POWER RESOURCES

**Smith Ranch - Highland Uranium Project**
P. O. Box 1210
Glenrock, Wyoming USA 82637
Casper: 307-235-1628
Douglas: 307-358-6541
Fax: 307-358-4533

August 9, 2007

**ATTN: Document Control Desk**

Keith I. McConnell, Deputy Director
Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
11545 Rockville Pike #2
White Flint, T7E18
Rockville, MD 20852-2738

RE: Smith Ranch-Highland Uranium Project
NRC License SUA-1548, Docket No. 40-8964
Semi-Annual Effluent and Environmental Monitoring Report, January 1 – June 30, 2007

Dear Mr. McConnell:

In accordance with 10 CFR 40.65 and License Condition No. 12.2 of License SUA-1548, please find enclosed the Semi-Annual Effluent and Environmental Monitoring Report for the Smith Ranch-Highland Uranium Project. This report covers the period January 1 – June 30, 2007. A copy of this report is also being forwarded to Mr. Paul Michalak, USNRC Headquarters, and Mr. Leonard Wert, Director DRSS, Region IV.

NMSS01



FSME

If you have any questions regarding the report, please contact me at (307) 358-6541, ext. 46.

Sincerely,

John McCarthy
Manager-Health, Safety
& Environmental Affairs

JM/bj

Enclosure

cc: Mr. Paul Michalak, USNRC Headquarters
Mr. Leonard Wert, Director DRSS, Region IV, USNRC
S.P. Collings w/o atta C. Foldenauer w/o atta File SR 4.6.4.1
Arlene Crook, RSO w/attachment

# POWER RESOURCES, INC.

# SMITH RANCH - HIGHLAND URANIUM PROJECT

# SEMI-ANNUAL EFFLUENT AND ENVIRONMENTAL MONITORING REPORT

## FOR THE PERIOD

## JANUARY 1 THROUGH JUNE 30, 2007

## USNRC SOURCE MATERIAL LICENSE NO. SUA-1548

## DOCKET NO. 40-8964

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## 1.0 RESULTS FROM EMPLOYEE URINALYSES IF AN EXPOSURE EXCEEDS ACTION LEVELS DESCRIBED IN THE OPERATIONS PLAN OF THE APPROVED LICENSE APPLICATION

During the period January 1, through June 30, 2007 one bioassay had a uranium level of 59.5 μg/L which exceeded the action level of 15 μg/L uranium. This elevated result was seen in a pre-employment sample provided by a contract employee. An investigation concluded that the individual provided a sample which came from off-site and was intentionally spiked. As a result, the procedure for obtaining bio-assay samples from contract employees was changed to prevent recurrence of this type of event.

## 2.0 INJECTION RATES, RECOVERY RATES, AND INJECTION TRUNK-LINE PRESSURES FOR EACH SATELLITE FACILITY

The required information for each Satellite facility for the 1st and 2nd Quarters of 2006 is presented in Tables 1A, 1B, 1C, and 1D included in Attachment A.

### 2.1 Satellite No. 1

Satellite No. 1 did not operate during the report period since restoration activities in the A and B Wellfield are complete. Therefore, no injection or recovery rates are available for the report period.

### 2.2 Satellite No. 2, Satellite No. 3, Satellite SR-1, Central Processing Plant

The injection rates, recovery rates, and injection pressure data for Satellite No. 2, Satellite No. 3, Satellite SR-1, and the Central Processing Plant (CPP) are contained in Table 1B, 1C, and 1D. The injection rates represent the total recovery rates minus the purge (clean-out circuit) flow. The purge from Satellite No. 2 and No. 3 is treated for uranium and radium removal and pumped to the Satellite No. 2 Purge Storage Reservoir prior to disposal by irrigation at the Satellite No. 2 Land Application Facility. Purge from Satellite SR-1 and the CPP is disposed by deep injection through permitted waste disposal wells.

## 3.0 RESULTS OF EFFLUENT AND ENVIRONMENTAL MONITORING INCLUDING WATER QUALITY ANALYSES AND MONITORING REQUIRED BY THE WDEQ PERMIT FOR THE OPERATING IRRIGATION SYSTEMS

### 3.1 Stack Emission Surveys

When the Central Processing Facility (CPF) at the Highland Uranium Project is operational, PRI monitors the Yellowcake Dryer and Packaging scrubber exhaust stacks to determine the emission rate of particulates, uranium, radium, and thorium. During the

report period, the Highland CPF remained on standby status as all yellowcake processing activities (elution, precipitation, drying, and packaging) were conducted at the Smith Ranch Central Processing Plant. The dryers at the Smith Ranch Central Processing Plant are zero emission vacuum dryers that do not require emission stack testing. Therefore, no stack tests were conducted during the report period. It is anticipated that the CPF at Highland will remain on standby status during several upcoming report periods.

3.2 Air Particulate, Radon, and Gamma Radiation Monitoring

PRI maintains five Air Monitoring Stations at various locations on and around the licensed area. Two of these stations are used to monitor downwind conditions of the Highland CPF, and monitoring is not required unless the CPF is in operation. The Air Monitoring Stations are used to monitor air particulates, radon, and gamma radiation. The stations are located as follows:

- AS-1 (Dave's Water Well): This station monitors background conditions, upwind of both the Smith Ranch and HUP wellfields and yellowcake processing facilities.

- AS-2 (Smith Ranch Restricted Area): This station monitors conditions downwind of the Smith Ranch CPP Restricted Area Boundary.

- AS-3 (Vollman Ranch): This station monitors the nearest downwind resident to the Smith Ranch CPP Restricted Area.

- AS-4 (HUP Restricted Area): This station monitors conditions downwind of the HUP CPF Restricted Area Boundary (when the HUP CPF is operating).

- AS-5 (Fowler Ranch): This station monitors the nearest downwind resident to the HUP CPF Restricted Area (when the HUP CPF is operating).

Monitoring at AS-4 and AS-5 was not conducted during the reporting period since the Highland CPF remains on standby status. It is anticipated that the Highland CPF will remain in standby status for several upcoming reporting periods and monitoring of downwind air stations will only resume if the Highland CPF becomes operational.

Table 2 shows the air particulate and radon data collected at these sites during the report period. Review of data collected during the report period shows that the Radon concentration at the Fenceline monitoring station was elevated during the report period. On June 6, 2007, during a routine check of the monitoring station, it was discovered that the Velcro securing Trak-Etch radon detector failed to hold, and the detector had fallen out of its holder and was lying face-up on the ground in direct sunlight. PRI believes that the high reading for the report period was a result of this exposure.

All other parameters are significantly less than the 10 CFR 20, Appendix B.

Gamma radiation data for the report period are provided in Table 3. 10 CFR 20 Appendix B contains no Effluent Concentration Limit for gamma radiation for comparison. However, gamma results for the report period are within normal background conditions and show no discernable trends with previous data.

## 3.3 Water Sampling Data

### 3.3.1 *Groundwater and Surface Water Monitoring Stations*

During the report period, monitoring was completed at eleven water wells and ten stock ponds throughout the permit area. Water samples are collected from the water wells and stock ponds on a quarterly basis for analysis of uranium and radium-226. Table 4 provides the analytical data for samples collected during the report period. A review of data collected during the report period shows that seven water wells (GW-3,4,5, 6, 8,10, and 13) did not run during the report period. A review of data collected from the eleven water wells and ten stock ponds show that the concentrations of uranium and radium-226 are well below the 10 CFR 20, Appendix B, Effluent Concentration Limits of 3.0E-07 μCi/mL and 6.0E-08 μCi/mL, respectively.

## 3.4 Wastewater Land Application Facilities Monitoring

### 3.4.1 *Soil and Vegetation Sampling*

In accordance with the approved license application and the WDEQ permits for the Satellite No. 1 and Satellite No. 2 Wastewater Land Application Facilities, soil and vegetation sampling of the irrigation areas is conducted in late summer of each year. The soil and vegetation data are collected to monitor and evaluate any adverse effects to the irrigation areas. The 2007 soil and vegetation sampling at the irrigation areas will be conducted in August 2007.

### 3.4.2 *Irrigation Fluid*

In accordance with the approved license application and the WDEQ Wastewater Land Application permits, PRI monitors the treated irrigation fluid that is disposed of at both irrigation facilities. Grab samples are collected at the irrigator pivot during each month of operation and analyzed for various parameters. As noted in Table 5 and Table 6, only Irrigator 2 operated during the report period.

Irrigation fluid data collected at Satellite No. 2 is provided in Table 6. A review of the data indicates that the concentration of uranium in the monthly grab samples was below the 10 CFR 20, Appendix B, Effluent Concentration Limit of 3.0 E-7 μCi/ml, and were less than the estimate provided in the original license application for the facility (1.4E-6 μCi/ml) The

samples contained radium-226 concentrations slightly above the 10 CFR 20, Appendix B, Effluent Concentration Limit of 6.0E-08 μCi/ml and above the estimate provided in the original license application for the facility (3.0E-9 μCi/ml)

3.4.3 *Radium Treatment Systems*

PRI collects grab samples each month to ensure that the radium-226 treatment systems are adequately treating wastewater from Satellites No. 2 and No. 3 prior to discharge into the Purge Storage Reservoir. No samples were collected from the Satellite No. 1 radium treatment system since Satellite No. 1 did not operate during the report period. The monthly radium-226 grab samples for Satellite No. 2 and No. 3 are collected at the discharge points of the radium treatment system at each facility. The results of this monitoring are included in Table 10A, and 10B. Review of the monitoring data shows that all radium-226 concentrations were below the 10 CFR 20, Appendix B, Effluent Concentration Limit of 6.0E-8 μCi/ml (60 pCi/L) at both Satellite No. 2 and Satellite No. 3 during the report period

3.4.4 *Soil Water*

In accordance with the approved license application and the WDEQ Wastewater Land Application Facility permits, PRI collects soil water samples at the irrigation areas in June of each year and analyzes them for various parameters, including uranium and radium-226. Sampling was conducted on June 29, 2007, but due to drought conditions and the relatively limited amount of irrigation, there was insufficient soil water available to produce a sample at any of the sample locations for the Satellite No. 1 and Satellite No. 2 irrigation areas.

3.4.5 *Satellite No. 1 Purge Storage Reservoir Monitor Well*

A shallow monitor well, located southwest of the Satellite No. 1 Purge Storage Reservoir is monitored at least weekly for potential seepage from the reservoir. There was no evidence of seepage during the report period. PSR-1 was dry for the entire period and it is not anticipated that water will be diverted to PSR-1 in the near future. Therefore, it is unlikely there will be any seepage from PSR-1 in the following report periods.

