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April 11, 2003

Attn: Document Control Desk
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RE: Smith Ranch Project
Docket No.: 40-8964
License No.: SUA-1548
2002 Annual ALARA Audit

Dear Ms. Frant:

In accordance with License Condition 12.2 of the above referenced license, please find enclosed the 2002 ALARA Audit for the Smith Ranch Facility. The audit was conducted on March 25 and 26, 2003. Also, in accordance with License Condition 12.2 please find a copy of the Semi-Annual Effluent and Environmental Monitoring Report for the period July to December 31, 2002.

As discussed with Mr. John Lusher, Project Manager, PRI is hopeful that we can revise and combine this annual NRC submittal to address the combined Smith Ranch – Highland Uranium Project Activities for 2003.

If you have any questions please call me at 307-358-6541, ext. 62.

Sincerely,

A handwritten signature in cursive script that reads "Bill Kearney".

W.F. Kearney
Manager-Health, Safety
& Environmental Affairs

WFK/ksj
enclosure

cc: Mr. Dwight Chamberlain, Director DRSS, Region IV USNRC
Mr. J. Lusher, USNRC Headquarters (addressee only)
S.P. Collings w/o atta
R. Knode w/o atta

File SR 4.6.4.1



NMSS01

**Power Resources, Inc.
Smith Ranch Uranium Project**

ALARA AUDIT REPORT

**For the Year Ending
December 31, 2002**

**USNRC License Number SUA-1548
Docket 40-8964**

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1 Introduction

The Annual ALARA Audit Report for the Smith Ranch in-situ operation, NRC Source Materials License SUA-1548, for the calendar year 2002 is hereby submitted for NRC review in accordance with Performance Based License Condition No. 9.4(e) and 12.2.

The Annual ALARA Audit was conducted by Michael Griffin, Manager of Health, Safety, and Environmental Affairs for Crow Butte Resources, Inc. on March 25 and 26, 2003. The Annual ALARA Audit was prepared with assistance from John McCarthy (past RSO) in data preparation before the audit. Bill Kearney (Power Resources, Inc. Manager of Health, Safety, and Environmental Affairs/CRSO) and Jake Hagar (Radiation Safety Technician) assisted during the audit.

The results of the ALARA review were presented to the ALARA committee members Ralph Knode (General Manager, Operations), Pat Drummond (Superintendent CPP/Maintenance), Mike Bryson (Superintendent Wellfield Operations), William Salisbury (Manager, Land and Administration), and Jake Hagar and Tim McCullough (Radiation Safety Technicians), by Bill Kearney (Manager of Health, Safety, and Environmental Affairs/CRSO) on April 10, 2003. Mike Griffin and Steve Collings, Senior Vice President- Operations were in attendance. Copies of the ALARA summary have also been distributed to corporate management for their review.

1.1 Project Summary

The Smith Ranch Uranium Project continued active uranium mining operations throughout 2002. The Smith Ranch Project initiated commercial operations June 20, 1997. Power Resources Inc. purchased the Smith Ranch Project on July 22, 2002 and is currently in the process of combining operations between the Smith Ranch and Highland Uranium Projects. Future ALARA Audits will likely review operations at the combined facilities. This Annual ALARA Audit follows the format used in the previous 2001 Annual ALARA Audit Report.

2 Employee Exposure Records

2.1 External Exposure

Gamma doses for employees are determined by the analysis of individual dosimeters worn by the employees. Personnel dosimeters are analyzed by an NVLAP-accredited outside contract laboratory. During 2002, all employees working in process areas were included in the dosimetry program.

2002 ALARA Audit Report

Summarized in Table 1 below are the employee quarterly gamma doses by incurred dose ranges. The highest individual external dose during the year was 661 mrem. Based on the exposure rates within the facility, it is not necessary to badge visitors. The individuals receiving greater than 10% of the annual limit during the year worked in the Satellite and Central Processing Plant (CPP). Exposures outside of these restricted areas are less than 10% of the annual limit. Since access to restricted areas is limited, it would not be expected that a visitor would receive the annual dose to the public limit of 100 mrem.

During 2002, it was determined that some personnel, especially those with the highest apparent dose, were not storing their dosimeters with the control badge when the individual was not on shift. This problem had been noted in previous ALARA Audit Reports. Failure to store the individual badge with the control badge resulted in elevated exposures reported for these individuals. Several workers were storing their dosimeters in the CPP Locker Room. These dosimeters were exposed to gamma radiation from CPP facilities when the workers were not at the site. Corrective actions instituted by PRI Management in September and October 2002, consisted of memos written discussing program requirements and signs posted reminding all operators of the importance of properly storing the dosimeter when not in use. Spot checks of the Control Badge Rack assisted in maintaining proper storage of the badges.

The reported fourth quarter 2002 external exposures are lower than the exposures reported for the first three quarters of the year. These lower exposures are apparently a result of proper dosimeter storage. A preliminary review of the fourth quarter 2002 analytical results indicates an average reduction in exposures of approximately 60% for those badges apparently stored at the wrong location. Additional data from the first and second quarter 2003 dosimeter results will be used to complete preliminary findings. A recommendation concerning this item is included in Section 11.3.1.

