



Department of Environmental Quality

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



Matthew H. Mead, Governor

Todd Parfitt, Director

CERTIFIED MAIL : 7010 0780 0000 4621 1502

November 16, 2012

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

RE: 2011-2012 Annual Report (AR) Review, Permit 603, Cameco Resources (CR)

Dear Mr. Garoutte:

The Land Quality Division (LQD) has completed the referenced review with the exception of the surety estimate. The surety will be reviewed by LQD staff no later than January 31, 2013. Please find review comments enclosed and provide responses to the comments **within 120 days** of receipt of this letter.

If you have any questions, please contact me at 307-777-7048 or 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)

2011-2012 ANNUAL REPORT REVIEW

INTRODUCTION

The Land Quality Division (LQD) received the above referenced report on July 31, 2012 for report period July 1, 2011 through June 30, 2012. LQD had granted an extension to submit the report late at CR's request. LQD staff reviewers included Steve Ingle (SI), Brian Goodnough (BG), Lowell Spackman (LS), Robin Jones (RJ) and Pam Rothwell (PCR).

A total of forty-four (45) comments are included in the review. Note: LQD has not completed a review of the surety for the permit. The surety review of the estimate provided in the Annual Report will be completed by January 31, 2012.

Please note Comment No. 43, requests the response to TFN 5 1/119 **by December 15, 2012** including a Form 11 to approve the updated restoration schedule and water balance with a condition to the permit.

COMMENTS

- 1 Table 3-1, Affected Areas Summary. The difference in the cumulative total affected acres between the 2010-2011 report period and the 2011-2012 report period is 3.8 acres. CR has identified the Vollman 31-27 DDW Pipe, Vollman Powerline, and the Mine Unit I to Water-Well Powerline disturbances which total 3.8 acres. However, the Table report the 2011-2012 Affected Area is 7.7 acres. Please identify the additional 3.9 acres that were disturbed during the report period.

Additionally, CR has removed the 6 acres of disturbance attributed to MU-K North presumably to reassign to Permit 633. This needs to be explained in the text. The change in the tabulated acres affects the total cumulative acres that are affected and must be explained. Please verify the change in acres between the past report period and the current report. All changes to the Table should be bolded and an explanation provided in the text discussion of the report. The acres changes should also translate to the Annual Report Maps for identification of new disturbance areas. CR will need to verify accuracy of the new disturbances on the AR maps. **(PCR)**

- 2 Table 3-2, Topsoil Stockpile Summary. The Table has been revised without text discussion explaining the change. Please provide text discussion of the added columns to the table. **(PCR)**
- 3 Table 3-2. The yellow highlight for topsoil stockpile 30 should be explained. The pile continues to show a volume of 592 yds, yet, it is reported under "Reclamation Date" that the pile was reclaimed in Fall 2011. Please explain the status of the stockpile. **(PCR)**

- 4 Page 8. Mining Activities. The disturbance for ISL mining includes stripping topsoil in areas of wellfield development. This is not reflected in the annual reports. CR needs to be tracking the acres that have had topsoil stripped including the salvage and replacement topsoil depths and the acres that are seeded with temporary seed. Please include these disturbances and/or seeded acres in the report. **(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. Table 3-5 presentation of combined flows through a Satellite does not address the intent of the requirement. Please include the injection and production flows for each wellfield and a description of how the flows were determined. **(SI/PCR)**
- 6 Page 11, Satellite No. 1. The text states that reclamation activities will commence upon approval of Mine Unit B groundwater restoration approval from the NRC. Please provide a timeline for the restoration approval from the NRC and the subsequent reclamation of Satellite No. 1. Provide illustration of the infrastructure requirements to the Satellite for the restoration of the wellfield to demonstrate the need for the Satellite. Discuss any necessary refurbishments to complete additional restoration. **(PCR)**
- 7 During the reporting period, the deep disposal wells injected an average of about 74.1 gallons per minute which is 31.9 gpm less than the 106 gpm deep injection rate used in the water balance. Please discuss the 31.9 gpm deficit. **(SI)**
- 8 Page 17. The text states that natural attenuation is occurring. To conclude that attenuation is occurring, it must be shown that the affected groundwater has reached the down gradient wells. Please discuss the basis for the attenuation statement. **(SI)**
- 9 Page 17, Mine Unit B. LQD approved the groundwater restoration for MU-B nearly five years ago. CR should provide a summary of the ongoing review/discussion issues with NRC including a timeline for the restoration approval from the NRC and the subsequent reclamation of Mine Unit B. Provide illustration of the infrastructure requirements for the restoration of the wellfield, preventing the reclamation of the wellfield. Discuss the status of the existing infrastructure in the wellfield including any necessary replacement wells, pipeline, header houses, etc. and also necessary refurbishments to complete additional restoration. **(PCR)**
- 10 Page 17, Mine Unit B. The LQD understands that CR is negotiating Alternate Concentration Limits (ACL) with the NRC for Mine Unit B groundwater restoration approval. As the review progresses, the LQD would like to be involved in discussions of the resolution as needed for any long-term requirements that are necessary which may require LQD oversight. No response required. **(PCR)**

