



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
REGION IV  
612 EAST LAMAR BLVD, SUITE 400  
ARLINGTON, TEXAS 76011-4125

November 25, 2008

John McCarthy, Manager  
Safety, Health and Environment  
Power Resources, Inc.  
P.O. Box 1210  
Glenrock, Wyoming 82637

SUBJECT: NRC INSPECTION REPORT 040-08964/08-002 AND NOTICE OF VIOLATION

Dear Mr. McCarthy:

This refers to the unannounced inspection conducted on September 23-25, 2008, at the Smith Ranch facility in Converse 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, and the final inspection findings were presented to you by telephone on November 4, 2008. The enclosed report presents the results of this inspection.

Based on the results of this inspection, the NRC has determined that three Severity Level IV violations of NRC requirements occurred. The first violation involves an exceedance of the public dose limit for radiation exposures in unrestricted areas. The second violation involves the failure to store byproduct materials in a restricted area. The third violation involves your failure to control and maintain constant surveillance of licensed material at a satellite facility. These violations were evaluated in accordance with the NRC Enforcement Policy included on the NRC's Web site at [www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html](http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html). The violations are being cited in the enclosed Notice of Violation (Notice) and the circumstances surrounding them are described in detail in the subject inspection report. The violations are cited in the Notice because they were identified by the NRC.

You are required to respond to this letter and should follow the instructions specified in the enclosed Notice when preparing your response. For your consideration and convenience, an excerpt from NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," is enclosed. 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 enclosure, and your response will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>. To the extent possible, your

response should not include any personal privacy, proprietary, or safeguards information so that it can be made available to the Public without redaction.

Should you have any questions concerning this inspection, please contact Ms. Linda M. Gersey at (817) 860-8299, or the undersigned at (817) 860-8197.

Sincerely,

**/RA/**

Jack E. Whitten, Chief  
Nuclear Materials Safety Branch B

Docket No.: 040-08964  
License No.: SUA-1548

Enclosures:

1. Notice of Violation
2. NRC Inspection Report 040-08964/08-002
3. NRC Information Notice 96-28

cc w/Enclosures 1&2:  
Ms. Carol Bilbrough  
Program Manager  
Wyoming Department of Environmental Quality  
Land Quality Division  
122 West 25th  
Cheyenne, Wyoming 82002

Mr. Lowell Spackman  
District I Supervisor  
Land Quality Division  
Herschler Building - Third Floor West  
122 West 25th  
Cheyenne, Wyoming 82002

Wyoming Radiation Control Program Director

bcc w/enclosures 1 and 2 via e-mail:

CCain

JWhitten

LMGersey

RJEvans

EAStriz, FSME/DWMEP/DURLD

DTMandeville, FSME/DWMEP/DURLD

RBurrows, FSME/DWMEP/DURLD

RWVonTill, FSME/DWMEP/DURLD

FEE Coordinator

MLxxxxxxxxxx

SUNSI Review Completed: LMG ADAMS: ☒ Yes ☐ No Initials: LMG

☒ Publicly Available ☐ Non-Publicly Available ☐ Sensitive ☒ Non-Sensitive

DOCUMENT NAME:

S:\DNMS\NMSB-B\LMG\Uranium Recovery\Power Resources\PRI-SR 2008-002 Inspection Report.doc

final r:\ dnms

| RIV:DNMS:NMSB-B | DNMS:NMSB-B | FSME:DWMEP   | C:NMSB-B  |
|-----------------|-------------|--------------|-----------|
| LMGersey        | RJEvans     | DTMandeville | JEWhitten |
| /RA/            | /RA/        | By Email     | /RA/      |
| 11/25/08        | 11/25/08    | 10/28/08     | 11/25/08  |

OFFICIAL RECORD COPY T=Telephone E=E-mail F=Fax

## NOTICE OF VIOLATION

Power Resources, Inc.  
Converse County, Wyoming

Docket No. 040-08964  
License No. SUA-1548

During an NRC inspection conducted on September 23-25, 2008, three violations of NRC requirements were identified. In accordance with the Enforcement Policy, the violations are listed below:

- A. 10 CFR 20.1301(a)(2) requires that the licensee conduct operations so that the dose in any unrestricted area from external sources does not exceed 2 millirem in any one hour.