3.4.6 *Satellite No. 2 Purge Storage Reservoir Shallow Wells*

In accordance with the approved license application, water levels are measured on a quarterly basis and ground water samples are required on a semi-annual basis from the two shallow monitoring wells located adjacent to the Satellite No. 2 Purge Storage Reservoir (PSR-2). PRI conducts quarterly sampling of these two wells. Shallow Wells No. 1 and No. 2 are located adjacent to the south and east sides of the reservoir, respectively. During the report period, monitoring was conducted on March 13 and June 21, 2007. Table 8 contains the applicable data for samples taken during this period.

Comparison of the uranium and radium-226 data from the Shallow Wells does not indicate any significant trends or changes from previous report periods. Comparison of water level data collected during the report period with previous data continues to show a trend of higher water levels during the spring-summer months and lower water levels during the fall-winter months.

## 4.0 SAFETY AND ENVIRONMENTAL EVALUATIONS

All safety and environmental evaluations made by the Safety and Environmental Review Panel (SERP) and resulting changed pages to the Operations Plan and Reclamation Plan of the approved license must be submitted on an annual basis. During the period January 1 through June 30, 2006, PRI initiated one SERP to update the license application reflecting the change of supplier and type of dosimeter used to monitor Environmental Gamma.

## 5.0 RUTH ISL PROJECT

The Ruth Project is licensed for commercial ISL uranium activities, however none has been initiated. The existing buildings and evaporation ponds, along with a few remaining wells, are left from research and development testing conducted by Uranerz, USA, one of the previous licensees. The facilities at the project are non-operational and on stand-by status. Therefore, radiation and effluent monitoring was not conducted and is not required by the NRC or the Wyoming Department of Environmental Quality. The quantity of radionuclides released to unrestricted areas in liquid and in gaseous effluents is considered negligible and is not applicable at this time.

Activities conducted during the report period consisted of quarterly inspections of the existing facilities. Inspection of the perimeter fence, pond embankments, and pond liners yielded no deficiencies during the report period.

## 6.0 NORTH BUTTE ISL PROJECT

The North Butte Project is also licensed for commercial ISL uranium operations; however, construction of facilities has not commenced and is currently on hold. Since there are no radioactive materials present on site, no radionuclides were released to unrestricted areas in liquid or in gaseous effluents.

License Condition 9.5 requires PRI to submit, for the NRC and WDEQ-LQD approval, an itemized cost estimate for implementation of the NRC-approved decommissioning/restoration plan prior to commencement of construction of a commercial facility at the North Butte/Ruth sites. Currently, PRI is in the process of updating the Operations and Reclamation Plan for the North Butte ISL Project in pursuit of approval to commence construction activities at the North Butte site.

## 7.0 ANNUAL INSPECTION AND NOTICE OF VIOLATION

The Annual Inspection was conducted April 2-5, 2007, and as a result one Notice Of Violation was issued addressing the failure to post a radiation area. A copy of this Notice of Violation and PRI's response are included n Attachment C.

# ATTACHMENT A

## DATA TABLES 1-8

## TABLE 1A
## SATELLITE NO. 1 INJECTION RATES, RECOVERY RATES, INJECTION PRESSURES

| MONTH | Injection Pressure (PSI) RO #1 | RO #2 | RO #3 | Grounwater Sweep GPM | Radium Ponds GPM | RO Feed GPM | Injection GPM | RO Concentrate GPM | Purge Flow GPM |
|---|---|---|---|---|---|---|---|---|---|
| Jan-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Feb-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mar-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Apr-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| May-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Jun-07 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

## TABLE 1B
## AVERAGE INJECTION RATES (GPM)

| MONTH | Satellite No. 2 | Satellite No. 3 | Satellite SR-1 | Central Processing Plant |
|---|---|---|---|---|
| Jan-07 | 2,098 | 2,492 | 4,089 | 3,870 |
| Feb-07 | 1,957 | 2,108 | 4,028 | 3,836 |
| Mar-07 | 2,045 | 3,187 | 4,095 | 3,754 |
| Apr-07 | 2,081 | 3,467 | 4,063 | 3737 |
| May-07 | 2,126 | 3,604 | 3,827 | 3522 |
| Jun-07 | 2,144 | 3,638 | 4,068 | 3604 |

## TABLE 1C
## AVERAGE RECOVERY RATES (GPM)

| MONTH | Satellite No. 2 | Satellite No. 3 | Satellite SR-1 | Central Processing Plant |
|---|---|---|---|---|
| Jan-07 | 2,124 | 2,526 | 4,089 | 3,905 |
| Feb-07 | 1,977 | 2,129 | 4,028 | 3,865 |
| Mar-07 | 2,066 | 3,221 | 4,128 | 3,762 |
| Apr-07 | 2,101 | 3,501 | 4,108 | 3,737 |
| May-07 | 2,145 | 3,641 | 3,853 | 3,534 |
| Jun-07 | 2,144 | 3,676 | 4,068 | 3,655 |

## TABLE 1D
## INJECTION TRUNK LINE PRESSURES (PSI)

| MONTH | Satellite No. 2 | Satellite No. 3 | Satellite SR-1 | Central Processing Plant |
|---|---|---|---|---|
| Jan-07 | 80 | 86 | 79 | 154 |
| Feb-07 | 79 | 82 | 79 | 156 |
| Mar-07 | 87 | 127 | 80 | 148 |
| Apr-07 | 81 | 129 | 84 | 144 |
| May-07 | 84 | 126 | 81 | 148 |
| Jun-07 | 88 | 141 | 83 | 157 |

TABLE 2

AIR SAMPLING DATA - 2007
ENVIRONMENTAL MONITORING SITES
1st and 2nd Quarters 2007

| SAMPLE LOCATION | SAMPLE PERIOD | RADIONUCLIDE (µCi/ml) | CONCENTRATION (µCi/ml) | ERROR EST. +/- (µCi/ml) | L.L.D. (µCi/ml) | EFF. CONC. LIMIT (µCi/ml) | % EFF. CONC. LIMIT % |
|---|---|---|---|---|---|---|---|
| **FENCE LINE** | 1st | U-Nat | 2.24E-16 | N/A | 1.00E-16 | 9.00E-14 | 0.2 |
| Air Station | Quarter | Th-230 | <1E-16 | N/A | 1.00E-16 | 3.00E-14 | < 1.0 |
| Restricted Area | | Ra-226 | <1E-16 | N/A | 1.00E-16 | 9.00E-13 | < 1.0 |
| Boundary | | Pb-210 | 1.52E-14 | 1.07E-15 | 2.00E-15 | 6.00E-13 | 2.5 |
| | | Rn-222 | | | 3.00E-10 | 1.00E-08 | 0.0 |
| | 2nd | U-Nat | 4.67E-16 | | 1.00E-16 | 9.00E-14 | 0.5 |
| | Quarter | Th-230 | <1E-16 | | 1.00E-16 | 3.00E-14 | < 1.0 |
| | | Ra-226 | <1E-16 | | 1.00E-16 | 9.00E-13 | < 1.0 |
| | | Pb-210 | 1.15E-14 | | 2.00E-15 | 6.00E-13 | 1.9 |
| | | Rn-222 | 1.85E-08 | | 3.00E-10 | 1.00E-08 | 185.0 |
| **VOLLMAN RANCH** | 1st | U-Nat | 5.17E-16 | N/A | 1.00E-16 | 9.00E-14 | 0.6 |
| Air Station | Quarter | Th-230 | <1E-16 | N/A | 1.00E-16 | 3.00E-14 | < 1.0 |
| Downwind Nearest | | Ra-226 | 1.29E-16 | 7.18E-17 | 1.00E-16 | 9.00E-13 | < 1.0 |
| Residence | | Pb-210 | 3.18E-14 | 1.44E-15 | 2.00E-15 | 6.00E-13 | 5.3 |
| | | Rn-222 | | | 3.00E-10 | 1.00E-08 | 0.0 |
| | 2nd | U-Nat | 4.58E-16 | | 1.00E-16 | 9.00E-14 | 0.5 |
| | Quarter | Th-230 | <1E-16 | | 1.00E-16 | 3.00E-14 | < 1.0 |
| | | Ra-226 | <1E-16 | | 1.00E-16 | 9.00E-13 | < 1.0 |
| | | Pb-210 | 1.58E-14 | | 2.00E-15 | 6.00E-13 | 2.6 |
| | | Rn-222 | 1.40E-09 | | 3.00E-10 | 1.00E-08 | 14.0 |
| **DAVE'S WATER WELL** | 1st | U-Nat | 1.78E-16 | N/A | 1.00E-16 | 9.00E-14 | 0.2 |
| Air Station | Quarter | Th-230 | <1E-16 | N/A | 1.00E-16 | 3.00E-14 | < 1.0 |
| Background | | Ra-226 | <1E-16 | N/A | 1.00E-16 | 9.00E-13 | < 1.0 |
| Site | | Pb-210 | 3.30E-14 | 1.48E-15 | 2.00E-15 | 6.00E-13 | 5.5 |
| | | Rn-222 | | | 3.00E-10 | 1.00E-08 | 0.0 |
| | 2nd | U-Nat | 1.16E-16 | | 1.00E-16 | 9.00E-14 | 0.1 |
| | Quarter | Th-230 | <1E-16 | | 1.00E-16 | 3.00E-14 | < 1.0 |
| | | Ra-226 | <1E-16 | | 1.00E-16 | 9.00E-13 | < 1.0 |
| | | Pb-210 | 1.58E-14 | | 2.00E-15 | 6.00E-13 | 2.6 |
| | | Rn-222 | 8.00E-10 | | 3.00E-10 | 1.00E-08 | 8.0 |

## TABLE 3

## DIRECT RADIATION (GAMMA) MEASUREMENT DATA - 2007
## ENVIRONMENTAL MONITORING SITES
## 1st & 2nd QUARTERS

| SAMPLE LOCATION | SAMPLE PERIOD | EXPOSURE RATE (mR/qtr) | ERROR ESTIMATE (mR/qtr) |
|---|---|---|---|
| **FENCE LINE** | | | |
| Air Station Restricted Area Boundary | 1st Quarter | 38 | |
| | 2nd Quarter | 30 | |
| **VOLLMAN'S RANCH** | | | |
| Air Station Downwind Nearest Residence | 1st Quarter | 36 | |
| | 2nd Quarter | 36 | |
| **DAVE'S WATER WELL** | | | |
| Air Station Background Site | 1st Quarter | 49 | |
| | 2nd Quarter | 30 | |

