



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

July 17, 2013

Ms. Arlene Faunce, Radiation Safety Officer  
Power Resources, Inc.  
P.O. Box 1210  
Glenrock, WY 82637

SUBJECT: NRC INSPECTION REPORT 040-08964/13-001 AND NOTICE OF VIOLATION

Dear Ms. Faunce:

This refers to the announced, routine inspection conducted from April 1-4 and May 29-30, 2013, at the Smith Ranch uranium recovery facility in Converse County, and the North Butte Satellite Facility in Campbell County, Wyoming. This 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 with the conditions of your license. Within these areas, the inspection consisted of selected examination of procedures and representative records, observations of activities, and interviews with personnel. The preliminary inspection findings were discussed with you at the exit briefing conducted at the conclusion of the onsite inspection. The final exit briefing was conducted telephonically with Mr. Brent Berg, General Manager, on June 21, 2013.

Based on the results of this inspection, the U.S. Nuclear Regulatory Commission (NRC) has determined that one Severity Level IV violation of NRC requirements occurred. The violation involves your failure to issue a Radiation Work Permit for contractors working in a contaminated area resulting in an intake of uranium, which is a violation of License Condition 9.7. This violation was evaluated in accordance with the NRC Enforcement Policy included on the NRC's Web site at [www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html](http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html). The violation is cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding it are described in detail in the subject inspection report. The violation is being cited to ensure that you provide us with the corrective actions necessary to prevent recurrence of the violation.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. The guidance in NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," may be helpful. You can find the Information Notice on the NRC website at: <https://www.nrc.gov/reading-rm/doc-collections/gen-comm/info-notices/1996/in96028.html>. The NRC will use your response, in part, to determine whether further enforcement action is necessary to ensure compliance with regulatory requirements.

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter, its enclosures, and your response, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and

A. Faunce

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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, 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 at 817-200-1299 or the undersigned at 817-200-1191.

Sincerely,

***/RJTorres for/***

D. Blair Spitzberg, PhD, Chief  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety

Docket: 040-08964

License: SUA-1548

Enclosures:

1. Notice of Violation
2. NRC Inspection Report 040-08964/13-001

cc w/encls: Mr. Carl Anderson, Solid Waste  
and Hazardous Division,  
Wyoming Department of Environmental Quality  
Ms. Nancy Nuttbrock, Land Quality Division  
Wyoming Department of Environmental Quality  
Mr. Scott W. Ramsay, Radiological Services Supervisor  
Wyoming Office of Homeland Security

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 Mr. Scott W. Ramsay, Radiological Services Supervisor  
 Wyoming Office of Homeland Security

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07/17/2013	07/17/2013	07/17/2013	07/17/2013

## NOTICE OF VIOLATION

Power Resources, Inc.  
Converse and Campbell Counties, Wyoming

Docket: 040-08964  
License: SUA-1548

During the U.S. Nuclear Regulatory Commission (NRC) inspection conducted on April 1-4 and May 29-30, 2013, one violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

License Condition 9.7, states, in part, that the licensee shall follow the guidance in U.S. Nuclear Regulatory Commission, Regulatory Guide 8.31, "Information Relevant to Ensuring that Occupational Radiation Exposure at Uranium Recovery Facilities will be As Low As Reasonably Achievable (ALARA), (Regulatory Guide 8.31)." Section 2.2, Operating Procedures, of Regulatory Guide 8.31, states, in part, that for work on non-routine jobs when the potential for exposure to radioactive material exists and for which no standard written operating procedure already exists, a Radiation Work Permit (RWP) should be used.

In the submittal to the NRC, dated March 20, 2008, Power Resources, Inc, revised Chapter 9 "Management Organization and Administrative Procedures" of the license application. In Section 9.7, "Standard Operating Procedures," it states, "in the case that employees are required to conduct activities of a non-routine nature where there is the potential for significant exposure to radioactive materials, and no standard operating procedures exist for the activity, an RWP will be required. The RWP will describe the scope of the work, precautions necessary to maintain radiation exposures ALARA, and any supplemental radiological monitoring and sampling to be conducted during the work. The RWP shall be reviewed and approved in writing by the Radiation Safety Officer, Radiation Safety Technician, or a designated supervisor in the absence of the RSO or RST, prior to initiation of the work."

Contrary to the above, on January 23, 2013, two sub-contractor welders failed to work under a RWP while removing overhead beams in the former yellowcake dryer room in the Highlands Central Processing Plant. This work was non-routine with the potential for exposure to residual yellowcake for which no written operating procedure already existed. Consequently, both individuals received intakes of uranium exceeding the action level of 15 micrograms of uranium per liter of urine (ug/L), as confirmed by positive bioassays, while working in this area. The bioassay results were 22.2 and 24.7 ug/L.

