



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

September 29, 2015

Mike Thomas, Director
ISR Regulatory Affairs
Uranerz Energy Corporation
1701 East "E" Street
P.O. Box 50850
Casper, WY 82605

SUBJECT: NRC INSPECTION REPORT 040-09067/15-001

Dear Mr. Thomas:

This refers to the announced, routine inspection conducted on March 17-18, 2015, at the Nichols Ranch facility located at the Nichols Ranch ISR Project, Nichols Ranch Unit, in Campbell and Johnson Counties, Wyoming. The inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's 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 at the exit briefing conducted at the conclusion of the onsite inspection. No violations were identified and no response is required.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response, should you chose 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 Ms. Linda M. Gersey, Health Physicist, 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: 040-09067
License: SUA-1597

Enclosure:
Inspection Report 040-09067/15-001

cc: Ms. Carol Bilbrough
Program Manager
Wyoming Department of Environmental Quality
Land Quality Division
122 West 25th
Cheyenne, WY 82002

Mr. Mark Rogaczewski
District 3 Supervisor
Land Quality Division
2100 West 5th Street
Sheridan, WY 82801

Director, Wyoming Radiation Control Program

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cc: Ms. Carol Bilbrough
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ADAMS ACCESSION NUMBER ML15271A335

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U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

Docket: 040-09067

License: SUA-1597

Report: 040-09067/15-001

Licensee: Uranerz Energy Corporation

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

Dates: March 17-18, 2015

Inspectors: Linda M. Gersey, Health Physicist, Team Leader
Repository and Spent Fuel Safety Branch
Division of Nuclear Materials Safety

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

Attachments: Supplemental Inspection Information

Enclosure

EXECUTIVE SUMMARY

Uranerz Energy Corporation, In-Situ Recovery Facility NRC Inspection Report 040-09067/15-001

This inspection included a review of site status, site tours, management organization and controls, site operations, radiation protection, and environmental protection.

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)
- The licensee's safety and environmental review panel evaluations were performed in accordance with license requirements. (Section 1.2b)
- The licensee was conducting audits and inspections as required by regulatory requirements and the license. (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

- The licensee was conducting in-situ recovery activities in accordance with license and regulatory requirements. (Section 2.2a)

Radiation Protection

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

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

- The effluent monitoring program was reviewed and documented in a separate document. (Section 4.2a)
- Wellfield and excursion monitoring was being conducted in accordance with license requirements. (Section 4.2b)

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

- Waste water treatment and disposal were being conducted in accordance with license requirements. (Section 5.2b)

Report Details

Site Status

Uranerz Energy Corporation, Nichols Ranch Project, was authorized to begin operations by letter dated April 15, 2014, (ADAMS Accession Number ML14105A422). At the time of the inspection, Uranerz Energy Corporation was extracting uranium at the Nichols Ranch Unit using the in-situ recovery process. The licensee was injecting lixiviant in the first wellfield, known as Production Area 1 (PA-1). The ion exchange processing facility at Nichols Ranch was in service supporting four header houses (HHs) in PA-1. Resin shipments were being sent for processing at Power Resources, Inc. Smith Ranch Central Processing Plant (CPP).

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 inspectors reviewed the organizational structure of the licensee's Nichols Ranch facility for compliance with License Application Section 5.1.1 (ML15076A032). The licensee had a total of 44 full-time employees, which report to the Nichols Ranch facility. Since the previous inspection, a new Mine Manager was hired. The licensee has one designated Radiation Safety Officer (RSO) with an additional two staff meeting the RSO qualifications, and one qualified Health Physics Technician (HPT). The licensee uses contractors for drilling work and 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. Safety and Environmental Review Panel

License Condition (LC) 9.4 of the performance-based license requires, in part, that the licensee establish a Safety and Environmental Review Panel (SERP) process to evaluate if program changes, tests, or experiments require an NRC license amendment prior to implementation. The inspectors reviewed one SERP evaluation (SERP-1-2015), related to qualifying an HPT as an RSO. The inspectors verified that the employee met the education, training, and experience in Regulatory Guide (RG) 8.31, "Information Relevant to Ensuring That Occupational Radiation Exposures at Uranium Recovery Facilities Will Be As Low As Reasonably Achievable." The inspectors concluded that the licensee had implemented the SERP determination in accordance with the performance-based license conditions.

