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July 24, 2017

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Kriss Kennedy  
Regional Administration  
U.S. Nuclear Regulatory Commission  
Region IV  
1600 E. Lamar Blvd.  
Arlington, TX 76011

**CAMECO RESOURCES**

*Smith Ranch-Highland  
Operation  
Mail:  
P.O. Box 1210  
Glenrock, WY  
82637 USA*

*Tel: (307) 358-6541  
Fax: (307) 358-4533  
www.cameco.com*

**Re: Confirmatory Action Letter – Power Resources, Inc., Addendum**

Dear Director:

NRC issued a Confirmatory Action Letter (CAL) (EA-16-156), dated August 30, 2016, to Power Resources, Inc. d/b/a Cameco Resources (Cameco) regarding the shipment of barium sulfate sludge. Cameco Resources sent NRC a reply to the CAL on Oct. 24, 2016 (ML16357A744) that partially addressed NRC's concerns about the Smith Ranch Transportation Program. NRC conducted an inspection on Nov. 15-17 2017 of the Smith Ranch Transportation Program. During the inspection (NRC Inspection Report 040-8964/2016-003) NRC identified nine apparent violations concerning transportation and concluded that there were three items that needed to be completed to before the CAL can be closed.

Included with this letter is an addendum to the Oct. 24, 2016, CAL response that addresses the remaining CAL items. Cameco Resources has completed the outstanding items and requests NRC approval to resume shipping barium sulfate sludge within the next 30 days.

If you have any questions regarding this submittal or need additional information, please contact me at 307-358-6541, ext. 438 or by email at: [Lawrence\\_Reimann@Cameco.com](mailto:Lawrence_Reimann@Cameco.com).

Sincerely,

A handwritten signature in blue ink, appearing to read "Larry Reimann", with a long horizontal flourish extending to the right.

Larry Reimann  
Manager, Compliance and Licensing

Enclosure: Cameco CAL Responses Addendum

cc: File  
Doug Mandeville, NRC Project Manager, via email

**Power Resources Inc.**  
**Smith Ranch-Highland Mine**  
**License: SUA 1548**  
**Addendum to Confirmatory Action Letter Response**  
**July 17, 2017**

**Introduction**

The following report is an addendum to Cameco Resources (Power Resources Inc.) Confirmatory Action Letter (CAL) Response (ML16357A774) dated Oct. 24, 2016. The CAL (EA-16-156) dated August 30, 2016 was issued in response to an incident with a leaking intermodal container containing barium sulfate sludge that was being shipped to Energy Fuel's White Mesa Mill in Blanding, Utah. Energy Fuels reported the container leak to the State of Utah on March 29, 2016.

**Purpose**

The purpose of this report is to address the outstanding items from the CAL response letter so that NRC can close the CAL and authorize Cameco Resources to resume the shipment of 11e.(2) waste sludge. This response does not include any personal privacy or proprietary information as requested by the June 29, 2017 correspondence, NRC Notice of Violation and NRC Inspection Report (EA-16-262).

**Background**

Cameco Resources sent a CAL response letter to NRC on Oct. 24 of 2016. The response letter addressed four items of concern from NRC. The four items from the CAL are:

1. Conduct a root cause analysis to identify specific causes for the inadequate packaging and transportation of barium sulfate sludge that resulted in two instances of a contaminated container arriving at the EFRI White Mesa Mill in Blanding Utah.
2. Conduct an assessment of the radioactive material present in the barium sulfate sludge shipped to the EFRI White Mesa Mill over the past three years. Assess the barium sulfate sludge for radioactivity concentrations and identify any shipments that exceeded the EFRI White Mesa Mill's acceptance criteria for LSA material.
3. Develop a corrective action plan and corresponding schedule to restore compliance and prevent recurrence of the transportation incidents.
4. Provide the NRC a copy of the independent expert's review of Cameco's transportation program.

