February 2, 2012

Mr. Josh Leftwich Cameco Resources Smith Ranch-Highland Uranium Project P.O. Box 1210 Glenrock, WY 82637

SUBJECT: LICENSE AMENDMENT NO. 17 - 2011-2012 FINANCIAL ASSURANCE

UPDATE FOR SMITH RANCH HIGHLAND URANIUM PROJECT, SOURCE MATERIAL LICENSE SUA-1548 (TACs J00514, J00611, J00615, J00630)

Dear Mr. Leftwich:

By letters dated December 20, 2010, January 28, 2011, June 30, 2011, and August 8, 2011, Power Resources, Inc. (PRI), doing business as Cameco Resources (Cameco) submitted its annual financial assurance updates to the U.S. Nuclear Regulatory Commission (NRC) staff for the Ruth, North Butte, Smith Ranch – Highland, and Gas Hills facilities, respectively. Collectively, these facilities are referred to as the Smith Ranch Highland Uranium Project and operate under NRC Source Material License SUA-1548. In response to comments from the Wyoming Department of Environmental Quality (WDEQ), Cameco submitted revised financial assurance estimates for Smith Ranch – Highland and Gas Hills on October 13, 2011, and October 31, 2011, respectively.

These updates seek to increase the financial assurance amount for the Smith Ranch Highland Uranium Project to a total of \$224,949,573. This increase is based on several factors, including: development of new mine units; increase in the number of pore volumes required for restoration from six to nine; increased plugging and abandonment costs for exploration and delineation borings; installation of additional deep disposal wells; retrofitting of mine units for restoration; changes in unit costs; and adjustments for project management, overhead, contract profit, project contingency, and inflation.

The NRC staff has reviewed the financial assurance update in accordance with License Condition 9.5, consistent with Criterion 9 of Appendix A to Part 40 of Title 10 of the Code of Federal Regulations (10 CFR Part 40, Appendix A). Based on its review, the NRC staff has reasonable assurance that the current financial assurance estimate of \$224,949,573 will be adequate to complete groundwater restoration and decommissioning activities at the facility. The NRC staff's review is documented in the enclosed Safety Evaluation Report (SER) (Enclosure 1). The SER concludes that sufficient information is available to support the reasonable assurance finding by the staff.

The SER also identifies several items where additional information would provide further clarity to the financial assurance estimate. Based on its review of the information in the update request, the NRC staff believes that any changes to the financial assurance estimate as a result of this additional information would be minor and these potential changes do not constitute a significant risk to public health and safety. Cameco should address the identified issues in the next financial assurance update for the facility.

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License Amendment No. 17 is also enclosed (Enclosure 2).

This licensing action meets the categorical exclusion provision for administrative changes in 10 CFR Part 51.22(c)(10)(i). Therefore, no further environmental review is required for this action.

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

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

Sincerely,

/RA/

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

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

Enclosures:

Safety Evaluation Report for Financial Assurance Review
 Amendment No. 17 to Source Materials License SUA-1548

cc: P. Rothwell, WDEQ G. Mooney, WDEQ M. Moxley, WDEQ J. Leftwich 2

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

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1. Safety Evaluation Report for Financial Assurance Review

2. Amendment No. 17 to Source Materials License SUA-1548

cc: P. Rothwell, WDEQ G. Mooney, WDEQ M. Moxley, WDEQ

CLOSES TACS J00514, J00611, J00615, J00630

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SAFETY EVALUATION REPORT 2011-2012 FINANCIAL ASSURANCE UPDATE FOR SMITH RANCH HIGHLAND URANIUM PROJECT GLENROCK, WYOMING

Docket No.: 40-8964

License No.: SUA-1548

Date: January 25, 2012

Facility: Smith Ranch-Highland Uranium Project

Technical Reviewers: Douglas T. Mandeville

Roman Przygodzki

Project Manager: Douglas T. Mandeville

SUMMARY AND CONCLUSIONS:

By letters dated December 20, 2010, January 28, 2011, June 30, 2011, and August 4, 2011, Power Resources, Inc. (PRI), doing business as Cameco Resources (Cameco) submitted its annual financial assurance updates to U.S. Nuclear Regulatory Commission (NRC) staff for the Ruth, North Butte, Smith Ranch – Highland, and Gas Hills facilities, respectively. These facilities all operate under source materials license SUA-1548. In response to comments from the Wyoming Department of Environmental Quality (WDEQ), Cameco submitted revised financial assurance estimates for Smith Ranch – Highland and Gas Hills on October 13, 2011 and October 31, 2011, respectively.

These updates seek to increase the financial assurance amount for the Smith Ranch Highland Uranium Project to a total of \$224,949,573. This increase is based on several factors, including: development of new mine units; increase in the number of pore volumes required for restoration from six to nine; increased plugging and abandonment costs for exploration borings; installation of additional deep disposal wells; retrofitting of mine units for restoration; changes in unit costs; and adjustments for project management, overhead, contract profit, project contingency, and inflation.

