

COLORADO OFFICE
10758 W. CENTENNIAL RD., STE. 200
LITTLETON, CO 80127
TEL: (866) 981-4588
FAX: (720)-981-5643



WYOMING OFFICE
5880 ENTERPRISE DR., STE. 200
CASPER, WY 82609
TEL: (307) 265-2373
FAX: (307) 265-2801

LOST CREEK ISR, LLC

January 18, 2017

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-001

Re: Reply to a Notice of Violation
Lost Creek ISR Project License SUA-1598, Docket 040-09068

To Whom It May Concern:

On December 21, 2016 the U.S. Nuclear Regulatory Commission issued an inspection report for the Lost Creek ISR Project. Please find behind this cover letter Lost Creek ISR, LLC's responses to the violations cited in the December 21, 2016 letter.

Please feel free to contact me at our Casper office if you have any questions.

Sincerely,
Lost Creek ISR, LLC

Chris Pedersen
Corporate Radiation Safety Officer

cc: NRC Region IV Administrator
Bernadette Bacca, NRC (via email)
Samantha Crane, NRC (via email)
Theresa Horne, Ur-Energy, Littleton
John Saxton, NRC (via email)

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- A. Summary of Violation: Failure to perform a Safety and Environmental Review Panel (SERP) when changing the organizational chart and associated job duties/responsibilities described in the TR.

Lost Creek ISR, LLC Response:

Reason for the Violation

Management changed the organization and positions within the company as the result of promotion of the RSO and, subsequently, a reduction in force. While considering these personnel actions, management carefully considered the job responsibilities enumerated in the TR to ensure all tasks were covered by qualified individuals. Since the job duties/responsibilities detailed in the TR were still covered by qualified personnel, (with appropriate lines of reporting) the TR was not updated.

Corrective Steps and Results

The organization chart and associated job duties/responsibilities described in the TR were updated by SERP LC16-07, which was completed on November 16, 2016. The SERP form and associated documentation are attached for your review. The organizational chart was amended to clarify how each position satisfies the required list of positions in the TR. Human Resources has been informed of the requirements in the TR so they can help ensure all required positions are filled with qualified personnel.

Future Corrective Steps

In the future, changes to job duties/responsibilities described in the TR will be reviewed by the RSO and Human Resources to ensure they are consistent with the TR. Prior to making changes, a SERP will be performed, or the license will be amended, as appropriate.

Date of Full Compliance

This issue was brought back into compliance on November 16, 2016.

- B. Summary of Violation: Failure to secure licensed materials stored in controlled or unrestricted areas.

Lost Creek ISR, LLC Response:

Reason for the Violation

The plant facility where the 11e.(2) material is stored is a controlled area surrounded by a securing fence and is manned 24 hours a day. The 11e.(2) in question was stored in a sealed shipping container which is located within a fenced restricted area immediately adjacent to the plant. The container is monitored by site cameras. The padlock for the restricted area fence immediately surrounding the 11e.(2) waste container was not closing properly making it difficult to lock, and was left in place, just not closed.

Also, the unsecured lock was missed during the daily Radiation Safety Inspection. It is not known how long the lock had not been properly engaged.

During the inspection it was noted that there was material being staged for placement into the bins. This was the only instance of this occurring. The typical route of disposing of 11e.(2) waste material is to bring the waste to the staging area inside of the plant.

Corrective Steps and Results

The lock was replaced with a new lock, as was verified by the NRC inspector during the inspection from September 27-29, 2016.

The RSO and HPT have already begun including a closer examination of the lock to the 11e.(2) area during the daily Radiation Safety Inspection.

Future Corrective Steps

The employees of Lost Creek will be further trained to reinforce the understanding that if equipment, especially safety and security equipment, doesn't function properly they must report it to their supervisor. Personnel will also be instructed to place all waste within the 11e.(2) bin or within the plant building for safe keeping until it can be placed in the 11e.(2) bin. This supplemental training has been initiated but is not complete at the time of this report.

All employees will be reminded that the 11e.(2) staging area in the plant is the appropriate place to store solid radioactive waste when there is not enough material to warrant opening the bins. There will be no material stored in the fenced restricted areas that is not inside the 11e.(2) shipping bins.

Also, the designees performing the daily Radiation Safety Inspection in the absence of the RSO or HPT will be trained to look specifically at this lock, and to ensure no waste is in the fenced area if it is not in the bins

Date of Full Compliance

The training will be completed within two weeks of the date of this letter.

C. Summary of Violation: Failure to obtain a Radiation Work Permit (RWP) when required.

Lost Creek ISR, LLC Response:

Reason for the Violation

Lost Creek ISR, LLC self-identified this issue to the NRC. Accessing the dryer through the knife valve requires an RWP because of a history of upset conditions. The goal of requiring an RWP was to have additional supervision and training each time the task was performed. The two factors that led to this violation were failure of an employee to follow procedures he had been trained to, and miscommunication about what task was being performed. The miscommunication was caused because the dryer operator was planning to access the inside of the dryer, but after talking with the dryer operator the RSO thought the dryer operator was removing the star valve under the dryer, which does not open directly into the dryer.

Corrective Steps and Results

The employee who failed to follow the procedure of obtaining an RWP is no longer employed at Lost Creek. The current dryer operator has performed well and reliably, has had no dryer room incidents, and has a lower dose rate.

A procedure was developed and tested to mitigate the hazards of opening the dryer from the valve on the bottom. This procedure was based on the success of several RWPs. Now when a dryer operator needs to open the knife valve, there is a standard procedure to refer to. The dryer operator has been trained in the new SOP and has the knowledge and training to perform the task safely without an RWP. The procedure was included in an update of SOP *OPS-026 Yellowcake Packaging* on October 27, 2016.

Future Corrective Steps

This issue has been addressed, but will continue to be carefully monitored going forward.

Date of Full Compliance

This issue has been maintained in compliance since December 2, 2015.

- D. Summary of Violation: Failure to perform surveys that met the requirements of 10 CFR 20.1501 and 10 CFR 20.1302

Lost Creek ISR, LLC Response:

Reason for the Violation

In some situations, the background beta measurements were greater than the measurements on the equipment, indicating that the background was not representative for the survey on the equipment. This could potentially lead to the release of contaminated equipment for unrestricted use.

