Department Environment Quality-Lands Quality Division (WDEQ-LQD).
- Expanding nuclear power is a key component of the Energy Policy Act (EPACT 2005) signed into law on August 8, 2005. The policy calls for federal agencies "to develop a national energy policy designed to help the private sector, and, as necessary and appropriate, state and local governments, promote dependable, affordable, and environmentally sound production and distribution of energy for the future." In addition to providing this direction, the EPACT 2005 provides significant incentives for the continuation and expansion of nuclear power in the U.S. (U.S. Congress, 2005).
- Since the publication of the EIS, LCI has indicated intent to develop the Lost Creek East Area. Because LCI has not prepared or submitted a proposed plan modification to BLM, there is insufficient information to address this expansion in the FEIS, as the development extent is speculative at this time. This ROD does not make any decision on activities pursuant to this or any other amendment to the LCI NRC license. Any development activity in this area will be covered by a separate NEPA analysis and decision. Development of the Lost Creek East Area was appropriately considered in the Cumulative Effects section of the FEIS.

Table 1 List of Regulatory Requirements (Page 1 of 4)

PERMIT OR LICENSE	STATUS	COMMENTS
Federal		
NRC, Source and Byproduct Material License	License issued August 2011.	License No. SUA-1598, Docket No. 40-9068.
	Uniform Resource Locator (URL): http://adams.nrc.gov/wba/ Under Advanced Search, Document Properties, Accession Number ML111940049	
	License amendment to operate Mine Unit 1 submitted September 2011.	Under review by NRC.
	URL: http://pbadupws.nrc.gov/docs/ML1220/ML12202B115.html	
	License amendment to operate a vacuum dryer submitted January 2012.	Under review by NRC.
	URL: http://pbadupws.nrc.gov/docs/ML1204/ML120470355.html	
NRC, Safety Evaluation Report (SER)	Final SER issued August 2011.	License No. SUA-1598, Docket No. 40-9068.
	URL: http://adams.nrc.gov/wba/ Under Advanced Search, Document Properties, Accession Number ML112231724	
NRC, NEPA Review	Final SEIS issued June 2011.	NUREG-1910, Supplement 3.
	URL: http://www.nrc.gov/reading-rm/doc-collections/nuregs/staff/sr1910/s3/	
EPA, UIC Class I & Class III Wells	--	See WDEQ permits as WDEQ-Water Quality Division (WQD) has primacy for Class I wells and WDEQ-LQD has primacy for Class III wells.
EPA, Aquifer Reclassification	Approved August 2011.	The aquifer exemption covers each mine unit plus 120 feet beyond the monitoring well ring for each mine unit.
EPA, Construction Application for the Storage Ponds	Approved December 2011.	For compliance with 40 CFR 61.252 (b)(1) & 40 CFR 192.32(a) as required by 40 CFR 61.252 (c).
	URL: http://www.epa.gov/region8/air/LostCreekNESHAP_ApprovalDec2011.pdf	
BLM, Plan of Operations	Submitted November 2009.	Basis for the EIS.

Table 1 List of Regulatory Requirements (Page 2 of 4)

PERMIT OR LICENSE	STATUS	COMMENTS
State		
WDEQ-LQD, Permit to Mine	Issued October 2011.	Permit No. 788. As WDEQ-LQD has primacy for UIC Class III wells, the Permit
	Posted to the BLM Rawlins Field Office Lost Creek Uranium *In-Situ* Recovery Project website, URL: http://www.blm.gov/wy/st/en/info/NEPA/documents/rfo/lostcreek.html	
WDEQ - Air Quality Division (AQD), Air Quality Permit	Issued January 2010.	Permit No. CT-7896.
	URL: http://pbadupws.nrc.gov/docs/ML1034/ML103480375.pdf	
WDEQ-WQD, UIC Class I Wells	Issued May 2010.	Permit No. 09-586.
	URL: http://deq.state.wy.us/wqd/events/public%20notices/UIC/FinalPermit_UREnergy_ClassI_09-586_LostCreekISR%20(2).pdf	
WDEQ-WQD, General Permit to Discharge Storm Water Associated with Large Construction Activity Under the Wyoming Pollutant Discharge Elimination System (WYPDES) Program	Approved per Permit Authorization Number WYR103695.	Storm Water Pollution Prevention Plan (SWPPP) required per General Permits.
WDEQ-WQD, General Authorization to Discharge Storm Water Associated with Mineral Mining Activities Under WYPDES	Application will be submitted once WDEQ-LQD Permit to Mine approved.	
Wyoming State Engineer's Office (WSEO), Permit to Appropriate Groundwater	Submitted for wells completed to date; will be submitted for future wells.	--

Table 1 List of Regulatory Requirements (Page 3 of 4)

PERMIT OR LICENSE	STATUS	COMMENTS
State (cont'd)		
WSEO, Permit for Storage Ponds	Approved May 2010.	Permit No. 13595R.
Wyoming Game and Fish Department (WGFD), Wildlife Monitoring and Protection Plan	Approved.	Approval required as part of WDEQ-LQD Permit to Mine.
County		
Sweetwater County Planning Commission, County Development Plan	Conditionally Approved December 2009	Must meet Development Plan Conditions required as required by Resolution 09-12-ZO-01
Sweetwater County Health Department, Septic System	Submitted June 29, 2009.	Sweetwater Health Department Septic Tank Permit approved by Permit 11-82 on April 14, 2011.
Sweetwater County Public Works Director, Road Use and Maintenance Agreement	If not already done prior to BLM approval of proposed action, LCI will prepare and submit.	Sweetwater County Board of County Commissioners and the Sweetwater County Public Works Department, as of September 11, 2012, have not received a draft of said Road Use and Maintenance Agreement
Sweetwater County Department of Engineering, County Road Crossing and Access Permits or Licenses		

Table 1 List of Regulatory Requirements (Page 4 of 4)

PERMIT OR LICENSE	STATUS	COMMENTS
County (cont'd)		
Sweetwater County Emergency Management Hazmat Inventory	Provide outstanding items as required by the Conditional Development Plan approval.	Required by Federal Tier II Regulations.
International Fire Code Compliance	Current coordination with SWCO	Per Resolution 09-12-ZO-01
Sweetwater County Weed and Pest	Coordination recommended during construction and operation	Noxious and invasive weed control coordination. Contact: Gale Lamb, Supervisor Sweetwater County Weed and Pest District, 307-874-6107

4.0 Proposed Action and Alternatives

Several alternatives were identified from the BLM's review of the Proposed Action and from the issues and concerns raised from public scoping comments and collaboration with federal, state, and local agencies, as well as tribal governments. The analysis in the EIS included the Proposed Action, three alternatives evaluated in detail, and eight alternatives considered, but eliminated from detailed study. The EIS incorporates by reference the WDEQ Permit to Mine (LCI, 2011b) and the NRC SEIS (NRC, 2011a), and builds off of the analyses presented in these documents.

NEPA requires evaluation of a No Action Alternative and reasonable alternatives to the Proposed Action that may avoid or minimize Project impacts. With the exception of the No Action Alternative, alternatives need to meet the Project's objective of producing six million pounds of uranium over an operating period of 12 years. The two alternatives that were considered and evaluated in detail include the Not Fencing the Pattern Areas and the Drying Yellowcake On-Site.

