



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

July 19, 2017

Mr. Larry L. Teahon, Manager  
Safety, Health, Environmental and Quality  
Cameco Resources  
Crow Butte Operations  
86 Crow Butte Road  
Post Office Box 169  
Crawford, NE 69339-0169

SUBJECT: NRC INSPECTION REPORT 040-08943/2017-001

Dear Mr. Teahon:

This letter refers to the announced, routine, U.S. Nuclear Regulatory Commission (NRC) inspection conducted on June 20-22, 2017, at your Crow Butte Operations facility in Dawes County, Nebraska. The purpose of this inspection was to examine activities conducted under your license as they relate to public health and safety and to confirm compliance with the Commission's rules and regulations and 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 inspection findings were discussed with you at the conclusion of the onsite inspection June 22, 2017.

Based on the results of the inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred. This violation related to the licensee's failure to appropriately survey and label an environmental sample prior to shipment to an offsite laboratory. Because the licensee identified the violation, corrected the violation within a reasonable period of time, the violation was non-repetitive, and the violation is not willful, the violation is being treated as a Non-Cited Violation (NCV), in accordance with Section 2.3.2 of the Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or significance of the NCV, you should provide a response within 30 days of the date of this inspection report, with the basis for your denial, to the Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington DC 20555-0001, with copies to: (1) the Regional Administrator, Region IV and (2) the Director, Office of Enforcement, United States Nuclear Regulatory Commission, Washington, DC 20555-0001.

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>. 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. Bernadette Baca, Health Physicist at 817-200-1235 or the undersigned at 817-200-1191.

Sincerely,

*/RA/*

Ray L. Keller, P.E., Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Docket: 040-08943

License: SUA-1534

Enclosure:

NRC Inspection Report 040-08943/2017-001

cc:

Director, Nebraska Radiation Control Program

NRC INSPECTION REPORT 040-08943/2017-001 – DATED JULY 19, 2017.

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 040-08943

License: SUA-1534

Report: 04008943/2017-001

Licensee: Cameco Resources

Location: Crow Butte Operations  
Dawes County, Nebraska

Dates: June 20-22, 2017

Inspectors: Bernadette Baca, Health Physicist  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Martha Poston-Brown, Health Physicist  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Accompanied By: Thomas Lancaster, Hydrogeologist  
Uranium Recovery Licensing Branch  
Decommissioning, Uranium Recovery and Waste Program  
Nuclear Materials Safety and Safeguards

Approved by: Ray L. Kellar, P.E., Chief  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Attachment: Supplemental Information

Enclosure

## **EXECUTIVE SUMMARY**

Cameco Resources., In-Situ Recovery Facility  
NRC Inspection Report 04008943/2017-001

The U.S. Nuclear Regulatory Commission (NRC) performed a routine health and safety inspection from June 20-22, 2017, which included observations of site activities, independent surveys, review of records, and interviews with site personnel. In summary, the license was conducting operations in accordance with regulatory and license requirements described below.

### **Management Control and Organization**

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. The licensee's safety and environmental reviews were performed in accordance with the license requirements. The licensee conducted audits and inspections as required by the license and the regulatory requirements. (Section 1.2)

### **In-Situ Leach Facilities**

The licensee conducted in-situ recovery and operations in accordance with the license and regulatory requirements. Radiological controls including signs and postings were implemented in accordance with license and regulatory requirements. (Section 2.2)

### **Radiation Protection**

The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license. Occupational doses were less than established limits. (Section 3.2)

### **Effluent Control and Environmental Protection and Maintaining Effluents from Materials Facilities As Low As Reasonably Achievable**

The licensee conducted environmental monitoring in accordance with license requirements. The licensee reported the results in semi-annual reports to the NRC. The annual dose to members of the public remained below regulatory limits. The licensee was documenting spills and conducting excursion sampling as specified in the license. (Section 4.2)

### **Inspection of Radioactive Waste Processing, Handling, and Storage**

The management, storage, and disposal of byproduct material and 11e.(2) wastes were conducted in accordance with the license and regulatory requirements. (Section 5.2)

### **Transportation**

A non-cited violation is documented in the report. The licensee identified an environmental sample was shipped without the appropriate surveys being performed or the appropriate labeling and marking being on the package. The licensee identified the issue and took immediate corrective actions to prevent recurrence. (Section 6.2)

## Report Details

### Site Status

At the time of the inspection, Cameco Resources, Inc. was extracting uranium using the in-situ recovery process. Uranium processing and drying operations were in progress at the Crow Butte Operations Central Processing Plant (CPP) for five of the eleven mine units (MU) making up the facility (MU 7-11). One mine unit (MU-1) has completed groundwater restoration and its related wells and well houses have been decommissioned. The remaining mine units (MU 2-6) are in the groundwater restoration process. No new areas were under construction.