Table 1
Individual Gamma Dose Per Quarter (mRem)

<i>Period</i>	<i>< 10 mrem</i>	<i>11-29 mrem</i>	<i>30-49 mrem</i>	<i>50*-69 mrem</i>	<i>>70 mrem</i>
1st Qtr.2002	40 (41)	3 (14)	5(4)	5 (2)	11 (7)
2ndQtr.2002	35 (41)	5(6)	10 (9)	0 (4)	9 (6)
3rdQtr.2002	25 (37)	10 (7)	5 (7)	7 (3)	17 (6)
4thQtr.2002	18 (39)	19 (8)	10 (5)	5 (4)	6 (9)

Notes:

1. The corresponding values for 2001 are in parenthesis.
2. All values above 30 mRem can be attributed to individuals working in the CPP or Satellite.

* 50 mrem is 1% of the allowable dose from 10 CFR Part 20.

2.2 Internal Exposure - Uranium

Employee exposure to airborne uranium is determined by a time weighted average method, which uses air particulate sampling data and employees' time in designated areas of the facility, as recommended in USNRC Regulatory Guide 8.30¹ Final exposure results are recorded in DAC-hours. 2,000 DAC-hours will result in a committed dose of 5 Rem, corresponding to the annual dose limit from 10 CFR Part 20.

Table 2 provides the maximum annual DAC-Hours for 2000 through 2002. The DAC-Hours in Table 2 for the years 2000 and 2001 are for a Plant Operator. The maximum exposure in 2002 was for a Dryer Operator at 23.0 DAC-hours. Table 2 also provides the maximum exposure as a percent of the allowable limit (i.e., 2000 DAC-Hours) from 10 CFR Part 20.

Table 2
Maximum Exposure to Airborne Uranium (DAC-Hours)

<i>Employee Category</i>	<i>2000</i>	<i>2001</i>	<i>2002</i>
Plant/Dryer Operator	7.5 (0.3%)	14.5 (0.7%)	23.0 (1.2%)

As is demonstrated in Table 2, employee exposure to airborne uranium continues to be negligible. The maximum exposure for the past three years of commercial operation have been approximately 1% of the allowable limit. The increasing trend over the review period is believed to be due to improved accuracy in the sampling methods.

The minimal exposures due to airborne uranium can be attributed to good housekeeping and personal hygiene, the use of respiratory protective equipment during yellowcake dryer and packaging operations, and an experienced, well-trained work force.

2.3 Internal Exposure - Radon Daughters

Exposure to radon daughters are calculated using the time weighted average format as recommended in USNRC Regulatory Guide 8.30. Exposures are calculated in Working Level Months (WLM) with an annual limit of 4 WLM corresponding to a committed dose of 5 Rem.

¹ US Nuclear Regulatory Commission, Regulatory Guide 8.30, *Health Physics Surveys in Uranium Recovery Facilities*, Revision 1, May 2002.

The total radon exposure summary received by employees during 2002, as compared to 2000 and 2001, is provided in Table 3.

Table 3
Annual Exposure to Radon Daughters (WLM)

<i>Exposure (WLM)</i>	<i>Year 2000</i>	<i>Year 2001</i>	<i>Year 2002</i>
< 0.10 *	82	82	70
0.10 - 0.20	0	8	0
0.21 - 0.30	0	3	0
0.31 - 0.40	0	0	0
> 0.40 *	0	0	0

* 2.5 % of the annual limit (4 WLM)

** 10 % of the annual limit (4 WLM)

As indicated, employee exposure to radon daughters continues to be limited. In 2002, no employees recorded exposures due to radon daughter concentrations in excess of 2.5% of the annual limit.

2.4 Total Effective Dose Equivalent (TEDE)

The overall total effective dose equivalent (TEDE) for the maximally exposed individual during the year 2002 was 0.717 rem, or approximately 14.3% of the annual limit from 10 CFR Part 20. This dose was almost entirely due to external radiation (i.e., gamma dose). As noted in Section 2.1, the reported external exposures are most likely elevated due to improper dosimeter storage by employees. Improved compliance with proper storage requirements should significantly reduce the gamma dose and TEDE for these employees.

3 Bioassay Results

During 2002, three hundred and three (303) bioassay samples were collected. Analytical results were below the detection level for uranium (5 µg/l) in all but ten samples. A written report to file was not required since all ten samples were less than 15 µg/l. In each case, the individuals were contacted and interviewed. A reinforcement of housekeeping and good personal hygiene was relayed to each individual.

The auditor reviewed the bioassay results and determined that all ten individuals with positive bioassay results were involved in drying and packaging operations. Although a

bioassay result in excess of 5 µg/l does not represent a significant internal exposure, the fact that the employees with these results are all engaged in a similar task indicates that there may be areas for improvement in respiratory protection and/or housekeeping and hygiene. A recommendation concerning this item is included in Section 11.3.2.

4 Summary of Inspections

Daily walk through inspections are conducted by the RSO, RST, or trained designee. General housekeeping, proper use and disposal of protective clothing, and ventilation fans are checked during the inspections. There were four hundred and three (403) items noted during inspections in 2002. A review of the inspections indicated there were minimal problems and housekeeping was the only action required.

The RSO's monthly report summarizes the results of health physics activities and environmental monitoring. No major items of concern were noted during the reporting period.

