



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**  
REGION IV  
1600 E LAMAR BLVD  
ARLINGTON, TX 76011-4511

December 11, 2014

Ms. Donna L. Wichers, President  
Uranium One USA, Inc.  
907 North Poplar Street, Suite 260  
Casper, WY 82601

**SUBJECT: NRC INSPECTION REPORTS 040-08502/13-002 AND 040-08502/14-001 AND  
NOTICE OF VIOLATION**

Dear Ms. Wichers:

This refers to the announced routine inspection conducted July 31- August 3, 2013 and the unannounced routine inspection conducted May 13-15, 2014, at the Willow Creek Project in Johnson and Campbell Counties, Wyoming. The inspection findings were discussed with you and members of your staff at the exit briefings conducted at the conclusion of the onsite inspections on August 3, 2013 and May 15, 2014.

During these inspections, the NRC staff examined activities conducted under your license as they relate to public health and safety compliance with the Commission's rules and regulations and with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. The issuance of NRC inspection report 040-08502/13-002 was initially delayed pending a decision on whether to request additional information from you on your environmental radon-monitoring program. A decision was subsequently made that requests for information would be handled through separate correspondence after issuance of NRC radon guidance.

Based on the results of this inspection, the U.S. Nuclear Regulatory Commission (NRC) has determined that two Severity Level IV violations of NRC requirements occurred. The violations involve: (1) your failure to issue a Radiation Work Permit on two occasions, as required by License Condition 10.9; and (2) your failure to perform monthly gamma surveys in the modular buildings, as required by License Application Section 5.7.2.

These violations were evaluated in accordance with the NRC Enforcement Policy included on the NRC's Web site at [www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html](http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html). The violations are cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violations are being cited because the NRC identified the violations in accordance with the requirements of the NRC Enforcement Policy, Section 2.3.2.b.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The guidance in NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," may be helpful. You can find the Information Notice on the NRC website at <https://www.nrc.gov/reading->

[rm/doc-collections/gen-comm/info-notices/1996/in96028.html](http://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/1996/in96028.html). The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC's Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Ms. Linda M. Gersey at 817-200-1299 or the undersigned at 817-200-1191.

Sincerely,

**/RA/**

Ray L. Kellar, P.E., Chief  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety

Docket: 040-08502  
License: SUA-1341

Enclosure:  
NRC Inspection Reports 040-08502/13-002 AND 040-08502/14-001 and NOV

cc w/enclosures: S. Ramsay, Wyoming Office of Homeland Security  
C. Anderson, Wyoming Department of Environmental Quality  
N. Nuttbrock, Wyoming Department of Environmental Quality  
M. Bennett, Wyoming Department of Environmental Quality

[rm/doc-collections/gen-comm/info-notices/1996/in96028.html](http://www.nrc.gov/doc-collections/gen-comm/info-notices/1996/in96028.html). The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements. If you have additional information that you believe the NRC should consider, you may provide it in your response to the Notice. The NRC review of your response to the Notice will also determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

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## NOTICE OF VIOLATION

Uranium One USA, Inc.  
Johnson and Campbell Counties, Wyoming

Docket: 040-08502  
License: SUA-1341

During the U.S. Nuclear Regulatory Commission (NRC) inspections conducted on July 31-August 3, 2013 and May 13-15, 2014, two violations of NRC requirements were identified. In accordance with the NRC Enforcement Policy, the violations are listed below:

- (1) License Condition 10.9 states, in part, that the licensee shall use a Radiation Work Permit for all work or non-routine maintenance jobs where the potential for significant exposure to radioactive material exists and for which no standard written operating procedure exists. All Radiation Work Permits shall be accompanied by a breathing zone air sample. The Radiation Work Permit shall be issued by the Radiation Safety Officer or designee.

Contrary to the above, on September 18, 2013 and June 20, 2013, work was performed for which there was the potential for significant exposure to radioactive material and for which no standard written operating procedure existed.

Specifically, on September 18, 2013, a yellowcake drum was transferred to the radioactive materials sump and pumped into the white thickener for reprocessing without using a Radiation Work Permit issued by the Radiation Safety Officer or designee. No breathing zone air samples for workers were collected during the drum transfer activities.

Specifically, on June 20, 2013, a Plant Manager allowed a Plant Operator to enter a scrubber tank without using a Radiation Work Permit issued by the Radiation Safety Officer or designee. No breathing zone air samples for workers were collected during the scrubber tank entry.

This is a Severity Level IV violation (Section 6.3).

- (2) License Condition 9.3, states, in part, that the licensee shall conduct operations in accordance with commitments, representations, and statements contained in the license renewal application dated March 7, 2012, Agencywide Documents Access and Management System (ADAMS Package No. ML120820095, Supplemental Information ML12082A057).

License Application Section 5.7.2 states, in part, that gamma exposure rate surveys will be performed in areas which are accessible to personnel and which could potentially exceed the criteria for designation and posting as radiation areas. Areas over the 2.0 milliRem/hr administrative limit will be surveyed on a monthly basis.