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

### 1.1 Inspection Scope

Ensure that the licensee has 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 inspectors reviewed the licensee's organization structure for Crow Butte Operations and Restoration. At the time of the inspection, the Crow Butte facility operation had approximately 34 full-time employees, a decrease of seven employees since the March 2016 inspection.

Since the previous inspection, the organizational structure has changed to include or remove some positions, reflect title changes and realignment of responsibilities, such as the Director of Safety, Health, Environment and Quality (SHEQ), which was added and then removed since the previous inspection. The organizational chart reflects the movement of individuals from one job position to another and a redistribution of responsibilities to address attrition or a reduction in mid-level management staffing. The inspectors found that the movement of duties and responsibilities associated with attrition and the recent reduction in force at the mid-management level did not have a negative impact on essential functions, such as operations and radiation protection. The Radiation Safety Officer is supported by one full-time health physics technician (HPT).

#### b. Safety and Environmental Review Panel (SERP)

License Condition 9.4 of the performance based license requires, in part, that the licensee establish a SERP process to evaluate whether program changes require an NRC license amendment prior to implementation. The inspectors reviewed the following SERP evaluations completed since the March 2016 inspection:

SERP 16-01	MU-5 Baseline Restoration Well Replacement
SERP 16-02	Pond Inspection Program Revised Forms
SERP 16-03	Organizational Structure Revision (add Director SHEQ)
SERP 16-03 (Revised)	Organizational Structure Revision (remove Director SHEQ)

SERP 16-04	Changes to Figures and Tables in License Renewal Application (LRA)
SERP 16-05	Organizational Changes related to Security Plan
SERP 17-01	Forms in SERP #16-02 revised to original format
SERP 17-02	Organizational Changes related to LRA

In accordance with License Condition 9.4, the licensee is expected to submit a description of each change, including a summary of each safety and environmental evaluation to the NRC in a future annual report. The inspectors found that the licensee correctly implemented the performance-based license, and the evaluations did not require prior NRC approval.

c. Audits and Inspections

The inspectors reviewed the routine site inspections generated by the licensee since the previous inspection, in accordance with the requirements of License Conditions 9.2, 9.7 and 11.9. The licensee was conducting and documenting a daily walk-through of all work and storage areas of the facility to ensure that good radiation practices were being followed. The RSO, HPT and trained/qualified operators performed and documented the daily walk-throughs. In accordance with license condition 9.7, site procedures allow trained and qualified operators to perform the daily walk-throughs on days when radiation safety staff are not available, such as weekends and holidays. The inspectors reviewed the designated operator training and confirmed that operators who performed daily walk-throughs had received the required training. The RSO or HPT reviews the walk-through documentation upon return to the facility. A review of the daily walk-throughs conducted since the previous inspection revealed no examples of the RSO or HPT failing to perform the required review.

Title 10 CFR 20.1101(c) requires annual audits of the radiation safety program content and implementation to the NRC. The inspectors reviewed the annual audit for 2016. The audit included an evaluation of occupational exposures, radiation survey results, training and compliance with license and regulatory requirements. The inspectors determined that the audit met the requirements of 10 CFR 20.1101(c) and license condition 11.2 as appropriate.

d. Additional Protocols

The inspectors verified that the licensee had provided the NRC with appropriate 2016 documentation to comply with the requirements of 10 CFR 75.11, which related to the Agreement between the United States of America and the International Atomic Energy Agency for the Application of Safeguards in the US. The licensee provided four of the completed forms which provided contact information, the capacity of yellowcake production, the actual annual yellowcake production, and the quantity of yellowcake on hand. The inspectors concluded the reports were accurate, complete, and consistent for the calendar year 2016.

