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LOST CREEK ISR, LLC

March 15, 2017

Attn: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Re: Annual Report of Changes, Tests, or Experiments Pursuant to License Condition 9.4(E)
Lost Creek ISR Project
License SUA-1598 Docket 40-9068

To Whom It May Concern:

This Annual Report for 2016 summarizes changes, tests, or experiments evaluated by the Safety and Environmental Review Panel (SERP) for the Lost Creek ISR Project (LC-ISR) provided in accordance with NRC License Condition (LC) 9.4(E). The License Condition authorizes LC-ISR to make changes, tests, or experiments at LC-ISR by a SERP without a license amendment provided certain conditions are met. Additionally, this report is to provide any page changes that have been approved by a SERP and incorporated into the NRC License Application Technical Report (TR) and/or Environmental Report (ER).

Evaluations by the SERP were conducted according to TR Section 5.2.2 and LC-ISR Standard Operating Procedure (SOP) AD-003: *SERP*. A SERP summary table and summary reports of the SERP evaluations are included as **Attachment 1**. An index of page changes, the changed pages with edits shown, and the replacement pages are included as **Attachment 2**.

If you have any questions regarding this report or require additional information please contact me at the Casper office.

Sincerely,

Michael D. Gaither
Manager EHS and Regulatory Affairs
Ur-Energy USA, Inc

NMSS01
IE47
NMSS

Attachments: **Attachment 1: SERP Summary and Reports**
Attachment 2: Index of Page Changes and Changed Pages

Cc: Deputy Director, Division of Decommissioning
Uranium Recovery and Waste Programs
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Mail Stop T-8F5
11545 Rockville Pike, Two White Flint North
Rockville, MD 20852-2738
John Saxton, NRC (via e-mail)
Brian Wood, WDEQ-LQD, Lander (via e-mail)
Theresa Horne, Ur-Energy, Littleton (via e-mail)

Attachment 1: SERP Summary
2016 Annual Report of Changes, Tests, or Experiments
Lost Creek ISR Project SUA-1598

SERP ID	SERP Meeting Date	Change, Test, or Experiment	Approved by SERP	TR/ER Page Changes?	Title	Description	Comments
LC16-01	11-Jan-2016	Change	Y	N	Alt. Discharge line to Pond	Discuss the alternate use of a hose from the Plant to the Pond	
LC16-02	15-Jan-2016	Change	Y	N	MU1 Baseline Data	Review and approve the recalculated MU1 baseline data	
LC16-03	26-Jan-2016	Change	Y	N	Mini Filter Press	Approve use of a small filter press in Plant for waste water filtration	
LC16-04	2-Feb-2016	Experiment	Y	N	IP Well Patterns	Review/approve alternate geometry of IP patterns in the wellfields	Cancelled
LC16-05	28-Apr-2016	Test/Change	Y	N	Header House filter banks	Review test for adding filter banks to header houses	
LC16-06	15-Apr-2016	Change	Y	Y	Perm tank vent	Remove perm tank vent from manifold. Pipe direct to roof.	
LC16-07	30-Sep-2016	Change	Y	Y	TR Org Chart change	Change the TR Org Chart and descriptions re: RSO	
LC16-08	17-Oct-2016	Change	Y	N	Add RO Tank vent	Add vent line and connect from RO tank to restoration IX vent line	
LC16-09	16-Nov-2016	Test	Y	N	Class V system Rn purge	Test to purge Rn from permeate using air injection	
LC16-10	2-Dec-2016	Change	Y	Pending	RA Boundary change	Add area SW corner of Plant in RA boundary	Suspended
LC16-11	7-Dec-2016	Change	Y	Y	RE2 IE2 vent line	Isolate the RE2 IE2 vent line from Elution Circuit manifold	

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LOST CREEK ISR, LLC

MEMO

Date: February 11, 2016

To: EHS Files

From: Michael Gaither – Manager EHS and Reg. Affairs

Subject: SERP LC16-01 Alternate Pond Discharge Line

SUMMARY

The SERP convened on January 11, 2016 to review the alternate method of discharging waste water from the Plant to the Storage Ponds. The waste would be discharged using a hose for temporarily discharging waste water that accumulates in the waste water storage tank. The method would only need to be used if necessary and for short periods of time.

BACKGROUND

Due to the freezing of the underground waste water line from the Plant during cold winter months, an alternate method of discharging waste water to the Pond was needed due to the limited capacity of the deep disposal wells in injecting the waste. It was proposed that a temporary line be used from time-to-time only on an emergency or an as-needed basis. A hose had been used in a similar capacity in the past resulting in an unplanned release (see Spill "Ponds Area" May 2014) since the end of the hose was not secured. Additionally, the NRC has concerns that the end of the hose could damage the Pond liner. These issues would be addressed by the SERP.

SERP DISCUSSION

The SERP discussion followed the review items on the SERP form. The applicable items were discussed as described herein.

The SERP discussed the configuration of the discharge line which would be composed of a flexible 2 inch hose. The line would start in the Plant coupled to the waste water tank. The line would run along floor through "IX" area then east across the "precip" area and would exit the building at shop area through east bay door. The hose would lay across the road to the corner of either Pond. The end of the hose would be placed in a section of PVC pipe or equivalent to prevent damage to the Pond liner and the end of the hose would be secured with the use of

sandbags or other device. The hose would be drained after use, rolled up, and stored in the Plant.

Risks of fluid releases using the added line were discussed. From previous experience using a temporary hose, the risks of a reportable release would be minimized as long as the line was secured at the discharge end. The use of a hose would not necessarily contribute to the added risk of a release. Flow rates would be minimal and the discovery of a release would be quick since the discharge would be monitored and only last a short time.

The SERP discussed any additional radiological concerns. There were no concerns beyond the normal radiological precautions associated with routine work. All workers associated with the use of the line would have been trained in radiation safety.

The SERP discussed the possibility of additional operational risks. No additional risks outside of normal operations would result. Barricades would be used to divert traffic when the line was used to prevent vehicles from damaging the hose.

The necessity of a procedure was discussed. An SOP would be drafted by the Plant Manager for training of Operators. The SOP and training must be completed prior to use of the line.

CONCLUSION

All of the critical SERP questions were answered with a "No" as documented on the form. The use of the line was approved by the SERP as documented on the signed SERP form. A condition was placed on the approval that the SOP must be established prior to use of the hose.

The SOP (OPS-060: *Plant to Storage Pond Waste Water Auxiliary Discharge*) was published on February 11, 2016.

UR Energy USA	UR-ENERGY USA, INC. LOST CREEK ISR, LLC STANDARD FORM	

SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP) FORM

Edition: 11Sep2014rev3	**FORM Number:** FORM_LC_AD-003A	**Approval:** MDG

SERP ID Number (*LCyy-##*): 16-01	**Date:** 1/11/2016

Proposed Change, Test, or Experiment:
Review the use of a hose for temporary or emergency relief of waste water. Hose would be layed out from the Plant, out the east side door, across to the Ponds to allow for discharge of waste water to the Storage Ponds.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Kurt Brown	Mine Manager	1/14/16
Operations: Alex Hunt	Plant Manager	1/14/16
RSO: Chris Pedersen	RSO	1/11/2016
Other: Jay Douthit	WF Ops Superintendant	1-14-2016
Other: Matt Jaynes	Project Engineer	1-20-2016
Other: Rodney Anderson	Maintenance Foreman	1-14-16
Other: Richard Hallcroft	Safety Coordinator	1/14/16
Other: Mike Gaither	Manager EHS and RA	1/11/2016
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.

- [X] APPROVED BY SERP (as signed above)
- [ ] CONDITIONALLY APPROVED BY SERP (as signed above w/ conditions listed below)
- [ ] NRC LICENSE AMENDMENT REQUIRED

Comments/Conditions:

SOP for hose deployment must be developed.

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.

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.

☒ Review the SOP for the proposed change and determine the impact on existing SOPs. Make the necessary changes to the existing SOPs.

☒ If applicable, review the emergency response plan and determine compatibility with the proposed change.

B. ENVIRONMENTAL/ HEALTH PHYSICS/ SAFETY REVIEW

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

☒ Review the proposed changes and determine the need for additional training.

☒ Review key personnel training records and determine training needs as required by the proposed change.

☒ Perform Risk Assessment, if necessary, according to the Risk Assessment procedure.

C. COMPLIANCE REVIEW

☒ 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.

☒ 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.

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:

Will the proposed change, test, or experiment:	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)?		X
• 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)?		X
• Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated)?		X
• Result in more than a minimal increase in the consequences of a malfunction of an SEMS previously evaluated in the license application (as updated)?		X
• Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated)?		X
• Create a possibility for a malfunction of an SEMS with a different result than previously evaluated in the license application (as updated)?		X
• 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?		X

Comments:

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LOST CREEK ISR, LLC

MEMO

Date: February 12, 2016

To: EHS Files

From: Michael Gaither – Manager EHS and Reg. Affairs

Subject: SERP LC16-02 Approval of Additional MU1 Baseline Data

SUMMARY

The SERP convened on January 15, 2016 to review and approve the additional baseline data collected for Mine Unit 1 (MU1). Additional data was collected in 2015 from five production zone monitor wells (MP-114, MP-115, MP-116, MP-117, and MP-118) located in the eastern portion of MU1. The monitor wells were added to provide a ratio of wells to pattern area (i.e. determined from the sum total area of each of the production zone sub-horizons individually) of 1 well per 4 acres as stipulated in Guideline 4 Reference Document 10.

BACKGROUND

As described in the Mine Unit 1 hydrogeological package ("MU1 Package") Section 4.0, baseline water quality was sampled and evaluated in 2009 as a prerequisite to operation of the Mine Unit. Production zone ("MP") wells had been installed in MU1 at a ratio of 1 well to 4 acres as recommended in LQD Guideline 4 and sampled for the appropriate parameters. The wellfield pattern area acreage was originally determined by the overall footprint area within the outside perimeter. This method for determining the ratio was accepted by LQD and NRC upon review and acceptance of the MU1 Package. However, the method did not account for each sub-horizon within the production horizon but only the pattern area as seen from above not accounting for the overlap of the sub-horizons. It was later requested by NRC that the ratio be determined as one well per the sum of the pattern areas of each sub-horizon within the full production horizon. Therefore, in concession, additional wells were selected to sample for baseline water quality and the additional data added to the MU1 Package.

SERP DISCUSSION

The ratio of MP-wells to pattern area was reviewed to verify that the ratio was acceptable. The total area of patterns as seen from above is 2,093,873.0 ft^2 (40.1 acres). The total area calculated individually is shown on the table below:

Individual Sub-Horizon	Area (ft^2)
100-110	172,644.1
South 110-120	152,931.4
120-130	606,509.0
130-140	155,195.5
140-150	1,543,495.6
160-170	395,628.0
170-180	7,228.2
180-190	44,438.8
Total	**3,078,070.5** (70.7 acres)

Therefore, at a ratio of one well to 4 acres, the required number of wells is 18 which is 5 more than what was originally installed and hence 5 were added. The 5 wells had been installed as injection or production wells and then sampled as a monitor well. The wells were selected in header house areas that had not yet been activated so there would be no contamination of the aquifer in those areas. Samples were collected before the header houses were active as shown in the following table:

Well (Alias)	Well Casing Date	Well Completion (screen) Date	Latest Sample Collection Date	Associated Header House	Header House Startup Date
MP-114 (1I441)	7/30/2013	8/28/2013	6/30/2015	HH 1-11	9/2/2015
MP-115 (1I518)	7/9/2013	8/22/2013	6/30/2015	HH 1-11	9/2/2015
MP-116 (1P354)	8/8/2013	12/18/2014	6/30/2015	HH 1-13	Not yet started
MP-117 (1P283)	8/20/2013	10/1/2014	6/30/2015	HH 1-13	Not yet started
MP-118 (1P239)	10/16/2014	12/11/2014	6/30/2015	HH 1-12	11/17/2015

The MP-well screening was reviewed by the hydrogeologist to determine the adequacy of the well screen coverage for each sub-horizon. The table of screen data is included as Attachment 1 and, as indicated on the table, "no action" was required for well recompletion since the screening was deemed adequate.