The difficulty establishing a representative background results from several factors. The background in areas of the restricted area is great enough that direct surveys for beta contamination below the removable contamination limit of 1000 dpm/100cm² is difficult and sometimes infeasible. Other complications that need to be addressed are that given a large enough object, the background will vary depending on what side of the object measurement is on, due to spatial variability of background radiation in the restricted areas. Also, the size, shape, and material type will create different amounts of shielding of the background radiation depending on the object being surveyed.

Corrective Steps and Results

Since the inspection in September 2016, the radiation safety staff began requiring that surveys performed with challenging backgrounds, with negative results on equipment, be swipe tested for removable contamination, so the sample could be counted in a controlled background setting. While this does not address all issues associated with establishing a representative background, it was a step towards achieving compliance.

Future Corrective Steps

The SOP for the screening and decommissioning of equipment will be improved to provide the details necessary to perform a survey that can establish and use a representative background for instruments in the plant. This procedure will apply principles such as establishing designated areas for performing

surveys with backgrounds low enough to meet the required MDC's, surveying objects in the designated areas prior to exposure to radiological contamination to establish a background with representative physical/chemical/radiological/biological characteristics, relying on swipes to determine removable contamination levels (¹limit for 1000 dpm/100cm²) and applying direct measurements for the non-removable contamination levels (¹limit 5000 dpm/100cm²).

Date of Full Compliance

Radiation Safety staff will continue to advance the development and implementation of these procedures. Equipment will not be released for unrestricted use until the appropriate procedure is implemented.

¹ Dependent on isotope of interest per Table 2 of RG 8.30 per License Condition 9.7

LOST CREEK ISR PROJECT

REPORT FOR SERP LC16-07

November 07, 2016

Proposed Action: *To review and edit the Organizational Chart and Section 5 in the NRC Technical Report to be consistent with the current Lost Creek Organizational Chart.*

SERP MEMBERS

Management Representative: *Steve Hatten – LCI President*

Operations Representative: *Kurt Brown – Mine Manager*

Radiation Safety Officer: *Chris Pedersen - RSO*

Support: *John Cash – LCI Vice President*

Support: *Michael Gaither - Manager EHS and Regulatory Affairs*

INTRODUCTION

In response to changes in the organizational structure at the Lost Creek ISR Project site, a SERP was convened to review and edit the NRC Technical Report (TR) and associated Organizational Chart (Org Chart) included in the TR. The SERP meeting was held on October 4, 2016 to approve the changes to the Org Chart (Figure 5.1-1) and associated language in TR Section 5 to match the LC Org Chart.

ANALYSIS AND DISCUSSION

The changes to the Org Chart were reviewed and compared to the language in the TR and Chart in the TR. The TR language and Org Chart were made to coincide with the LC Org Chart and footnotes were to be added to the LC Org Chart if job titles were not listed exactly as described in the TR. The main changes were:

- Drill Supervisor was removed from Department Heads and placed under the Mine Geologist
- Wellfield Operations Superintendent was split into the Department Heads of Wellfield Operations Supervisor and Wellfield Construction Supervisor.
- The Site Accountant was removed from the Department Heads
- EHS Supervisor was removed from the RSO title (the RSO responsibilities do not change as a result).
- The Department Head of Plant Foreman was changed to Plant Manager
- References to General Manager or Operations Manager were removed since those positions are not part of the LC organizational structure. The Vice Presidents, Manager

EHS, or Mine Manager have absorbed the responsibilities that were listed as for the General or Operations Manager.

The following documents were reviewed:

- NRC Technical Report Section 5
- Reg Guide 8.31
- NUREG-1569
- Lost Creek SER

Operations/Technical Review

- The proposed changes would not impact operations.
- Other review items were not applicable.

Environmental/ Health Physics/Safety Review

Review items under this section were not applicable.

Compliance Review

- The system does not conflict with the Project license.
- The system is compliant with NRC and State regulations.
- Other reviews were not applicable.

All SERP questions were answered with a "no" indicating that a license/permit amendment was not determined to be necessary.

CONCLUSION

Reviews by the NRC provided in the LC SER describe some of the original positions that were changed but the revised structure would still be "consistent with 10 CFR 40.32(b), which requires that the applicant be qualified through training and experience to use source materials". The revised job positions still fulfill the job responsibilities as originally described.

The changes to the TR Section 5 and Figure 5.1-1 were approved by the SERP. Footnotes will be added to the LC Org Chart to reference the positions as described in the TR if the job titles differ slightly.



LOST CREEK ISR PROJECT
STANDARD FORM

SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP) FORM

Edition: 11Sep2014rev3

FORM Number: AD-003A

Approval: MDG

SERP ID Number (LCyy-##): LC16-07

Date: 10/4/2016

Proposed Change, Test, or Experiment:

Revise Technical Report Section 5.1 and associated Figure 5.1-1 to be consistent with current Lost Creek Project organizational structure.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: STEVE HATTEN	PRESIDENT LCI	[Signature] 10/4/16
Operations: KURT BROWN	MINE MANAGER	[Signature] 10-7-2016
RSO: CHRIS PEDERSEN	RSD	[Signature]
Other: JOHN CASH	VICE PRESIDENT LCI	[Signature] 10/4/16
Other: MIKE GANTHER	MANAGER EHS & RA	[Signature] 10/4/2016
Other:		
Other:		
Other:		
Other:		

II. SERP CONCLUSION

After performing the reviews in Section III, answer the SERP questions in Section IV. If any are "YES", then NRC License amendment is required. Check the appropriate conclusion below.

☒ APPROVED BY SERP (as signed above)

☐ CONDITIONALLY APPROVED BY SERP (as signed above w/ conditions listed below)

☐ NRC LICENSE AMENDMENT REQUIRED

Comments/Conditions:

The SERP is convened and conducted in accordance with License Condition 9.4, NRC License Application Technical Report Section 5.2.2, and Standard Operating Procedure AD-003.