Contrary to the above, during the months of November 2013 and January through April 2014, no gamma exposure rate surveys were performed in areas posted as radiation areas. Specifically, 21 modular buildings, were not surveyed on a monthly basis, although all were posted as radiation areas and exceeded the 2.0 milliRem/hr administrative limit.

This is a Severity Level IV violation (Section 6.3).

Pursuant to the provisions of 10 CFR 2.201, Uranium One USA, Inc., is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, Region IV within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further violations; and (4) the date when full compliance will be achieved. Your response may reference or include previous docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time.

If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Your response 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>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

In accordance with 10 CFR 19.11, you may be required to post this Notice within two working days.

Dated this 11th day of December 2014

U.S. NUCLEAR REGULATORY COMMISSION  
Region IV

Docket: 040-08502

License: SUA-1341

Report: 040-08502/13-002

Licensee: Uranium One USA, Inc.

Facility: Willow Creek Project

Location: Johnson and Campbell Counties, Wyoming

Dates: July 31-August 2, 2013  
May 13-15, 2014

Inspector: Linda M. Gersey, Health Physicist  
Repository and Spent Fuel Safety Branch

Accompanied By: Inspection Dates: August 1-2, 2013 and May 13-15, 2014  
Ron C. Linton, Hydrogeologist  
Uranium Recovery Licensing Branch  
Division of Decommissioning, Uranium Recovery, and Waste Programs  
Office of Nuclear Material Safety and Safeguards

Inspection Dates: May 13-15, 2014  
Jose Valdes, Hydrogeologist  
Uranium Recovery Licensing Branch  
Division of Decommissioning, Uranium Recovery, and Waste Programs  
Office of Nuclear Material Safety and Safeguards

Inspection Date: August 2, 2013  
Bill VonTill, Branch Chief  
Uranium Recovery Licensing Branch  
Division of Decommissioning, Uranium Recovery, and Waste Programs  
Office of Nuclear Material Safety and Safeguards

Approved By: Ray L. Kellar, P.E., Chief  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety

Attachment: Supplemental Inspection

## EXECUTIVE SUMMARY

Uranium One USA, Inc.  
NRC Inspection Reports 040-08502/13-002 and 040-08502/14-001

These inspections were of licensed activities at Uranium One USA, Inc.'s Willow Creek in-situ uranium recovery facilities located in Johnson and Campbell Counties, Wyoming. These inspections included a review of site status, site tours, management organization and controls, site operations, radiation protection, environmental protection, and radioactive waste management. This report describes the findings of the inspections.

### Management Organization and Controls

- The organizational structure and staffing levels maintained by the licensee during the inspection period met the requirements specified in the license and were sufficient for the work in progress. (Section 1.2a)
- Audit and program reviews were being conducted in accordance with license and regulatory requirements. (Section 1.2b)
- One Unresolved Item was identified related to the licensee approving, through the Safety and Environmental Review Panel process, monitoring wells operating outside the NRC licensed boundary. (Section 1.2c)
- The licensee had provided the appropriate reports to comply with the additional protocol reporting requirements. (Section 1.2d)

### In-Situ Leach Facilities

- In general, the licensee was operating the facility as required by the license and regulatory requirements. (Section 2.2a)
- The licensee had completed corrective actions associated with a violation for the failure to decommission wellfields within 24 months and failure to provide the NRC with an alternate decommissioning schedule, as required by 10 CFR 40.42(h)(1) and 40.42(j). (Section 2.2a)

### Radiation Protection

- Occupational radiation exposures were below regulatory limits. (Section 3.2a)
- One violation was identified for failure to perform monthly gamma surveys in modular buildings, as required by License Application Section 5.7.2. (Section 3.2b)
- One violation was identified for failure to use Radiation Work Permits as required by License Condition 10.9. (Section 3.2c)

Effluent Control and Environmental Protection and Maintaining Effluents from Materials Facilities as Low As Reasonably Achievable (ALARA)

- The licensee was submitting the Semiannual Effluent and Environmental Monitoring Reports in accordance with license requirements. (Section 4.2a)
- Groundwater and surface water environmental monitoring was being conducted in accordance with license requirements. (Section 4.2b)
- The licensee was reporting spills as required by license conditions. (Section 4.2c)

Inspection of Transportation Activities and Radioactive Waste Processing, Handling, Storage, and Transportation

- The licensee was disposing of 11e.(2) byproduct material in accordance with the license and regulatory requirements. (Section 5.2b)
- The wastewater treatment activities were being conducted in accordance with license requirements. (Section 5.2c)



## Report Details

### **Site Status**

NRC Materials License SUA-1341 was renewed on March 7, 2013. At the time of the inspections, Uranium One USA, Inc. (the licensee) was producing uranium at its Willow Creek Project using the in-situ recovery process. The Central Processing Plant (CPP), located at the Irigaray site receives source material from the Christensen Ranch site in the form of uranium-loaded resins for further processing, drying, and packaging of uranium concentrate powder (yellowcake).

The facility is operating 24 hours/day with 4 operators on 12 hr. shift during days and 2 on 12 hr. shift at night. The man camps at both Irigaray and Christensen Ranch are being used by operators between shifts.

