

**CAMECO RESOURCES
CROW BUTTE OPERATION**



**86 Crow Butte Road
P.O. Box 169
Crawford, Nebraska 69339-0169**

**(308) 665-2215
(308) 665-2341 – FAX**

February 19, 2008

Mr. Stephen J. Cohen, Project Manager
Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
U.S. Nuclear Regulatory Commission
Mail Stop T8-F5
Washington D.C. 20555-0001

Subject: Response to letter received January 8, 2008 (Dated December 18, 2007) –
Request for Additional Information, 2008 Surety Estimate, Crow Butte
Resources, Inc., Crawford, Nebraska, Source Materials License SUA-1534
(TAC J00552)

Dear Mr. Cohen:

By letter dated December 18, 2007, the U.S. Nuclear Regulatory Commission (NRC) staff, upon review of the 2008 Surety Estimate, requested additional information regarding soil and groundwater remediation costs.

NRC identified that CBR included costs for removing contaminated soil around injection and production wells within each mine unit however has not included soil remediation costs in areas where pipeline spills have occurred.

In the February 1998 Environmental Assessment (EA) for Renewal of Source Material License # SUA-1534, Sections 6.2 and 6.4 describes the CBR operating procedures used to minimize the potential failure of pipelines and the potential failure of injection or production well casing.

In Section 6.2, indicates that all pipelines from the plant, as well as that to and within the wellfields are buried to avoid freezing. All pipeline welds are tested at operating pressures prior to burial and the start of production flow. Each wellfield has a number of wellhouses where injection and recovery lines are monitored continuously. Individual lines have high and low flow alarms, and all set points and alarms are monitored by a computer in the control room. In addition, each wellhouse has an alarm system to detect spills within the house. In this way, small, occasional leaks at joints and fittings for pipes in the wellhouses can be detected and repaired as needed.



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Section 6.4 describes the procedures used to minimize leaks from the potential failure of an injection or production well casing. To minimize the likelihood of such leaks, CBR pressure-tests wells for integrity following initial completion, after testing and certain types of maintenance, and at least once every five years during a well's operational lifetime. CBR has also performed subsurface investigations to determine whether groundwater or subsurface soils have been contaminated by leaking wells.

License Amendment 13, Crow Butte Resources *In Situ* Leach Facility, License # SUA-1534 (September 2002), outlines in Section 12.2 the reporting and record keeping requirements for spills, leaks, and line ruptures. CBR has a procedure which evaluates the consequences of each spill against 10 CFR 20, Subpart "M," and 10 CFR 40.60 reporting criteria. All spills are documented and the information includes; date, volume, total activity of radionuclides released, radiological survey results, soil sample results (if taken), corrective actions, results of post remediation surveys (if taken), and a map showing the spill location and the impacted area. This information is kept current and is reviewed by NRC staff during the annual site inspection.

Soil is removed from a spill area and sent to a by-product disposal facility if radiological surveys indicate that contamination is present. Attached is a bill-of-lading of a shipment of such contaminated soil.

CBR includes soil remediation costs around each production and injection well in each mine unit to account for the potential contamination that might occur throughout the life of the well. Final remediation of the soil around each wellhead will be determined during reclamation of each mine unit.

NRC staff noted that CBR has specified a total restoration pore (PV) of 8 PVs in the surety estimate. However, a review of the Mine Unit 1 restoration report indicates that 9 PVs were required to restore this mine unit.

During restoration of Mine Unit 1 CBR was continually upgrading the restoration circuit. At the beginning of restoration, RO Unit 1 was brought on line with only two patterns circulating through the unit. At the same time, 11 to 13 other patterns were online for ion exchange treatment. As restoration progressed, new RO units were constructed. Eventually RO Unit 1 was shut down and replaced with three thin film membrane RO units. The flow capacity with these three new RO units was 200 gpm, so at the end of groundwater treatment for Mine Unit 1, there were nine patterns in RO restoration.

In addition to newer and better RO units, new restoration pipelines were installed which provided increased flow capacity and versatile flow arrangements. This allowed for more



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efficient RO operations. Currently CBR has installed fifteen RO units with a flow capacity of 500 gpm and has installed additional piping to further isolate the restoration circuit from the commercial production circuit. These improvements to the restoration system should significantly reduce the number of pore volumes for the restoration of future mine units.