NRC conducted an announced inspection on Nov.15-17, 2016 to review Smith Ranch's transportation program. The inspection resulted in nine apparent violations. Cameco was given the choice of responding in writing to the apparent violations or to schedule a meeting Predecisional Enforcement Conference (PEC) to discuss the apparent violations with NRC. Cameco attended the PEC on May 4, 2017 and presented a summary of the causes of the apparent violations and the corrective actions.

NRC responded on June 29, 2017 with the final Notice of Violation (EA-16-262) and NRC Inspection Report (040-8964/2016-003). A total of nine violations were identified. The first five were characterized collectively as Severity Level III, while the remaining four were categorized in accordance with the NRC Enforcement Policy at Severity Level IV.

### **Outstanding CAL Responses**

NRC concluded during the Nov. 15 inspection (NRC Inspection Report 040-8964/2016-003) that the commitments documented in the CAL response were partially completed. Only the following items need to be completed before the CAL (EA-16-156) could be closed:

1. Revision of the facility procedures.
2. Completion of employee training.
3. Complete copies of the IP-2 certification package including the testing specifications.

A detailed description of how the outstanding items have been completed is as follows.

#### **1. Revision of facility procedures:**

Cameco Resources has revised internal procedures, WYO-RPP-008 Transportation of Radioactive Materials and WYO-SOP-146 Selenium Removal Circuit Process, to reflect lessons-learned and address deficiencies. Cameco's solution involves loading and handling the barium sulfate sludge into IP-2 rated bags with a super adsorbent poly acrylamide to adsorb any interstitial water, followed by placement in an IP-1 container as an over pack. Because the loading and handling of the material has changed significantly, new procedures were developed to ensure safe handling and loading of the material.

The detailed instructions for loading and preparing the bags for shipment are included in the WYO-SOP-146 Selenium Removal Circuit Process. WYO-SOP-146 instructs the operators on how to handle, load, sample and prepare the barium sulfate sludge for shipment. The broader instructions for shipping not only the barium sludge, but also other radioactive materials are included in WYO-RPP-008. WYO-RPP-008 instructs employees on how radioactive material and 11e.(2) waste are to be handled, packaged, and shipped from the site.

Additionally, a new Safety Data Sheet (SDS) was drafted for the barium sulfate sludge. The new SDS properly characterizes the material and the major constituents

that can be contained in the sludge. New SDSs will be developed to address other waste, sediments, sludge, and 11e.(2) materials, if needed, before shipping.

Cameco also reviewed and revised WYO-RPP-FORM-020 Byproduct Material Truck Survey and WY-SOP-FORM-031 ISO Container Inspection Checklist to reflect the use of IP-2 bags for barium sludge shipments. The IP-1 bin is incorporated into the shipping package as a shipping over-pack and is also addressed in the form revisions.

The revised procedures and SDS are available for NRC inspection.

## **2. Completion of Employee Training**

Cameco Resources has completed transportation training reviews for the entire workforce at Smith Ranch - Highland. Operations and other personnel that are responsible for loading shipments and preparing transportation documentation have received more in-depth training that covers their responsibilities as shippers of byproduct material.

The crews that handle, load, and survey the barium radium sludge shipments helped develop the revised loading procedures and received training on the sampling and preparation of the waste for shipment. Knowing and understanding the procedures are a key to the prevention of future incidents once shipping has resumed.

Attached to this addendum is the training schedule and the estimated completion dates for training (Attachment A).

## **3. Complete Copies of the IP-2 Container Certification**

Cameco Resources has identified a suitable IP-2 container for shipping 11e.(2) barium sludge. Cameco Resources wanted to ensure that the new system would eliminate the previous problems that were encountered during the shipment of barium sludge, which took additional time to develop. The changes to the sludge handling system required modifications to the previous loading system and improvements to the sampling procedures to ensure a representative sample, and to ensure that the modified loading system was safe for our employees.