Table MU1 Attachment 4-1 in the MU1 Package was updated with the added water quality results from samples collected from the 5 wells in May-June of 2015. The calculations were reviewed and approved by the hydrogeologist.

CONCLUSION

The revised data set, screen intervals, and the well-to-acre ratio were deemed acceptable by the SERP as validated by the signatures on the associated SERP Form. The new data set was submitted to WDEQ-LQD as non-significant revision (NSR) #11. Comments to NSR #11 by LQD were received and responses submitted.

UR Energy USA	UR-ENERGY USA, INC. LOST CREEK ISR, LLC STANDARD FORM	LC ISR

SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP) FORM

Edition: 11Sep2014rev3	**FORM Number:** FORM_LC_AD-003A	**Approval:** MDG

SERP ID Number (*LCyy-##*): 16-02	**Date:** 1/15/2016

Proposed Change, Test, or Experiment:

Review and approve the additional baseline data collected for MP-114 - 118. Additional wells were added to bring the ratio of wells-to-pattern area to the required 1 well to 4 acres.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Michael Gaither	Manager EHS and RA	1/16/2016
Operations: Kurt Brown	Mine Manager	1/20/16
RSO: Chris Pedersen	RSO	1/21/16
Other: Kevin Shelburne	Hydrogeologist	1/18/16
Other: Steve Loose	Chief Production Geologist	1/21/16
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.

- [X] 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.

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

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

☒ 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.

☒ 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.

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:

Will the proposed change, test, or experiment:	**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)?		X
• 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)?		X
• Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated)?		X
• Result in more than a minimal increase in the consequences of a malfunction of an SEMS previously evaluated in the license application (as updated)?		X
• Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated)?		X
• Create a possibility for a malfunction of an SEMS with a different result than previously evaluated in the license application (as updated)?		X
• 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?		X

Comments:

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LOST CREEK ISR, LLC

MEMO

Date: February 12, 2016

To: EHS Files

From: Michael Gaither – Manager EHS and Reg. Affairs

Subject: SERP LC16-03 Mini Filter Press Use

SUMMARY

The SERP was convened to review and approve the use of a small-scale ("mini") filter press for use in filtering waste water from swabbing operations, tank cleaning, or other miscellaneous sources prior to adding into the waste water system.

BACKGROUND

Due to the presence of solids in waste water from various sources, a filtration system was needed to remove the solids to prevent clogging components along the waste water system. The pre-filter would help prevent premature buildup of solids on the waste water bag filters both in the Plant and in the disposal well pump houses.

SERP DISCUSSION

The SERP convened on January 26, 2016 to discuss the semi-permanent use of a small-scale filter press within the Plant. The unit would be located next to the resin water tank near the control room. The system would be piped into the waste water line. Injecting water through the filter press would be facilitated by hoses from the source and connected to the filter press.

The SERP discussed the possibility that additional radon could build up in the Plant area. The RSO stated that routine samples of radon would are taken in the Plant and that the continuous air monitor (CAM) would alert the operators if additional radon was being generated by filter press operation. If the levels of radon as detected by the CAM were elevated (25% of the DAC or 80mWL is the action limit), supplemental Plant ventilation would be activated.

A draft procedure was developed and reviewed. The final SOP would need be published and training performed prior to use of the filter press.

The SERP discussed operational issues with the filter press use. The use would not contribute to an incident such as a spill that would be greater than anticipated. All releases would be contained within the Plant containment and sumps and could be controlled easily with the shutdown of the unit. Nominal flow pressures and rates could not be accidentally exceeded. Check valves would be in place to prevent backflow into the unit.

CONCLUSION

The use of the filter press is approved by the SERP. The SOP was published after minor changes and will be used for training prior to using the unit.

UR Energy USA	UR-ENERGY USA, INC. LOST CREEK ISR, LLC STANDARD FORM	LC ISR

SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP) FORM

Edition: 11Sep2014rev3	**FORM Number:** FORM_LC_AD-003A	**Approval:** MDG

SERP ID Number (*LCyy-##*): 16-03	**Date:** 1/26/2016

Proposed Change, Test, or Experiment:
Review and approve the installation of a small-scale filter press to filter waste water from plant processes and swab operations.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Kurt Brown	Mine Manager	2/2/16
Operations: Jay Douthit	WF Ops Superintendant	2.2.2016.
RSO: Chris Pedersen	RSO	1/26/16
Other: Alex Hunt	Plant Manager	2/2/16
Other: Craig Hourt	WF Construction Foreman	~~1/25/16~~ 2/2/16
Other: Michael Gaither	Manager EHS and RA	1/26/2016
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.

- [X] APPROVED BY SERP (as signed above)
- [ ] CONDITIONALLY APPROVED BY SERP (as signed above w/ conditions listed below)
- [ ] NRC LICENSE AMENDMENT REQUIRED

Comments/Conditions:

SOP must be published and personnel trained prior to operational use.

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.

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.

☒ Review the SOP for the proposed change and determine the impact on existing SOPs. Make the necessary changes to the existing SOPs.

☒ If applicable, review the emergency response plan and determine compatibility with the proposed change.

B. ENVIRONMENTAL/ HEALTH PHYSICS/ SAFETY REVIEW

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

☒ Review the proposed changes and determine the need for additional training.

☒ Review key personnel training records and determine training needs as required by the proposed change.

☒ Perform Risk Assessment, if necessary, according to the Risk Assessment procedure.

C. COMPLIANCE REVIEW

☒ 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.

☒ 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.

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:

Will the proposed change, test, or experiment:	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)?		X
• 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)?		X
• Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated)?		X
• Result in more than a minimal increase in the consequences of a malfunction of an SEMS previously evaluated in the license application (as updated)?		X
• Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated)?		X
• Create a possibility for a malfunction of an SEMS with a different result than previously evaluated in the license application (as updated)?		X
• 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?		X

Comments:

LOST CREEK ISR PROJECT

REPORT FOR SERP LC16-04

April 29, 2016

Proposed Action: *Test of expanding Injection/Production patterns in the wellfield by increasing the ratio of injection wells to a single production well.*

SERP MEMBERS

Management Representative: *Kurt Brown – Mine Manager*
Operations Representative: *Jay Douthit - Wellfield Operations Superintendent*
Radiation Safety Officer: *Chris Pedersen – RSO*
Support: *Steve Loose – Chief Production Geologist*
Support: *Kevin Shelburne - Hydrogeologist*
Support: *John Cash – Vice President*
Support: *Michael Gaither - Manager EHS and Regulatory Affairs*

INTRODUCTION

The SERP convened on February 2, 2016 and reviewed the proposed test of expanding Injection/Production patterns in the wellfield by increasing the number of injection wells to a single production well.

The proposed test was proposed due to the loss of injectivity in Mine Unit 1 and, in order to make the patterns more efficient and increase yields per production well, it was proposed that the patterns would be adjusted within a sub-horizon to increase the ratio of injectors to producers.

ANALYSIS AND DISCUSSION

The proposed test involves three patterns in MU1 (Table 1). The pattern of injectors would supply the producers 1I262P, 1P116, and 1I235AP. Two of the producers are converted injectors to optimize the geometry of the patterns.

Table 1: Test Patterns

Producer	Number of Injectors	Sub-horizon	Comment
1I262P	14	140-150	
1P116	13	140-150	
1I235AP	10	120-130	Overlays both 140-150 zones

The SERP discussed the relationship of the proposed experiment to what was described in the NRC Technical Report (TR) and LQD Operations Plan (OP) to determine if the experiment was in the scope of established wellfield operational practices. The following sections of the documents were reviewed:

- OP 3.2.1
- TR 3.2.2.1
- TR 3.2.7.2

The OP states that "injection and production well pattern design will be based on conventional five-spot patterns, modified as necessary to fit the characteristics of the orebody".

The patterns are a deviation from the standard 5-spot pattern but were established in order to adapt to the characteristics of the orebody and to address injectivity challenges of Mine Unit 1. This was determined to be consistent with the TR language and spirit.

Operations/Technical Review

- The proposed test would not impact operations.
- The proposed change would not be a change to the processes used.
- No procedural changes were necessary for the test.
- No change in the emergency response procedures is necessary.

Environmental/ Health Physics/Safety Review

- Additional HP or groundwater monitoring is not necessary
- Wellfield Operators will be instructed as to the flow schemes per existing procedures
- Risk assessment is not necessary.

Compliance Review

- There is no conflict with policies regarding training and safety.
- The system does not conflict with the Project license.
- The system is compliant with NRC and State regulations.
- No change in surety is required.

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

CONCLUSION

Standard operational use of the reconfigured patterns is dependent upon the success of the three experimental patterns. Results of the test will be provided in a supplement to this report.

	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-##*): LC16-04	**Date:** 2/2/2016

Proposed Change, Test, or Experiment:
Proposed experiment for adjusting the pattern geometry of I-P patterns (from the standard patterns such as 5-spot) to add more injectors per producer. Two test patterns, reconfigured from exisiting patterns, will be evaluated for improvement in flow balance and U concentration.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Kurt Brown	Mine Manager	2/15/16
Operations: Jay Douthit	WF Ops Superintendent	2-11-2016
RSO: Chris Pedersen	RSO	2/11/16
Other: Steve Loose	Chief Prod. Geologist	2-2-16
Other: Kevin Shelburne	Hydrogeologist	2/2/16
Other: John Cash	Vice President	2/2/16
Other: Michael Gaither	Manager EHS and RA	2/2/2016
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:

Approved as an experiment but SERP will need to reconvene if change is proven sucessful and a full-scale use is desired. The flair effects will be re-modeled to determine if any adjustments in surety is necessary.

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.

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.

☒ Review the SOP for the proposed change and determine the impact on existing SOPs. Make the necessary changes to the existing SOPs.

☒ If applicable, review the emergency response plan and determine compatibility with the proposed change.

B. ENVIRONMENTAL/ HEALTH PHYSICS/ SAFETY REVIEW

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

☒ Review the proposed changes and determine the need for additional training.

☒ 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

☒ 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.

☒ 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.

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:

Will the proposed change, test, or experiment:	**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)?		X
• 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)?		X
• Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated)?		X
• Result in more than a minimal increase in the consequences of a malfunction of an SEMS previously evaluated in the license application (as updated)?		X
• Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated)?		X
• Create a possibility for a malfunction of an SEMS with a different result than previously evaluated in the license application (as updated)?		X
• 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?		X

Comments:

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FAX: (307) 265-2801

LOST CREEK ISR, LLC

MEMO

Date: 5/16/2016

To: SERP LC16-04 Files

From: Michael Gaither - Manager EHS and Reg. Affairs

Subject: Follow-up to SERP LC16-04

The injection-production test pattern configuration was planned but never implemented and was eventually abandoned as of May 2016. The well patterns remained operational in the original balance scheme (e.g. 5-spot patterns).

Therefore, this SERP was cancelled.

LOST CREEK ISR PROJECT

REPORT FOR SERP LC16-05

May 10, 2016

Proposed Action: *To review and approve the test use of a filter bank in Header House 1-13 and to determine future use of filters in header houses.*

SERP MEMBERS

Management Representative: *Kurt Brown – Mine Manager*
Operations Representative: *Jay Douthit - Wellfield Operations Superintendent*
Radiation Safety Officer: *Chris Pedersen - RSO*
Support: *Michael Gaither - Manager EHS and Regulatory Affairs*

INTRODUCTION

A SERP meeting was held on April 28, 2016 to discuss the test use of a filter bank in Header House 1-13. A decision would be made after the initial use and evaluation to determine if the filter would be used permanently and if other header houses would be built/retrofitted with filters.

The filters are proposed as a method for capturing fines (clays, silts, etc.) that have been infiltrating into the production stream and entering the PC/IC loop and in turn getting injected into screen intervals theoretically causing injectivity problems. Different gravel packs have been incorporated in wells in the HH1-13 area to try to prevent fines from getting liberated into the production stream. The effectiveness of changes in gravel packs in the production wells will be evaluated by the filter use. If the gravel packs work then the filters may not be needed however depending upon the results the filters may still be used.