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

Pursuant to the provisions of 10 CFR 2.201, Power Resources, Inc. is hereby required to submit a written statement or explanation to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Desk, Washington, DC 20555-0001, with a copy to the Regional Administrator, Region IV within 30 days of the date of the letter transmitting this Notice of Violation (Notice). This reply should be clearly marked as a "Reply to a Notice of Violation" and should include for each violation: (1) the reason for the violation or, if contested, the basis for disputing the violation or severity level; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken to avoid further violations; and (4) the date when full compliance will be achieved. Your response may reference or include previous

docketed correspondence, if the correspondence adequately addresses the required response. If an adequate reply is not received within the time specified in this Notice, an order or a Demand for Information may be issued as to why the license should not be modified, suspended, or revoked, or why such other action as may be proper should not be taken. Where good cause is shown, consideration will be given to extending the response time. If you contest this enforcement action, you should also provide a copy of your response, with the basis for your denial, to the Director, Office of Enforcement, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001.

Because your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's Agencywide Documents Access and Management System (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>, to the extent possible, it should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the public without redaction. If personal privacy or proprietary information is necessary to provide an acceptable response, then please provide a bracketed copy of your response that identifies the information that should be protected and a redacted copy of your response that deletes such information. If you request withholding of such material, you must specifically identify the portions of your response that you seek to have withheld and provide in detail the bases for your claim of withholding (e.g., explain why the disclosure of information will create an unwarranted invasion of personal privacy or provide the information required by 10 CFR 2.390(b) to support a request for withholding confidential commercial or financial information). If safeguards information is necessary to provide an acceptable response, please provide the level of protection described in 10 CFR 73.21.

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

Dated this 17th day of July 2013

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket: 040-08964

License: SUA-1548

Report: 040-08964/13-001

Licensee: Power Resources, Inc.

Facility: Smith Ranch In-Situ Recovery and North Butte Satellite Facilities

Location: Converse and Campbell Counties, Wyoming

Dates: April 1-4 and May 29-30, 2013

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

Accompanied by: Elise Striz, PhD, Hydrogeologist  
Uranium Recovery Licensing Branch  
Office of Federal and State Materials and Environmental  
Management Programs

Varughese Kurian, Health Physicist  
Materials Decommissioning Branch  
Office of Federal and State Materials and Environmental  
Management Programs

Approved by: D. Blair Spitzberg, PhD, Chief  
Repository and Spent Fuel Safety Branch  
Division of Nuclear Materials Safety

Attachment: Supplemental Inspection Information

## EXECUTIVE SUMMARY

### Power Resources, Inc. Smith Ranch In-Situ Recovery Facility NRC Inspection Report 040-08964/13-001

This inspection included a review of site status, site tours, management organization and controls, site operations, radiation protection, environmental protection, transportation, radioactive waste management, and emergency preparedness.

#### 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 evaluations were performed in accordance with license requirements. (Section 1.2b)
- The licensee had provided the appropriate reports to comply with 10 CFR 75.11. (Section 1.2d)

#### In-Situ Leach Facilities

- The licensee was conducting in-situ recovery and restoration activities in accordance with license and regulatory requirements. (Section 2.2)
- North Butte Satellite operations appeared to be in compliance with license commitments 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, with one exception. (Section 3.2)
- One violation was identified for failure to perform work under a Radiation Work Permit, as required by the license. (Section 3.2a)

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

- The licensee implemented groundwater and surface water monitoring programs in accordance with the license. (Section 4.2)

#### Inspection of Transportation Activities and Radioactive Waste Management

- One violation was closed by the inspectors related to the failure of a transportation package to maintain its integrity during shipment. (Section 5.2)
- The licensee collected wastewater samples as required by the license application, and the sample results indicated that the fluid met the criteria for disposal by land application. (Section 5.2)

### Emergency Preparedness

- The licensee implemented an Emergency Response Program that was consistent with its license conditions and operating procedures. (Section 6.2)



## Report Details

### **Site Status**

At the time of the inspection, Power Resources, Inc. was extracting uranium using the in-situ recovery process. Four satellite facilities (Sat-2, Sat-3, SR-1, and SR-2) and one remote satellite facility (North Butte) were in service and supporting 12 operating mine units (MUs). Seven MUs were in active restoration. Uranium processing and drying operations were in progress at the Smith Ranch Central Processing Plant (CPP). Uranium recovery operations were on standby at the Highland CPP and the licensee was in the process of renovating this portion of the facility.

The licensee was conducting work at its other licensed satellite facilities. In order to initiate operations at the Reynolds Ranch satellite, the licensee was in the process of obtaining approval from the Wyoming Department of Environmental Quality (WDEQ) in anticipation of starting construction at Reynolds Ranch later in 2013. The Gas Hills and Ruth satellites are not in operation at this time, although the licensee inspects these facilities once per quarter.

The licensee had initiated injection of lixiviant in the first wellfield, MU 1, at North Butte. The inspectors spent two days reviewing operations at North Butte and determined that operations were in compliance with the commitments in the license and license application, and with regulatory requirements.