Contrary to the above, on September 25, 2008, the byproduct storage bins at satellite Sat-3 and satellite Sat-2 were found to have exposures rates of 3.5 millirems in any one hour at one foot from the surfaces of the bins. Both byproduct bins were located in unrestricted areas.

This is a Severity Level IV violation (Supplement IV).

- B. License Condition 10.1.6 requires, in part, that the licensee maintain an area within the restricted area boundary for storage of contaminated materials prior to their disposal.

Contrary to the above, on September 25, 2008, the byproduct storage bins at satellite Sat-3 and satellite Sat-2 contained items contaminated with licensed radioactive material, in storage pending disposal, and were located in unrestricted areas.

This is a Severity Level IV violation (Supplement IV).

- C. 10 CFR 20.1802 requires that the licensee control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.

Contrary to the above, on September 25, 2008, the licensee did not control and/or maintain constant surveillance of uranium contained in the T-207 transfer storage tank in the satellite SR-1 building, which is a controlled area. The area around this tank was a posted radiation area. The satellite SR-1 building and the immediate area around the T-207 transfer storage tank were unoccupied by employees, the doors to the SR-1 building were unlocked, and the overhead bay doors were open allowing uncontrolled access to licensed source materials.

This is a Severity Level IV violation (Supplement IV).

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, 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.

ENCLOSURE 1

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, United States 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 document 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 2.790(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 are required to post this Notice within two working days.

Dated this 25<sup>th</sup> day of November 2008

U.S. NUCLEAR REGULATORY COMMISSION  
REGION IV

Docket No.: 040-08964

License No.: SUA-1548

Report No.: 040-08964/08-002

Licensee: Power Resources, Inc.

Facility: Smith Ranch In-Situ Recovery Facility

Location: Converse County, Wyoming

Dates: September 23-25, 2008

Inspectors: Linda M. Gersey, Health Physicist  
Nuclear Materials Safety Branch B

Douglas T. Mandeville, PE, Geotechnical Engineer  
Decommissioning and Uranium Recovery Licensing Directorate  
Division of Waste Management and Environmental Protection  
Office of Federal and State Materials and Environmental  
Management Programs

Elise A. Striz, Hydrogeologist  
Decommissioning and Uranium Recovery Licensing Directorate  
Division of Waste Management and Environmental Protection  
Office of Federal and State Materials and Environmental  
Management Programs

Accompanied by: Ronald Burrows, Senior Health Physicist  
Decommissioning and Uranium Recovery Licensing Directorate  
Division of Waste Management and Environmental Protection  
Office of Federal and State Materials and Environmental  
Management Programs

Approved by: Jack E. Whitten, Chief  
Nuclear Materials Safety Branch B

Attachment: Supplemental Inspection Information

## **EXECUTIVE SUMMARY**

### **Power Resources, Inc. Smith Ranch In-Situ Recovery Facility NRC Inspection Report 040-08964/08-002**

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

#### **Management Organization and Controls**

- The organizational structure and staffing levels met license requirements and were sufficient for the work in progress (Section 1).
- The annual radiation protection program audit had been satisfactorily completed (Section 1).

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

- Site operations were, in general, conducted in accordance with the performance-based license and regulatory requirements (Section 2).
- One violation was identified related to the exceedance of the public dose limit for radiation exposures in unrestricted areas. A second violation was identified related to the failure to store byproduct material in a restricted area. A third violation was identified related to the licensee's failure to maintain control over or surveillance of licensed material that was located in a controlled area and not in storage (Section 2).
- Two previous Unresolved Items were closed. The first involved uranium recovery operations that commenced in Mine Unit K and in the Southwest Area prior to NRC approval, and the second involved the determination of the exact content of the waste water streams to purge storage reservoir number 2 (Section 2).
- One previous Unresolved Item related to whether purge storage reservoir number 2 was leaking was left open pending further review by the NRC (Section 2).