4.1 Proposed Action

The Proposed uranium ISR operation will extract the mineral from permeable, uranium-bearing sandstones through a series of mine units. During operations, a lixiviant will be pumped into the ground which oxidizes the uranium mineral, allowing dissolution of uranium in groundwater. The resulting uranium-laden solution will then be pumped from the production wells in the mine unit(s) through buried pipelines to the Plant. There, the uranium will be recovered by a series of circuits (e.g., ion exchange, elution, precipitation) and prepared for shipment as either a yellowcake slurry or dried yellowcake. The lixiviant will be regenerated and pumped back to the mine unit(s) to recover additional uranium. Storage ponds will be used in conjunction with Underground Injection Control (UIC) Class I wells for waste water disposal. After mining, groundwater restoration will essentially reverse the effects of oxidation to re-establish the reducing conditions that were present prior to mining.

For the purposes of the EIS, and for correlation with the NRC SEIS, the Project is described in three phases: Construction, Operation (Production), and Reclamation, because of the similarities in the activities and impacts within each phase. These phases are sequential with respect to the Plant and each mine unit; however, because of the progressive development of the mine units, there will be overlap among the mine units (e.g., the first mine unit is in reclamation when the third mine unit is in development). Therefore, the Project schedule includes:

- Construction
    - Initial Construction
    - Mine Unit Development
- Operation (Production)

- Reclamation
    - Mine Unit Restoration and Reclamation
    - Final Reclamation

Initial Construction will occur during the first year of the Project and includes the major facility construction, improvement of the access roads, drilling of the UIC Class I wells (except the first deep well that was drilled for testing in 2008), and installation of additional equipment for air and water quality monitoring.

Development of the first mine unit, which will take about two years, will overlap with the Initial Construction. The scale and number of the mine units for a given ISR operation depends on a variety of factors, including ore distribution, aquifer characteristics, plant capacity design, and operational feasibility. Three mine units are anticipated for the Proposed Action, and each mine unit has an expected production cycle of about two to three years. Development of the next mine unit will begin during production of the previous mine unit.

Mine Unit Restoration and Reclamation will begin when technical, economic, and operational criteria indicate uranium recovery in a mine unit is completed. Restoration and reclamation of each mine unit includes groundwater restoration, radiological decontamination, equipment removal/decommissioning (e.g., well abandonment), and surface reclamation (e.g., well site reseeding).

Final Reclamation, including facility decontamination and decommissioning and surface reclamation, will occur once the Plant is no longer in use and will require about two years. As with Mine Unit Reclamation, monitoring of revegetation success will be required until at the least the fifth full growing season.

4.2 Alternatives Evaluated in Detail

As mentioned above, three alternatives were evaluated in detail: No Action; Not Fencing the Pattern Areas; and Drying Yellowcake On-Site. These alternatives are described below.

4.2.1 No Action Alternative

The No Action Alternative describes what would likely happen to the Permit Area, should the Project not be implemented. Current land uses would not be expected to change. LCI would continue exploration activities, which would involve reclamation of disturbance associated with LCI's Drilling Notification, but no uranium would be produced from the Permit Area.

4.2.2 Alternative of Not Fencing the Pattern Areas

An alternative option to the Proposed Action is Not Fencing the Pattern Areas. If the pattern areas were fenced, grazing would not be possible in the pattern areas.

Also, if a gate were left open, cattle or wild horses could be injured if they entered the pattern area and were startled. However, not fencing the pattern areas leaves the well heads exposed, which could then be damaged by cattle or wild horses and result in potential spills or leaks of the lixiviant solution. The fencing also would increase security and safety of the site and would be beneficial to the reclamation of the areas within the fences. Therefore, the alternative of 'Not Fencing the Pattern Areas' was evaluated in detail. It should be noted that even if the pattern areas were not fenced, about ten acres of the Plant would still be fenced to keep out cattle and wild horses, and two of the ten acres would also be fenced to keep out wildlife around the Storage Ponds. This alternative is discussed in detail in Section 2.3.1.2 of the FEIS.

4.2.3 Drying Yellowcake On-Site Alternative

This alternative is the same as the Proposed Action with the addition of a yellowcake drying and packing facility in the Plant. As with the Proposed Action, yellowcake slurry would be produced. However, rather than shipping the slurry off-site for drying, the slurry would be filter-pressed to remove additional water, dried under vacuum, and packaged (also under vacuum) in drums for off-site shipping to a fuel processing facility. Emissions from the drying chamber would be treated through a bag filter to remove yellowcake particulates, and any water vapor exiting the drying chamber would be cooled and condensed. The condensate volume from the dryer would be minimal and re-used in processing or disposed of through the disposal system used during slurry production. Historically, vacuum drying of yellowcake in ISR has resulted in no measurable emissions to the environment, because the vacuum system is designed to prevent any releases (NRC, 2011). Use of a dryer would provide an economic benefit to the proponent because payment of processing fees to another operator would not be necessary. Use of a dryer would also result in fewer shipments from the site due to the difference in volume between yellowcake slurry and dried yellowcake. Fewer shipments would reduce traffic impacts, including the risk of transportation accidents and wildlife disturbance and collisions, and also reduce air quality impacts from travel on unpaved roads.

4.3 Preferred Alternative

The BLM's Preferred Alternative is the alternative which the BLM believes will fulfill its statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors, as outlined in Section 101 of the NEPA. The BLM selects the Drying Yellowcake On-Site Alternative as the Preferred Alternative for this Project. This alternative is the same as the Proposed Action, but rather than shipping the slurry off-site for processing, the slurry will be dried on-site and shipped from the site as yellowcake uranium. This action involves drying the mineral solution into a solid yellowcake form within the plant. Housing the drying-packing facility within the processing plant will reduce shipments from the site, resulting in fewer transportation-related impacts, wildlife

disturbances, and air quality impacts. Not Fencing the Pattern Area was not chosen as a preferred alternative due to the nature of the potential impacts and the benefits associated with having the areas fenced. Although the fencing will restrict grazing land, the potential leaks and spills from damaged wellheads pose a more significant impact to the environment. Additionally, the benefits of fencing the pattern areas, including safety and reclamation advantages, outweigh the potential impacts of eliminating a small portion of grazing land in the area.

4.4 Environmentally Preferred Alternative

The environmentally preferred alternative is the No Action Alternative, as it would have the least impact on the environment, wildlife, and current uses of the land. However, the BLM believes that the benefits to the local economy and the management considerations described above in **Section 3** would outweigh the limited impacts to the environment, particularly when considering the environmental protection measures that would be implemented as part of the Proposed Action.

4.5 Alternatives Considered but Eliminated from Detailed Analysis

In addition to the alternatives evaluated in detail, several alternatives were considered, but eliminated from detailed study. These alternatives are listed below, along with the primary reason(s) for elimination. Several were eliminated based on the analyses presented in other documents, such as the NRC SEIS (2011a) and WDEQ-LQD Permit to Mine (LCI, 2011b).