The inspectors toured the North Butte facility and MU 1 wellfield, Smith Ranch CPP, satellite facilities, Highland facility, and header houses on site. The inspectors met with licensee personnel responsible for surety submittal and discussed information regarding cost estimate basis and assumptions.

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

#### **1.1 Inspection Scope**

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

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

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

The licensee's organizational structure is illustrated in Figure 9-1 of the February 2008 license amendment that was approved by the NRC on August 18, 2008. The Smith Ranch operation was reduced from 161 full time employees, as noted in the previous inspection, to 148 full time employees currently. The reduction in staff was a result of reorganization of the parent company, Cameco Resources Inc. The inspectors reviewed the licensee's organizational structure for Smith Ranch operations and found that it was in agreement with the structure specified in Figure 9-1.

The inspectors reviewed the Safety and Environmental Review Panel (SERP) 4/13-1, dated May 28, 2013, which described the organizational structure for the North Butte Satellite. The General Manager for Power Resources, Inc. will continue to oversee Smith Ranch operations and North Butte Satellite. The North Butte Safety, Health, and

Environmental Quality (SHEQ) Specialist and Health Physics Technician (HPT) will report directly to the Radiation Safety Officer (RSO). Twenty-four staff are permanently staffed at North Butte including one full time HPT. The inspectors reviewed the licensee's organizational structure for North Butte operations and found that it was in agreement with the structure specified in Figure 9-1.

At the time of the inspection, the licensee had two vacancies at Smith Ranch operations and five vacancies at the North Butte Satellite. The licensee's Smith Ranch radiation safety staff consisted of one RSO, two HPTs, and two HPTs in training. 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.

The licensee was in the process of decontaminating the Highland CPP to prepare for installation of new process equipment. The licensee had hired experienced demolition contractors to perform all work related to the project. The licensee's radiation safety staff ensured that all work performed was in accordance with the licensee's procedures and license commitments, with one exception described in Section 3.2.

b. Safety and Environmental Review Panel

The inspectors reviewed ORC/SERP 1/13-1, which approved the wellfield package for MU 10. The inspector noted that maps in the wellfield package report show MU 10 overlaps with part of MU 9. Both of the MUs are in the K-sand layer. Upon discussion with the licensee's wellfield manager, the inspectors were informed that the licensee intends to combine MU 9 and MU 10 in the future and remove the perimeter ring monitoring wells, which now lie between them. The licensee plans to document this change using the SERP process. The inspectors concluded that the licensee had implemented the SERP determination for ORC/SERP 1/13-1 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 License Condition (LC) 9.7 and U.S. Nuclear Regulatory Commission Regulatory Guide (RG) 8.31. The licensee was conducting and documenting a daily walk-through of all work and storage areas of all facilities to ensure good radiation practices were being followed. The HPTs performed the daily walk-through, except on weekends or holidays, when a trained plant operator performed them. The RSO, or an HPT when the RSO was not available, was performing a weekly inspection of all facility areas to observe general radiation control practices and review 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 monitoring and radiation exposure data. The inspectors found that the audits and inspections met requirements contained in the license.

The licensee hired contractors to perform the annual audit of the radiation safety program as required by 10 CFR 20.1101(c). The inspectors reviewed the 2012 annual audit dated March 20, 2013. The audit included a review of occupational exposures, radiation survey results, and compliance with license and regulatory requirements. The inspectors concluded the audit met regulatory requirements.

d. Additional Protocol Verification

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

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 had provided the appropriate reports to comply with 10 CFR 75.11.

**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. Purge Storage Reservoir 2

On a previous inspection in August 2011, the licensee provided the inspectors with two separate reports prepared by a contractor to determine if the wastewater in Purge Storage Reservoir 2 (PSR2) was leaking into the surrounding groundwater. The first report was titled "Purge Storage Reservoir No. 2 Shallow Groundwater Characterization Monitoring Plan," dated August 17, 2011. The second report was titled "Work Plan for Installing Groundwater Monitoring Wells," dated August 30, 2011. During the August 2011 inspection, the inspectors concluded that PSR2 was seeping wastewater into the subsurface sediments. During the current inspection, the licensee provided a third report, "Final Purge Storage No. 2 Shallow Groundwater Characterization Plan," dated March 20, 2012. This report described eight new shallow monitoring wells which were installed near and around PSR2 to characterize any seepage. These wells included upgradient background wells. The third report contained water quality and ground water elevation data from the new wells which further corroborated the presence of seepage from PSR2. The report outlined further actions recommended by the licensee's contractor to characterize the extent and nature of the seepage. Although the third report supported the presence of seepage, it did not address if this seepage had impacted the ground water in the aquifers underlying and surrounding PSR2.