#### **Radiation Protection**

- The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license, with the three exceptions described in Section 2 of this report (Section 3).
- One previous Unresolved Item was closed involving the licensee's use of a conversion factor to determine the weekly soluble uranium intake in milligrams (Section 3).

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

- The licensee did not release effluents into the environment during the first and second quarters of 2008, in quantities exceeding regulatory limits (Section 4).

- The reports related to groundwater and environmental monitoring programs were submitted to the NRC as required. No findings of significance were identified during the review of the environmental monitoring data (Section 4).

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

- The licensee was conducting transportation and waste disposal operations in accordance with regulatory requirements (Section 5).

## **Report Details**

### **Site Status**

At the time of the inspection, Power Resources, Inc (PRI) was mining uranium through in-situ leach recovery operations in a number of wellfields. Three satellite facilities (Sat-2, Sat-3, and SR-1) were in service and supporting wellfield operations. Construction activities at satellite facility SR-2 were nearing completion, and the licensee was conducting equipment checks during the inspection. Uranium processing and drying operations were in progress at the Smith Ranch central processing plant (CPP). Operations had been previously discontinued by PRI at Satellite No. 1 and the Highland CPP.

The licensee was developing Mine Unit 9 for uranium extraction and is currently waiting for approval from the Wyoming Department of Environmental Quality (WDEQ) before initiating in-situ leach uranium recovery operations in this area. The initial processing of uranium-laden fluids from Mine Unit 9 will occur at satellite facility SR-2.

The licensee was also conducting limited work at its other licensed satellite facilities. Ore body delineation was in progress at the Reynolds Ranch satellite. The licensee anticipates initiation of in-situ leach uranium recovery operations at Reynolds Ranch sometime in 2009. The licensee was also in the process of delineating ore bodies at the Gas Hills satellite, and the licensee plans to submit a revised operations plan to the NRC for this satellite during 2009. The North Butte satellite remains on standby, and the licensee plans to submit a revised operations plan for this satellite in 2009. The Ruth site continues to remain in standby.

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

#### **1.1 Inspection Scope**

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

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

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

The licensee's organization structure is illustrated in Figure 9-1 of the February 2008 license amendment that was approved by the NRC on August 18, 2008. The inspectors determined that the licensee's current organizational structure was in agreement with the structure specified in Figure 9-1. The licensee had hired 14 new employees since the previous NRC inspection in March 2008. Among the 14 new employees, the licensee had hired a new training supervisor, two coordinators who assisted in report writing, and a new Assistant Manager of Safety, Health and Environment. 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 and Audits**

License Condition 9.4 of the performance based-license requires, in part, that the licensee establish a Safety and Environmental Review Panel (SERP). No SERP evaluations have been performed in 2008.

The annual radiation protection program audit for calendar year 2007 was conducted in April 2008. The audit identified several cases in satellite Sat-2 where the administrative action level for airborne radon daughters had been exceeded. The cause of the radon daughter exceeding the airborne action levels was due to leaks in the reverse osmosis system and the ongoing maintenance activity undertaken by the licensee. The inspectors determined, that once identified, appropriate corrective actions had been taken by the licensee in satellite Sat-2 to reduce the airborne levels.

### 1.3 Conclusions

The organizational structure and staffing levels met license requirements and were sufficient for the work in progress. The annual radiation protection program audit had been satisfactorily completed.

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

### 2.1 Inspection Scope

Determine if operating activities were being conducted in accordance with regulatory and license requirements.

### 2.2 Observation and Findings

#### a. Site Tours

The NRC inspectors conducted site tours to observe in-situ leach operations in progress. Areas toured by the NRC inspectors included the Smith Ranch CPP, satellites SR-1, SR-2, Sat-1, Sat-2, and Sat-3, radium ponds, wellfields, Purge Storage Reservoir 2 (PSR 2), irrigator 2, header houses, the east and west evaporation ponds, and an area used for storage of old equipment (referred to as the "boneyard"). Also during the site tours, the inspectors observed the condition of tanks, valves, yellowcake thickener, fences, and gates.