The licensee reported oil and gas activity within the licensed boundary and in the area. The licensee reports the oil and gas target areas are primarily in the Shannon formation approximately 10,000 foot deep. The licensee reported a new oil and gas well is proposed near Deep Disposal Well-18-3 (DDW -18-3) targeting the Shannon formation. The licensee is in discussions with the oil and gas company about location of the well. If well is installed at current proposed location, the drilling will be through the Lance and within DDW 18-3 radius of influence.

At the time of the inspections, the NRC was still in the process of reviewing licensee submittals that provided details for several of the program requirements associated with the license renewal. The program requirements still under review were not inspected and will be reviewed during future inspections after NRC acceptance of the program requirements. The program topics include: the contamination control program as identified in License Condition (LC) 9.8; procedures and training for non-radiation safety personnel designated to survey resin trucks leaving the restricted area, as identified in LC 9.12; procedures and training used by the Radiation Safety Officer (RSO) designate to conduct daily inspections, as identified in LC 9.12; onsite meteorological parameters to show compliance with 10 Code of Federal Regulations (CFR) Part 20, as identified in LC 9.15; airborne effluent and environmental monitoring program, including estimating doses to members of the public, as identified in LC 11.3; and the minimum detectable concentration for radiation survey instruments, as identified in LC 11.9.

### **1 Management Organization and Controls (88005)**

#### **1.1 Inspection Scope**

Ensure that the licensee had established an organization to administer the technical programs and to perform internal reviews, self-assessments, and audits.

#### **1.2 Observations and Findings**

##### **a. Organizational Structure**

The licensee's organizational structure is illustrated in Figure 5-2 of the approved license application. The inspectors reviewed the licensee's current organizational structure and found that it was in agreement with the structure specified in Figure 5-2. Since the January 2013 inspection, the licensee had eliminated 28 personnel, mostly from the

wellfield constructions and drilling groups. At the time of the May 2014 inspection, the licensee had approximately 48 full time on-site employees and 23 office employees reporting to the Casper, Wyoming office. The licensee's radiation safety staff consisted of one RSO and one qualified health physics technician (HPT). In April 2014, the licensee hired a new RSO and the previous RSO currently performs the HPT duties. The inspectors reviewed the qualifications of the new RSO and found the education, training, and experience to comply with NRC Regulatory Guide (RG) 8.31, "Information Relevant to Ensuring That Occupational Radiation Exposures at Uranium Recovery Facilities Will Be As Low As Reasonably Achievable", as required by LC 9.12. The licensee uses contractors for drilling, construction, and some electrical work, as needed. The inspectors determined that the licensee had sufficient staff to implement the radiation protection, groundwater monitoring, and environmental programs at its current operating level.

b. Audits and Inspections

License Condition 11.5 states, in part, that the RSO or designee shall document a daily and weekly walk-through of Irigaray and Christensen Ranch facilities to ensure radiation control practices are being followed. The inspectors noted that the daily and weekly walk-through observations were being conducted by the HPT or RSO. The inspectors found the documentation of the walk-through to comply with the LC. The RSO was providing a monthly summary of the radiation safety program to licensee management, in accordance with LC 9.12. The inspectors reviewed the monthly reports and found them to meet the license commitments.

The annual radiation safety audit for 2012, dated March 29, 2013, was reviewed by the inspectors and found to be a thorough review of the radiation safety program. The audit had been conducted by a contractor using RG 8.31 as a basis for audit topics. The audit included reviews of occupational exposures and compliance with regulations and the license application.

c. Safety and Environmental Review Panel

The inspectors reviewed the following Safety and Environmental Review Panel (SERP) evaluations conducted by the licensee as authorized in LC 9.4:

- 1) SERP 12-01A, dated April 11, 2012, related to the review and approve the Northwest and Southeast Area of Mine Unit (MU) 8, Modules 83, 84, 85, 86, & 88 for operations. This SERP incorporated new requirements by the Wyoming Department of Environmental Quality (WDEQ) including a change from Schedule 40 PVC to SDR-17 piping, and a new construction technique for wellhead leak detection. The SERP also approved a new module building design to have a self-contained lined sump. The SERP 12-01A determined in Section 4.0 A., that all but the three wells associated with the perimeter production zone monitor wells (monitor well ring wells) in Southwest Areas of MU 8 are located within the WDEQ Permit Boundary, and NRC licensed area. The SERP determined that a boundary revision from the WDEQ would be needed for operations in the Southwest area of MU 8 (Module 89). The operation of three monitoring wells outside the NRC licensed boundary was identified by the inspectors as an Unresolved Item (URI 040-08502/1301-01). An Unresolved Item involves an issue that requires more information to determine if a violation has occurred. It was unclear at the end of the inspection if the licensee's performance-

based license allows the licensee to extend the NRC licensed boundary without a license amendment. This Unresolved Item will be discussed and reviewed by NRC to resolve this item. Should additional information be needed from the licensee, it will be requested in separate correspondence.