ANALYSIS AND DISCUSSION

The previous SERP LC14-03 was reviewed since it was very similar to the proposed use of filters. The planning and technical aspects of the system were discussed prior to the SERP as ORC16-02.

Radon will be monitored as already prescribed by radiation monitoring procedures. The radon levels will be evaluated to determine if there is an increase in radon levels as a result of the filters. It was stated in SERP LC14-03 that "controlled area" signage would be posted but will not be used since it is not required and in lieu the common signage "Any area within this facility may contain radioactive material" or similar will be used.

The following reviews were repeated as in SERP LC14-03 since they were similar.

Operations/Technical Review

- The proposed change would not impact operations.
- The proposed change would not be a change to the processes used.
- The Header House Operations SOP (OPS-051) was modified to reflect the changes
- No change in the emergency response procedures is necessary.

Environmental/ Health Physics/Safety Review

- HP monitoring will continue as described above
- Training on filter maintenance (as described in revised OPS-051) will be provided to Wellfield Operators since they perform the daily inspections and maintenance.
- Risk assessment is not necessary.

Compliance Review

- There is no conflict with policies regarding training and safety.
- The system does not conflict with the Project license.
- The system is compliant with NRC and State regulations.
- No change in surety is required.

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

CONCLUSION

The SERP determined that the filter use at HH1-13 is acceptable and may proceed with the following conditions:

- Personnel must be trained on the additions to SOP OPS-051 that detail the radiation safety and maintenance procedures prior to normal and routine operation. Documentation of training shall be provided.
- A follow up report shall be included with the SERP documentation to provide the results of the experiment and if filters will be:
    - Incorporated in the standard design and construction of future header houses;
    - Added as retrofits for existing header houses; or
    - Removed, not installed, and/or not used.

The SERP finds that it will be acceptable to use filtration systems if it is necessary as a result of the test and therefore the SERP will not need to render a decision on future use.

	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-##*): LC16-05	**Date:** 4/28/2016

Proposed Change, Test, or Experiment:
Review the proposed experiment for operating filter banks in header houses to assess the ability to remove fines from the production stream.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Kurt Brown	Mine Manager	4/28/2016
Operations: Jay Douthit	WF Ops Superintendent	5-2-2016.
RSO: Chris Pedersen	RSO	4/28/2016
Other: Michael Gaither	Manager EHS and RA	4/28/2016
Other:		
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:
SOP OPS-051 has been edited and republished but training and documentation on SOP change need be verified. Submit follow-up report for results of filter experiment.
(REVIEW VERY SIMILAR TO SERP LC14-03)

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.

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.

☑ Review the SOP for the proposed change and determine the impact on existing SOPs. Make the necessary changes to the existing SOPs.

☑ If applicable, review the emergency response plan and determine compatibility with the proposed change.

B. ENVIRONMENTAL/ HEALTH PHYSICS/ SAFETY REVIEW

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

☑ Review the proposed changes and determine the need for additional training.

☑ Review key personnel training records and determine training needs as required by the proposed change.

☑ Perform Risk Assessment, if necessary, according to the Risk Assessment procedure.

C. COMPLIANCE REVIEW

☑ 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.

☑ 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:

Will the proposed change, test, or experiment:	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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LOST CREEK ISR, LLC

MEMO

Date: September 1, 2016

To: EHS Files

From: SERP/ORC

Subject: Header House Modifications for Filter Banks and SERP Follow-Up

An ORC meeting (ORC16-02) was originally held on March 24, 2016 to discuss the proposed experiment of adding a filter bank to HH1-13. A SERP was convened April 28, 2016 (SERP16-05) for the proposed experiment/test which, as a result, approved the retrofit of filter banks for all Header Houses. Following the construction and operation of the test bank in HH1-13, additional ORC planning was conducted in June to design and plan installation of the additional filter banks in the existing Header Houses (HH) which would entail the modifications to the HH buildings.

The original placement of the filter bank in HH1-13 was within the existing HH building but after operational trials it was suggested by wellfield and engineering staff that improvements could be made by changing the placement of the filters which would improve accessibility and operation. Management approved a building expansion that would be added to the side of the HH to enclose the filter banks. The design changes completed in early July by the Project Engineer are shown on the attached figures. As a result of the changes to the HHs, a follow-up meeting to the original SERP was held on August 25, 2016 since the item of review regarding surety needed to be revisited.

The meeting included the following individuals:

- Steve Hatten – LC President
- Kurt Brown – Mine Manager
- Michael Gaither – Manager EHS and Reg. Affairs
- Chris Pedersen – RSO
- Brooks Bowthorpe – Project Engineer

The group discussed that the surety would likely be changed based on the increase in cubic footage of the Header Houses due to the addition of the side structure housing the filter banks. It was confirmed that all other concerns regarding radiological safety and operations had already been addressed in the original SERP and had been incorporated in the applicable SOP OPS-051. The resulting change to the surety would be adjusted as necessary in the next update submitted with the LQD Annual Report in October 2016.

LOST CREEK ISR PROJECT

REPORT FOR SERP LC16-06

June 13, 2016

Proposed Action: *To review and approve the rerouting of the vent line from the Permeate Tank to the atmosphere.*

SERP MEMBERS

Management Representative: *Kurt Brown – Mine Manager*
Operations Representative: *Alex Hunt – Plant Manager*
Radiation Safety Officer: *Chris Pedersen - RSO*
Support: *Brooks Bowthorpe – Project Engineer*
Support: *Michael Gaither - Manager EHS and Regulatory Affairs*

INTRODUCTION

A SERP meeting was held on April 15, 2016 to discuss the alteration of the vent line connected to the Permeate Tank in the Plant. The engineering and planning was completed as ORC15-06. The Permeate tank vent was initially connected to the vent manifold connecting the elution circuit tanks to the final exit vent line. It was proposed that the vent line from the Perm Tank was to be isolated to prevent the possible contamination of permeate if the elution tanks were to overflow into the vent manifold. No booster fan would be installed in the line.

ANALYSIS AND DISCUSSION

The SERP discussed the review items listed on the SERP form as per SOP AD-003.

Since the overflow of the tanks was an issue leading to the design change, the flow rates into the tank were discussed as a worst-case scenario. The max flow of water to the tanks would be on the order of 720 gpm. The flow rates of air through the piping and the sizing of pipe was discussed. The sizing determinations/calculations were made as part of ORC15-06.

The SOP for Reverse Osmosis would be edited to include operation of the tank.

Radon was discussed. The design includes an overflow line with p-trap for preventing radon from emanating into the Plant area. It was discussed that if the flow rate was great enough would the p-trap design prevent water from being pushed out and liberating radon. Radon is still a concern since the RO system does not remove radon.

The vent would be included in the radon air effluent monitoring program.

The need for a check valve on the vent line was discussed. The overflow line should be of sufficient size to prevent water from exiting the vent line to the roof.

It was necessary for the SERP to approve a figure change (Figure 4.1-3) that shows the vent pipe schematic.

The following documents were reviewed:

- License SUA-1598
- SER 3.2.3.1
- SER 4.1.3.1.1, 4.1.3.1.2, 4.1.3.3
- SER 5.7.8.3.1
- TR 4.1.2.2
- TR 5.7.1.1

Operations/Technical Review

- The proposed change would not impact operations.
- The proposed change would not be a change to the processes used.
- The Reverse Osmosis SOP (OPS-013) will be modified. The tank would be part of the RO system since the tank would hold the permeate from the RO.
- No change in the emergency response procedures is necessary.

Environmental/ Health Physics/Safety Review

- Additional HP monitoring will occur as described above
- Training on the SOP will be provided to Operators since they perform the operations and maintenance.
- Risk assessment is not necessary.

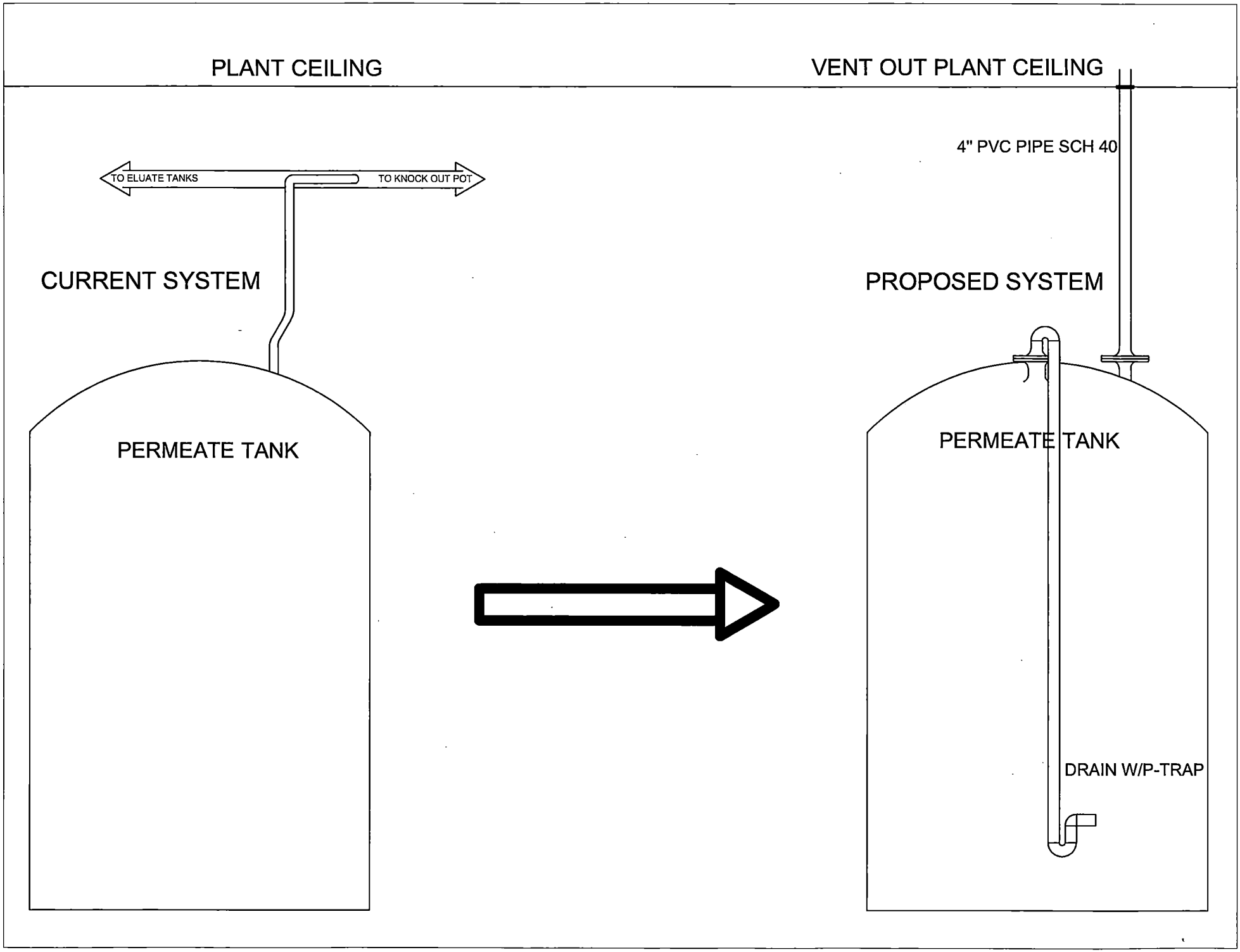
Compliance Review

- There is no conflict with policies regarding training and safety.
- The system does not conflict with the Project license. However, Figure 4.1-3 would need to be edited to reflect the change in routing of the vent line.
- The system is compliant with NRC and State regulations.
- No change in surety is required.

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

CONCLUSION

The modification to the vent line was approved by the SERP as well as the figure change in the TR. The change would be made to TR Figure 4.1-3. The SOP would need to be edited to include operation of the Perm Tank and precautionary information on radon.


