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LOST CREEK ISR, LLC

February 10, 2016

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 2015 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 summary table and summary reports of the SERP evaluations are included as **Attachment 1**.

No page changes have been made to the TR or ER in 2015.

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

IE47
NMSSD1
NMSS

Attachments: **Attachment 1: SERP Summary and Reports**

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
2015 Annual Report of Changes, Tests, or Experiments
Lost Creek ISR Project SUA-1598

SERP ID	Change, Test, or Experiment	Approved by SERP	SERP Meeting Date	Title	Description
LC15-01	Change	Y	22-Jan-2015	Plant Ventilation	Reconfigure Plant ventilation to improve air flow
LC15-02	Change	Y	29-Feb-2015	11e2 Bin Reloc	Move bin from Pond area to corral next to Plant
LC15-03	Change	Y	1-May-2015	HPT Installment	Approve new HPT
LC15-04	Test	Y	8-May-2015	Clay Dispersant	Review and approve use of clay dispersant within wells
LC15-05	Test	Y	29-Jun-2015	Injection Well Perforation	Test effectiveness of Class III injection well stimulation
LC15-06	Change	Y	17-Dec-2015	Pond Netting Installation	Review of bird netting installation ORC

Lost Creek ISR Project

Report for SERP LC15-01

February 18, 2015

Proposed Change: The proposed change is to test and configure the ventilation flow scheme in the Plant to operate more efficiently and to mitigate radon more effectively than the current configuration. An additional change would be to add vent outlets in the main HVAC duct to ventilate the chemical area.

OBJECTIVE

The objective of the Safety and Environmental Review Panel (SERP) was to review the proposed change to determine if it is a suitable configuration and supports ALARA. The SERP review was conducted according to LC-ISR standard operating procedure AD-003: *SERP*.

SERP MEMBERS

The following individuals comprised the SERP:

Management Representative:	Michael Gaither, Manager EHS and Regulatory Affairs
Operations Representative:	Matt Jaynes, Mine Project Engineer
Radiation Safety Officer:	Chuck Kelsey, RSO
Support:	Kurt Brown, Mine Manager
Support:	Alex Hunt, Plant Manager/Engineer

INTRODUCTION

The SERP was provided with the results of informal ORC discussions and planning for the potential changes to the system. A SERP meeting to evaluate the proposed changes from the ORC plan was held on January 22, 2015 to discuss the proposed change.

Prior to the SERP the main exhaust fans had been shut off previously due to their effect of short-circuiting the ventilation flow. The SERP was evaluating the effect of the change in flow scheme and to evaluate if it is a permanent solution.

The following general items were discussed in the meeting:

- Discussed the overview of the SERP
- Reviewed diagram from ORC LC15-01
- No major changes other than schematic changes
- See how not running the main vent fan improves ventilation

ANALYSIS

The following documents were reviewed as relevant to the SERP:

- ORC LC15-01 Summary
- TR 4.1.2.2
- TR 5.7.1.1
- NRC SER 3.2.3.1
- NRC SER 4.1.3.1.1
- NRC SER 5.7.4.3.4
- NRC SER 5.7.8.3.1

Plant and tank vent flow rates were evaluated by the Mine Project Engineer as provided in the ORC summary. The proposed mode of operation of the individual tank vent circuits was also proposed by the Engineer.

There are three groups of ventilation within the Plant:

- Main HVAC Plant ventilation
- Office area HVAC ventilation
- Localized tank ventilation systems

The systems are currently in accord with the descriptions in the TR as referenced above. The systems are operated independently but work together in the overall scheme of Plant ventilation to protect workers from radiological exposure from radon or uranium particulates. The main change to the main Plant airflow is the location of the exhaust. Instead of exhausting out of the Plant side fans (behind the IX columns), the airflow is directed to the east through the Precipitation Circuit (Precip) area, through the shop and out the side fan in the shop area out the east side of the building. This will prevent exhaust from recirculating back to the HVAC intakes on the west side of the building.

ALARA was discussed. The new configuration would be more ALARA-friendly due to the fact that radon could be mitigated more efficiently during normal operations as well as more efficiently during upset-conditions in the IX area with the use of the side ventilation fans.

REVIEWS

A. Operations/Technical Review

- There will be no change in Plant or office ventilation operations. There will be a change in the operation of individual tank vent systems. No process changes.
- There will be changes in each SOP for each circuit that has a dedicated tank ventilation system. The operation of the main exhaust fan may be addressed in the radon monitoring SOP. The warning of excessive radon levels is facilitated with the continuous air monitor next to the control room.

- For upset conditions and emergencies, the main exhaust fans may be operated to facilitate expedient radon mitigation.

B. Environmental/ Health Physics/Safety Review

- Changes in monitoring is addressed in the response to NRC comments from January 2015. Individual tank vent circuits will need to be monitored and radon effluent accounted for. No change in recordkeeping is necessary.
- Additional training will occur following the publishing of changes to the SOPs.
- Records of training will be updated as applicable.
- No risk assessment is necessary.

C. Compliance Review

- There are no conflicts with policies regarding training and safety
- The changes will be in compliance with the NRC License
- The changes are in compliance with federal and state regulations. However, monitoring is required to determine if the effluents due to venting is in compliance with regulations on public exposures and ALARA.
- No changes to the surety are required.

CONCLUSION

The SERP agreed upon the changes and approved them without the need for license amendments or TR changes as indicated by signatures on the SERP form. The proposed changes do not contradict the systems as described in the TR or as evaluated in the SER. The description of the systems in the TR is flexible enough to allow for adjustments of the airflow scheme to best practice ALARA. These adjustments determined from operational results, testing, and monitoring will result in more effective mitigation of radon.

The revisions to the monitoring plan for effluents of radon are being worked out with the NRC concurrent with the issuance of this report. The monitoring plan for measuring radon effluent from tank vent stacks is dependent upon the outcome.

ACTION ITEMS

The following are action items that resulted from the SERP:

- Radon "trak-etch" monitor will be placed at the new exhaust point in the Shop area.
- SOPs for each circuit that has a dedicated ventilation system will be modified to detail the use of the fans.
- Training will be provided on the changes to the SOPs for all applicable employees.
- Effluent monitoring will occur in accordance with the final agreement with the NRC. (Relates to the LC reply to NRC RAI Nov. 3, 2014 regarding LC12.10)

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SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP) FORM

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

SERP ID Number (*LCyy-##*): LC15-01	**Date:** 1/22/2015

Proposed Change, Test, or Experiment:
The proposed change is to test and configure the ventilation flow scheme in the Plant to operate more efficiently and to mitigate radon more effectively than the current flow configuration.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Mike Gaither	Manager EHS and RA	1/22/2015
Operations: Matt Jaynes	Mine Project Engineer	1/22/2015
RSO: ~~Chris Pedersen~~ CHUCK KELSEY ~~mtg 1/22/2015~~	~~Alternate~~ RSO	1/22/2015
Other: KURT BROWN	MINE MANAGER	1/22/15
Other: ALEX HUNT	PLANT MANAGER ~~PROCESS ENGINEER~~	
Other: ~~Chuck~~		
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 PROPOSED CHANGE WAS PRESENTED BY ORC THAT REVIEWED THE ENGINEERING SPECIFICATIONS AND PROVIDED FLOW DESIGN.

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. NA

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

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.

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SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP) FORM		
Edition: 11Sep2014rev3	**FORM Number:** FORM_LC_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 LC15-02

March 4, 2015

Proposed Change: The proposed change is to relocate the 11e2 bin currently stored in the Pond area to an enclosure next to the Plant on the east side.

OBJECTIVE

The objective of the Safety and Environmental Review Panel (SERP) was to review the proposed change to determine if it is a suitable plan. The SERP review was conducted according to LC-ISR standard operating procedure AD-003: *SERP*.

SERP MEMBERS

The following individuals comprised the SERP:

Management Representative:	Kurt Brown, Mine Manager
Operations Representative:	Alex Hunt, Plant Manager/Engineer
Radiation Safety Officer:	Chuck Kelsey, RSO
Support:	Michael Gaither, Manager EHS and Regulatory Affairs
Support:	Jay Douthit, Wellfield Operations Superintendent

INTRODUCTION

The SERP was provided with the results of informal ORC planning (ORC LC15-02) for the location and design of the bin enclosure. A SERP meeting to evaluate the proposed changes was held on February 19, 2015 to discuss the proposed change.

The ORC provided plans and a summary ORC LC15-02. The ORC discussed the relocation in a meeting in October 2014.

