

**SAFETY EVALUATION REPORT
REVIEW OF REQUEST FOR THE REMOVAL OF LICENSE CONDITION 10.19 REQUIRING
CONTINUOUS COLLECTION OF METEOROLOGICAL DATA
LOST CREEK ISR, LLC LOST CREEK PROJECT
SWEETWATER COUNTY, WYOMING**

Docket No.: 040-09068

License No.: SUA-1598

Date: February 8, 2018

Facility: Lost Creek Project

Technical Reviewer: Ronald A. Burrows

Project Manager: John L. Saxton

SUMMARY AND CONCLUSIONS:

By letter dated March 4, 2016, (LCI, 2016), Lost Creek ISR, LLC (LCI, or the licensee) submitted to the U.S. Nuclear Regulatory Commission (NRC), for review and approval, a request to amend its Materials License SUA-1598 (license) by removing License Condition (LC) 10.19. LC 10.19 requires LCI to collect data from its onsite meteorological station on a continuous basis until the NRC staff determines that the data are representative of long-term conditions. As documented in this Safety Evaluation Report (SER), available NRC guidance for non-reactor facilities lacks specific information on acceptable statistical or analytical methodologies for staff to use in determining "long-term representativeness". In support of their request, LCI submitted supporting information (LCI, 2017; 2018), which included an alternative approach to an analysis of representativeness different than that based on statistical methodologies suggested by staff in a previous safety evaluation report covering this issue (NRC, 2013). Staff finds that through this alternative analysis, the data submitted by LCI in this request is of sufficient duration and quality to accept it as representative of long-term conditions. Therefore, the NRC staff finds removal of LC 10.19 from Materials License SUA-1598 to be appropriate.

TECHNICAL REVIEW:

Background

In its August 2011 Safety Evaluation Report (SER) for the license application (NRC, 2011a), the NRC staff found that LCI provided meteorological data to represent conditions at the site; however, the NRC staff also found that LCI had not statistically analyzed the data to demonstrate that the data provided was representative of long-term meteorological conditions. Because of this finding, the NRC staff required a license condition for LCI to continue collecting meteorological data at the Lost Creek Project until the NRC staff determined that the collected data were representative of long-term conditions. That license condition was originally

Enclosure

numbered as LC 12.8 (preoperational) (NRC, 2011b).

By letter dated April 22, 2013 (NRC, 2013), the NRC issued Amendment No. 1 to LCI's license. Part of this amendment addressed a proposed change by LCI to remove the commitment to continue operating the Lost Creek meteorological station. In its SER supporting this amendment, the NRC staff found that LCI did not meet the requirements of LC 12.8 by providing NRC staff with a proper statistical analysis of the meteorological data demonstrating long-term representativeness of that data. The NRC staff renumbered LC 12.8 (as a pre-operational license condition) as LC 10.19 (as an operational license condition), leaving the requirement unchanged. LCI's current license (NRC, 2016a) contains LC 10.19 describing the conditions whereby the licensee may terminate the collection of meteorological data, as follows:

- 10.19 The licensee will continue to collect additional meteorological data on a continuous basis at a data recovery rate of 90 percent until the data collected is determined by the NRC to be representative of long-term conditions. Justification of the similarity or validity of the data will include analysis of the statistical data presented to illustrate confidence in the representativeness of the data. The data collected shall include, at a minimum, temperature, precipitation, wind speed, wind direction, and an annual wind rose. The submittal shall include a summary of the stability classification.

The purpose of this SER is limited to the NRC staff's review of the meteorological data submitted by LCI (LCI, 2017; 2018) to determine if the meteorological data used for assessing impacts are representative of expected long-term conditions at and near the site, consistent with NRC review guidance (NRC 2003). The NRC staff had previously found the meteorological data collected by LCI to be of sufficient quality and acceptable for use in calculations to determine effluent concentrations and radiation doses (Section 2.2, NRC, 2011a). In addition, the NRC staff previously found that LCI placed their air monitoring stations at acceptable locations to meet the operational environmental monitoring requirements in Criterion 7 of Appendix A to 10 CFR Part 40 (refer to Section 5.7.8.3.2.1 of NRC, 2011a).

