



UNITED STATES  
NUCLEAR REGULATORY COMMISSION  
WASHINGTON, D.C. 20555-0001

August 7, 2015

Mr. Larry McGonagle  
Cameco Resources  
550 North Poplar Street, Suite 100  
Casper, WY 82601

SUBJECT: SECOND REQUEST FOR ADDITIONAL INFORMATION, AIRBORNE EFFLUENT AND ENVIRONMENTAL MONITORING PROGRAM FOR THE SMITH RANCH HIGHLAND URANIUM IN SITU RECOVERY FACILITY, CONVERSE, JOHNSON, CAMPBELL, AND NATRONA COUNTIES, WYOMING, LICENSE SUA-1548 (TAC J00635)

Dear Mr. McGonagle:

By letter dated April 21, 2015, Power Resources, Inc., doing business as Cameco Resources (Cameco), submitted to the U.S. Nuclear Regulatory Commission (NRC) staff a response to a request for additional information (RAI) related to the renewal of Source Material License SUA-1548 (Agencywide Documents Access and Management System ML15147A440). This RAI response, in part, provided information on Cameco's airborne effluent and environmental monitoring program. Specifically, the response to RAI 45 provided information on Cameco's proposed methods for air monitoring and compliance with 10 CFR 20.1302. The NRC staff has accepted the response to RAI 45 for a detailed technical review. During our technical review of Cameco's response to RAI 45, the NRC staff identified certain areas of deficiency for which we are requesting additional information. The NRC staff's RAI is enclosed herein. Please either respond to this RAI or provide a schedule for submitting your responses within 30 days of receipt of this letter.

The NRC staff is evaluating Cameco's response to RAI 45 as a separate action from the remainder of the April 21, 2015, RAI response as this is a continuation of our efforts to understand Cameco's airborne effluent and environmental monitoring program as it relates to verifying compliance with 10 CFR 20.1301 and 10 CFR 20.1302. These efforts were described in our March 14, 2014 letter (ML13347B121) to which Cameco responded with a letter dated June 24, 2014 (ML14178A063). We will continue with our review of the remainder of Cameco's April 21, 2015 response to NRC staff's RAI for the renewal of Source Material License SUA-1548 and communicate the results of that review to you at later date.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter will be available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records component of NRC's Agencywide Documents Access and Management System (ADAMS). ADAMS is accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

L. McGonagle

2

If you have any questions, please contact me at (301) 415-0724, or by e-mail at [Douglas.Mandeville@nrc.gov](mailto:Douglas.Mandeville@nrc.gov).

Sincerely,

**/RA/**

Douglas T. Mandeville, Project Manager  
Uranium Recovery Licensing Branch  
Division of Decommissioning, Uranium Recovery,  
and Waste Programs  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 40-8964

License No.: SUA-1548

Enclosure: Request for Additional Information

cc: M. Bennett, WDEQ

L. McGonagle

2

If you have any questions, please contact me at (301) 415-0724, or by e-mail at [Douglas.Mandeville@nrc.gov](mailto:Douglas.Mandeville@nrc.gov).

Sincerely,

**/RA/**

Douglas T. Mandeville, Project Manager  
Uranium Recovery Licensing Branch  
Division of Decommissioning, Uranium Recovery,  
and Waste Programs  
Office of Nuclear Material Safety  
and Safeguards

Docket No.: 40-8964  
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cc: M. Bennett, WDEQ

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**U.S. Nuclear Regulatory Commission  
Second Request for Additional Information, RAI 45  
Power Resources Inc. dba Cameco Resources (Cameco) Smith Ranch Project Technical  
Review of the License Renewal Application  
For Source Material License SUA-1548**

The purpose of the following Request for Additional Information (RAI) is to provide the additional information and data that are necessary for the U.S. Nuclear Regulatory Commission (NRC) to review Power Resources, Inc. dba Cameco Resources (Cameco) (the "Licensee") response to RAI 45 (Cameco, 2015).

**RAI 1:**

**Description of Deficiency**

The staff cannot complete its evaluation of NUREG-1569, Acceptance Criteria 4.1.3(2) and 5.7.7.3(1) for radon releases from the Smith Ranch Central processing plant (CPP), Highland Central Processing Facility (CPF) and satellite facilities.