The following general items were discussed in the meeting:

- Overview of the proposed change
- Reviewed diagram from ORC LC15-02
- Clearance required for the bin lid
- Fence security requirement as related to restricted area requirements and fence height
- Specific North/South placement of the bin (i.e. on northern corner vs. closer to middle of building)
- Screening of personnel

- Use of forklifts
- Fence gate and anchor point

The relocation of the 11e2 bin was proposed to provide easier access by:

- The transport vehicle when the bin is collected for offsite disposal;
- Personnel to dispose of material in the bin;
- Forklift when depositing supersacks into the bin.

ANALYSIS

The following documents were reviewed as relevant to the SERP:

- ORC LC15-02 Plan
- TR 4.3.2
- TR 5.6.2
- NRC SER 4.2.3.2
- NRC SER 5.6.3
- 10 CFR 20 Subpart I

The security requirement were determined to be consistent with the TR. Section 5.6.2 states that "*The Plant, including areas of byproduct storage and handling, shall be fenced with access controlled by a locked gate*". The current fencing plan is consistent with the requirement. The area will also be visible by security camera.

The dimensions of the fence should provide adequate clearance for the bin lid.

The placement at the northeast corner of the building will allow for access by both transport vehicle and forklifts. The only hazard may be the proximity to the Plant loading ramp on the north side of the northeast corner. The placement would situate the transport vehicle so that the driver side door would be facing just adjacent to the loading ramp and the driver would exit the vehicle next to the loading ramp.

The personnel radiological screening method will be consistent with the current protocol for screening of personnel who enter the Pond Restricted Area (RA). If they go directly to and from the 11e2 storage area they do not need to scan prior to exiting the Plant restricted area as long as they directly return to the Plant RA and scan prior to leaving the Plant RA to go to non-restricted areas (TR 5.7.6.1). This is current screening protocol when going to and from the Plant to the Pond area.

REVIEWS

A. Operations/Technical Review

- There is no impact to operations or processes
- The SOP will be reviewed to determine if any changes are required

- There is no change to the emergency response plan.

B. Environmental/ Health Physics/Safety Review

- No monitoring or recordkeeping changes are necessary. The current personnel radiological screening protocol is adequate.
- There is no additional training other than to inform personnel of the move
- No Risk Assessment is necessary

C. Compliance Review

- There is no change to training or safety with the exception of the evaluation of the hazard of the loading ramp regarding fall protection.
- The security measures of locking the enclosure and the coverage of the security camera is compliant with the security plan as described in TR 5.6.2 and NRC regulation 10 CFR 20 Subpart I.
- No adjustment to the Surety is required.

CONCLUSION

The SERP concluded that the relocation of the 11e2 bin is acceptable. The following action items are required for the change.

ACTION ITEMS

- A Work Order will be submitted for the installation of the fence
- Need to ensure proper signage will be installed on the fence to include:
  - "Restricted Area"
  - "Any Area within this Facility May Contain Radioactive Material"
- Modify Fig 5.7-1 to include bin area in the RA boundary.
- The loading ramp will be evaluated to determine the need for fall protection (i.e. railing).

END OF REPORT

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SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP) FORM

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

SERP ID Number (*LCyy-##*): LC15-02	**Date:** 2/19/2015

Proposed Change, Test, or Experiment:
The proposed change is to move the 11e2 storage bin from the Pond restricted area to a new fenced in restricted area adjacent to the Plant on the east end.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: KURT BROWN	MINE MANAGER	K Brown 2/19/15
Operations: ALEX HUNT	PLANT MANAGER/ ENGINEER	Alexandra Hunt 2/19/2015
RSO: CHUCK KELSEY	RSO	2/19/15
Other: MIKE GAITHER	MANAGER ENS + RA	2/19/2015
Other: JAY DOUTHIT	WF OPS SUPERINTENDANT	2-19-2015
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:
SEE TR 4.3.2, PROPOSED LAYOUT FIGURE.
-NEED TO MODIFY FIG 5.7-1 TO DEFINE RESTRICTED AREA

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. N/A

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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LOST CREEK ISR, LLC

MEMO

Date: 5/18/2015

To: HP Files

From: Michael Gaither – Manager EHS and Reg. Affairs

Subject: SERP LC15-03 Approval of Krista Amunson as HPT

In accordance with the qualification requirements of both NRC Regulatory Guide 8.31 and Technical Report Section 5.4.3.1, the credentials of Krista Amunson who was hired as the new Health Physics Technician was reviewed. Option 1 of the qualifications was used for comparison.

The requirements along with the qualifying education, training, or certifications that are fulfilled by Krista are listed below:

1. Associate degree or two or more years of study in the physical sciences, engineering, or health related field. Fulfilled by:
    - Bachelor's Degree in Chemical Engineering
    - Master's Degree in Physical Science

2. At least a total of four weeks of generalized training in radiation health protection applicable to uranium recovery facilities. Fulfilled by:
    - 40 hr RSO Training 2009
    - 40 hr Intro to Radiation Safety 2008
    - CERT Basic Training 3-day 2009
    - FEMA Rad-Emergency Response 2008 1-day
    - FEMA Rad-Response Transportation Training 2008 1-day
    - Ludlum Instrument Training 2-day
    - Radiation Protection for Public Health Officials 0.5-day
    - Hazardous Materials for First Responders 0.5-day
    - Lost Creek Radiation Safety Training 0.5-day
    - DOT Radioactive Materials Shipping Training 0.5-day
    - Lost Creek General Site Safety Training/Orientation 0.5-day
    - Lost Creek Respirator Training with emphasis on uranium protection 0.5-day
    - Lost Creek Occupational Health and Safety Training 1-day

3. One year work experience using sampling and analytical laboratory procedures that involve health physics, industrial hygiene, or industrial safety measures to be applied in a uranium recovery facility. Fulfilled by:
    - 1 yr with Department of Homeland Security as a radiation specialist that included instrumentation, education/awareness
    - Current Lost Creek experience approx. 1 month at time of review

Therefore, the SERP declares Krista Amunson qualified to perform duties as a Health Physics Technician at the Lost Creek ISR Project site. Approval signatures are included on the SERP form.

END

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-##*): LC15-03	**Date:** 5/1/2015

Proposed Change, Test, or Experiment:
SERP verification of qualifications for installation of Krista Amunson as Health Physics Technician

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: Mike Gaither	Manager EHS and RA	5/1/2015
Operations: Kurt Brown	Mine Manager	5/1/2015
RSO: Chris Pedersen	RSO	5/1/2015
Other: Krista Amunson	HPT	5.1.15
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:
JTR 5.4.3.1 HRS HPT QUALIFICATIONS (eg 8.31/30)

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

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

NOT PERF. BUT WILL BE DONE ☑ 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

NO ☑ Review the proposed change and determine whether it will conflict with Project policies regarding training and safety.

TR 5.4.3.1 YES ☑ Review the proposed change and determine compliance with the Project license.

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

R6 8.30 ☑ 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.

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

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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FAX: (307) 265-2801

LOST CREEK ISR, LLC

MEMO

Date: 5/18/15

To: File

From: John Cash

Subject: SERP to Utilize Clay Dispersant

On May 8, 2015 A Safety and Environmental Review Panel (SERP) was convened to consider the usage of clay dispersant to assist with well development thereby improving well flow characteristics. The SERP was composed of the following individuals:

1. John Cash, Vice President of Regulatory Affairs – Management Representative
2. Jay Douthit, Wellfield Operations Superintendent – Operations Representative
3. Chris Pedersen, RSO – Health Physics Representative
4. Kevin Shelburne, Senior Hydrologist
5. Steve Hatten, Vice President of Operations

Mr. Shelburne joined the meeting by telephone from the Casper office.

Lost Creek ISR, LLC is looking for ways to improve well development methods in order to enhance flow rates for both UIC Class III injection and production wells. Currently, wells at the Lost Creek site are developed by air lifting, pumping, and or swabbing. One of the main goals of well development is to remove fine grained particulate matter that may plug the throats of pore spaces; such as phylosilicates and clay sized particles.

The potable water industry commonly uses clay dispersants to disaggregate and loosen clays from the near well bore surface so they can be physically removed. John Cash and Steve Hatten independently investigated what types of commercial clay dispersants are available that may be used at Lost Creek. Two broad categories of dispersants were discovered: organic based solvents commonly used in the oil field and polymers commonly used in the potable water industry. The decision was made by Steve and John to focus on the polymers since they are non-hazardous and environmentally friendly.

Prior to convening the SERP, John Cash contacted John Saxton of the NRC and Brian Wood of the WDEQ-LQD and asked if there were any regulatory concerns with using such products for well development. Both the NRC and LQD agreed that use of such products was permissible. Therefore, John Cash initiated the steps to convene the SERP.