LOST CREEK ISR PROJECT
STANDARD FORM

SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP) FORM

Edition: 11Sep2014rev3

FORM Number: AD-003A

Approval: MDG

III. SERP REVIEW ITEMS

Perform the following reviews A, B, and C referring to documents such as:

- NRC License Conditions
- NRC License Application Technical and Environmental Reports
- NRC Safety Evaluation Reports,
- Environmental Assessments or Impact Statements
- WDEQ Permit to Mine Operations Plan/Reclamation Plan
- Associated Federal and State regulations and regulatory guidance documents

A. OPERATIONS/TECHNICAL REVIEW

- ☒ Review operating criteria and critical equipment and determine if:
- The proposed change impacts the operations as described in the license application;
 - The proposed change significantly changes the processes used at the facility as described in the license application.

N/A ☐ Review the SOP for the proposed change and determine the impact on existing SOPs. Make the necessary changes to the existing SOPs.

N/A ☐ If applicable, review the emergency response plan and determine compatibility with the proposed change.

B. ENVIRONMENTAL/ HEALTH PHYSICS/ SAFETY REVIEW

N/A ☐ Review the proposed change to determine if any changes in monitoring and record keeping are required to ensure compliance with existing programs.

N/A ☐ Review the proposed changes and determine the need for additional training.

N/A ☐ Review key personnel training records and determine training needs as required by the proposed change.

N/A ☐ Perform Risk Assessment, if necessary, according to the Risk Assessment procedure.

C. COMPLIANCE REVIEW

N/A ☐ Review the proposed change and determine whether it will conflict with Project policies regarding training and safety.

☒ Review the proposed change and determine compliance with the Project license.

☒ Review the proposed change and determine compliance with NRC regulations and other federal and state regulations.

N/A ☐ Review the proposed change to determine if any adjustment to the financial surety would be necessary. Surety must be updated through a license amendment or the annual surety update before the proposed change takes place.



LOST CREEK ISR PROJECT
STANDARD FORM

SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP) FORM

Edition: 11Sep2014rev3

FORM Number: AD-003A

Approval: MDG

IV. SERP QUESTIONS

When the reviews from A, B, and C above are complete answer the following SERP questions regarding the changes, tests, or experiments and provide a conclusion:

<i>Will the proposed change, test, or experiment:</i>	YES	NO
• Result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated)?		✓
• Result in more than a minimal increase in the likelihood of occurrence of a malfunction of a facility structure, equipment, or monitoring system (SEMS) important to safety previously evaluated in the license application (as updated)?		✓
• Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated)?		✓
• Result in more than a minimal increase in the consequences of a malfunction of an SEMS previously evaluated in the license application (as updated)?		✓
• Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated)?		✓
• Create a possibility for a malfunction of an SEMS with a different result than previously evaluated in the license application (as updated)?		✓
• Result in a departure from the method of evaluation described in the license application (as updated) used in establishing the final safety evaluation report (FSER), environmental impact statement (EIS), environmental assessment (EA), or other analysis and evaluations for license amendments?		✓

Comments:

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Attachment 5.7-1 Site Specific Risk Analysis for a Spill of Pregnant Lixiviant in the Field

Attachment 5.7-2 Site Specific Risk Analysis of Potential Interactions between Chemical Systems and Radioactive Material

Attachment 5.7-3 Ludlum Instrument Maintenance and Calibration (electronic only)

Attachment 5.7-4 RESRAD Files (electronic only)

5.0 OPERATIONAL ORGANIZATION, MANAGEMENT, PROGRAMS, & TRAINING

5.1 Corporate Organization and Administration

Management and operation of monitoring programs at the Project are the responsibility of the six positions within LC ISR, LLC. Those positions are:

- 1) President;
- 2) Vice President;
- 3) Mine Manager;
- 4) Manager of Environment, Health, and Safety (EHS) and Regulatory Affairs;
- 5) Radiation Safety Officer (RSO)/~~EHS Supervisor~~; and
- 6) Department Heads: Mine Geologist, Project Engineer, Maintenance Supervisor, ~~Drill Supervisor~~, Wellfield (WF) Operations ~~Superintendent Supervisor~~, WF Construction Supervisor, Plant Foreman/Manager, and Site Accountant.

The organization of these positions is depicted in **Figure 5.1-1**. In addition, per the requirements of the NRC, a Safety and Environmental Review Panel (SERP) will be established to integrate the various roles that support the operation and maintenance of the mine.

All LC ISR, LLC employees responsible for day-to-day operation of the facility will spend the majority of their time at the mine site. These include the positions of Mine Manager, RSO/~~EHS Supervisor~~, Health Physics Technician, Department Heads, and Uranium Recovery Workers. The positions of President, Vice President, and Manager EHS and Regulatory Affairs will generally work out of the Casper, Wyoming office. LC ISR, LLC is a 100% owned subsidiary of Ur-Energy USA Inc. The President of LC ISR, LLC also serves in a senior management position with Ur-Energy USA Inc.

The RSO/~~EHS Supervisor~~ will report directly to the Vice President and neither position shall have direct production responsibilities. This will allow the individuals filling these two positions to make sound decisions regarding EHS and radiation safety without being unduly pressured by production concerns. The RSO/~~EHS Supervisor~~ shall have complete authority and responsibility to halt any work which they deem unsafe. The Mine Manager shall also have the authority and responsibility to halt any work which may be unsafe. No employee, regardless of position, shall place production ahead of protection of employees, the public, and the environment. No employee will be forced to perform work which, in their view, is unsafe or could result in an unnecessary exposure to radiation.

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Members of the SERP shall be allowed to consider proposed actions without undue influence from senior management. In other words, the result of the SERP will not be a foregone conclusion, but will be based on a thorough review of the proposal and its merit.

The successful construction and operation of an in situ recovery facility relies on the close cooperation of several groups. Construction of the facility will be managed by the Operations Group under the leadership of the Project Engineer. While the facility is being designed and constructed, members of the EHS Department will be regularly involved to ensure EHS and radiation issues are being properly addressed. During construction, daily safety inspections will be performed by the EHS Department to ensure construction activities are being performed in a manner consistent with regulations. The Operations Group shall perform regular inspections during construction to ensure the facility is constructed in a manner consistent with the approved design. During operations, all significant projects and maintenance will be performed under a work order system. The work order system will include a mechanism for convening a SERP if warranted. All work orders will be reviewed by a department supervisor and EHS Department before initiation of work to ensure the proposed work is technically sound and protective of employees, public and the environment.