- Portable Drill Pits and Closed Loop Drilling Systems – Limited or no reduction in surface disturbance, increased transportation and wildlife impacts, and increased costs and logistical difficulties;
- Alternative Mining Methods (also an alternative eliminated from detailed analysis in the NRC SEIS) – Significantly greater surface disturbance (with corresponding increases in soil, vegetation, and wildlife impacts), increased groundwater consumptive use, and increased health and safety risks;
- Alternative Waste Water Disposal Methods (discussed in the NRC SEIS) – Significantly increased surface disturbance, less efficient (or no) operation during adverse weather, and increased impacts to land use, vegetation, and wildlife;
- Phased Development of Mine Units – Suggested either fewer mine units or adjusting the schedule to attempt to minimize impacts while still accomplishing the same goal. Not economically viable and constrains options for more efficient mining and groundwater restoration;
- Alternative Lixiviants (also an alternative eliminated from detailed analysis in the NRC SEIS) – Geologic setting and geochemical site

conditions restrict use of alternative lixiviant types because the alternatives available create a groundwater environment that is difficult to restore to its previous state;

- Shipping Uranium-Laden Resin – Increased transportation impacts (with corresponding increases in air quality and wildlife impacts);
- Alternate Plant Locations (evaluated by LCI prior to submittal of the NRC license application and WDEQ-LQD permit application) – Interference with potential mine unit development and increased potential impacts to active raptor nests; and
- Alternate Routes for the East and West Access Roads (reviewed and evaluated by the NRC, WDEQ-LQD, and WGFD [LCI, 2011a]) – Increased surface disturbance (with corresponding increases in vegetation, soil, surface water, and wildlife impacts).

5.0 Environmental Protection Measures and Monitoring

5.1 Agency-Required Measures

Agency-required measures and LCI's commitments and initiatives to comply with the applicable environmental statutory and regulatory programs have developed through several federal, state, and local permitting and licensing processes. Agency-required mitigation measures are summarized in **Table 2**. LCI will also be required to conduct monitoring related to the Project. These requirements are mandated by various regulations and permits, including: State wildlife protection regulations; air and water quality regulations; and the permits from the WDEQ-AQD, the WDEQ-LQD, and the NRC. The monitoring measures are summarized in **Table 3.**

5.2 Additional Measures

The Proposed Action was analyzed with reference to the provisions of the 1872 Mining Law, the 43 CFR 3809 regulations, and the Rawlins Resource Management Plan (RMP) (BLM, 2008) and the Lander Resource Management Plan (BLM, 1987). Based on the BLM's review and on comments received during the NEPA process (comments and responses can be found in Appendix F in the FEIS), some additional measures will be needed to address concerns not previously addressed through the other processes. These concerns are related to disturbances near ephemeral drainages, groundwater stability, impacts to visual resources, and several concerns associated with wildlife. The measures to address these concerns are listed in **Table 4**.

Table 2 Cross -References to Discussions of Environmental Protection Measures, Monitoring, and Impacts in WDEQ-LQD and NRC Documents (Page 1 of 7)

Agency	BLM EIS Proposed Action, Protection Measures & Monitoring	BLM EIS Impacts	WDEQ-LQD Permit No. 788	NRC SEIS Proposed Action, Protection Measures & Monitoring	NRC SEIS Impacts	NRC License No. SUA-1598	Summary of Environmental Protection Measures
Land Use							
Baseline	§ 3.1	--	Appendices D1 & D2	§ 3.2	--	--	Determined historic & existing land uses & usage rates (e.g., grazing, types of livestock, & stocking rates).
Construction	§§ 2.1.3.2, 2.1.5, 2.3.1, 4.2.1 & 4.2.2	§ 4.2.4	§ OP 2.3	--	§ 4.2.1.1	--	Limit disturbance & changes to access where possible.
Operation					§ 4.2.1.2		
Reclamation	§§ 2.1.2.5, 2.1.2.6, 4.2.1 & 4.2.2		§ RP 4.5.1	§ 2.1.1.1.5	§§ 4.2.1.3 & 4.2.1.4		Groundwater restoration & surface reclamation to approved post-mining land uses (essentially pre-mine uses) as soon as possible.
Transportation							
Baseline	§ 3.2	--	--	§ 3.3	--	--	Determined status of roads & usage rates.
Construction	§§ 2.1.2.5, 2.3.1, 4.3.1, 4.3.2 & 4.3.5	§§ 4.3.4.1 & 4.3.5	§ OP 2.6	§§ 2.1.1.1.2.3 & 2.1.1.1.7	§§ 4.3.1.1 & 4.3.2.1		Proper road installation & improvement, maintenance, safety training & inspections, shipment records, & usage monitoring.
Operation		§§ 4.3.4.2 & 4.3.5			§§ 4.3.1.2 & 4.3.2.2		
Reclamation	§§ 2.1.5, 2.3.1, 4.3.1.3 & 4.3.5	§§ 4.3.4.3 & 4.3.5	§§ RP 3.2 & RP 4.4	§§ 2.1.1.1.5.4 & 2.1.1.1.7	§§ 4.3.1.3, 4.3.1.4, 4.3.2.3 & 4.3.2.4		Unless otherwise approved, all new roads removed & reclaimed. Improved roads reclaimed back to original or removed.
Geology, Ore Mineralogy, & Seismology							
Baseline	§ 3.3	--	Appendix D5	§ 3.4.1 & 3.4.3	--	--	Assessed stratigraphy, structure, ore distribution, seismology, thickness & extent of sandstone & shale, & historic drilling locations. Additional evaluation of each mine unit before start-up.
Construction	§§ 2.1.3, 2.3.1, 4.4.1, 4.4.2 & 4.4.5	§§ 4.4.4.1 & 4.4.5	§ OP 3.3	§§ 2.1.1.1.2.4.1 - 2.1.1.1.2.4.3	§§ 4.4.1.1, 4.4.2 & 4.4.3	Condition 10.5	Continued efforts to locate historic drill holes, assess status, & properly abandon. Conduct new drilling & well installation in accordance with current requirements. Update geologic interpretation as new data available.
Operation	§§ 2.1.4.1, 2.1.4.3, 2.3.1, 4.4.1, 4.4.2 & 4.4.5	§§ 4.4.4.2 & 4.4.5		§§2.1.1.1.2.4.3	§§ 4.4.1.2, 4.4.2 & 4.4.3		
Reclamation	§§ 2.1.5.1, 2.3.1, 4.4.1, 4.4.2 & 4.4.5	§§ 4.4.4.3 & 4.4.5	§ RP 3.1		§ 4.4.1.3, 4.4.1.4, 4.4.2 & 4.4.3	--	Abandon drill holes & wells in accordance with applicable permits & requirements.