Regulatory Requirements and Available Guidance

The requirements in 10 CFR 40, Appendix A, Criterion 7, specify that a preoperational monitoring program must be conducted to provide complete baseline data on a milling site and its environs at least one full year prior to any site construction.

Acceptance criterion 2.5.3(3) of NUREG-1569 (NRC, 2003), states that "[t]he characterization of the site meteorology is acceptable if ... the meteorological data used for assessing impacts are substantiated as being representative of expected long-term conditions at and near the site" (NRC, 2003). Additional guidance on assessing whether short-term meteorological data are representative of long-term conditions is provided in the fourth paragraph of Regulatory Position C.1 of Regulatory Guide 3.63, "Onsite Meteorological Measurement Program for Uranium Recovery Facilities – Data Acquisition and Reporting" (NRC, 1988), which states:

The minimum amount of meteorological data needed for a siting evaluation is considered to be that amount of data gathered on a continuous basis for a consecutive 12-month period that is representative of long-term (e.g., 30 years) meteorological

conditions in the site vicinity. To determine whether the period during which the onsite data was collected is representational, compare a concurrent period of meteorological data from a National Weather Service (NWS) station with the long-term meteorological data from that NWS station. The NWS station selected for this comparison should, if possible, be in a similar geographical and topographical location and be reasonably close (preferably within 50 miles (80 kilometers)) to the site. In some sections of the country, the spacing between NWS stations may necessitate the selection of an NWS station more than 50 miles away. The reduced data and supportive documentation should be retained and should be available for review for the period of facility operation.

Regulatory Guide 3.63 (NRC, 1988) does not include guidance on acceptable methods, qualitative or quantitative, for comparing concurrent and long-term meteorological data from a nearby NWS station.

NRC Staff Evaluation

In its March 4, 2016, letter (LCI, 2016), LCI submitted various onsite meteorological data for the Lost Creek Project and statistical analyses for some of these data. The onsite data collected included horizontal wind speed and direction, standard deviation of horizontal wind speed (sigma theta), ambient temperature at a height of 2 and 10 meters, precipitation, solar radiation, and relative humidity. LCI also provided wind roses for the time period June 2007 through July 2015. Subsequent to the March 4, 2016 letter (LCI, 2016), LCI submitted a revised data set that included only datasets that met the established quality criterion (at least 90 percent recovery rate) and provided an alternative analysis of the data (LCI, 2017; 2018). The NRC staff used the revised data and analyses submitted by the applicant (LCI, 2018) for its analysis of this licensing action.

The alternative analysis provided by the applicant focused on the period of record (POR), which is the length of time a meteorological parameter (e.g., wind speed) is measured, and a qualitative analysis of differences in yearly measurements, to demonstrate long-term representativeness. In order to assess the proposed alternative analysis, the NRC staff reviewed guidance documents prepared by the NRC staff and others, as well as NRC-endorsed Standards in order to determine current state-of-the-art evaluation of the representativeness of short-term data to long-term conditions. A current discussion of the NRC staff's use of these documents and standards is documented in NRC, 2017. The current state-of-the-art leads the NRC staff to find that an onsite meteorological record of 5 years, with 3 or more whole years of consecutive annual cycles (all 5 years of consecutive annual cycles are preferred), can be used to demonstrate representativeness as an alternative to establishing representativeness in accordance with Regulatory Guide 3.63, Regulatory Position C.1.