The IP-2 container that was chosen for shipping our 11e.(2) byproduct is a bag system designed by PacTec. The PacTec IP-2 bags are used by the DOE for shipping waste to low level repositories in the United States. The PacTec, LiftPac<sup>R</sup> system is designed for "homogenous flowable solids that may include soil, gravel, and demolition debris". The system is appropriate for the barium sulfate sludge.

The manufactures copies of the Certificate of Conformance: IP-2 Packaging and ISO 9001 Registration are included with this response (Attachment B). The certifications certify that the bags were constructed to a standard design that was tested and

certified using testing that confirms to the specifications for an IP-2 container found in 49 CFR 173.465.

The manufacturer has provided Cameco Resources with two reports DTS-TR-010 *Test and Evaluation Report for the PACTEC, Inc. Lift Pac Flexible Material Packaging*, March 2005, and DTS-RPT-076, *Evaluation Report for the PACTEC, Inc. Modified "Lift Pac" IP-2 Packaging*. July 2005. The first report addresses the primary design of the flexible package, and the second report discusses design changes and additional testing. The testing was performed by Duratek Technical Services, Richland, Washington. Cameco Resources is including PacTec ISO Certification and an example of the quality control documentation that is part of PacTec's ISO 9001 Certifications (Attachment B).

Copies of the testing reports were not included in this response because the reports contain proprietary information pertaining to the LiftPac<sup>R</sup> IP-2 bag system design. The testing reports are available for NRC inspection.

## **Conclusion**

This report addresses the outstanding CAL items identified in the NRC's Nov. 15 inspection report (NRC Inspection Report 040-8964/2016-003). Cameco Resources has now completed all CAL items and accordingly requests closure of the CAL and NRC approval to resume shipping barium sulfate sludge.

# Attachment A

Training Schedule for Smith Ranch Transportation Training

Work Group	Training Required	Estimated Completion Date <sup>1</sup>
All	WYO-RPP-008	7/21/2017
All Operators	WYO-TRNG-FORM-086 Trailer Scan Training	7/21/2017
Sat 2/ Selenium Plant	WYO-SOP-146 Se Removal Circuit Process	6/23/2017-7/5/2017
CPP Operations	WYO-SOP-124 Smith Ranch CPP-Drum Inspections and Securing for Transport (SRH)-Appendix 5	7/21/2017
Operations Supervisors/Foreman	WYO-SOP-097 ISO Intermodal Container Acceptance, Loading and Shipping WYO-SOP-Form -031 ISO container Inspection Checklist	7/19/2017
Radiation Safety	WYO-RPP-FORM-020 Byproduct Material Shipment Truck Survey SDS Barium Radium Sulfate. Lab Analysis E901.1 Method or Equivalent	7/20/2017

1. Some shift workers are off during the training period but are scheduled for training once they return to shift.

# Attachment B

## IP-2 Container Documentation



# PACTEC

P.O. Box 8069  
 Clinton, LA 70722  
 (900) 272-2832 Toll-Free  
 (225) 683-8602 Local  
 (225) 683-8711 Fax

pactecinc.com

## Certificate Of Conformance: IP-2 Packaging

DATE ISSUED	
04 October 2016	
CERTIFICATE ISSUED TO	
Cameco Resources - Smith Ranch-Highland	
CONTRACT/PO NUMBER	
4500549064	
SHIPMENT #	WORK ORDER #
1 of 1	95260

Product ID Number:	LP855-IP-2	Units Shipped:	4	Drawing Rev #	3.0
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Tracking Requirement: Item Code, Work Order# and the Serial# (below), all of which appear on the product label

Serial Numbers of Containers	Serial # sequence: 14-sm-				Missing / Skipped:	Not Applicable
	06452	06453	06565	06612		

PacTec Incorporated, a registered ISO 9001:2008 company, certifies that the LiftPac Flexible Packaging System(s) being supplied has been evaluated as meeting the following packaging regulations and standards requirements for Industrial Packaging Type 2 (IP-2) when loaded as described in the referenced documentation. [See regulations and standards on reverse side of this COC]