During the inspection in August 2012, the licensee informed NRC that the ongoing casing leak investigation in the shallow aquifers in the northern part of MUC might identify any ground water impacts from the seepage from PSR2, as the MUC aquifers are down-gradient from the impoundment. During this inspection, the licensee made a comprehensive presentation on the casing leak investigation and provided the

inspectors with the associated report, "2012 Status Update Casing Leak Investigation, C, E, and F Wellfields, Smith Ranch- Highlands Operations, Feb. 20, 2013". The presentation and report showed there was compelling evidence that the ground water in numerous monitoring wells in two shallow aquifers (140 and 130 sands) in the northern portion of MU C reflected similar water quality to the wastewater in PSR2. In addition, the ground water elevations and flow direction also supported the conclusion that the elevated chloride and other constituent levels in the shallow aquifers in MU C North were associated with seepage emanating from PSR2. At the time of the inspection, NRC informed the licensee that they will be required to take timely corrective actions to eliminate seepage from PSR2 and to restore the ground water quality in any shallow impacted aquifers in MU C North. The NRC has issued a letter dated, June 17, 2013, (ML13151A104) to inform the licensee of these requirements.

b. Recovery Operations and Restoration

At the time of this inspection, uranium recovery operations were being performed at Highland MUs F, H, I, J, K, and K-North. Recovery operations were also being conducted at Smith Ranch MUs 2, 3, 9, 10, 15, and 15A. The licensee had recently initiated injection of lixiviant in MU 1 at North Butte. Development was underway in Smith Ranch MU 7. Delineation was underway in Smith Ranch MUs 8, 10a, 16, and 17.

Mine Units 1, 4, 4A, C, D, D-ext, and E were in restoration. Only one wellfield, MU A, has had its restoration approved by NRC and WDEQ. During the inspection, the licensee provided a comprehensive presentation on the status of wellfield restoration. The licensee reported that it now has in place a dedicated restoration team of 12 employees. It has replaced 270 wells in MUs undergoing restoration and upgraded header houses to improve restoration capabilities. Mine Units undergoing ground water sweep and treatment are showing improvement with substantial declines in alkalinity, chloride, conductivity and uranium between Jan 2012 and Jan 2013. Mine Units D and E south may complete restoration in 2013 and begin stability monitoring. Mine Unit C and MU 1 are also nearing restoration completion. The licensee anticipates that MU H and MU 2 may go into restoration this year. The licensee also gave a detailed presentation on the pending MU B alternate concentration limit (ACL) amendment application. The inspectors provided the licensee with feedback on the presentation, including several issues the licensee should consider addressing in the application before submission. The staff received the licensee's MU B ACL application on May 30, 2013.

The inspectors conducted a review of the licensee's control of its disposal pathways for plant wastewater. The sources of wastewater include the production bleed stream, plant wash-down water, sump water, laboratory wastes, and reverse osmosis system water. At the CPP, the sources of wastewater also include the yellowcake thickener overflow and filter press wash water.

As described in the license application, the licensee is authorized to dispose of plant and wellfield operations wastewater through land application or by deep disposal well (DDW) injection. The licensee currently has seven DDWs in use. The licensee provided the inspectors with the current waste disposal rates for each of the operating DDWs. The range of actual capacity reported by the licensee for the seven wells was 15.7-91.4 gallons per minute (gpm) with a total capacity of approximately 320 gpm. Two additional wells, DDWs 7 and 8 are permitted for operation. The licensee stated it has a contract in place to

install DDW 7 this year to increase wastewater disposal capacity. In addition to the DDWs, the licensee is authorized to dispose of wastewater via land application at the irrigation circle associated with PSR 2. The land application system provides an additional 180 gpm of disposal capacity. The licensee stated it was assessing the use of the existing irrigator at Highland for additional wastewater disposal capacity. The inspectors noted this additional capacity would help the licensee meet restoration waste-water disposal demands.

The licensee also reported it is conducting a pilot test to improve its wastewater selenium treatment process. The pilot investigates the use of a different iron media. If successful, the use of this media would eliminate the sand and gravel in the current selenium treatment circuit. This action would reduce the volume of solid byproduct material produced by the treatment train by two-thirds. The inspectors noted that this activity meets the NRC objective of As Low As Reasonably Achievable (ALARA). The licensee also informed the inspectors that it was evaluating the use of phytoremediation at ten test plots in the land application circle at PSR2 to remediate selenium in the soil. The inspectors were shown the selenium test pilot and the phytoremediation field plots during the inspection. The inspectors provided feedback to the licensee on their research efforts to improve operations to reduce waste and protect the environment.

c. Site Tours

The inspectors conducted site tours to observe in-situ recovery operations in progress. Areas toured included the Smith Ranch CPP, the Highland CPP and surrounding areas, the SR-2 and SR-3 satellite facilities, MU C North monitoring wells, GW-11 environmental monitoring well, PSR2 monitoring wells and land application area, MU F and header house F-44, the radium/selenium treatment building, and Fowler's Ranch Air Sampling Station. The inspectors reviewed the status of plant equipment, radiation protection postings, and site security. Plant parameters were within required operating intervals, plant equipment appeared to be in good condition, radiological postings were in place, and site security was adequate. In summary, the licensee was maintaining control of the areas and equipment in accordance with license and regulatory requirements.