PLANT CEILING
VENT OUT PLANT CEILING
4" PVC PIPE SCH 40
TO ELUATE TANKS
TO KNOCK OUT POT
CURRENT SYSTEM
PROPOSED SYSTEM
PERMEATE TANK
PERMEATE TANK
DRAIN W/P-TRAP

	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-##*): LC16-06	**Date:** 4/15/2016

Proposed Change, Test, or Experiment:
Proposed change is to reroute the vent line from the perm tank and the addition of an overflow line with p-trap. The vent would be separated from the elution circuit vent manifold and routed directly through the roof to the plant exterior.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Kurt Brown	Mine Manager	K J Brown 4/20/16
Operations: Alex Hunt	Plant Manager	4/20/16
RSO: Chris Pedersen	RSO	4/20/16
Other: Brooks Bowthorpe	Project Engineer	4-20-16
Other: MICHAEL GARDNER	MANAGER EHS & RA	4/21/2016
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.

- [X] APPROVED BY SERP (as signed above)
- [ ] CONDITIONALLY APPROVED BY SERP (as signed above w/ conditions listed below)
- [ ] NRC LICENSE AMENDMENT REQUIRED

Comments/Conditions:

SOP for Reverse Osmosis will be amended. Plant vent diagram Figure 4.1-3 will be edited.

Stack will be included in air effluent monitoring program.

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.

☒ Review the SOP for the proposed change and determine the impact on existing SOPs. Make the necessary changes to the existing SOPs.

☒ If applicable, review the emergency response plan and determine compatibility with the proposed change.

B. ENVIRONMENTAL/ HEALTH PHYSICS/ SAFETY REVIEW

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

☒ Review the proposed changes and determine the need for additional training.

☒ Review key personnel training records and determine training needs as required by the proposed change.

☒ Perform Risk Assessment, if necessary, according to the Risk Assessment procedure.

C. COMPLIANCE REVIEW

☒ 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.

☒ 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.

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:

Will the proposed change, test, or experiment:	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)?		X
• 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)?		X
• Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated)?		X
• Result in more than a minimal increase in the consequences of a malfunction of an SEMS previously evaluated in the license application (as updated)?		X
• Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated)?		X
• Create a possibility for a malfunction of an SEMS with a different result than previously evaluated in the license application (as updated)?		X
• 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?		X

Comments:

The configuration after the change would be consistent with the the SER, TR, and regulatory guidance.

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	10/4/16
Operations: KURT BROWN	MINE MANAGER	10-7-2016
RSO: CHRIS PEDERSEN	RSO	
Other: JOHN CASH	VICE PRESIDENT LCI	10/4/16
Other: MIKE GAITHER	MANAGER EHS+RA	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.

- [x] 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.

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.

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:

Will the proposed change, test, or experiment:	**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:

LOST CREEK ISR PROJECT

REPORT FOR SERP LC16-08

October 17, 2016

Proposed Action: *To review and approve ventilation design of reverse osmosis tanks.*

SERP MEMBERS

Management Representative: *Kurt Brown – Mine Manager*
Operations Representative: *Alex Hunt- Process Engineer/Plant Manager*
Radiation Safety Officer: *Chris Pedersen - RSO*
Support: *Michael Gaither - Manager EHS and Regulatory Affairs*
Support: Brooks Bowthorpe – Project Engineer

INTRODUCTION

A SERP meeting was held on October 17, 2016 to discuss the ventilation for the two RO clean in place tanks.

The reverse osmosis (RO) unit at Lost Creek has been setup to process water for disposal into a class V injection well. Recently, the unit was operated for testing and process setup. The RO unit uses two plastic tanks, situated along the wall just to the south of the unit. These two plastic tanks have 16 inch opening on the top. These tanks are used during the process for cleaning the RO. The containers will either have perm water, citric acid, or a weak basic compound. Sometimes during cleaning cycles personnel will have a difficult time surveying out, and the continuous air monitor for radon in the plant will display an elevated concentration. These tanks are identified as the source of the elevated radon. The issues with the radon are also expected to happen in the future during restoration activities in the future.

ANALYSIS AND DISCUSSION

A 6" PVC foam core pipe is sufficient to ventilate the RO tank system. Max flow rate into the tanks is ≈ 200 GPM (26.74 cu. ft), one at a time. We are proposing to install a 6" ventilation line from the restoration vent system. This system is equipped with a Plastec p20 exhaust fan and is currently unused. The CFM rating on the fan is 300. The current ventilation setup is measured at 189 CFM, split between the tanks to 94.5 CFM. This number is several times greater than the displacement volume flow of the tanks. 6" vent pipe is chosen because of the current construction of the ventilation system and flow/velocity numbers. 6" pipe at 94.5 CFM has a velocity of 121 ft/min. This is more than sufficient to remove air and radon.

To determine if there is sufficient flow to keep the radon from escaping the open top of the tank into the plant, the ventilation system can be viewed as a hood enclosing the aerosol, like a

chemical hood. The air is being exhausted from the hood at a rate of 94.5 CFM, and the hazard is being generated at a rate of 27 CFM, which gives an excess of 67.5 CFM (volume flow rate). The important factor preventing the gas from escaping the tank into the plant, is the velocity flow rate. The ventilation piping will extend into the tank, effectively making the opening of the tank equivalent to the opening of a hood. The area of the opening of the hood is the annulus area between the 16" pipe and the 6" pipe diameters. This results in a calculated velocity flow rate of 83 ft/min. The OSHA Technical Manual recommends a minimum of 50 ft/min capture velocity as a good practice (Section III: Chapter 3). For an enclosure hood, the capture velocity is the velocity in the plane of the opening.

A knockout pot for this system will not be used. The risks of picking up airborne contaminants other than radon are small: the agitation in these tanks is not likely to produce mist, the water in these tanks is either Permeate solution or cleaning solution, these open tops of the tanks will provide an alternative route for overflows rather than into the ventilation system.

During the SERP review, the potential for overflowing the tank into the ventilation system was discussed. The two concerns are that fluid would break the fan, and we want to prevent fluid from releasing onto the roof. The two tanks are of same size and would take only a couple of minutes to fill. Either a p-trap overflow, or a float-ball check valve will be installed to prevent water from entering the system.

Also discussed during the SERP, the horizontal piping will be angled slightly so the water runs towards the tanks.

Operations/Technical Review

- The proposed change would not impact operations.
- The proposed change would not be a change to the processes used.
- No change in SOPs is necessary.
- No change in the emergency response procedures is necessary.

Environmental/ Health Physics/Safety Review

- HP monitoring will add the RO ventilation to the effluent monitoring procedures.
- Risk assessment is not necessary.

Compliance Review

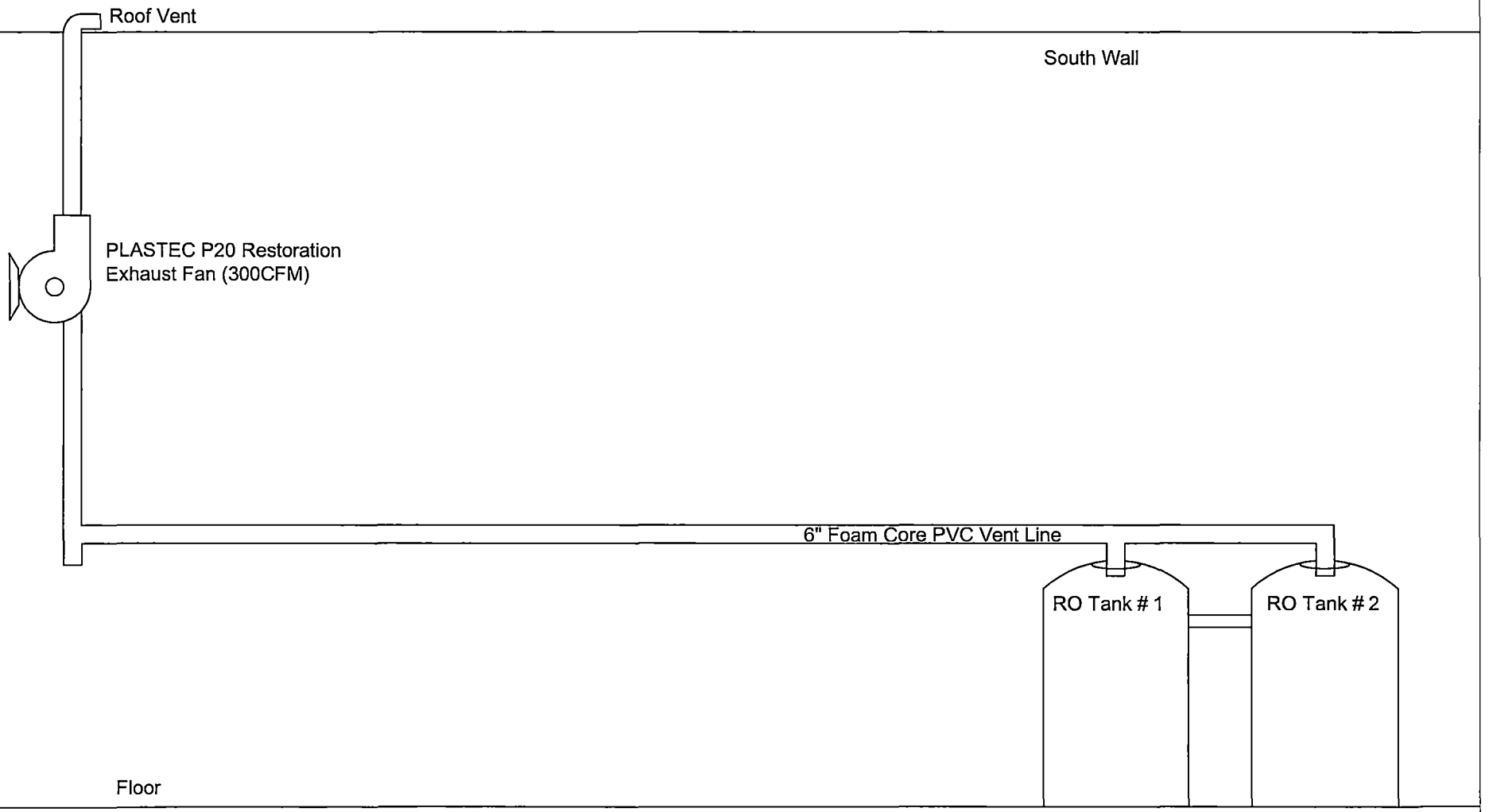
- There is no conflict with policies regarding training and safety.
- The system does not conflict with the Project license.
- The system is compliant with NRC and State regulations.
- No change in surety is required.

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

CONCLUSION

The SERP determined that the proposed modifications to IX13/14 ventilation to be used for the RO clean in place tanks is approved.

Proposed Vent System For RO



	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-##*): LC16-08	**Date:** 10/17/2016

Proposed Change, Test, or Experiment:
The proposed change is to add a ventilation line from the RO waste water tanks. The vent line would be connected to the existing restoration column vent line to the roof.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Kurt Brown	Mine Manager	10/19/16
Operations: Alex Hunt	Plant Manager	10/19/2016
RSO: Chris Pedersen	RSO	10-20-2016
Other: Brooks Bowthorpe	Project Engineer	10/19/2016
Other: Mike Gaither	Manager EHS and RA	10/20/2016
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.

- [X] APPROVED BY SERP (as signed above)
- [ ] CONDITIONALLY APPROVED BY SERP (as signed above w/ conditions listed below)
- [ ] NRC LICENSE AMENDMENT REQUIRED

Comments/Conditions:
The vent line from the RO tanks will connect to the existing restoration column vent line with fan. The existing line was included in the original TR.

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.

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.

☒ 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

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

☒ Review the proposed changes and determine the need for additional training.

☒ 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

☒ 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.

☒ 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.