**Basis for Request**

NUREG-1569, Acceptance Criteria 4.1.3(2) and 5.7.7.3(1) refer, in part, to the As Low As Reasonably Achievable (ALARA) aspects of Regulatory Guide (RG) 8.37. RG 8.37 states, in part, "When practicable, releases of airborne radioactive effluents should be from monitored release points (e.g., monitored stacks, discharges, vents) to ensure that the magnitude of such effluents is known with a sufficient degree of confidence to estimate public exposure."

In Section 7.3.3.5.1 of the revised Technical Report (TR) (Cameco, 2015) Cameco stated that only tanks that are considered to be significant sources of radon emissions will be sampled.

The staff requires additional clarification of Cameco's proposed radon monitoring program for the Smith Ranch CPP, Highland CPF and satellite facilities.

**Request for Additional Information**

Please provide the following information:

- A. Please provide a list of tanks that have the potential to contain significant sources of radon and that will be included in the sampling program.
- B. Please describe how radon daughter activity will be addressed for all radon sources originating from the Smith Ranch CPP, Highland CPF and satellite facilities.
- C. Please provide drawings that details current tank vent connections so that staff can verify radon sampling points or indicate where this can be found in the application.

Enclosure

- D. Please provide assumptions for air flow through open doors and justification for disregarding this pathway if applicable.

**RAI 2:**

Description of Deficiency

The staff cannot complete its evaluation of NUREG-1569, Acceptance Criteria 4.1.3(2) and 5.7.7.3(1) for radon releases from the header houses.

Basis for Request

NUREG-1569, Acceptance Criteria 4.1.3(2) and 5.7.7.3(1) refer, in part, to the ALARA aspects of RG 8.37. RG 8.37 states, in part, "When practicable, releases of airborne radioactive effluents should be from monitored release points (e.g., monitored stacks, discharges, vents) to ensure that the magnitude of such effluents is known with a sufficient degree of confidence to estimate public exposure."

In Section 7.3.3.5.1 of the revised TR (Cameco, 2015), the licensee stated that radon concentrations in air released from the header houses will be based on four production and four restoration header houses monitored with Track Etch cups. The average radon emission per header house will be attributed to the remaining operational header houses in each group.

The staff requires additional clarification of Cameco's proposed radon monitoring program for the header houses.

Request for Additional Information

Please describe how radon daughter activity will be addressed for radon sources originating from the header houses.

**RAI 3:**

Description of Deficiency

The staff cannot complete its evaluation of NUREG-1569, Acceptance Criteria 4.1.3(2) and 5.7.7.3(1) for radon releases from the wellfield.

Basis for Request

NUREG-1569, Acceptance Criteria 4.1.3(2) and 5.7.7.3(1) refer, in part, to the ALARA aspects of RG 8.37. RG 8.37 states, in part, "When practicable, releases of airborne radioactive effluents should be from monitored release points (e.g., monitored stacks, discharges, vents) to ensure that the magnitude of such effluents is known with a sufficient degree of confidence to estimate public exposure."

In addition, RG 8.37 states, in part, "If a licensee has release points for which monitoring is not practicable, the licensee should estimate the magnitude of the unmonitored effluents" and

“When practicable, unmonitored effluents should not exceed 30% of the total estimated effluent releases.”

In Section 7.3.3.5.1 of the revised TR (Cameco, 2015), the licensee stated that the amount of radon released from the production wells is minor compared to the quantity released from the Central Processing Plant/Satellites and the header houses.

Regarding spills, the licensee stated that the radon concentration will be based on an estimate using MILDOS.

The staff requires additional clarification of Cameco’s proposed radon monitoring program for the wellfield.

Request for Additional Information

- A. Consistent with RG 8.37, please provide an estimate of the radon released from the production wellheads to account for this source.
- B. Regarding spills, is the assumption that all radon in the spilled production fluid is released (100%) or is a smaller amount assumed?

**RAI 4:**

Description of Deficiency

The staff cannot complete its evaluation of NUREG-1569, Acceptance Criteria 4.1.3(5).

Basis for Request

10 CFR 20.1301(a) requires, in part, that each licensee shall conduct operations so that the total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem in a year.

NUREG-1569, Acceptance Criteria 4.1.3(5) recommends that the application demonstrates that the operations will be conducted so that all airborne effluent releases are ALARA.

In Section 5.10.1 of the revised TR (Cameco, 2015), the licensee stated that environmental monitoring station AS-2 represents the highest potential exposure to a member of the public while environmental monitoring station AS-3 represents the nearest downwind resident.