- [1] Title 49 Code of Federal Regulations (CFR), Part 173, "Shippers-General Requirements for Shipments and Packagings," 173.411(b)(2), "Industrial Packagings"
- [2] IAEA Safety Standards, "Regulations for the Safe Transport of Radioactive Material" (2012 edition), No. SSR-6, Section VI, General Requirements for all Packaging and Packages and para 624, "Requirements for Type 2"

DOCUMENT REFERENCES	DTS-TP-010, Rev.1, Test Plan for PacTec, Inc. Lift Pac Flexible Material Packaging Duratek Technical Services, Richland, Washington, 2005
	DTS-TR-010, Rev.0, Test and Evaluation Report for PacTec, Inc. Lift Pac Flexible Material Packaging Duratek Technical Services, Richland, Washington, 2005
	FSWO-TP-013, Rev.1, Test Plan for PacTec, Inc. IP-2 Flexible Material Packagings Containing Various Payloads Energy Solutions Federal Services, Inc., Richland Washington, 2006
	FSWO-TR-011, Rev.0, Test and Evaluation Report for PacTec, Inc. Center Zipper Lift Pac IP-2 Flexible Material Packaging Energy Solutions Federal Services, Inc., Richland Washington, 2006
	PT-ER-001, Rev.0, Evaluation Report for PacTec, Inc. IP-2 Lift Pacs Combined PacTec Inc., Clinton, Louisiana, 2009
	PT-TR-010, Rev.1, Test and Evaluation Report for PacTec, Inc. LiftPac Flexible Material Packaging: Vibration Wyle Labs, Huntsville Alabama, 2010
	TEST PLAN FOR PACTEC, INC. REV.0, IP-2 MacroBag Packaging Containing Various Payloads PacTec Inc., Clinton, Louisiana, 2014

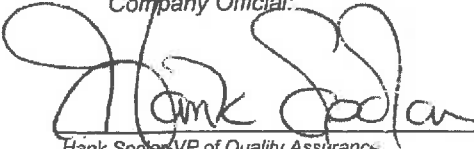
The LiftPac is designed to ship solid radioactive materials, normal form. The simulated payload used during testing consisted of sand, soil, gravel, and construction debris including concrete, loose steel parts/ pieces, wood and wrapped lead bricks.

The Flexible Packaging System(s) being furnished is of good quality, as pursuant to industry standard manufacturing practices for Flexible Packaging Systems, including the materials / components used in manufacturing. All materials used in the fabrication of the listed Product ID Number are genuine (that is, not counterfeit) and match the quality, test reports, markings and/or fitness for use required by the Contract/PO. **NOTE! Unused containers should be STORED INDOORS OR TARPED OUTDOORS ON A PALLET to minimize UV degradation.**

The bags covered by this COC are being shipped with a Lift Frame [LF8506161]. A Load Frame is backordered to ship at a later date.

Additional Comments



Company Official:  
  
 Hank Spolar - VP of Quality Assurance  
 Maria Stanfill - Quality Engineer

04 Oct. 2016  
 Date

PK COC/PSW/REV 2.1

**PACTEC CERTIFICATE OF CONFORMANCE (REVERSE SIDE), TYPE IP-2 PACKAGING: 49 CFR 173.411(b)  
(USA): IAEA SAFETY STANDARDS NO. SSR-6 (2012 Edition), Section VI, 624, 722, 723**

173.411(b)(2) Each IP-2 must meet the general design requirements prescribed in §173.410 and when subjected to the tests specified in §173.465(c) and (d) or evaluated against these tests by any methods authorized by 173.461(a), must prevent (i) Loss or dispersal of the radioactive contents; and (ii) A significant increase in the radiation levels recorded or calculated at the external surfaces for the condition before the test.