5.1.1 President

The President maintains the ultimate responsibility for all operations of LC ISR, LLC, including the Project and its activities. This individual is responsible for interpreting and acting upon the Managers' policy and procedural decisions. The President has the responsibility and authority to immediately suspend, postpone, or modify an action deemed threatening to human health or the environment or deemed in violation of state and federal regulations.

To provide direction to Project management and employees, the President shall develop and publish a policy that defines the organization's commitment to protection of the environment, and health and safety of employees and the public. The President shall periodically review the policy to ensure continued relevance.

5.1.2 Vice President

The Vice President is responsible for the safe operations of LC ISR, LLC, including the

Project. The Vice President reports directly to the President. Responsibility includes direction of the Environment, Health, and Safety Management System (EHS-MS) which includes company health and safety, radiation safety, environmental compliance, quality assurance, and licensing programs; and ensures that they are conducted in a safe and financially responsible manner, while maintaining compliance with applicable regulations, license conditions, and corporate policy. The Vice President, with the assistance of the Manager of EHS and Regulatory Affairs, shall perform and document an annual review of the EHS-MS. The purpose of the annual review shall be: to ensure appropriate organization of the management system; to ensure adequate resources are available to protect the health and safety of employees, the public, and the environment; and to ensure trends in regulatory and/or policy noncompliance are recognized and root causes are mitigated.

5.1.3 Mine Manager

The Mine Manager for the Project reports to the President, and is responsible for implementing managerial and financial actions that affect mining operations, and the EHS-MS of LC ISR, LLC. The Mine Manager will assist in the development, administration, and enforcement of the mining safety, radiation protection, environmental, and operational monitoring programs. These programs involve the development, review, approval, and implementation of mining process and safety protocols, as well as technical review, evaluation, and participation in routine audits of QA/QC programs. The Mine Manager also provides technical guidance and assistance concerning mining operations and activities to site personnel; including development and administration of corporate radiation protection programs and applicable mine safety programs. The Mine Manager has the responsibility and authority to immediately suspend, postpone, or modify an action deemed threatening to human health or the environment or deemed in violation of state and federal permitted and licensed regulations.

5.1.4 Manager of EHS and Regulatory Affairs

The Manager of EHS and Regulatory Affairs will have the responsibility and authority for LC ISR, LLC's radiation safety, environmental compliance, and quality assurance programs at the Project and LC ISR, LLC's other development activities. This person will work in conjunction with the RSO to ensure that all radiation safety, environmental compliance and permitting/licensing programs are conducted in a responsible manner, and in compliance with all applicable regulations and permit/license conditions. The

Manager of EHS and Regulatory Affairs reports directly to the Vice President. The Manager of EHS and Regulatory Affairs shall assist the Vice President in the annual review and resulting documentation of the EHSMS as defined above.

5.1.5 RSO/~~EHS Supervisor~~

The RSO/~~EHS Supervisor~~ reports to the Vice President and is responsible for the daily implementation and supervision of the EHSMS of the Project. This individual's responsibilities will include developing and implementing safety and environmental programs, properly maintaining and retaining records, and assisting the mine staff to comply with regulations and license conditions applicable to employee health protection. In addition, the RSO/~~EHS Supervisor~~ will play an integral role in facility design and start-up and will work closely with all parties during the development of procedures, training, and inspections to ensure the As Low As Reasonably Achievable (ALARA) principle is adhered to throughout the Project.

The RSO/~~EHS Supervisor~~ also is/will:

- the designated Site QA/QC Coordinator;
- a member of the As Low As Reasonably Achievable (ALARA) Committee and required to assist management with the annual ALARA Audit;
- required to report to the Vice President and the Mine Manager on all matters regarding environmental protection and radiation and worker safety;
- conduct routine training programs for the supervisors and employees with regard to the proper application of radiation protection, emergency response, and environmental control programs;
- inspect the facilities to verify compliance with all applicable radiological health and safety requirements and the QA/QC program;
- annually review all operating procedures to ensure that radiation exposures will be maintained ALARA;
- authorized to terminate immediately any activity that may be a threat to the employees, public health, or the environment;
- coordinate implementation of the health physics programs with other departments within the facility to ensure compliance with regulations;
- responsible for ensuring that all health physics samples and records are complete, accurate, and properly filed and stored;
- responsible for routinely auditing all operational and monitoring procedures and the QA/QC programs;
- responsible for administering the Radiation Protection Program;
- monitor relative attainment of radiation exposure ALARA;

- receive 40 hours of applicable refresher radiation safety training from qualified instructors on a biennial basis;
- ensure that any non-routine work not covered by an SOP will be conducted in accordance with an RWP (Radiation Work Permit) as reviewed;
- ensure that the use, handling and transport of radioactive materials is restricted to qualified individuals that have received all proper training and approval from the RSO to perform these functions;
- make certain that transport of any radioactive materials generated at the site complies with all state and federal regulatory requirements for transport of applicable radioactive materials;
- ensure that all employees wear approved personal dosimetry radiation monitoring badges in areas as required;
- provide an annual dose report to all monitored individuals;
- coordinate and implement the calibration and maintenance of site radiation detection and survey instruments with the manufacturer at intervals recommended by the manufacturer, and ensure that all radiation survey instruments are in current calibration and proper working condition;
- ensure that all site personnel have read, understand and comply with all radiation safety program requirements;
- assist Department Heads with the development and revision of SOPs; and
- maintain the EHS-MS, including SOPs, in such a manner that all employees have access to the most recent information regarding all relevant facets of environmental, health, and safety issues.

5.1.5.1 Health Physics Technician

The Health Physics Technician (HPT) shall assist the RSO with the implementation of the radiological safety program by collecting, documenting, and interpreting data. The HPT shall also help maintain radiation safety equipment such as survey meters. The HPT reports directly to the RSO.