5 Respiratory Protection Program

Respirators are inspected for potential contamination and damage each month. During 2002, there were four hundred and thirty three (433) swipes performed on respirators. Respirators with more than 100 dpm removable alpha contamination are washed by the assigned individual and returned to service. Damaged respirators that cannot be repaired are removed from service.

A recommendation concerning the respiratory protection program implementation is contained in Section 11.3.

6 Training Program Activities

The annual radiation safety and industrial safety refresher training courses were conducted during the first and second quarters of 2002. The training includes a radiation safety review in addition to first aid and industrial safety procedures and rules. The radiation safety staff spent three hundred and thirty-five (335) person-hours presenting radiation safety training during the year for annual radiation refresher and new employee training. Nine (9) person-hours of Radiation Safety Hazard Awareness Training were presented to contractors during the year.

DOT Hazardous Awareness Training is required every three years and most employees were trained in 2001.

7 Radiation Safety Meetings

Ninety-four (94) radiation topics were discussed during weekly safety and staff meetings during 2002.

8 Radiological Survey and Sampling Data

8.1 Occupational Radiological Surveys

8.1.1 Contamination Surveys

There were five thousand seven hundred and seventy-five (5775) surface contamination surveys performed during the review period in both the controlled (i.e., fenced area) and restricted (i.e., CPP and Satellite) areas of the facility. Eating areas, change rooms, laboratories, and offices are surveyed weekly.

Removable contamination exceeding 1,000 dpm/100 cm² requires decontamination in restricted areas outside of the yellowcake/precip areas. During this reporting period, no surveys exceeded the action level.

Personnel exiting the restricted area of the plants are required to perform a survey for alpha contamination. During 2002, twenty-two thousand three hundred and ninety-six (22,396) alpha contamination surveys were logged, for an average of one thousand eight hundred and sixty (1,860) per month. Individuals exceeding the release limit of 1000 dpm are required to decontaminate and re-survey until contamination levels are below the posted limit.

During each quarter, the RSO or designee randomly performs an alpha contamination "spot check" on the personnel present in the controlled area that day. All spot scans performed on individuals exiting the work area during 2002 were below the 1000 dpm limit.

Surveys are performed within waste receptacles in the CPP and dumpsters located on site to verify contaminated materials are not inadvertently leaving the facility. There were one thousand five hundred and forty-four (1,544) alpha or gamma surveys on waste/refuse during the year. No problems were noted during the reporting period.

There were one thousand three hundred and ninety-seven (1,397) alpha and gamma surveys conducted on equipment released from within the restricted or controlled areas of the facility. All equipment released was below the limits stated in "Guidelines for

Decontamination of Facilities and Equipment Prior to Release for Unrestricted Use or Termination of Licenses for Byproduct or Source Materials”.

8.1.2 Gamma Monitoring

Gamma surveys are performed quarterly at various locations within the facility. The results of the 2002 in-plant surveys (inclusive of background) are shown in Table 4. The corresponding average values for each location in 2001 are in parenthesis.

Table 4
2002 In-Plant Gamma Exposure Rates (average mR/hr)

Area ¹	1st 2002	2nd 2002	3rd 2002	4th 2002	Average
1 Pilot	0.08	0.13	0.10	0.10	0.10 (0.04)
2 Pilot	0.49	0.40	0.27	0.19	0.34(0.05)
3 Pilot	0.03	0.03	0.04	0.03	0.03 (0.14)
1 CPP	0.08	0.12	0.12	0.09	0.10 (0.09)
2 CPP	0.36	0.90	1.40	1.40	1.01 (0.47)
3 CPP	0.80	0.70	1.00	0.44	0.74 (0.70)
4 CPP	0.60	0.60	0.80	0.36	0.59 (0.33)
5 CPP	0.36	0.25	1.20	0.80	0.65 (0.47)
6 CPP	0.12	0.14	0.26	0.23	0.19 (0.23)
7 CPP	0.08	0.07	0.14	0.12	0.10 (0.12)
8 CPP	0.08	0.12	0.16	0.11	0.12 (0.11)
9 CPP	0.16	0.09	0.18	0.20	0.16 (0.20)
10 CPP	0.20	0.26	1.00	0.45	0.48 (0.45)
11 CPP	0.34	0.26	0.60	0.26	0.37 (0.34)
12 CPP	0.22	0.36	0.12	0.10	0.20 (0.13)
13 CPP	0.60	0.14	0.13	0.22	0.27(0.08)
14 CPP	0.10	0.40	0.80	0.12	0.36(0.08)
15 CPP	1.40	0.12	0.19	0.16	0.47 (0.57)
1 Sat	0.49	0.49	0.38	0.20	0.39 (0.36)
2 Sat	0.19	0.20	0.61	0.14	0.29 (0.28)

¹Areas are: 1 Pilot - Yellowcake Area, 2 Pilot - plant, 3 Pilot - lab, 4 Pilot - Column Areas, 5 Pilot - Yellowcake Press, 1 CPP through 4 CPP - Injection/column Area, 5 CPP through 9 CPP - Elution Area, 10 CPP and 11 CPP - Thickener Area, 12 CPP through 14 CPP - Dryer Area, and 15 CPP - Yellowcake Storage. 1 Sat- IX column area, 2 Sat- tank area

In addition to the required gamma survey locations, there were one thousand three hundred thirty (1,330) spot gamma surveys conducted during 2002.

