UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION IV
1600 E. LAMAR BLVD
ARLINGTON TX 76011-4511

April 3, 2017

EA-16-262
EA-16-156

Mr. Brent Berg, President
Cameco Resources
Power Resources, Inc.,
550 N Poplar St.
Casper, WY 82601

SUBJECT: NRC INSPECTION REPORT 040-08964/2016-003

Dear Mr. Berg:

This letter refers to the U.S. Nuclear Regulatory Commission (NRC) routine inspection conducted from November 15-17, 2016, at the Smith Ranch uranium recovery facility, in Converse County, Wyoming. The inspection also included review of information provided by your staff subsequent to the on-site portion of the inspection. The purpose of the inspection was to review your transportation program and your response to the transportation incident associated with a leaking intermodal container from an exclusive use barium sulfate sludge shipment to the Energy Fuel Resources' White Mesa Mill in Blanding, Utah, on March 28, 2016. Energy Fuel Resources reported the leaking container to the State of Utah on March 29, 2016, and the state subsequently contacted the NRC. The NRC issued a Confirmatory Action Letter (CAL), EA-16-156 (Agencywide Documents Access and Management System (ADAMS) Accession ML16238A359), on August 30, 2016. The enclosed report presents the results for this inspection. The inspectors discussed the preliminary inspection findings with members of your staff on November 17, 2016, at the conclusion of the onsite portion of the inspection. A final exit meeting was conducted telephonically on March 2, 2017, with you and members of your staff to discuss the results of the inspection. An additional discussion was held with members of your staff on March 13, 2017, to clarify an apparent violation characterization.

The announced inspection included an examination of activities conducted under your license as they relate to public health and safety, and to confirm compliance with the Commission's rules and regulations and the conditions of your license. Within these areas, the inspection consisted of an examination of selected procedures and representative records, observations of activities, and interviews with personnel.

Based on the results of this inspection, nine apparent violations were identified and are being considered for escalated enforcement action in accordance with the NRC Enforcement Policy. The current Enforcement Policy is included on the NRC Web site at http://www.nrc.gov/about-nrc/regulatory/enforcement/enforce-pol.html. The apparent violations involved: (1) the failure to accurately assess the activity of pond sediment and barium sulfate sludge waste shipments; (2) the failure to adequately report the total activity for waste and resin shipments on the associated shipping documents; (3) the failure to accurately label waste shipment packages;

(4) the failure to classify and ship the waste packages as Low Specific Activity level two (LSA-II) material; (5) the failure to ship LSA-II waste material in appropriate containers; (6) the failure to ensure by examination or appropriate tests that packages were proper for the contents to be shipped and closure devices were properly secured; (7) the failure to perform evaluations or perform tests that ensured the transportation package would be capable of withstanding the effects of any acceleration and vibration normally incident to transportation; (8) the failure to provide the name of each radionuclide listed and an accurate chemical description of contents; and (9) the failure to provide function specific training to a hazmat employee concerning the requirements that are specifically applicable to the functions the employee performed.

The circumstances surrounding the apparent violations, the significance of the issues, and the need for lasting and effective corrective actions were discussed with your staff at the conclusion of the onsite portion of the inspection and with you and members of your staff during a telephonic conference conducted March 2, 2017.

Additionally, based on the results of this inspection, the NRC will not be closing CAL EA-16-156 at this time. The commitments documented in your CAL response (ML16357A774) were partially completed and the following items remain to be completed: (1) revision of facility procedures, (2) completion of employee training, and (3) obtain a complete IP-2 certification package containing the testing specifications. The NRC plans to review the remaining CAL commitments during the next inspection or review the status of the remaining open items if you choose to send a supplemental response to the CAL.

In addition, since your facility has not been the subject of escalated enforcement actions within the last 2 years, and based on our understanding of your corrective actions, a civil penalty may not be warranted in accordance with Section 2.3.4 of the Enforcement Policy. The final decision will be based on you confirming on the license docket that the corrective actions previously described to the NRC staff have been, or are being taken.

Before the NRC makes its enforcement decision we are providing you with the opportunity to (1) respond, in writing, to the apparent violations addressed in this inspection report within 30 days of the date of this letter; or, (2) request a Predecisional Enforcement Conference (PEC). If a PEC is held, it will be open for public observation. If you decide to participate in a PEC, please contact Mr. Ray Kellar, Chief, Fuel Cycle and Decommissioning Branch, at (817) 200-1191 within 10 days of receipt of this letter to notify us of your intentions. A PEC should be held within 30 days of the date of this letter.

If you choose to provide a written response, it should be clearly marked as a “Response to an Apparent Violation in NRC Inspection Report 040-08964/2016-003; EA-16-262,” and should include for each apparent violation: (1) the reason for the apparent problem or violation, or if contested, the basis for disputing the apparent violation; (2) the corrective steps that have been taken and the results achieved; (3) the corrective steps that will be taken; and (4) the date when full compliance will be achieved. Your response may reference or include previously documented correspondence, if the correspondence adequately addresses the required response. Additionally, your response should be sent to the U.S. Nuclear Regulatory Commission, ATTN: Document Control Center, Washington, DC 20555-0001, with a copy to Mark Shaffer, Director, Division of Nuclear Materials Safety, U.S. Nuclear Regulatory Commission, Region IV, 1600 East Lamar Blvd., Arlington, TX 76011-4511, within 30 days of the date of this letter. If an adequate response is not received within the time specified or an extension of time has not been granted by the NRC, the NRC will proceed with its enforcement decision or schedule a PEC.

