



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

February 26, 2016

John McCarthy, Manager  
Environmental, Health and Safety  
Uranerz Energy Corporation  
1701 East "E" Street, Suite 100  
Casper, WY 82601

SUBJECT: NRC INSPECTION REPORT 040-09067/16-001

Dear Mr. McCarthy:

This refers to the announced, routine team inspection conducted from January 26-28, 2016, at your Nichols Ranch in situ recovery (ISR) Project in Campbell and Johnson Counties, Wyoming. This inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Nuclear Regulatory Commission's (NRC) rules and regulations and the conditions of your license. Within these areas, the inspection consisted of selected examinations of procedures and representative records, observations of activities, and interviews with personnel. The inspection findings were discussed with you and other members of your staff at the conclusion of the onsite inspection on January 28, 2016.

Based on the results of this inspection, the NRC has determined that one Severity Level IV violation of NRC requirements occurred. From August through November 2015, the Radiation Safety Officer failed to review the results of daily and weekly inspections and summarize air sampling data and dosimetry reports on a monthly basis, which could have led to possible failures to identify negative trends in radiation exposures or equipment deficiencies. This violation is being treated as a Non-Cited Violation (NCV), consistent with Section 2.3.2 of the Enforcement Policy. The NCV is described in the subject inspection report. If you contest the violation or the 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 the Regional Administrator, Region IV; and the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response, if you choose to provide one, 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 not include any personal privacy or proprietary information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Dr. Robert Evans, Senior Health Physicist, at 817-200-1234 or the undersigned at 817-200-1191.

Sincerely,

***/RA by R.Browder For/***

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

Docket: 040-09067

License: SUA-1597

Enclosure:

Inspection Report 040-09067/16-001

cc: C. Bilbrough, WDEQ  
M. Rogaczewski, WDEQ  
R. Schierman, WDEQ  
Director, Wyoming Radiation Control Program

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**DISTRIBUTION:**

M. Dapas, RA  
 K. Kennedy, DRA  
 M. Shaffer, D:DNMS  
 L. Howell, DD:DNMS  
 R. Kellar, C:FCDB  
 J. Whitten, C:NMSB-B  
 R. Evans, FCDB  
 L. Gersey, FCDB  
 M. Poston-Brown, NMSB-A  
 B. Baca, FCDB  
 B. VonTill, NMSS/DUWP/URLB  
 R. Linton, NMSS/DUWP/URLB  
 M. Herrera, DRMA/FRMT  
 C. Hill, NMSB-B

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SIGNATURE	<i>/RA/</i>	<i>/RA by RJEvans For/</i>	<i>/RA/</i>	<i>/RA by RJEvans For/</i>	<i>/RA by RSBrowder For/</i>
DATE	02/25/16	02/25/16	02/25/16	02/25/16	02/26/16

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**Service List:**

Carol Bilbrough,  
Program Manager  
Wyoming Department of Environmental Quality  
Land Quality Division  
122 West 25<sup>th</sup>  
Cheyenne, WY 82002

Mark Rogaczweski  
District 3 Supervisor  
Wyoming Department of Environmental Quality  
Land Quality Division  
2100 West 5<sup>th</sup> Street  
Sheridan, WY 82801

Ryan Schierman  
Uranium Recovery Program Manager  
Wyoming Department of Environmental Quality  
Land Quality Division  
200 W. 17<sup>th</sup> Street  
Cheyenne, WY 82002

Scott W. Ramsay  
Radiological Services Supervisor  
Wyoming Office of Homeland Security  
5500 Bishop Blvd., Door #1  
Cheyenne, WY 82002

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 040-09067

License: SUA-1597

Report: 040-09067/16-001

Licensee: Uranerz Energy Corporation

Location: Nichols Ranch ISR Project, Nichols Ranch Unit  
Johnson and Campbell Counties, Wyoming