5.1.6 Department Heads

The Department Heads include the Mine Geologist, ~~the Project Engineer,~~ Maintenance Supervisor, ~~Drill Supervisor~~, WF Operations ~~Superintendent~~ Supervisor, ~~WF Construction Supervisor~~, and Plant ~~Foreman/Manager~~, and the Site Accountant. They are responsible for the site's operational and maintenance activities and procedures. Department Heads shall review the tasks that their respective employees will be performing and develop, with input from the RSO, SOPs for any task that may present a hazard to the employee, public, environment, or operation. Department Heads will subsequently use the SOPs as

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training documents to ensure employees receive consistent and thorough training. Department Heads shall enforce compliance with all facets of the EHSMS, including SOPs, in order to minimize risks. Department Heads or their designee shall perform and document an annual review of each SOP within their area to ensure continued accuracy and relevance. These individuals report to the Mine Manager. Development and review of procedures involving radiological safety concerns will be coordinated with the RSO/~~EHS Supervisor~~.

5.1.7 Uranium Recovery Workers

Because a radiation protection and ALARA program is only as effective as the workers' adherence to the program, all workers at the facility, especially those involved in daily uranium processing activities such as Plant and Mine Unit Operators and maintenance crews, will be responsible for:

- adhering to all rules, notices, and operating procedures for radiation safety established by management and the RSO;
- reporting promptly to the RSO any license management equipment malfunctions or violations of standard practices or procedures that could result in increased radiological hazard to any individual; and
- suggesting improvements for the radiation protection program to ensure it is ALARA.

5.2 Management Control Program

5.2.1 Environmental, Health, and Safety Management System (EHSMS)

In order to provide the highest level of protection to employees, the public, environment, and operation, site management (including the Manager of EHS and Regulatory Affairs, Mine Manager, ~~Site Supervisor-EHS~~/RSO, and Department Heads) shall develop and implement an Environmental, Health, and Safety Management System (EHSMS). Critical aspects of the management control program include: Standard Operating

Procedures (SOPs) applicable in those situations routinely encountered; RWPs applicable in unanticipated conditions; recordkeeping to ensure all aspects of the EHSMS and the effectiveness of the program can be evaluated by LC ISR, LLC and NRC; reporting to ensure that no part of the program is inadvertently overlooked; and Quality Assurance Program applicable to all key components of the various phases of an ISR project.

Standard Operating Procedures

An important aspect of the EHSMS is the development of SOPs. SOPs will be developed for all routine tasks which may present a hazard to employees, the public, environment, or the operation. Written health physics SOPs shall be developed for personnel and area monitoring, sampling, analysis, and instrument calibration. Department Heads shall be responsible for initiating the development of SOPs for all routine tasks within their area that may generate a hazard. The ~~Site Supervisor EHS~~/RSO shall assist with the development of SOPs and may also initiate SOPs when the need arises. SOPs may be considered final when they have been approved by the respective Department Head and the ~~Site Supervisor EHS~~/RSO. SOPs developed in response to SERP findings must be approved by the SERP before implementation. SOPs related to handling, processing, storing, or transporting radioactive materials and all health physics related SOPs will be annually reviewed by the RSO. The RSO and the management team will be responsible for seeing that employees are trained and provided guidance to ensure adherence to SOPs. Hard copies of SOPs will be readily accessible to personnel at work areas and will be part of the radiation safety training (Section 5.5) and on-the-job training.

Hard copies of the SOPs for specific work areas will be provided as controlled copies. The supervisor EHS/RSO will ensure that the controlled copies of the SOP Manuals are up-to-date and that no out-of-date SOPs are present in the active Manuals. The Supervisor EHS/RSO will be the custodian of the master copy of all SOPs and a complete controlled copy of the Procedures Manual.

Radiation Work Permits

Non-routine procedures or maintenance activities that may result in significant occupational exposure to radioactive materials and for which no SOP exists will be performed in accordance with an RWP. An RWP will be issued by the RSO or the HPT. Each RWP will, at a minimum, describe the:

- scope of work to be performed;
- estimated worker exposures;
- precautions necessary to reduce radiation exposure;
- necessary supplemental radiological monitoring and sampling prior to, during
- and following completion of the work;

- RWP-specific training required; and
- personal protective equipment (PPE) required.

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5.3.1 Radiation Safety Inspections

5.3.1.1 Daily Inspections

The RSO, HPT, or an individual designated by the RSO (hereafter referred to as the Designee) will conduct a daily inspection of all Plant areas where radioactive materials are present and/or where direct radiation levels may be elevated. The areas inspected will include, but shall not be limited to, the Plant, byproduct storage area, and Storage Ponds. The inspector will look for and report to the ~~Operations Manager, Site Supervisor~~ ~~EHS~~/RSO and Mine Manager all non-conformances with regulations, SOPs, and ALARA principle. The inspector shall record date, name, areas inspected, and findings for each item on the inspection checklist (Attachment 5.7-5). If corrective actions are necessary, they shall be implemented as soon as is practicable. Corrective actions taken shall be documented. Documentation shall be maintained until license termination. At a minimum, the inspector will specifically check the ventilation systems, signage, security features, and the status of the Continuous Working Level (CWL) monitoring device.

The RSO may only designate an individual to perform daily inspections if that individual meets the training and experience qualifications outlined in Sections 5.4.3.2 and 5.5. A Designee may only be appointed to perform daily inspections that occur on weekends, holidays, and times when both the RSO and HPT(s) must both be gone at the same time (for example, illness or offsite training). In no case shall a Designee perform daily inspections for more than three consecutive days. The Designee has no authority to perform health physics duties outside the scope of his/her regularly assigned duties. For example, the Designee will not have authority to release materials for unrestricted release or to approve a RWP. On the first day the RSO or HPT return to work, the daily inspection checklist used by the Designee must be reviewed by the RSO or HPT. During periods when a Designee is used to complete daily inspections, either the RSO or HPT must be reachable by telephone to provide assistance.

5.3.1.2 Weekly Operations Inspections

The RSO ~~and Operations Manager~~, or their designees in their absence, shall perform a weekly inspection of all areas of the facility where radioactive materials and/or radiation levels above background may be present. The inspectors shall ensure that all regulations, SOPs and ALARA principles are being followed. The inspectors shall also look for ways to improve the operation in order to minimize exposure to radionuclides. The RSO or their designee shall perform the weekly inspection by listing the date, areas visited, names of inspectors, and inspection findings. Inspection findings shall be reported to the

Mine Manager, RSO, and Manager of EHS and Regulatory Affairs. Documentation shall be maintained until license termination.