If you choose to request a PEC, the conference will afford you the opportunity to provide your perspective on these matters and any other information that you believe the NRC should take into consideration before making an enforcement decision. The decision to hold a PEC does not mean that the NRC has determined that a violation has occurred or that enforcement action will be taken. This conference would be conducted to obtain information to assist the NRC in making an enforcement decision. The topics discussed during the conference may include information to determine whether a violation occurred, information to determine the significance of a violation, information related to the identification of a violation, and information related to any corrective actions taken or planned. In presenting your corrective actions, you should be aware that the promptness and comprehensiveness of your actions will be considered in assessing any civil penalty for the apparent violations. The guidance in NRC Information Notice 96-28, "Suggested Guidance Relating to Development and Implementation of Corrective Action," may be helpful. You can find an updated excerpt from NRC Information Notice 96-28 on the NRC Web site at http://www.nrc.gov/docs/ML061240509.pdf.

In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review. You will be advised by separate correspondence of the results of our deliberations on this matter.

In accordance with 10 CFR 2.390 of the NRC's "Agency Rules of Practice and Procedure," a copy of this letter, its enclosure, and your response, will be made available electronically for public inspection in the NRC Public Document Room or from the NRC's ADAMS, accessible from the NRC Web site at http://www.nrc.gov/reading-rm/adams.html. To the extent possible, your response should not include any personal privacy or proprietary, information so that it can be made available to the Public without redaction.

Should you have any questions concerning this matter, please contact Mr. Ray Kellar, Chief, Fuel Cycle and Decommissioning Branch, of my staff at (817) 200-1191.

Sincerely,

/RA by LLHowell Acting For/

Mark R. Shaffer, Director
Division of Nuclear Materials Safety

Docket: 040-08964
License: SUA-1548

Enclosure:
NRC Inspection Report 040-08964/2016-003
w/Attachment: Supplemental Information

cc: D. Pavlick, Cameco Resources, Power Resources, Inc.
S. Ramsay, Wyoming Radiation Control Program
R. Schierman, Wyoming Depart. of Environmental Quality (WDEQ)
D. Anderson, WDEQ
R. Solid, WDEQ
K. Wendtland, WDEQ

U.S. NUCLEAR REGULATORY COMMISSION

REGION IV

Docket:	040-08964
License:	SUA-1548
Report:	040-08964/2016-003
EA No.:	EA-16-262
Licensee:	Power Resources Inc, dba Cameco Resources
Location:	Smith Ranch Converse County, Wyoming
Dates:	November 15, 2016 through March 13, 2017
Lead Inspector:	Bernadette Baca, Health Physicist Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety
Inspectors:	David Brown, Sr. Health Physicist Uranium Recovery Licensing Branch Division of Decommissioning, Uranium Recovery, and Waste Office of Nuclear Materials Safety and Safeguards
	Martha Poston-Brown, Health Physicist Nuclear Materials Safety Branch - A Division of Nuclear Materials Safety
Accompanied by:	Thomas Lynch, Investigator Field Operations – Southwest Region Office of Hazardous Material Safety Pipeline and Hazardous Material Safety Administration U. S. Department of Transportation
	Ryan Schierman, Manager Uranium Recovery Program Department of Environmental Quality Land Quality Division State of Wyoming
Approved by:	Ray Kellar, Chief Fuel Cycle and Decommissioning Branch Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

Power Resources, Inc.
NRC Inspection Report 040-08964/2016-003

This U.S. Nuclear Regulatory Commission (NRC) announced inspection included a review of the licensee's transportation program to ensure compliance with NRC regulations and conditions of the license. The inspection included an evaluation of the circumstances related to two transportation incidents that occurred on August 20, 2015, and on March 28, 2016. Additionally, inspectors reviewed the changes made within the transportation program in response to the Confirmatory Action Letter (CAL), EA-16-156 (ML16238A359), issued on August 30, 2016.

Transportation Activities and Radioactive Waste Processing, Handling, and Storage

The licensee was conducting resin and 11e.(2) waste shipments in accordance with U.S. Department of Transportation (DOT) and NRC requirements with the following exceptions:

- An apparent violation was identified related to the use of an inappropriate analytical method to determine radioactive material concentrations for all pond sediment and barium sulfate sludge waste shipments. This resulted in four additional apparent violations related to DOT transportation requirements for: (1) the failure to adequately report the total activity for waste and resin shipments on the associated shipping documents; (2) the failure to label waste shipment packages; (3) the failure to classify and ship waste packages as Low Specific Activity level two (LSA-II) material; and (4) the failure to ship LSA-II waste material in appropriate containers. (Section 1.2 b.)

- Two apparent violations for failure to perform evaluations or perform tests that ensured a transportation package would be capable of withstanding the effects of any acceleration and vibration and the failure to ensure by examination or appropriate tests that the package was proper for the contents to be shipped and closure devices were properly secured. (Section 1.2 c.)

- An apparent violation was identified associated with inaccurate chemical name and radionuclide information on shipping papers for barium sulfate sludge shipments. (Section 1.2 d.)

Management Organization and Controls

The licensee's transportation training program components met applicable requirements and the licensee's staff had received appropriate training for their job assignments with one exception. An apparent violation was identified associated with the licensee's failure to provide task specific hazardous material transportation training for an individual who performed surveys and prepared and signed shipping papers. (Section 2.2)

Follow-up of Confirmatory Action Letters

The licensee had partially completed the CAL commitments and the following items remain to be completed: (1) revision of facility procedures, (2) perform employee training, and (3) obtain a complete IP-2 certification package containing the testing specifications. Therefore, the CAL remains open at this time. (Section 3.3)

Report Details

Site Status

At the time of the inspection Power Resources, Inc. (PRI) was extracting uranium using the in-situ recovery process. Uranium processing and drying operations were in progress at the Smith Ranch Central Processing Plant (CPP). Additionally, four satellite facilities (Sat-2, Sat-3, SR-1, and SR-2) and one remote satellite facility (North Butte) were in service. The Sat-2 facility was only supporting mine unit restoration activities.