Dates: January 26-28, 2016

Inspectors: Robert Evans, Ph.D., Senior Health Physicist, Team Leader  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Linda Gersey, Health Physicist  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Bernadette D. Baca, Health Physicist  
Fuel Cycle and Decommissioning Branch  
Division of Nuclear Materials Safety

Martha R. Poston-Brown, Health Physicist  
Nuclear Materials Safety Branch A  
Division of Nuclear Materials Safety

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

Attachment: Supplemental Inspection Information

## EXECUTIVE SUMMARY

### Uranerz Energy Corporation, In-situ Recovery Facility NRC Inspection Report 040-09067/16-001

This inspection included observation of site activities, review of records, and interviews with site staff. In summary, the licensee was conducting operations in accordance with regulatory and license requirements, with one exception as described below.

#### Management Organization and Controls

- The organizational structure and staffing levels maintained by the licensee during the inspection period, with one minor exception, 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, with one exception. A Non-Cited Violation was identified related to the licensee's failure to develop and issue all monthly reports in a timely manner. The licensee continued to investigate problems with various facility fans. The licensee implemented corrective actions including fan repairs and upgrades as necessary. (Section 1.2)

#### In-Situ Leach Facilities

- The licensee conducted in-situ recovery and operations in accordance with the license and regulatory requirements. Plant parameters were within the limits specified in the license and license application. The licensee constructed the elution, precipitation, and filter press circuits in accordance with license and regulatory requirements. The licensee started, but had not completed, operator training for the new equipment. 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 annual regulatory limits. (Section 3.2)

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

- Wellfield and excursion monitoring was being conducted in accordance with license requirements. One release was reported by the licensee as required by the license. (Section 4.2)

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

- Waste water treatment, transportation of resin, disposal of byproduct materials, and management of 11e.(2) wastes were being conducted in accordance with license and regulatory requirements. (Section 5.2)

### Implementation of the Decommissioning Planning Rule

- The licensee established and implemented radiological monitoring and response programs for spills and releases. The licensee also maintained records of releases of radioactive materials and financial assurance as required by the license. In summary, the licensee was in compliance with the requirements of the Decommissioning Planning Rule. (Section 6.2)

## Report Details

### **Site Status**

At the time of the inspection, Uranerz Energy Corporation (licensee) was conducting in situ recovery (ISR) operations at the Nichols Ranch ISR Project, Nichols Ranch Unit. Uranium recovery operations were being conducted in Production Area No. 1. Six header houses were in service, and a seventh header house was under construction. The uranium-bearing lixiviant from the wellfield was being pumped to the Nichols Ranch Unit central processing plant where the uranium was extracted from the fluid using ion exchange columns. The barren solution was then refortified with chemicals prior to re-injection into the ore zone aquifer. The licensee continued to ship the uranium-bearing ion exchange resins to a nearby, NRC-licensed facility for further processing.

In recent months, the licensee constructed the elution, precipitation, and filter press circuits at the Nichols Ranch Unit central processing plant. The licensee plans to place these new systems into service in the near future. The licensee plans to ship the output from the filter press, a yellowcake slurry, to an out-of-state uranium mill for drying and packaging.

The licensee is allowed to construct a dryer and related support equipment at the Nichols Ranch Unit central processing plant, but at the time of this inspection, the licensee has not started construction of the dryer. The licensee is also allowed to conduct uranium recovery operations in Production Area No. 2, but the licensee has not started operations in this area. Finally, the licensee is authorized to construct a satellite facility at the Hank Unit, but the licensee has not started construction of this facility.

### **1 Management Organization and Controls (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 compared the licensee's organizational structure in effect at the time of the inspection to the NRC-approved structure provided in the License Application, Section 5.1.1 (ADAMS Accession No. ML15076A032). The licensee had a total of 35 full-time employees reporting to the Nichols Ranch facility. Since the previous inspection, the organizational structure was revised due to a merger with Energy Fuels. The merger resulted in changes in job titles and a slight change in responsibilities. The licensee addressed these changes using the Safety and Environmental Review Panel (SERP) process (SERP 5-2015), as allowed by its performance-based license.