Request for Additional Information

Please describe who, or what group, is the maximally exposed member of the public for compliance purposes. Please provide an analysis that incorporates likely exposure times for those individuals or group of individuals.

**RAI 5:****Description of Deficiency**

The staff cannot complete its evaluation of the licensee's proposed methodology for factoring in radon-222 (radon) progeny into analyzing potential public dose from operations consistent with 10 CFR 20.1302.

**Basis for Request**

10 CFR 20.1301(a) requires, in part, that each licensee shall conduct operations so that the total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem in a year.

A year is defined in 10 CFR 20.1003 as the period of time beginning in January used to determine compliance with 10 CFR Part 20.

In Section 7.3.3.5.1 of the revised TR (Cameco, 2015), the licensee stated that the annual radon concentration at the receptor will be determined by calculating the average net radon concentration at the receptor location.

**Request for Additional Information**

Please describe the time period that background concentrations of radon will be collected to derive average net radon concentrations at the receptor location. If the time period for the background measurements of radon is not concurrent with operational monitoring results, please provide justification for this approach.

**RAI 6:****Description of Deficiency**

The staff cannot complete its evaluation of the licensee's proposed methodology for factoring in radon-222 (radon) progeny into analyzing potential public dose from operations consistent with 10 CFR 20.1302.

**Basis for Request**

10 CFR 20.1301(a) requires, in part, that each licensee shall conduct operations so that the total effective dose equivalent to individual members of the public from the licensed operation does not exceed 0.1 rem in a year.

In Section 7.3.3.5.1 of the revised TR (Cameco, 2015), the licensee stated that an alternate approach to measuring net radon concentrations at a receptor location is to utilize release rates for radon from all source terms at the facility and to use this information as input into the MILDOS-AREA atmospheric dispersion code to calculate a dose at a receptor location.

The NRC staff previously determined (NRC, 2014a, 2014b) that using calculations and models with no monitoring results to support either is not sufficient to demonstrate compliance with public dose limits.

In addition, the NRC staff observes that FSME Interim Staff Guidance FSME-ISG-01, *Evaluations of Uranium Recovery Facility Surveys of Radon and Radon Progeny in Air and Demonstrations of Compliance with 10 CFR 20.1301*, Revised Draft Report for Comment (NRC, 2014c) recommends that when radon is measured at release points and a model is used to calculate a dose to a receptor that "...NRC staff should ensure that the licensee has measured (or the licensee commits to measuring) radon or radon progeny in air to provide validation that regulatory limits are not exceeded."

#### Request for Additional Information

Please provide a description of measurements of radon or radon progeny in air to ensure the dose to members of the public do not exceed regulatory limits for this alternate approach.

#### Administrative Issue

1. On page 7-27 of the revised TR under the "Wellfield" heading (Cameco, 2015), the applicant referred to the reporting of radon released from Crow Butte. This appears to be an incorrect reference. Please correct the facility name as appropriate.

#### References

Cameco, 2015. Letter from L. McGonagle, Cameco Resources, to U.S. NRC, Cameco Resources' Response to U.S. Nuclear Regulatory Commission Request for Additional Information for License Renewal of Cameco Resources Smith Ranch-Highland Uranium Project Source Materials License SUA-1548 (TAC J00635), April 21, 2015, ADAMS Accession No. ML15147A440.

NRC, 2014a. Letter from A. Persinko, NRC, to M. Thomas, Uranerz Energy Corporation, "Safety Evaluation Report, Nichols Ranch ISR Project, License Amendment, License Conditions 12.7 through 12.14, Source Materials License SUA-1597, April 15, 2014, ADAMS Accession No. ML14087A244.

NRC, 2014b. Letter from R. Linton, NRC, to S. Schierman, Uranium One USA, Inc., "Denial of Acceptance for Review, Information Required by License Condition 11.3, Uranium One USA, Inc., Willow Creek Project, Campbell and Johnson Counties, Wyoming, Materials License SUA-1341 (TAC No. J00711), November 12, 2014, ADAMS Accession No. ML14295A668.

NRC, 2014c. U.S. NRC, FSME Interim Staff Guidance FSME-ISG-01, *Evaluations of Uranium Recovery Facility Surveys of Radon and Radon Progeny in Air and Demonstrations of Compliance with 10 CFR 20.1301*, Revised Draft Report for Comment, March 2014, ADAMS Accession No. ML13310A198. Published for comment March 27, 2014 (79 FR 17194).