Uranium recovery operations were on standby at the Highland CPP. The Reynolds Ranch Satellite had received Wyoming Department of Environmental Quality (WDEQ) approval. At this time, the licensee had not started activities at the Reynolds Ranch Satellite. The Gas Hills and Ruth Satellites were not in operation at the time of the inspection, although the licensee inspected these facilities once per quarter.

1 Inspection of Transportation Activities (86740) and Radioactive Waste Processing, Handling, Storage and Transportation (88035)

1.1 Inspection Scope

The inspection was conducted to determine whether the licensee had established and was maintaining an effective program to ensure radiological safety in the packaging and transportation of licensed radioactive material. The review included determining whether transportation activities were in compliance with the requirements of the applicable NRC and DOT transportation regulations. Particular areas of focus included: (1) the licensee's methodology for sampling and determining the activity of radioactive material shipped from the facility; (2) a review of the shipping containers currently in use or planned for use by the licensee, their selection process/criteria, and the procedures governing the packaging of shipments; and (3) a review of the licensee's shipping documentation process and the documents generated for 11.e(2) byproduct, resin, waste pond sediment, and barium sulfate sludge against the requirements of the DOT.

1.2 Observations and Findings

a. Background

On March 28, 2016, the licensee sent 13 cubic yards of barium sulfate sludge for disposal to White Mesa Uranium Mill, operated by Energy Fuel Resources, Inc. While en route to White Mesa Uranium Mill, the driver braked hard to avoid hitting a deer on the road. The driver did not stop between the braking event and reaching White Mesa Uranium Mill. When the shipment arrived at White Mesa, there was observable evidence the package was leaking. An interview with the driver, following his arrival at White Mesa, indicated he did not observe any leakage from the package during transportation.

On March 29, 2016, the State of Utah emailed a notice to the NRC that White Mesa Uranium Mill had notified PRI of a leaking 11.e(2) shipment (the barium sulfate sludge) received at their facility. In addition, the notification indicated this was the second incident of leakage associated with shipment of 11.e(2) waste sent to White Mesa Uranium Mill by PRI. The first incident occurred on August 20, 2015. The contamination

levels reported for the August 2015 incident were below DOT Title 49 of the *Code of Federal Regulation* (CFR) 173.443 limits for an exclusive use shipment. The contamination levels for the March 2016 shipment, as reported by the State of Utah, for radiological material along the roadway at the White Mesa site ranged between 9,360 disintegrations per minute per 100 centimeter square (dpm/100 cm^2) to 5,850 dpm/100 cm^2 for total direct alpha surveys and 0.04 to 0.08 millirem per hour (mrem/hr) beta/gamma surveys. Removable alpha contamination for the asphalt roadways used by the carrier for the March 2016 shipment was reported as 383 to 493 dpm/100 cm^2. Direct surveys of the conveyance were reported as 35,100 to 58,500 dpm/100 cm^2 total alpha (i.e. fixed and removable) and 5.0 mrem/hr beta/gamma. Removable alpha contamination on the conveyance ranged between 439 to 2,551 dpm/100 cm^2. The contamination levels for the March 2016 shipment also did not exceed DOT contamination limits for an exclusive use shipment.

On April 1-2, 2016, Cameco-Smith Ranch health physics technicians (HPTs) conducted more extensive surveys along the transportation route used for the March 28, 2016, shipment and did not identify any areas along the route where contamination was present other than the roadway on-site as mentioned above.

In response to the notification from the State of Utah, the NRC conducted an inspection of transportation operations at the Cameco-Smith Ranch facility on June 20-23, 2016. During the June inspection several deficiencies were identified in the Cameo-Smith Ranch transportation program. As a result of the June 2016 inspection, the NRC issued CAL EA-16-156 dated August 30, 2016, to Cameco-Smith Ranch. On November 15-17, 2016, the NRC conducted an on-site inspection to review the licensee's response to the CAL (ML16357A774) and complete a more thorough assessment of the licensee's transportation program.

b. Shipment Activities

The licensee used analyzed samples to establish an annual baseline concentration of radionuclides for each shipment type. The licensee used the annual concentration number to calculate the activity of each shipment based on the volume of the shipment. The inspectors noted that the available sample analysis results for the radionuclide concentrations in barium sulfate sludge shipments appeared to be anomalously low. The inspectors compared the barium sulfate radionuclide concentrations from previous sample analysis to the radiation exposure rates measured by the Cameco-Smith Ranch HPTs for the August 20, 2015, and March 28, 2016, shipments to White Mesa. Using MicroShield version 10.0 software, the inspectors estimated the external dose rates based on the sample analysis should have been around 150 microRoentgen per hour (µR/hr) rather than the 5 miliRoentgen per hour (mR/hr) measured by the licensee for the packages.

The inspectors reviewed the analytical method used for the barium sulfate sludge shipments. The licensee's off-site analytical laboratory used Environmental Protection Agency (EPA) Method 903.0 "Alpha-Emitting Radium Isotopes in Drinking Water." EPA Method 903.0 is an appropriate method for screening samples for radium content. However, EPA Method 903.0, Section 1.2 states the method does not always give an accurate assessment of the radium-226 content of the samples when other radium alpha emitters are present. When the total radium alpha activity of a water sample is greater than 5 pico-Curies per litter (pCi/L), then radium-226 analysis is required.

