UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

July 23, 2015

Mr. John Cash, Vice President
Lost Creek ISR, LLC
5880 Enterprise Drive, Suite 200
Casper, WY 82609

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION, CLASS V DISPOSAL AMENDMENT, LOST CREEK ISR, LLC, SWEETWATER COUNTY, WYOMING, LICENSE SUA-1598 (TAC L00782)

Dear Mr. Cash:

By letter dated March 3, 2015, (U.S. Nuclear Regulatory Commission (NRC) Agencywide Documents Access and Management System (ADAMS) Accession No. ML15076A380 Lost Creek ISR, LLC (Lost Creek) submitted a request for the UIC Class V Amendment to the Source and Byproduct Materials License SUA-1598. Lost Creek's amendment request consists of disposing of liquid waste into UIC Class V Wells. The UIC Class V Wells are shallow wells in the uppermost aquifer. Lost Creek proposes to inject liquid waste into at least one but up to four on-site wells. The liquid waste will contain licensed material at concentrations less than the effluent concentrations in 10 CFR Part 20, Appendix B, Table 2.

NRC staff is reviewing the amendment request and identified certain areas of deficiency for which we are requesting additional information. Staff's request for additional information (RAI) is enclosed. Staff is willing to meet with LCI to discuss and/or clarify staff's expectations for the enclosed RAI, otherwise please either respond to this RAI or provide a schedule for submitting your responses within 30 days of receipt of this letter.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html.

If you have any questions, please contact me at (301) 415-0697, or at John.Saxton@nrc.gov.

Sincerely,

/RA/

John Saxton, Hydrogeologist
Uranium Recovery Licensing Branch
Division of Decommissioning, Uranium Recovery,
and Waste Programs
Office of Nuclear Material Safety
and Safeguards

Docket No.: 040-09068
License No: SUA-1598

Enclosure:
Requests for Additional Information

cc:
Mr. Brian Wood, WDEQ
Mr. John Russell, BLM

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UIC Class V Amendment
Request for Additional Information

Background

By letter dated March 3, 2015, Lost Creek ISR, LLC (Lost Creek) submitted a request for the UIC Class V Amendment to the Source and Byproduct Materials License SUA-1598. Lost Creek's amendment request consists of disposing of liquid waste into UIC Class V Wells. The UIC Class V Wells are shallow wells in the uppermost aquifer. Lost Creek proposes to inject liquid waste into at least one but up to four on-site wells. The liquid waste will contain licensed material at concentrations less than the effluent concentrations in 10 CFR Part 20, Appendix B, Table 2.

This is an innovative approach for managing excess permeate which otherwise may need to be injected into a UIC Class I deep well. Conceptually, this proposal has several aspects that are beneficial. First, the consumptive use of groundwater by the operations will be offset by the injection of clean water back into the shallow aquifer, albeit at a slightly higher stratigraphic level than the in situ operations. Second, the volume of material injected into the deep well will be reduced.

Staff has reviewed the amendment request and has the following Request for Additional Information (RAI) to complete the review.

Licensee's Stated Regulatory Basis

Unfortunately, because no guidance is available to inform the licensee on information needed to support for such a request for disposal of liquid effluent from an In Situ Recovery (ISR) operation into a shallow well. In Section 5.1 of the Technical Report, the applicant states the following with regard to meeting applicable NRC's regulations:

> *Most of the source waters listed above are defined by the NRC as byproduct material because they were generated during the recovery of uranium. As such, the average analyte composition of the fluids must be less than the corresponding effluent standard in 10 CFR 20 Appendix B, Table 2, Column 2 prior to being injected into a UIC Class V well or better than the background quality of the groundwater. In other words, the average quality of the effluent must be better than the NRC effluent standard or the baseline water quality; whichever is higher.*

Also, in the environmental report, the applicant states the following:

> *Lost Creek ISR, LLC (LCI) is submitting this Environmental Report (ER) to the United States (US) Nuclear Regulatory Commission (NRC) in support of an amendment to license SUA-1598 in accordance with the Atomic Energy Act of 1954, as amended, 10 Code of Federal Regulations (CFR) Parts 20, 40, 51, and 70, and other applicable laws, regulations and NRC guidelines.*

Regulatory Basis

Summary of Applicable Regulation Sections

A summary of the regulation sections applicable to this request is as follows:

10 CFR Part 20
- Subpart B Radiation Protection Programs
  - 10 CFR 20.1101 Radiation protection programs
- Subpart D Radiation Dose Limits to Individual Members of the Public
  - 10 CFR 20.1301 Dose limits for individual members of the public
  - 10 CFR 20.1302 Compliance with dose limits for individual members of the public
- Subpart K Waste Disposal
  - 10 CFR 20.2001 General requirements
  - 10 CFR 20.2002 Method for obtaining approval of proposed disposal procedures
- Appendix B, Table 2 Effluent Concentration

10 CFR Part 40
- 10 CFR 40.32 General Requirements for issuance of specific requirements
- 10 CFR 40.44 Amendment of licenses at request of licensee
- 10 CFR 40.45 Commission action on applications to renew or amend
- 10 CFR 40.65 Effluent monitoring reporting requirements

The applicable Guidance Documents are as follows:

- Regulatory Guide 8.37 ALARA Levels for Effluents from Materials Facilities
- NUREG-1569 Standard Review Plan for In Situ Leach Uranium Extraction License Applications

Specific Regulations

The regulations governing the waste disposal of license material are found in 10 CFR Part 20, Subpart K *Waste Disposal*. The two sections pertinent to this review are Sections 20.2001 and 20.2002. Section 10 CFR 20.2001 specifies that the licensed material can be disposed of by only one or more of eight methods, including as authorized under Section 20.2002.