The NRC staff has reviewed the financial assurance update in accordance with License Condition 9.5, consistent with Criterion 9 of Appendix A to Part 40 of Title 10 of the Code of Federal Regulations (10 CFR Part 40, Appendix A). Based on its review, the NRC staff has reasonable assurance that the current financial assurance estimate of \$224,949,573 will be adequate to complete groundwater restoration and decommissioning activities at the facility. This Safety Evaluation Report (SER) concludes that sufficient information is available to support the reasonable assurance finding by the staff.

This SER also identifies several items where additional information would provide further clarity to the financial assurance estimate. Based on its review of the information in the update request, the NRC staff believes that any changes to the financial assurance estimate as a result of this additional information would be minor and these potential changes do not constitute a significant risk to public health and safety. Cameco should address the identified items in the next financial assurance update for the facility.

Note that as a result of permitting changes with WDEQ, the Reynolds Ranch permit area has been incorporated into the Smith Ranch portion of the facility. As a result, there is no longer a separate financial assurance estimate for the Reynolds Ranch satellite. Additionally, the costs to plug and abandon deep disposal well SRHUP#10 have been incorporated into the Smith Ranch portion of the facility. Therefore, there is no longer a separate financial assurance estimate for deep disposal well SRHUP#10. These changes are reflected in the proposed license conditions at the end of this SER.

TECHNICAL REVIEW

License Condition (LC) 9.5 of source material license SUA-1548 reads, in part, as follows:

The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criterion 9, adequate to cover the estimated reclamation and closure costs, if accomplished by a third party, for all existing operations and any planned expansions or operational changes for the upcoming year. Reclamation includes all cited activities and groundwater restoration, as well as off-site disposal of all 11e.(2) byproduct material.

The NRC staff reviewed the components of the submitted financial assurance cost estimate to verify that it includes the activities that would be required during reclamation and closure of the facility. The NRC staff also reviewed the unit costs to verify that they represent the costs that would be incurred by a third party to complete reclamation and closure. Detailed discussion for the financial assurance increases for each portion of the site follows below.

Ruth

Cameco does not plan development or operational activities at the Ruth satellite during the next year (Cameco, 2010). The current financial assurance estimate includes costs for decommissioning, demolition, and disposal of the existing building and evaporation pond at the site that remain from research and development activities. The increase in the cost estimate to \$183,000 reflects changes to unit costs (Cameco, 2010).

The NRC staff reviewed the estimate for the Ruth satellite and determined that the cost estimate does include the range of activities necessary to decommission, reclaim, and close the site. The NRC staff observes that Cameco used either guidance from WDEQ Guideline 12, "Standardized Reclamation Performance Bond Format and Cost Calculation Methods," or actual costs to develop the cost estimate. As no commercial scale uranium recovery activities have occurred at Ruth, the cost estimate does not include groundwater restoration costs. This is acceptable to the NRC staff, provided that activities at Ruth remain developmental. The NRC staff will need to approve an updated estimate that includes groundwater restoration costs prior

to injection of lixiviant at the Ruth satellite. For the reasons identified above, the NRC staff determined that Cameco has provided adequate justification for the current financial assurance estimate at the Ruth satellite facility. Therefore, the NRC staff has reasonable assurance that the financial assurance estimate is sufficient and accepts Cameco's estimate for the Ruth satellite.

North Butte

Cameco plans to initiate development activities related to Mine Unit 1 at the North Butte satellite in the near future. Therefore, the financial assurance estimate has been updated to \$8,518,000 and includes the following items (Cameco, 2011a and Cameco, 2011b):

- Well plugging and abandonment of 481 wells in Mine Unit 1.
- Surface reclamation activities in Mine Unit 1.
- Abandonment of a deep disposal well.
- Reclamation of seven header houses in Mine Unit 1.
- Reclamation and decommissioning of the satellite plant and related evaporation ponds.
- Offsite disposal of byproduct material at an appropriately licensed facility.

The NRC staff reviewed the estimate for the North Butte satellite and determined that the cost estimate does include the range of activities necessary to decommission, reclaim, and close the site. The quantities included in Cameco's estimate are consistent with NRC staff's knowledge of the site. The NRC staff observes that Cameco used either guidance from WDEQ Guideline 12 or actual costs to develop the cost estimate. As Cameco plans to initiate development activities, the NRC staff observes that the largest component of the increase in the cost estimate results from the plugging and abandonment of the exploration wells in Mine Unit 1. This is acceptable to the NRC staff, provided that activities at North Butte remain developmental. The NRC staff will need to approve an updated estimate that includes groundwater restoration costs prior to injection of lixiviant at the North Butte satellite. For the reasons identified above, the NRC staff determined that Cameco has provided adequate justification for the current financial assurance estimate at the North Butte satellite facility. Therefore, the NRC staff has reasonable assurance that the financial assurance estimate is sufficient and accepts Cameco's estimate for the North Butte satellite.