TABLE 4

WATER SAMPLING DATA - 2007
*ENVIRONMENTAL MONITORING SITES*
1st & 2nd QUARTERS 2007

| SAMPLE LOCATION | SAMPLE DATE | RADIONUCLIDE | CONCENTRATION (mg/L) | CONCENTRATION (pCi/L) | ERROR EST. +/- (pCi/L) | CONCENTRATION (µCi/ml) | EFF. CONC. LIMIT (µCi/ml) | % EFF. CONC. LIMIT |
|---|---|---|---|---|---|---|---|---|
| **SW-1** | 1st Quarter | U-Nat | 0.0121 | | | 8.2E-09 | 3.0E-07 | |
| Stock Pond | | Ra-226 | | ND | | | 6.0E-08 | |
| Section 3 | | | | | | | | |
| T35N, R74W | 2nd Quarter | U-Nat | 0.0183 | | | 1.2E-08 | 3.0E-07 | 4.1 |
| | | Ra-226 | | ND | | | 6.0E-08 | |
| **SW-2** | 1st Quarter | U-Nat | **DRY** | | | | 3.0E-07 | |
| Stock Pond | | Ra-226 | | | | | 6.0E-08 | |
| Section 2 | | | | | | | | |
| T35N, R74W | 2nd Quarter | U-Nat | 0.0008 | | | | 3.0E-07 | |
| | | Ra-226 | | 1.1 | 4.00E-01 | | 6.0E-08 | |
| **SW-3** | 1st Quarter | U-Nat | **DRY** | | | | 3.0E-07 | |
| Stock Pond | | Ra-226 | | | | | 6.0E-08 | |
| Section 35 | | | | | | | | |
| T36N, R74W | 2nd Quarter | U-Nat | 0.0116 | | | | 3.0E-07 | |
| | | Ra-226 | | 6.2 | 8.00E-01 | | 6.0E-08 | |
| **SW-4** | 1st Quarter | U-Nat | 0.0006 | | | | 3.0E-07 | |
| Stock Pond | | Ra-226 | | ND | | | 6.0E-08 | |
| Section 36 | | | | | | | | |
| T36N, R74W | 2nd Quarter | U-Nat | 0.0004 | | | | 3.0E-07 | |
| | | Ra-226 | | 0.7 | 3.00E-01 | | 6.0E-08 | |
| **SW-5** | 1st Quarter | U-Nat | 0.0026 | | | | 3.0E-07 | |
| Stock Pond | | Ra-226 | | ND | | | 6.0E-08 | |
| Section 21 | | | | | | | | |
| T36N, R73W | 2nd Quarter | U-Nat | ND | | | | 3.0E-07 | |
| | | Ra-226 | | ND | | | 6.0E-08 | |
| **SW-6** | 1st Quarter | U-Nat | ND | | | #VALUE! | 3.0E-07 | #VALUE! |
| Stock Pond | | Ra-226 | | ND | | #VALUE! | 6.0E-08 | #VALUE! |
| Section 22 | | | | | | | | |
| T36N, R73W | 2nd Quarter | U-Nat | ND | | | #VALUE! | 3.0E-07 | #VALUE! |
| | | Ra-226 | | ND | | | 6.0E-08 | |

TABLE 4 (Continued)

| SAMPLE LOCATION | SAMPLE DATE | RADIONUCLIDE | CONCENTRATION (mg/L) | CONCENTRATION (pCi/L) | ERROR EST. +/- (pCi/L) | CONCENTRATION (µCi/ml) | EFF. CONC. LIMIT (µCi/ml) | % EFF. CONC. LIMIT |
|---|---|---|---|---|---|---|---|---|
| **SW-7** | 1st Quarter | U-Nat | 3E-04 | | | | 3.0E-07 | |
| Stock Pond | | Ra-226 | | ND | | #VALUE! | 6.0E-08 | #VALUE! |
| Section 22 | | | | | | | | |
| T36N, R73W | 2nd Quarter | U-Nat | 0.0005 | | | 3.4E-10 | 3.0E-07 | 0.1 |
| | | Ra-226 | | ND | | | 6.0E-08 | |
| **SW-8** | 1st Quarter | U-Nat | 0.0036 | | | | 3.0E-07 | |
| Stock Pond | | Ra-226 | | ND | | | 6.0E-08 | |
| Section 18 | | | | | | | | |
| T36N, R72W | 2nd Quarter | U-Nat | 0.0005 | | | 3.4E-10 | 3.0E-07 | 0.1 |
| | | Ra-226 | | ND | | | 6.0E-08 | |
| **SW-9** | 1st Quarter | U-Nat | 0.0024 | | | | 3.0E-07 | |
| Stock Pond | | Ra-226 | | 0.8 | 4.00E-01 | | 6.0E-08 | |
| Section 18 | | | | | | | | |
| T36N, R72W | 2nd Quarter | U-Nat | 0.0004 | | | | 3.0E-07 | |
| | | Ra-226 | | nd | | | 6.0E-08 | |
| **SW-10** | 1st Quarter | U-Nat | 0.002 | | | 1.4E-09 | 3.0E-07 | 0.5 |
| Stock Pond | | Ra-226 | | ND | | | 6.0E-08 | |
| Section 19 | | | | | | | | |
| T36N, R72W | 2nd Quarter | U-Nat | 0.0004 | | | | 3.0E-07 | |
| | | Ra-226 | | 1.8 | 6.00E-01 | | 6.0E-08 | |
| **GW-1** | 1st Quarter | U-Nat | 0.0423 | | | | 3.0E-07 | |
| Windmill | | Ra-226 | | 1.3 | 4.00E-01 | | 6.0E-08 | |
| Section 1 | | | | | | | | |
| T35N, R74W | 2nd Quarter | U-Nat | 0.0296 | | | | 3.0E-07 | |
| | | Ra-226 | | 1.7 | 5.00E-01 | | 6.0E-08 | |
| **GW-2** | 1st Quarter | U-Nat | 0.0306 | | | 2.1E-08 | 3.0E-07 | 6.9 |
| Water Well | | Ra-226 | | 1.4 | 4.00E-01 | 1.4E-09 | 6.0E-08 | 2.3 |
| Section 35 | | | | | | | | |
| T36N, R74W | 2nd Quarter | U-Nat | 0.0331 | | | 2.2E-08 | 3.0E-07 | 7.5 |
| | | Ra-226 | | 0.5 | 2.00E-01 | 5.0E-10 | 6.0E-08 | 0.0 |

TABLE 4 (Continued)

| SAMPLE LOCATION | SAMPLE DATE | RADIONUCLIDE | CONCENTRATION (mg/L) | CONCENTRATION (pCi/L) | ERROR EST. +/- (pCi/L) | CONCENTRATION (µCi/ml) | EFF. CONC. LIMIT (µCi/ml) | % EFF. CONC. LIMIT |
|---|---|---|---|---|---|---|---|---|
| **GW-3** | 1st Quarter | U-Nat | **Not Running** | | | #VALUE! | 3.0E-07 | |
| Windmill | | Ra-226 | | | | 0.0E+00 | 6.0E-08 | |
| Section 27 | | | | | | | | |
| T36N, R74W | 2nd Quarter | U-Nat | **Not Running** | | | #VALUE! | 3.0E-07 | #VALUE! |
| | | Ra-226 | | | | 0.0E+00 | 6.0E-08 | 0.0 |
| **GW-4** | 1st Quarter | U-Nat | **Not Running** | | | #VALUE! | 3.0E-07 | #VALUE! |
| Windmill | | Ra-226 | | | | | 6.0E-08 | |
| Section 23 | | | | | | | | |
| T36N, R74W | 2nd Quarter | U-Nat | **Not Running** | | | #VALUE! | 3.0E-07 | #VALUE! |
| | | Ra-226 | | | | 0.0E+00 | 6.0E-08 | 0.0 |
| **GW-5** | 1st Quarter | U-Nat | **Not Running** | | | | 3.0E-07 | |
| Windmill | | Ra-226 | | | | | 6.0E-08 | |
| Section 30 | | | | | | | | |
| T36N, R73W | 2nd Quarter | U-Nat | **Not Running** | | | | 3.0E-07 | 0.0 |
| | | Ra-226 | | | | | 6.0E-08 | 0.0 |
| **GW-6** | 1st Quarter | U-Nat | **Not Running** | | | | 3.0E-07 | 0.0 |
| Windmill | | Ra-226 | | | | | 6.0E-08 | 0.0 |
| Section 28 | | | | | | | | |
| T36N, R73W | 2nd Quarter | U-Nat | **Not Running** | | | | 3.0E-07 | |
| | | Ra-226 | | | | | 6.0E-08 | |
| **GW-7** | 1st Quarter | U-Nat | 0.0303 | | | 2.1E-08 | 3.0E-07 | 6.8 |
| Water Well | | Ra-226 | | 1.5 | 5.00E-01 | 1.5E-09 | 6.0E-08 | 2.5 |
| Section 27 | | | | | | | | |
| T36N, R73W | 2nd Quarter | U-Nat | 0.0324 | | | 2.2E-08 | 3.0E-07 | 7.3 |
| | | Ra-226 | | ND | | #VALUE! | 6.0E-08 | 0.0 |
| **GW-8** | 1st Quarter | U-Nat | **Not Running** | | | | 3.0E-07 | |
| Windmill | | Ra-226 | | | | | 6.0E-08 | |
| Section 23 | | | | | | | | |
| T36N, R73W | 2nd Quarter | U-Nat | **Not Running** | | | | 3.0E-07 | |
| | | Ra-226 | | | | | 6.0E-08 | |