In addition to the areas identified above, the inspectors visited the North Butte remote satellite facilities. At the North Butte remote satellite, the licensee had recently initiated operations in MU 1 and was continuing development of this mine unit. The licensee appeared to be performing activities in a manner consistent with license requirements.

The inspectors conducted independent radiological surveys of the gamma exposure rates present in the Smith Ranch CPP, satellite facilities, header houses, selenium plant, and the Highland CPP. The surveys were conducted using a Ludlum Model 19 microRoentgen survey meter (NRC 015530, calibration due date of 12/28/2013), and a Ludlum Model 2401-EC survey meter (NRC 21176G, calibration due date of 12/28/2013). 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 and satellite buildings. The highest gamma exposure reading of 1800  $\mu\text{R/hr}$  was measured in the CPP near a fresh eluent tank (T-40). The inspectors did not identify any areas that had not already been identified and posted as radiation areas by the licensee.

## 2.3 Conclusions

The licensee was conducting in-situ recovery and restoration activities in accordance with license and regulatory requirements. North Butte Satellite operations appeared to be in compliance with license commitments 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 license and 10 CFR Part 20 requirements.

### 3.2 Observations and Findings

#### a. Occupational Exposures

The inspectors reviewed the licensee's dose assessment records from June 2012 through May 2013. Approximately 232 employees and contractors were monitored for external exposures using thermoluminescent dosimeters that were exchanged on a quarterly basis. Occupationally monitored employees included CPP operators, satellite/restoration operators, health physics staff, and maintenance workers. The highest deep dose equivalent for the calendar year (CY) 2012 was a dryer operator that received 702 millirem (7.02 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 2012. The highest derived airborne concentration in hours (DAC-hrs) for radon daughters for an employee in CY 2012 was a laboratory worker that received 40.95 DAC-hrs. The highest employee airborne uranium exposure was 83.38 DAC-hrs, received by a dryer employee. All DAC-hrs results were below the regulatory limit of 2000 DAC-hrs. The inspectors confirmed that the licensee had conducted air sampling at the required intervals.

The licensee collected urine bioassay samples to assess the potential for intakes of uranium. The inspectors reviewed the bioassay program to verify compliance with LCs 11.2 and 11.3. Since the previous inspection, two bioassay results exceeded the action level of 15 micrograms uranium per liter of urine ( $\mu\text{g/L}$ ). The samples were collected on January 28, 2013, from two welding sub-contractors with the confirmed results of 22.2  $\mu\text{g/L}$  and 24.7  $\mu\text{g/L}$ . The two sub-contractors had been removing existing beams on the second and third floors of the old yellowcake dryer area at the Highlands CPP. While removing metal beams from the ceiling, the sub-contractors noticed suspended and settled dust on exposed surfaces, which appeared yellow, although the sub-contractors did not report this to the licensee until four days later. Follow-up bioassays were taken from the two contractors on January 30, 2013, with one sample reported as non-detectable and the second sample reported as 8.2  $\mu\text{g/L}$ . The two sub-contractors were performing work without a Radiation Work Permit (RWP), although the work was non-routine and had the potential for exposure to radioactive material for which no standard operating procedure existed. This is a violation (VIO 040-08964/1301-01) of LC 9.7, which states, in part, that the licensee shall follow the guidance in U.S. Nuclear Regulatory Commission, Regulatory Guide 8.31, "Information Relevant to Ensuring that

Occupational Radiation Exposure at Uranium Recovery Facilities will be As Low As Reasonably Achievable (ALARA), (Regulatory Guide 8.31).” Section 2.2, Operating Procedures, of Regulatory Guide 8.31, states, in part, that for work on non-routine maintenance jobs when the potential for exposure to radioactive material exists and for which no standard written operating procedure already exists, a RWP should be used. Additionally, in license application section 9.7, dated March 20, 2008, the licensee commits to using RWPs when there is a potential for exposure to radioactive materials during non-routine work.

The licensee also monitors for soluble uranium intake in compliance with 10 CFR 20.1201(e). The highest soluble intake of uranium for CY 2012 was received by a contractor and was calculated to be 4.5 milligrams of uranium in one week. This is below the regulatory limit of 10 milligrams per week.

The highest total effective dose equivalent for employees and contractors in CY 2012 was a CPP employee that received 781 millirem (7.81 milliSievert). This is below the regulatory limit of 5000 millirem (50 milliSievert).

b. Radiation Protection Surveys

Section 9.8 of the license application requires, in part, that the licensee perform quarterly gamma radiation surveys in specific locations throughout the satellite buildings and CPP areas to verify radiation area postings and to assess external radiation conditions. At the time of the inspection, the inspectors determined that the licensee was conducting the gamma radiation surveys on a weekly frequency in all areas, except the header houses. Various header houses were surveyed on a monthly basis that resulted in each being surveyed at least once during the year. The inspectors reviewed the survey results and found them to meet the requirements of the license.