8.1.3 Airborne Uranium and Radon Daughters

During 2002, there were three hundred and ninety-three (393) and four hundred and thirty-nine (439) samples taken for airborne uranium and radon daughters, respectively. The average and highest concentrations detected for the period are listed in Table 5. The Satellite was not sampled for airborne natural uranium because sampling is not required by the performance based license and because airborne natural uranium is not expected to be present due to the nature of the process.

Table 5
2002 In-Plant Airborne Radionuclide Concentrations

<i>Parameter</i>	<i>Area</i>	<i>Average</i>	<i>High</i>
<i>Pilot Plant</i>			
Unat (% DAC)	Yellowcake Filter Press Area	0.21	0.54
Unat (% DAC)	General Process Plant	0.26	0.60
Radon Daughters (WL)	CPP	0.01	0.05
<i>Satellite Plant</i>			
Radon Daughters (WL)	General Satellite	0.02	0.26
<i>Central Processing Plant</i>			
U-nat (% DAC)	Yellowcake Filter Press / Dryer	1.48	17.65*
U-nat (% DAC)	CPP	0.27	1.47
Radon Daughters (WL)	CPP	0.01	0.12

* Respiratory protection is required when unloading the dryer or filter press areas and during cleanup.

8.2 Environmental Radiological Surveys

8.2.1 Environmental Gamma Monitoring

Direct gamma radiation is measured using a calibrated survey meter on a quarterly basis at the following locations:

1. Upwind from the CPP;
2. Down-wind from the CPP;
3. Leach tank;
4. East evaporation pond; and
5. West evaporation pond.

The results of the quarterly surveys for 2002 indicate that the gamma values are essentially at background at the first three sites and slightly above background at the evaporation ponds. No significant trends were noted. The data is presented in Table 7. A recommendation concerning this practice is included in Section 11.3.

Table 7
2002 Environmental Gamma Radiation (mR/hr)

<i>Area</i>	<i>1st Qtr.</i> <i>2002</i>	<i>2nd Qtr.</i> <i>2002</i>	<i>3rd Qtr.</i> <i>2002</i>	<i>4th Qtr.</i> <i>2002</i>	<i>Average</i>
Upwind	0.018	0.020	0.021	0.025	0.021
Downwind	0.026	0.024	0.026	0.028	0.026
Leach Tank	0.027	0.027	0.030	0.026	0.028
E. Evaporation Pond	0.028	0.029	0.040	0.069	0.042
W. Evaporation Pond	0.031	0.026	0.035	0.051	0.036

Environmental dosimeters are also used for direct radiation monitoring at environmental stations. The dosimeters are analyzed by a NVLAP-accredited outside contract laboratory. A summary of the environmental direct radiation monitoring results is presented in Table 8.

**Table 8
2002 Environmental Gamma Dose Rates (mR/quarter)**

<i>AREA</i>	<i>1st 2002 mR/Qtr.</i>	<i>2nd 2002 mR/Qtr.</i>	<i>3rd 2002 mR/Qtr.</i>	<i>4th 2002 mR/Qtr.</i>	<i>2002 Average</i>
Dave's WW	43	35	38	34	38
Fence	39	40	45	40	41
Vollman	*	33	35	32	33
Wellfield I	43	40	46	38	42
Evap. Pond	40	38	46	41	41
Wellfield 3	37	35	40	37	37
Wellfield 4	38	37	38	37	38
Wellfield 4A	38	34	39	37	37

Notes:

- The supplied TLD did not contain the Lithium Fluoride chips and a reading could not be obtained.

8.2.2 Environmental Radon Monitoring

Radon monitoring is conducted on a continuous basis using a Track-etch™ cups provided by Landauer. The cups are exchanged on a quarterly frequency for analysis.

**Table 6
2002 Environmental Radon Concentrations (pCi/liter)**

<i>Location</i>	<i>1st Qtr.</i>	<i>2nd Qtr.</i>	<i>3rd Qtr.</i>	<i>4th Qtr.</i>	<i>Average</i>
Dave's WW	1.4	0.4	1.5	1.2	1.1
Controlled Area Boundary Fence	1.8	0.7	2.3	1.6	1.6
Vollman	1.1	0.4	1.3	1.2	1.0

8.2.3 Environmental Air Particulate Monitoring

Continuous air particulate monitoring for radionuclides is performed at three locations:

1. Dave's WW;
2. Vollman Ranch; and

3. The Controlled Area Boundary Fence.

The air sample filters are collected a minimum of once a month. The air sample filters are analyzed by an accredited outside contract laboratory for natural uranium, radium-226, lead-210, and thorium-230. A summary of the environmental air particulate monitoring results is presented in Table 9.

