



Matthew H. Mead, Governor

# Department of Environmental Quality

*To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.*



John Corra, Director

June 5, 2012

Mr. Ken Garoutte  
Manager, Safety Health, Environment and Quality  
Cameco Resources  
P.O. Box 1210  
Glenrock, WY 82637

**RE: 2010-2011 Annual Report (AR) Review, Permit 603, Cameco Resources (CR)**

Dear Mr. Garoutte:

The Land Quality Division (LQD) has completed the referenced review which has been delayed due to other priority reviews requested by your operation. Please find review comments enclosed.

A total of forty-four (44) comments are included in the review. Of these comments, thirty-seven (37) will require response with changes to the report. The remaining seven (7) comments should be addressed within the 2011-2012 AR with responses to those comments provided with the new report and a copy for the 2010-2011 AR file.

A review of the surety estimate has determined that an increase in the surety will be required. The surety amount is set at \$231,464,435.00. The current surety is \$92,730,500.00. Therefore, an increase in the amount of \$138,734,000.00 will be required. A formal request for the increase will be sent to CR in the near future.

LQD is continuing to work on a compliance schedule for outstanding comments. This effort is taking more time than expected and therefore, will be sent to CR upon completion later this month.

If you have any questions, please contact me at 307-777-7048 or [pam.rothwell@wyo.gov](mailto:pam.rothwell@wyo.gov).

Sincerely,

Pam Rothwell  
District 1 Assistant Supervisor  
Land Quality Division

Enclosure: Review Comments

cc: Cameco Resources, Cheyenne, WY  
Doug Mandeville, NRC



PERMIT 603, HIGHLAND URANIUM PROJECT, CAMECO RESOURCES (CR)

2010-2011 ANNUAL REPORT REVIEW

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**INTRODUCTION**

The Land Quality Division (LQD) received the above referenced report on July 5, 2011 for report period June 1, 2010 through May 31, 2011. LQD had granted an extension to submit the report late at CR's request. LQD's review of the report was delayed due to multiple permitting and compliance priorities of the Cameco permits. LQD staff reviewers included Steve Ingle (SI) and Pam Rothwell (PCR). In addition, the Wyoming Game and Fish reviewed the annual raptor monitoring results with no requests for management or mitigation.

A total of forty-four (44) comments are included in the review. Of these comments, thirty-seven (37) will require response with changes to the report. The remaining seven (7) comments should be addressed within the 2011-2012 Annual Report with responses to those comment provided with the new report.

As a result of the review, LQD has determined that an increase in the surety will be required. See comment 43 below. The surety amount is set at \$231,464,435.00. The current surety is \$92,730,500.00. Therefore, an increase in the amount of \$138,734,000.00 will be required. A formal request for the increase will be sent to CR in the near future.

**COMMENTS**

- 1 Page 8, Reporting Period. CR indicates the reporting period is June 1, 2010 through April 30, 2011. The reporting period is June 1, 2010 through May 31, 2011, although a reporting cutoff date may be used for information provided in the report. Please state the correct reporting period. CR may include a statement that describes the cutoff period for the information reported. **(PCR)**
- 2 Page 8. Item 3 states that seven expanded maps, Plates 1-1 through 1-8(HUP) were added to this Annual Report. There is no Plate 1-8(HUP). Please correct the text to show that Plates 1-1 through 1-7(HUP) were added. **(SI)**
- 3 Page 10 states that there were no reportable spills during the Annual Report period. On March 10, 2011 there was a pump test water spill in the K-North wellfield. Please include this spill in Item 3 on Page 10 of the Annual Report. **(SI)**
- 4 Page 10, Injection/Production Flows. The last sentence should be corrected by removing the reference to CPP. **(PCR)**
- 5 Page 10. Table 3-5 presents the total annual flows at Satellite 2 and Satellite 3. As specified in Chapter 11, Section 15(c)(iii) injection and production flows for each wellfield should be specified. The citation also requires a description of how these flows

were determined. Please include the injection and production flows for each wellfield and a description of how the flows were determined. **(SI)**