At the time of this inspection, 13 mine units were actively in operation. The WDEQ and the NRC have approved restoration activities at Mine Unit A. The WDEQ approved restoration activities at Mine Unit B in early 2008, and the licensee plans to submit a report documenting restoration activities for this mine unit to the NRC in the near future. In addition, Mine Units C and 1 were in restoration. The licensee plans to submit to the NRC a decommissioning plan for satellite Sat-1 and associated features in late 2008 or early 2009.

The inspectors conducted independent radiological surveys using a NRC-issued portable survey meter. The surveys were conducted using a Ludlum Model 19 microRoentgen meter (NRC No. 015525 with a calibration due date of 02/14/09, calibrated to radium-226). The ambient gamma exposure rates noted by the inspectors varied from the background exposure rate of 15 micro-Roentgen per hour ( $\mu\text{R/hr}$ ) up to greater than 5000  $\mu\text{R/hr}$  observed in the processing areas of the CPP and satellite structures. The dose rates observed by the inspectors were consistent with licensee's measurements, and all areas with exposure rates in excess of 5 millirems per hour were posted as radiation areas as required by regulations.

During the site tour, the inspectors conducted radiological surveys of the byproduct storage bins located at satellites Sat-2 and Sat-3. The licensee was using the byproduct storage bins to store byproduct waste material, such as used filters or contaminated equipment, prior to disposal. The stored wastes collected in the bins will eventually be sent offsite for disposal in a licensed 11e.(2) disposal cell. The highest exposure rate from these bins was found to be 3.5 millirems per hour at one foot from the surfaces of the bins. The storage bins were posted as radiation areas, although there existed no control of personnel access to the areas where the bins were located. Furthermore, the bins were located in areas that were designated by the licensee as radiologically unrestricted areas. These inspection findings were identified as two violations. One violation (040-08964/0802-01) pertains to exceedance of the dose limit for members of the public specified in 10 CFR 20.1301(a)(2). This regulation requires, in part, that the licensee conduct operations so that the dose in any unrestricted area from external sources does not exceed 2 millirems in any one hour. The second violation (040-08964/0802-02) pertains to failures to adhere to License Condition (LC) 10.1.6, which requires, in part, that the licensee maintain an area within the restricted area boundary for storage of contaminated materials prior to their disposal. The storage bins were located outside of the restricted area, contrary to the requirements of the license.

During the site tour of the satellite SR-1 building, the inspectors conducted radiological surveys of the T-207 transfer storage tank. The highest exposure rate on this tank was measured as 3.5 millirems per hour at one foot from the surface. The tank was posted as a radiation area, and the licensee considered the location of the transfer storage tank as a radiologically restricted area (a controlled area). At the time of the site tour, the satellite building was unattended by licensee employees, the doors were unlocked, and the bay overhead doors were open allowing unfettered access to licensed material. This finding was identified as a violation (040-08964/0802-03) of 10 CFR 20.1802, which requires, in part, that the licensee control and maintain constant surveillance of licensed material that is in a controlled or unrestricted area and that is not in storage.

During the visit to the east evaporation pond, the inspectors were able to observe the vacuum truck used to remove sediment from the bottom of the dewatered pond. The licensee had developed a radiation work permit for this activity and was developing a standard operating procedure for the use of the vacuum truck. Upon completion of sediment removal, the licensee plans to install a new liner in the pond. NRC staff will review the status of the east evaporation pond following sediment removal during the next inspection.

The inspectors visited the "boneyard" area near the Smith Ranch CPP. The inspectors noted general improvement in the visual appearance of the "boneyard" as the licensee continues to improve the conditions of this portion of the facility. The licensee had sorted equipment by size and had placed some equipment in bins or on elevated wooden pallets. In discussions with the inspectors, the licensee indicated that they plan to continue sorting and disposing of this equipment over the remainder of 2008 and into 2009. NRC staff plans to review the licensee's progress in the "boneyard" during the next inspection.

Mine Units K, 15, and 15 A are the newest wellfields to go into operation. The licensee was in the process of installing piping in Mine Unit 9. The licensee had submitted a hydrogeological test report for Mine Unit 9 to WDEQ and was awaiting approval by the State of Wyoming before starting operations in this area.