Table 2 Cross-References to Discussions of Environmental Protection Measures, Monitoring, and Impacts in WDEQ-LQD and NRC Documents (Page 2 of 7)

Agency	BLM EIS: Proposed Action, Protection Measures & Monitoring	BLM EIS: Impacts	WDEQ-LQD Permit No. 788	NRC SEIS: Proposed Action, Protection Measures & Monitoring	NRC SEIS: Impacts	NRC License No. SUA-1598	Summary of Environmental Protection Measures
Soils							
Baseline	§ 3.4	--	Appendix D5, Attachments OP-5a & b	§ 3.4.2	--	--	Evaluated soil types & distribution, analyzed properties, & determined topsoil thicknesses. Additional evaluation of each mine unit before start-up.
Construction	§§ 2.1.2.3, 2.1.3.2, 2.3.1, 4.5.1, 4.5.2 & 4.5.5	§§ 4.5.4.1 & 4.5.5	§ OP 2.5	§ 2.1.1.1.2.1	§§ 4.4.1.1, 4.4.2 & 4.4.3	Condition 11.6	Minimize soil disturbance, erosion, & compaction. Where soil removal necessary, preserve & protect excavated soils. Implement protective measures against spills & leaks to reduce chance of soil contamination. Plans in place to address any contamination from accidental releases.
Operation	§§ 2.1.2.5, 2.1.4.3, 2.3.1, 4.5.1, 4.5.2 & 4.5.5	§§ 4.5.4.2 & 4.5.5	§§ OP 2.5 & OP 3.5	§§ 2.1.1.1.4.4 & 2.1.1.1.4.5	§ 4.4.1.2, 4.4.2 & 4.4.3		
Reclamation	§§ 2.1.5, 2.3.1, 4.5.1, 4.5.2 & 4.5.5	§§ 4.5.4.3 & 4.5.5	§§ RP 3.3 & RP 4.5	§ 2.1.1.1.5	§ 4.4.1.3, 4.4.1.4, 4.4.2 & 4.4.3	Conditions 11.6 & 12.13	Recontour if necessary before replacing excavated soils. Prepare surface for revegetation.
Surface Waters, Wetlands, & Aquatic Ecology							
Baseline	§ 3.5	--	Appendices D6 & D11	§§ 3.5.1 & 3.6.2	--	--	Mapped drainages, determined usage (none) & capacity. Measured flows if possible. Collected storm water runoff samples for assessment of water quality. Determined no permanent surface water, wetlands, or aquatic organisms exist in the Project area.
Construction	§§ 4.6.1, 4.6.2 & 4.6.5	§§ 4.6.4	§§ OP 2.9, OP 2.11.1, OP 3.5 & Attachments OP-2 & OP-4	§§ 6.2.2, 6.2.4, 6.3.2 & 6.3.3	§§ 4.5.1.1.1, 4.5.1.2, 4.51.3 & 4.6.1.1.3	Condition 11.6	Limit disturbance where possible and adhere to buffers for ephemeral drainages. Construct proper road crossings. Implement protective measures against spills & leaks to reduce chance of sediment & water contamination. Plans in place to address any contamination from accidental releases.
Operation					§§ 4.5.1.1.2, 4.5.1.2 & 4.5.1.3		
Reclamation			§§ RP 3.2 & RP 4.0	--	§§ 4.5.1.1.3, 4.5.1.1.4, 4.5.1.2 & 4.51.3		Progressive reclamation as mine units completed. Removal of road crossings. Surface reclamation including recontouring (where necessary), soil replacement, & revegetation.

Table 2 Cross-References to Discussions of Environmental Protection Measures, Monitoring, and Impacts in WDEQ-LQD and NRC Documents (Page 3 of 7)

Agency	BLM EIS		WDEQ-LQD Permit No. 788	NRC SEIS		License No. SUA-1598	Summary of Environmental Protection Measures
	Proposed Action, Protection Measures & Monitoring	Impacts		Proposed Action, Protection Measures & Monitoring	Impacts		
Groundwater							
Baseline	§ 3.6	--	Appendix D6 & § OP 3.6.4.1	§ 3.5.2	--	Conditions 10.9 through 10.12, & 11.3	Determined aquifer characteristics from stratigraphic information & aquifer testing. Evaluated existing water uses. Collected ground water samples. Additional evaluation of each mine unit before start-up.
Construction	§§ 2.1.2.2 through 2.1.2.4, 2.3.1, 2.1.3.2, 4.7.1, 4.7.2, 4.7.4 & 4.7.8	§§ 4.7.4 & 4.7.5	§§ OP 2.9, OP 2.11.2, OP 3.0 & Attachments OP-2, OP-7 & OP-8	§§ 2.1.1.1.2.4.1 - 2.1.1.1.2.4.3, 6.2.5, 6.3.1, & 6.3.2	§§ 4.5.2.1.1, 4.5.2.2, & 4.5.2.3	Conditions 10.5, 11.6, 12.4 & 12.15	Proper well construction & maintenance, including Mechanical Integrity Tests. Proper construction of pipelines, storage ponds & other facilities, including leak detection measures, automatic shut-offs & periodic inspection. Routine water level measurements, water quality sampling & other measures of equipment & process performance, including water balance, in accordance with approved schedules. Plans in place to address detections of leaks, excursions, or other anomalous conditions.
Operation	§§ 2.1.4.1, 2.1.4.3, 2.3.1, 4.7.1, 4.7.2, 4.7.4 & 4.7.8	§§ 4.7.4 & 4.7.6		§§ 2.1.1.1.3.1.1 - 2.1.1.1.3.1.3, 6.2.5, 6.3.1 & 6.3.2	§ 4.5.2.1.2, 4.5.2.2 & 4.5.2.3	Conditions 10.1, 10.5, 10.7 through 10.9, 10.13, 11.1, 11.4 through 11.6 & 12.7	
Reclamation	§§ 2.1.5.1, 2.3.1, 4.7.1, 4.7.2, 4.7.4 & 4.7.8	§§ 4.7.4 & 4.7.7	§§ RP 1.0 & RP 2.0	§§ 2.1.1.1.4, 6.2.5 & 6.3.1	§§ 4.5.2.1.3, 4.5.2.1.4, 4.5.2.2 & 4.5.2.3	Condition 10.6	Mine Units - Progressive groundwater restoration in accordance with approved schedule & procedures (sweep, reverse osmosis, transfer, and recirculation). Sampling, including during a stability period, to ensure water quality returned to the uses for which it is was suitable before ISR. All Wells - Abandonment in accordance with applicable permits & requirements.
Vegetation							
Baseline	§ 3.7	--	Appendix D8	§ 4.3.4.1	--	--	Mapped vegetation types, evaluated cover & species diversity & assessed weed distribution.
Construction	§§ 2.1.3, 2.3.1, 4.8.1, 4.8.2 & 4.8.5	§ 4.8.4.1	§ OP 2.7	§ 2.1.1.1.2.1	§§ 4.6.1.1.1.1, 4.6.2 & 4.6.3		Limit disturbance where possible, especially in Lowland Sagebrush. Weed control. Revegetation of mine units after installation, with approved seed mix.
Operation		§ 4.8.4.2		§§ 6.2.3 & 6.5.1	§§ 4.6.1.2.1, 4.6.2 & 4.6.3		
Reclamation	§§ 2.1.5, 2.3.1, 4.8.1, 4.8.2 & 4.8.5	§ 4.8.4.3	§ RP 4.5	§§ 2.1.1.1.5.5 & 6.5.1	§§ 4.6.1.3, 4.6.1.4, 4.6.2 & 4.6.3		Progressive revegetation, with approved seed mix, after facility removal in mine units & after final reclamation. Vegetation sampling to determine revegetation success.