Alpha contamination surveys were conducted by the licensee on a weekly frequency in clean areas of the site and in the process areas, although Section 9.13 of the license application authorizes the licensee to conduct monthly process area surveys. The inspectors reviewed the survey results and found them to meet the requirements of the license.

c. Training

The licensee is required to conduct training in accordance with LC 9.7 and license application Section 9.6 for its contractors and new employees, and provide annual refresher training for current employees. The inspectors reviewed radiation safety training records for four current employees and the Highland CPP contractors hired since the previous inspection. The annual refresher training for all staff was conducted during March 2013. The inspectors reviewed the training content and written exam and found them to meet the requirements of the license and regulatory requirements. All training activities and records were in accordance with the requirements of the license.

d. Instrumentation

The inspectors reviewed the licensee’s operability, calibration, and maintenance records for portable radiation survey instruments. On an annual basis, the licensee sends all portable survey instruments to an outside vendor for calibration. The inspectors

reviewed instrument calibration certificates for several portable survey instruments and found the calibration certificates to be adequate and the instruments currently calibrated. The inspectors observed survey meters being used by the licensee's employees when exiting restricted areas. The survey instruments examined by the inspectors were found to be in calibration and were being used appropriately by the licensee's staff.

### 3.3 Conclusions

The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license, with one exception. One violation was identified for failure to perform work under a Radiation Work Permit, as required by the license.

## **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

License Condition 12.2 states, in part, that the results of effluent and environmental monitoring shall be reported to the NRC in accordance with the provisions of 10 CFR 40.65. The inspectors reviewed the licensee's Semiannual Effluent and Environmental Monitoring Report for January 1, 2012 through June 30, 2012, dated August 30, 2012, and the July 1 through December 31, 2012, dated February 28, 2013 (referred to in this report as "semiannual reports"). The licensee's environmental monitoring program consisted of air particulate, radon, ambient gamma radiation, groundwater, and surface water. As part of the licensee's wastewater land application permit from the WDEQ, soil and vegetation, irrigation fluid and radium treatment system samples, soil water samples at the irrigation areas, and monitor wells at PSR2 are sampled.

Continuous air particulate sampling was conducted at five locations. These stations monitored conditions at background, downwind of the Smith Ranch CPP restricted area boundary, the nearest downwind resident to the Smith Ranch CPP restricted area, downwind of the HUP CPF restricted area boundary, and downwind resident to the HUP CPF restricted area. The licensee sampled the air for uranium, radium-226, and lead-210 particulate concentrations. The licensee also elected to voluntarily sample for thorium-230 concentrations in the air. None of the sample results for CY 2012 exceeded the respective effluent concentration limits specified in 10 CFR Part 20, Appendix B.

The licensee also sampled for radon-222 concentrations in the air at the five sample stations. The inspectors reviewed the radon-222 airborne concentration results for CY 2012. All sample results for radon-222 taken by the licensee were less than the effluent concentration limit approved in the license application.



The licensee measured ambient gamma radiation levels at the five sample stations using thermoluminescent dosimeters. For CY 2012, all sample results were comparable to background levels.

The licensee reported the annual dose to the public from operations for CY 2012, as required by 10 CFR 20.1301, to be less than 100 millirem (1 milliSievert). The licensee, using 10 CFR 20.1302(b)(2), demonstrated that the annual average radioactive effluent concentrations did not exceed the values in 10 CFR Part 20, Appendix B, Table 2 limits and that the external dose to an individual continuously present in an unrestricted area would not exceed 2 millirem (0.02 milliSievert) in any one hour and 50 millirem (0.5 milliSievert) in a year. The licensee calculated the highest total effective dose equivalent to a member of the public in CY 2012 to be 9.6 millirem (0.96 milliSievert).

b. Wellfield and Excursion Monitoring

The licensee reported that four wellfield spills had taken place since the last inspection. The first spill occurred on October 16, 2012, in MU 9 at injection well 9I-209 near header house (HH) 9-7. The second spill occurred at Booster House #3 on October 20, 2012. The third spill was a release at F wellfield pipeline on December 20, 2012. The final spill was at the 42 F bellhole near HH F-15 on Feb. 17, 2013. All releases were evaluated and reported to the NRC as required by LC 12.1.

License Condition 11.5 requires, in part, that the licensee monitor groundwater at the designated monitoring wells twice a month. The licensee has approximately 1,300 groundwater monitoring wells that are sampled during a typical month using six field sampling personnel. The inspectors reviewed some of the groundwater sampling records and concluded that these records indicated operational groundwater monitoring was being conducted as required by the license.

During the inspection, the licensee provided the inspectors with a presentation on the status of current and recently corrected excursions since the last inspection. The presentation included an in-depth analysis of the likely cause of each excursion and associated corrective actions. Two wells are currently on excursion status. One well, KM-007, was placed on excursion status as of March 11, 2013. It is located in the overlying aquifer in MU K. The cause is currently unknown and is being evaluated. Another well, DM-003, remains on long-term excursion status. According to the licensee, DM-003 is thought to be affected by contaminated water in nearby underground mine workings from previous uranium mine operators not associated with this licensee. The licensee recently installed three interceptor wells near this well. One interceptor well, DX114, is pumping at 9.1 gpm to correct the excursion; however, it does not appear to affect water quality at DM-003. The licensee indicated that pumping will continue with the objective to remove contaminated water from the nearby mine workings.