The SERP explicitly reviewed a polymer product produced by Baroid called Aqua-Clear PFD, see attached MSDS and Spec Sheet, and a product produced by Johnson Screens called Nu-Well 220. The SERP found that usage of the product, following procedures consistent with those described in the specification sheet, would present no new hazards. The product will be mixed in a clean (relatively clay free) portable tank with water at a rate consistent with the specification sheet and placed in the well bore. The wellhead will then be reattached and sufficient water injected to push the chemical solution into the wellbore. Kevin Shelburne is to calculate the amount of water needed to push the chemical solution into the host rock. The chemical mixture will then be agitated with the aid of a swab cup or other method without bringing solution to the surface. The chemical may be allowed to sit for several hours before agitating some more and then purging the well. All solutions purged from the well are to be captured and sent to the facilities waste water system. In the future, if wells which have not been subjected to lixiviant are developed using polymers, the purged chemical would not have to be disposed of in the facilities' licensed waste water system.

Only two wells will initially be developed using this method. If the results are encouraging, additional usage of clay dispersants in active and non-active wells is hereby approved.

The SERP authorizes the work with the following caveats:

1. The field crew will be under the direct supervision of Jay Douthit and/or Kevin Shelburne during the first two wells. A tailgate safety meeting will be held prior to initiating work. The meeting will include a review of the MSDS and a discussion of the work plan.
2. The existing Swabbing SOP will be followed when swabbing the well.
3. All other factors such as CO2 addition and pressure will be held constant post development, to the extent possible, so the effect of clay dispersants isn't masked by other changes.
4. Wells with good historic flow and low grade should be selected for the test.
5. Wells with swab records should be selected for the initial test.
6. pH of the purged fluid will be monitored in an attempt to determine when the chemical mixture is recovered. This may not be effective since the polymer has a roughly neutral pH that may be indistinguishable from native groundwater.

The SERP found that since the clay dispersants are non-hazardous and the physical well development techniques are the same as those currently used, there are no new hazards associated with this task.

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-##*): LC15-04	**Date:** 5/8/15

Proposed Change, Test, or Experiment:
Evaluate and approve the use and injection of clay dispersants into the injection wells.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: John Cash	Vice President	5/8/15
Operations: Jay Douthit	WF Ops Superintendent	5-8-2015
RSO: Chris Pedersen	RSO	5/8/2015
Other: Kevin Shelburne	Hydrogeologist	
Other: Steve Hatten	Vice President	5/8/15
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:
See comments on back page

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. MSDS + tailgate

☑ 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:

AQUA-CLEAR® PFD

Phosphate-Free Dispersant

Description

AQUA-CLEAR® PFD concentrated liquid polymer dispersant provides superior mud and sediment removal from the producing formation and gravel pack. This product is also a highly effective mud thinner. AQUA-CLEAR PFD dispersant contains no phosphates.

Applications/Functions

- Can disperse mud, sediment and clay from the producing formation and gravel pack in the screened interval.
- Can reduce viscosity and gel strength of drilling fluids

Advantages

- NSF/ANSI Standard 60 certified
- Helps reduce development time
- Helps increase well yield and capacity
- Safe to use on most plastics, rubber and metals
- Non-fermenting
- Can reduce pumping costs

Typical Properties

Appearance	straw colored liquid
Specific gravity	1.2 to 1.4
pH (neat)	6.5 to 7.5

Recommended Treatment

As a Well Development Aid

- Determine volume of water in screen area and double the calculated volume to account for water in gravel pack and formation interface ***or*** determine the static volume of water and add 50% excess.
- Once the water volume is determined, calculate the required treatment volume of AQUA-CLEAR PFD by the following formula:

AQUA-CLEAR PFD (gal or L) = 0.002 x Water Volume (gal or L)

This equates to one gallon of AQUA-CLEAR PFD for every 500 gallons of water (0.2% by volume) or 2.0 liters of AQUA-CLEAR PFD for every cubic meter of water.

- Mix thoroughly before introducing into well.
- The preferable application method utilizes a tremie line with the product applied into the screened area.
- If necessary, the AQUA-CLEAR PFD/water solution may be poured into the well.
- Mixture should be thoroughly blended in well, then agitated using a surge

Rev. 03/2011

Recommended Treatment (continued)

and swab, jetting, or other developmental technique repeatedly every two hours for a period of up to 24 hours.

- Pump to waste until turbidity clears up and then connect well to distribution system.

As a Mud Thinner

- Start by adding one pint of AQUA-CLEAR® PFD to 500 gallons of mud. Increase concentration until desired viscosity is achieved.

Well Capacity Chart (Gallons per Foot)					
Well Diameter (Inches)	Well Capacity in Gallons/ft	Well Diameter (Inches)	Well Capacity in Gallons/ft	Well Diameter (Inches)	Well Capacity in Gallons/ft
2	0.2	12	5.9	24	23.5
4	0.7	14	8.0	26	27.6
6	1.5	18	13.2	30	36.7
8	2.6	20	16.3	36	52.9
10	4.1	22	19.7	48	94.0

Well Capacity Chart (Liters per Meter)					
Well Diameter (millimeters)	Well Capacity Liters/meter	Well Diameter (millimeters)	Well Capacity Liters/meter	Well Diameter (millimeters)	Well Capacity Liters/meter
51	2.0	305	73.0	610	292.0
102	8.1	356	99.3	660	342.6
152	18.3	457	164.2	762	456.1
203	32.4	508	202.7	914	656.8
254	50.7	559	245.3	1219	1167.7

Note: The volumes in these tables show only the volume of water in a 1 foot or 1 meter section of a given size of screen. Excess volume must be included to account for water present in the formation interface and gravel pack.

Packaging

AQUA-CLEAR PFD is packaged in 50-lb (22.7-kg) or 25-kg (55-lb) plastic containers or in a case of 4, 1-gal (3.8 liter) plastic containers weighing 43-lbs (19.6-kg).

Availability

AQUA-CLEAR PFD can be purchased through any Baroid Industrial Drilling Products Retailer. To locate the Baroid IDP retailer nearest you contact the Customer Service Department in Houston or your area IDP Sales Representative.

Baroid Industrial Drilling Products
Product Service Line, Halliburton
3000 N. Sam Houston Pkwy E.
Houston, TX 77032

Customer Service	(800) 735-6075 Toll Free	(281) 871-4612
Technical Service	(877) 379-7412 Toll Free	(281) 871-4613

HALLIBURTON

MATERIAL SAFETY DATA SHEET

Product Trade Name: **AQUA-CLEAR® PFD**

Revision Date: 04-Oct-2013

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Trade Name: AQUA-CLEAR® PFD
Synonyms: None
Chemical Family: Blend
Application: Additive

Manufacturer/Supplier
Baroid Fluid Services
Product Service Line of Halliburton
P.O. Box 1675
Houston, TX 77251
Telephone: (281) 871-4000
Emergency Telephone: (281) 575-5000

Prepared By
Chemical Compliance
Telephone: 1-580-251-4335
e-mail: fdunexchem@halliburton.com

2. COMPOSITION/INFORMATION ON INGREDIENTS

Substances	CAS Number	PERCENT (w/w)	ACGIH TLV-TWA	OSHA PEL-TWA
Contains no hazardous substances	Mixture	60 - 100%	Not applicable	Not applicable

3. HAZARDS IDENTIFICATION

Hazard Overview May cause eye irritation.

4. FIRST AID MEASURES

Inhalation If inhaled, remove from area to fresh air. Get medical attention if respiratory irritation develops or if breathing becomes difficult.

Skin Wash with soap and water. Get medical attention if irritation persists.

Eyes In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and get medical attention if irritation persists.

Ingestion Under normal conditions, first aid procedures are not required.

Notes to Physician Not Applicable

5. FIRE FIGHTING MEASURES

Flash Point/Range (F):	Not Determined **Min:** > 212
Flash Point/Range (C):	Not Determined **Min:** > 100
Flash Point Method:	COC
Autoignition Temperature (F):	Not Determined
Autoignition Temperature (C):	Not Determined
Flammability Limits in Air - Lower (%):	Not Determined
Flammability Limits in Air - Upper (%):	Not Determined

Fire Extinguishing Media Carbon Dioxide, Dry Chemicals, Foam.

Special Exposure Hazards Decomposition in fire may produce toxic gases. Spills produce extremely slippery surfaces.

Special Protective Equipment for Fire-Fighters Full protective clothing and approved self-contained breathing apparatus required for fire fighting personnel.