Section 10 CFR 20.2002 specifies information needed for Commission approval of the proposed waste disposal procedures "not authorized in the regulations." The injection of liquid waste using a Class V well is onsite disposal of radioactive material, which requires authorization under 10 CFR 20.2002. NRC guidance on onsite disposal under 10 CFR 20.2002 is provided in Section 15.12.3 of NUREG-1757, Vol. 1, Rev. 2, and NRC's public website (www.nrc.gov/waste/llw-disposal/10cfr20-2002-info.html). NRC's practice is to approve onsite disposal based on a dose criterion of a few millirem per year, in the range of 3 to 10 millirem per year. This practice is codified in the regulations for effluent discharges at nuclear power plants (see 10 CFR Part 50 Appendix I) and the as low as reasonable achievable (ALARA) philosophy fulfilling the requirement of 10 CFR 20.1301.

RAI-1 – Table 3, Effluent Limits

A) On Page 1, Lost Creek states that the wells will be UIC Class V, Subclass 5C3 wells "Industrial Process Water and Waste Disposal Facility" in accordance with Wyoming Department of Environmental Quality Rule and Regulations. In Section 5.1, Lost Creek states that the "average analyte composition of the fluids must be less than the corresponding effluent standard in 10 CFR 20 Appendix B, Table 2, Column 2". Table 3.3 *Effluent Limits* contains a column titled "Injectate Limit" but not a specific column for effluent limits.

   Please clarify the following:

   (1) NRC considers the fluid as 11e.(2) byproduct material even though it is treated to meet the effluent limits in 10 CFR Part 20. Please explain how the proposed onsite disposal of the treated byproduct material meets the ALARA principle (i.e., NRC's policy for a dose criterion of a few millirem per year). The dose assessment for onsite disposals should include site-specific, realistic scenarios.

   (2) Include a column titled "Effluent Limit" on Table 3.3 (or notation that the "Injectate Limit" are the proposed effluent limits.

B) Please provide justification that the use of observed "maximum values" is appropriate for the Receiving Aquifer Background values, and, for several parameters, the injectate or effluent limit in Table 3-3.

C) Please correct the regulation referenced in the column on Table 3-3 titled "EPA MCL: 40 CFR 140" and in the narrative of the report to the proper regulation (10 CFR Part 141).

D) Please correct the units for the EPA MCL for Gross Beta to 4 millirems per year and not (pCi/L)

E) Please provide calculations for determining Gross Alpha levels in the Receiving Aquifer Background Values

F) Please clarify why the levels for the Th-230, Pb-210 and Po-210 in the Receiving Aquifer Background include both dissolved and suspended fractions whereas the future monthly composite will only analyze the dissolved fraction.

RAI 2 - Receiving Aquifer Properties

In the amendment request submitted to NRC, Lost Creek elected to include only qualitative statements and no data from the pumping test data apparently performed in support for the UIC permit. The qualitative statements provides no basis for staff's evaluation of the following licensee's conclusion in Section 2.4: "thus limiting or negating the effect on nearby Mine Unit 1 and 2 receiving aquifer monitor well water levels". Staff's concern is not specifically water level changes in the receiving aquifer, but also: (1) the potential for migration of the injectate to the nearby mine units affecting the water quality of the monitoring program during the life of the mine units; and (2) potential for mounding in the area of the surface impounds affecting the safety of the impoundment liners.

Please clarify or provide backup data for the following:

A) Hydraulic Conductivity - Appendix B uses a value of 0.59 feet per day for the PHAST analysis but the calculations in Section 4.2 Maximum Area of Impact and Section 22.4 Receiving Aquifer Characteristics uses or suggest that the horizontal hydraulic conductivity exceeds 1 foot per day.
B) Specific Capacity - Section 2.4 states the specific capacity calculation was approximately 1 gpm per foot of drawdown. If correct, then for injection of 200 gallons per minute at a single well would result in an increase in head at the injection well to ground surface and potential spill at the surface.
C) Drawdown - Section 2.4 states that drawdown in monitoring well M-FG8 was about an eighth of the expected drawdown implying the North Fault acted as a barrier to flow toward Mine Unit 1.
D) Please provide the estimated distance traveled for the injected effluent for the duration of operations and restoration of mine unit 1.

RAI 3 - Reporting Requirements

In Section 6.0, the applicant discusses its monitoring program but did not include a discussion on evaluation and reporting of the data. The licensee will have to report the quantity of each principal radionuclide released by the effluent discharges, including liquid effluents, in accordance with requirements of 10 CFR 40.65.

Please clarify that Lost Creek will include the quantity of the principal radionuclides released by the proposed activities in accordance with requirements of 10 CFR 40.65.

Please clarify that Lost Creek will review the effluent monitoring program in the annual audit of the Radiation Protection Program.

RAI 4 - Potentiometric Pressure Increase

The proposed injection of up to 200 gpm will increase the potentiometric head in the surrounding aquifer. Depending upon the interconnection between the FG and HJ horizons and effectiveness of the North Fault as a barrier, the increase may affect the water levels in monitoring wells used for the excursion monitoring program. Please provide a description of: (1) the anticipated impacts; and (2), should those impacts be measurable, procedures to account for those impacts.