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:

Will the proposed change, test, or experiment:	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)?		X
• 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)?		X
• Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated)?		X
• Result in more than a minimal increase in the consequences of a malfunction of an SEMS previously evaluated in the license application (as updated)?		X
• Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated)?		X
• Create a possibility for a malfunction of an SEMS with a different result than previously evaluated in the license application (as updated)?		X
• 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?		X

Comments:

LOST CREEK ISR PROJECT

REPORT FOR SERP LC16-09

November 30, 2016

Proposed Action: *To review and approve the test of injecting air into the RO Permeate tank to help liberate radon prior to Class V Ra-226 treatment and injection.*

SERP MEMBERS

Management Representative: *Michael Gaither - Manager EHS and Regulatory Affairs*
Operations Representative: *Alex Hunt- Process Engineer/Plant Manager*
Radiation Safety Officer: *Chris Pedersen - RSO*

INTRODUCTION

SERP meetings were held on both November 2 and 16, 2016 to discuss the basic process of injecting air into the permeate tank.

The process will be used to test the effectiveness of purging radon-222 from permeate prior to further treatment and injection into the Class V injection system. The likely source of Pb-210, in concentration close to the discharge limit for Class V, is the decay of Rn-222. Since radon is easily purged from water using agitation, injection of air was proposed as the method of agitation.

To perform the basic test, an air hose adapter was attached to an inlet flange at the base of the Permeate Tank to allow a Plant air hose to be connected to the inlet. Plant air will be injected into the base of the tank with no diffuser. Samples will be collected before and after the "bubbling" to determine if the radon concentration can be reduced.

ANALYSIS AND DISCUSSION

No engineering review was necessary since the setup was a simple attachment of an air hose to the tank with no modifications to the tank. The tank is vented to the atmosphere (SERP LC16-06) and no additional radon should be liberated into the Plant. A side benefit is the reduction of radon entering the wastewater system.

In reference to the MILDOS calculation done for the TR (Att 7.2-1), the source term would not change. There may be a slight increase in radon effluent that would be quantified in the semi-annual effluent report but would be well under the estimated effluent quantity.

Operations/Technical Review

- The proposed change would not impact operations.
- The proposed change does not change the normal operating processes.
- A change in the SOP is necessary if the process is effective and to be continued.
- No change in the emergency response procedures is necessary.

Environmental/ Health Physics/Safety Review

- HP monitoring will already include the perm tank ventilation to the effluent monitoring procedures.
- Additional training will follow the SOP changes, if necessary.
- Risk assessment is not necessary.

Compliance Review

- There is no conflict with policies regarding training and safety.
- The system does not conflict with the Project license.
- The system is compliant with NRC and State regulations.
- No change in surety is required.

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

CONCLUSION

The proposed test for air injection into the Permeate Tank is approved by this SERP with the condition that a follow-up report be prepared to include analytical results for Rn-222 and Pb-210 concentrations. Evaluation of the results of the monitoring of radon before and after the air injection is necessary to conclude the SERP. If the method is effective the SOP for Class V operation will be modified in addition.

	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-##*): LC16-09	**Date:** 11/16/2016

Proposed Change, Test, or Experiment:
Test to determine the changes in concentration of Rn-222 and associated decay products in the RO permeate destined for the Class V injection system due to injecting air into the permeate in the RO tank.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Michael Gaither	Manager EHS and RA	11/16/2016
Operations: Alex Hunt	Plant Manager	11/18/2016
RSO: Chris Pedersen	RSO	11-16-2016
Other:		
Other:		
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:
Approval is conditional since proposed change is a test. If procedure proves effective the SOP for Class V operation will be changed to describe the additional process. Monitoring of effluent is already in place and continuous monitoring of outflow to the Ra treatment would not necessary since monitoring protocol is in place for Class V injection. Follow-up results are required for conclusion of SERP.

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.

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.

☒ Review the SOP for the proposed change and determine the impact on existing SOPs. Make the necessary changes to the existing SOPs.

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

B. ENVIRONMENTAL/ HEALTH PHYSICS/ SAFETY REVIEW

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

☒ Review the proposed changes and determine the need for additional training.

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

☐a Perform Risk Assessment, if necessary, according to the Risk Assessment procedure.

C. COMPLIANCE REVIEW

☐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.

☒ 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.

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:

Will the proposed change, test, or experiment:	**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)?		X
• 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)?		X
• Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated)?		X
• Result in more than a minimal increase in the consequences of a malfunction of an SEMS previously evaluated in the license application (as updated)?		X
• Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated)?		X
• Create a possibility for a malfunction of an SEMS with a different result than previously evaluated in the license application (as updated)?		X
• 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?		X

Comments:

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

LOST CREEK ISR, LLC

MEMO

Date: March 13, 2017

To: SERP LC16-09 File

From: Michael Gaither – Manager EHS and RA

Subject: Conclusion of SERP LC16-09 – Radon in Water Results before and after Air Sparge

The test for air injection into the Permeate Tank that was approved by SERP LC16-09 had a condition that a follow-up report be prepared to include analytical results for Rn-222 and Pb-210 concentrations. Results of the analysis by Energy Labs in Casper were reviewed and the concentrations are provided on the table below:

Sample ID	Sample Date	Parameter	Results	Units	Comments
Perm Tank Sparge	1/4/2017	Rn-222	3,850	pCi/L	
Perm Tank No Sparge	1/5/2017	Rn-222	5,400	pCi/L	
Class V	1/5/2017	Pb-210	1.9	pCi/L	Post radium treatment

The results of the test indicate likely success in reducing the concentration of Rn-222 in permeate to be injected into the Class V wells in an attempt to limit the ingrowth of Pb-210. The sparging provided nearly 30% reduction in radon concentration. The concentration of Pb-210 in the final effluent after processing through the radium treatment module was significantly less than the effluent limit of 10 pCi/L. The conclusion of the SERP is that air sparging is approved to continue in order to liberate a percentage of radon in addition to other gasses.

LOST CREEK ISR PROJECT

REPORT FOR SERP LC16-10

December 14, 2016

Proposed Action: *To review and approve the expansion of the Restricted Area Boundary at the exterior southwest corner of the Plant.*

SERP MEMBERS

Management Representative: *Kurt Brown – Mine Manager*
Operations Representative: *Brooks Bowthorpe – Project Engineer*
Radiation Safety Officer: *Chris Pedersen – RSO*
Support: *Michael Gaither - Manager EHS and Regulatory Affairs*

INTRODUCTION

In follow up to an ORC meeting (ORC 16-04) that was held on December 1, 2016, a SERP was convened on December 2, 2016 to review and approve the change that was proposed in the ORC.

The change was the expansion of the restricted area boundary at the southwest exterior corner of the Plant. The expansion was proposed to allow personnel to exit the Plant and gain access to the main piping vault on the west side of the Plant as well as the soda ash silo. The personnel would be allowed to exit the building without performing a radiological scan since the area would be encompassed by the restricted area.

ANALYSIS AND DISCUSSION

Because there is no access to the piping vault on the west side of the building from within the Plant, access is gained by exiting the Plant and entering the exterior door to the vault. Due to the frequency at which personnel must access both the vault and silo, it is not practical or efficient to perform a radiological screen each time personnel leave the building.

Therefore, it would be practical to expand the restricted area. The area would be delineated with fencing to control access and no personnel or materials would be allowed to leave the area to a non-restricted area without the proper radiological screening. A new egress door would be installed from the IC/PC pump area out to the north side of the soda ash silo strictly for access to the silo and vault.

This modification of the restricted area boundary is similar to the modification of the boundary in a previous SERP LC15-02 to address storage of the 11e2 bins on the exterior of the building.

However, no radioactive materials would be stored in the new southwest area and access to the building would be controlled.

Operations/Technical Review

- The proposed change would not impact operations.
- The proposed change does not change the normal operating processes.
- No changes to SOPs area required.
- No change in the emergency response procedures is necessary. The egress door would not be for normal use as an exit. The door will be posted as "Not an Exit".

Environmental/ Health Physics/Safety Review

- HP monitoring will not change.
- Additional training will be conducted as necessary.
- Risk assessment is not necessary.

Compliance Review

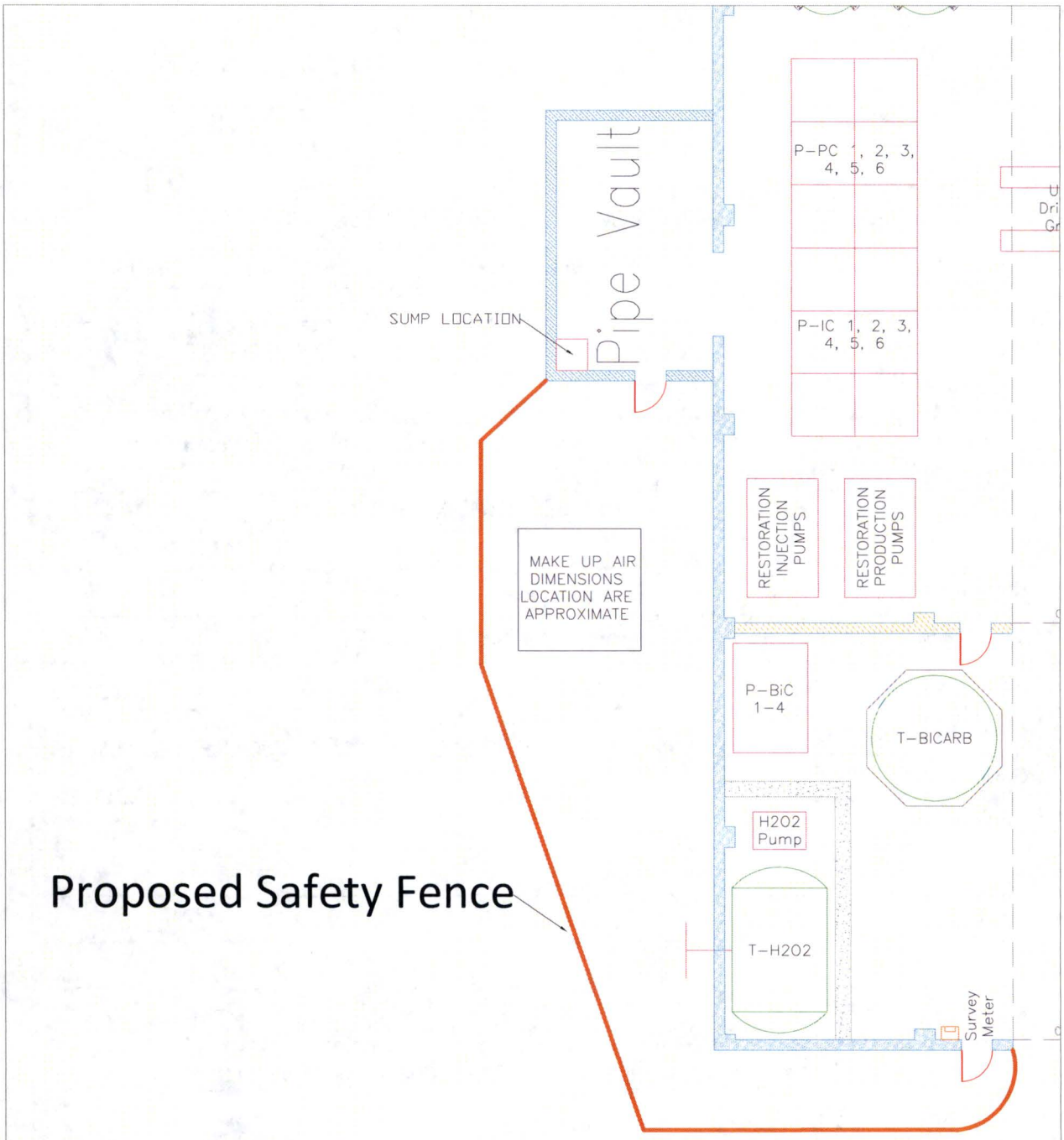
- There is no conflict with policies regarding training and safety.
- The system does not conflict with the Project license.
- The system is compliant with NRC and State regulations.
- No change in surety is required.