- 2) SERP 12-01B, dated October 29, 2012, related to the review and approval of the Southwest Area of MU 8, Modules 87 and 89 for operations. SERP 12-01A determined that a WDEQ boundary revision would be needed for the Southwest Area of MU 8, Modules 87 and 89 for operations. The SERP stated that three monitoring wells were installed outside the NRC licensed area and the WDEQ permitted boundary. The WDEQ approved an insignificant boundary revision to incorporate the three well on July 10, 2012. The licensee did not request a revision of the licensed area to the NRC and determined that the revision could be approved using the SERP process. This issue is associated with the Unresolved Item (URI 040-08502/1301-01) discussed above.
- 3) SERP 12-06, dated June 28, 2012, related to the review and approval to changes in operation resulting from the expansion of the Christensen Ranch Satellite Facility and to allow the startup of the six new IX columns and associated facilities. The inspectors concluded that the licensee had implemented the SERP determination in accordance with the performance-based license conditions.
- 4) SERP 12-08, dated December 27, 2012, related to the review and approval of MU 10A for operations. This SERP evaluated and integrated new WDEQ requirements to use SDR-17 casing materials instead of 40PVC and included new well head designs to include a leak detection system. It also included a module building design to have a self-contained lined sump and a barrier on the outside of the module building adjacent to the module bag filters to ensure radiation levels are less than 0.02 milliSeiverts (2 millirem) in any one hour. Although the SERP states that seven monitoring wells are within the NRC licensed area and within the WDEQ Permitted Boundary, it also states that the licensee needed to revise the WDEQ Permitted Boundary. It was not clear to the inspectors if the operational monitoring wells were actually within the NRC licensed area. This is associated with the Unresolved Item (URI 040-08502/1301-01) discussed above.
- 5) SERP 13-01, dated January 15, 2013, related to the addition of a bi-carbonate injection system to the mine unit modules. This bi-carbonate addition supplements the bi-carbonate supplied at the plant and is used to increase the concentration of bicarbonate of wellfield recovery solution during preconditioning operations. The inspectors concluded that the licensee had implemented the SERP determination in accordance with the performance-based license conditions.

d. Additional Protocol Verification

The inspectors verified that the licensee had provided the NRC with appropriate documentation to comply with 10 CFR 75.11. The licensee had provided the three necessary forms that identified the capacity of yellowcake production, the actual annual yellowcake production, and the quality of yellowcake on hand. The licensee discussed how they determined these numbers, and the inspectors found the reports to be accurate, complete, and consistent for reports submitted from 2010 to 2013.

### 1.3 Conclusions

The organizational structure and staffing levels maintained by the licensee during the inspection period met the requirements specified in the license and were sufficient for the work in progress. Audit and program reviews were being conducted in accordance with license and regulatory requirements. One Unresolved Item was identified associated with the licensee approving operation of monitoring wells outside of the NRC licensed boundary using the SERP process. The licensee had provided the appropriate reports to comply with the additional protocol reporting requirements.

## **2 In-Situ Leach Facilities (89001)**

### 2.1 Inspection Scope

Determine if in-situ recovery activities were being conducted by the licensee in accordance with the NRC's regulatory requirements and the license.

### 2.2 Observation and Findings

#### a. Recovery Operations and Restoration

##### Christensen Ranch (CR)

The CR satellite facility was operating at approximately 6,000 gallons per minute (gpm) the time of the inspection. This is consistent with LC 10.4 which allows the plant to operate up to 9,000 gpm. The following wellfields were in operation:

- MU 5, one module operating (module 5-2)
- MU 7, six modules operating (modules 7-1 through 7-6)
- MU 8, eight modules operating (modules 8-1 through 8-9, with module 8-4/5 combined)
- MU 10, six modules operating (modules 10-1 through 10-6)

Two DDWs were operating at CR, DDW-1 and DDW-18-3. Wastewater was being disposed of at approximately 75 gpm into the Lance formation approximately 6,800 feet deep. Approximately 50 gpm was being disposed into DDW-18-3 and approximately 25 gpm was being disposed into DDW-1. Three of four disposal ponds, CR-1, CR-2, and CR-4, were in operation at CR. Waste fluid, commonly called "bleed", goes into the evaporation ponds before transfer to the DDW's for disposal. The licensee reported that the ponds could evaporate approximately 20 to 25 gpm of water, on a seasonal basis, prior to deep-well disposal. The licensee was in the process of draining pond CR-2 to inspect and evaluate a suspected leak.

The licensee has completed ground water restoration activities at CR MUs 2, 3, 4, 5, and 6. The licensee submitted Restoration Reports for MUs 2, 3, 4, 5, and 6 to the NRC and the WDEQ for review. The licensee has gone back into MU 5 for production from module 5-2. The NRC has reviewed the ground water restoration reports and responded to the licensee on October 23, 2012, with a technical evaluation that did not approve restoration.