The NRC staff focused its analysis of meteorological data representativeness on the parameters of wind direction, wind speed, and atmospheric stability class distribution. Atmospheric stability is defined as the amount of turbulent mixing in the atmosphere and its effect on effluent dispersion (NRC, 2007). The reason for using these parameters is that they were used in the siting of LCI's environmental monitoring stations and its initial assessment of potential radiological impacts of its operations. Although the NRC staff has since approved (NRC,

2016b) LCI's methodology for evaluating the member(s) of the public likely to receive the highest exposures from licensed operations consistent with 10 CFR 20.1302, any analyses by LCI using the MILDOS computer code should use meteorological data that are representative of long-term conditions at the site.

Acceptability of meteorological data collected at the Lost Creek site

The guidance in Regulatory Guide 3.63 (NRC, 1988) recommends that meteorological systems should be maintained to ensure an annual data recovery of at least 90 percent for each individual parameter measured. Referring to the meteorological parameters measured on site (temperature, humidity, wind speed, wind direction, precipitation, and solar radiation), LCI provided a table of annual meteorological data recovery rates (refer to Table 1 of LCI, 2018).

Based on the guidance in Regulatory Guide 3.63 (NRC, 1988), and the information provided in Table 1 by LCI (LCI, 2018), the NRC staff finds that the meteorological data for the years 2009 – 2010, and 2012 – 2014 are valid for the purpose of demonstrating long-term representativeness because the data met the 90 percent criterion.

The data set provided by the applicant (LCI, 2018) for establishing a POR to demonstrate long-term representativeness is also consistent with analogous NRC staff findings for a minimum meteorological record (NRC, 2017). Specifically, the applicant provided a data set that included an onsite meteorological record of 5 years with 3 years of consecutive annual cycles.

Qualitative analyses

The NRC staff evaluated the bar charts (Figures 6, 7, and 8 of LCI, 2018) and wind roses (Appendix A of LCI, 2018) for the comparisons of wind speed, wind direction, and stability category provided by LCI for the onsite meteorological station (LCI, 2018). The purpose of evaluating the graphical data was to determine if any of the data were clearly different enough to dismiss the POR collection period (2009 – 2010, and 2012 – 2014) as unrepresentative of the long-term meteorological conditions in the site vicinity.

The NRC staff finds that stability categories are consistent from year to year (Figure 8 of LCI, 2018). Regarding wind speed, Figure 7 (LCI, 2018) shows a strong similarity between all periods evaluated. There appears to be no more than a 1 to 7 percent difference across all wind speed categories. Likewise, the wind direction comparison (Figure 6 of LCI, 2018) demonstrates a strong similarity between the two periods evaluated. Here, there appears to be no more than a 1 to 5 percent difference across all wind direction categories. The largest discrepancy appears to be in the west-southwest and west wind direction categories. However, after evaluating the short-term and long-term wind roses, any differences in the bar charts do not appear meaningful. Specifically, the wind roses in Appendix A (LCI, 2018) indicate that the top three prevailing wind directions (west, west-southwest, and southwest), as well as the least prevalent wind directions, are the same for all evaluation periods. The NRC staff additionally observes that the summary wind rose in Appendix A for the POR collection period (2009 – 2010, and 2012 – 2014) is in general agreement with the Lost Creek wind data initially evaluated by the NRC staff for the licensing review of the Lost Creek site (refer to Figure 2.2-3 of NRC, 2011a). In addition, the NRC staff evaluated the wind rose for each individual year with

valid data (i.e., an annual data recovery rate of at least 90 percent), which include the years 2009-2010 and 2012-2014, and noted no major discrepancies with the wind data initially evaluated by the NRC staff for the licensing review of the Lost Creek site (refer to Figure 2.2-3 of NRC, 2011a). Therefore, no additional evaluation of air monitoring station locations is necessary.

Conclusion

Since LCI provided a minimum of 3 consecutive years of valid onsite meteorological data, with an additional 2 years of nonconsecutive valid meteorological data, the NRC staff considers LCI's meteorological record complete. In addition, based upon the NRC staff's review of LCI's meteorological data and finding no discrepancies with that data, the NRC staff considers LCI's meteorological record sufficient to support its alternative approach for adequately representing long-term variability in meteorological conditions onsite, and finds that these data meet Acceptance Criterion 2.5.3(3) of NUREG-1569 (NRC, 2003).