Table 2 Cross-References to Discussions of Environmental Protection Measures, Monitoring, and Impacts in WDEQ-LQD and NRC Documents (Page 4 of 7)

Agency	BLM EIS Proposed Action, Protection Measures & Monitoring	BLM EIS Impacts	WDEQ-LQD Permit No. 788	NRC SEIS Proposed Action, Protection Measures & Monitoring	NRC SEIS Impacts	NRC License No. SUA-1598	Summary of Environmental Protection Measures
Wildlife							
Baseline	§ 3.8	--	Appendix D9	§§ 3.2.1, 3.6.1.2 & 3.6.3	--	--	Surveyed species & habitat, with surveys over larger areas for Greater sage-grouse.
Construction	§§ 2.1.2.6, 2.3.1, 4.9.1, 4.9.2 & 4.9.5	§§ 4.9.5	§ OP 2.7 & Attachment OP-6	§§ 2.1.1.1.2.5, 6.2.3, 6.5.2 & Appendix F	§§ 4.6.1.1.1.2, 4.6.1.1.2, 4.6.1.1.4, 4.6.1.1.5, 4.6.2 & 4.6.3		Implement Best Management Practices (BMPs), e.g., minimize disturbance, erosion control, speed limits, & perch & collision guards, & conformance with stipulations designed for protection of specific species. Fence construction in accordance with protective requirements. Continue surveys & implement Adaptive Management Plan.
Operation	§§ 2.3.1, 4.9.1, 4.9.2 & 4.9.5	§§ 4.9.6		§§ 6.2.3, 6.5.2 & Appendix F	§§ 4.6.1.2.2, 4.6.2 & 4.6.3		
Reclamation	§§ 2.1.5, 2.3.1, 4.9.1, 4.9.2 & 4.9.5	§§ 4.9.7		§§ 6.2.3, 6.5.2 & Appendix F	§§ 4.6.1.3, 4.6.1.4, 4.6.2 & 4.6.3		Continue use of BMPs & Adaptive Management during reclamation work (e.g., facility removal). Surface reclamation, including revegetation & weed control, for habitat restoration.
Wild Horses							
Baseline	§ 3.9	--	Appendix D9	§§ 3.2.1 & 3.6.1.2.7	--	--	Noted occurrence & site usage by wild horses.
Construction	§§ 2.1.2.6, 2.1.3, 4.10.1 & 4.10.2	§§ 4.10.4.1 & 4.10.5	§ OP 2.8 & Attachment OP-6	§ 2.1.1.1.2.5	§§ 4.2.1.1 & 4.6.1.1.1.2		Implement BMPs (e.g., speed limits). Fence construction in accordance with protective requirements. Consideration of modified cattle guards under gates.
Operation	§§ 4.10.1 & 4.10.2	§§ 4.10.4.2 & 4.10.5		--	§ 4.2.1.2		
Reclamation	§§ 2.1.2.6, 2.1.5, 4.10.1 & 4.10.2	§§ 4.10.4.3 & 4.10.5	§§ RP 4.5.4 & 4.5.5		--		Continue use of BMPs during reclamation work (e.g., facility removal). Surface reclamation, including revegetation & weed control, for habitat restoration.
Meteorology, Climatology, & Air Quality							
Baseline	§ 3.10	--	Appendix D4	§ 3.7	--	Condition 12.8	Installed meteorological station. Sampled air particulates.
Construction	§§ 2.1.1.4, 2.1.3, 4.11.1 & 4.11.2	§§ 4.11.4.1, 4.11.4.4 & 4.11.5	OP 5.1.1	§§ 2.1.1.1.6.1, 2.1.2 & 2.1.3	§§ 4.7.1.1, 4.7.3 & 4.7.3.1	--	Implement BMPs (e.g., road dust control, speed limits & vehicle maintenance) to reduce fugitive dust and emissions. Install & maintain a scrubber for use during loading of the HCl storage tank.
Operation		§§ 4.11.4.2, 4.11.4.4 & 4.11.5			§§ 4.7.1.2, 4.7.3, & 4.7.3.2		
Reclamation		§§ 4.11.4.3, 4.11.4.4 & 4.11.5			§§ 4.7.1.3, 4.7.1.4, 4.7.3, 4.7.3.3 & 4.7.3.4		Continue use of BMPs during reclamation work (e.g., facility removal). Revegetation after installation of each mine & after final facility removal to minimize wind erosion.

Table 2 Cross-References to Discussions of Environmental Protection Measures, Monitoring, and Impacts in WDEQ-LQD and NRC Documents (Page 5 of 7)

Agency	BLM EIS Proposed Action, Protection Measures & Monitoring	BLM EIS Impacts	WDEQ-LQD Permit No. 788	NRC SEIS Proposed Action, Protection Measures & Monitoring	NRC SEIS Impacts	NRC License No. SUA-1598	Summary of Environmental Protection Measures
Noise							
Baseline	§ 3.11	--	--	§ 3.8	--	--	Measured ambient noise. Measured/assessed noise generated by machinery to be used during the Project.
Construction	§§ 4.12.1 & 4.12.5	§§ 4.12.4.1 & 4.12.5	§ OP 2.8	--	§§ 4.8.1.1, 4.8.2 & 4.8.3		Implement BMPs to reduce noise (e.g., vehicle maintenance & mufflers). Operate primarily during daylight hours.
Operation		§§ 4.12.4.2 & 4.12.5			§§ 4.8.1.2, 4.8.2 & 4.8.3		
Reclamation		§§ 4.12.4.3 & 4.12.5			§§ 4.8.1.3, 4.8.1.4, 4.8.2 & 4.8.3		
Historic & Cultural Resources							
Baseline	§ 3.12	--	Appendix D3	§ 3.9	--	--	Researched historic site use & completed archeological surveys.
Construction	§§ 2.1.7, 2.2, 4.13.1 & 4.13.2	§§ 4.13.3, 4.13.4 & 4.13.5	§ OP 2.4	Appendix E	§§ 4.9.1.1, 4.9.2 & 4.9.3	Condition 9.8	Avoid known sites. Implement approved treatment plan at unavoidable site location(s). Plan in place for unanticipated discovery of archaeological resources.
Operation				--	§§ 4.9.1.2, 4.9.2 & 4.9.3		
Reclamation					§§ 4.9.1.3, 4.9.1.4, 4.9.2 & 4.9.3		Plan in place for unanticipated discovery of archeological resources.
Visual & Scenic Resources							
Baseline	§ 3.13	--	--	§ 3.10	--	--	Evaluated visibility of proposed infrastructure, assessed viewsheds, & site-specific factors contributing to scenic resources, including wilderness characteristics.
Construction	§§ 2.1.2, 2.1.3, 2.3.1, 4.14.1 & 4.14.5	§ 4.14.4.1		--	§§ 4.10.1.1, 4.10.2 & 4.10.3		Minimize disturbance & use paint colors designed to reduce visibility.
Operation	§§ 2.1.2, 2.1.4, 4.14.1 & 4.14.5	§ 4.14.4.2			§§ 4.10.1.2, 4.10.2 & 4.10.3		
Reclamation	§§ 2.1.2, 2.1.5, 4.14.1 & 4.14.5	§ 4.14.4.3			§§ 4.10.1.3, 4.10.1.4, 4.10.2, & 4.10.3		Removal of facilities & roads. Surface reclamation & vegetation.