In the October 1999 report, *Evaluation and Simulation of Wellfield Restoration at the RMAC Smith Ranch Facility*, prepared for Rio Algom Mining Corporation by Lewis Water Consultants, and submitted to the NRC, it was concluded that it was possible, at that location, to restore a mine unit to class-of-use within 3.4 pore volumes and should meet baseline conditions for all constituents within 4.4 pore volumes. Although this study was conducted using the Smith Ranch site, the parameters used would be fairly representative of those at the CBR site.

CBR feels that the 8 PVs used in the 2008 Surety Estimate is very conservative and with the improvements made to the restoration circuit, future mine units should be restored using significantly fewer pore volumes.

The Mine Unit 1 restoration report states that 26.2 PVs of groundwater ion exchange treatment was undertaken from September 1994 through February 1999. NRC questions why this cost has not been included in the 2008 surety and whether or not ion exchange treatment is part of restoration.

Once a mine unit has been taken out of production (injection of mining solution has ceased) soluble uranium is still present. To continue recovering this ore the production stream is removed from the commercial ion exchange circuit and is diverted through ion exchange in the restoration circuit. Although the restoration circuit is used for this purpose, CBR has not viewed this as part of the restoration process but as a continuation of the mining process. Excluding this process from restoration has no impact on the overall restoration costs. It is merely an extension of the mining process without additional injection of mining solution. By increasing the throughput through the commercial plant (License Amendment No. 22, dated November 30, 2007) CBR will be able to use this additional flow to lower the headgrade of a well to a concentration closer to the restoration value, thus reducing the amount of ion exchange through the restoration circuit. Any residual uranium will then be removed through ion exchange prior to RO treatment. With the flow increase CBR now has the ability to mine the low headgrade wells through the commercial production circuit and will not have to use the restoration circuit as was done when restoring Mine Unit 1.

If you have any questions, please feel free to contact me at (308) 665-2215 ext 114.

CROW BUTTE RESOURCES, INC.



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Sincerely,
CAMECO RESOURCES

Larry Teahon

Larry Teahon
Manager of Environmental, Health and Safety

Attachment: As Stated

cc: David Miesbach, NDEQ
Steve Collings, CBR
Jim Stokey, CBR
CBR File

STRAIGHT BILL OF LADING
ORIGINAL--NOT NEGOTIABLE

Shipper No. _____

Carrier No. _____

Page 1 of 1

Smith System Transportation

Date 12/17/07

(Name of Carrier)

(SCAC)

on Collect on Delivery shipments, the letters COD must appear before consignee's name or as otherwise provided in Item 430, Sec. 1.

To: Consignee Path Finder Mines, Inc.
Street Shirley Basin
City Shirley Basin State WY Zip Code 82615

From: Shipper Cameco Resources - Crow Butte Operation
Street: 86 Crow Butte Rd.
City Crawford State NE Zip Code 69339
24 hr. Emergency Contact Tel. No: (308) 665-1393

Route :

Vehicle:
Number

No. of units & container type	HM	Basic Description Proper Shipping Name, Hazard Class, Identification Number (UN or NA), Packing Group, per 172.101, 172.202, 172.203	Total Quantity (Weight, Volume, Gallons, etc.)	Weight (Subject to Correction)	RATE	Charges (For Carrier Use Only)
1 roll off	XX	RADIOACTIVE MATERIAL, L.S.A., RQ, N.O.S. CLASS 7, UN2912, LSA 1	15 cubic yards			
		PHYSICAL FORM: Solid byproduct material				
		CHEMICAL FORM: NATURAL URANIUM OXIDE UO₄-2H₂O				
		LABELS APPLIED: N/A				
		TRANSPORT INDEX: N/A per 49CFR172.208(d)(1)(k)				
		ACTIVITY OF SHIPMENT: <u>8.47x10⁷</u> Bq				
		THIS VEHICLE IS ASSIGNED FOR EXCLUSIVE USE OF POWER RESOURCES, INC. UNDER PROVISIONS OF 49 CFR 173.425 (b)				
		DO NOT LOAD OTHER FREIGHT IN THIS VEHICLE, TRANSFER EN ROUTE, OR BREAK SEAL				
		PLACARDS: RADIOACTIVE 7 TRUCK SEAL NUMBER: n/a				
		CBR Shipment #: W-25-07 <u>CBR#2</u>				