TABLE 4 (Continued)

| SAMPLE LOCATION | SAMPLE DATE | RADIONUCLIDE | CONCENTRATION (mg/L) | CONCENTRATION (pCi/L) | ERROR EST. +/- (pCi/L) | CONCENTRATION (µCi/ml) | EFF. CONC. LIMIT (µCi/ml) | % EFF. CONC. LIMIT |
|---|---|---|---|---|---|---|---|---|
| **GW-9** | 1st Quarter | U-Nat | **Not Running** | | | #VALUE! | 3.0E-07 | |
| Windmill | | Ra-226 | | | | 0.0E+00 | 6.0E-08 | |
| Section 14 | | | | | | | | |
| T36N, R73W | 2nd Quarter | U-Nat | 0.0018 | | | | 3.0E-07 | |
| | | Ra-226 | | ND | | | 6.0E-08 | |
| **GW-10** | 1st Quarter | U-Nat | **Not Running** | | | #VALUE! | 3.0E-07 | |
| Water Well | | Ra-226 | | | | 0.0E+00 | 6.0E-08 | |
| Section 14 | | | | | | | | |
| T36N, R73W | 2nd Quarter | U-Nat | **Not Running** | | | #VALUE! | 3.0E-07 | |
| | | Ra-226 | | | | 0.0E+00 | 6.0E-08 | |
| **GW-11** | 1st Quarter | U-Nat | 0.0012 | | | 8.1E-10 | 3.0E-07 | 0.0 |
| Water Well | | Ra-226 | | 3.1 | 6.00E-01 | 3.1E-09 | 6.0E-08 | 5.2 |
| Section 11 | | | | | | | | |
| T36N, R73W | 2nd Quarter | U-Nat | 0.0006 | | | | 3.0E-07 | |
| | | Ra-226 | | ND | | | 6.0E-08 | |
| **GW-12** | 1st Quarter | U-Nat | **Not Running** | | | | 3.0E-07 | |
| Water Well | | Ra-226 | | | | | 6.0E-08 | |
| Section 7 | | | | | | | | |
| T36N, R72W | 2nd Quarter | U-Nat | ND | | | | 3.0E-07 | |
| | | Ra-226 | | ND | | | 6.0E-08 | |

**TABLE 5**

**SATELLITE NO. 1 LAND APPLICATION FACILITY (IRRIGATOR NO. 1)**
**MONTHLY IRRIGATION FLUID DATA**

| IRRIGATION CYCLE | | Jan-07 | Feb-07 | Mar-07 | Apr-07 | May-07 | Jun-07 |
|---|---|---|---|---|---|---|---|
| **VOLUME (AF)** | | | | | | | |
| **MAJOR IONS (mg/L)** | REP. LIMIT | | | | | | |
| Ca | 1.0 | | | | | | |
| Mg | 1.0 | Irrigator Did | Irrigator Did | Irrigator Did | Irrigator Did | Irrigator Did | Irrigator Did |
| Na | 1.0 | Not Operate | Not Operate | Not Operate | Not Operate | Not Operate | Not Operate |
| K | 1.0 | | | | | | |
| $HCO_3$ | 1.0 | | | | | | |
| $SO_4$ | 1.0 | | | | | | |
| Cl | 1.0 | | | | | | |
| **NON-METALS** | | | | | | | |
| TDS @ 180° C (mg/L) | 10.0 | | | | | | |
| pH (standard units) | 0.010 | | | | | | |
| SAR | 0.01 | | | | | | |
| **TRACE METALS (mg/L)** | | | | | | | |
| As | 0.001 | | | | | | |
| Ba | 0.10 | | | | | | |
| B | 0.10 | | | | | | |
| Se | 0.001 | | | | | | |
| **RADIOMETRIC** | | | | | | | |
| U-nat (uCi/mL) | 2.03E-10 | | | | | | |
| Ra-226 (uCi/mL) | 2.00E-10 | | | | | | |
| Ra Err. Est. +/- | | | | | | | |

TABLE 6

SATELLITE NO. 2 LAND APPLICATION FACILITY (IRRIGATOR NO. 2)
MONTHLY IRRIGATION FLUID DATA

| IRRIGATION CYCLE | | Jan-07 | Feb-07 | Mar-07 | Apr-07 | May-07 | Jun-07 |
|---|---|---|---|---|---|---|---|
| **VOLUME (AF)** | | | | | | | 28.4 |
| **MAJOR IONS (mg/L)** | REP. LIMIT | | | | | | |
| Ca | 1.0 | | | | | | 355 |
| Mg | 1.0 | Irrigator Did | Irrigator Did | Irrigator Did | Irrigator Did | Irrigator Did | 108 |
| Na | 1.0 | Not Operate | Not Operate | Not Operate | Not Operate | Not Operate | 99 |
| K | 1.0 | | | | | | 30 |
| $HCO_3$ | 1.0 | | | | | | 151 |
| $SO_4$ | 1.0 | | | | | | 679 |
| Cl | 1.0 | | | | | | 516 |
| **NON-METALS** | | | | | | | |
| TDS @ 180° C (mg/L) | 10.0 | | | | | | 2310 |
| pH (standard units) | 0.010 | | | | | | 8.03 |
| SAR | 0.01 | | | | | | 4.29 |
| **TRACE METALS (mg/L)** | | | | | | | |
| As | 0.001 | | | | | | ND |
| Ba | 0.1 | | | | | | ND |
| B | 0.10 | | | | | | 0.1 |
| Se | 0.001 | | | | | | 0.776 |
| **RADIOMETRIC** | | | | | | | |
| U-nat (uCi/mL) | 2.03E-10 | | | | | | 6.67E-08 |
| Ra-226 (uCi/mL) | 2.00E-10 | | | | | | 1.01E-08 |
| Ra Err. Est. +/- | | | | | | | 1.00E-09 |

## TABLE 7A

## MONTHLY RADIUM GRAB SAMPLES
## AT THE DISCHARGE FROM THE RADIUM TREATMENT SYSTEM
## SATELLITE NO. 2

| **SAMPLE DATE** | | 12-Jan-07 | 20-Feb-07 | 14-Mar-07 | 11-Apr-07 | 11-May-07 | 7-Jun-07 |
|---|---|---|---|---|---|---|---|
| **RADIOMETRIC** | Rep. Limit | | | | | | |
| Ra-226 (uCi/mL) | 2.00E-10 | 3.70E-09 | 5.10E-09 | 2.20E-09 | 4.90E-09 | 5.70E-09 | 2.80E-09 |
| Ra Err. Est.+/- | | 6.00E-10 | 8.00E-10 | 5.00E-10 | 7.00E-10 | 9.00E-10 | 6.00E-10 |

## TABLE 7B

## MONTHLY RADIUM GRAB SAMPLES
## AT THE DISCHARGE FROM THE RADIUM TREATMENT SYSTEM
## SATELLITE NO. 3

| **SAMPLE DATE** | | 12-Jan-07 | 20-Feb-07 | 14-Mar-07 | 11-Apr-07 | 11-May-07 | 7-Jun-07 |
|---|---|---|---|---|---|---|---|
| **RADIOMETRIC** | Rep. Limit | | | | | | |
| Ra-226 (uCi/mL) | 2.00E-10 | 1.80E-09 | 1.10E-09 | 1.34E-08 | 9.00E-10 | 9.00E-10 | 6.80E-09 |
| Ra Err. Est.+/- | | 5.00E-10 | 4.00E-10 | 1.00E-09 | 3.00E-10 | 4.00E-10 | 9.00E-10 |

**TABLE 8**

**SATELLITE NO. 2 PURGE STORAGE RESERVOIR**
**SHALLOW MONITORING WELLS**
**QUARTERLY WATER LEVEL DATA**
**SEMI-ANNUAL WATER QUALITY DATA**

| **SAMPLE SITE** | | **Shallow Well No. 1 (South)** | | **Shallow Well No. 2 (East)** | |
|---|---|---|---|---|---|
| **SAMPLE DATE** | | 13-Mar-07 | 21-Jun-07 | 13-Mar-07 | 21-Jun-07 |
| **WATER LEVEL (DTW)** | | 17.3 | 12.13 | 11.23 | 8.68 |
| **MAJOR IONS (mg/L)** | Rep. Limit | **Not** | | | |
| $HCO_3$ | 1.0 | **enough** | 227 | 180 | 254 |
| $SO_4$ | 1.0 | **water** | 2420 | 2670 | 2500 |
| Cl | 1.0 | **to** | 222 | 264 | 402 |
| | | **sample** | | | |
| **NON-METALS** | | | | | |
| Cond (µmho/cm) | 1.0 | | 4410 | 4830 | 5140 |
| pH (standard units) | 0.01 | | 7.77 | 7.19 | 7.27 |
| **TRACE METALS (mg/L)** | | | | | |
| Ba | 0.001 | | ND | ND | ND |
| Se | 0.0025 | | 1.72 | 0.058 | 0.075 |
| **RADIOMETRIC** | | | | | |
| U-nat (uCi/mL) | 6.77E-10 | | 9.21E-08 | 1.90E-08 | 2.93E-08 |
| Ra-226 (uCi/mL) | 2.00E-10 | | 2.00E-09 | 2.60E-09 | 2.90E-09 |
| Ra-226 Err. Est. +/- (uCi/mL) | | | 5.00E-10 | 6.00E-10 | 6.00E-10 |

# ATTACHMENT B

# SAFETY AND ENVIRONMENTAL EVALUATIONS COMPLETED IN 2006

# Power Resources, Inc.
# Inter-Company Memorandum

Date: March 12, 2007

To: Chuck Foldenauer, Jon Winter, John McCarthy

From: Arlene Crook- RSO

Re: Safety and Environmental Review Panel (SERP) No. 2007-1

Cc: File SR 4.6.4.2

A. INTRODUCTION

A Safety and Environmental Review Panel was convened on March 12, 2007 to discuss a Self Identified Violation of the Environmental Dosimeter supplier/product described in EHS Volume VI and as described in the License Application.

B. SAFETY AND ENVIRONMENTAL REVIEW PANEL (SERP)

NRC License condition 9.4D of SUA-1548 requires that any changes, tests or experiments made under the Performance Based License Condition be evaluated by a SERP consisting of at least three individuals. One member must have management expertise and have financial and management responsibility for approving changes. The second member must have operational and/or construction expertise and have responsibility for implementing any operational changes. The third member must be the Radiation Safety Officer (RSO), or equivalent, with the responsibility of assuring that the proposed activities will conform to radiation safety requirements. Individuals selected to perform this SERP review include:

C. Foldenauer-Mine Manager
J. Winter- EHS Coordinator
A. Crook- Radiation Safety Officer
J. McCarthy-EHS Manager

D. EVALUATION OF PROPOSED CHANGE/TEST

It is stated in the license application that we will use Spherical TLD's. In EHS Volume VI it is stated that we will use Landauer X9 Environmental TLD Dosimeter.

In January 2006 we switched to comparable National Voluntary Laboratory Accreditation program (NVLAP) certified supplier do to poor service from Landauer. The language of Volume VI needs to be updated to allow changes in Environmental Dosimeter suppliers and advances in technology. In addition a proposed revision to

the License Application to include any provider/product that meets NRC qualifications.

A review of the NRC License 1548 shows that this change will not conflict with any requirements. This change will result in the need to revise Section 5.3.4 of the License Application. A revised Section 5.3.4 that specifies that Passive Gamma Radiation is monitored using Environmental TLD Dosimeters or equivalent, which meet NRC standards is included.