The Radiation Safety Officer (RSO) was supported by one staff member with RSO qualifications and one Health Physics Technician. The licensee used contactors for drilling work on an as-needed basis. The inspectors determined that the licensee had sufficient staff to implement the radiation protection, groundwater monitoring, and environmental programs at its current operating level.

At the time of the inspection, the licensee was operating under an interim organization that was not consistent with the License Application or the performance-based license. This interim organization was implemented to allow for succession planning as the Environmental, Health, and Safety Manager had announced his intention to retire. The license had not conducted a SERP review of this interim organization as required by License Condition 9.4. This failure constituted a violation of minor significance and was not subject to formal enforcement action. The NRC inspectors discussed with licensee staff the need for the organization and reporting structure to match the License Application commitments, as amended by the performance-based license. In response to NRC comments, the licensee revised the organizational structure on an interim basis via SERP 3-2016. The licensee intends to withdraw this interim SERP decision and return to the organization described in SERP 5-2015 upon retirement of the Environmental, Health, and Safety Manager.

b. Safety and Environmental Review Panel

License Condition (LC) 9.4 of the performance-based license requires, in part, that the licensee establish a SERP process to evaluate if program changes, tests or experiments require an NRC license amendment prior to implementation. The inspectors reviewed nine SERP evaluations completed since the last inspection, conducted in March 2015 (ML15271A335). The NRC's review included six SERP evaluations conducted in 2015 and three evaluations conducted in 2016. The SERPs included:

- SERP 2-2015, Well Installation Figure Change
- SERP 3-2015, Organizational Figure Change
- SERP 4-2015, Equivalent Feed of Uranium Loaded Resin
- SERP 5-2015, Organizational Structure Change
- SERP 6-2015, Shipment of Yellowcake Slurry
- SERP 7-2015, Central Processing Plant Buildout
- SERP 1-2016, Organizational Structure Change
- SERP 2-2016, Health Physics Technician Qualifications
- SERP 3-2016, Interim Organization Change

In accordance with LC 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 concluded that the licensee correctly implemented the performance-based license, and none of the evaluations required prior NRC approval.

c. Audits and Inspections

The inspectors reviewed the audits and inspections generated by the licensee for calendar year 2015 in accordance with the requirements of LC 9.7 and Regulatory Guide 8.30. 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 Health Physics Technician, RSO, or RSO-designee performed and documented the daily walk-throughs. The licensee has implemented a training program for selected operations staff to become RSO designees and perform daily walk-throughs on holidays or weekends. The inspectors reviewed the associated training of the RSO designees and determined that the training program (instruction and practical training)

reflected the current operation of the facility and tasks associated with a complete, daily walk-through.

One Severity Level IV violation was identified related to the licensee's failure to generate all of the monthly written summaries of the radiation safety program in a timely manner during 2015. License Condition 9.7 states, in part, that the licensee shall follow the guidance provided in Regulatory Guide 8.31, "Information Relevant to Ensure Occupational Radiation Exposures at Uranium Recovery Facilities Will Be As Low As Reasonably Achievable (ALARA)." Regulatory Guide 8.31, Section 2.3.2, states that the RSO will provide a monthly report that summarizes significant worker protection activities and provide the report to management for review. From August through November 2015, the licensee failed to generate the monthly RSO reports and provide the reports to management for review. The licensee identified the failure during an audit on January 13, 2016. The licensee implemented immediate corrective actions by generating the four monthly reports by January 21, 2016, and providing copies to the Mine Manager and all department heads. Corrective actions taken to prevent recurrence included having the Environmental, Health, and Safety Manager and the Mine Manager receive a report status if the required monthly summary report is not issued by the 15<sup>th</sup> of the following month. If reports are not completed by the 25<sup>th</sup> of the following month, a rough draft will be submitted to management for review of completed items. Incomplete items will be noted and finalized as soon as possible. Although this incident was a violation of LC 9.7, the licensee identified and corrected the violation, and the corrective actions taken should prevent future recurrence of the violation. This non-repetitive, licensee-identified and corrected violation is being treated as a Non-Cited Violation (NCV 040-09067/1601-01), consistent with Section 2.3.2.b of the NRC Enforcement Policy.