5.3.1.3 Monthly RSO Reports

Pursuant to NRC Regulatory Guide (RG) 8.31, at least monthly, the RSO will review the results of daily and weekly inspections, including a review of all monitoring and exposure data for the month. The RSO will provide the Mine Manager and Department Heads a written summary of the month's significant worker protection activities that contains a summary of the most recent personnel exposure data, including bioassays and time-weighted calculations and a summary of all pertinent radiation survey records. In addition, the monthly summary report should specifically address any trends or deviations from the radiation protection and ALARA program, including an evaluation of the adequacy of the implementation of license conditions regarding protection and ALARA. The summary should provide a description of unresolved problems and the proposed corrective measures. Monthly summary reports will be maintained on file and be readily accessible for at least five years.

5.3.2 Storage Pond Inspections

Storage Ponds will be installed at the facility to act as surge capacity. The Storage Ponds will be constructed and inspected in accordance to applicable guidance found in NRC RG 3.11.1. In the event of a significant occurrence such as a flood, tornado, earthquake, or intense rain, the Manager of EHS and Regulatory Affairs may have additional Special Inspections performed to ensure the continued stability of the Storage Ponds.

5.3.2.1 Daily Storage Pond Inspections

The following inspection will be performed by a trained employee with the results documented on an official form. Documentation will be maintained by the ~~Site Supervisor-EHS~~/RSO until license termination. The ~~Operations-Mine~~ Manager and Manager of EHS and Regulatory Affairs shall review the results of the daily inspection.

- The condition of inlet and outlet piping and associated valving shall be visually inspected to ensure they are correctly positioned and in good operating condition with no obvious damage.
- Water levels shall be recorded and referenced against allowable freeboard to ensure safe levels are maintained.
- The retention dam and diversion ditches shall be visually inspected for signs of cracking, movement, erosion and seepage.

- When in use, the enhanced evaporation system shall be inspected daily for proper operation.
- An automated leak detection system will be installed in the leak detection standpipe. If the system detects a leak it will notify the operators with an alarm.

5.3.2.2 Weekly Storage Pond Inspections

The following inspection will be performed by a trained employee with the results documented on an official form. Documentation will be maintained by the ~~Site Supervisor EHS/RSO~~ until license termination. The ~~Operations-Mine~~ Manager and Manager of EHS and Regulatory Affairs shall review the results of the weekly inspection.

- The perimeter fence and associated signage shall be inspected to ensure adequate protection from wildlife intrusion and warning of potential hazards, respectively.
- The automated leak detection system will be inspected to ensure it is working properly.
- Diversion channels shall be inspected for erosion.
- Emergency ropes shall be inspected for proper placement and good working condition.
- The pond liner shall be inspected for holes and signs of stress.

5.3.2.3 Quarterly Storage Pond Inspections

Since the shallowest aquifer is isolated from the storage ponds by aquitards, four monitor wells will be completed immediately above the shallowest aquitard down-gradient of the storage ponds. At least quarterly, water level readings will be taken to see if any water is collecting at the surface of the aquitard. If water is present, an attempt will be made to collect a sample that will be analyzed for specific conductance, chloride, alkalinity, sodium, and ~~sulphate~~sulfate. If the water chemistry in the well is similar to pond water chemistry, an investigation will be made to determine if a pond is leaking.

The following inspection will be performed by the ~~Site Supervisor EHS/RSO~~ with the results documented on an official form. Documentation will be maintained by the ~~Site Supervisor EHS/RSO~~ until license termination. The ~~Operations-Mine~~ Manager and Manager of EHS and Regulatory Affairs shall review the results of the ~~weekly~~ quarterly inspection.

- The top of the embankment and toe areas shall be examined for evidence of settlement, seepage, erosion, or depression.
- Water quality results from the leak detection standpipes and groundwater monitor

- wells will be reviewed for evidence of leakage.
- Embankments will be inspected for cracks, movement, irregularities in alignment, and erosion.

5.3.2.4 Annual Technical Evaluation of Storage Ponds

The following inspection will be performed by the Manager of EHS and Regulatory Affairs, who may elect to receive assistance from outside technical experts. Documentation of the inspection findings and potential corrective actions will be maintained by the ~~Site Supervisor EHS/RSO~~ until license termination. The ~~Operations Mine~~ Manager and Manager of EHS and Regulatory Affairs shall review the results of the Annual Technical Evaluation and ensure all necessary corrective actions are completed.

- The findings from the previous year's daily, weekly, and quarterly inspections shall be reviewed to ensure they are thorough, properly documented, and that findings have been appropriately corrected.
- An assessment of the hydraulic and hydrologic capacities shall be made to ensure the proper infrastructure is in place.
- The embankment shall be surveyed to ensure movement is within acceptable ranges.
- The inspector shall visually inspect the embankments, embankment toes, and diversion ditched to ensure there is no seepage, undesirable movement, or erosion.
- The water quality of the Storage Ponds shall be determined and compared against any trends in ground and surface water quality.

5.3.3 ALARA Operating Philosophy

LC ISR, LLC commits to abiding by the principle of As Low As Reasonably Achievable (ALARA) as outlined in NRC RG 8.10. The ALARA philosophy involves a formal and binding commitment by management to provide clearly defined radiation protection responsibilities and an environment in which the radiation protection staff can do its job properly. It will be the responsibility of the RSO and radiation protection staff to conduct surveillance programs and investigations to ensure that occupational exposures are as far below the specified limits as is reasonably achievable. Additionally, the RSO and radiation protection staff should be vigilant in searching out new and better ways to perform all jobs with lower radiation doses. The RSO is assigned sufficient authority to enforce safe ALARA operations and employees are trained to understand and apply the ALARA philosophy.

As part of implementing the ALARA Philosophy, an annual audit of the radiation safety and ALARA programs will be performed by the Manager of EHS and Regulatory Affairs, ~~General Manager~~, and the ~~Operations Mine~~ Manager. The Manager of EHS and Regulatory Affairs may also call on outside technical expertise to complete the audit. A technical expert for the purposes of this section shall be an individual who meets the qualifications of an RSO and who has at least five years of experience in applied radiation safety. The ~~Site Supervisor EHS~~ RSO may be called upon to provide data but shall not be involved in audit findings or the writing of the Annual ALARA Audit Report.