- 6 Page 11, Selenium Treatment Facility. The permit requires that processed remediation water sent from Satellite 2 and Satellite 3 to PSR-2 and then to the surface irrigator to target an average selenium concentration not to exceed 0.1 mg/L. The text states, "*The new plant will provide selenium removal to a target concentration not to exceed average selenium levels of 0.1 mg/L.*" To demonstrate that the target has been achieved for the report period, please provide a tabulation of all sampling data (monthly), for water samples taken at the Satellite facility prior to sending to PSR-2. This information is being requested per Wyoming Environmental Quality Act § 35-11-411(b). **(PCR)**
- 7 Page 12, Satellite No. 3. The text states, "*A production bleed is maintained by treating a portion of the injection fluid and disposing of it at Irrigator No. 2.*" The sentence is misleading in that it indicates fluid injected into the wellfields is also disposed at the irrigator. Please clarify the statement with the correct terms for the fluids and where it is treated prior to disposal to the Irrigator No. 2. **(PCR)**
- 8 Page 12, Deep Disposal Wells. The sentence which states, "*For operation of SRHUP # 6, the maximum instantaneous injection rate is permitted by the WDEQ-WQD...*" should reference SRHUP # 9. Please correct the text. **(PCR)**
- 9 Page 15 of the Annual Report states that attenuation is occurring in Wellfield A, but Page 19 states that the values are stable. Review of Table 3-6 shows that the values are stable. Please correct the text on Page 15. **(SI)**
- 10 Page 16, Mine Unit C. Please discuss any groundwater sweep, reverse osmosis or recirculation, degassing activities that occurred in the mine unit during the report period including volumes (AF) of groundwater used for each activity. A running total should be included for the wellfield as documented in previous reports. **(PCR)**
- 11 Page 16, Mine Unit C. Please discuss the excursions in the wellfields during the report period including discussion of any efforts to control them. **(PCR)**
- 12 Page 17, Mine Unit C, Underground Mine Workings. Please discuss the sample results for the underground workings as reported in the Quarterly Reports to date. The additional monitor wells that were installed to monitor potential movement of production fluids within and surrounding the underground workings should be evaluated. LQD does not know whether the sample results have been evaluated. The discussion should describe changes since the initiation of the sampling program. This information is being requested per Wyoming Environmental Quality Act § 35-11-411(b). **(PCR)**
- 13 Page 17, Mine Unit D and D-Extension. The text describes RO treatment at the up-gradient end of the mine unit... Please explain if groundwater sweep was used prior to RO. If it was not, describe the intent to achieve a pore volume of sweep as required by

the permit. Also, provide the volume of fluids used to treat the groundwater during the report period. **(PCR)**

- 14 Page 17, Mine Unit E. Please state whether or not any restoration fluids were used during the report period and if so, provide the volumes. **(PCR)**
- 15 Page 18. Please elaborate on the anti-scalant chemical treatment including a description of the process and the chemicals used. Also, describe where this activity is occurring. **(PCR)**
- 16 Page 18, Section 5. The citation should be corrected to read § 35-11-411(a)(iii). LQD has clarified to CR that the restoration schedule can be updated in the annual report as a result of minor changes such as delays due to minor market adjustment for commodity or minor operational adjustments. However, if the schedule is modified due to a change in operational planning, CR is required to submit a permit revision for review and approval of the change. Please refer to Noncoal Rules and Regulations, Chapter 7 (as referenced in Chapter 11, Section 19 (f)). **(PCR)**
- 17 Page 18, Highland Central Processing Facility. The reviewer suggests CR contact DEQ/Industrial Siting Division regarding any requirements to permit the facility modifications. **(PCR)**
- 18 Page 18-19, Mine Unit F. CR should ensure that the addition of new header houses should follow the plans in the wellfield package as reviewed for approval. Deviations from the approved plans should be discussed with LQD for evaluation of the need for a revision to the plan. **(PCR)**
- 19 Pages 18 and 19. The text states that delineation drilling is planned for Mine Unit's F, I, and J. Please provide an estimate of the disturbance acreage for these areas. **(SI)**
- 20 Page 19, Mine Unit B. CR will need to keep LQD informed of the discussions with NRC regarding restoration of the groundwater in Mine Unit B. It is not sufficient to only notify LQD when groundwater restoration is approved by NRC as stated in the report. If CR is requesting Alternate Concentration Limits to achieve the restoration, LQD needs to be informed. If additional restoration effort is pursued, LQD needs to be informed. If wellfield refurbishments are considered to implement additional restoration, LQD needs to be informed. Please keep LQD informed of the restoration discussions with the NRC. **(PCR)**
- 21 Page 20, Wastewater Treatment and Disposal. Pipeline infrastructure is an integral part of an insitu operation. Changes such as the proposed 5.5 mile pipeline to connect Satellite 2 with MUs C, D, Dext and E should be included in the permit, i.e., shown on a map and describing the purpose in the text. Please revise the permit. **(PCR)**