The inspectors reviewed the ALARA audit report for site operations dated December 17, 2015. This report included operations conducted between April 2014 and August 2015. The audit included a review of occupational exposures, radiation survey results, training activities, and compliance with license and regulatory requirements. The inspectors determined that the audit met the requirements of 10 CFR 20.1101(c).

The inspectors verified the RSO had reviewed all radiation safety and operational procedures as required by LC 9.7 and Section 2.2 of Regulatory Guide 8.31. The majority of the procedures were reviewed in December 2015.

In addition, the inspectors reviewed the results of an investigation that was ongoing at the time of the March 2015 inspection (ML15271A335). This investigation involved troubleshooting of four ventilation fans: (1) bicarbonate and transfer tanks; (2) lamella and plant water tanks; (3) permeate tank; and (4) waste water tanks. The radiation safety staff noted numerous problems with the fans. In response, the licensee's staff took corrective actions including sensor problems and motor failures. Various fan repairs were made in 2015. The RSO documented the licensee's responses in an internal memo dated January 18, 2016. The corrective actions included a commitment to continue with inspection of fan operational status and to install more durable fans as feasible. The RSO concluded that the operation of the fans was necessary to maintain exposures to radon ALARA, but that routine sample results had not identified any instance of elevated radon levels within the Nichols Ranch Unit central processing plant.

### 1.3 Conclusions

The organizational structure and staffing levels maintained by the licensee during the inspection period, with one minor exception, 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, with one exception. An NCV was identified related to the licensee's failure to develop and issue all monthly reports in a timely manner. The licensee continued to investigate problems with various facility fans. The licensee implemented corrective actions including fan repairs and upgrades as necessary.

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

### 2.1 Inspection Scope

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

### 2.2 Observations and Findings

#### a. Uranium Recovery Operations

At the time of the inspection, uranium recovery operations were being performed at Nichols Ranch Production Area PA-1. The Production Area Pump Test document for Production Area PA-2 had been completed and was awaiting approval by the Wyoming Department of Environmental Quality. Six header houses were in operation in Production Area PA-1. Injection and recovery wells were being installed in support of future operations at Header Houses HH-7 and HH-8. The inspectors reviewed records of the lixiviant composition and concluded the results were in compliance with LC 10.1 requirements.

The inspectors reviewed the injection, production, and waste disposal rates from Production Area PA-1 based on information presented in the four quarterly reports submitted by the licensee. At the time of the inspection, the average production flow was approximately 330 gallons per minute per header house, for a total daily flow rate of 1,980 gallons per minute, which is well below the maximum rate of 3,500 gallons per minute specified in LC 10.2. The inspectors reviewed the licensee's uranium production records and noted that the production rates for 2014-2015 were below the annual limit specified in LC 10.2.

The licensee is required to demonstrate an inward hydraulic gradient in wellfields during all operations in accordance with LC 10.9. The inspectors evaluated the bleed rate, recent ground water levels in the monitoring well ring, and the monitoring ring well hydrographs to confirm the presence of an inward gradient. The monitoring ring well hydrographs showed a continuous and substantial decrease in water level from the start of recovery to the present date. The bleed rate was approximately 19 gallons per minute, a flow rate that was within the 0.5-1.5 percent range specified in the license application.