In addition EHS Volume VI, Section 5.3 revisions are included.

The SERP evaluated the changes against the conditions stated in the License Condition 9.4B as shown in the below. The SERP concluded that these changes satisfied those conditions.

**SERP Evaluation Checklist**

| NRC LICENSE REQUIREMENT | YES | NO | N/A |
|---|---|---|---|
| Does the proposed change, test, and/or experiment conflict with the ALARA principle? | | X | |
| Does the proposed change, test, and/or experiment conflict with the Company's ability to meet all applicable NRC regulations? | | X | |
| Is there degradation in the essential safety or environmental commitments in the license application, or provided in the approved reclamation plan? | | X | |
| Does the proposed change, test, and/or experiment conflict with any requirement specifically stated in the source material license? | X | | |
| Is the proposed change, test, and/or experiment not consistent with the conclusions of actions analyzed in the facilities Final Safety Evaluation Report (FSER)? | | X | |
| Is the proposed change, test, and/or experiment not consistent with the conclusions of actions analyzed in the facilities Environmental Assessment (EA) or supplemental EAs? | | X | |
| Does the proposed change, test, and/or experiment result in any increase in the frequency of occurrence of an accident previously evaluated in the license application (as updated)? | | X | |
| Does the proposed change, test, and/or experiment result in any increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety previously evaluated in the license application (as updated)? | | X | |
| Does the proposed change, test, and/or experiment result in any increase in the consequences of an accident previously evaluated in the license application (as updated)? | | X | |
| Does the proposed change, test, and/or experiment result in any increase in the consequences of a malfunction of an SSC previously evaluated in the license application (as updated)? | | X | |
| Does the proposed change, test, and/or experiment create a possibility for an accident of a different type than previously evaluated in the application (as updated)? | | X | |
| Does the proposed change, test, and/or experiment create a possibility for a | | X | |

| | | | |
|---|---|---|---|
| malfunction of an SSC with a different result than previously evaluated in the license application (as updated)? | | | |
| Does the proposed change, test, and/or experiment result in the departure from the method of evaluation described in the license application (as updated) used in establishing the final safety evaluation report or the environmental assessment (EA) or technical evaluation reports (TERs) or other analysis and evaluations? (SSC means any SSC which has been referenced in a NRC staff SER, TER, EA, or environmental impact statement (EIS) and all supplements and amendments.) | | X | |

E. CONCLUSIONS

The SERP concluded that changing the EHS Volume VI to include other suppliers and products should not compromise the effectiveness of the ALARA and environmental compliance programs. Therefore, the SERP approves this change.

Signature: _____ Date: 3-12-07
C. Flodenauer, Mine Manager

Signature: _____ Date: 3.12.07
J. Winter, EHS Coordinator

Signature: Arlene Crook Date: 3/12/07
A. Crook, Radiation Safety Officer

Signature: _____ Date: 3/12/07
J. McCarthy, EHS Manager

Original

### 5.3.4 Passive Gamma Radiation Monitoring

Passive gamma radiation is monitored at the five Air Monitoring Stations described above. Passive gamma radiation is monitored using spherical TLD's which are exchanged on a quarterly basis. Results of the monitoring are reported to the NRC in the Semi-Annual Report. Gamma radiation is monitored at Air Station Nos. 4 and 5 only when the stations are active in response to yellowcake processing at the Highland Central Plant.

Passive gamma radiation monitoring data collected at the Smith Ranch Air Monitoring Stations for the period 1996 through 2002 is summarized in Table 5-2. Table 5-5 summarizes the passive gamma radiation monitoring at the Higland Air Stations and the three Passive Air Stations. Review of these data show that background gamma radiation levels at the respective upwind and downwind sites for each project range from 33 to 36 mRem per quarter. It should be noted that the downwind sites also represent background due to their distance from any processing areas or gamma radiation sources. In comparison to the background sites, data obtained at the Restricted Area Boundaries of the Smith Ranch CPP and Highland CPF show apparent minimal increases in gamma radiation of only 2 to 5 mRem per quarter.

### 5.3.5 Environmental Ground Water Monitoring Program

The project wide environmental ground water monitoring program includes the quarterly monitoring of operating domestic and stock wells located within 1 km of operating wellfields. Water samples are obtained from these wells for the analysis of uranium and radium-226. The ground water monitoring stations for current (March 2003) operating wellfields are described in Table 5-6 and shown on Plate 1. Plate 1 also shows the locations of other potential ground water monitoring sites near proposed wellfields that will be added to the monitoring program once wellfield operations commence in those areas.

### 5.3.6 Environmental Surface Water Monitoring Program

The project wide environmental surface water monitoring program includes the quarterly monitoring of Sage Creek when stream flow is present as well as numerous stock ponds that are located down stream of operating wellfields. The surface water monitoring sites are described in Table 5-7 and shown on Plate 1. Water samples are obtained from these sites for the analysis of uranium and radium-226 when adequate water exists to permit sampling.

### 5.3.7 Wastewater Land Application Facilities Monitoring Program

#### 5.3.7.1 General

To assist in assessing impacts of irrigating treated wastewater at the Satellite No. 1 and Satellite No. 2 Wastewater Land Application Facilities (Irrigation Areas) the irrigation

Proposed Change

concentrations have averaged less than 5% of the respective Effluent Concentration Limit. A review of this data also shows that no significant difference has been determined between background radionuclide concentrations and those determined at the Restricted Area Boundary at the HUP Central Plant, or the nearest downwind residence (Fowler Ranch). Comparison of historic radionuclide particulate data from the Smith Ranch and Highland Air Monitoring Stations shows no significant variations.

### 5.3.3 Passive Radon Gas Monitoring

Passive radon gas (radon-222) is monitored at the site to assess background conditions and releases from the facilities to the environment. Radon is monitored using Track-Etch type radon cups (detectors) provided by a contractor specializing in radon detection. The radon cups were historically exchanged on a quarterly basis. The frequency of exchange of the cups has been changed to semi-annually (every 6 months) in order that the 0.2 pCi/L sensitivity level recommended in NRC Regulatory Guide 4.14 can be potentially met. Results of the monitoring are reported to the NRC in the Semi-Annual Report. Radon is monitored at the five Air Monitoring Stations described above. Radon is monitored at Air Station Nos. 4 and 5 only when the stations are active in response to yellowcake processing at the Highland Central Plant.

Radon-222 monitoring data collected at the Smith Ranch Air Monitoring Stations for the period 1996 through 2002 is summarized in Table 5-2. Table 5-4 summarizes the radon-222 monitoring data collected at the Highland Air Monitoring Stations and the three Passive Air Stations. A review of these data shows that radon-222 at all sites has averaged less than 20% of the Effluent Concentration Limit. Review of this data also shows that no significant difference has been determined between background radon-222 concentrations and those determined at the Restricted Area Boundary or nearest downwind residence sites. The data from the Highland Passive Air Stations also show that increases in radon-222 adjacent to Satellite No. 2, where radon is routinely vented during operations, has had a minimal impact on ambient air quality. As the monitoring data shows, any increases in radon-222 have been minimal and well below the Effluent Concentration Limit.

### 5.3.4 Passive Gamma Radiation Monitoring

Passive gamma radiation is monitored at the five Air Monitoring Stations described above. Passive gamma radiation is monitored using Environmental Dosimeters or equivalent, which meet NRC standards. Dosimeters are exchanged on a quarterly basis. Results of the monitoring are reported to the NRC in the Semi-Annual Report. Gamma radiation is monitored at Air Station Nos. 4 and 5 only when the stations are active in response to yellowcake processing at the Highland Central Plant.

Passive gamma radiation monitoring data collected at the Smith Ranch Air Monitoring Stations for the period 1996 through 2002 is summarized in Table 5-2. Table 5-5 summarizes the passive gamma radiation monitoring at the Higland Air Stations and the three Passive Air Stations. Review of these data show that background gamma radiation levels at the respective upwind and downwind sites for each project range from 33 to 36

Original



## 5.2 Preoperational Gamma Surveys

The NRC requires that preoperational gamma measurements be performed at the site for processing facilities. The recommended survey pattern consists of readings made at 150-meter intervals on the eight compass points out to a distance of 1,500 meters. These surveys are generally performed during the site characterization process and are not routinely required at Crow Butte or Smith Ranch/Highland.

## 5.3 Operational Direct Gamma Radiation Monitoring

Environmental gamma radiation monitoring during operations is performed using thermoluminescent dosimeters (TLDs) provided by Landauer, Inc. Landauer's environmental/low level dosimetry service is designed to meet ANSI standards and provides accurate reporting to 0.1 mrem. Monitoring is performed using the Landauer X9 aluminum oxide TLD dosimeter. The X9 has a minimum detectable dose of nominally 0.1 mrem ambient dose equivalent. The gross and net dosage reported, and the minimum detectable dose for the batch is shown on each report. The TLDs exhibit negligible fade of less than 10 percent during three months of extreme environmental conditions. The X9 TLD fully meets ANSI N545 performance, testing, and procedural specifications.

Five lithium fluoride chips are located in the X9 environmental TLD area monitor. The TLD area monitors are white balls, approximately 1" in diameter, with a chain and clasp attached. A location/ID tag is also attached to the chain.

The TLDs are supplied by the vendor before the end of each quarter. Each shipment of dosimeters contains a control dosimeter that measures exposure rates during processing and shipping of the dosimeters. Before deployment of the dosimeters, the control dosimeter must be placed in a storage area with a low ambient background gamma dose rate.

The dosimeters are deployed at the beginning of each quarter. The dosimeters are clipped onto each survey location with the fastener provided with the dosimeter. Each dosimeter has a tag with an identification number. When exchanging the dosimeters, the dosimeter is replaced with the corresponding dosimeter identification number.

After the dosimeters are collected, care is taken to ensure that they are not exposed to any additional gamma radiation or x-rays. Once the dosimeters are collected, they are returned to the vendor in the original box with the provided shipping label. This label cautions against exposure to radioactive materials or x-rays while in transit.

## 5.2 Preoperational Gamma Surveys

Proposed Change

The NRC requires that preoperational gamma measurements be performed at the site for processing facilities. The recommended survey pattern consists of readings made at 150-meter intervals on the eight compass points out to a distance of 1,500 meters. These surveys are generally performed during the site characterization process and are not routinely required at Crow Butte or Smith Ranch/Highland.