c. Audits and Inspections

The inspectors reviewed the audits and inspections being generated by the licensee in accordance with LC 9.7 and RG 8.30. The licensee was conducting and documenting a

daily walk-through of all work and storage areas of the facility to ensure good radiation practices were being followed. The HPT or RSO perform and document the daily walk-through. The RSO was performing a weekly inspection of all facility areas to observe general radiation control practices and reviewing required changes in procedures and equipment. In addition, the RSO was generating a monthly report that summarized the results of the daily and weekly inspections, and air monitoring and radiation exposure data. The inspectors found that the audits and inspections met the requirements contained in the license.

The inspectors reviewed the licensee's Monthly Radiation Safety Officer ALARA reviews, including a review completed on March 11, 2015. In the March 2015 monthly review, the licensee described troubleshooting of four ventilation fans for the: (1) bicarbonate and transfer tanks; (2) lamella and plant water tanks; (3) permeate tank; and (4) waste water tanks. The licensee's radiation safety staff had noticed problems with the lamella, plant water, and permeate tank vent fans. However, upon further investigation, the licensee noticed that the sensors on the lamella and waste water tanks were switched. As a result, the licensee concluded that the ventilation fan for the waste water tanks had burned out. At the time of the inspection, a problem with the permeate tank fan, which is difficult to reach, was still under investigation. The inspectors will follow up on the conclusion of this review during the next inspection.

d. Additional Protocol

The inspectors verified that the licensee had provided the NRC with appropriate documentation to comply with 10 CFR 75.11, which relates 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 had provided the three necessary forms that provide contact information, the capacity of yellowcake production, the actual annual yellowcake production, and the quantity of yellowcake on hand. The licensee discussed how it determined these numbers, and the inspectors concluded the reports were accurate, complete, and consistent for the reports submitted for calendar year (CY) 2014.

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 review evaluations were performed in accordance with license requirements. The licensee was conducting audits and inspections as required by regulatory requirements and the license. 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

At the time of the inspection, uranium recovery operations were being performed at Nichols Ranch PA-1. The Production Area Pump Test document for PA-1 had been approved by the Wyoming Department of Environmental Quality (WDEQ) and verified by NRC to begin operations. Four header houses were in operation in the northern portion of PA-1. Injection and recovery wells were being installed in support of the future operation of header house 6 (the licensee stated that development for header house 5 will be conducted at some point in the future). Inspectors reviewed records of the lixiviant composition and found the results to comply with LC 10.1.

The inspectors reviewed the injection, production and waste disposal rates from PA-1. At the time of the inspection, the production flow was approximately 400 gallons per minute (gpm) per header house, for a total daily flow rate of 1,600 gpm, which is well below the maximum rate of 3,500 gpm daily, average flow rate as stated in LC. 10.2.

The licensee is required to demonstrate an inward 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 provided by the licensee, 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 licensee is required to conduct mechanical integrity testing (MIT) on each injection and production well before the wells are put into service, as required by LC 10.5. The licensee had implemented corrective actions to mitigate the inadvertent use of wells that had failed MIT testing. The corrective action included placing a red cap on wells that fail MIT testing to prevent its use. The red well cap is temporary until the well is plugged and abandoned.

The licensee had implemented corrective actions to mitigate future spills due to failing wellhead leak detection. The corrective actions include waterproofing the leak detector's electrical connections and routine testing of the leak detection system. The testing procedure includes filling the pan that surrounds the wellhead with water to simulate a wellhead leak. The licensee indicated that leak detection testing would be conducted quarterly for the older (trash can type) wellheads and semi-annually for the newer (fiberglass) wellheads.