The licensee is required by LC 10.5 to conduct mechanical integrity testing on each injection and production well before the wells are placed into service, and every five years thereafter. The inspectors reviewed the quarterly reports and identified that 6 out of 282 wells had failed the mechanical integrity tests. The wells that failed were plugged and abandoned.

b. Central Processing Plant Buildout

License Condition 12.3 states, in part, that the licensee shall not commence operations until the NRC performs a preoperational inspection to confirm that written operating procedures and approved radiation safety and environmental monitoring programs are in place, and that preoperational testing is complete. This license condition also states that the licensee should inform the NRC at least 90 days prior to the expected commencement of operations to allow the NRC sufficient time to plan and perform the preoperational inspection. By letter dated September 10, 2015 (ML15265A054), the licensee formally notified the NRC that it was requesting a preoperational inspection for the elution, precipitation, and drying circuits at the Nichols Ranch Unit central processing plant. As part of this inspection, the NRC conducted a preoperational review of the licensee's recently constructed systems.

The inspectors observed the status of construction and site drawings. The equipment had been constructed in accordance with license application and license requirements, and the drawings had been updated based on as-built plant conditions. The equipment had been functionally tested as much as possible. In addition, various chemicals were staged and ready for injection into the plant systems.

At the time of the inspection, the licensee had not received its slurry trailer, for transporting yellowcake slurry to an out-of-state uranium mill for drying and packaging. The licensee's programs for slurry trailer operations will be reviewed during a future inspection. The inspectors noted that the licensee was currently conducting operations using a resin tanker, therefore, the licensee should be able to successfully integrate slurry tanker operations into its programs.

The inspectors reviewed the status of site procedures and programs. In accordance with LC 10.4, the licensee developed four procedures specifically for operation of the new equipment. The inspectors conducted walk-downs of the procedures and interviewed plant operators. The licensee's staff demonstrated the transfer of stripped resins from an ion exchange column to an elution column. The inspectors discussed potential procedural enhancements with licensee staff, and the licensee updated the procedures as necessary. At the close of the onsite inspection, the procedures were still in draft, and the licensee is expected to formally approve and implement the procedures in the immediate future. The inspectors noted that the licensee had expanded its radiation protection program to include the areas of the new equipment. The license plans to conduct routine radiological surveys in the areas of the new equipment, when placed into service.

Finally, the inspectors reviewed the status of operator training. A training program had been developed. Training was in progress, but the operations manager stated that he could not complete all training, including task training, until the equipment was placed into service. The operations manager stated that experienced supervisory staff will monitor equipment operations until all operators are sufficiently trained to independently

conduct operations. In addition, the licensee stated that it would document training of operations staff who will conduct routine chemical and uranium sampling and analysis. The NRC staff plans to review the licensee's training efforts during a future inspection.

Code of Federal Regulation 10 CFR 40.32(c) requires, in part, that an application for a specific license will be approved if the applicant's proposed equipment, facilities, and procedures are adequate to protect health and minimize danger to life or property. During the onsite inspection, the team interviewed personnel, observed the facility, and reviewed applicable procedures for compliance with license application commitments, license condition requirements, and regulatory requirements. The inspection team concluded that the licensee was ready to commence operation as evidenced by a review of the licensee's equipment, facilities, and procedures being protective of site workers, the public, and the environment. On February 2, 2016, the NRC issued a letter (ML16033A344) to the licensee, authorizing the licensee to begin yellowcake slurry producing operations using the elution, precipitation, and slurry filter press. The NRC will review the operation of these new systems during future inspections.

c. Site Tours

The inspectors conducted site tours to observe in-situ recovery operations in progress. Areas toured included the Nichols Ranch Unit central processing plant, Production Area PA-1 wellfield, several header houses, associated excursion monitoring wells, meteorological tower, and both operating deep disposal wells (DDW #1 and DDW #4). The inspectors also reviewed the status of construction at Header House HH-7. In the header houses, the inspectors observed and discussed system pressures and flow rates, confined space entry constraints, and lock-out/tag-out requirements with the site operators. The inspectors determined that the operators were conducting operations in accordance with site procedures. The inspectors found the wellfield infrastructure to be in good condition.

The inspectors observed that all entrances to the facility and wellfields were posted with the words, "Any Area Within This Facility May Contain Radioactive Materials," as required by LC 9.11. Security was being maintained by fences, gates, locked doors, and cameras.