NFPA Ratings: Health 1, Flammability 1, Reactivity 0
HMIS Ratings: Health 1, Flammability 0, Physical Hazard 0 , PPE: B

6. ACCIDENTAL RELEASE MEASURES

Personal Precautionary Measures Use appropriate protective equipment. Spills of this product are very slippery.

Environmental Precautionary Measures Prevent from entering sewers, waterways, or low areas.

Procedure for Cleaning / Absorption Isolate spill and stop leak where safe. Contain spill with sand or other inert materials. Scoop up and remove.

7. HANDLING AND STORAGE

Handling Precautions Avoid contact with eyes, skin, or clothing. Wash hands after use.

Storage Information Store away from oxidizers. Store in a cool, dry location. Product has a shelf life of 36 months.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering Controls Use in a well ventilated area.

Personal Protective Equipment If engineering controls and work practices cannot prevent excessive exposures, the selection and proper use of personal protective equipment should be determined by an industrial hygienist or other qualified professional based on the specific application of this product.

Respiratory Protection Not normally necessary.

Hand Protection Impervious rubber gloves.

Skin Protection Normal work coveralls.

Eye Protection Safety glasses.

Other Precautions None known.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State:	Liquid
Color:	Yellowish
Odor:	Slight
pH:	7 - 9
Specific Gravity @ 20 C (Water=1):	1.3
Density @ 20 C (lbs./gallon):	10.8
Bulk Density @ 20 C (lbs/ft3):	Not Determined
Boiling Point/Range (F):	Not Determined
Boiling Point/Range (C):	Not Determined
Freezing Point/Range (F):	Not Determined
Freezing Point/Range (C):	Not Determined
Vapor Pressure @ 20 C (mmHg):	Not Determined
Vapor Density (Air=1):	Not Determined
Percent Volatiles:	~ 55
Evaporation Rate (Butyl Acetate=1):	Not Determined
Solubility in Water (g/100ml):	Soluble
Solubility in Solvents (g/100ml):	Not Determined
VOCs (lbs./gallon):	Not Determined
Viscosity, Dynamic @ 20 C (centipoise):	100-400 (77F)
Viscosity, Kinematic @ 20 C (centistokes):	Not Determined
Partition Coefficient/n-Octanol/Water:	Not Determined
Molecular Weight (g/mole):	Not Determined

10. STABILITY AND REACTIVITY

Stability Data: Stable

Hazardous Polymerization: Will Not Occur

Conditions to Avoid None anticipated

Incompatibility (Materials to Avoid) Strong oxidizers.

Hazardous Decomposition Products Carbon monoxide and carbon dioxide.

Additional Guidelines Not Applicable

11. TOXICOLOGICAL INFORMATION

Principle Route of Exposure Eye or skin contact, inhalation.

Sympotoms related to exposure

Acute Toxicity

Inhalation	May cause respiratory irritation.
Eye Contact	May cause mild eye irritation.
Skin Contact	Prolonged or repeated contact may cause slight skin irritation.
Ingestion	Swallowing a relatively large amount of this material is unlikely to produce serious illness or death.

Chronic Effects/Carcinogenicity No data available to indicate product or components present at greater than 1% are chronic health hazards.

LD50 Oral:
> 2000 mg/kg; (rat)

Toxicology data for the components

Substances	CAS Number	LD50 Oral	LD50 Dermal	LC50 Inhalation
Contains no hazardous substances	Mixture	No data available	No data available	No data available

12. ECOLOGICAL INFORMATION

Ecotoxicological Information

Ecotoxicity Product

Acute Fish Toxicity: LC50:(96 hour) >100 mg/l (Brachidanio rerio)
Acute Crustaceans Toxicity: EC50: (48 hour) >100 mg/l (Daphnia magna)

Acute Algae Toxicity: Not determined

Ecotoxicity Substance

Substances	CAS Number	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Contains no hazardous substances	Mixture	No information available	No information available	No information available	No information available

12.2 Persistence and degradability
Not readily biodegradable

12.3 Bioaccumulative potential
Bioaccumulation is unlikely

12.4 Mobility in soil
No information available

12.5 Results of PBT and vPvB assessment
No information available.

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS

Disposal Method Disposal should be made in accordance with federal, state, and local regulations.

Contaminated Packaging Follow all applicable national or local regulations.

14. TRANSPORT INFORMATION

Land Transportation

DOT
Not restricted

Canadian TDG
Not restricted

ADR
Not restricted

Air Transportation

ICAO/IATA
Not restricted

Sea Transportation

IMDG
Not restricted

Other Transportation Information

Labels: None

15. REGULATORY INFORMATION

US Regulations

US TSCA Inventory	All components listed on inventory or are exempt.
EPA SARA Title III Extremely Hazardous Substances	Not applicable
EPA SARA (311,312) Hazard Class	None
EPA SARA (313) Chemicals	This product does not contain a toxic chemical for routine annual "Toxic Chemical Release Reporting" under Section 313 (40 CFR 372).
EPA CERCLA/Superfund Reportable Spill Quantity	Not applicable.
EPA RCRA Hazardous Waste Classification	If product becomes a waste, it does NOT meet the criteria of a hazardous waste as defined by the US EPA.
California Proposition 65	All components listed do not apply to the California Proposition 65 Regulation.
MA Right-to-Know Law	Does not apply.
NJ Right-to-Know Law	Does not apply.
PA Right-to-Know Law	Does not apply.

Canadian Regulations

Canadian DSL Inventory	All components listed on inventory or are exempt.
WHMIS Hazard Class	Un-Controlled

16. OTHER INFORMATION

The following sections have been revised since the last issue of this SDS
Not applicable

Additional Information

For additional information on the use of this product, contact your local Halliburton representative.

For questions about the Safety Data Sheet for this or other Halliburton products, contact Chemical Compliance at 1-580-251-4335.

Disclaimer Statement

This information is furnished without warranty, expressed or implied, as to accuracy or completeness. The information is obtained from various sources including the manufacturer and other third party sources. The information may not be valid under all conditions nor if this material is used in combination with other materials or in any process. Final determination of suitability of any material is the sole responsibility of the user.

*****END OF MSDS*****

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

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

LOST CREEK ISR, LLC

MEMO

Date: 10/29/2015

To: HP Files

From: Michael Gaither – Manager EHS and Reg. Affairs

Subject: SERP LC15-05 Well Perforation

SUMMARY
As a result of the ORC discussion on techniques to increase the injectivity at injection wells that had decreased flow rates, a SERP was convened to approve an experiment by which several injection wells would be perforated in increase the injectivity of the wells. The perforations would be conducted with existing oilfield technology for placing an explosive perforation charge down the well bore. The description of the process was summarized in the ORC15-03 workplan.

The SERP was convened on June 29, 2015 and approved the perforation experiment. The approval was validated by the Panel on the associated SERP form attached.

The perforation test occurred at four wells on July 14, 2015. The attached summary report provided the field data and assessment of the performance of the injection wells following the perforations.

CONCLUSION
The perforation did not prove beneficial in solving the injectivity issues. The gains in injection flow rates were not sustained and therefore was not an effective means to improve injection rates. The experiment has been concluded as of the end of August 2015.

	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-##*): LC15-05	**Date:** 6/29/2015

Proposed Change, Test, or Experiment:
Review the proposed method for stimulating injection wells by perforating the active injection horizon.

I. SERP MEMBERS

NAME	TITLE	SIGNATURE/DATE
Management: KURT BROWN	MINE MANAGER	6/29/15
Operations: JAY DOUTHIT	WF OPS SUPERINTENDENT	6-29-2015
RSO: CHRIS PEDERSEN	RSO	6/29/2015
Other: STEVE HATTEN	VICE PRES. OPERATIONS	6/30/15
Other: MIKE GAITHER	MANAGER EHS & RA	6/29/2015
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:
– PROJECT WAS SUMMARIZED AS ORC15-03.

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.

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:

Description of Process and Requirements for Perforating Injection Wells at the Lost Creek Mine

June 17, 2015

Objective:

Select up to four MU-1 injection wells which initially had high performance but have now greatly reduced infectivity. Perforate these wells in the open hole intervals using conventional oil field technology and measure their performance over time. Evaluate the data collected and determine the potential for future use.

Equipment / personnel:

1. Conventional oil field wireline truck capable of conducting perforating
2. Hollow core (pipe) barrels equipped with 19 gram shaped charges spaced at two shots per foot
    a. Barrels will be a maximum of 20 feet in length
    b. Charges should be capable of penetrating up to 5 feet into the formation with a ½ to 5/8 inch hole.
3. One operator

Process:

Selection of the wells will be made based on multiple Header House locations for wells that originally had high injection rates, have greatly fallen off at present, but still have potential to recover significant uranium at adjacent recovery wells.