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

CONCLUSION

After discussion and review, the SERP approved the following changes:

- Expansion of the RA Boundary
- Installation of fencing at the RA Boundary perimeter
- Installation of the new access door
- Changes to Figure 5.7-1 showing the delineation of the RA Boundary


Pipe Vault
SUMP LOCATION
P-PC 1, 2, 3, 4, 5, 6
P-IC 1, 2, 3, 4, 5, 6
RESTORATION INJECTION PUMPS
RESTORATION PRODUCTION PUMPS
MAKE UP AIR DIMENSIONS LOCATION ARE APPROXIMATE
P-BiC 1-4
T-BICARB
H202 Pump
T-H202
Survey Meter
Proposed Safety Fence

	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-##*): LC16-10	**Date:** 12/2/2016

Proposed Change, Test, or Experiment:
Expand the Restricted Area boundary at the SW exterior corner of the Plant to allow movement from the Plant to the vault and soda ash silo without the need for scanning out. A fence will be installed for delineation.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Kurt Brown	Mine Manager	12/2/16
Operations: Brooks Bowthorpe	Project Engineer	12/2/16
RSO: Chris Pedersen	RSO	12.2.16
Other: Michael Gaither	Manager EHS and RA	12/2/2016
Other:		
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.

- [X] APPROVED BY SERP (as signed above)
- [ ] CONDITIONALLY APPROVED BY SERP (as signed above w/ conditions listed below)
- [ ] NRC LICENSE AMENDMENT REQUIRED

Comments/Conditions:

- NEED TO MODIFY FIG 5.7-1 IN TR WITH ADJUSTED RA BOUNDARY
- PROVIDE TRAINING ON NEW BOUNDARY + INGRESS/EGRESS PROCEDURE.
- SERP APPROVAL INCLUDES UPDATES TO FIG 5.7-1 (IE SAMPLING LOCS + AS BUILT CORRECTIONS)

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.

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.

☑ Review the SOP for the proposed change and determine the impact on existing SOPs. Make the necessary changes to the existing SOPs.

☑ If applicable, review the emergency response plan and determine compatibility with the proposed change.

B. ENVIRONMENTAL/ HEALTH PHYSICS/ SAFETY REVIEW

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

☑ Review the proposed changes and determine the need for additional training.

☑ Review key personnel training records and determine training needs as required by the proposed change.

☑ Perform Risk Assessment, if necessary, according to the Risk Assessment procedure.

C. COMPLIANCE REVIEW

☑ 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.

☑ 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.

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:

Will the proposed change, test, or experiment:	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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10758 W. CENTENNIAL RD., STE. 200
LITTLETON, CO 80127
TEL: (866) 981-4588
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5880 ENTERPRISE DR., STE. 200
CASPER, WY 82609
TEL: (307) 265-2373
FAX: (307) 265-2801

LOST CREEK ISR, LLC

MEMO

Date: March 14, 2017

To: SERP LC16-10 File

From: Michael Gaither – Manager EHS and Reg. Affairs

Subject: Status of SERP LC16-10 as of March 2017

Work as approved by this SERP has been suspended and not yet completed as of March 2017. Therefore, the Restricted Area boundary modification to Figure 5.7-1 in the Technical Report has not been made and will be included in the 2017 summary of changes if those changes occur. Additionally, changes to the procedures have not yet been made.

LOST CREEK ISR PROJECT

REPORT FOR SERP LC16-11

December 7, 2016

Proposed Action: *To review and approve the rerouting of the vent line from the Rich Eluate 2 and Intermediate Eluate 2 tanks to the atmosphere.*

SERP MEMBERS

Management Representative: *Kurt Brown – Mine Manager*
Operations Representative: *Brooks Bowthorpe – Project Engineer*
Radiation Safety Officer: *Chris Pedersen - RSO*
Support: *Michael Gaither - Manager EHS and Regulatory Affairs*

INTRODUCTION

A SERP meeting was held on December 7, 2016 to discuss the alteration of the vent line connected to the Rich Eluate 2 (RE-2) and the Intermediate Eluate 2 (IE-2) tanks. The tanks' vents were initially connected to the vent manifold connecting the Eluate Circuit tanks to the final exit vent line. It was proposed that the vent line from the RE-2 and IE-2 tanks were to be isolated to prevent the possible contamination of bleed water if the elution tanks were to overflow into the vent manifold. No booster fan is planned be installed in the line, but can be added later if necessaery.

ANALYSIS AND DISCUSSION

The SERP discussed the review items listed on the SERP form as per SOP AD-003.

Two eluate tanks have had a purpose change for the class V disposal well project. The two tanks are the RE-2 and IE-2 tanks. The new purpose of those tanks are to hold bleed water for the RO. A collateral purpose is to hold bleed water for the re-pulping process. The class V is an important process and any source of potential contamination from other process materials must be removed. The primary contamination source of concern is the eluate fluid, which is much greater concentrations of uranium than bleed water. Prior to this SERP a vector of transmitting the contamination would be through the Eluate Circuit ventilation manifold; an overflowing Eluate Circuit tank could overflow into RE-1 or IE-1, through the ventilation. The solution to this problem is to remove these tanks from that manifold and vent directly out the roof.

A fan is not going to be installed into these systems unless there are other problems. The radon will build up in the tanks, but the only release point will be out the roof.

Overflow lines were designed as corrective actions related to previous concerns with tanks overflowing into other process tanks, and overflowing into ventilation fans. The overflow lines,

with P-traps for radon, were designed to handle 250 gpm. The max bleed rate for our facility based on the max flowrate through the wellfield is 90 gpm.

The discussion and review of SERP LC16-11 is nearly identical to SERP LC16-06 for separating the Permeate tank ventilation from the Eluate Circuit manifold.

The vent will be included in the radon air effluent monitoring program.

It was necessary for the SERP to approve a figure change (Figure 4.1-3) that shows the vent pipe schematic.

The following documents were reviewed:

- SERP LC16-06

Operations/Technical Review

- The proposed change would not impact operations.
- The proposed change would not be a change to the processes used.
- No changes in SOPs are necessary.
- No change in the emergency response procedures is necessary.

Environmental/ Health Physics/Safety Review

- Additional HP monitoring will occur as described above
- No additional training is necessary.
- Risk assessment is not necessary.

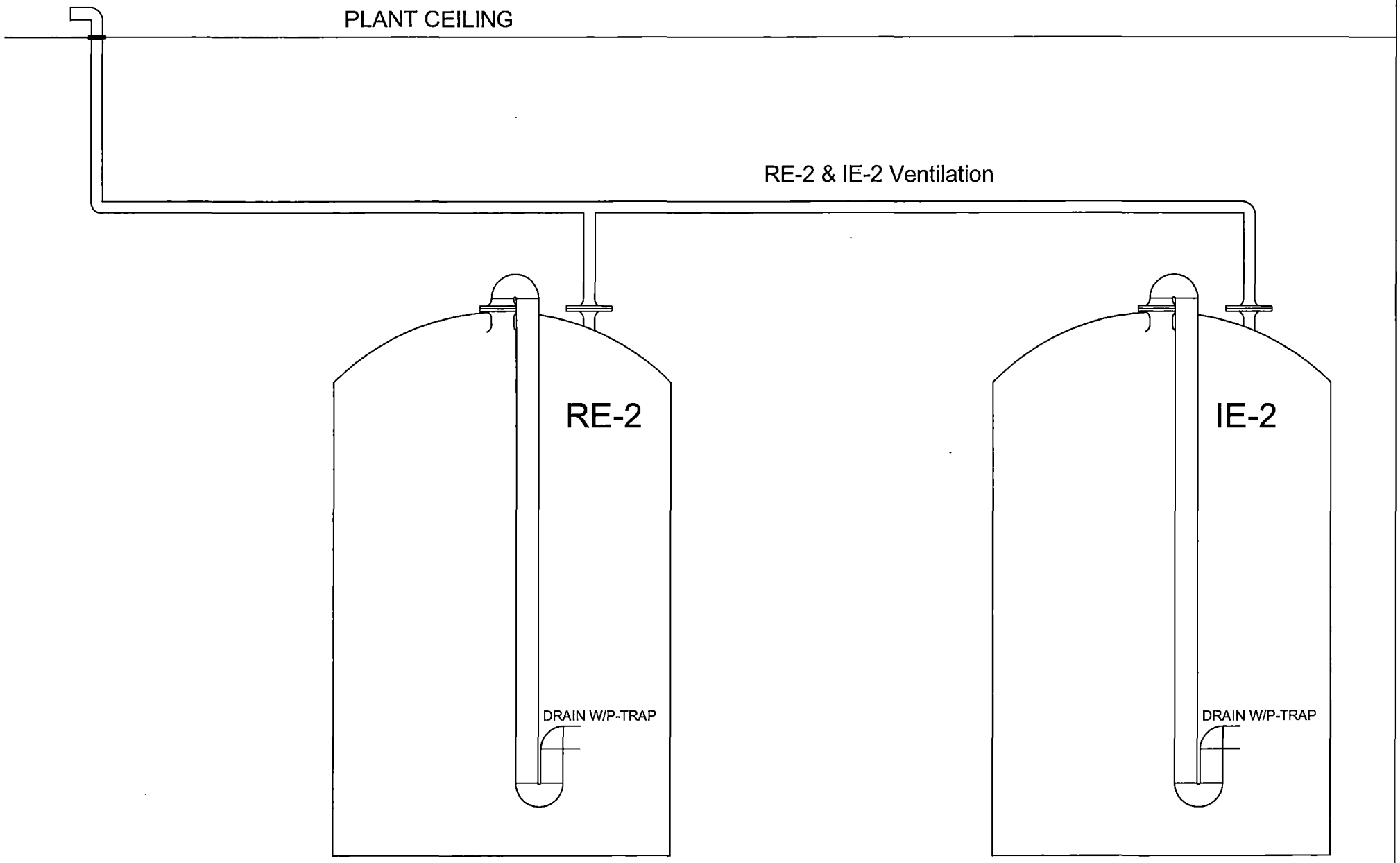
Compliance Review

- There is no conflict with policies regarding training and safety.
- The system does not conflict with the Project license. However, Figure 4.1-3 would need to be edited to reflect the change in routing of the vent line.
- The system is compliant with NRC and State regulations.
- No change in surety is required.

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

CONCLUSION

The modification to the vent line was approved by the SERP as well as the figure change in the TR. The change will be made to TR Figure 4.1-3.


PLANT CEILING
RE-2 & IE-2 Ventilation
RE-2
DRAIN W/P-TRAP
IE-2
DRAIN W/P-TRAP

	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-##): ~~LC16-10~~ CSP LC16-11	**Date:** 12·7·2016

Proposed Change, Test, or Experiment: Proposed change is to reroute the vent line from the IE-2 and RE-2 tanks. The vent would be separated from the elution circuit vent manifold and routed through the roof to the plant exterior. An overflow line with p-trap will be installed on each tank.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Curtis Brown	Mine Manager	12/15/16
Operations: Brooks Bowthorpe	Project Engineer	12/8/2016
RSO: Chris Pedersen	RSO	12/8/2016
Other: MIKE GAITHER	MANAGER EHS & RA	12/15/2016
Other:		
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: This is similar to SERP LC16-06.
- Plant Vent diagram figure 4.1-3 will be edited.
- Stack will be included in air effluent monitoring program.

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.

☑ Review the SOP for the proposed change and determine the impact on existing SOPs. Make the necessary changes to the existing SOPs.

☑ If applicable, review the emergency response plan and determine compatibility with the proposed change.

B. ENVIRONMENTAL/ HEALTH PHYSICS/ SAFETY REVIEW

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

☑ Review the proposed changes and determine the need for additional training.

☑ Review key personnel training records and determine training needs as required by the proposed change.

☑ Perform Risk Assessment, if necessary, according to the Risk Assessment procedure.

C. COMPLIANCE REVIEW

☑ 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.