Table 9
2002 Environmental Air Particulate Concentrations ($\mu\text{Ci/ml}$)

Vollman Station (Downwind)

<i>Radionuclide</i>	<i>1st Quarter $\mu\text{Ci/ml}$</i>	<i>2nd Quarter $\mu\text{Ci/ml}$</i>	<i>3rd Quarter $\mu\text{Ci/ml}$</i>	<i>4th Quarter $\mu\text{Ci/ml}$</i>	<i>Average $\mu\text{Ci/ml}$</i>
U^{nat}	1.00E-16	1.00E-16	1.00E-16	1.51E-16	1.13E-16
Th^{230}	1.00E-16	1.00E-16	1.00E-16	1.00E-16	1.00E-16
Ra^{226}	1.00E-16	1.00E-16	1.00E-16	1.00E-16	1.00E-16
Pb^{210}	3.75E-15	8.55E-15	9.06E-15	6.98E-15	7.08E-15

Dave's WW Station (Upwind-Background Location)

<i>Radionuclide</i>	<i>1st Quarter $\mu\text{Ci/ml}$</i>	<i>2nd Quarter $\mu\text{Ci/ml}$</i>	<i>3rd Quarter $\mu\text{Ci/ml}$</i>	<i>4th Quarter $\mu\text{Ci/ml}$</i>	<i>Average $\mu\text{Ci/ml}$</i>
U^{nat}	1.00E-16	1.00E-16	1.00E-16	1.40E-16	1.10E-16
Th^{230}	1.00E-16	1.00E-16	1.00E-16	1.00E-16	1.00E-16
Ra^{226}	1.00E-16	1.00E-16	1.00E-16	1.00E-16	1.00E-16
Pb^{210}	4.74E-15	8.61E-15	1.11E-14	4.66E-15	7.28E-15

Fence Line Station

<i>Radionuclide</i>	<i>1st Quarter $\mu\text{Ci/ml}$</i>	<i>2nd Quarter $\mu\text{Ci/ml}$</i>	<i>3rd Quarter $\mu\text{Ci/ml}$</i>	<i>4th Quarter $\mu\text{Ci/ml}$</i>	<i>Average $\mu\text{Ci/ml}$</i>
U^{nat}	1.00E-16	2.64E-16	4.44E-16	1.96E-16	2.51E-16
Th^{230}	1.00E-16	1.00E-16	1.00E-16	1.00E-16	1.00E-16
Ra^{226}	1.00E-16	1.00E-16	1.00E-16	1.00E-16	1.00E-16
Pb^{210}	3.04E-15	7.74E-15	1.19E-14	3.32E-15	6.50E-15

The results of the environmental air particulate monitoring confirm no measurable impact from the Smith Ranch facility on nearby air quality. The majority of the results are at or below the detection levels for the specific radionuclides (i.e., 1.00E^{-16} $\mu\text{Ci/ml}$ natural

uranium, $1.00E^{-16}$ $\mu\text{Ci/ml}$ Thorium-230, $1.00E^{-16}$ $\mu\text{Ci/ml}$ Radium-226, and $2.00E^{-15}$ $\mu\text{Ci/ml}$ Lead-210). A comparison of concentrations that were above the detection level showed normal seasonal fluctuations that were comparable with those noted at the background monitoring location.

8.3 Transportation Surveys

There were seventeen (17) yellowcake shipments made during the year with one thousand eight hundred seventy nine (1879) associated alpha and gamma surveys. One thousand six hundred eighty four (1684) scans were performed on yellowcake drums before their release for shipment.

There were fifty-three (53) barren and pregnant resin shipments made from the CPP and Satellite with one thousand five hundred thirty-seven (1537) associated alpha and gamma surveys.

There were no incidents associated with any radiological shipment.

9 Reports of Overexposure

There were no overexposures during the reporting period.

10 Operating Procedures

With the purchase of Rio Algom's holdings in July of 2002 by Power Resources, Inc., the review and merger of Standard Operating Procedures between the Smith Ranch and Highland Uranium facilities is on going. Development of a combined program is in progress.

Eighteen (18) RWP's were issued during the report period. Most RWP's were associated with work performed on the Yellowcake Dryers and associated systems. One hundred sixty-four (164) associated samples were collected in connection with the RWP's. No concerns were noted.

11 Conclusions and Recommendations

11.1 Status of the 2001 ALARA Audit Recommendations

The following list details the status of recommendations made by the year 2001 ALARA Committee.

- Continue maintaining high standards in housekeeping.

During the year 2002, Daily Inspections by the Plant Operators and the EHS Department have assisted in maintaining good housekeeping.

The Dryer/Press Area has been washed with a mild Hydrochloric Acid to effectively clean the equipment and area.

- Continue to encourage site personnel to properly store dosimeters when not in use.

Memos were written and signs posted to remind individuals to properly store their dosimeters with the control badge when not in use. Spot checks of the Control Badge Storage Rack are performed by the EHS Department to ensure proper storage. A preliminary assessment of the actions taken indicates a potential reduction of 60% in exposures to badges that were routinely stored in the improper location.

- Continue to stress radiation safety topics at Departmental Safety Meetings and Annual Refresher Training.

94 radiation topics were presented at various safety meetings during the year. Annual Radiation Refresher is given to all employees during the year.

11.2 ALARA Efforts During 2002

The following efforts at maintaining exposures ALARA were noted during 2002:

1. Spot alpha and gamma surveys were performed on personnel and equipment used in the recompletions in Wellfields 3 and 4 in an effort to ensure contamination and exposures were being maintained ALARA. No concerns were noted.
2. Ventilation fans and ductwork were installed at the Resin Shaker Deck in the CPP to aid in the removal of radon during resin transfers.