Selected wells will have their injection equipment removed and a drill rig retrieve the packers and screen assembly.

When the wireline truck arrives at the mine site it will be directed to a selected well location. The barrels will already have the charges installed but they will need to be all tied together and a primer installed just prior to being run into the well casing.

The barrel will be elevated over the well and then lower to the predetermined depth and discharged. A small amount of water may momentarily over flow the well casing. The barrel will then be retrieved and set aside and another barrel readied for the next well. The expended barrels will be left on site for eventual disposal.

Following the perforating, the well will be lightly airlifted to only remove loose sand and explosive residue. Then the screen should be replaced and the well MIT'ed. Following MIT the well should be airlifted again and after that clay stabilizer introduced if used. The well can then be returned to production injection and full analysis of performance to follow.

Rad Health Considerations:

The well perforating test will only be performed on existing injection wells. As such, the well bores will only contain very small amounts of uranium and daughters that can attach to down hole equipment. Potentially contaminated equipment would include the charge barrel, end cap, top head and the wire line. All but the barrels would be checked and decontaminated if needed. This includes the surveying

wireline truck for release. The barrels would remain on site and be disposed of at a later date along with other pipe that had been used down hole for different purposes.

Down hole water, if any, that may come to the surface as a result of the perforating process will be contained in the wellhead box. Only a small amount of water is expected and can easily be contained in the box and disposed in our ponds at a later date.

The wireline operator will be provided with our standard contractor radiation and safety training. No problems are anticipated as wireline operations have been conducted at the mine site in the past connected with our waste water disposal wells.

Safety:

In addition to the standard contractor orientation, a safety meeting will be conducted with all personnel involved in the perforating operation before beginning the field activities. Two way radios will be turned off within 250 feet of perforating operations and personnel will be limited at the well sites. OSHA requirements will be in full force during this operation.

Kurt Brown

August 2015 Monthly Report – Perforated Injection Well Performance

On July 14, 2015 four Mining Unit 1 injection wells were perforated to test their long term performance. These wells were 1I-129, Header House 1; 1I-016 Header House 2; 1I-170, Header House 6; and 1I-279, Header House 7. The 6 week operational performance of these wells is discussed below:

1I-129

This injection well was placed under a 10 gpm restriction. The well operated at approximately 9 – 10 gpm for 4 weeks and then reached its maximum injection pressure after which is fell off to about 5 gpm in week 6.

1I-016

This injection well initially flowed at 27 gpm and then settled into a steady rate of 18-19 gpm for 4 weeks. After that period the well fell off to about 15 gpm during the past 2 weeks.

1I-170

This well initially flowed at 21 gpm and then steadily decreased to 7.5 gpm. For the past week this well has continued to flow at 7.5 gpm.

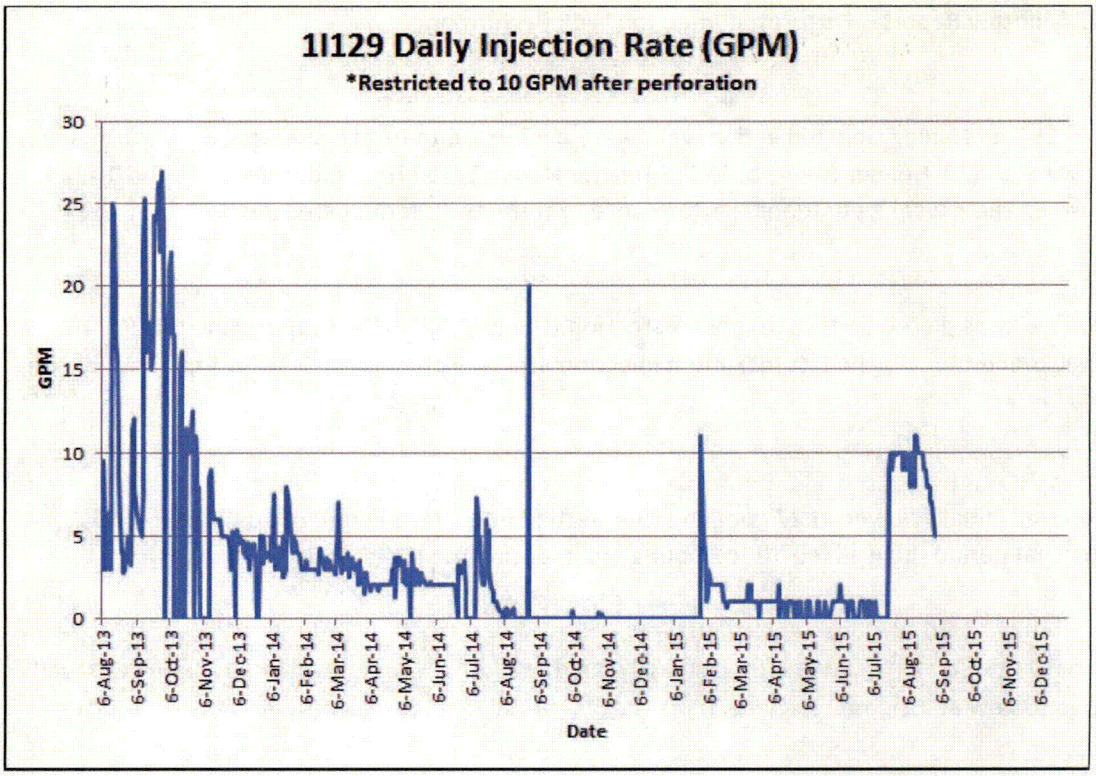
1I-279

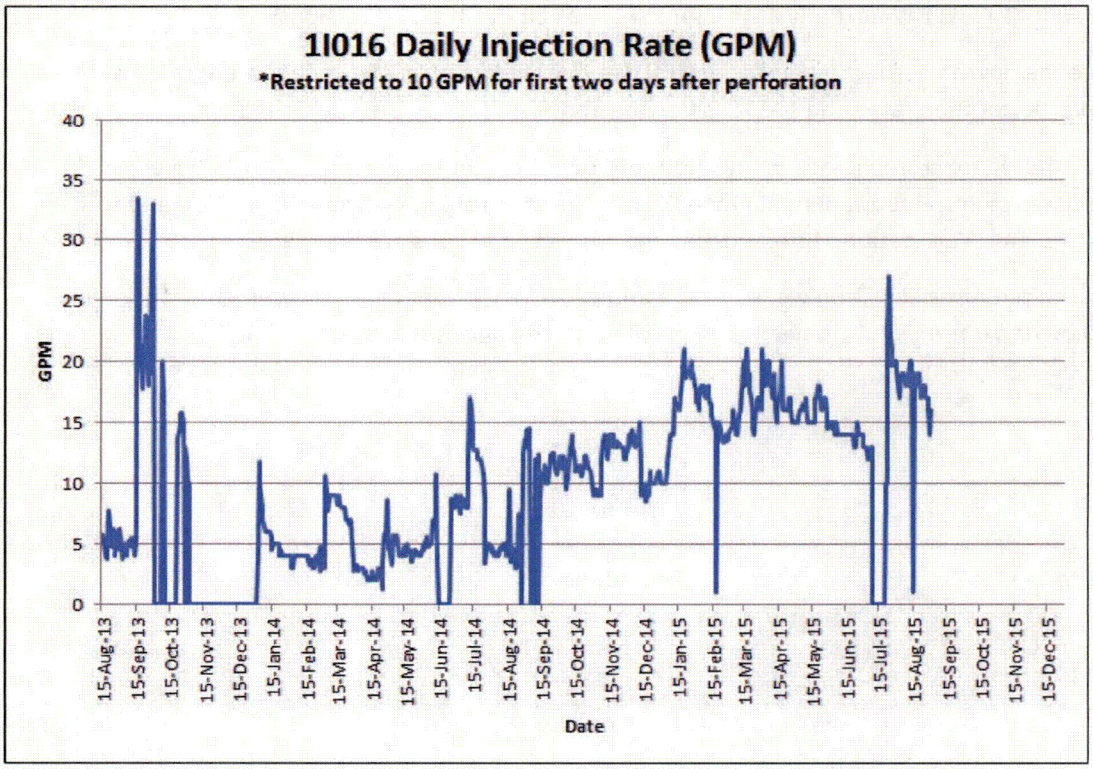
This well initially flowed at 12 gpm but rapidly dropped to 5 gpm in the first 10 days of operation and then to 2.5 gpm. The well is currently at the same flow as before the perforations.