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. The licensee's safety and environmental reviews were performed

in accordance with the license requirements. The licensee conducted audits and inspections as required by regulatory requirements and the license.

## **2 InSitu Leach (ISL) Facilities (89001)**

### **2.1 Inspection Scope**

Determine if in-situ recovery activities were conducted in accordance with regulatory requirements and the license.

### **2.2 Observation and Findings**

#### **a. Uranium Recovery**

At the time of this inspection, uranium recovery production was being performed at MUs 7, 8, 9, 10, and 11. Facility records indicate that MUs 2, 3, 4, 5, and 6 were in restoration. Mine Units 2 and 3 were within the restoration monitoring phase that demonstrates stability of restored ground water quality and MUs 4 thru 6 were within restoration phases where ground water quality is being actively restored through ground water extraction and injection.

Consistent with License Conditions 10.5 and 10.13, the inspectors observed that the highest recorded flow rate over the past year was below the maximum allowed plant throughput of 9,000 gallons per minute (gpm). Facility records indicate that the average and highest operating flow observed over the past year was 4,699 gpm and 6,840 gpm, respectively. The inspectors reviewed the licensee's uranium production records and noted that the annual production for calendar year 2017 was well below the annual limit of 2 million pounds of yellowcake per year specified in the above license conditions.

The inspectors spot-checked facility records to verify that the bleed at MU-10 is sufficiently maintaining an inward hydraulic gradient. The inspectors observed average monthly bleed data for MU-10 for the period from May 2016 to May 2017, and hydrographs (i.e., time-series graphs of monthly ground water level measurements) for perimeter monitoring wells CM10-05, CM10-11, CM10-15, CM10-21, and CM10-26 for the period from May 2016 to May 2017. These records indicated that an inward hydraulic gradient had been maintained at the MU-10 in accordance with License Condition 10.7.

License Condition 9.8 requires, in part, that any new construction area not previously assessed by the NRC shall have a cultural inventory completed by the licensee prior to construction. The licensee stated that no new areas were under construction since the previous inspection that required a cultural resource inventory.

#### **b. Site Tours**

The inspectors conducted a site tour to observe in-situ recovery operations in progress and restoration process testing at the Crow Butte Operations Central Processing Plant (CPP), Restoration Building, selected wellfields, header houses (numbers 52, 55, and

64), the two deep disposal wells, and the evaporation ponds. The inspectors determined the operators were conducting operations in accordance with the site procedures.

The inspectors found that all entrance areas to the facility and wellfields were posted with the words, "Any Area Within This Facility May Contain Radioactive Material", as required by License Condition 9.8. Additionally, the temporary storage of byproduct waste materials was located in fenced and locked restricted areas as required by License Condition 10.1.7.

The inspectors conducted independent radiological surveys of the gamma exposure rates present in the central processing plant, header houses and wellfields. The surveys were conducted using a Ludlum Model 19 microRoentgen rate meter (NRC No. 015544 calibration due date of July 13, 2017, calibrated to Ra-226) and a Thermo Electron Corp. RAD EyeG gamma meter (NRC No. 86962 calibrated April 18, 2017). The inspectors noted that the as-found gamma exposure rates were consistent with the licensee's measurements. The licensee had several areas conservatively posted as radiation areas. The highest exposure rate observed during the inspection was 4 mR/hr at the reverse osmosis (RO) units in the RO Building. No area was identified that met the definition of a radiation area (5.0 millirem in one hour) that was not posted as a radiation area.

c. Evaporation Ponds

The inspectors observed the three Commercial Evaporation Ponds (Ponds 1, 3, and 4) and the two research and development (R & D) ponds (East and West Ponds) to assess the condition of the pond liners, condition of the side slopes, and the manner in which the ponds were being operated. The licensee is authorized to construct a total of five ponds, however, Commercial Evaporation Ponds 2 and 5 were never constructed. According to the licensee, the R & D ponds and the Commercial Evaporation Ponds receive well development water and CPP process waste effluent, respectively. The inspectors observed that the licensee was maintaining the proper amount of freeboard on the respective ponds in accordance with License Condition 10.16.