Smith Ranch - Highland

The Smith Ranch – Highland facility is currently operating and producing dried yellowcake. Cameco has revised the financial assurance estimate for 2011-2012 to a total of \$212,774,773. The estimate includes \$120,044,303 for the Smith Ranch portion of the facility and \$92,730,470 for the Highland portion of the facility (Cameco, 2011c and Cameco, 2011d). The financial assurance estimate includes the following items:

• An increase in the amount of pore volumes required for groundwater restoration from 6 to 9. This increase was made to better reflect the amount of effort required to restore groundwater at the facility.

- Adjustment of the restoration period for each mine unit to reflect the size of the mine unit instead of basing the costs on a fixed restoration period.
- The addition of capital costs to increase groundwater restoration capacity. The
 capital costs are intended for items such as additional deep disposal wells, reworking
 of existing deep disposal wells, a selenium treatment plant, and additional reverse
 osmosis units.
- Retrofitting of existing mine units prior to initiation of groundwater restoration activities.
- New mine units that are being developed and expected to come on-line in the near future
- Plugging and abandonment costs for the new mine units and additional deep disposal wells.
- Surface reclamation activities in the new mine units.
- Adjustments in the unit and labor costs for many of the items in the estimate. The licensee used either guidance from WDEQ Guideline 12 or actual costs to develop the cost estimate.
- Corrections to the mine unit area, completed thickness, number of wells, flare factor, and porosity to reflect the observed conditions in the field.

The NRC staff reviewed the estimate for the Smith Ranch – Highland facility and determined that the cost estimate does include the range of activities necessary to restore, decommission, reclaim, and close the site. The NRC staff finds that the cost estimate reflects the known asbuilt conditions (i.e., number of wells, size, depth, completed thickness, etc.) of the mine units that have been installed or are planned for installation in the near future. The NRC staff observes that the estimate includes costs to address spills at the wellheads and other known spill locations. The estimate also includes costs to complete groundwater restoration at the facility. For these reasons, the NRC staff determined that Cameco has provided adequate justification for the current financial assurance estimate at the Smith Ranch - Highland facility. Therefore, the NRC staff has reasonable assurance that the financial assurance estimate is sufficient and accepts Cameco's estimate for the Smith Ranch – Highland Facility.

Gas Hills

The Gas Hills satellite facility is not currently operating (Cameco, 2011e and Cameco, 2011f). Cameco's activities at the Gas Hills satellite facility are focused on exploratory drilling. The updated financial assurance estimate of \$3,473,800 includes costs for decommissioning, demolition, and disposal of the existing buildings that are present at the site. These activities represent the largest component of the cost estimate. The estimate also includes costs to plug and abandon the existing monitoring wells and delineation drilling bore holes at the site (Cameco, 2011e and Cameco, 2011f).

The NRC staff reviewed the estimate for the Gas Hills satellite facility and determined that the cost estimate does include the range of activities necessary to reclaim and close the site. The NRC staff observes that Cameco has not included groundwater restoration costs for the Gas Hills satellite. This is acceptable to the NRC staff, provided that activities at Gas Hills remain developmental. The NRC staff will need to approve an updated estimate that includes

groundwater restoration costs prior to injection of lixiviant at the Gas Hills satellite. The NRC staff determined that the quantities included in Cameco's cost estimate (i.e., number of wells, depth of wells, size of buildings, etc.) are consistent with its knowledge of the site. The NRC staff observes that Cameco used either guidance from WDEQ Guideline 12 or actual costs to develop the cost estimate. For these reasons, the NRC staff determined that Cameco has provided adequate justification for the current financial assurance estimate at the Gas Hills satellite facility. Therefore, the NRC staff has reasonable assurance that the financial assurance estimate is sufficient and accepts Cameco's estimate for the Gas Hills satellite.

CLARIFICATION ITEMS FOR FUTURE COST ESTIMATE SUBMISSIONS

Common Items (apply to all estimates)

Item 1:Estimate to include the costs for U.S. Nuclear Regulatory Commission (NRC)related decommissioning, decontamination, and restoration activities (License Condition 9.5)

License Condition 9.5 to Source Materials License SUA-1548, in part, requires:

The licensee also must ensure that the surety, where authorized to be held by the State, identifies the NRC-related portion of the surety and covers the above-ground decommissioning and decontamination, the cost of offsite disposal of 11e. (2) byproduct material, soil and water sample analyses, and groundwater restoration associated with the site.

In this regard, to further refine the future cost estimate the licensee should separately state NRC and WDEQ costs, regardless of any overlap. The NRC staff recommends that Cameco review the cost estimate and identify separate NRC and WDEQ costs, regardless of any overlap.

Item 2:Labor overhead, contractor profit (License Condition 9.5, NUREG-1569, Appendix C)

License Condition 9.5 to Source Materials License SUA-1596, in part, requires:

The licensee shall maintain an NRC-approved financial surety arrangement, consistent with 10 CFR 40, Appendix A, Criterion 9, adequate to cover the estimated reclamation and closure costs, if accomplished by a third party, for all existing operations and any planned expansions or operational changes for the upcoming year...Along with each proposed revision or annual update of the surety, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation, maintenance of a minimum 15 percent contingency...