## 5.3 Operational Direct Gamma Radiation Monitoring

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The dosimeters are deployed at the beginning of each quarter. The dosimeters are clipped onto each survey location with the fastener provided with the dosimeter

After the dosimeters are collected, care is taken to ensure that they are not exposed to any additional gamma radiation or x-rays. Once the dosimeters are collected, they are returned to the vendor in the original box with the provided shipping label. This label cautions against exposure to radioactive materials or x-rays while in transit.

The results of environmental gamma radiation monitoring are recorded in the environmental record system for use by the EHS Department staff to determine trends at particular locations and to analyze potential impacts from site operations. These results are also included in the Semi-annual Radiological Effluent and Environmental Monitoring Report submitted to the NRC. The analytical results should be reviewed to ensure that NRC quality requirements are met. The analytical results include the mean gross and net ambient dose equivalents. The net ambient dose equivalent is determined by subtracting the dose to the control dosimetry from the gross reading for the dosimeter deployed in the field.

**Section 2. ASSESSMENT OF SIGNIFICANCE**

1. Does the Change Request involve a level of significance great enough to require an ORC/SERP review as described in EHS-6? **Yes X** **No** ☐

2. Were Site Significant Environmental Aspects reviewed **Yes** ☐ **No X**

3. Does change result in result in an increased environmental risk? **Yes** ☐ **No X**

**Signed:** Don Winter **Date:** 3-19-07
EHSMS Coordinator

If "No" is answered to question # 1 above, then work may proceed may proceed on the request in accordance with established procedures and safe work practices, or other controls identified in the Work Order.

If "Yes" is answered to question # 1 above, then an ORC and/or SERP review must be performed in accordance with procedure EHS-6 *Managing Change* and EHS-3, *Hazard Identification, Risk Assessment, and Risk Control.*

ORC Review (See ORC Review Documentation):

Date Performed 3/12/07

Approved X Disapproved ☐

Comments:

ORC Review (See ORC Review Documentation):

Date Performed 3/12/07

Approved X Disapproved ☐

Comments:

## Section 3. CHANGE IMPLEMENTATION

Have actions and controls identified by the ORC and/or SERP to be implemented prior to project start-up been completed? Yes ☒ No ☐

If "Yes", then change is ready to Proceed.

Signed: _____ _____
Area Supervisor/Manager Change Originator

## Section 4. FOLLOW-UP

| | | |
|---|---|---|
| Was the change completed according to applicable procedures? | Yes ☐ | No ☐ |
| Were controls identified through the Risk Assessment completed | Yes ☐ | No ☐ |
| Has the expected performance of the change been achieved? | Yes ☐ | No ☐ |
| Has the change control process been executed properly? | Yes ☐ | No ☐ |
| Has the results of the change been communicated to appropriate personnel?<br><br>If so, to whom and how was it communicated? Describe below: | Yes ☐ | No ☐ |

Signatures: _____ _____
Area Supervisor/Manager EHSMS Coordinator

POWER RESOURCES

# CHANGE CONTROL

**Section 1. CHANGE IDENTIFICAION**

**Title of Change: Environmental Dosimetry**

**Change Request Originator: Chuck Foldenauer**

**Date: 3/12/07**
**Work Order # (If Applicable): _____**

**Scope Of Change: Environmental Health and Safety Volume VI describes in detail who provides the Dosimetry and what kind of Passive Gamma Dosimetry we will be using. We changed our distributor of Environmental Gamma Monitoring devices in 2006. Volume VI requires updating to include other Approved providers and equipment available that may change and improve.**

**In addition our License Application states that we will use Spherical TLD's. A proposed change to state "Environmental Dosimeters or equivalent, which meet NRC standards".**

| Is the risk(s) identified acceptable as a result of the controls and mitigative actions described above. | Yes<br>X | No<br>☐ |
|---|---|---|
| If "No", describe additional controls or mitigative actions required to bring the risk(s) back to acceptable levels: | | |

**Section 5**

| Risk Assessment Team Approvals | | |
|---|---|---|
| **Name (Print)** | **Signature** | **Date** |
| CHUCK FOLDENAUER | [illegible] | 3.12.07 |
| JOHN McCARTHY | [illegible] | 3/12/07 |
| Arlene Crook | Arlene Crook | 3/12/07 |
| Jon Winter | Jon Winter | 3/12/07 |
| | | |
| | | |
| | | |
| | | |

# RISK SCREENING/ASSESSMENT

**Section 1**

**Title of Proposed Change: Environmental Dosimetry**

**Assessment Team: Chuck Foldenauer, Arlene Crook, John Winter**

**Section 2**

| Risk Assessment Question | Yes | No | N/A |
|---|---|---|---|
| Will the proposed change result in a potential increase of radiological exposure to employees or the public? | ☐ | X | ☐ |
| Will additional radiological monitoring be required as a result of the proposed change? | ☐ | X | ☐ |
| Will additional radiological controls or personal protective equipment be required as a result of the proposed change? | ☐ | X | ☐ |
| Will the proposed change result in an increase in transportation of radioactive materials or require modification of current transportation methods? | ☐ | ☐ | X |
| Will the proposed change result in an increased potential for a significant release or spill of radioactive material? | ☐ | ☐ | X |
| Has new equipment, facilities, or processes been proposed that introduce potential additional hazards or require engineering controls to reduce hazards? | ☐ | X | ☐ |
| Have new electrical systems been proposed that introduce potential additional hazards or require engineering controls to reduce hazards? | ☐ | ☐ | X |
| Will the proposed change result in an increased exposure to elevated noise levels? | ☐ | ☐ | X |
| Will new potentially hazardous chemicals and/or bulk chemical storage areas be introduced? | ☐ | ☐ | X |
| Will the proposed change introduce potentially hazardous confined space areas or introduce potential hazards to existing confined spaces? | ☐ | ☐ | X |
| Will the proposed change result in abnormal hazards from excavation or construction not predicted in current procedures? | ☐ | ☐ | X |
| Will the proposed change result in an increased fire hazard or will existing fire protection systems be ineffective? | ☐ | ☐ | X |
| Will the proposed change increase potential for a violation of an environmental or radiological regulatory permit or standard? | ☐ | X | ☐ |
| Will the proposed change cause significant surface disturbance outside of the permit area? | ☐ | ☐ | X |

| | | | |
|---|---|---|---|
| Will the proposed change result in a significant increase in solid, hazardous, or radiological waste generation? | ☐ | ☐ | X |
| Will the proposed change require approval from a regulatory agency or coverage under a permit? | ☐ | X | ☐ |
| Will special training need to be incorporated beyond the scope of current training programs? | ☐ | X | ☐ |
| Will additional Standard Operating Procedures or Emergency Response Procedures need to be developed prior to change implementation? | ☐ | X | ☐ |
| Will the proposed change introduce potential legal issues or obligations? | ☐ | X | ☐ |
| Will the proposed change result in nonconformance with established company policies? | ☐ | X | ☐ |
| Will the proposed change result in damage to the credibility, public perception, reputation, or public good standing of Power Resources, Crow Butte Resources, or Cameco as a reputable company? | ☐ | X | ☐ |
| Are there any other risk scenarios not included in the above questions that could result from the proposed change? | ☐ | X | ☐ |
| Will proposed change affect the sites Environmental Aspects? | ☐ | X | ☐ |

**Section 3**

**If yes was answered to any questions above, indicate the controls or mitigative actions to be used to minimize the associated risk:**

**Section 4**

# ATTACHMENT C

# NOTICE OF VIOLATION

SR- 4.6.4.1

UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
611 RYAN PLAZA DRIVE, SUITE 400
ARLINGTON, TEXAS 76011-4005

April 24, 2007

RECEIVED

MAY - 1 2007

SMITH RANCH - HIGHLAND

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

SUBJECT: NRC INSPECTION REPORT 040-08964/07-001 AND NOTICE OF VIOLATION

Dear Mr. McCarthy:

This refers to the inspection conducted on April 2-5, 2007, at the Smith Ranch facility in Glenrock, Wyoming. The inspection was an examination of activities conducted under your license as they relate to safety and compliance with the Commission's rules and regulations and 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. Details of the inspection were presented to you at the exit briefing conducted on April 5, 2007.

Based on the results of this inspection, the NRC has determined that a Severity Level IV violation of NRC requirements occurred. The violation involves your failure to post a radiation area. The 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.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 because it was identified by the NRC and because it had the potential for actual safety consequences.

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 enclosures, 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 www.nrc.gov/reading-rm/adams.html.

Should you have any questions concerning this inspection, please contact the undersigned at (817) 860-8191 or Mr. Robert J. Evans, Senior Health Physicist, at (817) 860-8234.

Sincerely,

D. Blair Spitzberg, Ph.D., Chief
Fuel Cycle and Decommissioning Branch

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

Enclosures:
1. Notice of Violation
2. NRC Inspection Report
   040-08964/07-001
3. NRC Information Notice 96-28

cc w/enclosures 1&2:
Mr. David Finley
Wyoming Department of Environmental Quality
Solid and Hazardous Waste 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

**ENCLOSURE 1**
**NOTICE OF VIOLATION**

Power Resources, Inc.
Glenrock, Wyoming

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

During an NRC inspection conducted on April 2-5, 2007, a violation of NRC requirements was identified. In accordance with the NRC Enforcement Policy, the violation is listed below:

> 10 CFR 20.1902(a) requires that the licensee post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA."
>
> Contrary to the above, on April 3, 2007, the Satellite SR-1 resin transfer water tank area, an accessible area in which an individual could receive a dose equivalent in excess of 0.005 rems (0.05 mSv) in one hour at 30 centimeters from the tank surface that the radiation penetrated, was not posted with a sign bearing the radiation symbol and the words "CAUTION, RADIATION AREA."

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 20555-0001, 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, 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 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.

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

Dated this 24th day of April 2007

**ENCLOSURE 2**

U.S. NUCLEAR REGULATORY COMMISSION
REGION IV

| | |
|---|---|
| Docket No.: | 040-08964 |
| License No.: | SUA-1548 |
| Report No.: | 040-08964/07-001 |
| Licensee: | Power Resources, Inc. |
| Facility: | Smith Ranch In-Situ Leach Facility |
| Location: | Converse County, Wyoming |
| Dates: | April 2-5, 2007 |
| Inspectors: | Robert Evans, P.E., C.H.P., Senior Health Physicist<br>Fuel Cycle & Decommissioning Branch<br><br>Robert G. Lukes, Health Physicist<br>Decommissioning and Uranium Recovery Licensing Directorate<br>Division of Waste Management and Environmental Protection<br>Office of Federal and State Materials and Environmental Management Programs |
| Accompanied by: | Paul Michalak, Project Manager<br>Decommissioning and Uranium Recovery Licensing Directorate<br>Division of Waste Management and Environmental Protection<br>Office of Federal and State Materials and Environmental Management Programs<br><br>Jason M. Razo, Health Physicist<br>Nuclear Materials Inspection Branch |
| Approved by: | D. Blair Spitzberg, Ph.D., Chief<br>Fuel Cycle & Decommissioning Branch |
| Attachment: | Supplemental Inspection Information |

## EXECUTIVE SUMMARY

Power Resources, Inc. Smith Ranch In-Situ Leach Facility
NRC Inspection Report 040-08964/07-001

This inspection included a review of site status, management organization and controls, site tours, radiation protection, environmental protection, transportation and radwaste activities, emergency preparedness, and followup of two previous NRC inspection findings. In summary, the licensee was conducting operations safely and in accordance with regulatory and license requirements, with one exception described below.