License Condition 11.9 requires the licensee to perform and document inspections of its onsite evaporation ponds. The inspectors reviewed recent pond inspection documentation to determine whether inspection results were being appropriately reported and that inspections were being performed properly. The inspectors observed a weekly pond inspection and verified that the inspection was performed in accordance with inspection procedures outlined in Crow Butte Project Environmental Manual Volume VI, Chapter 8.

The inspectors reviewed the licensee's response to two violations of NRC requirements documented during the March 2016 NRC Inspection (040-08943/2016-001). The results of that review are as follows:

- A. NRC inspectors reviewed records of the licensee's response to the violation concerning pond standpipes monitoring after liner leak verification. NRC inspectors observed that water quality in the affected standpipes was being monitored from June 8, 2016 to the time of the June 2017 inspection. In accordance with License Condition 11.9, this monitoring was observed to include the analyses of the five parameters (e.g., specific conductance, chloride, alkalinity,

sodium, and sulfate) once every 7 days. Inspectors also observed that the monitoring data included a record of when monitoring could not be performed due to the lack of fluid in the affected standpipes (e.g. water in the standpipe was absent or was in the form of ice).

The inspectors determined the above-referenced violation concerning pond standpipes monitoring after a liner leak verification is considered closed (VIO-040-8943/2016-001-01).

- B. NRC inspectors reviewed records of the licensee's response to the violation concerning the corrective action plan for the commercial evaporation pond 4 liner leak. The inspectors observed that the licensee submitted the corrective action plan for the commercial evaporation pond 4 liner leak to the NRC in a letter dated April 12, 2016 [ML16111B136]. The correction plan indicated the licensee's intent to replace the upper liner of Commercial Evaporation Pond #4 during 2016. However, since the implementation of the corrective action plan was not completed in 2016, the licensee provided an updated corrective action plan in a subsequent letter dated December 21, 2016 [ML17006A015].

In accordance License Condition 11.9, inspectors found that the licensee's corrective action plan documented steps to adequately address the liner leak. The corrective action plan also documented that the current waste flows, deep disposal well capacity, and capacity in Commercial Evaporation Ponds # 1 and #3 did not have an impact on having Commercial Evaporation Pond #4 out of service during this time period. Thus, the above-referenced violation concerning the corrective action plan for the commercial evaporation pond 4 liner leak is considered closed (VIO-040-08943/2016-001-02).

### 2.3 Conclusion

The licensee conducted in-situ recovery and operations in accordance with the license and regulatory requirements. Radiological controls including signs and postings were implemented in accordance with license and regulatory requirements.

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

### 3.1 Inspection Scope

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

### 3.2 Observations and Findings

#### a. Occupational Exposures

The inspectors reviewed the licensee's occupational exposure records for calendar year 2016 and the first quarter of 2017. Thirty two employees were monitored for external exposure using optically stimulated luminescence dosimeters for the first quarter of 2017. Occupational monitored employees included plant and wellfield operators, health

physics staff and maintenance workers. The highest deep dose equivalent exposure reviewed was 36 millirem (0.36 milliSievert) for the first quarter of 2017. This dose was assigned to two CPP operators. For the first quarter of 2016, 37 employees were monitored for external exposure, but by the fourth quarter of 2016 this number had decreased to 32 employees. The highest dose assigned for CY 2016 was 106 mrem (1.06 milliSievert). This dose was assigned to a CPP operator. All doses were below the limits established in 10 CFR 20.1201. No bioassay results were above the action level for investigation.

The licensee conducted air sampling, in part, for assessment of internal exposures. The inspectors reviewed the licensee's radon-222 air sampling records and the uranium particulate and worker breathing zone results for calendar year 2016. The inspectors identified that internal exposures were below the limits established in 10 CFR 20. The inspectors confirmed that the licensee had conducted air sampling at the required intervals. The appropriate exposures were calculated and recorded for each employee.

b. Radiation Work Permits

Since the previous inspection, twelve radiation work permits were issued and involved repair/maintenance work on pond #4, waste roll-off bins, ion exchange columns and system tanks/piping. The inspectors reviewed the permits and found they included the necessary air sampling and protective equipment requirements for the work being performed.