PLACARDS TENDERED: YES : NO:

REMIT C.O.D. TO:
ADDRESS

Note-(1) Where the rate is dependant on value, shippers are required to state specifically on writing the agreed or declared value of the property, as follows: The agreed or declared value of the property is hereby specifically stated by the shipper to be not exceeding _____ per _____
(2) Where the applicable tariff provisions specify a limitation of the carrier's liability absent a release or a value declaration by the shipper and the shipper does not release the carrier's liability or declare a value, the carrier's liability shall be limited to the extent provided by such provisions. See NMFL item 172.
(3) Commodities requiring special or additional care or attention in handling or stowing must be so marked and packaged as to ensure safe transportation. See Section 2(e) of item 360, Bills of Lading, Freight Bills, and Statements of Charges and Section 1(a) of the Contract terms and conditions for a list of such articles.

I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name and are classified, packaged, marked, and labeled/placard, and are in all respects in proper condition for transport according to applicable international and national governmental regulations.

ON BEHALF OF SHIPPER

Signature

COD Amt \$

Subject to Section 7 of the conditions if this shipment is to be delivered to the consignee without recourse on the consignor, the consignor shall sign the following statement:
The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges.

(Signature of Consignor)

C.O.D. FEE:
PREPAID
COLLECT \$

TOTAL CHARGES: \$

FREIGHT CHARGES
FREIGHT PREPAID Check box if charges
except when box at are to be
right is checked collect

RECEIVED, subject to the classifications and tariffs in effect on the date of issue of this Bill of Lading, the property described above in apparent good order, except as noted (contents and condition of contents of packages unknown), marked, consigned, and destined as indicated above which said carrier (the word carrier being understood throughout this contract as meaning any person or corporation in possession of this property under the contract) agrees to carry to its usual place of delivery at said destination, if on its route, otherwise to deliver to another carrier on the route to said destination. It is mutually agreed as to each carrier of all or any of, said property over all or any portion of said route to destination and as to each party at any time interested in all or any said property, that every service to be performed hereunder shall be subject to all the bill of lading terms and conditions in the governing classification on the date of the shipment. Shipper hereby certifies that he is familiar with all the lading terms and conditions in the governing classification and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his assigns.

SHIPPER: **Cameco Resources - Crow Butte Operation**

CARRIER: **Smith System Transportation**

PER Larry Teahon

PER DW

DATE 12/17/07

DATE 12-17-07

CROW BUTTE RESOURCES, INC.

86 Crow Butte Road
P.O. Box 169
Crawford, Nebraska 69339-0169



(308) 665-2215
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SHIPPING PAPERS

(Complies with D. O. T. Hazardous Material Regulations, 49 CFR Parts 100-199)

SHIPPER: Cameco Resources
Crow Butte Operation
Crawford, Nebraska 69339
License No. SUA-1534

RECEIVER: Pathfinder Mines Corp
Shirley Basin Mine
Shirley Basin, Wyoming 82615

SHIPPING DATE: December 17, 2007

CBR SHIPMENT #: W-25-07

CONTENTS:

Radioactive Material; low specific activity; N.O.S., LSA, RQ, UN 2912, Hazard Class 7
Shipment contains low specific activity by-product material from an in-situ uranium mine.

Bulk shipment of by-product material

Total Maximum Activity of Load: 2.29×10^{-3} Ci (8.47×10^7 Bq)

LABEL CATEGORY: Radioactive L.S.A.

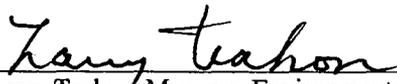
RADIOACTIVE PLACARDS APPLIED.

This roll-off container is assigned for exclusive use of Crow Butte Resources, Inc. under provisions of 49 CFR 173.425 (b) and (c). No other materials may be hauled during this shipment and until decontamination is verified after unloading.

Specification marking and labeling accepted by 49 CFR 173.425 (b).

SHIPPERS CERTIFICATION:

This is to certify that the above named materials are properly classified, described, packaged, marked, and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.


Larry Teahon, Manager, Environmental,
Health and Safety
Cameco Resources – Crow Butte Operation