Management Organization and Controls

- The organizational structure and staffing levels met license requirements and were sufficient for the work in progress. The licensee's Safety and Environmental Review Panel evaluations were conducted in accordance with requirements of the performance-based license (Section 1).

In-Situ Leach Facilities

- Site operations were being conducted in accordance with the performance-based license and regulatory requirements. Radiation and area postings met requirements, with one exception. A violation was identified involving the licensee's failure to post a radiation area in Satellite SR-1 (Section 2).

Radiation Protection

- The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license (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 2006 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 environmental monitoring data (Section 4).

Transportation of Radioactive Material and Radioactive Waste Management

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

Emergency Preparedness, Fire Protection, and Emergency Procedures

- The licensee had established an emergency preparedness program as required by the license (Section 6).

Followup

- The inspectors reviewed and closed a previously identified Inspection Followup Item involving the licensee's well sampling protocols (Section 7.1).

- The inspectors also reviewed and closed a previously identified violation involving the failure to utilize a radiation work permit, resulting in an uptake of uranium by a site worker. The licensee implemented corrective actions including a protocol for assessing doses to workers (Section 7.2).

## Report Details

### Site Status

At the time of the inspection, the licensee was in the process of recovering uranium through in-situ leach operations in a number of wellfields. Uranium processing and drying operations were in progress at the Smith Ranch central processing plant (CPP). Three satellite facilities (2, 3, and SR-1) were in service to support wellfield operations. Operations had been previously discontinued at Satellite No. 1 and the Highland central plant. Further, the licensee's three offsite locations (North Butte, Ruth, and Gas Hills) remained in standby.

Since 2006, the licensee placed Mine Units J and K into service, while Mine Unit 4 was removed from service. During the inspection, the licensee was constructing a reverse osmosis unit in the CPP for future water cleanup activities. Wellfields in development included 15A, portions of K, and the southwest area (Mine Units 9, 10, 11). Restoration was in progress in Mine Units 1 and C. Experimental bio-remediation was in progress in Mine Unit C. Finally, Mine Unit B had been restored but was awaiting regulatory approval of final restoration results.

### 1 Management Organization and Controls (88005)

#### 1.1 Inspection Scope

The purposes of this portion of the inspection were to ensure that the licensee had established an organization to administer the technical programs and to ensure that the licensee had established a program to perform internal reviews, self-assessments, and audits.

#### 1.2 Observations and Findings

The licensee's approved organizational structure is illustrated in Figure 9-1 of the March 12, 2003, application. The current organization was compared to the required structure, and the inspectors found that the licensee's organizational structure was in agreement with the license application. In summary, the licensee had sufficient staff to implement the radiation protection and groundwater monitoring programs.

License Condition 9.4 of the performance-based license requires, in part, that the licensee establish a Safety and Environmental Review Panel (SERP). The inspectors reviewed the licensee's SERP evaluations performed during calender year 2006 and the first quarter of 2007. The SERPs included startup of a wellfield, review of elevated radon in the CPP, operation of a shredder to reduce waste volume, and changes in environmental thermoluminescent dosimeters. The 2006-2007 SERP evaluations were technically adequate and provided sufficient detail to support the proposed change.

#### 1.3 Conclusions

The organizational structure and staffing levels met license requirements and were sufficient for the work in progress. The licensee's SERP evaluations were conducted in accordance with requirements of the performance-based license.

## 2 In-Situ Leach Facilities (89001)

### 2.1 Inspection Scope

The inspection objectives were to determine if operations were being conducted in accordance with regulatory and license requirements.

### 2.2 Observations and Findings

Site tours were conducted to observe in-situ leach operations in progress. Areas toured included the CPP, wellfields, selected header houses, and satellite buildings. During the site tours, the inspectors observed the condition of plant equipment, fences, and gates. Plant operating parameters (flow, pressure) were compared to licensed limits. The inspectors concluded that operations were being conducted in accordance with established procedures.

The inspectors performed independent radiological surveys using NRC-issued Ludlum Model 19 microRoentgen meters (NRC Nos. 015546 and 016338 with calibration dues dates of 02/12/08). The inspectors observed that the resin transfer water tank in Satellite SR-1 was an unposted radiation area. The tank was measured with an exposure rate of greater than 5 millirems per hour, but the tank was not posted as a radiation area as required by 10 CFR 20.1902(a). This finding was identified as a violation of regulatory requirements (VIO 040-08964/0701-01). Immediate corrective actions taken by the licensee included posting the tank as a radiation area. The inspectors determined that contributing causes included potentially frequent changes in equipment radiation levels because of plant evolutions and incomplete procedure guidance. Although the licensee had procedures to support resin transfer water operations, the inspectors determined that the procedures did not provide clear guidance in all areas such as when to change the water contained in the tank.

### 2.3 Conclusions

Site operations were being conducted in accordance with the performance-based license and regulatory requirements. Radiation and area postings met requirements, with one exception. A violation was identified involving the licensee's failure to post a radiation area in Satellite SR-1.

## 3 Radiation Protection (83822)

### 3.1 Inspection Scope

The purpose of this portion of the inspection was to determine if the licensee's radiation protection program was in compliance with license and 10 CFR Part 20 requirements.

### 3.2 Observations and Findings

The inspectors reviewed the licensee's dose assessment records for 2006. License Application Section 9.8 states that the external radiation exposures to plant operators

will be monitored on a quarterly basis. During 2006, the CPP and satellite/restoration operators were monitored with thermoluminescent dosimeters. The highest deep dose equivalent exposure for 2006 was 490 millirems.

The licensee conducted air sampling, in part, for assessment of internal exposures. The inspectors reviewed the licensee's 2006-2007 sampling records, and confirmed that the licensee had conducted sampling at the required intervals. Internal exposures were calculated and assigned to individuals using these air sample results. The highest internal dose assigned to an individual was 310 millirems.

The occupational worker total effective dose equivalents, the combination of internal and external exposures, were compared to the dose limits specified in 10 CFR 20.1201(a). The maximum total effective dose equivalent exposure for 2006 was 779 millirems with a regulatory limit of 5000 millirems. In summary, occupational doses were below the regulatory limit.

The licensee collected bioassay samples to assess the potential for intake of uranium. The inspectors reviewed the bioassay program to verify compliance with License Conditions 11.2 and 11.3. One sample result exceeded the action level. During early March 2007, a baseline sample was collected from a contract worker. The sample result was 59.5 micrograms of uranium per liter of urine. A second sample was collected about two weeks later. The second sample did not contain detectable concentrations of uranium. The licensee conducted a review and declared the first sample to be invalid. The inspectors reviewed the licensee's analysis and concurred with the licensee's conclusions. In addition, the licensee did not assign a dose to this individual because it was a baseline sample (i.e., sample was collected from employee prior to work in the restricted areas). Further, the sample results did not meet the requirements for reportability, therefore, the licensee did not report the result to the NRC.

Section 9.8 of the license application requires, in part, that the licensee perform quarterly gamma radiation surveys in specific locations to verify postings and to assess external radiation conditions. The inspectors verified that the licensee had performed the required routine surveys during 2006 and the first quarter of 2007.

Contamination surveys were conducted weekly in clean areas of the site and monthly in the process areas. Quarterly spot checks were conducted on personnel leaving the site. Equipment, materials, and trash leaving the site were surveyed. The licensee maintained extensive records of contamination surveys. Records indicate that nothing left the site with contamination in excess of licensed limits. One individual was identified with contamination in excess of the limit, but this individual was decontaminated, resurveyed and counseled prior to release from the site.

The radiation safety officer conducts radiation safety training for new employees and individuals allowed to work in controlled or restricted areas. The training records for a randomly selected individual was reviewed. This employee's training was up-to-date and no deficiencies were identified. The licensee's training program was in conformance with applicable license requirements and regulations.

3.3 Conclusions

The licensee implemented a radiation protection program that met the requirements of 10 CFR Part 20 and the license.

## 4 Environmental Monitoring and Maintaining Effluents from Materials Facilities ALARA (87102 and 88045)

4.1 Inspection Scope

The environmental and effluent monitoring programs were reviewed by the inspectors to assess the effectiveness of the licensee 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 40.65. The two semiannual environmental monitoring reports for 2006 were reviewed during the inspection. The licensee's environmental monitoring program consists of air particulate, radon, groundwater, surface water, soil, and vegetation sampling. Measurements of ambient gamma exposure rates were also performed.

All results for natural uranium, thorium-230, radium-226, lead-210, and radon-222 concentrations were found to be below the effluent concentration limits specified in 10 CFR Part 20, Appendix B. Gamma radiation data for 2006 was consistent with previous years' measurements, and data from down-gradient locations was only slightly higher than up-gradient measurements. In summary, the potential radiation dose to any member of the public from licensed material during 2006 was below the 100 millirem per year annual dose limit specified in 10 CFR 20.1301(a).

b. Groundwater and Environmental Water Sampling

The inspectors reviewed groundwater monitoring well and effluent monitoring data. All required data was presented in the semi-annual reports. The groundwater and surface water monitoring programs were implemented by the licensee in accordance with Chapter 5 of the license application. The groundwater program consisted of quarterly sampling for natural uranium and radium-226 in wells used for livestock or domestic water within 1-kilometer of the operating wellfields.

The inspectors found no significant changes over the previous year's results. The inspectors reviewed the water sampling standard operating procedure and observed a groundwater technician performing well sampling. The water collection process was performed in accordance with the instructions provided in the licensee's procedures.

c. Wellfield and Excursion Monitoring

License Condition 12.1 requires, in part, that until the license is terminated, the licensee maintain documentation on spills of source materials,11e.(2) byproduct materials, or process chemicals. Also, the licensee is required to report any well-field 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 is required to make notification to the NRC in accordance with License Condition 9.2.