The purpose of the audit shall be to: 1) determine the effectiveness of the radiation safety and ALARA programs and ensure the veracity of radiation measurements and calculations; 2) ensure compliance with applicable regulations, procedures, and policies; 3) ascertain trends in employee and public exposure and potential reasons for trends; and 4) look for methods to further mitigate employee and public exposure to radionuclides. The Annual ALARA Audit shall be conducted in accordance with NRC Regulatory Guide 8.31. A written report of the audit findings will be submitted to the President, General Manager, Mine Manager, and all Department Heads. Additionally, the report findings and their implications shall be discussed with all employees during annual radiation safety training.

The Annual ALARA Audit Report shall summarize:

- employee exposure records (external and time-weighted calculations);
- bioassay results;
- inspection log entries and summary reports of daily, weekly, and monthly inspections;
- documented training program activities;
- radiation safety meeting reports;
- radiological survey and sampling data;
- reports on overexposure of workers submitted to the NRC and other applicable regulatory agencies; and
- operating procedures that were reviewed during this time period.

The report shall specifically address the following:

- trends in personnel exposures for identifiable categories of workers and types of operational activities;
- whether equipment for exposure control is being properly used, maintained, and inspected; and
- recommendations on ways to further reduce personnel exposures from uranium and its daughters.

5.4 Qualifications for Personnel Conducting Radiation Safety Program

The minimum qualifications and experience levels required of personnel assigned the responsibility of developing, conducting, and administering the Radiation Safety Program are described below.

5.4.1 Mine Manager

The position of Mine Manager requires a bachelor's degree in engineering or associated science from an accredited college or university, plus a minimum of five years of managerial experience and directing operational functions.

5.4.2 Manager of EHS and Regulatory Affairs

This position requires a bachelor's degree in an engineering or science field degree from an accredited college or university, or an equivalent level of work experience. Additionally, a minimum of five years in senior management and operations functions will be required as well as the ability to meet the requirements of the position of RSO.

5.4.3 ~~Site Supervisor EHS / RSO~~

The ~~Site Supervisor EHS~~/RSO must demonstrate a working knowledge and proper understanding of the operation of radiation health physics instruments and equipment used during uranium recovery, surveying and sampling techniques, and personnel dosimetry requirements. In accordance with NRC RG 8.31, the position of RSO requires:

- a bachelor's degree in physical science, industrial hygiene, or engineering from an accredited college or university or an equivalent combination of training and relevant experience in radiation protection related to uranium recovery (Two years of relevant experience are generally considered equivalent to one year of academic study.);
- at least one year of work experience relevant to uranium recovery operations in applied health physics, radiation protection, industrial hygiene, or similar work (This experience should involve actually working with radiation detection and measurement equipment, not strictly administrative or "desk" work.);
- at least four weeks of specialized classroom training in health physics

specifically applicable to uranium recovery (In addition, the RSO should attend refresher training on uranium recovery health physics every two years.); and

- a thorough knowledge of the proper application and use of all health physics equipment used during uranium recovery activities, the chemical and analytical procedures used for radiological sampling and monitoring, methodologies used to calculate exposure to uranium and its daughters, and a thorough understanding of the uranium recovery process and equipment used and how the hazards are generated and controlled during the uranium recovery process.

5.4.3.1 Health Physics Technician

The HPT will have one of the following combinations of education, training, and experience.

Option I:

- an associate degree or two or more years of study in the physical sciences, engineering, or health related field;
- at least a total of four weeks of generalized training (up to two weeks may be on-the-job training) in radiation health protection applicable to uranium recovery facilities; and
- one year of work experience using sampling and analytical laboratory procedures that involve health physics, industrial hygiene, or industrial safety measures to be applied in a uranium recovery facility; or

Option II:

- a high school diploma;
- a total of at least three months of specialized training (up to one month may be on-the-job training) in radiation health protection relevant to uranium recovery facilities; and
- two years of relevant work experience in applied radiation protection.

5.4.3.2 Designee

The Designee's qualifications and training will be commensurate with their level of responsibility and significance of the hazards they are attempting to recognize and mitigate. Beyond normal radiation worker duties, the Designee's duties shall be limited to completing and documenting the daily radiation safety inspection during the absence of both the RSO and HPT. The Designee shall not perform more than three consecutive days of inspection. The Designee may not perform any other RSO or HPT specific radiation safety duties (For example, the Designee will not have authority to release materials for unrestricted use or to approve a RWP.). The Designee training shall consist of the following as a minimum:

- A high school diploma.

- A minimum of three months experience working at the Lost Creek Project as a radiation worker.
- Annual radiation worker training complying with Reg. Guide 8.31 Section 2.5.
- A line by line review of the Daily Inspection SOP with the RSO or HPT.
- On the job-training performing daily inspections under the direct supervision of the RSO or HPT. An individual shall complete a minimum of five (5) directly supervised inspections before becoming qualified to be a Designee. In order to remain qualified as a Designee, the individual must complete at least five (5) daily inspections under the direct supervision of the RSO or HPT annually. The on the job training will consist of the following:
 - ✓ How to complete the inspection check list;
 - ✓ A review of each inspection item in the field so the potential designee understands what they are inspecting and what upset situations require notification of the RSO or HPT;
 - ✓ A discussion of findings and corrective actions resulting from recent inspections;
 - ✓ How to contact the RSO or HPT if needed;
 - ✓ A discussion of how each item on the inspection checklist affects employee safety; and
 - ✓ The candidate must accompany the RSO or HPT on at least five complete inspections before being appointed a Designee.

LC ISR does not believe it is appropriate to send a Designee candidate to RSO training since this position does not perform the technical duties of an RSO that are commonly taught during RSO training (such as dose calculation, instrument calibration, LLD calculation, unrestricted release surveys, employee training, etc.)

The RSO shall determine if an individual is qualified to be a Designee by:

- Documenting that the training requirements outlined above in 2a have been satisfactorily completed.
- Proffering a written test to determine if the individual is able to properly use the inspection sheet, recognize hazards, and report hazards to individuals responsible for implementing corrective action. The candidate must demonstrate an advanced proficiency of each of these topics before being appointed Designee.