NUREG-1569 states that "[o]verhead costs for labor and equipment and contractor profit may be calculated as separate items or loaded into hourly rates...[i]f included in hourly rates, the unit costs must identify the percentages applied for each area....All costs (unit and total) are to be estimated on the basis of third party, independent contractor costs (include overhead and profit in unit costs or as a percentage of the total)."

The submitted cost estimates include line items for contractor profit, overhead, contractor profit, and contingency with one percentage amount. The NRC staff recommends that Cameco clarify its subsequent decommissioning cost estimates to differentiate between overhead, contractor profit, and contingency.

Item 3:Credit for salvage value (NUREG-1569, Appendix C)

NUREG-1569 states that "[c]redit for salvage value is generally not acceptable in the estimated costs." The NRC staff recommends that Cameco clearly identify whether or not a credit for salvage value is taken in its subsequent cost estimates.

Items specific to the Ruth estimate

Item 1:Well plugging cost estimate

The Well Plugging and Abandonment table identifies three wells that require plugging. The table also reports the wells' depth has a range of 500 to 1,000 feet. The cost estimate assumes an average depth of 550 feet, which does not appear to be consistent with the range of well depth. The NRC staff recommends that Cameco clarify the well depth assumption used in its next cost estimate.

Item 2:Computations in the Building Demolition and Disposal table

The building demolition and disposal table presents costs of demolition and disposal on a perbuilding basis. The next to last line of the table provides the subtotal of the demolition and disposal costs per building. The NRC staff observes that the sum of these subtotals does not appear to equal the bottom-line cost stated at the end of the table. Additionally, the volume computations appear to underestimate the building volume. The NRC staff recommends that prior to its next cost estimate submission Cameco review its tables to ensure that the arithmetic is accurately shown.

Items specific to the North Butte estimate

Item 1:Spreadsheet calculations

The NRC staff identified several calculations in the spreadsheet that should be better stated to avoid any impression of potential inconsistencies. For example:

- In the Building Demolition and Disposal sheet, labor and equipment costs in connection with surveying components after an HCI acid wash do not appear to be included in the estimate.
- In the Building Demolition and Disposal sheet, decontamination costs, the area of the wall and floor to be decontaminated are provided in square feet; however, the unit cost for the acid wash is provided as \$0.971 per square foot for the wall and \$0.44 per gallon for the floor.
- In the Building Demolition and Disposal sheet, the NRC staff did not arrive at the same number for the volume of the satellite building for disposal.

- Part III.D.3: The calculation in "Converted C&D waste volume to tons" appears to make reference to "Cost per well cover," rather than "Total Volume (cy)".
- Part III.D.3: "Subtotal Disposal Costs" does not appear to multiply the waste volume (in tons) by the waste disposal rate, and does not appear to include the transportation costs.
- Part V.C.3: It is unclear whether "Seeding/Disking" costs are included in "Header House Reclamation Costs per Wellfield."
- The well abandonment unit cost calculations (cost per foot of well) do not appear to include the cost of the 1,250 gallon water tank.
- The delineation surface unit cost calculations (cost per well) do not appear to include the "Site Locating" cost.
- The Miscellaneous Reclamation sheet states that the topsoil unit cost is \$1.09 per cubic yard. However, this unit cost appears to correspond to the costs for moving materials at one way distance of 1,000 feet at a 0 percent grade (see Master Costs Sheet).

The NRC staff requests that prior to submitting its next cost estimate Cameco review these calculations and ensure that they are clearly and accurately stated.

<u>Items specific to the Smith Ranch estimate</u>

Item 1: Basis or explanation for unit costs, calculations, references, assumptions (Appendix C of NUREG-1569, LC 9.5)

LC 9.5 requires, in part, that the cost estimate provide supporting documentation, showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation. NUREG-1569 states that "[u]nit costs, calculations, references, assumptions, equipment and operator efficiencies, et cetera, must be provided." The NRC staff observes that the cost estimate contains numerous: (1) unit costs; and (2) assumptions and activities, which should be better identified.

With respect to unit costs, the following items should be better identified:

- Numerous unit costs contained in the tables called "Electrical Costs," "Chemical Costs,"
 "Analytical Costs," Landfill disposal rates, "Cost to Refurbish Mine Units," and "Seeding Unit Costs" in the "MasterCosts" sheet:
- Mechanical Integrity Test (MIT) costs for the Deep Disposal Wells (DDWs) in the "UC-MIT" sheet;
- "RO Maintenance Costs" in the "UC-RO BIO Chem" sheet;
- Natural gas and propane costs in the "UC-Heating Costs" sheet;
- Most unit costs in the "UC-WA" sheet;
- Annual cost of "Infrastructure, Equipment Maintenance, Replacement and Repairs" in the "Misc Rec" sheet, Section VI; and,
- WDEQ Guideline 12 unit costs relied in various sheets do not appear to be consistent with the most recent WDEQ Guideline 12.