c. Free release surveys

Free release surveys since the previous inspection from the CPP were reviewed and found to be performed in accordance with License Condition 9.6.

d. Radiation Safety Instrumentation

The inspectors reviewed the licensee's operability, calibration and maintenance records for survey instruments. Instruments reviewed were found to be in calibration. The licensee uses an offsite vendor to perform annual calibration for radiation safety instrumentation. The inspectors observed survey meters used by licensee personnel when exiting restricted areas. The survey meters examined by the inspectors were found to be in calibration and were used appropriately by licensee's staff.

e. Computer Modeling/Calculations

The inspectors reviewed the licensee's computer modeling and calculations used to assign dose to occupational workers based on area monitoring results (uranium airborne and radon daughters). The formulas and assumptions are based on ICRP 26/30 standards and are appropriate for the conditions found at the facility.

3.3 Conclusions

The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license. Occupational doses were less than established limits.

#### **4 Effluent Control and Environmental Protection and Maintaining Effluents from Material Facilities ALARA (87102, 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

Since the previous inspection, the licensee had submitted the August 2016 and February 2017 Semiannual Radiological Effluent and Environmental Monitoring Reports in a timely manner in accordance with the requirements of 10 CFR 40.65. The environmental monitoring program consisted of air particulate, radon, surface water, private water wells, sediment, and ambient gamma exposure rate sampling as required by License Condition 11.13. The inspectors reviewed these semiannual reports and compared the reported data to the licensee's records, procedures, and records of daily operations. The licensee's report data was found to be consistent with the inspectors' review of the licensee's records.

Surface water samples were collected quarterly from streams and water impoundments at the facility. The licensee collected water samples from five streams (unless they were dry) and three impoundments since the previous inspection. The inspector reviewed the analysis and sample frequency of recorded data and found the samples were analyzed quarterly for uranium and radium in accordance with License condition 11.13. The inspector also found the results presented in the semiannual reports were consistent with previously collected data.

Stream sediment samples were collected annually from three locations in Squaw Creek, two locations on English Creek, and three impoundments on English Creek consistent with the water sample locations. The samples were analyzed for natural uranium, radium-226, and lead-210 concentrations. No specific limit has been established for sediment samples, but the data is used by the licensee for trending purposes.

The semiannual reports also contained water supply well data. Water supply wells located within 1 kilometer of the wellfields were sampled quarterly. A total of 21 wells were sampled. The inspector found the results presented in the semiannual reports are consistent with previously collected data.

b. Dose to Members of the Public

The licensee conducted annual assessments of public doses as required by 10 CFR Part 20. The maximum public dose for calendar year 2016 was 35.32 millirem total effective dose equivalent at the sampling station AM-9. The dose was calculated using data from optically stimulated luminescence dosimeters, radon track etch detectors, and particulate air samples. The assigned doses were primarily from radon-222 and its progeny. The maximum dose for 2016 was less than the annual limit (100 millirem per year) specified in 10 CFR 20.1301(a)(1).

c. Wellfield and Excursion Monitoring

License Condition 11.5 specifies excursion monitoring well sampling requirements and the criteria for placing a groundwater monitoring well on excursion status. The licensee's excursion sampling program requirements include biweekly monitoring of wells in active MUs, weekly sampling of wells in excursion status, and well sampling in MUs under restoration. The inspectors reviewed groundwater sampling records for the past year to determine whether the licensee was collecting samples at the required frequency and whether excursions were properly identified. The inspectors randomly selected monitoring data and examined the reports to confirm the licensee's automated excursion reporting system was functioning properly. Data from known excursions was also reviewed to ensure that the monitoring frequency had been increased according to License Condition 11.5 requirements. The inspectors concluded that the licensee was implementing the excursion monitoring program in accordance with the license.

The inspectors reviewed the spill records for the past 12 months. According to the licensee's records, two spills occurred resulting in a total of 3,171 gallons of unrecovered fluids. Of the total unrecovered volume, 329 gallons of production fluid was released.