The inspectors reviewed the licensee's spill records and determined that the licensee was in compliance with License Conditions 9.2 and 12.1 requirements. The licensee recorded 26 spills between July 2006 (the date of the last inspection) and December 2006, four of which were reportable to the NRC. During the first quarter of 2007, there were eight recorded spills, two of which were reported to NRC.

A leak in the licensee's East Evaporation Pond was discovered by the licensee on October 21, 2005. The pond was subsequently dewatered on November 7, 2005, to eliminate the leak. The pond is currently out-of-service; however, sludge removal and liner replacement are planned for the spring of 2007.

The licensee continues to monitor excursion well DM-3 on a weekly basis. The licensee initially notified the NRC of this finding by letter dated January 29, 2002. The licensee believes that the excursion was not caused by over-injection of lixiviant but was due to the presence of an underground mine shaft in the vicinity of the mine unit. This conclusion was based on the technical assistance provided by a hydrological consulting firm. This mine unit is currently in restoration, and the licensee continues to create an inward hydrogeologic gradient in an attempt to capture the excursion and to bring the mine unit back into compliance. The NRC will continue to review the licensee's restoration actions during future inspections.

4.3 Conclusions

The licensee did not release effluents into the environment during 2006 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 Transportation of Radioactive Materials and Radioactive Waste Management (86740 and 88035)

5.1 Inspection Scope

The objectives of the inspection were to determine if transportation and disposal activities were being conducted in compliance with regulatory requirements.

5.2 Observations and Findings

The licensee's transportation records were reviewed during the inspection. The licensee utilized tankers to transport resin to and from the satellite buildings. The inspectors reviewed selected resin tanker shipping papers. The papers provided all the pertinent information required by U.S. Department of Transportation (DOT) regulations. Included in the licensee's records were survey forms for documentation of DOT-required radiological surveys.

License Condition 9.6 allows the licensee to dispose of byproduct material at an offsite location. The inspectors reviewed the shipping records for recent disposal shipments to ascertain whether the records were complete. The records included radiological surveys of the packages prior to shipment. The records were found to be complete.

5.3 Conclusions

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

## 6 Emergency Preparedness, Fire Protection, and Emergency Procedures (88050, 88055, and 88064)

6.1 Inspection Scope

The objective of this portion of the inspection was to ensure that the licensee's emergency preparedness program was being maintained in a state of readiness.

6.2 Observations and Findings

Volume VIII of the Operations Manual details the health physics and safety requirements for emergency preparedness. Coordination with local law enforcement and fire protection units was reviewed, and emergency contacts were kept up-to-date. Daily logs maintained by the radiation safety officer, and the CPP operators ensured that day-to-day operations of the facility are within specified parameters. Operators rely on trend analysis and industry experience to locate potential problem areas. Spill kits and the emergency response trailer had all required materials. Employees appeared aware of their responsibilities and expectations depending on the type of emergency or spill.

An emergency simulation was conducted in December 2006, involving all aspects of the facility. Minor issues were identified and corrected.

6.3 Conclusions

The licensee had established an emergency preparedness program as required by the license.

## 7 Followup

7.1 (Closed) Inspector Follow up Item (IFI) 040-08964/0501-01: Followup of Licensee's Procedures and Protocols for Well Sampling

During a previous inspection, the licensee agreed to formally review its ground water sampling program, including purging criteria, through its performance-based license provisions. This would involve submitting this issue to its SERP for technical review.

Since the last inspection, the licensee has retained a consultant to review and make recommendations concerning its ground water sampling procedures. The licensee had recently received the consultant's draft report; however, a final report has not been formally submitted to the licensee's SERP for technical review.

The inspectors briefly reviewed the consultant's technical report during this inspection. The licensee was determined to be addressing the NRC's original concerns. Detailed review of the technical report and the SERP's response to the report will be performed during a future inspection.

7.2 (Closed) Violation 040-08964/0601-01: Conducting Non-Routine Work Without a Radiation Work Permit

The violation involved a failure to utilize a radiation work permit to control exposure to uranium during non-routine work activities resulting in the intake of radioactive material by an occupational worker. By letter dated September 20, 2006, the licensee provided corrective actions to prevent recurrence. One corrective action included development of a protocol to assess internal doses from uranium uptakes. The inspectors reviewed the protocol and determined that it was in agreement with NRC guidance documents.

## 8 Exit Meeting Summary

The inspectors presented the preliminary inspection results to the licensee's representatives at the conclusion of the onsite inspection on April 5, 2007. During the inspection, the licensee did not identify any information reviewed by the inspectors as propriety.

## ATTACHMENT

### PARTIAL LIST OF PERSONS CONTACTED

Licensee

A. Crook, Radiation Safety Officer
P. Drummond, Superintendent, Plant Operations & Maintenance
C. Foldenauer, Mine Manager
S. Hatten, Wellfield Manager
J. McCarthy, Manager, Environmental Health & Safety
J. Winter, Senior Environmental Health and Safety Coordinator

### ITEMS OPENED, CLOSED, AND DISCUSSED

Open

| | | |
|---|---|---|
| 040-08964/0701-01 | VIO | Failure to post a radiation area |

Closed

| | | |
|---|---|---|
| 040-08964/0601-01 | VIO | Conducting non-routine work without a radiation work permit |
| 040-08964/0501-01 | IFI | Followup of licensee's procedures and protocols for well sampling |

Discussed

None

### INSPECTION PROCEDURES USED

| | |
|---|---|
| IP 83822 | Radiation Protection |
| IP 86740 | Transportation of Radioactive Material |
| IP 87102 | Maintaining Effluents from Materials Facilities ALARA |
| IP 88005 | Management Organization and Control |
| IP 88035 | Radioactive Waste Management |
| IP 88045 | Environmental Monitoring |
| IP 88050 | Emergency Preparedness |
| IP 88055 | Fire Protection |
| IP 88064 | Emergency Procedures |
| IP 89001 | In-Situ Leach Facilities |
| IP 92701 | Followup |

### LIST OF ACRONYMS USED

| | |
|---|---|
| CPP | central processing plant |
| DOT | U.S. Department of Transportation |
| IFI | Inspection Followup Item |
| IP | NRC Inspection Procedure |
| SERP | Safety and Environmental Review Panel |
| VIO | Violation |

SR 4.6.3.1
SR-4.6.4.1

POWER RESOURCES

**Smith Ranch - Highland Uranium Project**
P. O. Box 1210
Glenrock, Wyoming USA 82637
Casper: 307-235-1628
Douglas: 307-358-6541
Fax: 307-358-4533

May 18, 2007

**ATTN: Document Control Desk**
Nuclear Regulatory Commission
Washington DC, 20555-10001

## RE: REPLY TO A NOTICE OF VIOLIATION
## Inspection Report 040-08964/07-001

Please find below Power Resource's reply to the Notice of Violation issued by the Nuclear Regulatory Commission (NRC) to Power Resources, Inc. (PRI) on April 24, 2007. This response is being provided in accordance with 10 CFR 2.201.

The violation stated: "10 CFR 20.1902(a) requires that the licensee post each radiation area with a conspicuous sign or signs bearing the radiation symbol and the words "CAUTION, RADIATION AREA".

Contrary to the above, on April 3, 2007, the Satellite SR-1 resin transfer water tank area, an accessible area in which an individual could receive a dose equivalent in excess of 0.005 rems (0.05 mSv) in one hour at 30 centimeters from the tank surface that the radiation penetrated, was not posted with a sign bearing the radiation symbol and the words "CAUTION, RADIATION AREA".

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

**Reason for the Violation**

At Smith Ranch-Highland, routine Gamma Surveys are conducted at least quarterly as recommended in Regulatory Guide 8.30. One purpose is the identification of radiation areas for proper posting to minimize time around the posted area. As listed above, the resin transfer water tank was found to be a Radiation Area during the Nuclear Regulatory Commission (NRC) inspection of April 3, 2007. The results of our Quarterly Surveys for the past two years are listed in the following table.

| GAMMA SURVEYS SR-1 TANK 207 | |
|---|---|
| **Date** | **mR/hr** |
| 1/31/2005 | 1.2 |
| 4/20/2005 | 1.0 |
| 8/10/2005 | 1.4 |
| 12/09/2005 | 2.2 |
| 2/08/2005 | 3.8 |
| 6/01/2006 | 1.4 |
| 8/06/2006 | 1.2 |
| 12/07/2006 | 1.4 |
| 1/18/2007 | 1.7 |
| 4/13/2007 | 5.0 |
| 5/04/2007 | 0.8 |
| 5/08/2007 | 0.4 |

Unfortunately, our surveys did not justify posting of Tank 207 before or after the time frame of the inspection. The gamma levels fluctuate with fresh water replacement of the resin transfer water.

The equivalent tanks located at the Central Processing Plant (CPP) and the Satellites were previously posted Radiation Areas after conformation by past surveys.

**Corrective Actions**

SR-1, Tank 207 was properly posted April 3, 2007 after its discovery during the NRC inspection. The resin transfer water originates from wells in the vicinity of the plant and satellite and/or Reverse Osmosis (RO) purge water. Residual process water is co-mingled with fresh water during resin transfers and ultimately is stored in resin transfer tanks in the plants. A build up of radium in the tanks may ensue depending on the number of transfers and time since the last fresh water replacement. At present, the resin transfer water is replaced with fresh fluids weekly or monthly based on frequency of transfers. The displaced resin transfer water is disposed of through deep disposal well or sprinkler irrigation after Barium treatment for radium removal.

The Safety, Health & Environmental Department will conduct a study comparing gamma values in mR/hr for each resin transfer tank before and after transfers. The information will be analyzed to determine a fresh water replacement rate for the resin transfer water stored in the tanks. A replacement rate based on time or number of transfers would be ideal, but ultimately could result in gamma surveys as the determining factor. The resin transfer tank in the CPP will also receive a build up of fines or sands in the tank bottom resulting in an increase of radium and the associated gamma. The build up of gamma compared to transfers and time will be analyzed for the CPP tank to determine cleaning frequency.

Standard Operating Procedures SOP-2000 (Resin transfer from the trailer – V-column) and SOP-2053 (Cleaning tanks in the plant) will be revised to reflect cleaning requirements determined by the study. These changes will be completed by September, 2007 and fully implemented.

John McCarthy
Manager, Safety, Health & Safety

Arlene Crook
Radiation Safety Officer

cc: B. Mallett, USNRC
P. Michalak USNRC
P. Drummond
C. Foldenauer
File SR-4.6.3.1
S. Collins