With respect to assumptions and activities, the following items should be better described:

- Ft³/day, Ft/day, Pumps/day, Ft³/day, and Number of Days in the "Equip" sheet Sections I.A.1, I.B, I.C.1, I.D.1, and I.E, respectively;
- No void space factor is identified for excavated soils in the "WF Rec" sheet;
- Labor and equipment costs in connection with surveying components after an HCl acid wash do not appear to be included in the "Bldgs" sheet;
- No costs identified in the "Misc Rec" sheet for the removal, transportation and disposal of the Settling Pond liner;
- Which cell(s) in the DDW sheet provide the "DDW PD Injection Pump" as referenced in the "UC-Electrical Power" sheet; and,
- The heights of the buildings in the "BLDGS" sheet.

The NRC staff recommends that prior to its next cost estimate submission Cameco clearly identify or describe the items identified above.

Item 2: Estimated Bioremediation Costs (LC 9.5)

LC 9.5, in part, states that the cost estimate must be "adequate to cover the estimated reclamation and closure costs, if accomplished by a third party... includ[ing] all cited activities and groundwater restoration." Both the current and prior financial assurance cost estimates state that the bioremediation portion of the estimate is for "information only" and that "data [is] being compiled." The NRC staff recommends that PRI clarify whether it intends to rely on bioremediation in its future cost estimates.

Item 3:Explanation for revisions to unit costs, figures and assumptions (NUREG-1569, Appendix C)

License Condition 9.5 to Source Materials License SUA-1548, in part, requires that for "each proposed revision or annual update of the surety, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates" (emphasis added). NUREG-1569 states that "[u]nit costs, calculations, references, assumptions, equipment and operator efficiencies, et cetera, must be provided." In this regard, the NRC staff has identified several assumptions that should be more clearly explained in Cameco's next cost estimate submission. These assumptions are identified in the list below.

- In the "GW Rest" sheet, Section II, "Reverse osmosis Costs," the Bleed to Deep Disposal well was decreased from 25% to 20% for some mine units;
- In the "GW Rest" Sheet, Section V, "Monitoring and Sampling Costs," many figures decreased for several wellfields (e.g., number of wells, groundwater sweep duration, reverse osmosis duration, number of samples);
- In the "WA" Sheet, for several mine units, the number of production, injection and monitoring wells have changed;
- In the "WF Rec" sheet, the number of header houses for MU-27 dropped to zero;
- In the "WF Rec" sheet, for many mine units, the number of production wells, injection wells, number of production wells with pumps, pump volume per wellfield, number of

- production wells with tubing, number of injection wells with tubing, total number of wellheads, and others, decreased;
- In the "WF Rec" sheet, Section IV.C, PRI previously stated that it would ship such waste
 to an NRC licensed facility, however the current sheet states that it will ship waste to a
 landfill facility;
- In the "WF Rec" sheet, Section V.C, PRI previously stated that it would dispose such waste on-site, however the current sheet states that it will ship waste to a landfill facility;
- In the "Equip" sheet, the number of tanks at Reynolds was decreased to zero;
- In the "BLDGS" sheet, many figures for "DDW Reynolds Buildings" have been decreased significantly (e.g., areas to be decontaminated, demolition cost, volume for disposal, disposal cost, and electricity costs);
- In the "BLDGS" sheet, electricity costs for DDW 1 and DDW 10 have decreased significantly;
- In the "UC-GWS DDW" sheet, the increase in pumping capacity should be justified, as it, in part, leads to a decrease in the unit costs of disposal per 1,000 gallons decreased, in part, due to increased pumping capacity;
- In the UC-Equipment Costs, it is unclear whether the costs referenced are up-to-date;
 and
- In the Master Costs sheet, both waste disposal rates associated with the disposal of byproduct material are lower than last year's rates.

Item 4:Verify/revise calculations (Appendix C of NUREG-1569, LC 9.5)

LC 9.5 requires, in part, that the cost estimate provide supporting documentation, showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation. NUREG-1569 states that "[u]nit costs, calculations, references, assumptions, equipment and operator efficiencies, et cetera, must be provided." Below is a list of calculations for which the breakdown and basis of the costs should be better delineated.

- In the "WF REC" sheet, the total chipped volume of buried trunkline does not appear to include the chipped volume of 3" HDPE trunkline;
- In the "UC-WFBLDGS" sheet, "Cost per header house" appears to only include the costs associated with one hour of labor of a radiation technician;
- In the "EQUIP" sheet,
 - Section I.A.2, it appears that the rate includes 8 hours for a crane with operator but only 1 hour for a loader;
 - Section I.C.1, the unit cost of equipment per day is zero for the CPP;
 - Section I.C.1, it appears that the rate relied on for the CPP is not the rate that includes overhead and profit;
 - Section II.B, the Bone Yard lists 30 cubic feet of steel pipe for disposal, however Section I.B does not list any footage of steel pipe;
 - Section II.B, CPP, lists 296 cubic feet of steel pipe for disposal, however, this figure is inconsistent with that of Section I.B;
- In the "BLDGS" sheet.
 - Many Subtotals to not appear to include the costs associated with "CPP Lab Addition," and "DDW 7 Buildings." For instance, "Total Decontamination Costs,"
 "Total Demolition Costs," "Total Disposal Costs";