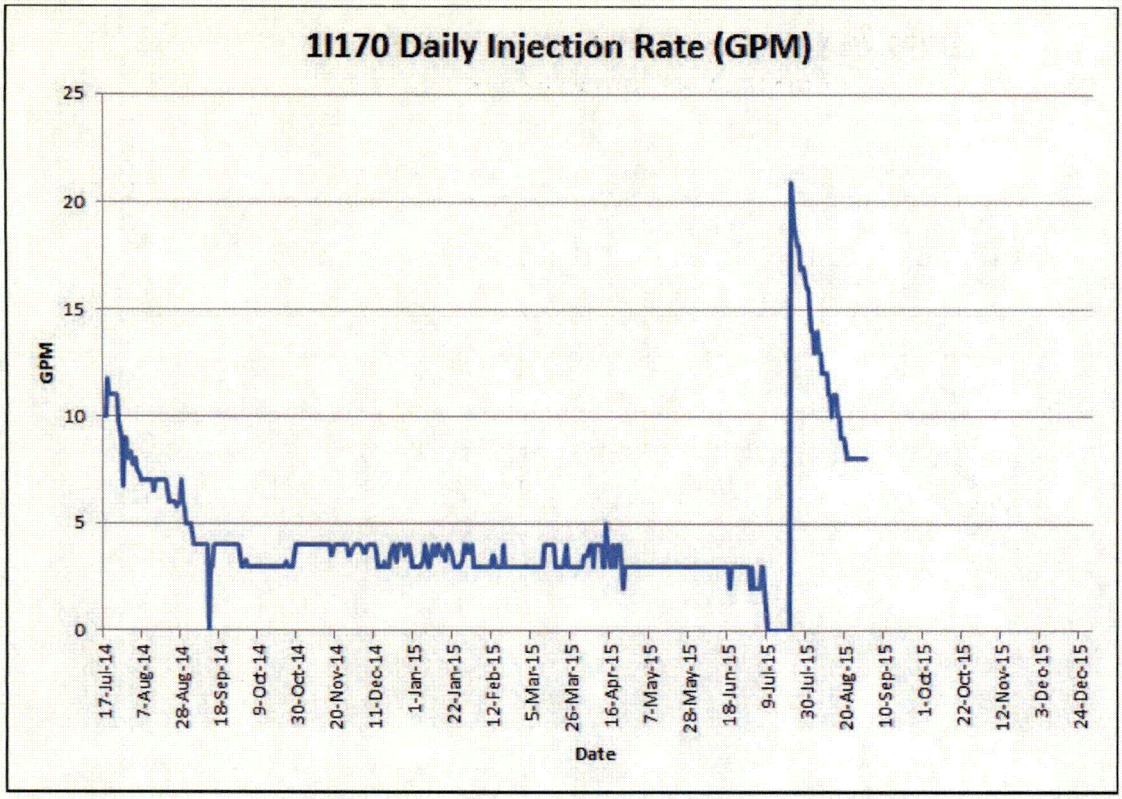
Attached are the flow charts for the wells described above. Three of the four wells are flowing at rates above the pre-perforation rates and 1I-170 is flowing above initial new well performance.

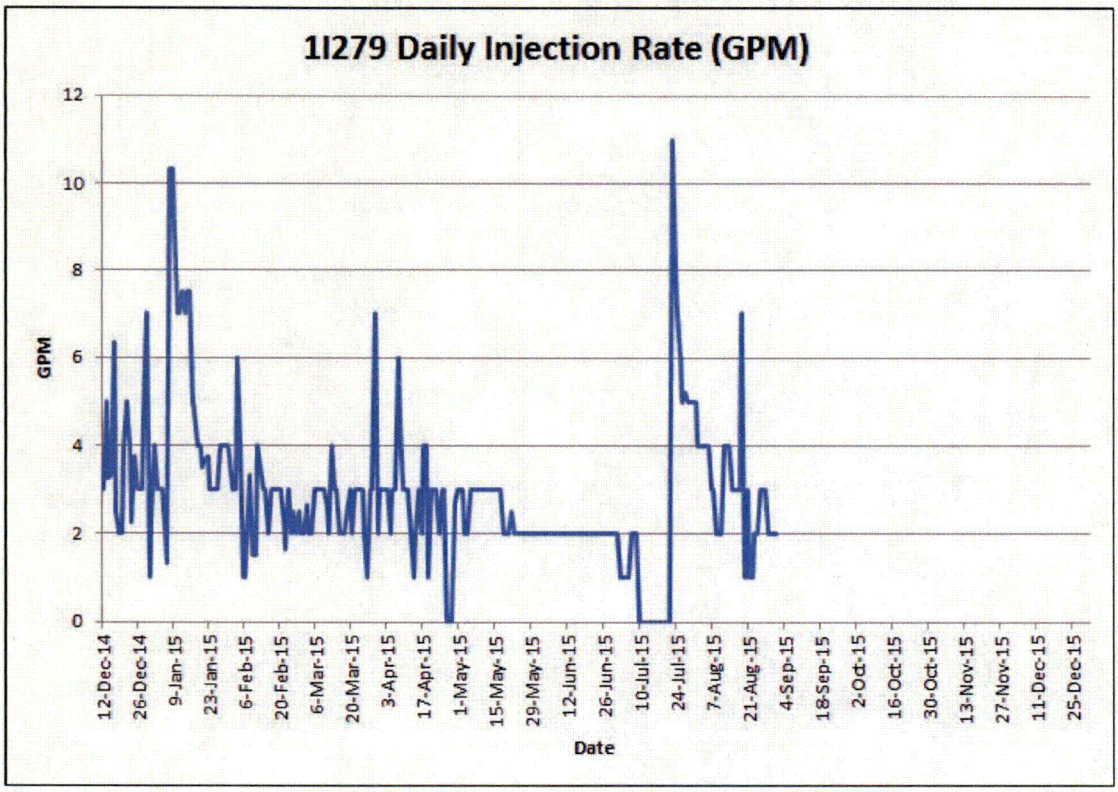
Many wells suffered from step losses of injection rate over this time period. It is now believed the losses are from releases of entrained sediment when IX columns are brought on line after elution and transfer of resin in the plant. Verification of the process and corrective actions are in progress.

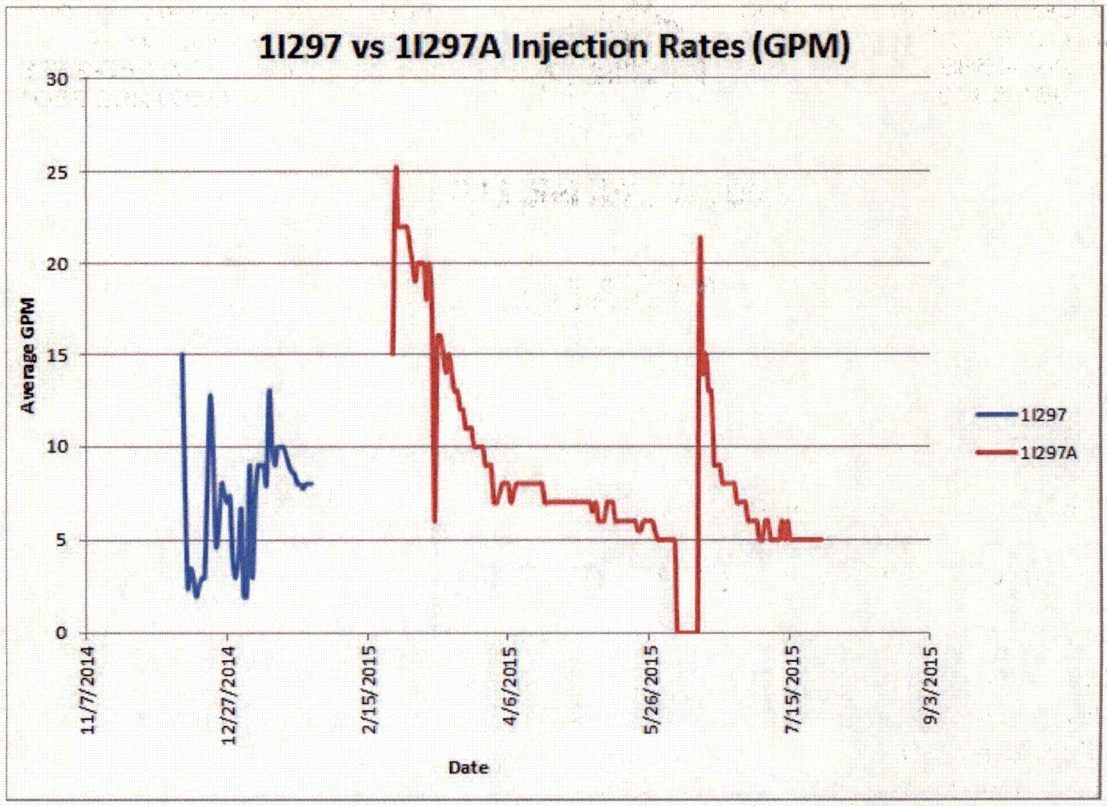
For comparison purposes, injection wells 1I-178a and 1I-297a, that are recent gravel packed injection wells, are shown that have similar injection rate fall off as the perforated wells.