Therefore, the NRC staff will remove LC 10.19 from Materials License SUA-1598 and amend LC 9.2 to include the commitments, representations, and statements made by LCI in the submissions dated November 17, 2017 (LCI, 2017) and February 6, 2018 (LCI, 2018). License Condition 9.2 is also referred to as the "tie down" condition. Under this license condition, the NRC requires the licensee to conduct operations in accordance with the commitments, representations, and statements contained in the license application and other submissions as noted. Since the licensee has made additional commitments, representations, and statements in submissions to the NRC as discussed in prior sections of this Safety Evaluation Report, the NRC staff will amend this license condition to add references to those commitments, representations, and statements.

The License Conditions 9.2 and 10.19 will be modified as follows:

- 9.2 The licensee shall conduct operations in accordance with the commitments, representations, and statements contained in the license application dated March 31, 2008 (Agencywide Documents Access and Management System (ADAMS) Accession No. ML081060525), which is supplemented by the submittals dated December 12, 2008 (ML090080451), January 16, 2009 (ML090360163), February 27, 2009 (ML090840399), August 5, 2009 (ML092310728), April 22, 2010 (ML102100263, ML102420249), May 14, 2010 (ML101600528), June 17, 2010 (ML101720161), June 24, 2010 (ML101820155), November 11, 2010 (ML103210590), November 16, 2010 (ML103280186), December 3, 2010 (ML103490862), September 13, 2011 (ML112580267), November 8, 2011 (ML11319A196), January 6, 2012 (ML120470353), February 10, 2012 (No. ML12048A678), February 17, 2012 (ML12053A326), March 5, 2012 (120670278), July 27, 2012 (ML12219A076), July 31, 2012 (ML12244A404), November 8, 2012 (ML13029A734), November 29, 2012 (ML12335A016), March 27, 2013 (ML13100A138), January 16, 2015 (ML15029A423), March 3, 2015 (ML15076A380), July 28, 2015 (ML15218A055), August 17, 2015 (ML15239A726), January 26, 2016 (ML16043A365), February 8, 2016 (ML16042A069), November 17, 2017 (ML17339A110), and February 6, 2018 (ML18043A086). The approved

application and supplements are, hereby, incorporated by reference, except where superseded by specific conditions in this license. The licensee must maintain the approved license application on site.

Whenever the word "will" or "shall" is used in the above referenced documents, it shall denote a requirement. The use of "verification" in this license with respect to a document submitted for U.S.

Nuclear Regulatory Commission (NRC) staff review means a written acknowledgement by NRC staff that the specified submitted material is consistent with commitments in the approved license application, or requirements in a license condition or regulation. A verification will not require a license amendment.

[Applicable Amendment: 1, 2, 3, 4, 5, 6]

10.19 [DELETED by Amendment 6]

Environmental Review and Consultations

In accordance with 10 CFR 51.22(b), the NRC staff has determined that neither an environmental assessment nor an environmental impact statement is required for deleting LC 10.19. Specifically, this amendment is administrative and procedural in nature because it removes a specific license conditions noted above from NRC Materials License SUA-1598 as a result of the NRC staff's review and approval of the information provided by the licensee in satisfaction of the specified license condition. Therefore, as an administrative and procedural amendment, this actions is categorically excluded under 10 CFR 51.22(c)(11) from the requirement to prepare an environmental assessment or environmental impact statement, based on the following NRC staff findings:

- The removal of the LC discussed above will not result in a significant change in the types or significant increase in the amounts of any effluents that may be released offsite.
- There will be no significant increase in individual or cumulative occupational radiation exposure as a result of the removal of the LC discussed above.
- The removal of the LC discussed above will not result in a significant construction impact.
- There is no significant increase in the potential for or consequences from radiological accidents as a result of the removal of the LC discussed above.

With the removal of the requirement for continued on-site measurements. LCI may elect to dismantle the 10-meter-high meteorological tower and instrumentation. The environmental

impacts from dismantling of the meteorological tower and instrument have been evaluated as part of NRC's review of the original license application (NRC, 2011c). LCI will have to perform the dismantling of the tower and instrument in accordance with approved procedures and as such no additional environmental analysis is warranted at this time.

Section 7 of the Endangered Species Act (Act) [16 U.S.C. 1531 et seq.] outlines the procedures for Federal interagency cooperation to conserve federally listed species and designated critical habitats. Section 7(a)(2) states that each Federal agency shall, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of a listed species or result in the destruction or adverse modification of designated critical habitat. The NRC staff has determined that a Section 7 consultation is not required because the proposed action is administrative/procedural in nature and will not affect listed species or critical habitat. The NRC staff has also determined that the proposed action is not a type of activity that has potential to cause effects on historic properties because it is an administrative/procedural action. Therefore, no additional consultation is required under Section 106 of the National Historic Preservation Act.

REFERENCES:

LCI, 2018. E-mail from M. Gaither, Ur-Energy USA, Inc., to J. Saxton, U.S. NRC, Revised Lost Creek Met Data Report, February 6, 2018, ADAMS Accession No. ML18043A086.

LCI, 2017. Letter from M. Gaither, Ur-Energy, Inc., to U.S. NRC, Request for Removal of License Condition 10.19: Lost Creek ISR Project, License SUA-1598, Docket 40-9068, November 17, 2017, ADAMS Accession No. ML17339A110 (Package).

LCI, 2016. Letter from M. Gaither, Ur-Energy, Inc., to U.S. NRC, Request for Removal of License Condition 10.19, March 4, 2016, ADAMS Accession No. ML16076A409.

NRC, 2017. Letter from R. Linton, U.S. NRC, to W. Goranson, Uranerz Energy Corporation, NRC Staff Verification, License Condition 10.15, October 5, 2017, ADAMS Accession No. ML16278A595.

NRC, 2016a. U.S. Nuclear Regulatory Commission, Materials License SUA-1598, September 6, 2016, ADAMS Accession No. ML16123A338.

NRC, 2016b. Letter from A. Kock, U.S. Nuclear Regulatory Commission, to S. Hatten, Lost Creek ISR, LLC, Amendment 4, Source and Byproduct Materials License SUA-1598, Lost Creek In Situ Recovery Project, Sweet Water County, WY, Removal of License Conditions 12.10, 12.11, and 12.12, ADAMS Accession No. ML15279A572.

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NRC, 2011a. Safety Evaluation Report for the Lost Creek Project, Sweetwater County, Wyoming, Materials License No. SUA-1598, Docket No. 40-9068, Lost Creek ISR, LLC, U.S. Nuclear Regulatory Commission, August 2011, ADAMS Accession No. ML112231724.

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NRC, 2011c. Environmental Impact Statement for the Lost Creek ISR Project in Sweetwater County, Wyoming: Supplement to the Generic Environmental Impact Statement for in situ Leach Uranium Milling Facilities, NUREG-1910 Supplement 3, June 2011, ADAMS Accession No. ML1125A006.

NRC, 2007. Regulatory Guide 1.23, Meteorological Monitoring Programs for Nuclear Power Plants, Revision 1, U.S. Nuclear Regulatory Commission, March 2007.

NRC, 2003. Standard Review Plan for In Situ Leach Uranium Extraction License Applications. NUREG-1569, Final Report, U.S. Nuclear Regulatory Commission, Washington, D.C., June 2003, ADAMS Accession No. ML032250177.

NRC, 1988. Regulatory Guide 3.63, "Onsite Meteorological Measurement Program for Uranium Recovery Facilities – Data Acquisition and Reporting," Washington, DC: NRC, Office of Nuclear Regulatory Research, March 1988, ADAMS Accession No. ML003739874.

ENCLOSURE 2
License SUA-1598, Amendment 6