The inspectors reviewed records of the licensee's reported Christensen Ranch bleed rates from September 29, 2013 through December 28, 2013 (4<sup>th</sup> calendar quarter 2013) and from December 29, 2013 through March 29, 2014 (1<sup>st</sup> calendar quarter 2014). The bleed rates were reported as:

4<sup>th</sup> calendar quarter 2013

MU-5-2	4.7%
MU-7	0.6%
MU-8	0.5%
MU-10A	2.2%
MU-10B	1.1%

1<sup>st</sup> calendar quarter 2014

MU-5-2	4.7%
MU-7	1.6%
MU-8	0.1%
MU-10A	1.5%
MU-10B	1.2%

License condition 10.1 requires, in part, that the licensee maintain an inward hydraulic gradient by maintaining a bleed in each individual wellfield starting when lixiviant is first injected into the production zone and continuing until the ground water restoration stability monitoring has begun. The inspectors noted that the licensee has maintained a bleed in both quarters for all mine units consistent with the license. The inspectors observed that the bleed rate for MU-8 in the 1<sup>st</sup> calendar quarter 2014 was 0.1%, and several weeks during the quarter was reported as a negative bleed. The licensee indicated that the bleed rates have increased for the current quarter.

Irigaray (IR)

Loaded resin is shipped from the CR Satellite to the IR CPP for processing and drying into yellowcake. The IR CPP, including the dryer, was operational during the inspections. The WDEQ has approved two DDWs for the IR site, although the license has not drilled those yet.

Three of four disposal ponds, RB, B and D, were in use at IR. The licensee was draining pond RA to inspect and evaluate a suspected leak. The licensee reported that Pond RB was over its normal 8-foot freeboard due to the draining of pond RA. However, LC 10.6, states, in part, that the 8-foot freeboard may be temporarily changed to a 2-foot freeboard in either RA or RB as long as sufficient reserve capacity is available in the overall pond system to accept the contents of one of the ponds in case of leakage. The inspectors noted that the freeboard for Pond RB was over 2 feet. The licensee reported that they have contracted with a new contractor to use electrical current technology to find leaks in the liner of Pond RA.

During the January 2013 inspection, (ML13036A408) one violation (VIO 040-08502/1301-02) was identified by the inspectors related to the failure to restore Irigaray MUs 8 and 9 within 24 months of initiation of decommissioning and failure to request an alternate restoration schedule. This was a violation of 10 CFR 40.42(h)(1) and 40.42(j). The inspectors noted that authorization to begin decommissioning and restoration approval occurred with NRC letter dated September 20, 2006. As of January 2013,

Mine Units 8 and 9 still needed piping removed and a few wells remain to mark buried piping. No trench or soil surveys had been completed at that time.

In letter dated March 28, 2013, the licensee challenged the violation (ML13091A082). The NRC responded to the challenge and stated that the NRC had substantiated the violation (ML13191B324). The licensee replied to the violation on August 6, 2013, (ML13220A028) and outlined specific tasks to be completed during the summer and fall of 2013. During the May 2014 inspection, the inspectors toured MUs 8 and 9. All subsurface wells have been plugged and subsurface piping has been removed, chipped and sent to a licensed 11e.(2) disposal facility for disposal. Surface reclamation and reseeding is complete. The licensee expects to complete final surveys and submit a final Decommissioning Report to the NRC in December 2014. The inspectors reviewed the corrective actions taken by the licensee and have found them to be sufficient. This violation is considered closed.

The inspectors reviewed all module header house injection manifold pressure weekly charts for 2012 and 2013 and found them to be in compliance with LC 11.1. The licensee reported that each module header house manifold pressure record chart is changed every Sunday night. Flow rates are measured and recorded throughout the day on the chart. Injection pressures did not exceed 140 psi, as per LC 11.1, at the Christensen Ranch site, except for a few isolated spikes in pressure. The highest recorded value was approximately 147 psi in module 82 during the week ending May 28, 2012. This spike was recorded on the chart as a power bump. The current License Application Section 3.3.3.4 and Willow Creek procedure WF-4 allow for temporary manifold pressures over 140 psi, but not exceeding 168 psi, for occurrences such as routine maintenance activities such as filter changes, startup or shutdown procedures, etc., or from power surges.

b. Site Tours

The inspectors conducted site tours to observe in-situ recovery operations in progress. Areas toured included the IR CPP and associated evaporation ponds, MU 4 and associated Modules, MU 5, the Christensen Ranch satellite and associated evaporation ponds, and MUs 7 through 10 and associated modules. The inspectors noted that radiation protection postings were located as appropriate and in accordance with LC 9.11. Plant parameters were within required operating intervals and plant equipment appeared to be in good condition. In summary, the licensee was maintaining control of the areas and equipment in accordance with license and regulatory requirements.

During the May 2014 inspection, the inspectors observed the storage conditions of approximately 1,053 55-gallon barrels of yellowcake originating from Uranium One's Honeymoon Mine in Australia. The licensee has submitted a license amendment request to process the yellowcake in their dryer, since the yellowcake from the Honeymoon Mine has a different organic concentration than the Willow Creek Project yellowcake. A review of the Honeymoon yellowcake drying will be performed during a future inspection.