The radium-226 analytical result reported to the licensee by the off-site analytical laboratory was 134 pCi/L; therefore, another analytical method to determine the radium-226 content was required. EPA allows for radium-226 analysis to include (1) Lucas cell counting after chemical treatment following EPA Method 903.1 or EPA EMSL-19, and (2) gamma spectroscopy following either EPA Method 901.1 (Gamma measurement of a sealed sample with a 21 day ingrowth period and calculating radium-226 content from Bi-214 content), or the Georgia Tech Method (chemical treatment to capture the radium in a precipitate and counting the precipitate). All 10 barium sludge shipments shipped off-site by the licensee between June 20, 2013, and March 28, 2016, contained radium-226 concentrations well above 5 pCi/L and the licensee should have followed the EPA 903.0 guidance to perform an additional radium-226 analysis. In addition to the barium sulfate sludge, the licensee informed the inspectors that the incorrect analytical method was also applied to 42 pond sediment shipments sent for disposal between June 17, 2014, and March 9, 2016. All 42 pond sediment shipments also had radium-226 concentrations above 5pCi/L and the licensee should have followed the EPA 903.0 guidance which indicated that additional radium-226 analysis was required. Use of an inappropriate analytical method resulted in under-reporting the activity of the radionuclides present in the pond sediment and barium sulfate sludge shipments.

The licensee used an excel spreadsheet provided by an independent contractor to perform calculations in determining if the material being prepared for shipment was Low Specific Activity level one (LSA-I) or level two (LSA-II). The NRC inspectors observed licensee staff use the contractor spreadsheet and analytical results from barium sulfate sludge samples (used to represent the concentrations in the August 20, 2015, and March 28, 2016, shipments) to determine the classification of the waste. The inspectors observed the material was identified as LSA-I regardless of what concentration of natural uranium was entered. The inspectors determined the spreadsheet was designed to exclude sample concentrations of natural uranium from the calculations. The calculations affected by this error also included the determination if an A_2 value (the maximum activity of normal form radioactive material permitted in a Type A package) or a reportable quantity (RQ) value of radioactive material was present. The inspectors independently performed calculations and determined the barium sulfate sludge material as LSA-II. In addition, during the June 2016 inspection, the licensee identified an additional error in the contractor spreadsheet related to the conversion factor from pCi to Ci. This error also lead to the misidentification of the material as LSA-I when the material was in fact LSA-II. These errors, in conjunction with the misanalysed waste stream samples, resulted in the misidentification of 42 shipments of pond sediment and the 10 barium sulfate sludge shipments as LSA-I when they were actually LSA-II. It was identified that 37 of the pond sediment shipments actually contained A_2 quantities of material and none of the shipments represented an RQ. Failure to correctly identify the quantity of material present in the each shipment and classify it correctly led to the selection of an inappropriate container and inappropriate labeling of the containers.

Under DOT rules, requirements for shipping containers and labeling vary based on the hazardous material and the classification of the hazardous material. For Class 7 (radioactive) materials, one of the criteria for determining the type of container required to safely transport the material is the total activity of the materials shipped. The requirements for shipping LSA-I material require the use of at least a level 1 industrial package (IP-1) and are exempt from various labeling requirements. The requirements for shipping LSA-II material require the use of at least a level 2 industrial package (IP-2) and the shipments are not exempt from various labeling requirements.

PRI's Materials License SUA-1548, Amendment 21, Administrative Condition 9.3, requires the licensee to comply with the statements and commitments made in the initial application and its amendments. The amendment dated March 20, 2008, Chapter 9, Section 9.4.4 requires, in part, that licensee workers adhere to all operating procedures. The licensee's operating procedure WYO-RPP-008, Revision 23, "Health Physics Manual - Transportation of Radioactive Materials," Section 1.7.2.4, states, in part, the licensee is responsible for having the waste samples analyzed for radionuclides, hazardous Resource Conservation and Recovery Act (RCRA) contaminations, and other characteristics.

The licensee failed to appropriately analyze waste samples for radionuclides, hazardous RCRA contaminations, and other characteristics for the 42 pond sediment and 10 barium sulfate sludge shipments from June 20, 2013, to March 28, 2016. The licensee did not ensure the analytical laboratory used an adequate method for determining radionuclides in waste samples. The analytical laboratory used standard EPA Method 903.0 to characterize the radionuclides, and contaminates. EPA Method 903.0, Section 1.2 clearly stated that when the total radium alpha activity of a water sample is greater than 5 pCi/L, then radium-226 analysis is required. Despite obtaining analytical results greater than 5 pCi/L radium for all pond sediment and barium sulfate sludge shipments, the licensee failed to ensure the use of an alternative analytical method to complete a radium-226 analysis. Failure to use an appropriate analytical method to determine radium-226 concentrations was identified as an apparent violation of Administrative Condition 9.3 of the license and Procedure WYO-RPP-008 (AV-040-08964/2016-003-01).

The inspectors determined that the under-reporting of the total activity in the 42 pond sediment and 10 barium sulfate sludge shipments led to four additional apparent violations associated with DOT regulations as described below.

NRC licensees are required to follow the DOT regulations in accordance with 10 CFR 71.5(a) which requires that each licensee who transports licensed material outside the site of usage, as specified in the NRC license or on public highways, or delivers licensed material to a carrier, shall comply with the applicable requirements of the DOT regulations in 49 CFR Parts 107, 171 through 180, and 390 through 397, appropriate to the mode of transport.