☑ 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

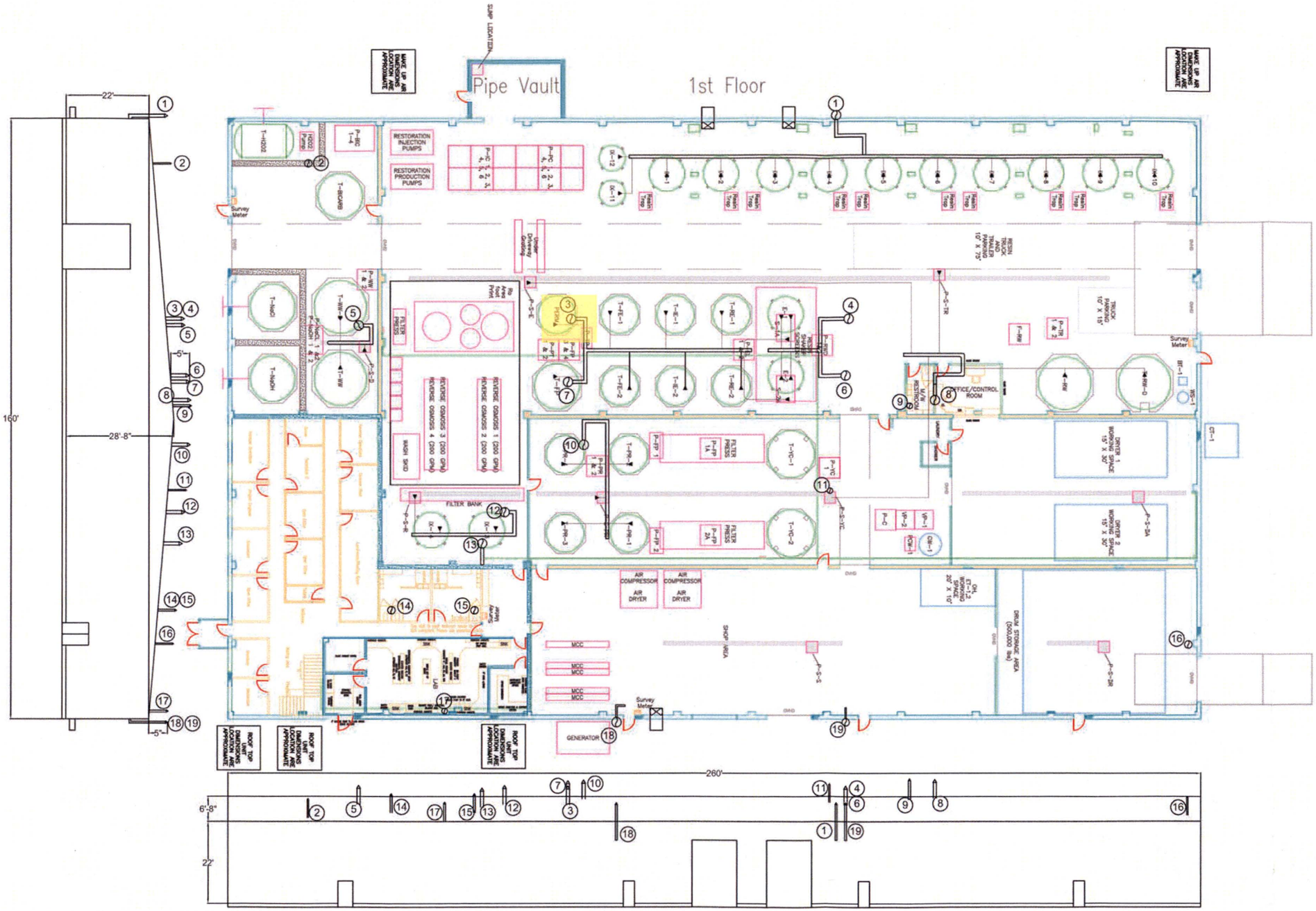
When the reviews from A, B, and C above are complete answer the following SERP questions regarding the changes, tests, or experiments and provide a conclusion:

Will the proposed change, test, or experiment:	**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)?		X
• 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)?		X
• Result in more than a minimal increase in the consequences of an accident previously evaluated in the license application (as updated)?		X
• Result in more than a minimal increase in the consequences of a malfunction of an SEMS previously evaluated in the license application (as updated)?		X
• Create a possibility for an accident of a different type than any previously evaluated in the license application (as updated)?		X
• Create a possibility for a malfunction of an SEMS with a different result than previously evaluated in the license application (as updated)?		X
• 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?		X

Comments: The configuration after the change would be consistent with the SER, TR, and regulatory guidance.

Attachment 2: Index of Page Changes
2016 Annual Report of Changes, Tests, or Experiments
Lost Creek ISR Project SUA-1598

No.	Date of Change	Document	Pages to be Removed	Pages to be Added	Description of Change	Source of Change	Comments
1	Jun 2016	Technical Report Section 4	Figure 4.1-3 (Jul12)	Figure 4.1-3 (Jun16)	Added vent modification for perm tank	SERP LC16-06	Superceded (see SERP LC16-11)
2	Sep 2016	Technical Report Section 5	Page 5-i (Rev5 Jun13)	Page 5-i (Rev6 Nov16)	Changed language and/or titles regarding RSO and other organizational positions	SERP LC16-09	
			Page 5-1 (Rev3 Jun13)	Page 5-1 (Rev4 Nov16)			
			Page 5-4, 5, 6 (Rev3 Jun13)	Page 5-4, 5, 6 (Rev4 Nov16)			
			Page 5-7 (Rev2 Mar10)	Page 5-7 (Rev3 Nov16)			
			Page 5-13 (Feb 17, 2012)	Page 5-13 (Rev4 Nov16)			
			Page 5-14, 15, 16, 17, 18 (Rev2 Apr10)	Page 5-14, 15, 16, 17, 18 (Rev3 Nov16)			
			Page 5-23 (Rev2 Apr10)	Page 5-23 (Rev3 Nov16)			
3	Sep 2016	Technical Report Section 5	Figure 5.1-1 (Jun13)	Figure 5.1-1 (Oct16)	Revised organizational positions	SERP LC16-09	
4	Dec 2016	Technical Report Section 4	Figure 4.1-3 (Jun16)	Figure 4.1-3 (Jan17)	Added vent modification for IE2 and RE2 tanks	SERP LC16-11	



LEGEND

- Point Source Ventilation with Fan
- Point Source Ventilation
- Duct Fan

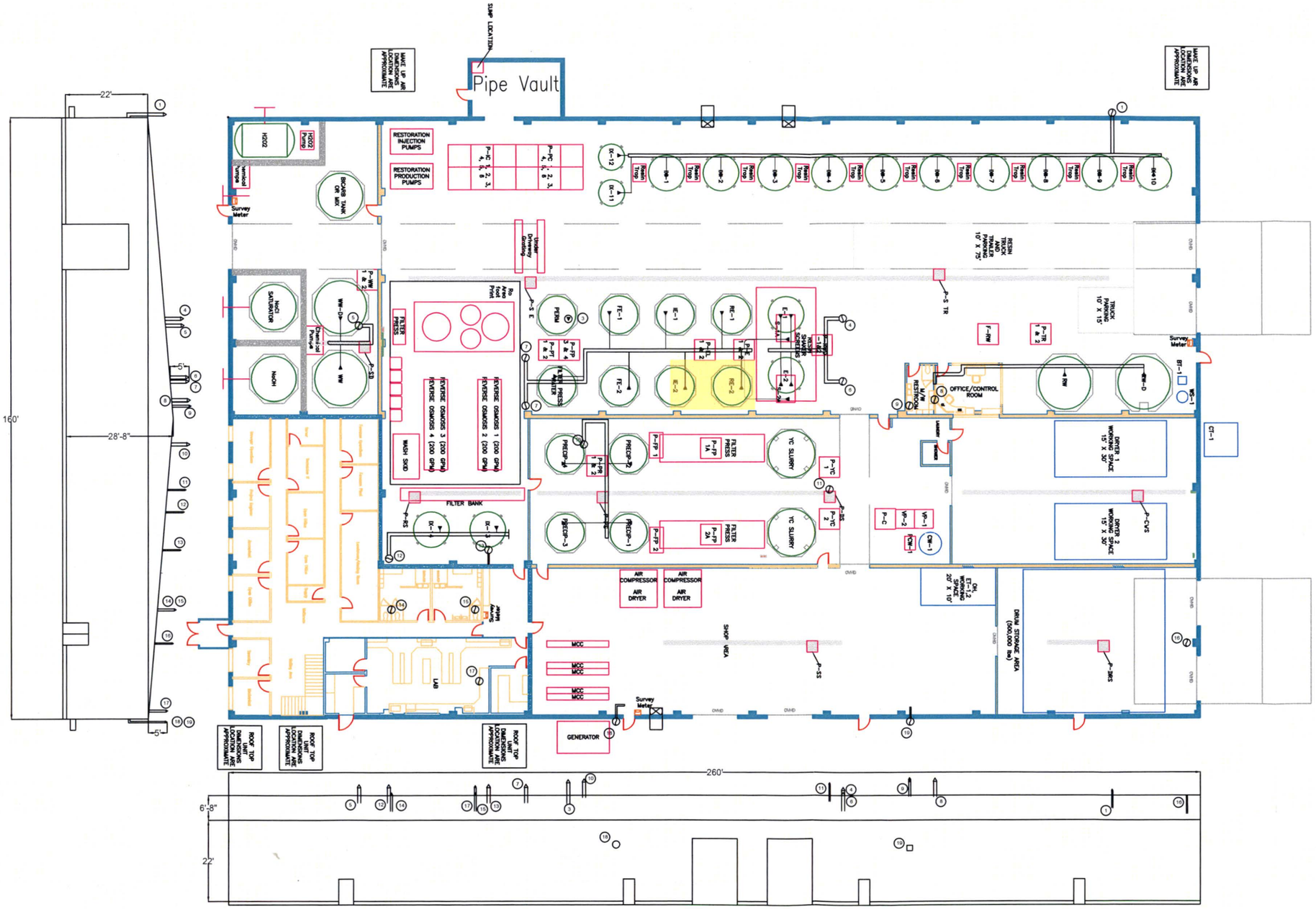
Lost Creek ISR, LLC
Littleton, Colorado USA

FIGURE 4.1-3
Ventilation Diagram
Lost Creek Permit Area

Issued For: NRC — Drawn By: CLB

Issued / Revised: 7.26.2012

Dwg No. NRCTR_4.0_Fig_4.1-3_7.26.12



LEGEND

- Point Source Ventilation with Fan
- Point Source Ventilation
- Duct Fan

Lost Creek ISR, LLC
Littleton, Colorado USA

FIGURE 4.1-3
Ventilation Diagram
Lost Creek Permit Area

Issued For: NRC	Drawn By: CLB/JHC
Issued / Revised: 12.6.2011/06.06.2016	
Dwg No. NRCTR_4.0_Fig4.1-3_12-06-2011_CLB	

TABLE OF CONTENTS

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 ~~Superintendant~~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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Manager of EHS and Regulatory Affairs reports directly to the Vice President. The Manager of EHS and Regulatory Affairs and 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 will 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 ~~Superintendant~~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

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

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.

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

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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); and
6) Department Heads: Mine Geologist, Project Engineer, Maintenance Supervisor, Wellfield (WF) Operations Supervisor, WF Construction Supervisor, Plant Manager.

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, 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 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 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.

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

5.1.5 RSO

The RSO 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 will play an integral role in facility design and start-up and will work closely will 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 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, Project Engineer, Maintenance Supervisor, WF Operations Supervisor, WF Construction Supervisor, and Plant Manager. 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 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.

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, 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 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 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.,

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 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 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 RSO until license termination. The 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 RSO until license termination. The 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 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 RSO with the results documented on an official form. Documentation will be maintained by the RSO until license termination. The Mine Manager and Manager of EHS and Regulatory Affairs shall review the results of the 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 RSO until license termination. The 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.

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- 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.

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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.