The inspectors noted that the semiannual effluent monitoring report was updated to reflect the wellfield bleed taken at satellite SR-1 and the Smith Ranch CPP. This issue was identified as an inspection finding during a previous inspection. This change to the semiannual effluent monitoring report allowed the inspectors to verify that a wellfield bleed is being maintained and documented by the licensee.

The Federal Energy Regulatory Commission (FERC), along with NRC staff, participated in a Dam Safety Inspection of the facility on June 24, 2008. This inspection focused on the embankment at PSR 2. At FERC's request, the details of this inspection are not being made publicly available as it contains critical energy infrastructure information. As a follow up to the FERC inspection, the licensee had a professional engineer perform a third party evaluation of the embankment. Follow up activities related to the FERC inspection and the professional engineer's evaluation were completed by the licensee in August 2008.

The license specifies that the licensee will conduct routine inspections of PSR 2. The NRC inspectors reviewed the PSR 2 inspection logs for the period May through August 2008. The inspection logs reviewed indicated that the licensee had performed the required freeboard checks; however, the inspectors did note that there were inconsistent records related to visual embankment checks on the log sheets. At the exit briefing, the licensee agreed to update and improve the log sheet and to provide enhanced training to ensure that the individuals conducting the routine dam inspections were aware of the need to identify and document potential purge storage reservoir deficiencies.

- b. (Closed) Unresolved Item 040-08964/0801-01: Uranium recovery operations commenced in Mine Unit K and in the Southwest Area prior to NRC approval

During the March 2008 inspection, the NRC identified an Unresolved Item related to uranium recovery operations that may have commenced in Mine Unit K and in the Southwest Area prior to NRC review and approval, as required by LC 9.13. In a letter dated June 24, 2008, the licensee responded to the Unresolved Item. The licensee's letter contained the following information in response to the Unresolved Item: (i) a clarification of the timeline of activities in Mine Unit 9; (ii) the timing of Amendment 11 to source material license SUA-1548 (which included LC 9.13); and (iii) specific discussion of the applicability of LC 9.13 to Mine Unit K. The NRC staff reviewed the licensee's response to this Unresolved Item and found that it adequately addressed the staff's concerns.

- c. (Closed) Unresolved Item 040-08964/0801-02: Determine the exact content of the waste water streams to PSR 2

During the March 2008 inspection, the NRC identified an Unresolved Item related to verification by the licensee that the wastewater streams being sent to PSR 2 were consistent with the waste streams approved in the license. The licensee's June 24, 2008, response stated, in part, that they were using PSR 2 in a manner that is consistent with LC 10.1.8. The NRC staff reviewed the licensee's response to this Unresolved Item and found that it adequately addressed the staff's concerns.

- d. (Discussed) Unresolved Item 040-08964/0801-03: Demonstrate that PSR 2 is not leaking into neighboring areas

During the March 2008 inspection, the NRC identified an Unresolved Item related to PSR 2 and its potential for leakage into neighboring areas. The NRC inspectors noted that no leak detection systems existed in or around PSR 2, and no baseline water quality data was available for review during the inspection. To resolve this issue, the NRC requested the licensee provide additional information to demonstrate that PSR 2 was not leaking into adjacent areas. In a letter dated June 24, 2008, the licensee provided a response to this Unresolved Item. The staff reviewed the licensee's response and determined that the licensee's response did not contain sufficient documentation for the NRC staff to conclude that PSR 2 was not leaking into neighboring areas. Therefore, this Unresolved Item remains open.

## **2.3 Conclusions**

Site operations were, in general, conducted in accordance with the performance-based license and regulatory requirements. One violation was identified related to the exceedance of the public dose limit for radiation exposures in unrestricted areas. A second violation was identified related to the failure to store byproduct material in a restricted area. A third violation was identified related to the licensee's failure to maintain control over or surveillance of licensed material that was located in a controlled area and not in storage. Two previous Unresolved Items were closed. The first involved uranium recovery operations that commenced in Mine Unit K and in the Southwest Area prior to NRC approval, and the second involved the determination of the exact content of the waste water streams to PSR 2. One previous Unresolved Item related to whether PSR 2 was leaking was left open pending further review by the NRC.