- 22 Page 21, Core and Mineralogy Program. Please discuss core drilling activities with LQD regarding the rigs size, disturbance area, pit size, access requirement, etc. **(PCR)**
- 23 Page 21, Core Mineralogy Program. LQD does not understand the purpose of the research. A discussion of the intent of the program should be explained in the permit. Please provide a permit revision. **(PCR)**
- 24 Page 21. CR states that they plan to perform a bioremediation field test on an isolated five spot pattern in Mine Unit E during the Third Quarter of 2011. CR will need to provide LQD with a proposal for a technical review and approval of the test prior to initiating the test. **(SI/PCR)**
- 25 Page 25, Vegetation Data. The text describes the Golder study to address characterization of the soils in PSR-2. The LQD has continued to wait for the responses to comments to the 2007 Annual Report and the data from Golder's study. During the 2009-2010 AR surety review, LQD agreed to defer a surety increase for the removal of the soils provided the information was submitted. As CR has not responded to the requests for information, LQD cannot assume the submittal is in progress or that it will be acceptable upon receipt. Therefore, a surety increase is required to cover the cost to remove a minimum of 12 inches of surface material from Irrigator No. See comment No. 43 below. **(PCR)**
- 26 Page 26. The text states that the irrigation fluid was applied through October 31, 2011. The correct date is October 31, 2010. Please correct the date. **(SI)**
- 27 Page 26. A review of the Land Application text section was not conducted for the report. Several comments have continued to be carried from the 2007-2008 review that have not been resolved. Those comments remain outstanding. During the 2009-2010 AR review, comment No. 50 stated *CR will need to include a cost to remove an estimated depth of contaminated soils (i.e., as agreed upon by CR and LQD) within the irrigation circles unless soil characterization information is provided to resolve this cost.* CR has not addressed the previous review comments or provided the characterization of the soil and vegetation as promised. LQD will add a cost for removal and transportation of 1.0 feet of soil from the two Irrigation Circles. See comment No. 43 below. **(PCR)**
- 28 Page 29, Annual Monitoring Report for Boner Bros. Partnership. CR should discuss the trending increases in selenium concentrations in vegetation at Section 22 Drainage as noted in Figure 2 within the 2011-2012 Annual Report. It would be beneficial to discuss the trends noted in past annual reports with LQD soil specialist, Lowell Spackman to ensure issues of concern are adequately addressed in the report. **(PCR)**
- 29 There are two copies of Tables 10-1 and 10-2 in the Annual Report. The first Table 10-1 indicates that there were 66,000,000 delineation holes. The second Table 10-1 indicates there were 66 delineation drill holes. Please remove the erroneous Table 10-1 and the duplicate Table 10-2. **(SI)**

- 30 Table 3-7. The table incorrectly lists the Domestic Class of Use standard for selenium as 0.01 mg/l. The correct value is 0.05 mg/l. Please correct the table. The table also lists the domestic Class of Use standard for uranium as 5 mg/l. Please provide the reference which identifies this standard. **(SI/PCR)**
- 31 Table 3-7. The table should indicate if the sample values are composite samples or averaged individual well samples. Please show the sample type. **(SI)**
- 32 Table 3-1, Affected Area Summary. (Please make the changes to this report)
- a) The total has not been changed from the 2009-2010 report, though there has been additional disturbance during the 2010-2011 report period. Please update the cumulative total.
  - b) The acres of disturbance for the Morton and Vollman deep disposal wells and pipeline are not included in the table. Please add these acres.
  - c) The Mine Unit I water well disturbance shown on Plate 1 is not included in the table. Please add the acres of disturbance.
  - d) How does CR track disturbance acres for exploration and delineation drilling outside of the mine units. These acres should be tabulated and included in the Annual Reports.
  - e) The line item *D-Extension Wellfield; 2001 (in production)* should be revised as it is no longer in production.
  - f) LQD requests that additions to the table for the report period be shown in bold print for ease of identification of the new disturbance. **(PCR)**
- 33 Table 3-2, Topsoil Stockpile Summary. CR added three stockpiles since the last report, however, the change in the total additional soil from 2009-2010 report period (142,452 cy) to the 2010-2011 report period (143,322 cy) does not match the additional volume for the report period (1244 cy). Please correct the total to show 143,696 CY. **(PCR)**
- 34 Table 7-6, Satellite No. 2 Land Application Facility. The fluid volume applied during the report period is shown as 57.3 acre/ft. The change in total volume from the last report period does not match the volume that was reported as applied for the report period. Please explain the discrepancy and correct the total. **(PCR)**
- 35 Plates 2, 2-1 and 2-2. Showing and tracking the affected acres is an excellent tool for identifying disturbance acres and tracking the status for reclamation. Maintaining this information for bond release will be very helpful when it is time to evaluate revegetation success. It is also useful in tracking changes from one report to the next with regard to surety updates. LQD appreciates the effort to develop the maps to present this information. CR should also ensure that the total acres included in the surety as needing permanent reclamation corresponds to the acres reported in Table 3-1 and shown on Plates 2, 2-1 and 2-2. LQD will evaluate these reported acreage numbers during the next AR review. **(PCR)**