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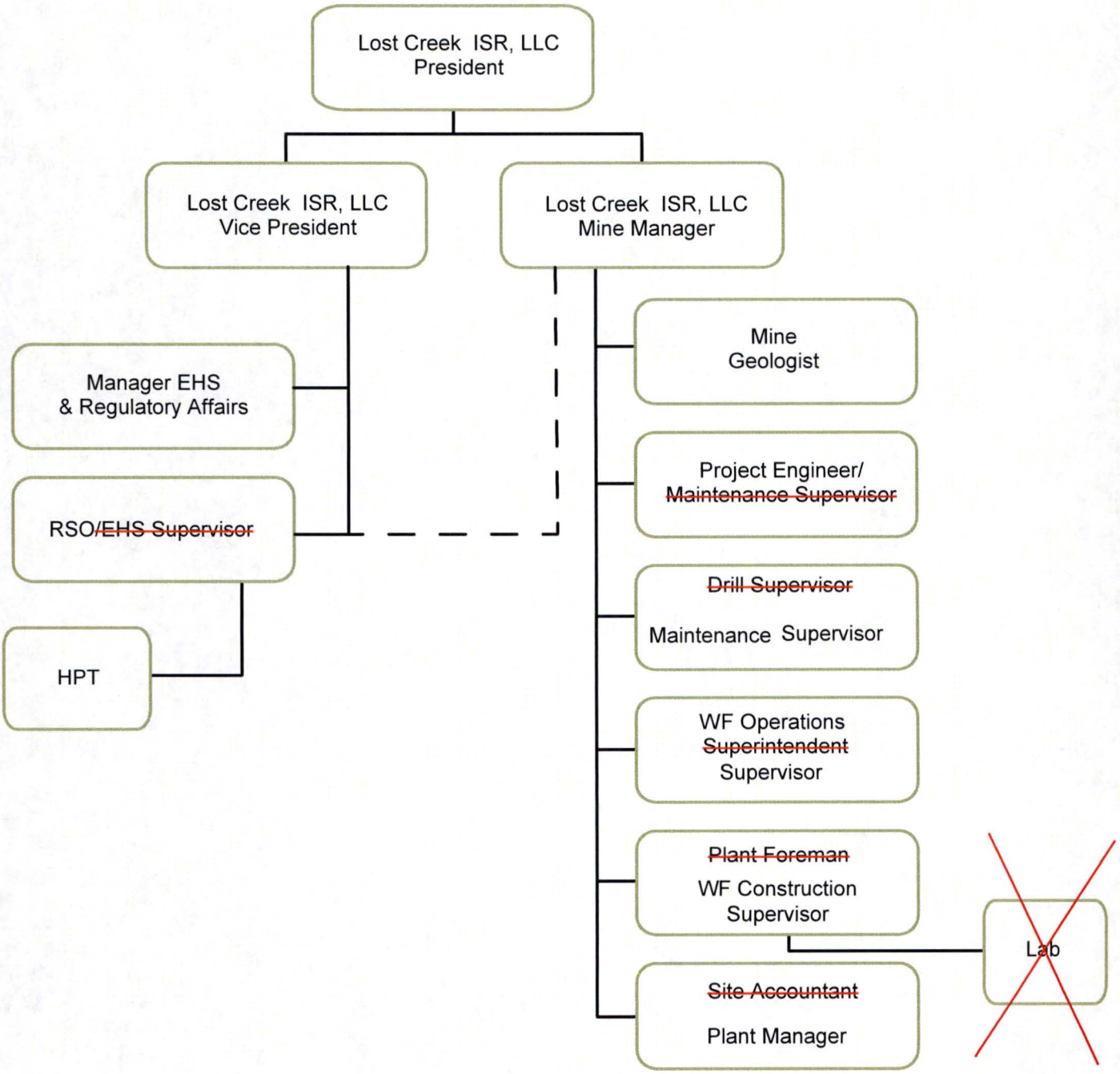
- Licensed material will be packaged, labeled, placarded and adequately described in shipping papers in accordance with applicable DOT and NRC regulations.
- Shipments of licensed material shall be kept within the controlled area of the Plant and shall remain locked prior to shipping.
- Bulk shipments 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

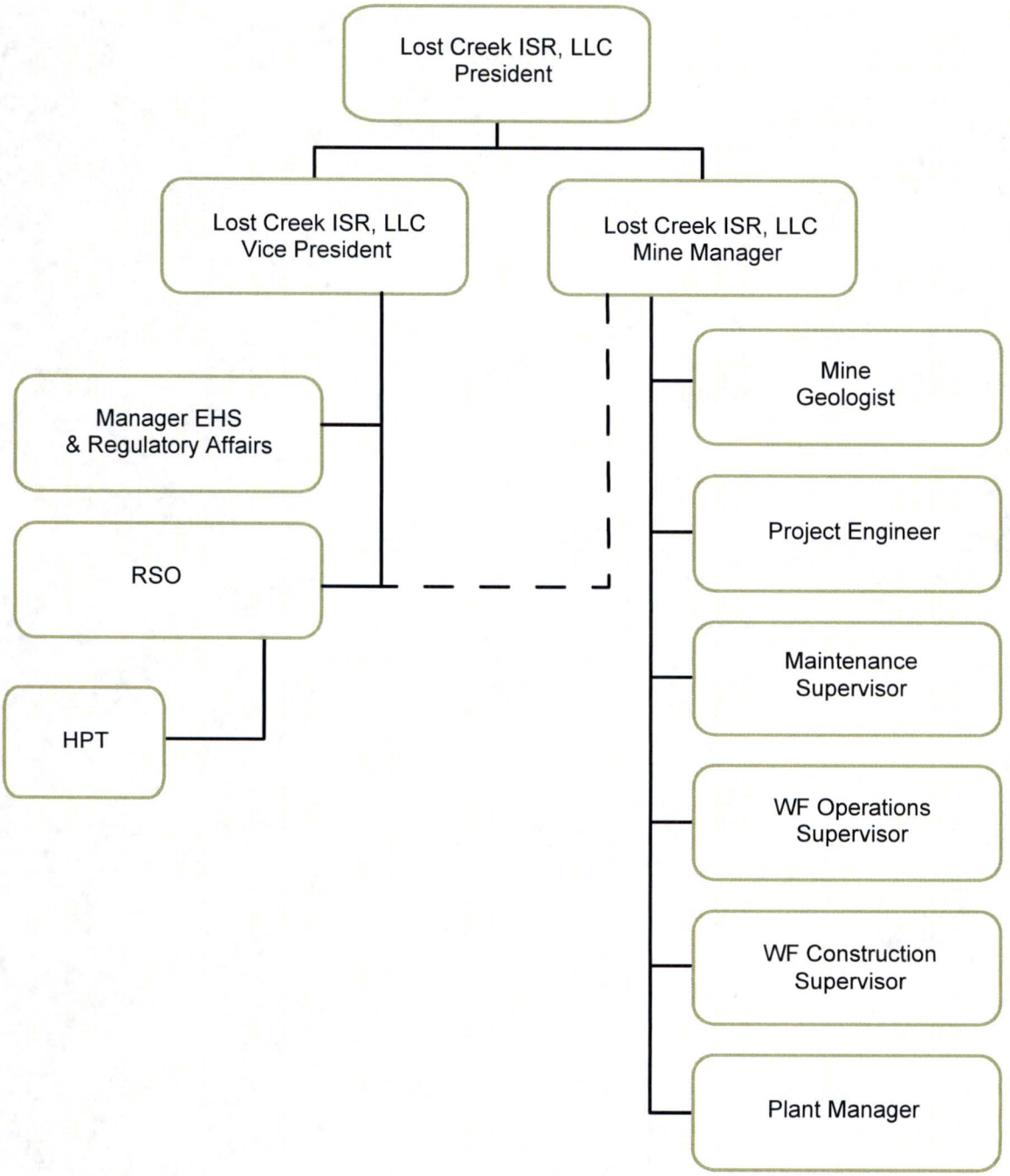
Figure 5.1-1 Lost Creek ISR, LLC Organization Chart

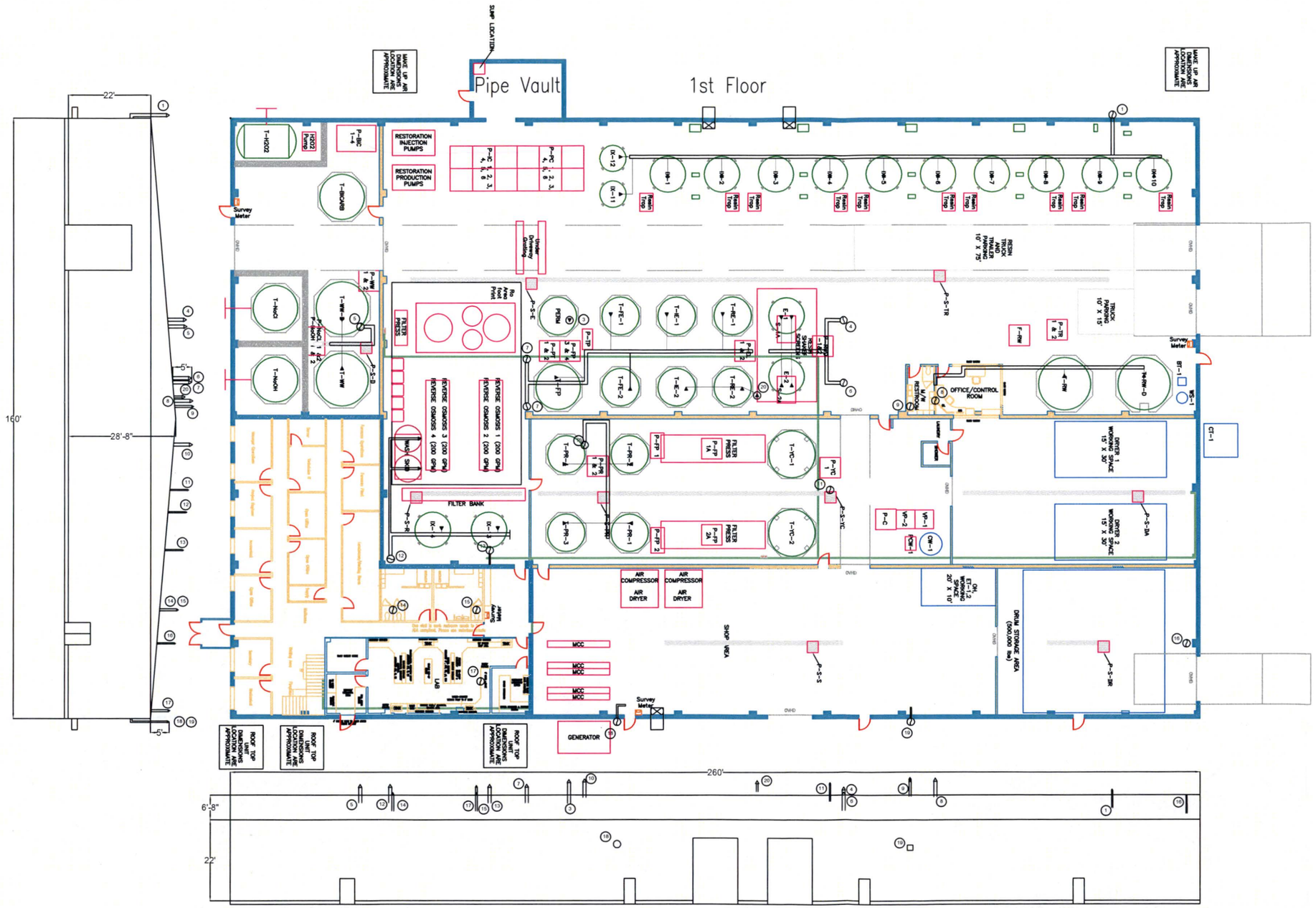


~~Revised June 2013~~

Revised October 2016

Figure 5.1-1 Lost Creek ISR, LLC Organization Chart





LEGEND

- Point Source Ventilation with Fan
- Point Source Ventilation
- Duct Fan

Lost Creek ISR, LLC
Littleton, Colorado USA

FIGURE 4.1-3
Ventilation Diagram
Lost Creek Permit Area

Issued For: NRC	Drawn By: CLB/JHC/BB
Issued / Revised: 12.6.2011/06.06.2016/01.10.2017	
Dwg No. NRCTR_4.0_Fig4.1-3_12-06-2011_CLB	