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 exposure rate meter (NRC No. 015546, calibration due date of 08/12/16, calibrated to radium-226). The inspectors noted that the as-found gamma exposure rates were consistent with the licensee's measurements. The licensee had posted several areas as radiation areas including several in-line fluid filters. The highest exposure rate within the central processing plant that was not posted as a radiation area was measured at the reverse osmosis unit at 1.8 millirem per hour. No area was identified that met the definition of a radiation area (5.0 millirem per hour) that was not posted as a radiation area.

2.3 Conclusions

The licensee conducted in-situ recovery and operations in accordance with the license and regulatory requirements. Plant parameters were within the limits specified in the license and license application. The licensee constructed the elution, precipitation, and

filter press circuits in accordance with license and regulatory requirements. The licensee started, but had not completed, operator training for the new equipment. 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 being 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 occupation exposure records up to the 3<sup>rd</sup> quarter of 2015. The licensee had not received the 4<sup>th</sup> quarter dosimetry data from the vendor at the time of the inspection. Approximately 25 employees were monitored for external exposures using optically stimulated luminescence dosimeters that were exchanged on a quarterly basis. Occupationally monitored employees included plant and wellfield operators, health physics staff, and maintenance workers. The highest deep dose equivalent exposure for the first three quarters of 2015 was 46 millirem (0.46 milliSievert). This dose was assigned to a plant operator. All doses were below the annual limits established in 10 CFR 20.1201.

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 2015. The highest derived air concentration in hours (DAC-hours) for radon daughters for 2015 was 6.6 DAC-hours, received by a plant operator. The highest airborne uranium exposure was 22.6 DAC-hours by the same plant operator for 2015. All internal exposure results were below the annual regulatory limit of 2000 DAC-hours. The inspectors confirmed that the licensee had conducted air sampling at the required intervals.

The highest total effective dose equivalent for the first three quarters of 2015 was received by a plant operator who received 111 millirem (1.11 milliSievert). This dose was below the regulatory limit of 5,000 millirem (50 milliSievert).

##### **b. Respiratory Protection**

The inspectors reviewed the licensee's respiratory program with regard to maintaining exposures ALARA. The inspectors reviewed the licensee's training, testing, use, restoration, and maintenance of respiratory protection for workers. The inspectors concluded that the licensee was maintaining a respiratory program in compliance with the regulatory requirements provided in 10 CFR 20.1703.

##### **c. Radiation Work Permits**

Since the previous inspection, 45 radiation work permits had been issued. The inspectors review a sampling of the permits and found they included the necessary air

sampling and protective clothing requirements for the work being done. The majority of the radiation work permits were construction-related for facility upgrades.

d. Free-release surveys

License Condition 9.6 requires the licensee to follow the guidance provided in the NRC document, "Guidelines for Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct, Source, or Special Nuclear Material." The inspectors reviewed the radiation survey release records developed since the previous inspection and identified that some surveys were completed using incorrect survey instrument conversion factors. The licensee stated that it had inadvertently used the 2-pi source efficiency without a corresponding source/surface efficiency factor. This error resulted in an incorrect conversion of the measured count rate into disintegrations per minute for comparison to the release criteria. Two survey instruments were identified and a total of 13 free-release survey results were completed in error.

The licensee investigated all of the surveys in questions and determined that if the surveys had been completed using the correct efficiency factor, all items still would have met the release criteria. In other words, no actual safety consequence occurred as a result of the licensee's efficiency conversion error. In response to this incident, the licensee changed calibration companies and will ensure that the correct efficiency factor is used for each instrument. Accordingly, the failure to use the correct instrument conversion factor constitutes a violation of minor significance and is not subject to formal enforcement action.

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 annual regulatory limits.