Table 2 Cross-References to Discussions of Environmental Protection Measures, Monitoring, and Impacts in WDEQ-LQD and NRC Documents (Page 6 of 7)

Agency	BLM EIS		WDEQ-LQD Permit No. 788	NRC SEIS		License No. SUA-1598	Summary of Environmental Protection Measures
	Proposed Action, Protection Measures & Monitoring	Impacts		Proposed Action, Protection Measures & Monitoring	Impacts		
Socioeconomics							
Baseline	§ 3.14	--	--	§ 3.11	--	--	Evaluated existing demographics & socioeconomic conditions, including labor force, housing & school availability, & tax revenues in comparison with work force & revenue projections for the Project.
Construction	§§ 4.15.1 & 4.15.2	§§ 4.15.3, 4.15.4.1, 4.15.5, 4.15.6.1, 4.15.8 & 4.15.9		§ 2.1.1.1.2.6	§§ 4.11.1.1, 4.11.2, & 4.11.3		Continue working with counties & municipalities through commitments & initiatives to improve socioeconomic conditions.
Operation		§§ 4.15.3, 4.15.4.2, 4.15.5, 4.15.6.2, 4.15.8 & 4.15.9		--	§§ 4.11.1.2, 4.11.2, & 4.11.3		
Reclamation		§§ 4.15.3, 4.15.4.3, 4.15.5, 4.15.6.3, 4.15.8, & 4.15.9		--	§§ 4.11.1.3, 4.11.1.4, 4.11.2, & 4.11.3		The need for protective measures is not anticipated.
Environmental Justice							
Baseline	--	--	--	§ 3.11	--	--	Evaluated existing demographics.
Construction	§§ 4.16.1, 4.16.4	§ 4.16.3		--	§§ 4.12.1.1, 4.12.2, 4.12.3		The need for protective measures is not anticipated.
Operation					§§ 4.12.1.2, 4.12.2, 4.12.3		
Reclamation					§§ 4.12.1.3, 4.12.1.4, 4.12.2, 4.12.3		

Table 2 Cross-References to Discussions of Environmental Protection Measures, Monitoring, and Impacts in WDEQ-LQD and NRC Documents (Page 7 of 7)

Agency	BLM EIS		WDEQ-LQD Permit No. 788	NRC SEIS		License No. SUA-1598	Summary of Environmental Protection Measures
	Proposed Action, Protection Measures & Monitoring	Impacts		Proposed Action, Protection Measures & Monitoring	Impacts		
Public & Occupational Health							
Baseline	--	--	Appendix D10	§ 3.12.2	--	Conditions 10.4, 12.2, 12.3, 12.5, 12.9 through 12.11, & 12.14	Analyzed soil, vegetation, surface water, groundwater, tissue, & particulate samples for radiological parameters. Additional evaluation of each mine unit before start-up.
Construction	§§ 2.1.2.6, 2.3.3.8, 2.1.7, 4.17.1, 4.17.5	§§ 4.17.4.1, 4.17.4.2, & 4.17.5	§§ OP 2.9, OP 5.0, OP 5.1.1, & OP 5.2.2.1	--	§§ 4.13.1.1, 4.13.2, & 4.13.3	Conditions 9.7, 10.14 -10.17, 11.2, 11.6, & 12.12	Employee training, proper facility design, operation & maintenance. Plans in place to address any contamination from accidental releases.
Operation	§§ 2.1.4.4, 2.3.3.1, 2.3.3.5, 2.1.7, 4.17.1, 4.17.5			--	§§ 4.13.1.2, 4.13.2, & 4.13.3	Conditions 9.7, 10.14 -10.17, 11.6 & 12.12	
Reclamation	§§ 2.1.7, 4.17.1, 4.17.5		§§ RP 2.2, RP 4.0, & RP 4.1 through 4.3	§§ 2.1.1.1.4 through 2.1.1.1.6	§§ 4.13.1.3, 4.13.1.4, 4.13.2, & 4.13.3	Conditions 9.7, 10.14 -10.17, 11.6, 12.12 & 12.13	Decontamination and packaging of equipment in accordance with specified practices & procedures
Waste Management							
Baseline	--	--	--	§§ 3.13	--	Conditions 9.6, 9.9, 11.1(D) & 12.6	Evaluated existing disposal facilities, capacity & options. Estimated types & quantities of wastes to be generated. Designed & permitted facilities where necessary (e.g., UIC Class I wells).
Construction	§§ 4.18.1 & 4.18.2	§§ 4.18.3, 4.18.4, & 4.18.5	§ OP 5.0	§§ 2.1.1.1.2.5 & 2.1.1.1.6	§§ 4.14.1.1 & 4.14.1.1.1		Construct approved disposal facilities (e.g., UIC Class I wells). Reduce liquid & solid wastes by reusing/ recycling materials. Employee training on proper storage, handling & disposal of wastes.
Operation				§§ 2.1.1.1.3.2 & 2.1.1.1.6	§§ 4.14.1.1 & 4.14.1.1.2		
Reclamation			§§ RP 4.1 through 4.3	§§ 2.1.1.1.5 & 2.1.1.1.6	§§ 4.14.1.1, 4.14.1.1.3, & 4.14.1.1.4		Decontaminate facilities & dispose of wastes generated during reclamation (e.g., building debris) in accordance with permits & regulations.
Financial Surety (Reclamation Bond)							
Amount determined by WDEQ-LOQ, NRC, and the BLM; approved surety instruments held by WDEQ-LQD and available to NRC and the BLM. Amount reviewed at least annually, and instruments increased if review indicates increase required.							

Table 3 Project Monitoring (Page 1 of 5)

Monitoring Activity	Description	Project Phases		
		Construction	Operation	Reclamation
Air Quality				
Meteorological Station	Hourly measurements.	X	X	Removed upon NRC's approval
Dust Control	Daily observations. Additional requirements may be part of WDEQ-AQD permit.	X	X	Until on-site dust-generating activities are finished.
Radiation: Radon Gas and Direct Gamma	Continuous monitoring, quarterly analysis reported to NRC semi-annually.		X	Until mine unit reclamation and plant decommissioning are completed.
Archaeology and Cultural Resources				
Mitigation and Confirmation of Survey	Prior to construction and mine unit development. SHPO evaluation.	X		
Equipment Performance – Basic and Radiation Safety				
Mine Units, Plant, and Waste Areas	Daily walk through.		X	Until daily on-site activities are completed, then only when personnel are on-site.
Equipment Performance – Effluent Control				
Storage Ponds	Daily, weekly, quarterly, and annual inspections/assessments; report leaks to NRC. Additional requirements may be part of EPA NESHAPs permit.		X	Until reclaimed and sludge disposed.
UIC Class I Well(s)	Annual evaluation, report to NRC and WDEQ. Additional reporting requirements may be part of UIC Permit.		X	Until wells are plugged.
Equipment Performance – Fluid Transfer and Processing				
Pipelines and Process Tanks	Automated with pressure gauges and alarms.		X	Until mine units are restored and processing operations completed.