- 36 Plates 3-1 through 3-7, Abandon Drill Hole Maps. Only Plates 3-1 and 3-2 were included in the report. Please provide the additional maps. Also, the legend does not state which drill hole locations are abandoned. Please identify this on the map. **(PCR)**
- 37 The renovation plan to convert the Highland Central Processing Facility to a Resin Transfer System should be provided to the LQD as a permit change. Please submit the permit revision. **(PCR)**
- 38 Appendix C, Surety Estimate, Page 4. Recent inspections of wellfields considered in production but in the very late stages of mining are a concern as LQD remains concerned that restoration is being delayed. The restoration delays continue to be an issue of complexity which CR has demonstrated little success to achieve. Most, if not all of the wellfields included in Permit 603 are in active restoration or late stages of mining. CR discovered a need for wellfield refurbishment in MUs C, D, Dext., E, and F. It would be expected that similar refurbishment will be necessary in MUs H, I and J. Please provide an estimate for the refurbishment costs for these wellfields in the 2011-2012 surety estimate. **(PCR)**
- 39 Appendix C, Surety Estimate, Page 8. Regarding disposal costs, the page shows a *transportation and disposal unit cost* to the county landfill for Well Head Covers of \$8.115/CY. However, only the disposal cost at the county landfill for Header Houses is \$8.12/CY. LQD questions the inclusion of the transportation cost in the \$8.115/CY. Please distinguish the transportation costs for disposal of all waste taken to the county landfill. Provide the information in the 2011-2012 surety estimate. **(PCR)**
- 40 Appendix C, Surety Estimate, Page 14. A cost is not included for the Satellite 3 Building Utility Cost. LQD has not been able to verify which facilities will be used in restoration. Documentation of restoration process fluids and the facilities that are used is necessary in the Annual Report. Please provide a utility cost for Satellite 3 or documentation of the facilities that are used to restore all wellfields in the 2011-2012 surety estimate. **(PCR)**
- 41 Appendix C, Surety Estimate, Building Utility Costs. Satellite No. 2 is showing eleven (11) years of operation required for restoration/reclamation. The approved restoration schedule shows MU-K in restoration through 2029. It could be CR's justification for using eleven years is that the facilities would only be necessary for eleven years from the time the operation ceased in the event of bond forfeiture. However, this cannot be assumed as the restoration is sequenced, based on an approved water balance which includes mining. LQD would be willing to discuss an interim bond water balance and restoration schedule based on the event of bond forfeiture. To accommodate a review of this change, CR would be required to present a separate interim water balance and restoration schedule that effectively demonstrates that multiple wellfields can be restored simultaneously. Until a permit revision is approved to accommodate a change, the full restoration period is required for the use of the facilities. Please correct the number of years of operation. The same applies to the Selenium Plant and the deep disposal wells. As a result of the correction to the years of operation, the costs also need to be corrected. Please correct the surety estimate in the 2011-2012 Annual Report. **(PCR)**

- 42 Appendix C, Surety Estimate, Page 24. Please provide itemized costs for the shallow well casing leak mitigation in the 2011-2012 surety estimate. (PCR)
- 43 Appendix C, Surety Estimate, Page 23. The estimated cost to remove 1.0 feet of soil and transport to an 11e2 waste disposal facility is approximately \$111,138,257.70. Note: a cost to replace topsoil has not been added; however, LQD will assess the need to replace the topsoil and may require additional costs for replacement in the future. Please correct the surety estimate to show this change. The calculation for the increase to the surety is shown on the attachment to this review. **An increase in the surety for the amount of \$138,734,000.00 is required as shown in the attached calculation (Attachments 1-3).** (PCR)
- 44 Appendix C, Surety Estimate. Staffing to conduct the groundwater restoration and subsequent surface reclamation is not clearly presented in the surety estimate. LQD understands that some of the labor costs are included as operator costs assigned to equipment, however, many labor costs are not clearly identified. For example, in the Equipment section of the surety, labor costs include the number of persons assigned to the task. On the contrary, in the, Groundwater Restoration section, Well Abandonment section, Wellfield Reclamation section, Wellfield and Satellite Surface Reclamation section, Buildings section, and Miscellaneous section, labor costs are not identified. CR has included limited supervisory labor costs in the Groundwater Restoration section, however, these costs are not sufficient to cover the labor costs required to complete the necessary restoration/reclamation work. LQD does not have information on current operational staffing to meet the needs of the operation. Therefore, CR will need to provide a detailed tabulation for the labor requirements for restoration/reclamation and show all associated costs in the surety estimate. Please identify all necessary labor costs in the 2011-2012 surety estimate. (PCR)