624. A *package* to be qualified as a *Type IP-2* shall be designed to meet the requirements for *Type IP-1* as specified in para. 623 and, in addition, if it were subjected to the tests specified in paras 722 and 723, it would prevent:

- (a) Loss or dispersal of the *radioactive contents*; and (b) More than a 20% increase in the maximum *radiation level* at any external surface of the *package*

173.465(c) *Free drop test*. The specimen must drop onto the target so as to suffer maximum damage to the safety features being tested, and: (1) The height of the drop measured from the lowest point of the specimen to the upper surface of the target may not be less than the distance specified in *Table 10*, for the applicable package mass. The target must be as specified in §173.465(c)(5). *Table 10* is as follows:

TABLE 14	TABLE 10	TABLE 14	TABLE 10
Package Mass (kg)	Package Mass (lb)	Free Drop Distance	Free Drop Distance
< 5,000 kilograms	< 11,000 pounds	1.2 meters	4 feet
5,000-10,000 kilograms	11,000-22,000 pounds	0.9 meters	3 feet
10,000-15,000 kilograms	22,000-33,000 pounds	0.6 meters	2 feet
> 15,000 kilograms	> 33,000 pounds	0.3 meters	1 foot

722. Free drop test: The specimen shall drop onto the target so as to suffer maximum damage in respect of the safety features to be tested:

- (a) The height of drop measured from the lowest point of the specimen to the upper surface of the target shall be not less than the distance specified in *Table 14* for the applicable mass. The target shall be as defined in para. 717. (b) For rectangular fibreboard or wood *packages* not exceeding a mass of 50 kg, a separate specimen shall be subjected to a free drop onto each corner from a height of 0.3 m. (c) For cylindrical fibreboard *packages* not exceeding a mass of 100 kg, a separate specimen shall be subjected to a free drop onto each of the quarters of each rim from a height of 0.3 m.

173.465(d) *Stacking Test*.

(1) The specimen must be subjected for a period of at least 24 hours to a compressive load equivalent to the greater of the following: (i) Five times the mass of the actual package; or (ii) the equivalent of 13 kPa (1.9 psi) multiplied by the vertically projected area of the package.

(2) The compressive load must be applied uniformly to the two opposite sides of the specimen, one of which must be the base on which the package would normally rest.

723. *Stacking test*: Unless the shape of the *packaging* effectively prevents stacking, the specimen shall be subjected, for a period of 24 h, to a compressive load equal to the greater of the following:

- (a) The equivalent of 5 times the maximum weight of the *package*; and (b) The equivalent of 13 kPa multiplied by the vertically projected area of the *package*.

The load shall be applied uniformly to two opposite sides of the specimen, one of which shall be the base on which the *package* would typically rest.



# PERRY JOHNSON REGISTRARS, INC.

## Certificate of Registration

*Perry Johnson Registrars, Inc., has audited the Quality Management System of:*

**PacTec Inc**

**9414 Plank Road Clive, LA 70722 United States**

*(This is a campus scheme. See Appendix for site specific details.)*

*(Hereinafter called the Organization) and hereby declares that the Organization is in conformity with:*

**ISO 9001:2008**

*The Registration is in respect to the following scope:*

**Design and Manufacture Soft Sided Packaging  
for the Hazardous and Nonhazardous Environmental Waste Industry**

*This Registration is granted subject to the system rules governing the Registration referred to above, and the Organization hereby covenants with the Assessment body duty to observe and comply with the said rules.*



*Terry Boboige*

Terry Boboige, President

Perry Johnson Registrars, Inc. (PJR)  
755 West Big Beaver Road, Suite 1340  
Troy, Michigan 48084  
(248) 358-3388

*The use of the UKAS accreditation symbol is in respect to the activities covered by the Accreditation Certificate Number 0105.*

*The validity of this certificate is dependent upon ongoing surveillance.*

Effective Date: February 24, 2014  
Expiration Date: February 23, 2017

Revision Date: September 27, 2016

Certificate No.: C2014-00017-R1  
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*the Organization is in conformance with:*

**ISO 9001:2015**

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*Terry Boboige*

Terry Boboige, President

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Effective Date: February 24, 2017  
Expiration Date: September 14, 2018

Certificate No.: C2017-00022  
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