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

### **3.1 Inspection Scope**

Determine if the licensee's radiation protection program was 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 through the second quarter of 2008. Approximately 48 employees were monitored for external exposures with thermoluminescent dosimeters exchanged on a quarterly basis. Occupationally monitored employees included Smith Ranch CPP operators, satellite/restoration operators, radiation technicians, and maintenance employees. The highest deep dose equivalent exposure through the second quarter 2008 was 208 millirems.

The licensee conducted air sampling, in part, for assessment of internal exposures. The inspectors reviewed the licensee's air sampling records for radon-222 and uranium particulates performed since March 2008 and confirmed that the licensee had conducted sampling at the required intervals.

The licensee collected bioassay samples to assess the potential for intake of uranium. The inspectors reviewed the bioassay program to verify compliance with LCs 11.2 and 11.3. Since the March 2008 NRC inspection, three bioassay sample results exceeded

the action level of 15 micrograms per liter ( $\mu\text{g/L}$ ), the action level specified in LC 11.2 for the implementation of corrective actions. All three sample results were less than 35  $\mu\text{g/L}$  of uranium, the action level specified in LC 11.3 where intakes must be reported to the NRC. Each occupationally exposed individual was assigned a dose, with the highest assigned dose being 1.2 millirems.

The licensee determines an occupationally exposed individual's internal exposure by using the combined totals from radon sampling, particulate sampling, personnel lapel monitoring, and bioassays for that individual. The highest total effective dose equivalent observed by the licensee (the sum of the internal and external doses) through the second quarter 2008 was 284 millirems. The inspectors verified that the current occupational doses were below the regulatory limit of 5,000 millirems.

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 to verify radiation area postings and to assess external radiation conditions. The licensee was currently conducting the gamma radiation surveys on a weekly frequency. The inspectors verified that the licensee had performed the required routine surveys during the first and second quarters of 2008. The inspectors also observed a radiation technician performing the weekly gamma survey in the CPP.

Alpha contamination surveys were conducted on a weekly frequency in clean areas of the site and in the process areas, even though Section 9.13 of the license application requires monthly process area surveys. Equipment, materials, and trash leaving the site were also routinely surveyed as required, and the licensee maintained records of the contamination surveys. A review of the survey records by the NRC inspectors indicated that nothing appeared to have left the site with contamination in excess of the licensee's prescribed release limits.

c. Training

The licensee conducts required training in accordance with LC 9.7 for contractors and new employees, and annual refresher training for current employees. As of the date of the inspection, 36 employees and contractors were provided training in radiation safety during 2008. The annual radiation safety refresher training was conducted in March 2008. The inspectors reviewed radiation safety training records of five current employees, five new employees hired since March 2008, as well as several U.S. Department of Transportation (DOT) training records. All training activities were conducted in accordance with the requirements of the license and NRC regulations. The NRC inspectors reviewed records associated with training activities conducted by the licensee and the records reviewed appeared to have been maintained in accordance with the NRC license and regulatory requirements.

d. Instrumentation

The NRC inspectors reviewed the licensee's operability, calibration, and maintenance records for portable radiation instruments. The inspectors also examined the operability, calibration process, and records maintained by the licensee for a representative sample of breathing zone pumps. Further, the inspectors reviewed the quality control process

used by the licensee for counting air samples. Quality control procedures and instrumentation calibrations appeared to be appropriate.

- e. (Closed) Unresolved Item 040-08964/0801-04: Conversion factor used to determine the weekly soluble uranium intake in milligrams

During the March 2008 inspection, the NRC identified an Unresolved Item related to the conversion factor used for calculating the weekly soluble uranium intake in milligrams from the total derived air concentration hours. In a letter dated June 24, 2008, the licensee provided a response to this Unresolved Item. The licensee used the derived air concentration conversion as provided in 10 CFR Part 20, Appendix B. The NRC staff reviewed the licensee's response to this Unresolved Item and found that it adequately addressed the staff's concerns.

### 3.3 Conclusions

The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license, with the three exceptions described in Section 2 of this report. One previous Unresolved Item was closed involving the licensee's use of a conversion factor to determine the weekly soluble uranium intake in milligrams.