Table 3 Project Monitoring (Page 2 of 5)

Monitoring Activity	Description	Project Phases		
		Construction	Operation	Reclamation
Equipment Performance – Mine Unit Balance				
Injection and Production Flow Rates and Pressures	Daily measurements and balancing.		X	Until ground water restoration is complete.
Mining Progress	Evaluated annually, report to NRC and WDEQ.		X	X
Equipment Performance – Wells and Pipelines				
Pipeline Integrity	Prior to use.	X		
Mechanical Integrity Testing of Wells	Prior to use.	X		
	Once every five years and after well repair, WDEQ-LQD may require a different monitoring frequency.		X	X
Downhole Injection Pressures	Automated with pressure gauges and alarms.		X	X
Groundwater				
Aquifer Testing and Monitor Well Sampling	Before start-up of each mine unit.	X		
On-Site Baseline Wells	Quarterly reports to NRC and WDEQ-LQD.	X	X	
Excursion Detection Monitoring	Twice per month with additional measurements if excursion is detected.		X	
Off-Site BLM wells	Quarterly evaluation, report to NRC, BLM, and WDEQ-LQD.		X	Until stability monitoring in last mine unit begins.
Restoration Progress	Daily, weekly, and monthly analyses as needed, report to NRC, BLM, and WDEQ-LQD.			X

Table 3 Project Monitoring (Page 3 of 5)

Monitoring Activity	Description	Project Phases		
		Construction	Operation	Reclamation
Stability Monitoring	Quarterly for twelve months, two additional samples taken in the six months following the initial sampling, report to NRC, BLM, and WDEQ-LQD.			X
Health (radiation-related)				
Radon	Monthly with increases to weekly under specific conditions.		X	X
Bioassay	Initial and exit sample for all on-site workers and monthly for workers in specified areas.		X	X
Security	Monitoring of fenced areas, visitors, and shipments.		X	X
Soils				
Evaluation of Topsoil Removal Practices		X		
Evaluation of Topsoil Protection Measures	Minimum quarterly evaluations.	X	X	
Radiation	Before and after removal of facilities, report to NRC and BLM.			X
Topsoil Viability	Before reclamation.			X
Replacement Depths	Whenever soil is replaced, report to WDEQ-LQD and BLM.			X
Surface Water				
Storm Water Runoff Controls	Quarterly evaluation.	X	X	X
Water Quality	Sampling and reporting per WYPDES.	X	X	Until groundwater restoration, mine unit reclamation, and plant decommissioning are all done.

Table 3 Project Monitoring (Page 4 of 5)

Monitoring Activity	Description	Project Phases		
		Construction	Operation	Reclamation
Surface Water	Monitoring only in case of spill or other accidents.		X	X
Transportation				
Transportation Risk	Sweetwater County Public Works Director, Road Use and Maintenance Agreement. Meet requirements identified in the agreement. Records of shipments, driver training, vehicle safety inspections, and maintenance work will be kept.	X	X	X
Road Conditions	Minimum quarterly inspections.		X	X
Fuel Storage	Minimum weekly inspections.		X	X
Vegetation				
Weed Control	Minimum annual evaluation, conduct following BLM guidance for weed control.	X	X	X
Revegetation Success	Annual evaluation until five seasons after successful reclamation of each disturbed area, report to BLM; Sample during the first growing season five years after reseeding, report to WDEQ-LQD.			X
Wildlife				
Raptor Nests	Survey known nests and document new nests annually.	X	X	X
Sage Grouse Leks	Survey known leks annually, including incidental survey of new leks. Aerial survey for new leks every three years.	X	X	X
All Species	Annual summary of accidents reported.	X	X	X

Table 3 Project Monitoring (Page 5 of 5)

Monitoring Activity	Description	Project Phases		
		Construction	Operation	Reclamation
All Species[1]	Annual Wildlife Monitoring Report submitted to BLM, WGFD.	X	X	X
All Species	Evidence of possible wildlife exposure to toxic chemicals.	X	X	X
Sensitive Species	Mortality of sensitive species.	X	X	X
All Species	Large die-offs.	X	X	X
Incidents				
All incidents	Reported to BLM.	X	X	X

1. All species to be covered in the required report can be found in Section 4.9 of the EIS.

Table 4 Additional Measures (Page 1 of 2)

Resource	Aspect	Description of Measures
Land Use	Cadastral Monument	Government survey markers and monuments are protected per 18 USC 1858 and 43 CFR 3809.420. Any changes, damages, or removal of survey monuments or markers will be immediately reported to the Authorizing Official.
Transportation	Roads	LCI will obtain a Road Use and Maintenance Agreement from the BLM for any crossing, access to, or use of a BLM-controlled road outside the permit boundary.
Surface Water	Ephemeral Drainages	Surface disturbing activities will be avoided within 20 feet of the inner gorge of ephemeral channels identified on Figure 3.5-1 in the FEIS or identified in the field by best professional judgment as a channel that meets the BLM guideline criteria of a "defined channel formed in response to ephemeral surface conditions." Exceptions to this will be granted by the BLM based on an environmental analysis and site-specific engineering and mitigation plans as required per 43 CFR 3809.411(d)(2). Only those actions within areas that could not be avoided and that will provide protection for the resource identified will be approved.
Groundwater	Stability Monitoring	As part of the reclamation plan and associated monitoring, required per the 43 CFR 3809 regulations, at least two additional stability monitoring samples will be collected, once every three months over a six-month period, after the initial stability period. The monitoring information will also support combined agency review of current stability monitoring requirements.

Table 4 Additional Measures (Page 2 of 2)

Resource	Aspect	Description of Measures
Wildlife – Greater Sage-Grouse	Adaptive Management	To ensure continued coordination and consultation with other local, state, and federal agencies and consistency with other agency plans, policies, and agreements, a Technical Advisory Committee (the BLM, WGFD, and LCI) will be established to develop the Adaptive Management Plan to complement on-going baseline data collection and existing stipulations.
Wildlife	Fencing	Fencing around the Storage Ponds will be upgraded to Type II fencing (WDEQ Guideline No. 10 [1994]) to preclude deer, antelope and elk.
Wildlife	Fencing	New fence construction will be authorized according to the BLM standards unless modified following consultation with affected parties. All fencing will be wildlife-friendly fencing, with appropriate collision deterrents, with the exception of the fencing around the Storage Ponds, which will be exclusion fencing.
Wildlife	Storage Ponds	The operator will monitor selenium levels in the storage ponds on a weekly basis. If selenium levels were to reach 0.02 mg/L, or above, in the storage ponds, mitigation measures will be required to prevent mortality of any protected birds in accordance with federal and state regulations, as required per 43 CFR 3809.401(b)(4). Potential mitigation measures include those to keep selenium levels below 0.02 mg/L, covering the storage ponds, or other mitigation measure(s) to be approved by the BLM wildlife biologist.
Wildlife	Storage Ponds	The BLM will require the applicant to obtain a Pesticide Use Proposal with associated environmental analysis and consider other Integrated Pest Management techniques, prior to authorizing the use of pesticides.
Wild Horses	Access to Fenced Pattern Areas	To help protect healthy herds of wild horses, LCI will likely implement cattle guards to deter wild horse access to a pattern area if gate of the fencing surrounding the pattern area were inadvertently left open. The cattle guards would be equipped with wings, and rods would be welded between the pipes to prevent horse injuries.
Visual and Scenic Resources	Building Completion	To help maintain the overall objectives of visual resource class, paint colors will conform to the BLM Standard Environmental Color Chart CC-001.