The licensee had implemented corrective actions to mitigate unplanned releases due to system over-pressurization. These corrective actions included: 1) revised injection manifold operation programming, 2) replacement of the custom algorithm to control the operation of the Plant Injection Booster Pumps with a standard algorithm, and 3) the addition of control valves on sand and pod filters to facilitate venting air from the system, which had been identified as a contributing factor to pressure exceedances. Review of recent data indicates pressures have not exceeded the design operating pressure of 150 psig.

b. Site Tours

The inspectors conducted site tours to observe in-situ recovery operations in progress. Areas toured included the Nichols Ranch CPP, PA1 wellfield and all 4 operating HHs, associated excursion monitoring wells, the meteorological tower, and DDW- 4. In the HHs, the inspectors discussed the pressure reading systems and the lock-out tag-out procedures with the site operators. The inspectors determined that the operators were conducting activities in accordance with the SOP. The inspectors visited both DDWs, which were undergoing annual hydraulic testing required by WDEQ. The inspectors found the wellfield infrastructure to be in good repair.

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 LC 9.11.

The inspectors conducted independent radiological surveys of the gamma exposure rates present in the CPP, header houses, DDWs, and wellfield. The surveys were conducted using a Ludlum Model 19 microRoentgen survey meter (NRC 015540, calibrated using radium-226, calibration due date of July 22, 2015). Gamma exposure rates measured by the inspectors were as expected. Background readings of 40 microRoentgen per hour ($\mu\text{R/hr}$) were found outside the CPP. The highest gamma exposure reading of 1000 $\mu\text{R/hr}$ was measured near a waste water cartridge filter.

2.3 Conclusions

The licensee was conducting in-situ recovery activities 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 dose assessment records for CY 2014. Approximately 20 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 for CY 2014 was a Wellfield Operator that received 150 millirem (1.50 milliSievert). This is below the annual limit of 5000 millirem (50 milliSievert).

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 sample results for CY 2014. The highest derived airborne concentration in hours (DAC-hrs) for radon daughters during CY 2014 was a

Plant Operator that received 74.6 DAC-hrs. The highest airborne uranium exposure received during CY 2014 was 7.14 DAC-hrs for a Plant Operator. All DAC-hrs results were below the annual regulatory limit of 2000 DAC-hrs. The inspectors confirmed that the licensee had conducted air sampling at the required intervals.

Urine bioassays are taken to ensure that the respiratory protection program and engineering controls for airborne uranium are being implemented appropriately. The licensee submits bioassays to an outside analytical laboratory, which is licensed by the NRC, for analysis on a monthly basis for the wellfield and plant operators. One or two bioassays are randomly collected from other employees on a monthly basis. The inspectors verified spike samples were submitted to the analytical laboratory, as required by LC 9.7. No bioassay results exceeded the action level of 15 micrograms uranium per liter of urine during CY 2014.

The highest total effective dose equivalent for CY 2014, was received by a Plant Operator that received 335 millirem (3.35 milliSievert). This is below the annual regulatory limit of 5000 millirem (50 milliSievert).

b. Qualitative Air Flow Study Summary Report

Inspectors reviewed an October 16, 2014, Qualitative Air Flow Study Summary Report, in which Tetra Tech evaluated seven locations in the CPP using guidance and procedures in NUREG-1400 and RG 8.25. Each location was tested with the three CPP bay doors open and then tested again with the 3 doors closed. Each smoke test was recorded on video (*.MP4 file). Inspectors did not review the video files. Tetra Tech observed that air was fairly well mixed when the doors are open and two positive pressure exhaust fans are operating. When the doors are closed, the air is more stagnant, such that any radon-222 release would likely remain near the source. Tetra Tech concluded that proposed locations of air monitors are appropriate and will produce representative results. The inspectors determined that the air flow study was conducted in accordance with NRC guidance and the CPP areas where radon-222 measurements were being conducted are appropriate.

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 the 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.