The RSO shall maintain a file for each designee containing their education, training and testing qualifications as described above. The designation of an individual will be documented in the file and the file shall be maintained in a manner that is easily inspectable by the NRC.

5.4.4 Department Heads

These positions require a bachelor's degree in engineering or associated science degree from an accredited college or university or an equivalent level of work experience, plus a

minimum of two years of managerial experience in engineering, geology, or operational functions.

Employees are instructed to inform their supervisor if any unauthorized individual gains access to the Plant. The supervisor will request the intruder to leave. If the intruder refuses to leave, the supervisor will request assistance from the County Sheriff and notify the Mine Manager. Employees shall not confront trespassers if they feel their safety may be in jeopardy.

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Visitors to the Plant will be required to register at the office so appropriate training can be completed and any necessary supervision assigned. Visitors will only be accepted during normal business hours unless approved by a member of management.

The ~~Operations Manager~~ RSO shall minimize the quantity of byproduct material stored at the site in order to minimize any potential security threat.

5.6.3 Transportation Security

Licensed material is most vulnerable to security threats while it is being transported. Therefore, LC ISR, LLC commits to the following practices involving the transportation of licensed material.

- All individuals involved in the packaging, labeling, and handling of licensed material will be trained in applicable DOT regulations, including the Security Plan as well as the facilities radiation safety SOPs and policies.
- Licensed material will be packaged, labeled, placarded and adequately described in shipping papers in accordance with applicable DOT and NRC regulations.
- Shipments of licensed material shall be kept within the controlled area of the Plant and shall remain locked prior to shipping.
- Bulk shipments of licensed material shall be secured by locking trailers and vehicles when they are not occupied.
- Bulk shipments of licensed material will only be sent on exclusive use carriers.
- All drivers transporting bulk quantities of licensed material will be familiar with the hazards of the shipment and how to properly respond to accidents involving the material.

5.7 Radiation Safety Controls and Monitoring

5.7.1 Effluent Control Techniques

During the Project, gaseous/airborne, liquid, and solid effluents will be produced from the processes associated with ISR operations. The only gaseous emission of concern due

Figure 5.1-1 Lost Creek ISR, LLC Organization Chart

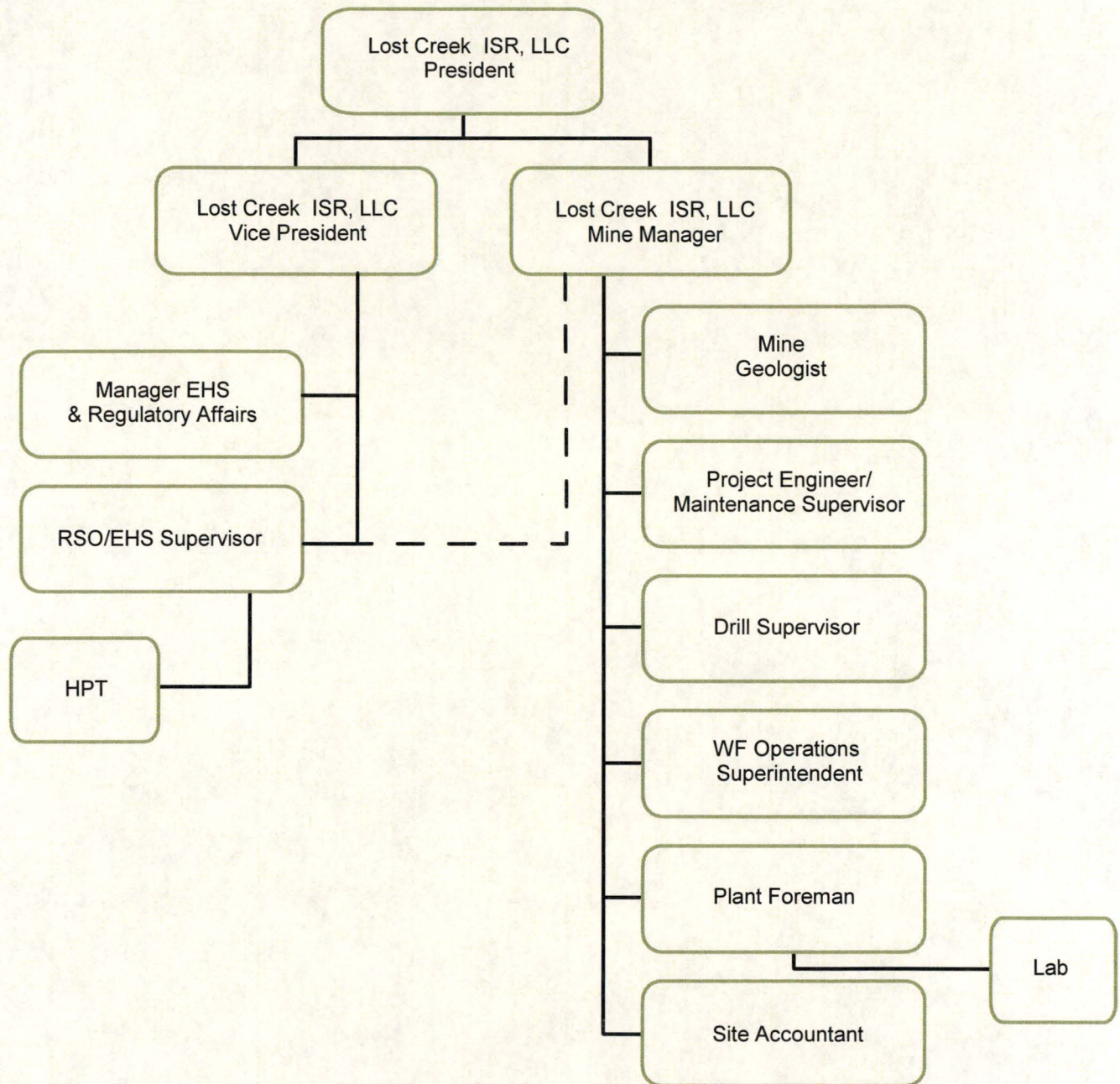


Figure 5.1-1 Lost Creek ISR, LLC Organization Chart