6.0 Public Involvement and Agency Consultation and Coordination

Public involvement and agency consultation were conducted in accordance with NEPA guidelines (40 CFR 1506.6 and 1501.6). As the Project completed the permitting processes for the NRC, WDEQ, and Sweetwater County, public meetings for the Project were held, prior to the BLM's NEPA review. For NRC to meet its NEPA requirements for evaluation of handling and managing uranium, NRC prepared a GEIS for uranium ISR and an SEIS for the Project, both of which included public scoping and comment periods (NRC and WDEQ, 2009; NRC, 2011a). The WDEQ permitting processes also required public notice and comment (AQD, Wyoming Air Quality Standards and Regulations, Ch. 6, Sec. 2(m); LQD, NonCoal Rules and Regulations, Ch. 11, Sec. 21; WQD, Water Quality Rules and Regulations, Ch. 13, Sec. 19), and these requirements were met, including notice and opportunity to participate in the Wyoming Environmental Quality Council (EQC) Hearing on the WDEQ-LQD Permit to Mine in August 2011 (resulting in the EQC upholding the WDEQ-LQD decision to issue the permit) (EQC, 2011). Public meetings were also conducted in Sweetwater and Carbon Counties to meet planning requirements or for public information (LCI, 2009).

The public scoping period for the BLM's NEPA review commenced when the Notice of Intent (NOI) to prepare an EIS was published in the *Federal Register* (FR) on February 11, 2011 (76 FR 7877). Notification of the scoping process was also published in local newspapers and was included in the BLM's weekly report to the Washington, D.C. office and the BLM's quarterly congressional briefing. Media interviews were conducted with The Radio Network, which operates a syndicated string of radio stations in southwest Wyoming. Several agencies, state and local government representatives, Native American tribes, local media, and interested organizations and individuals also received a public scoping notification via e-mail or mail.

Organizations and agencies were mailed letters of invitation to become cooperating agencies in the Project's EIS development process. These organizations included: the USFWS; Arapahoe Tribe; Shoshone Tribe; Ute Tribe; State of Wyoming and its agencies; Carbon County Commissioners; Fremont County Commissioners; Sweetwater County Commissioners; and members of the Coalition of Local Governments. The BLM worked closely with the EPA during the NEPA process. The following agencies participated as cooperating agencies: State of Wyoming and its agencies; Carbon County Commissioners; and Sweetwater County Commissioners.

A public scoping meeting was held at the BLM Rawlins Field Office on March 7, 2011. During the public scoping period, ten comment submittals (e.g., letter, comment form) were received and contained 57 comments. These comments were evaluated to identify key issues and concerns and to develop alternatives.

Tribes, individuals, organizations, and agencies have been and continue to be consulted regarding the Project. In compliance with Section 7 of the Endangered Species Act of 1973, as amended, NRC and the BLM consulted with the USFWS to ensure any actions authorized, permitted, or otherwise carried out will not jeopardize the continued existence of any listed species or adversely modify designated critical habitats. NRC initiated Section 106 consultation with the Wyoming SHPO in 2008 and in 2010, a Memorandum of Agreement was finalized among the NRC, Wyoming SHPO, the BLM, the Northern Arizona Tribe, the Eastern Shoshone Tribe, and LCI.

The BLM published a Notice of Availability (NOA) on April 27, 2012, for the DEIS for the proposed Project (77 FR 25193). A public DEIS informational meeting was held in Rawlins on May 14, 2012. The public comment period was 45 days with comments due on June 11, 2012. The BLM received 22 comment submittals. The comments and the BLM's responses were included as Appendix F in the FEIS.

The NOA for the FEIS was published in the *Federal Register* on August 17, 2012, followed by a 30-day review period. During this time, the BLM received seven letters commenting on the Project. The letters were read thoroughly for substantive comments, and responses were drafted. A summary of the comment and response process, the substantive comments, the BLM's responses, and the original letters received are included in Appendix B of this ROD.

7.0 Appeal of Decision

If you do not agree and are adversely affected by this decision, you may request that the Wyoming BLM State Director review this decision. If you request a State Director review, the request must be received in the Wyoming BLM State Office, P.O. Box 1828, Cheyenne, WY 82003-1828, no later than 30 calendar days after you receive this decision. The request for State Director review must be filed in accordance with the provisions in 43 CFR 3809.805. This decision will remain in effect while the State Director review is pending, unless the State Director grants a stay. If you request a stay (suspension), you have the burden of proof to demonstrate that a stay should be granted.

If the State Director does not make a decision on your request for review of this decision within 21 days of receipt of the request, you should consider the request declined. Under 3809.809(a) denial of a request for State Director review cannot be appealed.

You may appeal this Record of Decision to the Interior Board of Land Appeals (IBLA) by following the procedures at 43 CFR 4.413. You may contact the BLM Wyoming State Office to determine when BLM received your request for State Director review. You have 30 days from the end of the 21-day period in which to

file a notice of appeal with the High Desert District Office, 280 Highway 191 North, Rock Springs WY 82901, with a copy to the Office of the Regional Solicitor, U.S. Department of the Interior, 755 Parfet Street, Suite 151, Lakewood, Colorado 80215. The High Desert District Office will forward a copy of your notice of appeal to the IBLA

If you wish to bypass a State Director review, this Record of Decision may be appealed directly to the IBLA in accordance with the regulations at 43 CFR 3809.801(a)(1) and 43 CFR Part 4 Subpart E. Your notice of appeal must be filed within 30 days of the date of this Record of Decision at the High Desert District Office, with a copy to the Office of the Regional Solicitor. The High Plains District Office will forward the appeal to the IBLA. As the appellant, you have the burden of showing that the decision appealed is in error. BLM form 1842-1 contains further information on taking appeals to the IBLA.

7.1 Request for Stay

If you wish to file a petition (request) pursuant to regulations 43 CFR 4.21(a)(2) – for a stay (suspension) of the effectiveness of this decision during the time that an appeal is being reviewed by the board – the petition for stay must accompany your notice of appeal.

Except as otherwise provided by law or other pertinent regulations, a petition for a stay of a decision pending appeal shall show sufficient justification base on the following standards:

1) The relative harm to the parties if the stay is granted or denied;
2) The likelihood of the appellant's success on the merits;
3) The likelihood of immediate and irreparable harm if the stay is not granted; and
4) Whether the public interest favors granting a stay.

The appellant requesting a stay bears the burden of proof to demonstrate that a stay should be granted. A copy of the notice of appeal and petition for stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed with the Authorized Officer at the High Desert District.

DECISION AND APPROVAL

I have reviewed the EIS prepared for the Lost Creek Uranium *In-Situ* Recovery Plan of Operations (BLM/WY/PL-12/034+1330). For the reasons stated above, I select the Preferred Alternative, and have determined that the Preferred Alternative is in conformance with this Record of Decision and approved RMPs.

THE UNITED STATES OF AMERICA
Department of the Interior
Bureau of Land Management - Wyoming

By _____ Date 5 October 2012
John F. Ruhs
High Desert District Manager

8.0 References

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