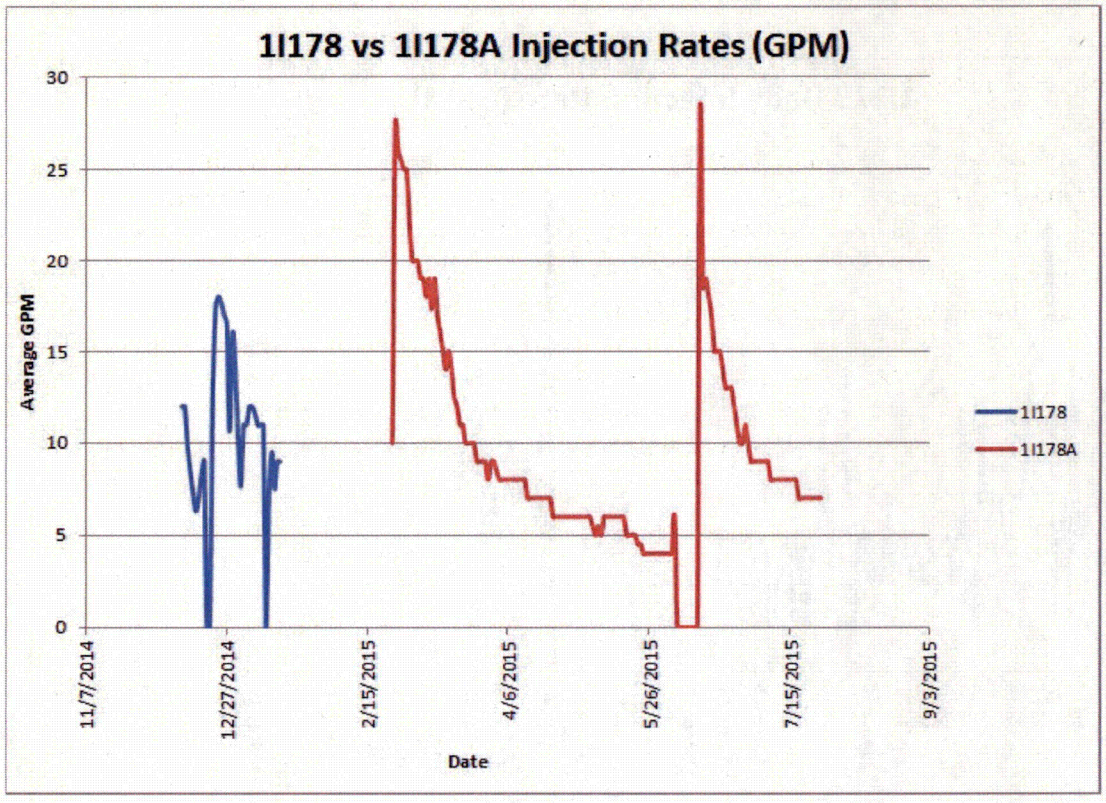

1I129 Daily Injection Rate (GPM)
*Restricted to 10 GPM after perforation
GPM
30
25
20
15
10
5
0
6-Aug-13
6-Sep-13
6-Oct-13
6-Nov-13
6-Dec-13
6-Jan-14
6-Feb-14
6-Mar-14
6-Apr-14
6-May-14
6-Jun-14
6-Jul-14
6-Aug-14
6-Sep-14
6-Oct-14
6-Nov-14
6-Dec-14
6-Jan-15
6-Feb-15
6-Mar-15
6-Apr-15
6-May-15
6-Jun-15
6-Jul-15
6-Aug-15
6-Sep-15
6-Oct-15
6-Nov-15
6-Dec-15
Date


1I016 Daily Injection Rate (GPM)
*Restricted to 10 GPM for first two days after perforation
GPM
40
35
30
25
20
15
10
5
0
15-Aug-13
15-Sep-13
15-Oct-13
15-Nov-13
15-Dec-13
15-Jan-14
15-Feb-14
15-Mar-14
15-Apr-14
15-May-14
15-Jun-14
15-Jul-14
15-Aug-14
15-Sep-14
15-Oct-14
15-Nov-14
15-Dec-14
15-Jan-15
15-Feb-15
15-Mar-15
15-Apr-15
15-May-15
15-Jun-15
15-Jul-15
15-Aug-15
15-Sep-15
15-Oct-15
15-Nov-15
15-Dec-15
Date


1I170 Daily Injection Rate (GPM)
GPM
25
20
15
10
5
0
17-Jul-14
7-Aug-14
28-Aug-14
18-Sep-14
9-Oct-14
30-Oct-14
20-Nov-14
11-Dec-14
1-Jan-15
22-Jan-15
12-Feb-15
5-Mar-15
26-Mar-15
16-Apr-15
7-May-15
28-May-15
18-Jun-15
9-Jul-15
30-Jul-15
20-Aug-15
10-Sep-15
1-Oct-15
22-Oct-15
12-Nov-15
3-Dec-15
24-Dec-15
Date


1I279 Daily Injection Rate (GPM)
GPM
12
10
8
6
4
2
0
12-Dec-14
26-Dec-14
9-Jan-15
23-Jan-15
6-Feb-15
20-Feb-15
6-Mar-15
20-Mar-15
3-Apr-15
17-Apr-15
1-May-15
15-May-15
29-May-15
12-Jun-15
26-Jun-15
10-Jul-15
24-Jul-15
7-Aug-15
21-Aug-15
4-Sep-15
18-Sep-15
2-Oct-15
16-Oct-15
30-Oct-15
13-Nov-15
27-Nov-15
11-Dec-15
25-Dec-15
Date


1I297 vs 1I297A Injection Rates (GPM)
Average GPM
30
25
20
15
10
5
0
11/7/2014
12/27/2014
2/15/2015
4/6/2015
5/26/2015
7/15/2015
9/3/2015
Date
1I297
1I297A


1I178 vs 1I178A Injection Rates (GPM)
Average GPM
30
25
20
15
10
5
0
11/7/2014
12/27/2014
2/15/2015
4/6/2015
5/26/2015
7/15/2015
9/3/2015
Date
1I178
1I178A

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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: February 3, 2016

To: EHS Files

From: Michael Gaither – Manager EHS and Reg. Affairs

Subject: SERP LC15-06 Pond Netting Installation

Members:

Kurt Brown, Mine Manager
Matt Jaynes, Project Engineer
Chris Pedersen, RSO
Michael Gaither, Manager EHS and Reg. Affairs

SUMMARY

SERP 15-06 *Pond Netting Installation* was completed in December 2015 pursuant to an NRC recommendation for documented review, by the Safety and Environmental Review Panel (SERP), of the installation of bird netting on the Lost Creek Storage Ponds. Initial planning, design and engineering began in August 2014. Subsequent to that, an Operational Review Committee (ORC) was convened in May 2015, at which time it was determined that a SERP was not required as this action was a compliance effort related to a BLM Record of Decision (ROD). Construction of the pond netting then occurred in June 2015.

A SERP was convened on December 17, 2015 to review the ORC planning, design and construction. Upon review of the ORC, it was determined that the SERP would have approved the installation had they convened for the initial planning. The approval of the installation was validated by the panel with signatures on the associated SERP form attached.

BACKGROUND

In the BLM ROD for the Lost Creek ISR Project (Table 4), BLM identified additional measures to protect wildlife at the project which included measures to prevent mortality of protected birds. The measures included additional water quality monitoring and "those to keep selenium levels below 0.02 mg/L, covering the storage ponds, or other mitigation measure(s) to be approved by the BLM wildlife biologist".

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.