**ATTACHMENT 1 – SOIL MITIGATION COSTS AT IRRIGATION CIRCLES 1 & 2**

**Irrigator No. 1**

Area = 55 ACRES

Volume of soil removal required = 55Ac X 43,560 ft<sup>2</sup>/ac X 1ft = **2,395,800 ft<sup>3</sup> / 27 = 8,733.3CY**

Removal & Loading Unit Cost (Guideline 12, Appendix C- one-way, 1000', level) = **1.090/BCY**

Transportation & Disposal Unit Cost (CR Response to Comment 47) = **\$14.88/ft<sup>3</sup>**

Removal/Loading Cost	8,733CY X \$1.090	\$ 96,718.97
Transportation/Disposal Cost	2,395,800 ft <sup>3</sup> X \$14.88	<u>\$35,649,504.00</u>
TOTAL MITIGATION COST @ Irrigator No. 1		<b>\$35,746,223.00</b>

**Irrigator No. 2**

Area – 116 ACRES

Volume of soil removal required = 116 Ac X 43,560 ft<sup>2</sup>/ac X 1ft = **5,052,960 ft<sup>3</sup> /27 =**

**187,146.67CY**

Removal & Loading Unit Cost (Guideline 12, Appendix C –one-way, 1000' level) =**1.090/BCY**

Transportation & Disposal Unit Cost (Response to Comment 47) = **\$14.88/ft<sup>3</sup>**

Removal/Loading Cost	187,146.67CY X \$1.090	\$ 203,989.87
Transportation/Disposal Cost	5,052,960 ft <sup>3</sup> X \$14.88	<u>\$75,188,044.80</u>
TOTAL MITIGATION COST @ Irrigator No. 2		<b>\$75,392,034.67</b>

<b>TOTAL SOIL MITIGATION COST- IRRIGATOR 1 &amp;2</b>	<b>\$111,138,257.00</b>
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**ATTACHMENT 2 -ADJUSTED COSTS FOR MISCELLANEOUS RECLAMATION**

**MISC REC, Sections VIII & IX (Mitigation Costs for Irrigators)**

Pages 23 & 24 of 2010-2011 Surety (MISC REC, Sections VIII & IX)

Irrigator No. 1 – Updated Mitigation Plan Cost	\$35,746,223.00
Less Approved Mitigation Plan Costs (obsolete plans)	<u>\$ - 54,394.00</u>
Revised Cost	<b>\$35,691,829.00</b>

Irrigator No. 2 – Updated Mitigation Plan Cost	\$75,392,034.67
Less Approved Mitigation Plan Costs (obsolete plans)	<u>\$ - 96,692.00</u>
Revised Cost (Sections VII&IX)	<b>\$75,295,343.67</b>

<b>Adjusted Mitigation Costs for Irrigators</b>	<b>\$110,987,172.00</b>
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**2010-2011 Surety Estimate for MISC REC (Sections I-XIII)**

Approved Total Miscellaneous Reclamation Cost	\$ 11,993,678.00
Adjusted Sections VII & IX	<u>\$110,987,172.00</u>

<b>TOTAL REQUIRED MISC REC (Sections I – XIII)</b>	<b>\$122,980,850.00</b>
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**ATTACHMENT 3 - ADJUSTED SURETY FOR REPORT PERIOD & REQUIRED INCREASE**

**2010-2011 SURETY ESTIMATE**

I	GW REST Sheet	\$ 34,613,100
II	WA	\$ 12,503,045
III	WF REC	\$ 10,380,553
IV	WF-SAT-SURF	\$ 449,972
V	EQUIP	\$ 538,415
IV	BLDG	\$ 3,705,613
VI	MISC REC Sheet	\$122,980,850
	Subtotal Reclamation Cost	\$185,171,548
	Contingency (25%)	<u>\$ 46,292,887</u>
	<b>TOTAL SURETY ESTIMATE</b>	<b>\$231,464,435</b>

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**REQUIRED SURETY INCREASE**

Required Surety Amount	\$231,464,435
Less Current Surety	<u>\$ 92,730,500</u>

<b>REQUIRED SURETY INCREASE (rounded up to nearest \$100)</b>	<b>\$138,734,000</b>
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Items in yellow indicate changes from the proposed surety estimate included in the 2010-2011 Annual Report