

July 5, 2008

Mr. John McCarthy  
Power Resources, Inc.  
Smith Ranch-Highland Uranium Project  
P.O. Box 1210  
Glenrock, WY 82637

SUBJECT: REVIEW OF BASELINE GAMMA RADIATION SURVEY FOR THE  
SOUTHWEST AREA AT THE SMITH RANCH HIGHLAND URANIUM  
PROJECT - SOURCE MATERIALS LICENSE SUA-1548 (TAC J00538)

Dear Mr. McCarthy:

On April 20, 2007, Cameco Resources, doing business as Power Resources, Inc. (PRI), submitted a report documenting the baseline radiological characteristics at the Southwest Area to the Smith Ranch-Highland Uranium Project (SR-HUP) to the U.S. Nuclear Regulatory Commission (NRC). This report was submitted to meet the requirements of License Condition 9.13, which states that *"Before engaging in any uranium recovery operations in an undeveloped area, the licensee shall submit a complete evaluation of the area's baseline radiological characteristics for NRC's review and approval."*

NRC staff has completed its review of PRI's characterization of the baseline radiological characteristics at the Southwest Area. The staff's evaluation is documented in the enclosed Technical Evaluation Report. Based on its review, the staff concludes that the baseline radiological characteristics at the Southwest Area have been adequately characterized. Therefore, the NRC approves this report.

If you have any questions regarding this action, please contact Mr. Douglas T. Mandeville, the Project Manager for Source Materials License SUA-1548, at 301-415-0724 or, by e-mail, at [douglas.mandeville@nrc.gov](mailto:douglas.mandeville@nrc.gov).

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice for Domestic Licensing Proceedings and Issuance of Orders," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records

component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

**/RA/**

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

Docket No.: 40-8964  
License No.: SUA-1548

Enclosure: Technical Evaluation Report for Southwest Area

cc: S. Ingle, WDEQ

component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

Sincerely,

**/RA/**

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

Docket No.: 40-8964  
License No.: SUA-1548

Enclosure: Technical Evaluation Report for Southwest Area

cc: S. Ingle, WDEQ

**CLOSES TAC J00538**

DISTRIBUTION:

J. Whitten, RIV      D. Orlando

**ML081400748**

|             |             |  |             |  |            |  |            |  |             |  |
|-------------|-------------|--|-------------|--|------------|--|------------|--|-------------|--|
| <b>OFC</b>  | URLB        |  | RDB         |  | URLB       |  | URLB       |  | URLB        |  |
| <b>NAME</b> | DMandeville |  | TYoungblood |  | BGarrett   |  | BvonTill   |  | DMandeville |  |
| <b>DATE</b> | 05/ 21 /08  |  | 05/ 29 /08  |  | 06/ 03 /08 |  | 06/ 05 /08 |  | 08/ 05 /08  |  |

OFFICIAL RECORD COPY

**TECHNICAL EVALUATION REPORT  
REVIEW OF BASELINE RADIOLOGICAL CONDITIONS IN SOUTHWEST AREA  
POWER RESOURCES INC. SMITH RANCH-HIGHLAND URANIUM PROJECT  
CONVERSE COUNTY, WYOMING**

**Docket No.:** 40-8964

**License No.:** SUA-1548

**Date:** May 15, 2008

**Facility:** Smith Ranch-Highland Uranium Project

**Technical Reviewer:** Thomas Youngblood

**Project Manager:** Douglas T. Mandeville

### **1.0 Summary and Conclusions**

On April 20, 2007, Power Resources Inc. (PRI) submitted a report to the U.S. Nuclear Regulatory Commission (NRC) staff that documented the baseline radiological characteristics at the Southwest Area of the Smith Ranch-Highland Uranium Project (SR-HUP) (PRI, 2007). This report was submitted to meet the requirements of License Condition (LC) 9.13, which reads as follows:

*Before engaging in any uranium recovery operations in an undeveloped area, the licensee shall submit a complete evaluation of the area's baseline radiological characteristics for NRC's review and approval.*

LC 9.13 was added to PRI's license as part of Amendment 11, dated January 31, 2007. NRC staff reviewed PRI's submittal, including the narrative description of the survey, sample location maps, and the test results. The review included an evaluation using the applicable procedures identified in NUREG-1569 (Standard Review Plan for In Situ Leach Uranium Extraction License Applications) (NRC, 2003) and Regulatory Guide 4.14, Revision 1 (Radiological Effluent and Environmental Monitoring at Uranium Mills) (NRC, 1980). NRC staff determined that the licensee has adequately established the baseline radiological characteristics in the Southwest Area of SR-HUP.

### **2.0 Background**

PRI currently conducts commercial scale *in-situ* leach (ISL) uranium recovery operations at SR-HUP under NRC license SUA-1548. The facility includes a central processing plant (CPP), satellite buildings, wellfields, major roads, and an administrative building. The administrative building and central processing plant are located approximately 22 miles (35.4 kilometers) northeast of Glenrock, Wyoming, in Converse County.

The Southwest Area consists of Mine Units 9, 10, 11, and 12, as well as a satellite building (SR-2) in the southwestern portion of PRI's permit boundary. The Southwest Area is approximately 4.5 miles (7.2 kilometers) from the CPP.

Enclosure

### 3.0 Technical Evaluation

#### 3.1 Baseline Radiological Characteristics

This section discusses the baseline radiological characteristics for the SR-HUP Southwest Area. The baseline radiological characteristics are used to evaluate the radiological impact of operations on the environment and to establish the radiological baseline for use in decommissioning and remediation of the project site when uranium recovery operations are terminated.