DOT regulation 49 CFR 172.202(a)(5) requires, in part, that the total quantity of hazardous materials covered by the (shipping papers) description must be indicated by mass or volume or by activity for Class 7 (radioactive) materials and must include an indication of the applicable unit of measurement. Since the licensee used an inappropriate analytical method which resulted in the establishment of incorrect concentrations, the licensee's shipping papers incorrectly listed the total quantity of hazardous material (by activity) for 42 pond sediment and 10 barium sulfate sludge packages shipped between June 20, 2013, and March 28, 2016. This was identified as an apparent violation of 49 CFR 172.202(a)(5) (AV-040-08964/2016-003-02). (Section 1.2 d. of this report documents another example of this apparent violation.)

DOT regulation 49 CFR 172.403(a) and (g) require, in part, that unless exempted from labeling by 49 CFR 173.421 through 49 CFR 173.427, each package of radioactive material must be labeled as provided in this section. The following applicable items of information must be entered in the blank spaces on the RADIOACTIVE label:

(1) Contents, (2) Activity, and (3) Transport index. Since the licensee failed to accurately assess the total activity in pond sediment and barium sulfate sludge shipments, the licensee failed to label each package for 42 pond sediment and 10 barium sulfate sludge packages shipped between June 20, 2013 and March 28, 2016. The licensee failed to recognize the material was LSA-II and had classified the packages as LSA-I which is exempt from these labeling requirements. This was identified as an apparent violation of 49 CFR172.403(a) and (g) (AV-040-08964/2016-003-03).

DOT regulation 49 CFR 173.403 states, in part, LSA material means Class 7 (radioactive) material with limited specific activity which is not fissile material or is excepted under 49 CFR 173.453, and which satisfies the descriptions and limits set forth below. (1) LSA-I; other radioactive material in which the activity is distributed throughout and the estimated average specific activity does not exceed 30 times the values for activities specified in 49 CFR 173.436 or calculated in accordance with 49 CFR 173.433 or 30 times the default values listed in Table 8 of 49 CFR 173.433. As a result of failing to accurately assess the total activity of 42 pond sediment and 10 barium sulfate sludge shipments from June 20, 2013 to March 28, 2016, the licensee classified the shipments as LSA-1. A subsequent review performed by the licensee determined that all shipments exceeded 30 times the values specified in 49 CFR 173.436 and should have been classified and shipped as LSA-II material. This was identified as apparent violation of 49 CFR 173.403 (AV-040-08964/2016-003-04).

DOT regulation 49 CFR 173.427(b)(1) requires, in part, that LSA material must be packaged in an industrial package (Type IP-1, Type IP-2, or Type IP-3) subject to the limitations of Table 6. Table 6 requires the use of an IP-1 package for an exclusive use shipment of LSA-I solid or liquid contents and the use of an IP-2 package for the exclusive use shipment of LSA-II solid or liquid contents. As a result of failing to accurately assess the total activity of 42 pond sediment and 10 barium sulfate sludge shipments from June 20, 2013 to March 28, 2016, the packages were classified by the licensee as LSA-1 material and shipped in an IP-1 container. The licensee failed to recognize that the contents of shipments met LSA-II requirements and were required to be shipped in an IP-2 container. This was identified as an apparent violation of 49 CFR 173.427(b)(1) (AV-040-08964/2016-003-05).

c. Shipping Containers

The loss of material, which occurred during both the August 2015 barium sulfate shipment and the March 2016 shipment, was determined to be the result of selection of an inappropriate container coupled with failure by the licensee to conduct tests or checks to verify the package would be able to retain its contents under conditions incident to transportation, such as acceleration, rapid deceleration, and vibration. The licensee also did not have a process in place to perform checks to ensure all openings were appropriately secured prior to the August 2015 event. A corrective action after the August 2015 shipment was to revise the shipping procedure to require a check of the container's door seal to ensure it was closed and sealed. However, this corrective action did not prevent the loss of the package contents in the March 2016 shipment.

DOT regulation 49 CFR 173.475 requires, in part, that before each shipment of Class 7 (radioactive) material, the licensee must ensure by examination or appropriate tests that: (a) the package is proper for the contents to be shipped; (c) each closure device of the packaging, including any required gasket, is properly installed, secured, and free of

defects; and (f) each closure, valve or other opening of the containment system through which the radioactive content might escape is properly closed and sealed.

On August 20, 2015, and March 28, 2016, the licensee failed to ensure by examination or appropriate tests that the packages were appropriate for transportation of material saturated with liquid. For the August 20, 2015 shipment, the licensee's procedure did not contain a step to require that the container's door seal be physically inspected to ensure the container was properly closed and sealed so radioactive content would not escape. After implementing corrective actions, the licensee's new procedure step to ensure the gasket was properly installed, secured, free of defects, and properly closed was found to be insufficient since the container leaked again during the March 28, 2016, shipment. This was identified by inspectors as an apparent violation of 49 CFR 173.475(a), (c), and (f) (AV-040-08964/2016-003-06).

Prior to use of the transportation container for each incident, the licensee failed to perform adequate evaluations to identify vibration as a potential mechanism that could separate the liquid and solid components of the sludge. In an evaluation after the August 2015 shipment, the licensee identified that seepage due to vibration increased with distance travelled and considered shipping to a closer location, but did not implement the idea due to cost considerations. The licensee also considered the use of an alternate container but the licensee was not able to readily identify one and thus the idea was not implemented. The corrective actions associated with the first incident focused on changing the absorbent material (from plug gel to bentonite chips) and adding inspection of the door seals to the procedure to prevent a reoccurrence. After the second incident, the licensee reconsidered changing containers as a corrective action.