The licensee has recently installed three additional security cameras located in the yellowcake drum storage area, the entry into the lower level of the drypack area, and outside the CPP viewing the yellowcake transport trailer. The cameras can be viewed on a dedicated monitor in the CPP control room. The licensee has constant presence

on site with a minimum of one plant operator physically in the plant and two wellfield operators on staff at all times. All entry doors to the Satellite, CPP, and Module buildings have key coded locks or padlocks. The inspectors noted that the areas around the evaporation ponds are fenced and entries have a pad lock.

The inspectors conducted independent radiological surveys of the gamma exposure rates present in the plant. The surveys were conducted using a Ludlum Model 19 microRoentgen survey meter calibrated with Radium-226 (NRC 015540, calibration due date of 05/14/2013 and NRC 015525, calibration due date of 07/22/14), and a Ludlum Model 2401-EC survey meter (NRC 21176G, calibration due date of 12/28/2013 and NRC 21175G, calibration due date of 11/07/2014). The inspectors noted that the lunchroom in the CPP had a higher background reading than previous inspections. Previously, the lunchroom background radiation level was measured to be approximately 25 microRoentgen per hour ( $\mu\text{R/hr}$ ). During the inspection, the lunchroom was found to be 125  $\mu\text{R/hr}$ . The increase in radiation readings was due to the storage of yellowcake drums inside the CPP adjacent to the lunchroom. Once the yellowcake drums are shipped off site, the readings in the lunchroom should return to normal background readings.

### 2.3 Conclusions

In general, the licensee was operating the facility as required by the license and regulatory requirements. One violation was closed related to the failure to decommission of wellfields within 24 months and failure to provide the NRC with an alternate decommissioning schedule, as required by 10 CFR 40.42(h)(1) and 40.42(j).

## **3 Radiation Protection (83822)**

### 3.1 Inspection Scope

Determine whether the licensee's radiation protection program was being conducted in compliance with license and 10 CFR Part 20 requirements.

### 3.2 Observations and Findings

#### a. Occupational Exposures

The inspectors reviewed the licensee's dose assessment records for calendar years (CYs) 2012 and 2013. Approximately 37 employees were monitored for external exposures using thermoluminescent dosimeters that were exchanged on a quarterly basis. Occupationally monitored employees included CPP operators, satellite operators, wellfield operators, two plant supervisors, two wellfield utility employees and the laboratory personnel. The highest deep dose equivalent for CY 2012 was 1.85 milliSieverts (185 millirems), received by a wellfield operator. The highest deep dose equivalent for CY 2013 was 3.73 milliSieverts (373 millirems), received by a wellfield operator.

The licensee conducted air sampling, in part, for assessment of internal exposures, as required by LC 10.10. The inspectors reviewed the licensee's radon-222 air sampling records and the uranium particulate and worker breathing zone sample results for CYs 2012 and 2013. The highest derived airborne concentration in hours (DAC-hrs) for

radon daughters for an employee for the time reviewed was 10.2 DAC-hrs. The highest employee airborne uranium exposure was 1.6 DAC-hrs. The results are below the limit of 2000 DAC-hrs per year. The inspectors confirmed that the licensee had conducted sampling at the required intervals, and the sample results were included in the worker's total effective dose equivalent exposure records.

The licensee collected urine bioassay samples to assess the potential for intakes of uranium. The inspectors reviewed the bioassay program to verify compliance with LC 10.12. The inspectors confirmed that bioassay samples were taken at the required frequency and in accordance with the collection procedure. Since the previous inspection, no confirmed bioassay sample result exceeded the action level of 15 micrograms of uranium per liter of urine.

The inspectors noted that the highest total effective dose equivalent (the summation of internal and external radiation exposure) for CY 2012 was 3.50 milliSieverts (350 millirem) for a wellfield operator and for CY 2013 was 5.40 milliSieverts (5.40 millirem). These are below the annual limit of 50 milliSieverts (5,000 millirem).

b. Radiation Protection Surveys

During the May 2014 inspection, one violation was identified by the inspectors (VIO 040-08502/1401-02) related to failure to perform monthly gamma surveys on the modular buildings. License Application Section 5.7.2 states, in part, that gamma exposure rate surveys will be performed in areas which are accessible to personnel and which could potentially exceed the criteria for designation and posting as radiation areas. Areas over the 2.0 milliRem/hr administrative limit will be surveyed on a monthly basis. The inspectors found that during the months of November 2013 and January through April 2014, no gamma exposure rate surveys were performed in areas posted as radiation areas. Specifically, 21 modular buildings, were not surveyed on a monthly basis, although all were posted as radiation areas and exceeded the 2.0 milliRem/hr administrative limit. Failure to perform gamma exposure rate surveys in the modular buildings could cause areas outside of the buildings to exceed the public dose limit of 2.0 milliRem in any one hour.

Alpha contamination surveys were conducted by the licensee on a weekly frequency in clean areas of the site and monthly in process areas. The inspectors reviewed the survey results and found them to meet the requirements of the license.

c. Radiation Work Permits

During the May 2014 inspection, one violation (VIO 040-08502/1401-03) was identified by the inspectors related to failure to use Radiation Work Permits. License Condition 10.9 states, in part, that the licensee shall use a Radiation Work Permit for all work or non-routine maintenance jobs where the potential for significant exposure to radioactive material exists and for which no standard written operating procedure exists. All Radiation Work Permits shall be accompanied by a breathing zone air sample. The Radiation Work Permit shall be issued by the RSO or designee.

