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Smith Ranch-Highland
Operation

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July 25, 2008

Elmo Collins
U.S. Nuclear Regulatory Commission,
Region IV
Texas Health Resources Tower
612 E. Lamar Blvd., Suite 4125
Arlington, Texas 76011-4125

RE: Source Material License SUA-1548, Docket No. 40-8964
Response to NRC Inspection Report 040-08964/08-001

Dear Mr. Collins:

Please find attached Power Resources, Inc dba Cameco Resources' response to the NRC Inspection Report concerning the March 24-27, 2008 inspection at Smith Ranch-Highland, WY.

If you have any questions concerning this submittal please contact me at (307) 358-6541 ext. 46.

Regards,

A handwritten signature in cursive script that reads 'John McCarthy'.

John McCarthy
Manager, Environment, Health and Safety, RSO

cc: D. Mandeville, USNRC

C. Foldenauer

S. Bakken

K. Wenzel

A. Crook

File SR 4.6.4.1

L. Spackman, WDEQ

June 24, 2008

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

RE: Response to NRC Inspection Report 040-08964/08-001 Unresolved Items

Please find below Power Resources Inc. d/b/a Cameco Resources (CR) reply to four unresolved items from the NRC inspection conducted March 24-27 2008.

Unresolved item 040-08964/0801-01 was identified related to uranium recovery operations that have commenced in Mine Unit K and in the Southwest Area. License Condition (LC) 9.13 requires, in part, that the licensee submit a complete evaluation of the area's baseline radiological characteristics for NRC review and approval prior to engaging in uranium recovery operations. The baseline radiological characteristic reports for Mine Unit K and Southwest Area were submitted to the NRC on April 26, 2007 and April 20, 2007, respectively. These reports are currently under review, but have not been formally approved by the NRC. A review of both reports indicates that the field work was performed between January and March 2007, and that uranium recovery operations may have been in progress during sample collection. Additional information is needed from PRI explaining their interpretation of LC 9.13 and outlining the reason why uranium recovery operations commenced prior to obtaining NRC approval. Upon receipt of this information, NRC will determine whether the issue in question is an acceptable item, a deviation, a nonconformance, or a violation.

CR response to unresolved item 040-08964/0801-01

To date no uranium recovery has taken place in Mine Unit 9 (Southwest Area); this item is not applicable to Mine Unit 9 (Southwest Area).

Regarding Mine Unit K, uranium recovery operations were not in progress during sample collection. Baseline soil and gamma surveys were obtained by Western Environmental Services on February 15, 2007. The samples were sent to an independent lab for analysis. In March 2007 the original samples taken February 15, 2007 were retested for 10% quality control purposes. A memo dated May 11, 2007 to the NRC was submitted along with the baseline results of Mine Unit K.

Regarding recovery operations in Mine Unit K, the timeline and our interpretation of Amendment 11 in conjunction with discussions with the NRC Program Manager are outlined below.

Uranium recovery operations had been planned before the amendment was issued. Actions regarding Mine Unit K were discussed between Mr. John McCarthy, CR Manager, Environment, Safety, and Health, and Mr. Paul Michalak, the Smith Ranch-Highland Project Manager, Uranium Recovery Licensing Branch, NRC, in the time periods specified at the same time as those for Reynolds Ranch. The hydrological test report was submitted to the Wyoming Department of Environmental Quality on July 14, 2006 and was discussed with Mr. Michalak. The 2006 Annual Surety Report included Mine Unit K as a proposed project.

Power Resources received Amendment 11, "*Review of Request to Operate the Reynolds Ranch Project In Situ Leach Uranium Recovery Facility – Amendment 11 to Source Material License SUA-1548 (TAC J00127)*" on February 7, 2007. It was CRs interpretation that the intent of the Amendment and License Condition was to provide review of current projects as they proceeded and to ensure baseline characteristics were reviewed and approved prior to proceeding to recovery for future undeveloped areas. This interpretation can be considered validated both by the title for Amendment 11 (noted above) as it specifies Reynolds Ranch and discussions had also included Mine Unit K which was already moving forward. Additionally, the cover letter to Amendment 11 speaks very specifically only to the proposed Reynolds Ranch Project. There were no indications during this time that CR actions in Mine Unit K did not meet the intent of Amendment 11 and NRC requirements.

Unresolved item 040-08964/0801-02 was identified related to the Purge Storage Reservoir 2 (PSR2). The inspectors noted that PSR2 was originally licensed as a holding pond to accept waters that were classified as "unrestricted release" for land application at Irrigator 2. The addition of other waste water streams to PSR2 may be inconsistent with the licensed use originally approved by the NRC for this reservoir. Additional information is needed from PRI that pertains to the exact content of the waste water streams flowing into PSR2. Upon receipt of this information, NRC will determine whether the issue in question is an acceptable item, a deviation, a nonconformance, or a violation.

CR response to unresolved item 040-08964/0801-02

Power Resources, Inc. was issued a new permit, Permit No. 93-410, *Power Resources Satellite #2 Wastewater Holding Pond and Land Application Facility*, to construct PSR2 by the Wyoming Department of Environmental Quality, Water Quality Division, on April 8, 1994. Condition 3 of 11 in that permit includes detailed information submitted by Power Resources on the quality of the wastewater. The wastewater was sampled for As, Ba, B, Cr, Se, Zn, Cl, SO₄, Total Dissolved Solids, Ra226, Ra228, pH, and SAR. As stated in the permit, the wastewater met the class of use limitations for class III groundwater (except for selenium). The waste stream consisted of wellfield purge and

groundwater restoration waters. These consist of wellfield bleed, restoration waters, groundwater sweep, and reverse osmosis waters. The results are analyzed for trends and none have been noted. There is one recent result for uranium that was higher than past results. However, there have been no changes to the wastewater input or any other conditions around PSR2. The wells were sampled again and results will be investigated to determine if the result is representative of conditions.