## 4 **Environmental Monitoring and Maintaining Effluents from Materials Facilities ALARA (88045)**

### 4.1 Inspection Scope

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

### 4.2 Observations and Findings

#### a. Environmental Monitoring

License 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 40.60. The inspectors reviewed the semiannual environmental monitoring report for the first half of 2008. The licensee's environmental monitoring program consisted of air particulate, radon, ambient gamma radiation, groundwater, surface water, soil, and vegetation sampling.

Continuous air particulate sampling was conducted at three locations: a background station, a downwind boundary station, and a nearest downwind resident station. 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 air. None of the sample results for the first and second quarters of 2008, exceeded the respective effluent concentration limits specified in 10 CFR Part 20, Appendix B.

The licensee also sampled for radon-222 concentrations in air at the three sample stations. The inspectors reviewed the radon-222 airborne concentration results for the

first and second quarters of 2008. All sample results taken by the licensee were less than the effluent concentration limit specified in 10 CFR Part 20, Appendix B.

The licensee measured ambient gamma radiation levels at the three sample stations. For the first and second quarters of 2008, all sample results were comparable to background levels established by the licensee.

b. Groundwater and Environmental Water Sampling

The inspectors reviewed surface water, groundwater, and effluent monitoring data for the Highland and the Smith Ranch sites. The most recent reports included data from both surface water sites and groundwater monitoring wells, Irrigator 1 & 2 soil data, Irrigator 1 & 2 vegetation, Irrigator 1 & 2 water, satellites Sat-2 and Sat-3 radium filter press effluents, Irrigator 1 & 2 lysimeters, and PSR 2 groundwater monitoring data.

The inspectors concluded that the licensee had implemented the groundwater and surface water monitoring programs in accordance with Chapter 5 of the license application. The monitoring consisted of quarterly sampling for natural uranium and radium-226 in groundwater wells and surface water sites used for livestock or for domestic water located within 1 kilometer of the operating wellfields. The latest semi-annual effluent monitoring report for January 1 through June 30, 2008, provided sample data for 12 out of 20 possible samples. (The 10 locations are sampled every quarter, which equates to 20 possible samples). For the remaining eight samples, the sample locations were dry and no samples were available for analysis. All reported values for natural uranium and radium-226 were within the respective effluent concentration limits. Only nine of the 20 groundwater wells were sampled for the same time period, as 12 windmills were not running. All of the wells reviewed by the inspectors were in compliance with radium-226 and uranium limits specified in the surface and groundwater monitoring program.

c. Wellfield and Excursion Monitoring

License Condition 12.1 requires, in part, that the licensee maintain documentation on spills of source materials, 11e.(2) byproduct materials, or process chemicals. The licensee is also required to report any wellfield excursions, spills, or pond leaks involving source materials, 11e.(2) byproduct materials, or process chemicals that may have an impact on the environment.

The licensee had reported three spills since the last inspection. The dates of the spills were July 18, August 17, and September 17, 2008. The inspectors found that spill reporting, investigation, and corrective actions were being satisfactorily undertaken and in compliance with license conditions. No new pond leaks have been reported since the last inspection, although the PSR 2 monitoring wells currently exceed the groundwater protection standards for selenium (0.01 milligrams per liter) and natural uranium (30 picocuries per liter). As noted in Section 3.2 above, Unresolved Item 040-08964/0801-03 remains open pending licensee evaluation of the groundwater conditions near PSR 2. This evaluation by the licensee is necessary to demonstrate that the pond is not leaking into the adjacent areas.

The licensee indicated that two wells are currently on excursion status. The inspectors verified that the licensee, in response to these excursions, has increased monitoring and

implemented appropriate corrective actions at these two wells. Monitoring well DM-3 has been on excursion since January 29, 2002. Corrective actions taken by the licensee since that time had not been successful in removing the well from excursion status. Based on discussions with the licensee, this specific well is apparently under the influence of contaminated water originating from an old underground mine. The licensee continues to monitor the well on a weekly basis. Monitoring well CM-32 was placed on excursion status on July 3, 2007. Corrective actions taken by the licensee since that time have not been successful in bringing monitoring wells CM-32 off excursion status. The licensee's staff continues to monitor this second well on a weekly basis.