- Heating costs appear to be omitted for Reynolds Ranch, but appear to be discussed and calculated in the "UC-Heating Costs" sheet;
- In the Miscellaneous Reclamation sheet.
 - "Total CPP/Office/Yard Area Reclamation" does not appear to include the costs of "Gravel Road Base Removal Costs";
 - "Total Miscellaneous Structures Reclamation Costs" does not appear to include
 "Subtotal O2 Pad CPP Costs," and "Subtotal O2 Pad MU-15 Costs";
- In the "GW Rest" sheet, the following subtotals do not appear to include the costs
 associated with mine Unit 8: "Total Ground Water Sweep," "Total Reverse Osmosis
 Costs," "Total Reverse Osmosis Costs [with Chemical Reductant]," "Total MIT Costs,"
 "Total Monitoring and Sampling Costs," and "Total Ground Water Restoration Costs";
- In the "WA" Sheet, "Production, Injection and Perimeter Well Average Depth" and "Total Mine Unit Well Depth (ft), production wells" do not appear to include Mine Units 27, 21, 7 and 8 in their respective formulas; and,
- In the "WF-Sat-Surf" sheet, several subtotals do not appear to include costs associated with Mine Unit 8: "Total Wellfield Area Reclamation Costs," and "Total Wellfield Laydown Area Reclamation Costs."

The NRC staff recommends that in its subsequent cost estimate submissions Cameco review these calculations to ensure that the breakdown and basis for the costs are fully stated and verified.

LC 9.5 requires, in part, that the cost estimate provide supporting documentation, showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation. NUREG-1569 states that "[u]nit costs, calculations, references, assumptions, equipment and operator efficiencies, et cetera, must be provided." Below is a list of calculations that should be better explained in Cameco's future cost estimate submissions:

- The "Air Exchange" and "Building BTU/hr" calculations in the "UC-Heating Costs" sheet;
- "Tank Volume" In the "Misc Rec" sheet;
- "Wellfield Pumping Electrical Costs per 1,000 Gallons," "Wellfield Pumping Labor Costs per 1,000 Gallons," "Plant of Satellite to DDW or Irrigator No. 2 Pumping Electrical Costs per 1,000 gallons," and "DDW Pumping Costs per 1,000 Gallons" in the "UC-RO Bio Chem" sheet;
- "Wellfield Pumping Electrical Costs per 1,000 Gallons," and "Reverse Osmosis/Bioremediation Electrical Costs Per 1,000 Gallons" In the "UC-RO Bio Chem" sheet; and,
- RO Feed Pump and Decar/Re-injection Pump in the "UC-Electrical Power."

Items specific to the Highland estimate

Item 1:Basis or explanation for unit costs, calculations, references, assumptions (Appendix C of NUREG-1569, LC 9.5)

LC 9.5 requires, in part, that the cost estimate provide supporting documentation, showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation. NUREG-1569 states that "[u]nit costs, calculations, references, assumptions, equipment and

operator efficiencies, et cetera, must be provided." The NRC staff observes that the cost estimate contains numerous: (1) unit costs; and (2) assumptions and activities for which the breakdown and basis of the costs should be better stated.

With respect to unit costs, the following items should be clearly identified in any subsequent cost estimate submission:

- Number of years of operation and cost of operation with respect to the Selenium Plant stated in the "GW Rest" sheet:
- Well Sealing unit cost stated in the "WA" sheet, Section V.A;
- Numerous unit costs contained in the tables called "Electrical Costs," "Chemical Costs,"
 "Analytical Costs," Landfill disposal rates, "Cost to Refurbish Mine Units," and "Seeding Unit Costs" in the "MasterCosts" sheet;
- Sampling costs, contaminated soil volumes, and verification testing stated in the "MISC REC" sheet, Section IV.A, Section IV.B, and Section IV.F, respectively;
- No void space factor is identified for contaminated soil removal in the "MISC REC" sheet, Section IV.B.1 and Section XIII;
- Mechanical Integrity Test (MIT) costs for the Deep Disposal Wells (DDWs) in the "UC-MIT" sheet;
- "RO Maintenance Costs" in the "UC-RO BIO Chem" sheet:
- Natural gas costs in the "UC-Heating Costs" sheet;
- Annual cost of "Infrastructure, Equipment Maintenance, Replacement and Repairs in the "Misc Rec" sheet, Section XII; and,
- WDEQ Guideline 12 unit costs relied in various sheets do not appear to be consistent with the most recent WDEQ Guideline 12.

With respect to assumptions and activities, the following items should be clearly described in any subsequent cost estimate submission:

- In the "Equip" sheet, a basis was not provided for Ft³/day, Ft/day, Pumps/day, Ft³/day, and Number of Days for Sections I.A.1, I.B, I.C, I.D, and I.E, respectively;
- In the "WF Rec" sheet, a basis was not provided for not including a void space factor for excavated soils:
- In the "Bldgs" sheet, labor and equipment costs in connection with surveying components after an HCl acid wash do not appear to be included;
- In the "UC-WA" sheet, most of the unit costs do not have a clear basis (e.g., do not identify the source of the unit cost);
- In the "UC-Electrical Power" sheet, several sections state that "DDW PD Injection Pump" costs are "in DDW disposal cost," but it is unclear which cell(s) in the DDW sheet references these costs; and.
- In the "BLDGS" sheet, Section II, the heights of the building should be included as an assumption or known value.
- In the "MISC REC" sheet, Section X, a basis was not provided for the estimated \$2,400,000 cost associated with "potential mitigation plan for shallow well casing leak investigation."