Information on wells with corrected excursions was also presented. Well JM-007 was reported on excursion in February 2012 and came off excursion on June 5, 2012. It was then reported back on excursion on August 8, 2012. Corrective action was taken and the well is no longer on excursion. Well FM-009 went on excursion status on July 30, 2012. The licensee took corrective action by pumping two nearby wells; however, there was no response. A mechanical integrity test (MIT) was done on FM-009 and the results indicated the well had failed. A camera surveillance video found

a crack in the casing of the well that corresponded to the location of a thick saturated sand. The licensee concluded the casing crack was leaking water into the well so it was replaced with a new well, FM-009A. FM-009A water quality was initially low in chloride but then started to show an increase. The chloride was suspected of being residual contamination in the aquifer from the casing leak in FM-009. FM-009 was therefore plugged and abandoned. FM-009A has not gone on excursion since FM-009 was plugged. The licensee has therefore concluded FM-009 was never on excursion but was impacted by water from the casing leak. KMO-31 has been on and off excursion since 2011. The licensee suspected it was due to anomalous baseline upper control limits (UCLs). A re-baseline of the UCLs was granted and the well has remained off excursion.

The inspectors determined that the licensee had conducted the requisite monitoring for the excursion monitoring program, identified and taken corrective actions and submitted the required reports within a timely manner pursuant to LC 11.5.

Since the previous inspection, the licensee has not reported any new leaks in the storage ponds. The licensee has continued to provide monthly status reports related to the November 7, 2011, leak in the east storage pond. During the inspection, the licensee provided the inspectors with a document titled, "Smith Ranch Storage Ponds Investigation Report," dated March 12, 2013. This report described the installation of pits and borings around the east storage pond which were used to assess if shallow groundwater had been impacted by the persistent leaks. Five test pits, 10-15 feet deep, and 3 boreholes with depths from 51-80 feet were installed and left open for 24 hours to collect water. No saturated conditions were encountered in either the pits or borings. The absence of saturation was taken to indicate no contamination to ground water. The inspectors found the leak continues to be reported in a manner consistent with LC 12.1.

License Condition 10.1.3 requires, in part, that a MIT be performed prior to an injection or recovery well being brought into service and every 5 years thereafter. The inspectors reviewed the MIT reports for existing and new wells since the last inspection. The licensee reported 9 new wells and 45 existing wells had failed a MIT between June 15 and December 20, 2012. For the time period in 2013 up to this inspection, 1 new well and 8 existing wells had failed a MIT. The licensee stated that all new monitoring wells would have an MIT before being put into use. The licensee also confirmed that all wells, which have been used for injection or production, would be evaluated for the cause of the MIT failure. The inspectors concluded the MITs were being conducted within a timely manner pursuant to LC 10.1.3.

#### 4.3 Conclusions

The licensee implemented the groundwater and surface water monitoring programs in accordance with the license.

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

### 5.1 Inspection Scope

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

### 5.2 Observations and Findings

#### a. Inspection of Transportation Activities

The inspectors reviewed the licensee's transportation records maintained since the August 2012 inspection. Trucks with tanker trailers are routinely utilized by the licensee to transport resin to and from the satellite buildings and the CPP. The inspectors reviewed selected resin tanker trailer shipping papers and found them to include the pertinent information required by Department of Transportation (DOT) regulations.

The inspectors closed one violation (VIO 040-08964/1202-01) related to the failure of a transportation package to maintain its integrity during shipment. The licensee had prepared an old yellowcake dryer for shipment and placed it into a sea-land container for shipment to a waste disposal facility. During transport, on July 13, 2012, the driver noticed that the dryer had shifted inside the container, and the shifting caused a split to occur from the top of the container down a seam approximately one foot at the driver's side rear corner. The failure of the package to withstand the effects of any acceleration, vibration, or vibration resonance that may arise under normal conditions of transport without any deterioration in the integrity of the package as a whole is a violation of 49 CFR 173.410(f). The licensee responded the violation in letter dated October 11, 2012. The licensee committed to updating the Standard Operating Procedure to ensure evaluation of non-routine hazardous shipments. Also, a second yellowcake dryer that was being disposed of as 11e.(2) waste was cut into pieces and placed into a steel U.S. Department of Transportation (DOT) IP-1 classification container for shipment. The inspectors reviewed the shipping papers for the yellowcake dryer and the updated procedure and determined that the corrective actions addressed the violation. This violation is considered closed.