3. Three non-operational IX Columns located in the Pilot Plant were removed to the Byproduct Storage Area. The removal of the columns has reduced the potential of gamma exposure in the Pilot Plant Area.
4. Alpha scanning is now required prior to entry to the CPP Lunch Room to minimize the potential spread of contamination and accidental ingestion of radioactive materials.

11.3 2002 ALARA Audit Recommendations

As a result of the 2002 ALARA Audit, the following recommendations are made.

11.3.1 Storage of Dosimeters

The improper storage of dosimeters has apparently resulted in recorded doses that are above the actual dose incurred by the individual. The radiation safety staff has taken action in the form of memos reviewing requirements, signs posted at badge storage locations, and spot checks of compliance. These efforts appear to be having some affect based on the reduced doses recorded for the fourth quarter of 2002. However, the auditor noted that this item was also a recommendation on the 2000 and 2001 ALARA Audit Reports. Efforts to ensure proper storage of dosimeters when not in use should continue. Spot checks of badge storage locations and disciplinary action for repeat offenders should be considered to ensure that the recent improvement in compliance continues.

11.3.2 Bioassays

The ten individuals with positive bioassay results were involved in drying and packaging operations. Although a bioassay result in excess of 5 $\mu\text{g}/\text{l}$ does not represent a significant internal exposure, the fact that the employees with these results are all engaged in a similar task indicates that there may be areas for improvement in respiratory protection and/or housekeeping and hygiene. The RSO should review the proper implementation of the respiratory protection program requirements, respiratory equipment selection, and general employee work habits and hygiene to determine whether improvements may be made to the drying and packaging operation radiological protection measures.

11.3.3 Environmental Gamma Surveys

The performance of direct gamma surveys at the environmental monitoring locations is redundant with the concurrent use of environmental dosimeters in these locations. The results from environmental dosimeters are more reliable and useful in this regard. In addition, USNRC Regulatory Guide 4.14 does not recommend direct gamma readings in these locations during operational activities. PRI could consider discontinuing the performance of direct gamma surveys at environmental stations and should review any

other environmental surveys performed with a gamma survey instrument. The results of these surveys using the survey instruments available will provide little meaningful data. However, such a change may require a license amendment from NRC due to commitments made in the License Application.

12 Safety and Environmental Review Panel (SERP) Annual Summary

During the year 2002, ten (10) SERP meetings were convened and completed. Summaries of the SERP actions are as follows:

1. Work Order 576 initiated an Operational Review Committee (ORC)/Safety and Environmental Review Committee (SERP) to review the technical and safety aspects of second completions in Wellfield 3.
2. Work Order 476 and the associated ORC/SERP reviewed technical and safety considerations associated with second completions in Wellfield 4.
3. Work Order 513 and the associated ORC/SERP reviewed the safety aspects of public access to Header houses.
4. Work Order 606 and the associated ORC/SERP reviewed the proposed access road between Smith Ranch and Highland.
5. Work Order 665 and associated ORC/SERP reviewed the safety aspects of transferring resin between Smith Ranch and Highland.
6. Work Order 598 and the associated ORC/SERP reviewed the casing volumes to be pumped from a monitor well before sampling.
7. Work Order 702 and the associated ORC/SERP reviewed the technical and safety aspects of bypassing the Dryer Feed Hoppers and supplying the Dryer directly from the Yellowcake Press.
8. Work Order 594 and the associated ORC/SERP reviewed past exposure data to determine the need to issue dosimeters to all employees and determine which employees require routine internal exposure measurement and records.
9. Work Order 551 and the associated ORC/SERP reviewed the proposal of using a liner and K-packer to repair hole 4P-210.
10. Work Order 557 and the associated ORC/SERP reviewed the technical aspects of the proposed electrical shutdown in header houses to prevent freezing.

Three Work Orders and the associated ORC were reviewed by PRI after the purchase of Smith Ranch and determined that the Work Orders be closed without further actions.

1. Work Order 275 and the associated documentation pertaining to a proposed Potable Water System at Smith Ranch were closed. It was determined that bottled water would continue to be brought to the site for domestic use.
2. Work Order 561 and the associated documentation pertaining to the proposed Restoration Facility were closed. PRI would initiate a ORC/SERP incorporating expertise gained at the Highland Project.

2002 ALARA Audit Report

3. Work Order 501 and the associated documentation pertaining to a proposed in-house Uranium Bioassay Analysis Program. The work order was closed and bioassay samples will continue to be analyzed at an outside lab.
4. Work Order 549 and the associated documentation pertaining to electrical procedures were postponed until the written SOPs from Smith Ranch and Highland are merged.

Revised pages to the License Application are not attached as the combined application for the Smith Ranch and Highland Uranium Projects was submitted to NRC on March 12, 2003. Upon approval, this application will replace the current Smith Ranch application.

13 Land Use Survey

License Condition 12.2 requires that a land use survey map be submitted to NRC. As discussed with NRC Project Manager Mr. John Lusher on April 2, 2003 there is no evidence that the land use (livestock grazing) in the surrounding area has changed from previous periods and the last report. Accordingly, Mr. Lusher confirmed that it is not necessary to submit a map with this report.



Smith Ranch - Highland
Uranium Project
P. O. Box 1210
Glenrock, Wyoming USA 82637
Casper: 307-235-1628
Douglas: 307-358-6541
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February 27, 2003

ATTN: Document Control Desk
Mr. Dan Gillen, Chief
Fuel Cycle Licensing Branch, NMSS
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Smith Ranch Facility
NRC License SUA-1548, Docket No. 40-8964
Semi-Annual Effluent and Environmental Monitoring Report, July 1– December 31, 2002

Dear Mr. Gillen:

In accordance with 10 CFR 40.65 and License Condition No. 11.1 of License SUA-1548, please find enclosed the Semi-Annual Effluent and Environmental Monitoring Report for the Smith Ranch Facility. This report covers the period July 1 through December 31, 2002. A copy of this report is also being forwarded to Mr. Dwight Chamberlain, Director DRSS, Region IV.

If you have any questions regarding the report, please contact me at (307) 358-6541, ext. 62.

Sincerely,

A handwritten signature in black ink that reads 'W.F. Kearney by A. B. Baker'.

W.F. Kearney
Manager-Health, Safety
& Environmental Affairs

WFK/mjh

Enclosure

cc: Mr. Dwight Chamberlain, Director DRSS, Region IV, USNRC
J. Lusher, USNRC Headquarters, (Addressee Only)
S.P. Collings w/atta
R. Knode w/o atta
M.J. Hagar w/o atta
File SR 4.6.4.1



A member of the Cameco group of companies

**POWER RESOURCES, INC.
SEMI-ANNUAL EFFLUENT MONITORING REPORT
SMITH RANCH FACILITY
JULY 1 THROUGH DECEMBER 31, 2002**

NRC - LICENSE SUA-1548, DOCKET 40-8964

**POWER RESOURCES, INC.- SMITH RANCH FACILITY
SEMI-ANNUAL EFFLUENT MONITORING REPORT
JULY 1 THROUGH DECEMBER 31, 2002**

EFFLUENT MONITOR REPORT

The Smith Ranch license, specifically License Condition 11.1, describes the information required to be submitted to the NRC for the effluent and environmental monitoring program for the facility. Accordingly, pursuant to 10 CFR §40.65, License Condition 11.1, and the parameters from Table 5.3 from the March 31, 1988, license application as amended, the effluent and monitoring results for this semi-annual period are herein provided.

I. Commercial Operation Data-Injection Rates, Recovery Rates, Pipeline Pressures, and Injection Manifold Pressures

Presented in the tables below are the average injection rates, recovery rates, pipeline pressures, and injection manifold pressures as required by Condition 11.1.

**Injection and Recovery Rates
(average gallons per minute)**

MONTH	WF#1 PC FLOW	WF#1 IC FLOW	WF#3 PC FLOW	WF#3 IC FLOW	WF#4 PC FLOW	WF#4 IC FLOW	WF#4A PC FLOW	WF#4A IC FLOW
July	250.29	249.03	2397.08	2372.69	1304.44	1297.88	1804.66	1795.58
Aug.	252.79	250.19	2542.80	2533.10	1526.05	1510.33	1799.50	1780.95
Sept.	196.70	194.66	2190.36	2179.91	1379.23	1364.91	1514.10	1498.38
Oct.	211.77	209.52	2316.34	2307.33	1473.53	1457.81	1672.72	1654.88
Nov.	194.42	192.66	2168.44	2158.23	1364.93	1352.57	1644.16	1629.27
Dec.	209.60	208.40	2201.31	2191.37	1474.14	1465.66	1670.92	1661.32

**Pipeline Pressures
(pounds per square inch)**

MONTH	CPP PC PRESSURE	CPP IC PRESSURE	SAT PC PRESSURE	SAT IC PRESSURE
July	76	163	95	63
Aug.	81	167	104	77
Sept.	80	166	108	82
Oct.	82	168	121	90
Nov.	81	162	116	88
Dec.	81	160	117	97

Injection Manifold Pressures
(pounds per square inch)

MONTH	WF#1 INJECTION PRESSURE	WF#3 INJECTION PRESSURE	WF#4 INJECTION PRESSURE	WF#4A INJECTION PRESSURE
July	92	95	122	137
Aug.	88	114	111	137
Sept.	92	116	114	139
Oct.	95	123	118	138
Nov.	90	117	120	140
Dec.	89	121	123	138

*This is the injection pressure at the manifold. Injection pressure at the individual wellhead is less due to pressure loss through manifold system, pipelines and filters.

II. Air Sampling

A. Particulates

Pursuant to License Condition 11.1 and as defined by Table 5.3, air particulates monitoring is performed by continuous air samplers at the nearest downwind residence (Vollman Ranch), downwind of the restricted area boundary (Fence Line), and an upwind "background" location (Dave's Water Well). Monitoring is required to be conducted quarterly. The results from this quarterly monitoring are presented Table 1.

III. Water

A. Groundwater

The groundwater monitoring program requires operating livestock or domestic wells within 1 kilometer of operating wellfields be sampled quarterly for natural uranium and radium-226. Vollman's Pond and Smith Windmill #1 are within 1 kilometer of Wellfield #1 and Smith's Windmill #2 and the Solar Pump are within 1 kilometer of Wellfield #3. There are no livestock or domestic wells within 1 kilometer of Wellfield #4. The results of the quarterly samples for the operating livestock wells are presented in Table 2.

B. Surface Water

The surface water monitoring program requires two (2) samples from Sage Creek and one (1) sample from the outfall of the Treatment Plant. Each is on a quarterly basis. The outfall from the Treatment Plant is not sampled as this facility has not been used for many years. The Sage Creek samples are to be taken upstream and downstream from the restricted areas when flow is available in the creek. During the report period, there was no flow in Sage Creek and therefore, no analytical results are available. There was no flow "Above the Restricted Area during either quarter.

IV. Soil

Soil sampling is conducted annually at the downwind air sampling station (Fence Line). The soil sample was obtained on August 28, 2002 and is comparable to background soil levels and is consistent with previous data.

Soil Sample Result

Location	U _{nat} pCi/g	Ra ₂₂₆ pCi/g	Pb ₂₁₀ pCi/g
Downwind Air Sampling Station (Fence Line)	0.48	1.0	NOT DETECTED

V. Vegetation

Vegetation sampling is performed annually at the downwind air-sampling site (Fence Line). The vegetation sample was obtained on August 28, 2002 and is comparable to background vegetation levels and is consistent with previous data.

Vegetation Sample Result

Location	U _μ Ci/Kg	Ra _{226μ} Ci/ Kg	Th _{230μ} Ci/Kg	Pb _{210μ} Ci/Kg
Downwind Air Sampling Station (Fence Line)	8.2E-4	1.2E-4	1.9E-3	8.0E-4

VI. Direct Radiation

Direct radiation readings are measured on a quarterly basis at the three (3) air monitoring stations, downwind of the evaporation pond, and at each wellfield using dosimeter badges. Provided in the Table 3 are the results from those measurements.

TABLE 1

**SMITH RANCH FACILITY
AIR SAMPLING DATA - 2002**

TABLE 2
SMITH RANCH FACILITY
WATER SAMPLING DATA - 2002
ENVIRONMENTAL MONITORING SITES
3RD & 4TH QUARTERS

SAMPLE LOCATION	SAMPLE DATE	RADIONUCLIDE	CONCENTRATION ($\mu\text{Ci/ml}$)	ERROR EST. +/- ($\mu\text{Ci/ml}$)	L.L.D. ($\mu\text{Ci/ml}$)	EFF. CONC. LIMIT ($\mu\text{Ci/ml}$)	% EFF. CONC. LIMIT
VOLLMAN POND	28-Aug-02	U-Nat Ra-226	DRY DRY			3.0E-07 6.0E-08	N/A N/A
	25-Nov-02	U-Nat Ra-226	DRY DRY			3.0E-07 6.0E-08	N/A N/A
SMITH POND	28-Aug-02	U-Nat Ra-226	DRY DRY			3.0E-07 6.0E-08	N/A N/A
	25-Nov-02	U-Nat Ra-226	DRY DRY			3.0E-07 6.0E-08	N/A N/A
SMITH'S WINDMILL #1	28-Aug-02	U-Nat Ra-226	3.01E-08 1.40E-09	N/A 3.00E-10	2.00E-10 2.00E-10	3.0E-07 6.0E-08	N/A 0.5
	25-Nov-02	U-Nat Ra-226	2.00E-08 7.00E-10	N/A 2.00E-10	2.00E-10 2.00E-10	3.0E-07 6.0E-08	N/A 0.3
SMITH'S WINDMILL #2	29-Aug-02	U-Nat Ra-226	5.49E-08 6.00E-10	N/A 2.00E-10	2.00E-10 2.00E-10	3.0E-07 6.0E-08	N/A 0.3
	25-Nov-02	U-Nat Ra-226	5.28E-08 4.00E-10	N/A 3.00E-10	2.00E-10 2.00E-10	3.0E-07 6.0E-08	N/A 0.5
SOLAR PUMP	28-Aug-02	U-Nat Ra-226	5.62E-09 7.00E-10	N/A 2.00E-10	2.00E-10 2.00E-10	3.0E-07 6.0E-08	N/A 0.3
	25-Nov-02	U-Nat Ra-226	DRY DRY			3.0E-07 6.0E-08	N/A N/A

TABLE 3

**SMITH RANCH FACILITY
DIRECT RADIATION (GAMMA) MEASUREMENT DATA - 2002
ENVIRONMENTAL MONITORING SITES
3RD & 4TH QUARTERS**

SAMPLE LOCATION	SAMPLE PERIOD	EXPOSURE RATE (mR/qtr)	ERROR ESTIMATE (mR/qtr)
FENCE LINE			
Air Station	3rd Quarter	45	2.2
Restricted Area Boundary	4th Quarter	40	1.1
VOLLMAN'S RANCH			
Air Station	3rd Quarter	49	1.6
Downwind Nearest Residence	4th Quarter	32	1.0
DAVE'S WATER WELL			
Air Station	3rd Quarter	38	1.9
Background Site	4th Quarter	34	0.8
WELLFIELD #1			
	3rd Quarter	46	0.9
	4th Quarter	38	2.5
WELLFIELD #3			
	3rd Quarter	40	0.8
	4th Quarter	37	1.5
WELLFIELD #4			
	3rd Quarter	38	1.6
	4th Quarter	37	1.7
WELLFIELD #4A			
	3rd Quarter	39	3.9
	4th Quarter	37	0.7
EVAP. POND			
	3rd Quarter	46	1.6
	4th Quarter	41	1.5