4.2.1 Observations and Findings

a. Environmental Monitoring

Inspectors discussed the licensee's compliance with the environmental monitoring program that was evaluated and documented by NRC headquarters' staff in its semiannual report review (ADAMS Accession No. ML ML15259A036).

b. Wellfield and Excursion Monitoring

The inspectors examined the reportable and non-reportable spill reports. During the time period from July 1, 2014, to March 18, 2015, the licensee had experienced eighteen spills, of which four were reportable to the WDEQ and NRC, as required by LC 11.6. The largest spill volume was estimated to be approximately 20,000 gallons, which resulted from a pipeline break due to over-pressurization. The licensee performed the appropriate corrective actions to clean up and document the spills.

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 of the excursion groundwater sampling records and found that no wells have been or are currently in excursion status. The inspectors concluded that operational groundwater monitoring was being conducted as required by the license.

4.3 Conclusions

The effluent monitoring program was reviewed and documented in a separate document. Wellfield and excursion monitoring was being conducted in accordance with license requirements.

5 Inspection of Transportation of Activities and Radioactive Waste Processing, Handling Storage, and Transportation (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 and Solid Byproduct Waste

Due to time constraints, the inspectors did not review the transportation program. This will be evaluated during a future inspection.

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. The inspectors reviewed the waste disposal agreement and found it to be valid. Material sent for disposal consisted of 11e.(2) contaminated equipment, such as filters, pipes, pumps, and soil.

The licensee stores 11e.(2) byproduct material in a restricted area. The inspectors observed that all waste storage bins were in restricted areas with surrounding fences and locked entries. Each area was posted appropriately as a restricted area.

b. Review of Waste Water Treatment Activities

The licensee currently has two deep disposal wells (DDWs) available for use. No waste storage ponds are located at the site. The licensee stated that the waste water disposal rates are currently so small that they alternate between using DDW-1 and DDW-4.

At the time of the inspection, annual hydraulic testing was being conducted for the DDWs, as required by the WDEQ. The tests consist of fluid injection at a constant rate for several days followed by a period of no injection. The pressure within the well is monitored throughout the test. At the time of the visit, DDW-4 was in the injection (approximately 25 gpm) portion of the test with an injection pressure of approximately 700 psi (the maximum permitted injection pressure is 1199 psi). The licensee indicated that its typical disposal rate is approximately 10 gpm and that the higher injection rate of 25 gpm was required to perform the hydraulic testing. DDW-1 was in the no injection portion of the test. The licensee indicated that since the last inspection, the DDWs were not out of service with the exception of routine maintenance and testing activities. The inspectors concluded the licensee has demonstrated that the two DDWs have sufficient capacity to handle current waste water disposal requirements as required in LC 10.11.

5.3 Conclusions

Waste water treatment and disposal were being conducted in accordance with license requirements.

6 Exit Meeting Summary

The NRC inspectors presented the inspection results to the licensee's representatives at the conclusion of the onsite inspection on June 24, 2014. During the inspection, the licensee did not identify any information reviewed by the NRC inspectors as proprietary that was included in the report.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

J. McCarthy, Environmental Health and Safety Manager
M. Thomas, Regulatory Affairs
J. Mote, Mine Manager
G. Thomas, Vice President of Operations
P. Goranson, President/CEO

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 of Activities
IP 88035	Radioactive Waste Processing, Handling Storage, and Transportation

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

None

Closed

None

Discussed

None

LIST OF ACRONYMS USED

ADAMS	Agencywide Documents Access and Management System
ALARA	As Low As Reasonably Achievable
CPP	central processing plant
CFR	<i>Code of Federal Regulations</i>
CY	calendar year
DAC-hrs	derived airborne concentration in hours
DDW	deep disposal well
gpm	gallons per minute
HH	header house
HPT	health physics technician
IP	NRC Inspection Procedures
LC	License Condition
MIT	mechanical integrity test
NRC	U.S. Nuclear Regulatory Commission
PA	production area
psi	pounds per square inch
QA	quality assurance
μR/hr	microRoentgens per hour
RG	NRC Regulatory Guide
RSO	Radiation Safety Officer
SERP	Safety and Environmental Review Panel
SOP	Standard Operating Procedures
WDEQ	Wyoming Department of Environmental Quality