The inspectors found, on two instances, that non-routine work was performed for which there was the potential for significant exposure to radioactive material and for which no standard written operating procedure existed. Specifically, on September 18, 2013, a



yellowcake drum was transferred to the radioactive materials sump and pumped into the white thickener for reprocessing without using an RSO or designee-approved Radiation Work Permit. No breathing zone air samples for workers were collected during the drum transfer activities. Additionally, on June 20, 2013, a Plant Manager allowed a Plant Operator to enter a scrubber tank without using an RSO or designee-approved Radiation Work Permit. No breathing zone air samples for workers were collected during the scrubber tank entry. Although there were no overexposures to the workers associated with these two instances, the failure to use a Radiation Work Permit and obtain an air sample could expose individuals to unknown radiological conditions resulting in an overexposure to the workers.

### 3.3 Conclusions

Occupational radiation exposures were below regulatory limits. One violation was identified for failure to perform monthly gamma surveys in modular buildings, as required by License Application Section 5.7.2. One violation was identified for failure to use Radiation Work Permits as required by License Condition 10.9.

## **4 Effluent Control and Environmental Protection and Maintaining Effluents from Materials Facilities ALARA (87102 and 88045)**

### 4.1 Inspection Scope

Determine if the environmental and effluent monitoring programs are adequate to monitor the impacts of site activities on the local environment.

### 4.2 Observations and Findings

#### a. Environmental Monitoring

License Conditions 12.1 and 12.6 state, in part, that the results of effluent and environmental monitoring shall be reported to the NRC in accordance with the provisions of 10 CFR 40.65. The inspectors reviewed the licensee's Semiannual Effluent and Environmental Monitoring Reports for CYs 2012 and 2013. The licensee's environmental monitoring program consisted of air particulate, radon, ambient gamma radiation, dryer stack emissions, groundwater, and surface water. Soil and vegetation sampling are conducted annually for trending purposes only.

Continuous air particulate sampling was conducted at six locations at the Irigaray CPP. The licensee sampled the air for uranium, radium-226, thorium-230, and lead-210 particulate concentrations. None of the sample results for the monitoring period exceeded the respective effluent concentration limits specified in 10 CFR Part 20, Appendix B.

The licensee also sampled for radon-222 concentrations in the air at six locations at the Irigaray CPP and five locations at the Christensen Ranch facility. This data will be evaluated during a future inspection.

The licensee measured ambient gamma radiation levels at six sample stations at the Irigaray facility and five sample locations at the Christensen Ranch facility using

thermoluminescent dosimeters. For the monitoring period, all sample results were comparable to background level.

The licensee resumed operation of the yellowcake dryer at the Irigaray CPP on November 1, 2011. Dryer stack emission tests were completed by a contractor on April 30, 2012, June 27, 2013, and December 2, 2013. The tests showed a particulate emissions rate of approximately 0.038 pounds per hour of total particulates, including yellowcake ( $U_3O_8$ ), natural uranium, thorium-230, radium-226, and lead-210. All the particulate concentrations released for the year were below the effluent concentration limit specified in 10 CFR Part 20, Appendix B.

b. Groundwater and Surface Water Environmental Monitoring

The groundwater monitoring program consists of quarterly sampling of five ranch wells near the Christensen Ranch facility and one ranch well near the Irigaray facility. Each sample is analyzed for natural uranium, thorium-230, radium-226, lead-210, and polonium-210. All radionuclides were at very low concentrations or non-detectable. No significant trends in the data was noted during this monitoring period. Samples were consistent with LC 11.3.

Surface water monitoring consists of Willow Creek, which is sampled quarterly, and the Powder River, which is sampled annually. All samples are analyzed for natural uranium, thorium-230, radium-226, lead-210, polonium-210, and eight chemical constituents, when there is water available. During the monitoring period, only one sampling was conducted at Willow Creek due to the creek being dry or frozen during the other sampling periods. All radionuclide results for the CYs 2012 and 2013 were low or non-detectable and no results exceed the effluent limits in 10 CFR 20, Appendix B.

c. Wellfield and Excursion Monitoring

License Condition 12.2 requires, in part, that the licensee maintain documentation on spills of source materials, 11e.(2) byproduct materials, or process chemicals. The licensee is also required to report to the NRC any wellfield excursions, spills, or pond leaks involving source materials, 11e.(2) byproduct materials, or process chemicals that may have an impact on the environment, or that is required to be reported to a State or Federal Agency. Within 30 days of notification to the NRC, the licensee is required to submit a written report that details the conditions leading to the spill or incident, corrective actions taken, and the results achieved. The licensee has committed in its license application to report all spill greater than 420 gallons.