#### 4.3 Conclusions

The licensee did not release effluents into the environment during the first and second quarters of 2008, in quantities exceeding regulatory limits. The reports related to groundwater and environmental monitoring programs were submitted to the NRC as required. No findings of significance were identified during the review of the environmental monitoring data.

### **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

The licensee's transportation records maintained since the March 2008 inspection were reviewed by the NRC inspectors. Trucks with tanker trailers were utilized by the licensee to transport resin to and from the satellite buildings. The inspectors reviewed selected resin tanker trailer shipping papers. For the shipping papers reviewed by the NRC inspectors, the licensee had provided all the pertinent information required by DOT regulations.

License Condition 9.6 allows the licensee to dispose of byproduct material at an offsite location. Equipment that is contaminated with 11e.(2) material, such as piping and pumps, is shipped offsite to a facility licensed to dispose of this material. Through September 2008, 21 shipments had been made by the licensee to a licensed disposal facility. The inspectors reviewed a select sample of the shipping records for the most recent disposal shipments and found them to be complete.

The licensee also ships licensed material off site. Through September 2008, approximately 34 shipments of yellowcake, loaded in 55-gallon drums, were shipped to an out-of-state processing facility. The inspectors reviewed a select sample of shipping records and found them to be complete.

#### 5.3 Conclusions

The licensee was conducting transportation and waste disposal operations in accordance with regulatory requirements.

## **6 Exit Meeting Summary**

The inspectors presented the preliminary inspection results to the licensee's representatives at the conclusion of the onsite inspection on September 25, 2008. The final exit briefing was held telephonically with the licensee on November 4, 2008. During the inspection, the licensee did not identify any information reviewed by the inspectors as proprietary.

## **SUPPLEMENTAL INSPECTION INFORMATION**

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

#### **Licensee**

T. Cannon, General Manager  
J. McCarthy, Manager, Safety, Health & Environment, Radiation Safety Officer  
A. Crook, Assistant Radiation Safety Officer  
K. Wenzel, Assistant Manager, Safety, Health & Environment

### **INSPECTION PROCEDURES USED**

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

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

#### **Open**

|                   |     |                                                                                    |
|-------------------|-----|------------------------------------------------------------------------------------|
| 040-08964/0802-01 | VIO | Exceeding the dose limit for members of the public near the byproduct storage bins |
| 040-08964/0802-02 | VIO | Failure to store byproduct storage bins in a restrictive area                      |
| 040-08964/0802-03 | VIO | Failure to control a restricted area                                               |

#### **Closed**

|                   |     |                                                                                                      |
|-------------------|-----|------------------------------------------------------------------------------------------------------|
| 040-08964/0801-01 | URI | Uranium recovery operations commenced in Mine Unit K and in the Southwest Area prior to NRC approval |
| 040-08964/0801-02 | URI | Determine the exact content of the waste water streams to PSR 2                                      |
| 040-08964/0801-04 | URI | Conversion factor used to determine the weekly soluble uranium in milligrams                         |

#### **Discussed**

|                   |     |                                                              |
|-------------------|-----|--------------------------------------------------------------|
| 040-08964/0801-03 | URI | Demonstrate that PSR 2 is not leaking into neighboring areas |
|-------------------|-----|--------------------------------------------------------------|

## **LIST OF ACRONYMS USED**

|       |                                             |
|-------|---------------------------------------------|
| CPP   | central processing plant                    |
| DOT   | U.S. Department of Transportation           |
| IP    | inspection procedures                       |
| LC    | license condition                           |
| µg/L  | micrograms per liter                        |
| µR/hr | microRoentgens per hour                     |
| NOV   | Notice of Violation                         |
| PRI   | Power Resources, Inc.                       |
| PSR 2 | purge storage reservoir number 2            |
| SERP  | Safety and Environmental Review Panel       |
| URI   | unresolved item                             |
| VIO   | violation                                   |
| WDEQ  | Wyoming Department of Environmental Quality |