The NRC staff recommends that prior to submitting its next cost estimate Cameco review these calculations to ensure that the unit costs and assumptions and activities are clearly stated.

Item 2: Estimated Bioremediation Costs (LC 9.5)

LC 9.5, in part, states that the cost estimate must be "adequate to cover the estimated reclamation and closure costs, if accomplished by a third party... includ[ing] all cited activities and groundwater restoration." Both the current and prior financial assurance cost estimates state that the bioremediation portion of the estimate is for "information only" and that "data [is] being compiled." The NRC staff requests PRI clarify whether it intends to rely on bioremediation in its future cost estimates.

Item 3:Explanation for revisions to unit costs, figures and assumptions (NUREG-1569, Appendix C)

License Condition 9.5 to Source Materials License SUA-1548, in part, requires that for "each proposed revision or annual update of the surety, the licensee shall submit supporting documentation showing a breakdown of the costs and the basis for the cost estimates" (emphasis added). NUREG-1569 states that "[u]nit costs, calculations, references, assumptions, equipment and operator efficiencies, et cetera, must be provided." In this regard, the NRC staff has identified several assumptions that should be better explained in any subsequent cost estimate. These assumptions are identified in the list below.

- In the "GW Rest" Sheet, Section VII, "Monitoring and Sampling Costs," many figures decreased for several wellfields (e.g., number of wells, groundwater sweep duration, reverse osmosis duration, number of samples);
- In the "GW Rest" Sheet, Section VIII, "Supervisory Labor Cost," the active restoration period decreased for several wellfields;
- In the "WA" Sheet, for several mine units, the number of production, injection and monitoring wells decreased;
- In the "WF Rec" sheet, for many mine units, the number of production wells, injection wells, number of production wells with pumps, pump volume per wellfield, number of production & monitor wells with tubing, and others, decreased;
- In the "WF Rec" sheet, Section IV.C, PRI previously stated that it would ship such waste to an NRC licensed facility, however the current sheet states that it will ship waste to a landfill facility;
- In the "WF Rec" sheet, Section V.C, PRI previously stated that it would dispose such waste on-site, however the current sheet states that it will ship waste to a landfill facility;
- In the "UC-GWS DDW Se Treat," the increase in pumping capacity should be justified, as it leads to a decrease in some unit costs;
- In the UC-Equipment Costs, it is unclear whether the costs are up-to-date; and,
- In the Master Costs sheet, both waste disposal rates associated with the disposal of byproduct material are lower than last year's rates.

Item 4: Verify/revise calculations (Appendix C of NUREG-1569, LC 9.5)

LC 9.5 requires, in part, that the cost estimate provide supporting documentation, showing a breakdown of the costs and the basis for the cost estimates with adjustments for inflation. NUREG-1569 states that "[u]nit costs, calculations, references, assumptions, equipment and operator efficiencies, et cetera, must be provided." Below is a list of calculations for which the breakdown and basis of the costs should be better identified:

- In the "UC-WFBLDGS" sheet, "Cost per header house" appears to only include the costs associated with one hour of labor of a radiation technician;
- In the "UC-DECON" sheet, "Manlift Rental" appears to be only the hourly rate, and thus does not appear to be a monthly rate;
- In the "EQUIP" sheet, Section I.B lists 2,000 feet of steel pipe but does not calculate its volume in Sections I.B and II.B;
- In the "WA" Sheet, the totals for "Production, Injection and Perimeter Well Average Depth," "Total Mine Unit Well Depth (ft), production wells," and "Total Mine Unit Well Depth (ft), all others" do not include Mine Units F, H, I and J in their respective formulas.
- The "Air Exchange" and "Building BTU/hr" calculations in the "UC-Heating Costs" sheet could not be verified;
- RO Feed Pump and Decar/Re-injection Pump in the "UC-Electrical Power" could not be verified:
- "Wellfield Pumping Electrical Costs per 1,000 Gallons," "Wellfield Pumping Labor Costs per 1,000 Gallons," "Plant or Satellite to DDW Electrical Costs per 1,000 gallons," and "DDW Pumping Costs per 1,000 Gallons" in the "UC-GWS DDW Se Treat" sheet could not be verified;
- "Wellfield Pumping Electrical Costs per 1,000 Gallons," and "Reverse Osmosis/Bioremediation Electrical Costs Per 1,000 Gallons" in the "UC-RO Bio Chem" sheet could not be verified; and,
- One cell in the "BLDGS" sheet, Section III.B.1, includes "Volume of Building" for the calculation of "Volume for Disposal (cy)."