License Condition 9.6 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 a new waste disposal agreement dated June 10, 2013, and found it to be valid. Material sent for disposal consisted of 11e.(2) contaminated equipment, such as filters, pipes, pumps, and soil. During CY 2012, the licensee had 189 shipments of waste to a licensed facility. This is an increase in waste shipments when compared to previous years due to the waste generated from the reconstruction of the Highland CPP. At the time of the inspection, twenty 11e.(2) waste shipments had occurred since the beginning of 2013. The inspectors reviewed selected shipping records and found them to be complete.

The licensee also ships licensed yellowcake product to Canada for processing. The licensee has an NRC export license, administered by a broker, that authorizes yellowcake to be brought into Canada for conversion into uranium hexafluoride and then returned to the U.S. for future processing. During CY 2012, the licensee had made a total of 30 yellowcake shipments, and from January through May of 2013, there had

been 14 shipments of yellowcake. The inspectors reviewed a selected sample of shipping records and found them to be complete and in accordance with DOT and NRC regulations.

b. Review of Wastewater Treatment Activities

The license application authorizes the licensee to dispose of wastewater at both the Satellites 1 and 2 land application facilities. Prior to discharge to the purge storage reservoirs, the plant wastewater is processed to remove the excess uranium, radium-226, and selenium concentrations in the water. After treatment, the wastewater is sampled to ensure that it meets the criteria specified in the license application as well as WDEQ requirements for land application.

During 2012, the licensee disposed of wastewater at the Satellite No. 2 land application facility, but not the Satellite No. 1 land application facility. In accordance with Tables 5-8 and 5-9 of the license application, the licensee samples the irrigation fluid monthly at the PSR2 suction line for the irrigator pivot for natural uranium, radium-226, selenium, and other chemical constituents.

5.3 Conclusions

One violation was closed by the inspectors related to the failure of a transportation package to maintain its integrity during shipment. The licensee collected wastewater samples as required by the license application, and the sample results indicated that the fluid met the criteria for disposal by land application.

**6 Emergency Preparedness (88050)**

6.1 Inspection Scope

Determine if Emergency Response activities were conducted in accordance with the licensees operating procedures.

6.2 Observations and Findings

The inspectors verified that the licensee documents spills of radioactive material as required by Section 7.1 of the Safety, Health, Environment and Quality Management System Emergency Procedures Manual, Volume VIII. The licensee's spill documentation indicates that there have been four spills since our previous inspection in August 2012. The inspectors examined all 2013 spill records to verify that the documentation was consistent with the requirements of Section 7.3.6 of the Manual. Based on this review it was determined that the spill records were adequate.

The inspectors also verified that the licensee's emergency preparedness activities were conducted in accordance with Manual VII, SHEQ-14: Emergency Preparedness. The inspectors interviewed the Incident Commander for the site and examined the training records for members of the hazardous material team, Confined Space Rescue team, Wild Land Fire team, and Basic Emergency Care team. Based on this review it was determined that the licensee has been implementing an Emergency Response program that is consistent with its license conditions and operating procedures.

### 6.3 Conclusions

The licensee was implementing an Emergency Response Program that is consistent with its license conditions and operating procedures.

### 7 **Exit Meeting Summary**

The NRC inspectors presented the preliminary inspection results to the licensee's representatives at the conclusion of the onsite inspection on May 30, 2013. The final exit briefing was conducted telephonically with Mr. Brent Berg, General Manager, on June 21, 2013. 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

B. Berg, General Manager  
D. Moody, Professional Services Manger  
A. Faunce, Radiation Safety Officer

**INSPECTION PROCEDURES USED**

IP 88005	Management Organization and Controls
IP 89001	In-Situ Leach Facilities
IP 83822	Radiation Protection
IP 88045	Effluent Control and Environmental Protection
IP 87102	Maintaining Effluents from Materials Facilities ALARA
IP 86740	Inspection of Transportation Activities
IP 88035	Radioactive Waste Management
IP 88050	Emergency Preparedness

**ITEMS OPENED, CLOSED, AND DISCUSSED**

Open

040-08964/1301-01 VIO Failure to perform work under a Radiation Work Permit

Closed

040-08964/1202-01 VIO Failure of a transportation package to maintain its integrity during shipment

Discussed

None

## LIST OF ACRONYMS USED

ACL	alternate concentration limit
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 air concentration hours
DDW	deep disposal well
DOT	U.S. Department of Transportation
gpm	gallons per minute
HH	header house
HPT	health physics technician
IP	NRC Inspection Procedures
LC	License Condition
MIT	mechanical integrity test
MU	mine unit
NRC	U.S. Nuclear Regulatory Commission
µg/l	micrograms per liter
µR/hr	microRoentgens per hour
ORC	Operational Review Committee
PSR	purge storage reservoir
RG	NRC Regulatory Guide
RSO	Radiation Safety Officer
RST	Radiation Safety Technician
RWP	Radiation Work Permit
SERP	Safety and Environmental Review Panel
SHEQ	Safety, Health, and Environmental Quality
UCL	upper control limit
VIO	violation
WDEQ	Wyoming Department of Environmental Quality