DOT regulation 49 CFR 173.410(f) requires, in part, that the package (used for shipment) will be capable of withstanding the effects of any acceleration, vibration or vibration resonance that may arise under normal conditions of transport without any deterioration in the effectiveness of the closing devices on the various receptacles or in the integrity of the package as a whole. On August 20, 2015, and March 28, 2016, the licensee failed to perform evaluations or perform tests that ensured the package would be capable of withstanding the effects of any acceleration and vibration normally incident to transportation in the selection of packaging and package configuration for shipments of barium sulfate sludge from the Cameco-Smith Ranch facility to the White Mesa Mill. The vibration and acceleration during transportation allowed for separation of water from the sludge and caused a loss of radioactive contents from the package during transport for the two shipments of barium sulfate sludge from Cameco-Smith Ranch to White Mesa facility. This was identified by the inspectors as an apparent violation of 49 CFR 173.410(f) (AV-040-08964/2016-003-07).

d. Shipping Paperwork

During a routine inspection conducted April 14-16, 2015, the NRC identified a Severity Level IV violation involving the licensee's failure to include the total quantity of hazardous material on shipping papers (NOV-040-08964/2015-001-01) (ML15191A335). As part of its corrective actions, documented in a letter dated August 17, 2015, (ML15231A011), the licensee committed to: (1) all shipping paperwork would be reviewed for accuracy by a second party with the preparer and reviewer signing the bill of lading; (2) all bills of lading would be originals with no copies being made or stored for

use on future shipments; and (3) employees responsible for surveying shipments and those responsible for preparing and reviewing bills of lading would renew their DOT training. During a routine inspection on June 20-23, 2016, the inspectors observed that from April 14, 2015, to June 23, 2016, there were 39 shipments of 11.e(2) byproduct material waste to offsite disposal facilities. The inspectors reviewed copies of the shipping papers. For 10 out of the 25 shipments made in 2015 and all of the shipments made in 2016, none of the shipping papers included the signatures of the preparer or reviewer on the bill of lading. When questioned, licensee staff indicated a new bill of lading form with two signature lines (one for preparer, one for reviewer) would be effective on June 23, 2016. The inspectors also confirmed the use of original paperwork as committed to by the licensee. The inspectors confirmed the training for the two primary individuals responsible for shipping. The previous violation could not be closed as training for other individuals had not yet been performed. Cameco had not consistently ensured shipment paperwork was being reviewed for accuracy or that the preparer and reviewer were both signing the bill of lading, and additional examples of inaccurate activities on shipping paperwork were identified by the licensee when performing an extended review of their records.

During this inspection, the inspectors reviewed the shipping documentation process and the shipping documentation generated by the licensee since the previous inspection with a focus on shipments of the 11.e(2) byproduct material, resins, pond sediment and barium sulfate sludge. As part of this review, the inspectors also reviewed four licensee identified violations related to shipping documentation. Three of these involved (1) the use of the wrong UN number on paperwork prepared to facilitate return of shipping containers to Smith Ranch; (2) a failure to accurately identify a shipping container for a single shipment of an empty container, the container was identified as a cargo trailer rather than a roll-off bin; and (3) a failure to perform a survey or prepare and provide shipping documents for a single shipment of dewatering contents to the SR-2 facility. The NRC inspectors reviewed the licensee's corrective actions for each of the self-identified violations and determined the licensee was taking appropriate corrective actions that would prevent reoccurrence.

In a fourth licensee identified violation, the licensee identified that shipping paperwork generated for the resin shipments from the North Butte facility to the CPP contained the wrong activity due to a change in the shipping trailer the licensee had used. The trailer's volume decreased from 1000 cubic yards to 500 cubic yards. The first set of paperwork generated after the change in trailer volume correctly modified the volume, but failed to reduce the total activity. This error, coupled with licensee's practice of using the previous paperwork to generate paperwork for the next shipment, resulted in perpetuation of the error. The licensee's documentation reviewed by the inspectors did not provide the total number of shipments or dates for which this issue applied. At the inspector's request, the licensee reviewed the shipments and identified that this error occurred for 308 shipments of resin between May 2013 and April 2016. The inspectors identified that the resin shipment documentation error was a recurrence of a prior violation involving the licensee's failure to include the total quantity of hazardous material on the shipping papers (NOV-040-08964/2015-001-01).

DOT regulation 49 CFR 172.202(a)(5) requires, in part, that the total quantity of hazardous materials covered by the (shipping papers) description must be indicated by mass or volume or by activity for Class 7 (radioactive) materials and must include an indication of the applicable unit of measurement. The licensee self-identified that its staff

failed to provide the maximum activity for the radioactive contents contained in each package during transport. From May 2013 to April 2016, Cameco-Smith Ranch listed the activity for 308 resin shipments made from the North Butte facility to the CPP at a value twice as high as was physically present. This error occurred based on the licensee's practice of using previous shipping paperwork as a template for generating new shipping paperwork, and the licensee failing to recognize a reduction in shipping container volume by half (from 1000 cubic yards to 500 cubic yards) would result in a reduction of activity per shipment by half. The licensee's corrective action in response to a prior NRC violation, NOV-040-08964/2015-001-01, failed to prevent recurrence. This repeat failure to comply with 49 CFR 172.202(a)(5) was identified as another example of apparent violation (AV-040-08964/2016-003-02), which was previously discussed in Section 1.2 b. of this report.