**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

The semi-annual reports, submitted by the licensee in accordance with the requirements of 10 CFR 40.65, are currently being evaluated by NRC headquarters staff. The NRC's review of these documents will be provided to the licensee under separate correspondence.

b. Wellfield and Excursion Monitoring

The inspectors examined the reportable and non-reportable spill reports. Since the previous inspection, conducted in March 2015, the licensee experienced 38 spills, of which one was reportable to the Wyoming Department of Environmental Quality and the NRC, as required by LC 11.6. The spill occurred at well N1A-078 at Header House HH-2, Production Area PA-1, on November 5th, 2015. Approximately 700 gallons of injection fluid was released onto the surface and into a dry drainage. The cause of the leak was a failed leak detection circuit when the pop-off valve was released. This problem appeared to have been a common problem in Header House HH-2 and other earlier header houses. The spill was adequately reported to both the NRC and State of Wyoming. The licensee stated that they will switch the enclosure units from modified garbage cans to fiberglass boxes. This change appears to facilitate better leak detection responses, and the licensee believes this change will eliminate the trend of failed leak detections in response to pop-off valve releases.

License Condition 11.5 requires, in part, that the licensee monitor groundwater at the designated excursion monitoring wells twice a month. The inspectors reviewed several excursion groundwater sampling records and determined that no wells have been or are currently in excursion status. The inspectors concluded that operational groundwater monitoring was being conducted by the licensee as required by the license.

4.3 Conclusions

Wellfield and excursion monitoring was being conducted in accordance with license requirements. One release was reported by the licensee as required by the license.

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

5.1 Inspection Scope

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

5.2 Observations and Findings

a. Inspection of Transportation Activities and Solid Byproduct Waste

The inspectors reviewed transportation activities from the start of shipments on June 11, 2014, through December 31, 2015. During this time period, the licensee shipped 139 resin shipments and three 11e.(2) byproduct waste shipments. The inspectors reviewed the licensee's applicable procedures, certified shippers' training records, selected shipment documentation, and observed a resin shipment. The licensee performed shipments within NRC and U.S. Department of Transportation regulations.

The inspectors were unable to review the slurry bulk container, the process for loading slurry into the container, or staff training regarding the new loading process and container. These items will be reviewed in future inspections.

License Condition 9.9 requires, in part, that the licensee possess a waste disposal agreement to dispose of 11e.(2) byproduct material at an offsite location. For the period reviewed, the licensee made three disposal shipments to the entity included in the waste disposal agreement. Materials sent for disposal consisted of contaminated equipment such as filters, pumps, consumables (gloves, paper towels), and soil.

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

b. Review of Wastewater Treatment Activities

The licensee continues to manage waste water within the plant using reverse osmosis equipment and storage tanks. The licensee currently has two deep disposal wells available for disposal of waste water. No waste storage ponds are located at the site. The licensee stated that the waste water disposal rates are currently so low that they alternated between the two wells on a weekly basis. The licensee indicated that since the last inspection, the deep disposal wells remained in service with the exception of routine maintenance and testing activities. The inspectors concluded the licensee has demonstrated that the two deep disposal wells have sufficient capacity to handle current waste water disposal requirements as required by LC 10.11.

5.3 Conclusions

Waste water treatment, transportation of resin, disposal of byproduct materials, and management of 11e.(2) wastes were being conducted in accordance with license and regulatory requirements.

**6 Review of Implementation of Decommissioning Planning Rule (Temporary Instruction 2600/017)**

6.1 Inspection Scope

The inspectors conducted a review of the licensee's implementation of the Decommissioning Planning Rule (DPR).

6.2 Observations and Findings

The NRC issued the DPR on June 17, 2011 (76 *Federal Register* 35512) with an effective date of December 17, 2012. The DPR requires certain licensees to establish programs to: (1) minimize the introduction of radiological contamination into the site environment; (2) ensure that releases of radioactivity to the environment are promptly identified and characterized; (3) document radiological survey data which identifies the location and concentrations or quantities of contamination that may require remediation at the time of license termination; and (4) report updated financial assurance information as required by the DPR. The inspectors reviewed the licensee's implementation of the DPR requirements.