The inspectors reviewed recent mechanical integrity testing documentation to determine whether test results were being appropriately reported and that the tests were being performed in accordance with license commitments. The inspectors observed the implementation of mechanical integrity testing at Well P-4589 and verified that the test was performed in accordance with test procedures outlined in Standard Operating Procedure P-23, Revision 13, of the facility's operating manual. The inspectors determined that the licensee was performing and documenting the mechanical integrity testing in accordance with the license commitments.

The inspectors observed recent monitoring well sampling to determine whether sampling is being performed in accordance with the license commitments. The inspectors observed a sampling of Well SM-55 and verified that the sampling was performed in accordance with the monitoring well sampling procedure in the facility's operating manual.

The inspectors observed on-site laboratory analysis of monitoring well ground water samples and plant water samples to determine whether the analyses were being performed in accordance with licensee procedures. The inspectors observed the analytical analysis of samples for uranium, conductivity, chloride, alkalinity bicarbonate, and total carbonate and verified that the analyses were performed in accordance with test procedures outlined in Standard Operating Procedures CBR-LAB 005-007 and 016, Revision 2, of the facility's laboratory manual.

The inspectors viewed the interior of header houses 52, 55, and 64. Locks were found to be secure and spill containment was present. In accordance with License Condition 10.14, the inspectors found that the licensee monitors and maintains daily records for flow rates on each injection and recovery well, and manifold pressures on the entire system. The inspectors reviewed the facility records for the past year that indicated that the injection pressures did not exceed 100 pounds per square inch at the injection well heads as specified by License Condition 10.14.

The inspectors examined the reportable and non-reportable spill reports since the last inspection pursuant to the requirements of License Condition 11.6. According to licensee records, three spills occurred since March 2016 resulting in a total of 1537 gallons for March 2016 through December 2016. An additional three spills year-to-date in 2017, resulting in a total of 626 gallons for January 2017 through June 2017. All the fluid spilled was production water.

License Condition 11.5 requires, in part, that the licensee monitor groundwater at the designated excursion monitoring wells no more than 14 days apart. The inspectors reviewed logs indicating groundwater monitoring was occurring. No excursions occurred since the previous inspection. The inspectors reviewed recent mechanical integrity testing documentation to determine whether test results were appropriately reported and to ensure that tests were performed in accordance with License Conditions 10.2 during this inspection. The inspectors observed the implementation of a mechanical integrity test at Well P-4589, excursion sampling of ground water monitoring well SM55, and on-site laboratory analysis of uranium (using the ICP-OES procedure), conductivity, chloride, and alkalinity bicarbonate as well as total carbonate analysis.

#### 4.3 Conclusions

The licensee conducted environmental monitoring in accordance with license requirements. The licensee reported the results in semi-annual reports to the NRC. The annual dose to members of the public remained below regulatory limits. The licensee was documenting spills and conducting excursion sampling as specified in the license.

### **5 Inspection of Radioactive Waste Processing, Handling and Storage (88035)**

#### 5.1 Inspection Scope

Determine if storage and disposal activities were conducted in compliance with regulatory and license requirements.

#### 5.2 Observations and Findings

##### a. Inspection of Byproduct Waste Storage

The inspectors observed that all 11e.(2) byproduct material waste storage bins were staged within restricted area with surrounding fences and locked entries. The inspectors performed an ambient gamma radiation survey of the fence line to confirm that the area was appropriately posted and controlled in accordance with 10 CFR 20 regulations.

b. Wastewater Treatment Activities

The licensee processes liquid effluent through reverse osmosis units, stored in storage tank(s), or disposed to a deep disposal well or one of four evaporation ponds.

Consistent with License Condition 10.17, the licensee has been disposing of plant and wellfield operation wastewater using deep disposal well (DDW) injection and evaporation ponds. The licensee currently has two DDWs. The licensee provided the inspectors with the waste disposal rates recorded over the past year for each of the two operating DDWs. The actual capacities reported by the licensee for DDW #1 and DDW #2 were 331 gpm under an injection pressure of 89 pounds per square inch (psi) and 20 gpm under an injection pressure of 261psi, respectively. The total capacity of two DDWs was approximately 351 gpm. The average injection rates for DDW #1 and DDW #2 over the past year were 222 gpm and 17 gpm, respectively.