An acceptable preoperational monitoring program for this area includes soil sampling and analyses and direct radiation measurements. The soil sampling and direct radiation measurements were conducted according to the guidance in Regulatory Guide 4.14, Revision 1, and NUREG-1569. PRI collected direct radiation measurements at 490-feet (150-meter) intervals and soil samples at 980-feet (300 meter) intervals. Soil samples were collected at 2-inch to 6-inch (5-cm to 15-cm) depth.

Surface soil and subsurface soil samples were collected in Study Areas A, B and C. The soil sample results on a dry-soil-basis are provided below.

In **Study Area A**, the 2-inch (5-cm) soil samples contained radium-226 concentrations from <0.1 to 2.9 pCi/g. The 6-inch (15-cm) soil samples contained radium-226 concentrations from 0.5 to 3.5 pCi/g. The 5-cm soil samples contained natural uranium, thorium 230 and lead 210 concentrations that ranged from 0.74 to 3.84 mg/kg, 0.2 to 1.0 pCi/g, and < 0.1 to 2.6 pCi/g, respectively. The 15-cm soil samples contained natural uranium, thorium 230 and lead 210 concentrations that ranged from 0.85 to 3.68 mg/kg, 0.3 to 1.0 pCi/g, and 0.3 to 2.3 pCi/g, respectively.

In **Study Area B**, the 2-inch (5-cm) soil samples contained radium-226 concentrations from 0.1 to 2.8 pCi/g. The 6-inch (15-cm) soil samples contained radium 226 concentrations from 0.3 to 8.5 pCi/g. The 2-inch (5-cm) soil samples contained natural uranium, thorium 230, and lead 210 concentrations that ranged from 1.04 to 3.25 mg/kg, 0.3 to 1.3 pCi/g and 0.3 to 3.3 pCi/g, respectively. The 6-inch (15-cm) soil samples contained natural uranium, thorium 230, and lead 210 concentrations that ranged from 0.93 to 3.12 mg/kg, 0.3 to 1.0 pCi/g, and <0.1 to 1.1 pCi/g, respectively.

In **Study Area C**, the 2-inch (5-cm) soil samples contained radium-226 concentrations from 0.9 to 2.4 pCi/g. The 6-inch (15-cm) soil samples contained radium 226 concentrations from 0.8 to 2.3 pCi/g. The 2-inch (5-cm) soil samples contained natural uranium, thorium 230, and lead 210 concentrations that ranged from 0.90 to 2.56 mg/kg, 0.3 to 0.9 pCi/g, and 0.4 to 1.8 pCi/g, respectively. The 6-inch (15-cm) soil samples contained natural uranium, thorium 230, and lead 210 concentrations that ranged from 1.04 to 4.21 mg/kg, 0.3 to 1.0 pCi/g, and 0.3 to 1.4 pCi/g, respectively.

Direct radiation measurements were collected at 490-feet (150-meter) intervals with Ludlum Model 19 microR survey meters in Study Areas A, B, and C. Radiation measurements were collected at 3.3 feet (1 meter) above the ground surface. The direct radiation results are reported below. The direct radiation measurement locations are provided in maps 2, 3 and 4 contained within PRI's April 20, 2007 submittal (PRI, 2007).

Direct radiation measurements in **Study Area A** ranged from 13 to 22  $\mu\text{R/h}$  with an average reading of 17  $\mu\text{R/h}$ . Direct radiation measurements in **Study Area B** ranged from 14 to 26  $\mu\text{R/h}$  with the average reading of 18  $\mu\text{R/h}$ . Direction radiation measurements in **Study Area C** ranged from 14 to 20  $\mu\text{R/h}$  with an average reading of 17  $\mu\text{R/h}$ .

### 3.2 Conclusions

NRC has completed its review of the characterization information concerned with the preoperational monitoring or baseline radiological characteristics at the Smith Ranch – Highland Uranium Project SR-2 Southwest Area. This review included an evaluation using the review procedures in NUREG-1569 Standard Review Plan Section 2.9.2 and the acceptance criteria outlined in Standard Review Plan Section 2.9.3.

The licensee has adequately established the baseline radiological characteristics by providing (i) monitoring programs to demonstrate baseline radiological characteristics that include radionuclides monitored, sampling frequency, and methods, location, and density, and (ii) radiological analyses of soil samples collected at depths of 2 inches (5-cm) and 6 inches (15-cm).

The report indicates that systematic soil sampling was performed at the density specified in Regulatory Guide 4.14, Revision 1 (NRC, 1980). The report also indicates that all soil samples were analyzed for radium-226 and 10 percent of the samples were analyzed for natural uranium, thorium-230 and lead-210, as specified in Regulatory Guide 4.14, Revision 1 (NRC, 1980).

Based on the information provided in the license amendment request, and the detailed review conducted of the characterization of the baseline radiological characterization at the SR-HUP, the staff concludes that the information is acceptable and is in compliance with 10 CFR 51.45. This requires a description of the affected environment containing sufficient data to aid the Commission in its conduct of an independent analysis of potential impacts to the environment and the adequacy of decommissioning activities when operations are terminated.

### References

Power Resources, Inc. (2007), Smith Ranch – Highland Uranium Project Baseline Gamma Radiation Survey for Southwest Area, prepared by Western Environmental Services and Testing, Inc., April 20, 2007 **[ADAMS Accession No. ML071640129]**.

U.S. Nuclear Regulatory Commission (1980), Regulatory Guide 4.14 - Radiological Effluent and Environmental Monitoring at Uranium Mills, April 1980 **[ADAMS Accession No. ML003739941]**.

U.S. Nuclear Regulatory Commission (2003), NUREG 1569 - Standard Review Plan for In Situ Leach Uranium Extraction License Applications, prepared by J. Lusher, June 2003.