When the NRC inspectors reviewed the shipping paperwork for barium sulfate sludge shipments, the inspectors observed the paperwork described the barium sulfate sludge as "natural uranium oxide" or "yellowcake" rather than barium sulfate containing natural uranium, throrium-230 and radium-226.

DOT regulation 49 CFR 172.203(d) requires that the description in each shipping paper for a shipment of Class 7 (radioactive) material must include the following additional entries as appropriate: (1) the name of each radionuclide that is listed in 49 CFR 173.435 of this subchapter. (For mixtures of radionuclides, the radionuclides required to be shown must be determined in accordance with 49 CFR 173.433(g) of this subchapter); and (2) a description of the physical and chemical form of the material. For the barium sulfate sludge packages that were shipped from June 20, 2013, and March 28, 2016, the licensee failed to provide the name of each radionuclide listed in 49 CFR 173.435 and the accurate chemical description of contents for all the shipments. The licensee identified the barium sulfate sludge shipments as natural uranium oxide or yellowcake rather than barium sulfate containing natural uranium, throrium-230 and radium-226. This was identified as an apparent violation of 49 CFR 172.203(d) (AV-040-08964/2016-003-08).

1.3 Conclusions

The licensee was conducting resin and 11e.(2) waste shipments in accordance with U.S. DOT and NRC requirements with the following exceptions: (1) failure to accurately assess the activity of pond sediment and barium sulfate sludge waste shipments; (2) failure to adequately report the total activity for waste shipments and resin shipments on the associated shipping documents; (3) failure to accurately label waste shipment packages; (4) failure to classify and ship the waste packages as Low Specific Activity level two (LSA-II) material; (5) failure to ship LSA-II waste material in appropriate containers; (6) failure to ensure by examination or appropriate tests that the packages were proper for the contents to be shipped and closure devices were properly secured; (7) failure to perform evaluations or perform tests that ensured the transportation package would be capable of withstanding the effects of any acceleration and vibration normally incident to transportation; and (8) failure to provide the name of each radionuclide listed and an accurate chemical description of contents for barium sulfate sludge shipments.

2 Management Organization & Controls (88005)

2.1 Inspection Scope

The focus of this portion of the inspection was to ensure the licensee's employee training program and retraining program adequately addressed licensed activities. The inspectors reviewed licensee-provided training to ensure that responsibilities applicable to each employee's specific job functions were covered in the training provided by the licensee.

2.2 Observation and Findings

The licensee is required to conduct initial training in accordance with License Condition 9.7, RG 8.31 and Section 9 of the Technical Report, as committed to in the initial license application and supplements for its contractors and new employees. The licensee was also required to provide annual refresher training to current employees and contractors specific to their job duties and responsibilities. The inspectors reviewed the employee training records regarding health physics technical assignments, transportation and HAZMAT handling, respiratory protection, and operator training.

Training was found to adequately cover the required topics and was conducted in a timely manner for both initial and refresher training. The majority of staff had completed and were current for hazmat training required for their specific jobs. However, one individual at North Butte was found to have initiated shipments of resins from that facility to the CPP without being current on the required Hazmat training. This individual signed paperwork for 12 shipments between June 23, 2016, and September 29, 2016, without current Hazmat training.

DOT regulation 49 CFR 172.704 (a)(2)(i) requires, in part, that each hazmat employee must be provided function specific training concerning the requirements of this subchapter, or exemptions or special permits issued under subchapter A of Chapter 1, that are specifically applicable to the functions the employee performs.

The inspectors identified the licensee failed to provide function specific training to a hazmat employee concerning the requirements that were specifically applicable to the functions the employee performed. From June 23 to September 29, 2016, a facility operator employed at the North Butte facility performed surveys and generated paperwork associated with 12 shipments of resins from the North Butte facility to the CPP without completing task specific hazardous material training associated with the performance of surveys or completing shipping paperwork. The licensee was only able to provide documentation that supported this individual's completion of general awareness hazardous material training. This was identified as an apparent violation of 49 CFR 172.704 (a)(2)(i) (AV-040-08964/2016-003-09).

2.3 Conclusion

Training program components were in place and the majority of the licensee's staff had received the appropriate training for their job assignments. An apparent violation was identified associated with failure to provide task specific hazardous material transportation training for an individual who performed surveys and prepared and signed shipping papers.

3 Follow-up of Confirmatory Action Letters (92703)

3.1 Inspection Scope

The inspectors reviewed the licensee's progress with commitments provided in a letter dated October 24, 2016 in response to the CAL issued on August 30, 2016.

3.2 Observations and Findings

On August 30, 2016, the NRC issued a CAL to PRI (EA-16-156, ML16238A359) as a result of the two transportation incidents that took place in August 2015 and March 2016. On October 24, 2016, PRI submitted its response to the CAL to the NRC (ML16357A774). The inspectors reviewed the licensee's progress in implementing with the corrective actions listed in the licensee's response to the CAL. The inspectors toured the facility, observed licensee transportation activities, reviewed documentation, and interviewed the licensee's staff.