The inspectors observed the two deep disposal wells to assess the manner in which they were being operated as well as their condition. The DDWs injection pressures were satisfactory monitored, controlled, and recorded. The DDWs housing was observed to be framed with heavy iron beams that were bolted to the housing concrete foundation. Locks were found to be secure and spill containment was present.

5.3 Conclusions

The management, storage, and disposal of byproduct material and 11e.(2) wastes were conducted in accordance with the license and regulatory requirements.

**6 Inspection of Transportation Activities (86740) and Radioactive Waste Processing, Handling, Storage and Transportation (88035)**

6.1 Inspection Scope

Determine whether the licensee's performance is in accordance with the license application and commitments for processing, handling, storage and transportation of radioactive materials and waste.

6.2 Observations and Findings

The inspectors reviewed shipments of yellowcake, waste and resins made by the licensee since the previous inspection. The licensee made 6 yellowcake shipments in 2016 and has made 5 yellowcake shipments year-to-date in 2017. In addition, the licensee made five shipments of waste resin shipments since the previous inspection and 5 waste shipments to the Denison Mine (Energy Fuels, Blanding Utah). The shipping records reviewed appropriately identified the shipment contents (activity, radionuclide, chemical form, UN number). The shipping papers also correctly classified the waste (exclusive use, LSA-1, Class 7, etc.)

There was one licensee identified issue associated with shipment of an environmental sample to an offsite lab. The licensee identified that this sample was not monitored prior to shipment, and due to lack of monitoring it was inappropriately classified and not labeled to reflect its classification as LSA-1 as required for compliance with 10 CFR 71.5 and 49 CFR 172.403. The licensee took immediate corrective action, including

retraining of laboratory staff on the requirements associated with packaging and shipping of environmental samples. The incident is not repetitive as a result of inadequate corrective action, and is not willful. This violation is being treated as a Non-Cited Violation (NCV), in accordance with Section 2.3.2 of the Enforcement Policy (NCV-040-08943/2017-01-001).

### 6.3 Conclusion

The licensee was conducting transportation activities in accordance with the license application and commitments for processing, handling, storage and transportation of radioactive materials and waste

## 7 **Exit Meeting Summary**

The NRC inspectors presented the inspection findings to the licensee's representatives at the conclusion of the onsite inspection on June 22, 2017. During the inspection, the licensee did not identify any information reviewed by the NRC as proprietary that was included in this report.

**SUPPLEMENTAL INSPECTION INFORMATION**

**PARTIAL LIST OF PERSONS CONTACTED**

Licensee Personnel

Doug Pavlick, General Manager US Operations  
Tami Dyer, Radiation Safety Officer  
Robert Tiensvold, Restoration Manager  
Larry Teahon, Safety Health Environment Quality Manager  
Tate Hageman, Plant Supervisor  
Gabe Scoggins, Wellfield Projects Manager  
Walt Nelson, Restoration Specialist  
Kari Towes, Corporate Radiation Safety Officer

**Items Opened, Closed and Discussed**

Opened

NCV	040-08943/2017-001-01	Failure to survey or label environmental sample prior to shipment to offsite laboratory for analysis.
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Closed

VIO	040-08943/2016-001-01	Failure to perform standpipe monitoring after liner leak verification
VIO	040-08943/2016-001-02	Corrective Action Plan for Evaporation Pond #4 Liner Leak
NCV	040-08943/2017-001-01	Failure to survey or label environmental sample prior to shipment to offsite laboratory for analysis.

Discussed

None

## **Inspection Procedures**

IP88005	Management Organization and Control
IP89001	InSitu Leach (ISL) Facilities
IP83822	Radiation Protection
IP88045	Effluent Control and Environmental Protection
IP87102	Maintaining Effluents from Materials Facilities ALARA
IP88035	Radioactive Waste Processing, Handling, Storage and Transportation

## **List of Acronyms**

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As is Reasonably Achievable
CFR	Code of Federal Regulations
CPP	Central Processing Plant
DDW	Deep Disposal Well
HPT	Health Physics Technician
LRA	License Renewal Amendment
MU	Mine Unit
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
RO	Reverse Osmosis
RSO	Radiation Safety Officer
SERP	Safety and Environmental Review Panel
SHEQ	Safety, Health, Environment and Quality