Unresolved item 040-08964/0801-03 was also identified related to the PSR2. The inspectors noted that there are no leak detection systems in the PSR2 and no baseline water quality data was available for review during the inspection. Additional information is needed from PRI to demonstrate to the NRC that the PSR2 is not leaking into neighboring areas. Upon receipt of this information, NRC will determine whether the issue in question is an acceptable item, a deviation, a nonconformance, or a violation.

Our response to unresolved item **040-08964/0801-03**

Based on our permits, no leak detection systems per se were required or employed. Alternatively, two shallow monitoring wells were installed at the time of construction of PSR 2 with a requirement for annual sampling (later increased to quarterly water level determinations and semi-annual sampling). Baseline water quality sampling was not required; however, the two shallow monitoring wells were installed during initial construction and have been routinely monitored since. Soil samples (at 0-6 inches and 6-12 inches) and vegetation samples were also taken at each of the four quarters of the proposed reservoir prior to construction. In addition, gamma readings were taken with a Micro R Meter at the nodes of a 200 foot by 200 foot grid prior to use of the reservoir. Further information is provided below.

Power Resources, Inc. was issued a new permit, Permit No. 93-410, *Power Resources Satellite #2 Wastewater Holding Pond and Land Application Facility*, to construct PSR2 by the Wyoming Department of Environmental Quality, Water Quality Division, on April 8, 1994. Condition 3 of 11 in that permit includes detailed information submitted by Power Resources on the quality of the wastewater. It was sampled for As, Ba, B, Cr, Se, Zn, Cl, SO₄, Total Dissolved Solids, Ra226, Ra228, pH, and SAR. As stated in the permit, the wastewater met the class of use limitations for class III groundwater (except for selenium). The permit also stated "The issuance of this permit requires the permittee to construct the Satellite 2 Purge Storage Reservoir into existing impervious soils of a thickness designed to prohibit a discharge to any groundwater aquifer or surface waters of the state. Any discharge to a groundwater aquifer or to ground surface occurring as a result of operation of this facility is a violation of this permit. The Water Quality Division believes that the "C Wellfield" monitor wells are situated in such a manner as to detect any class of use violation caused by leakage from the Purge Storage Reservoir."

During the permit application and review process, Power Resources provided information that domestic and stock wells in the area of the proposed facility were not routinely installed to depths less than approximately 200 feet. In addition, it was noted that this

substantiated the premise that shallower sandstone units less than approximately 200 feet deep, if present, do not contain enough water to support domestic or livestock water use.

During the application and review process, it was determined that the two shallow wells (10 to 15 feet deep) would be installed just east of the east dike and just south of the south dike. In addition, sampling was and still is required at least semi-annually for pH, electrical conductivity, Cl, SO₄, HCO₃, Se, B, U, and Ra226 per current WDEQ permit requirements (WDEQ/LQD Permit to Mine No. 603). The results are analyzed for trends and none have been noted. There is one recent result for uranium that was higher than previously. However, there have been no changes to the wastewater input or any other conditions around PSR2. The wells were sampled again and results will be investigated to determine if the result is representative of conditions.

Unresolved item 040-08964/0801-04 was identified related to PRI's use of conversion factor for calculating the weekly soluble uranium (in milligrams) from the total Derived Air Concentration hours. The licensee's staff, when questioned by the inspectors, could not determine where the conversion factor originated. Additional information is needed from PRI to demonstrate that the conversion factor is correct. Upon receipt of this information, NRC will determine whether the issue in question is an acceptable item, a deviation, a nonconformance, or a violation.

CR response to unresolved item **040-08964/0801-04**

The conversion factor is correct as used and its origination and usage is shown below. The value used for the specific activity of natural uranium is 6.84E-4 microcuries/mg (as used in some NIOSH/DOE documents). The calculation could also use the more commonly used specific activity of 6.77E-4 microcuries/mg and the final result for weekly soluble uranium effectively remains the same. To prevent future confusion, we plan to update the spreadsheet to use and display the calculations in a more logical manner. In the meantime, explanations of the calculations to determine the total Derived Air Concentration (DAC) hours and weekly soluble uranium have been added to the spreadsheets and users of the spreadsheet have been trained on their origination.

The calculation to determine exposure in DAC hours in a week is shown in Equation 1.

$$\text{DAC-hrs in a week} = \frac{C \times t}{5E-10} \quad \text{Equation 1}$$

where

C = airborne concentration to which the worker is exposed (microcuries/ml)

t = duration of exposure during a week (hrs)

5E-10 = nonstochastic DAC for natural uranium (microcuries/ml)

The calculation showing the origination of the conversion factor is shown in Equation 2.

$$\text{Conversion Factor (mg U /DAC-hrs)} = \frac{60 \times 2E4 \times 5E-10}{6.84E-4} = 0.877 \quad \text{Equation 2}$$

where

60 = minutes in an hour

2E4 = volume of air breathed per minute by a worker in a minute (ml)

6.84E-4 = specific activity of natural uranium (microcuries/mg)

5E-10 = nonstochastic DAC for natural uranium (microcuries/ml)

Equation 3 uses the results from Equations 1 and 2 to calculate the weekly soluble uranium (in milligrams).

$$\text{weekly soluble uranium in mg} = \text{DAC-hrs in a week} \times 0.877 \quad \text{Equation 3}$$

where

0.877 = conversion factor (mg U/DAC-hrs)