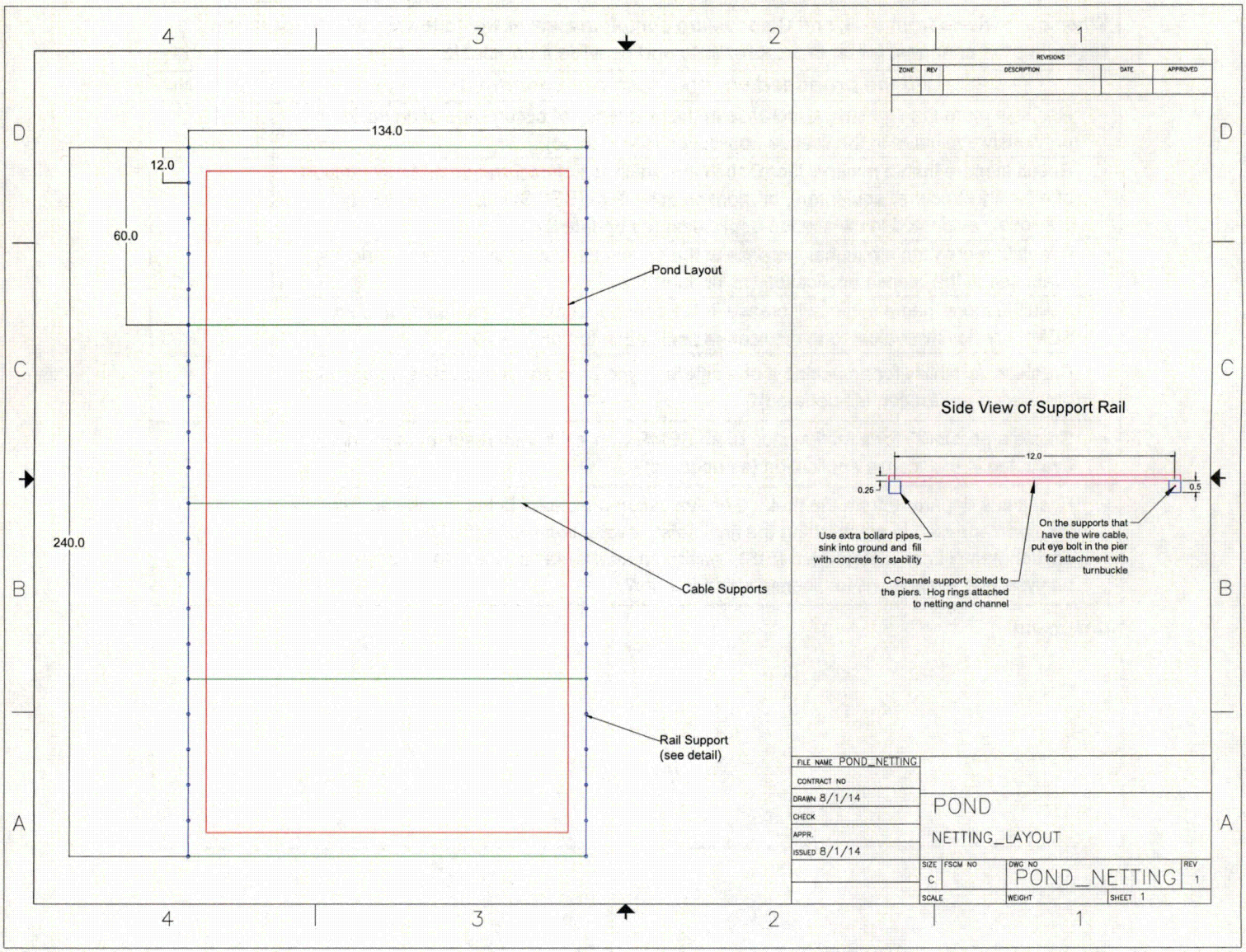
☑ Review the proposed change to determine if any adjustment to the financial surety would be necessary. Surety must be updated through a license amendment or the annual surety update before the proposed change takes place.

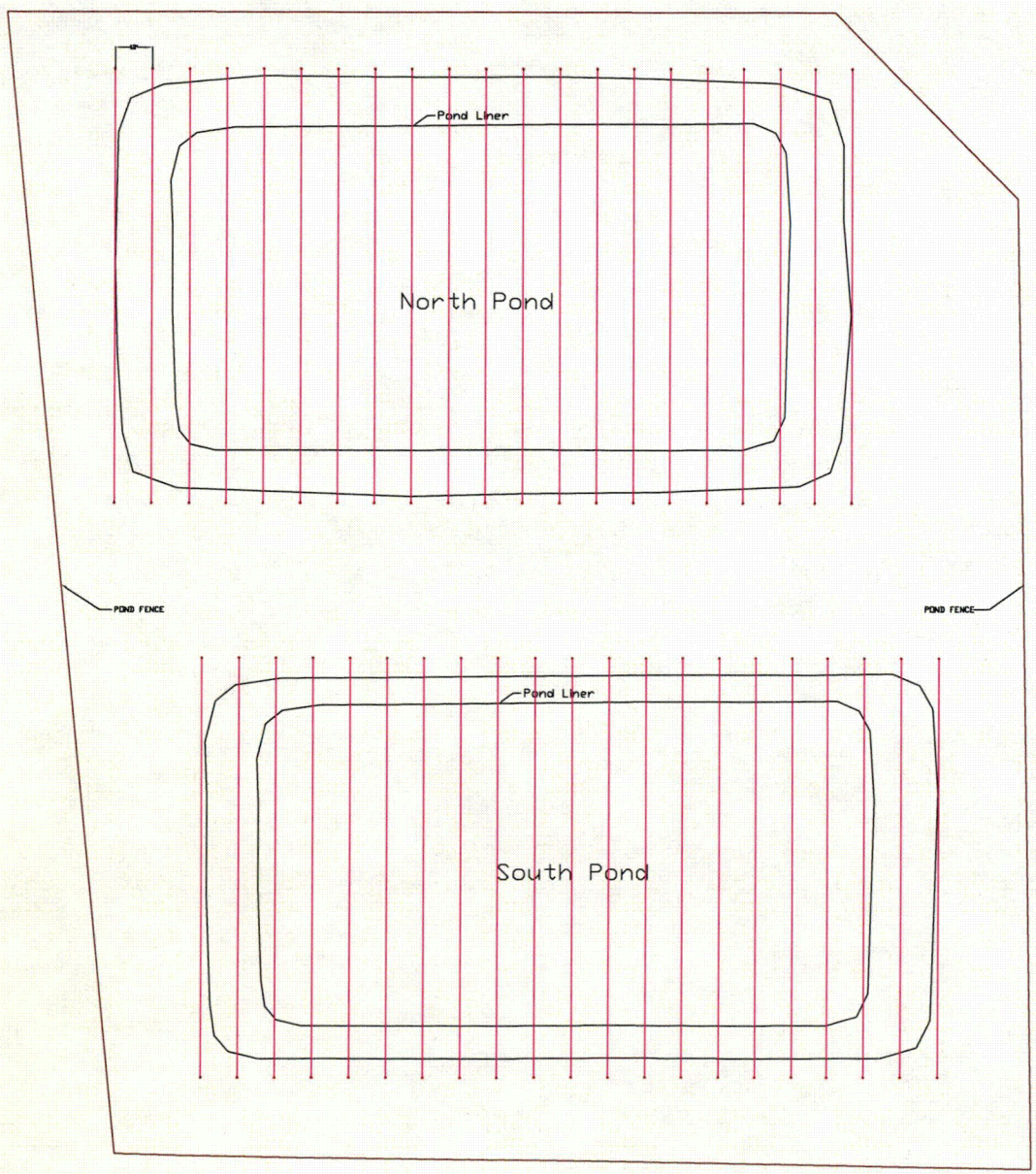
IV. SERP QUESTIONS

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:


4
3
2
1
D
C
B
A
134.0
12.0
60.0
240.0
Pond Layout
Cable Supports
Rail Support
(see detail)
REVISIONS
ZONE
REV
DESCRIPTION
DATE
APPROVED
Side View of Support Rail
12.0
0.25
0.5
Use extra bollard pipes, sink into ground and fill with concrete for stability
C-Channel support, bolted to the piers. Hog rings attached to netting and channel
On the supports that have the wire cable, put eye bolt in the pier for attachment with turnbuckle
FILE NAME POND_NETTING
CONTRACT NO
DRAWN 8/1/14
CHECK
APPR.
ISSUED 8/1/14
POND
NETTING_LAYOUT
SIZE
C
FSCM NO
DWG NO
POND_NETTING
REV
1
SCALE
WEIGHT
SHEET 1

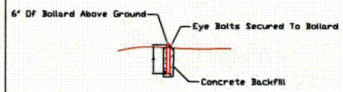


PERIMETER FENCE

BIRD NETTING PROJECT:

SIDE VIEW:

(QTY 42 Bollards Per Pond)



ISOMETRIC VIEW: