



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 EAST LAMAR BOULEVARD
ARLINGTON, TEXAS 76011-4511

September 26, 2018

Mr. Greg Kruse, Manager
U. S. Operations
Uranium One USA, Inc.
907 Poplar Street, Suite 260
Casper, WY 82601

SUBJECT: NRC INSPECTION REPORT 040-08502/2017-002 URANIUM ONE - WILLOW
CREEK PROJECT

Dear Mr. Kruse:

This letter refers to the U.S. Nuclear Regulatory Commission's (NRC's) inspection conducted on October 17-19, 2017, and May 16, 2018, at your Willow Creek Project, Irigaray Site, in Johnson County, Wyoming. The inspection was conducted to confirm compliance with the Commission's rules and regulations, the conditions of your license, and your NRC-approved decommissioning plan. Within these areas, the inspection consisted of selected examination of decommissioning procedures and representative records, observations of activities, interviews with personnel, collection of soil samples, and confirmatory surveys.

The preliminary inspection findings were discussed with you and facility representatives at the conclusion of the onsite inspections on October 19, 2017, and May 16, 2018. A final telephonic exit was conducted with Mr. Scott Schierman on July 16, 2018. Within the scope of the inspection, no violations were identified and no response to this letter is required.

The purpose of the inspection was to support NRC's review of your August 7, 2015, final status survey report and request to release Irigaray Mine Units 1-9 and two associated buildings for unrestricted use (Agencywide Documents Access and Management System (ADAMS) Accession Package No. ML15231A096). At the time of this inspection, your August 7, 2015, submittal was still under NRC review. You will be informed of NRC's final determination on the release of Irigaray Mine Units 1-9 and the two associated buildings by the NRC Project Manager in separate correspondence.

In accordance with Title 10 of the *Code Federal Regulations* (CFR) 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, and its enclosure, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

G. Kruse

2

To the extent possible, your response, should you choose to provide one, should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction. If you have any questions concerning this inspection, please contact Ms. Linda M. Gersey, Health Physicist, at 817-220-1299 or the undersigned at 817-200-1151.

Sincerely,

/RA/

Janine F. Katanic, PhD, CHP, Chief
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Docket: 040-08502

License: SUA-1341

Enclosure:

NRC Inspection Report 040-08502/2017-002

cc w/enclosure:

R. Schierman, WY Uranium Recovery Program Manager

G. Cameron, WY Homeland Security

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket No.: 040-08502
License No.: SUA-1341
Report: 04008502/2017-002
Licensee: Uranium One USA, Inc.
Location: Willow Creek Project - Irigaray Site
Johnson County, Wyoming
Inspection Dates: October 17-19, 2017
May 16, 2018
Inspector: Linda M. Gersey, Health Physicist
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety
Approved by: Janine F. Katanic, PhD, CHP, Chief
Fuel Cycle and Decommissioning Branch
Division of Nuclear Materials Safety

Enclosure

EXECUTIVE SUMMARY

Uranium One USA, Inc., In-Situ Recovery Facility NRC Inspection Report 04008502/2017-002

The U.S. Nuclear Regulatory Commission performed on-site inspection activities on October 17-19, 2017, and May 16, 2018, at the licensee's Irigaray Site Mine Units 1-9 to support NRC's review of the licensee's August 7, 2015, final status survey report and request to release Irigaray Mine Units 1-9 and two associated buildings for unrestricted use. In summary, the licensee was conducting decommissioning activities in accordance with their license, although several confirmatory soil samples results exceeded the licensee's release criteria for radium-226.

Uranium Mill, In-Situ Leach Uranium Recovery, and 11e.(2) Byproduct Material Disposal Site Decommissioning Inspection

- The licensee was conducting decommissioning activities as required by their NRC-approved decommissioning plan. (Section 1.2)
- Five soil samples analyzed by the NRC's contractor exceeded the licensee's radium-226 release criteria. (Section 1.2b)
- One soil sample analyzed by the licensee's contractor exceeded the licensee's radium-226 release criteria, although at the time of the inspection, the 15 soil sample results from the May 2018 inspection were not available for NRC review. (Section 1.2c)
- The licensee's August 7, 2015, request for approval to release Irigaray Mine Units 1-9 and the two associated buildings for unrestricted use is still pending review by the NRC Project Manager. (Section 1.2)

Report Details

Site Status

The licensee's Willow Creek Project is comprised of two distinct sites, known as the Irigaray and Christensen Ranch Sites, located in Johnson and Campbell Counties, Wyoming, respectively. The license was held by several subsequent companies over the years until Uranium One acquired the license in 2010. The Irigaray Project began commercial in-situ leach recovery in 1978 and ceased recovery operations in 1994. The total acreage of disturbed historical Irigaray operations is approximately 133 acres. Historical Irigaray in-situ Mine Units 1 through 9 (MUs 1-9) were permitted through the Wyoming Department of Environmental Quality (WDEQ).

The licensee completed groundwater restoration at Irigaray MUs 1-9 in 2004. By letter dated November 1, 2005, the WDEQ determined that the groundwater had been returned to its pre-mining class of use and the wellfields could be abandoned, as described in the licensee's Mine and Reclamation Plan (Agencywide Documents Access and Management System (ADAMS) Accession No. ML060830597). By letter dated November 7, 2005, the licensee requested that the Nuclear Regulatory Commission (NRC) concur with the WDEQ's decision that Irigaray MUs 1-9 had been restored and wells could be abandoned, to allow for surface decommissioning of the wellfields (ADAMS Accession No. ML053270028). The NRC approved the Irigaray groundwater restoration by letter dated September 20, 2006, and concluded that MUs 1-9 had been restored to pre-mining conditions and wellfield surface decommissioning could commence (ADAMS Accession Nos. ML062570175 and ML062570181).

By letters dated December 19, 2000, June 15, 2001, June 18, 2001, and August 31, 2001, the licensee (formerly COGEMA Mining, Inc.) submitted their decommissioning plan (DP) for surface reclamation to the NRC for approval (ADAMS Accession Nos. ML003781238, ML011700655, ML011710035, and ML012490112). The NRC approved the DP in license Amendment Number 6, dated December 31, 2001 (ADAMS Accession No. ML020030279).

By letter dated August 7, 2015, the licensee submitted the "Final Status Decommissioning Report Supporting Release of Mine Units 1 through 9 and Two Associated Buildings at the Irigaray Site for Unrestricted Future Use," to the NRC for review (ADAMS Accession Package No. ML15231A096). In the August 7, 2015, submittal, the licensee requested that the NRC approve the release of Irigaray MUs 1-9 and two associated buildings for unrestricted use. At the time of this inspection, the licensee's request was still under review by the NRC Project Manager.

1 Uranium Mill, In-Situ Leach Uranium Recovery, and 11e.(2) Byproduct Material Disposal Site Decommissioning Inspection (87654)

1.1 Inspection Scope

To perform confirmatory surveys and collect soil samples for analysis at Irigaray MUs 1-9, and the associated utility buildings to determine if these areas are below the licensee's radiological release criteria limits for unrestricted use.

1.2 Observations and Findings

1.2a Background

The NRC's contractor, Oak Ridge Institute for Science and Education (ORISE) performed an onsite confirmatory survey on July 26-28, 2016, and submitted the results to the NRC in letter "Independent Confirmatory Survey Summary and Results for Mine Units 1 through 9 and Two Associated Buildings at the Willow Creek Project Irigaray Site Johnson County, Wyoming," dated January 17, 2017 (ADAMS Accession No. ML17027A224). By letter dated February 13, 2017, "Uranium One, USA, Inc., Willow Creek Project, Review of Irigaray Mine Units 1-9, Final Status Decommissioning Report," NRC staff determined that the site could not be released for unrestricted use and could not approve the final decommissioning of Irigaray MUs 1-9 due to soil sample results that exceeded the licensee's release criteria (ADAMS Accession No. ML17038A560).

In July 2017, the licensee informed the NRC that they had cleaned up the areas that were identified by the NRC as exceeding the licensee's release criteria and that they were ready to have the NRC perform additional confirmatory surveys. On October 17-19, 2017, and May 16, 2018, an NRC inspector performed on-site inspection activities to support NRC's additional confirmatory surveys. Specific details related to this inspection activity are below.

1.2b On-site Inspection Activities October 17-19, 2017

The inspector observed the licensee and their contractors collect soil samples from the top 10 percent of survey units with the highest gamma readings. Each soil sample was a composite of 5 sampled areas within the survey unit. Each survey unit consisted of a marked off area of 100 square meters. There were 3,440 survey units in the MUs, of which 344 soil samples were required. The licensee followed Procedure Number D-3, Revision No. 0, dated December 5, 2000, "Soil Cleanup Verification Survey and Sampling Plan," as provided in the December 19, 2000, "Revised Decommissioning Plan," dated December 19, 2000 (ADAMS Accession No. ML003781238). The inspector observed the licensee gridding a survey unit, taking 5 samples and compositing them to obtain one representative soil sample for each survey unit, handling and labelling sample bags, and completing chain of custody forms. The inspector concluded that the licensee was performing soil sampling in accordance with their procedure.

During the on-site inspection, the licensee collected 32 soil samples, out of the total 344 soil samples, which were split with the NRC. The NRC samples were sent to ORISE for radium-226 and natural uranium (uranium-235 and uranium-238) analysis. The licensee's soil release criteria for radium-226 is 7 picocuries per gram (pCi/g) in soil and 152 pCi/g for natural uranium. In letter dated December 4, 2017, "Letter Report for Analytical Results for 32 Soil Samples Associated with the Uranium One-Irigaray Mine Units 1-9 in Johnson County, Wyoming," (ADAMS Accession No. ML18019A035) NRC's contract laboratory identified two soil samples which exceeded 7 pCi/g of radium-226. The two sample results which exceeded the release criteria were reported as 16.08 pCi/g and 8.86 pCi/g. No soil samples exceeded the natural uranium release criteria of 152 pCi/g.

During the on-site inspection, the licensee had not completed the collection of all soil samples in MUs 1-9 and continued to take samples during the next several weeks. To ensure the NRC was analyzing representative soil samples over all MUs, the licensee was instructed to take additional split soil samples after the on-site inspection. The licensee obtained an additional 31 split soil samples and as a courtesy, shipped the NRC's split samples to ORISE for analysis. The licensee shipped their split soil samples to their contract laboratory for analysis. Letter dated January 4, 2018, "Letter Report for Analytical Results for 31 Soil Samples Associated with the Uranium One-Irigaray Mine Units 1-9 in Johnson County, Wyoming," (ADAMS Accession No. ML18005A143) identified one soil sample result for radium-226 as 8.71 pCi/g, which exceeds the licensee's release criteria of 7 pCi/g. No soil samples exceeded the natural uranium release criteria of 152 pCi/g.

The inspector performed an ambient gamma radiation survey of 39 survey units using a count rate meter (Ludlum Model 18 count rate meter connected to an Eberline SPA-3 sodium iodide probe, NRC No. 012778, calibration due date of July 25, 2018). The purpose of the gamma survey was to verify the survey units did not exceed an average of 25,000 counts per minute (cpm). The licensee used an investigation level of 25,000 cpm gamma to evaluate the survey unit and potentially remediate that area. The inspector did not identify any survey units that exceeded an average of 25,000 cpm.

The inspector also observed the licensee's contractor performing static alpha contamination surveys in the large utility building. The licensee's contractor was re-surveying areas that had been cleaned. Counting times for static alpha measurements were determined to ensure the detectors could meet the minimum detectable concentration of 100 disintegrations per minute per 100 square centimeters (dpm/100 cm²), which is 10 percent of the licensee's action limit for alpha contamination (1000 dpm/100 cm²). During the inspection, the licensee's contractor had not identified any static measurements that exceeded the licensee's action limit. The small utility building had been previously surveyed by the licensee's contractor and found to be below the licensee's release criteria for unrestricted release. Accordingly, the licensee decided no further surveys were required for the small utility building.

The inspector noted that no soil samples had been taken below the large utility building. The utility building had several trenches and sumps that had been filled in by the licensee. In addition, it was noted that the building had several deep cracks in the building foundation. The licensee had plans to turn over the building to the land owner for use after decommissioning. After discussions with the NRC project manager, the licensee agreed to take soil samples below the building to ensure the soil didn't exceed the licensee's release criteria. The inspector was on-site at a later date to observe coring through the building foundation and collecting soil samples (see Section 1.2c below).

1.2c On-site Inspection Activities May 16, 2018

The inspector performed on-site inspection activities on May 16, 2018. The purpose of this portion of inspection was to collect an additional 15 soil samples. Three soil samples were taken at the MU locations identified by the NRC as exceeding the radium-226 release criteria, 7 soil samples were taken from other MU survey units, and 5 soil samples were taken from below the utility building. During this inspection, one soil sample was collected from each of the 15 locations for the purpose of having NRC's

contractor laboratory ORISE and the licensee's contract laboratory perform analyses using the same sample. The inspector collected the soil samples with the assistance of the licensee. The inspector shipped the samples to ORISE for analysis. When ORISE had completed the soil sample analysis, the samples were shipped the licensee's contract laboratory for analysis.

The licensee used a contractor for coring through the utility building's cement foundation. Five soil sample locations in the building were identified by the inspector in areas of former sumps, trenches, and areas of deep foundation cracks. In a report dated August 23, 2018, "Letter Report for Analytical Data Summary for 78 Soil Samples Associated with the Uranium One-Irigaray Mine Units 1-9 in Johnson County, Wyoming," (ADAMS Accession No. ML18235A555) ORISE provided analytical results for the 15 soil samples obtained in May 2018, as well as a summary of all soil samples analyzed related to the licensee's decommissioning of MUs 1-9. The ORISE report identified 3 soil samples taken in May 2018 that exceeded the licensee's radium-226 release criteria of 7 pCi/g. The three sample results were 11.62 pCi/g, 8.65 pCi/g, and 12.85 pCi/g.

During the May 2018 on-site inspection, the inspector questioned the licensee about the status of the sanitary piping left in place below the utility building. The licensee stated that the piping had been cut at the building boundary after the septic system was decommissioned, although no evaluation or surveys had been performed on the piping to determine if contamination was present. The licensee's decommissioning plan does not address soil or piping below the utility building. It was noted that after October 1, 2018, the licensee will be regulated by the State of Wyoming, and questions regarding how to address this issue should be coordinated with the WDEQ.

1.2d Licensee's Spilt Sample Soil Results

In email dated September 12, 2018, the licensee provided the NRC with the licensee's contract laboratory's analytical results for the 63 split samples related to the October 2017 NRC inspection (ADAMS Accession No. ML18256A036). One of the soil sample results reported by the licensee was 7.9 pCi/g for radium-226, which exceeds the licensee's radium-226 release criteria of 7 pCi/g. At the time of this inspection, the licensee's 15 soil sample results from the May 2018 inspection were not available for review because the licensee had not received the analytical results from their contract laboratory.

1.3 Conclusions

The licensee was conducting decommissioning activities as required by their NRC-approved decommissioning plan. Five soil samples analyzed by the NRC's contractor exceeded the licensee's radium-226 release criteria. One soil sample analyzed by the licensee's contractor exceeded the licensee's radium-226 release criteria, although at the time of the inspection, the 15 soil sample results from the May 2018 inspection were not available for NRC review. The licensee's August 7, 2015, request for NRC approval to the release Irigaray MUs 1-9 and the two associated buildings for unrestricted use is still pending review by the NRC Project Manager.

6 Exit Meeting Summary

The inspector presented the inspection results to Mr. Scott Schierman, Manager, Health Safety and Environment, by telephone on July 16, 2018. During the inspection, the licensee did not identify any information reviewed by the inspector as proprietary.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee Personnel

G. Kruse, Manager of US Operations
S. Schierman, Manager, Health Safety and Environment

Wyoming Department of Environmental Quality

R. Schierman, Uranium Recovery Program Manager, Land Quality Division

INSPECTION PROCEDURE (IP) USED

IP 87654 Uranium Mill, In-situ Leach Uranium Recovery, and 11e.(2) Byproduct Material
Disposal Site Decommissioning

ITEMS OPENED, CLOSED AND DISCUSSED

Opened and Closed

None

Discussed

None

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
cpm	counts per minute
DP	decommissioning plan
DOE	U.S. Department of Energy
IP	Inspection Procedure
LC	License Condition
MU	Mine Unit
NRC	U.S. Nuclear Regulatory Commission
ORISE	Oak Ridge Institute for Science and Education
pCi/g	picoCuries per gram
WDEQ	State of Wyoming Department of Environmental Quality

NRC INSPECTION REPORT 040-08502/2017-002 URANIUM ONE - WILLOW CREEK
PROJECT- DATED SEPTEMBER 26, 2018

DISTRIBUTION:

KKennedy, ORA
SMorris, ORA
TPruett, DNMS
LHowell, DNMS
JKatanic, FCDB
REvans, FCDB
BBaca, FCDB
MPoston-Brown, FCDB
BVonTill, NMSS
RLinton, NMSS/
R4DNMS_FCDB

ADAMS ACCESSION NUMBER: ML18257A147

<input checked="" type="checkbox"/> SUNSI Review By: LMG	ADAMS <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	<input checked="" type="checkbox"/> Non-Sensitive <input type="checkbox"/> Sensitive	<input checked="" type="checkbox"/> Publicly Available <input type="checkbox"/> Non-Publicly Available	Keyword: NRC-002
OFFICE	RIV:DNMS/FCDB			BC:FCDB
NAME	LMGersey			JFKatanic
SIGNATURE	/RA/			/RA/
DATE	9/20/18			9/26/18

OFFICIAL RECORD COPY