The NRC staff recommends that prior to submitting its next cost estimate Cameco review these calculations to ensure that the unit costs and assumptions and activities are clearly stated.

Items specific to the Gas Hills estimate

The NRC staff has not identified additional items for clarification related to the Gas Hills estimate.

PROPOSED LICENSE CONDITIONS

Cameco proposed the following license conditions by email dated December 8, 2011 (Cameco, 2011g). Cameco has proposed updating the dollar amounts to reflect the current estimate, changing the term "instrument" to "instrument(s)" so that it would be possible to use more than one financial assurance instrument, and removing the paragraphs addressing the Reynolds Ranch satellite facility and deep disposal well SRHUP#10. The Reynolds Ranch satellite facility has been incorporated into the Smith Ranch license area by WDEQ. The Smith Ranch financial

assurance estimate has been re-adjusted to include the Reynolds Ranch and deep disposal well SHHUP#10 costs. Therefore, these paragraphs are no longer necessary. The NRC staff concurs with the proposed changes.

LC 9.5

Power Resources, Inc., shall continuously maintain an approved surety instrument(s) for the Smith Ranch Project, in favor of the State of Wyoming, in the amount of no less than \$120,044,303.0014,456,300.00 for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Wyoming and the NRC.

The licensee shall continuously maintain an approved surety instrument(s) for the Highland Uranium Project in the amount of no less than \$92,730,470.0021,278,100.00, in favor of the State of Wyoming, for the purpose of complying with 10 CFR 40. Appendix A, Criterion 9. until a replacement is authorized by both the State of Wyoming and the NRC.

The licensee shall continuously maintain an NRC-approved surety instrument(s) for the current non-operational Ruth facility in the amount of no less than \$183,000.00181,000.00, in favor of the State of Wyoming, until a replacement is authorized by both the State of Wyoming and the NRC.

The licensee shall continuously maintain an NRC-approved surety instrument(s) for the current non-operational North Butte facility in the amount of no less than \$8,518,000.00442,000.00 in favor of the State of Wyoming, until a replacement is authorized by both the State of Wyoming and the NRC.

The licensee shall continuously maintain an NRC-approved surety instrument(s) for the current non-operational Gas Hills Project facility in the amount of no less than \$3,473,800.001,944,000.00 in favor of the State of Wyoming, until a replacement is authorized by both the State of Wyoming and the NRC.

The licensee shall continuously maintain an approved surety instrument for the current non-operational Reynolds Ranch ISL satellite facility in the amount of no less than \$3,331,600.00, in favor of the State of Wyoming, for the purpose of complying with 10 CFR 40, Appendix A, Criterion 9, until a replacement is authorized by both the State of Wyoming and the NRC.

The licensee shall continuously maintain an NRC-approved surety instrument for deep disposal well SRHUP#10 at the Smith Ranch facility in the amount of no less than \$172,700.00 in favor of the State of Wyoming, until a replacement is authorized by both the State of Wyoming and the NRC.

REFERENCES

Cameco Resources, Inc. (2011a), letter to U.S. Nuclear Regulatory Commission Re: 2011-2012 Annual Surety Update for North Butte Satellite Facility, License SUA-1548, dated January 28, 2011. [ADAMS Accession No. ML110330258]

Cameco Resources, Inc. (2011b), letter to U.S. Nuclear Regulatory Commission Re: Updates to 2011-2012 Surety Estimate for North Butte Satellite Facility, License SUA-1548, dated October 7, 2011. **[ADAMS Accession No. ML11313A107]**

Cameco Resources, Inc. (2011c), letter to U.S. Nuclear Regulatory Commission Re: 2011-2012 Annual Surety Update for Smith Ranch Highland Facility, License SUA-1548, dated June 30, 2011. **[ADAMS Accession No. ML11193A116]**

Cameco Resources, Inc. (2011d), letter to U.S. Nuclear Regulatory Commission Re: Updates to Surety Estimate for Smith Ranch-Highland, License SUA-1548, dated October 13, 2011. **[ADAMS Accession No. ML11291A030]**

Cameco Resources, Inc. (2011e), letter to U.S. Nuclear Regulatory Commission Re: 2011-2012 Annual Surety Update for Gas Hills Satellite Facility, License SUA-1548, dated August 4, 2011. **[ADAMS Accession No. ML11222A038]**

Cameco Resources, Inc. (2011f), letter to Wyoming Department of Environmental Quality Re: Revised Bond Estimate and 2011 Proposed Additional Exploration Gas Hills ISR Project, License SUA-1548, dated October 31, 2011. **[ADAMS Accession No. ML11311A270]**

Cameco Resources, Inc. (2011g), email from J., Leftwich to D. Mandeville re: Proposed license condition language for Smith Ranch financial assurance update, dated December 8, 2011. [ADAMS Accession No. ML113470018]

Cameco Resources, Inc. (2010), letter to U.S. Nuclear Regulatory Commission Re: 2010-2011 Annual Surety Update for Ruth Satellite Facility, License SUA-1548, dated December 20, 2010. **[ADAMS Accession No. ML103620717]**