The licensee is required to minimize the introduction of radiological contamination into the site environment. The licensee implements this requirement with a combination of procedural controls, plant design, and site tours. The most likely sources of environmental radiological contamination at the Nichols Ranch ISR Project are spills and leaks. To counter the potential for spills and leaks, the licensee installed wellfield leak detection systems, differential flow alarms, high/low tank level alarms, high/low pressure alarms, tank level indicators, and automatic shutdown interlocks. The licensee also uses engineering controls including sumps, berms, and containments within site structures to control leaks. Operators are trained to respond to alarms, including identification and termination of releases and spills. Plant staff conduct routine plant walk downs, in part, to identify any ongoing leaks, spills, or releases.

To avoid the potential for build-up of long-term gaseous and liquid effluent releases to the environment, the licensee established and implemented an NRC-approved environmental monitoring program. The licensee also developed instructions for responding to wellfield leaks and spills. Depending on the circumstances of the spill, the licensee's response may include gamma radiation surveys, soil sampling, solution sampling, spill containment, and soil/fluid recovery. The inspectors confirmed that the licensee had the procedures and equipment, including calibrated survey meters, for responding to spills within a structure or in the environment.

License Condition 11.6 provides the spill and leak reporting requirements. The licensee established and implemented a program for recording radiological survey data taken in response to spills. Based on the circumstances of each spill, the licensee may choose to clean up the spill at that time, or delay cleanup until a later date. The inspectors confirmed that the licensee maintained records important to decommissioning in accordance with the requirements of 10 CFR 40.36(f). The inspectors commonly review the licensee's spill and release records as part of the routine inspection program. In addition, the NRC routinely reviews the licensee's semi-annual effluent and environmental monitoring reports.

Finally, the licensee is required by the DPR to update its financial assurance for spills that have not been cleaned up. License Condition 9.5 provides the requirements for maintaining financial assurance. The licensee's current financial assurance included costs of decommissioning, decontamination, and offsite disposal. The licensee is required to update the financial assurance at least annually.

### 6.3 Conclusions

The licensee established and implemented radiological monitoring and response programs for spills and releases. The licensee also maintained records of releases of radioactive materials and financial assurance as required by the license. In summary, the licensee was in compliance with the requirements of the DPR.

## 7 **Exit Meeting Summary**

The NRC inspectors presented the inspection results to the licensee's representatives at the conclusion of the onsite inspection on January 28, 2016. 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

Kode Ames, Safety Officer  
Scott Bakken, Senior Director, Regulatory Affairs  
Hilton Ballinger, Operations Supervisor  
Bernard Bonifas, Mine Manager  
Megan Fraley, Operator  
W. Paul Goranson, Executive Vice President of ISR Operations  
Tony Hind, Project Manager  
Dawn Kolkman, Permitting Manager, Regulatory Affairs  
Aaron Linard, Radiation Safety Officer  
John McCarthy, Environmental, Health and Safety Manager  
Chuck Patterson, Laboratory Supervisor  
Royal Pond, Environmental Supervisor  
Christine Schlagenhauser, Operations Manager

Wyoming Department of Environmental Quality

Ryan Schierman, Uranium Recovery Program Manager, Land Quality Division

**INSPECTION PROCEDURES USED**

IP 88005	Management Organization and Control
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
IP 88050	Emergency Preparedness
IP 88055	Fire Protection
TI 2600/017	Review of the Implementation of the Decommissioning Planning Rule

## ITEMS OPENED, CLOSED, AND DISCUSSED

### Opened

040-09067/1601-01 NCV Failure to generate monthly written summary of radiation safety program

### Closed

040-09067/1601-01 NCV Failure to generate monthly written summary of radiation safety program

### Discussed

None

## LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CFR	Code of Federal Regulations
DPR	Decommissioning Planning Rule
IP	NRC Inspection Procedure
ISR	in situ recovery
μR/hr	microRoentgens per hour
NCV	Non-Cited Violation
NRC	U.S. Nuclear Regulatory Commission
RSO	Radiation Safety Officer
SERP	Safety and Environmental Review Panel
TI	NRC Temporary Instruction