The licensee reported that 15 spills had taken place during CYs 2012 and 2013. The inspectors reviewed a representative sample of spill reports. Notification was made to the NRC regional office and NRC Headquarters. These notifications and follow-up reports appear to be consistent with the reporting procedures required in LC 12.2. The inspectors toured IR MU 8 to look at leak 8-4/5 that was identified after the MU 8 was put into service as described in section 2.2.a. The leak was determined to be from improperly plugged historic boreholes and the licensee discussed actions taken to stop the leak which the inspectors found to be adequate. The licensee appears to be maintaining, documenting, and reporting spills consistent with LC 12.2 and commitments made in the license application.

#### 4.3 Conclusions

The licensee was submitting the Semiannual Effluent and Environmental Monitoring Reports in accordance with license requirements. Groundwater and surface water environmental monitoring was being conducted in accordance with license requirements. The licensee was reporting spills as required by license conditions.

### **5 Inspection of Transportation of Activities and Radioactive Waste Management (86740 and 88035)**

#### 5.1 Inspection Scope

Determine if transportation and disposal activities conducted by the licensee were conducted in compliance with regulatory requirements.

#### 5.2 Observations and Findings

##### a. Inspection of Transportation Activities

Transportation activities will be reviewed by inspectors during a future inspection.

##### b. Solid Radioactive Waste

License Condition 9.7 requires, in part, that the licensee possess a waste disposal agreement to dispose of 11e.(2) byproduct material at an offsite location. The inspectors reviewed the waste disposal agreement and determined that it was valid until July 23, 2015. During CY 2013, a total of twelve waste disposal shipments were made to a licensed waste disposal site. Material sent for disposal consisted of 11e.(2) contaminated equipment, such as filters, pipes, and pumps. The inspectors reviewed selected shipping records and found them to be complete.

##### c. Review of Wastewater Treatment Activities

License Conditions 10.6 and 10.7 state, in part, that the licensee may dispose of liquid effluents by discharge into evaporation ponds or by permitted DDWs. The inspectors reviewed the reserve capacity available in the overall pond system to accept the contents of one of the ponds in case of leakage. The inspectors concluded that the licensee was maintaining sufficient reserve capacity in the ponds.

The inspectors accompanied the licensee on inspection of evaporation ponds CR 1 through 4 at Christensen Ranch. The licensee demonstrated weekly and quarterly pond leak detection and showed where these items were listed and recorded on Waste Pond Inspection sheet. At pond CR-3, the licensee demonstrated at one of the six pond leak detection pipes the process for a quarterly leak-detection inspection as required by internal procedures. The freeboard was inspected on all four ponds and none exceeded the freeboard requirements in LC 10.6. The evaporation pond inspections appear to be consistent with LC 11.4.

### 5.3 Conclusions

The licensee was disposing of 11e.(2) byproduct material in accordance with the license and regulatory requirements. The wastewater treatment activities were being conducted in accordance with license requirements.

### **6 Exit Meeting Summary**

The inspectors presented the inspection results to the licensee's representatives at the conclusion of the onsite inspections on August 2, 2013 and May 15, 2014. During the inspections, the licensee did not identify any information reviewed by the inspectors as proprietary that was included in the report.

## **SUPPLEMENTAL INSPECTION INFORMATION**

### **PARTIAL LIST OF PERSONS CONTACTED**

#### **Licensee**

Donna Wichers, President  
Jon Winter, Director of Safety Health and Environment  
Ryan Shierman, Radiation Safety Officer  
Tim McCullough, Manager Site Safety Health Environment

### **INSPECTION PROCEDURES USED**

IP 88005	Management Organization and Controls
IP 89001	In-Situ Leach Facilities
IP 83822	Radiation Protection
IP 88045	Effluent Control and Environmental Protection
IP 87102	Maintaining Effluents from Materials Facilities ALARA
IP 86740	Inspection of Transportation Activities
IP 88035	Radioactive Waste Processing, Handling, Storage, and Transportation

### **ITEMS OPENED, CLOSED, AND DISCUSSED**

#### **Opened**

040-08502/1401-02	VIO	Failure to perform monthly gamma surveys on the modular buildings
040-08502/1401-03	VIO	Failure to use Radiation Work Permits.

#### **Closed**

040-08502/1301-02	VIO	Failure to decommission wellfields within 24 months and failure to provide the NRC with an alternate decommissioning schedule as required by 10 CFR 40.42
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#### **Discussed**

040-08502/1301-01	URI	Approval through the SERP process of monitoring wells operating outside the NRC licensed boundary
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LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
CFR	<i>Code of Federal Regulations</i>
CPP	Central Processing Plant
CR	Christensen Ranch
CY	Calendar Year
DAC-hrs	derived airborne concentration in hours
DDW	Deep Disposal Well
gpm	gallons per minute
HPT	health physics technician
IP	Inspection Procedure
IR	Irigaray
LC	License Condition
MU	Mine Unit
NCV	Non-Cited Violation
NOV	Notice of Violation
NRC	U.S. Nuclear Regulatory Commission
µR/hr	microRoentgen per hour
URI	Unresolved Item
SERP	Safety and Environmental Review Panel
RSO	Radiation Safety Officer
VIO	violation
WDEQ	Wyoming Department of Environmental Quality