At the time of the inspection, the licensee had revised procedures to use EPA Method 901.1 to ensure an adequate radium-226 analysis was performed on composite samples (such as pond sediment and barium sulfate sludge) to appropriately quantify radioactive material for shipment. However, the licensee was not ready to implement use of the new container the licensee proposed to use in the CAL response. The CAL response indicated the licensee secured a different style of IP-1 intermodal container (IMC) and an IP-2 container. The licensee was in possession of both of these alternate containers, but had not yet determined the level of fill for the IP-2 container, the number of IP-2 containers that would be used for each IP-1 IMC, the sequence for loading the IP-2 containers into the IP-1 IMC (before or after loading with sludge), or a final method to be used to incorporate the absorbent material (sodium polyacrylate) into the sludge (in parallel with sludge loading, layered, or after the sludge was already added). At the time of the inspection the licensee did not have the capability to load a full IP-2 container and then place it into an IP-1 IMC. The licensee indicated they were considering loading partially filled IP-2 containers but were not sure what controls will be implemented to prevent overloading the IP-2 container before lifting it into the IP-1 IMC. Additionally, at the time of the inspection, the licensee did not have a complete IP-2 certification package containing the associated testing specifications.

At the time of the inspection the licensee was continuing to develop facility procedures regarding the sampling and analysis techniques associated with the barium sulfate sludge and pond sediments, use of the new shipping containers, and labelling instructions. The licensee committed to train personnel once the new procedures have been completed.

The NRC will review the remaining CAL commitments during the next inspection or the NRC would review the status of the remaining open items if the licensee chooses to send a supplemental response to the CAL.

3.3 Conclusion

The NRC will not close the CAL at this time. The licensee had partially completed the CAL commitments and the following items remain to be completed: (1) revision of facility

procedures, (2) perform employee training, and (3) obtain a complete IP-2 certification package containing the testing specifications.

4 Exit Meeting Summary

On November 17, 2016, the inspectors presented the initial inspection findings to the licensee's representatives at the conclusion of the onsite inspection. On March 2, 2017, after additional review and obtaining supplemental information, Region IV staff discussed the preliminary inspection findings with Mr. Brent Berg, President, and other members of the licensee staff. On March 13, 2017, an additional discussion was held with licensee staff to clarify an apparent violation characterization. The licensee confirmed that any proprietary information reviewed by the inspectors had been returned or destroyed.

SUPPLEMENTAL INSPECTION INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Licensee

T. Coleman, Radiation Safety Officer
K. Garoutte, Safety, Health, Environment Quality Manager
D. Laird, Central Processing Plant Foreman
M. Thomas, Safety, Health, Environment Quality Director
B. Frye, Health Physics Technician
M. Griffitts, Health Physics Technician
J. Eads, Health Physics Technician in training
C. Sexson, Health Physics Technician
C. Griffitts, Satellite Foreman

Items Opened, Closed and Discussed

Opened

040-08964/2016-003-01	AV	Failure to accurately assess the activity of pond sediment and barium sulfate sludge waste shipments.
040-08964/2016-003-02	AV	Failure to have appropriate shipping paperwork that documented total activity for pond sediment, barium sulfate sludge, and resin shipments.
040-08964/2016-003-03	AV	Failure to appropriately label packages used for pond sediment and barium sulfate sludge waste shipments.
040-08964/2016-003-04	AV	Failure to appropriately classify pond sediment and barium sulfate sludge waste shipments as LSA-II.
040-08964/2016-003-05	AV	Failure to ship pond sediment and barium sulfate sludge waste shipments in IP-II containers when the shipments contained LSA-II material.
040-08964/2016-003-06	AV	Failure to ensure by examination or appropriate tests that the packages were proper for the contents to be shipped and closure devices were properly secured.
040-08964/2016-003-07	AV	Failure to perform evaluations or perform tests that ensured the transportation package would be capable of withstanding the effects of any acceleration and vibration normally incident to transportation.
040-08964/2016-003-08	AV	Failure to provide the name of each radionuclide and an accurate chemical description of content in shipping papers for barium sulfate sludge shipments.

040-08964/2016-003-09	AV	Failure to provide function specific training to a hazmat employee concerning the requirements that were specifically applicable to the functions the employee performed.

Closed

None

Discussed

040-08964/2015-001-01	NOV	Failure to record the correct activity on 30 shipments of 11.e(2) byproduct waste shipments.

Inspection Procedures

IP88005	Management Organization and Controls
IP86740	Inspection of Transportation Activities
IP86730	Transportation of Radioactive Materials (49 CFR Parts 100-179 and 10 CFR 71)
IP88035	Radioactive Waste Processing, Handling, Storage and Transportation
IP92703	Follow-up of Confirmatory Action Letters or Orders

List of Acronyms

ADAMS	Agencywide Documents Access and Management System
AV	apparent violation
Bq	Becquerel
CAL	Confirmatory Action Letter
CPP	Central Processing Plant
CFR	Code of Federal Regulations
dpm/100 cm^2	disintegrations per minute per 100 centimeter square
DOT	U.S. Department of Transportation
EPA	Environmental Protection Agency
HPT	Health Physics Technician
IMC	intermodal container
IP	NRC Inspection Procedure
LSA	Low Specific Activity
mrem/hr	milliRoentgen equivalent man per hour
µR/hr	microroentgen per hour
mR/hr	milliroentgen per hour
mSv	milliSievert
NRC	U.S. Nuclear Regulatory Commission
NOV	Notice of Violation
pCi/L	pico-Curies per litter
PEC	Predecisional Enforcement Conference
PRI	Power Resources Inc.
RCRA	Resource Conservation and Recovery Act
RG	NRC Regulatory Guide
RQ	reportable quantity
WDEQ	Wyoming Department of Environmental Quality

NRC INSPECTION REPORT 040-08964/2016-003; DATED APRIL 3rd, 2017.

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ADAMS ACCESSION NUMBER: ML17079A564

■ SUNSI Review By: **BDB**	ADAMS ■ Yes ☐ No	■ Non-Sensitive ☐ Sensitive	■ Publicly Available ☐ Non-Publicly Available	Keyword: NRC-002
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