- 11 Page 21. Waste Water Treatment. Please explain how adding an anti-scalent to the treated water will reduce the RO reject from 25% to 15% and discuss any potential effects the anti-scalent might have on the wellfields that are in restoration. **(SI)**
- 12 Chapter 11, Section 15(c)(v) allows LQD to request potentiometric surface maps for all aquifers affected by mining operations. Please provide updated potentiometric surface maps for Wellfields C, D, E, F, and H. **(PCR)**
- 13 Pages 20 and 21 states that the ambient air quality, radon and gamma radiation monitoring results are included in Appendix C. These results are not in Appendix C. Please include the ambient air quality, radon and gamma radiation monitoring results in Appendix C. **(SI)**
- 14 Page 24, Core and Mineralogy Program. Please discuss core drilling activities with LQD regarding the rigs size, disturbance area, pit size, access requirement, etc. **(PCR)**
- 15 Page 24, 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. CR is causing disturbance to the mine site which requires well abandonment and surface reclamation that is not approved in the Mine Plan. Please provide a permit revision. **(PCR)**
- 16 Page 25, Section 8, Monitoring Activities (b) Surface Water Analysis and Discharge Data, Stock Ponds: Cameco stated as part of the NRC Source Materials License requires the sampling of several stock ponds once every quarter for natural uranium and radium-226. Cameco only provided 3rd & 4th Quarter 2011 monitoring results. Please provide the monitoring results for the 2012 1st & 2nd quarters or explain why the locations were not sampled and why monitoring results were excluded from the AR. **(BG)**
- 17 Page 25, Section 8, Monitoring Activities (c) Precipitation Data: Cameco listed the Meteorological data and information in Table 10-3 and should be listed on Table 10-6. The meteorological station was not located on the map during this review. Please illustrate Meteorological station on map and list the legal location under Section 8, Monitoring Activities (c) Precipitation Data. **(BG)**
- 18 Appendix B. Table 1 in the Boner Report only includes the 2010 water sampling. Please update the table. **(SI)**
- 19 Appendix B. Table 2 in the Boner Report only includes the vegetation sampling from 2009. Please update the table. **(SI)**
- 20 Appendix B. Figure 2 is not included in the Boner Report. Please include Figure 2 in the report. **(SI)**

- 21 The loading of deleterious constituents in Irrigator No. 2 that is used for disposal of waste water is less of a concern to the LQD than it was before the use of the Selenium Treatment Plant was initiated. Se concentrations were greatly reduced in the vegetation from 16.6 mg/kg in 2009 to 1.4 mg/kg in 2010. However, the vegetation concentration increased to 4.6 mg/kg Se in 2011. A similar decrease in soil concentration occurred in 2009 followed by an increase soil Se in 2011 for this irrigator. The reasons for the increase in 2011 have not been explained or understood.

Although there are some positive results in the reduction of Se after the initiation of the Selenium Treatment Plant for Irrigator No. 2, the results thus far for Irrigator No. 1 show that *the soil concentrations are consistently high for Se concentration in the vegetation.* The clayey nature of the soils and limited natural precipitation create challenges to reducing the levels of deleterious constituents. Responses to outstanding Comment Nos. 19-22 that were originally formulated from the 2007-08 Annual Report review are pending. These responses will attempt to address the remaining concerns. Concerns outlined in these comments will be addressed and tracked through TFN 5 6/348 that was assigned to track the changes resulting from the research conducted by Golder Associates and responses to Comment Nos. 19-22 of the 2007-08 Annual Report. Since these concerns are being addressed through the TFN, no response is necessary to this comment. (LS)

- 22 Section (g) Vegetation Data – CR states that the laboratory analysis procedures for Se concentrations in vegetation changed in 1998 resulting in more complete digestion. This change in procedure may account for the increase in Se during 1998 through 2008. This observation should be footnoted on Figures 7-1 and 7-2.

Recent vegetation analysis shows vegetation Se in Irrigator No. 1 increased from 18.78 in 2010 to 21.1 mg/kg in 2011. For Irrigator No. 2, Se concentrations were greatly reduced in the vegetation from 16.6 mg/kg in 2009 to 1.4 mg/kg in 2010, which was followed by an unexpected vegetation concentration increased to 4.6 mg/kg Se in 2011. The threshold for toxicity in vegetation is 5 mg/kg, therefore the vegetation in Irrigator No. 2 is currently acceptable, but remains elevated in Irrigator No. 1 thus requiring mitigation based on these most recent analysis. No response necessary. (LS)

- 23 Land Application: Soil. Figure 7-3, Irrigator No. 1 and Figure 7-4, Irrigator No. 2 include Radium-226 concentration. The Radium 226 concentration trend showed a general decrease in Radium over the three year period of 2009-2011. CR should continue to monitor radium in these soils. No responses necessary. (LS)

- 24 Land Application: Soil. Figures 7-1 and 7-2 – This comment from the 2009-10 Annual Report has been brought forward to this review. In the previous Annual Report responses, CR explained that in 2006 and 2007 the contract lab changed the analytical methods, thus accounting for the apparent rise in the Radium 226 values. CR should place a footnote or

notation on these figures to explain the anomalies resulting from the different analysis.
(LS)

- 25 Land Application: Soil Water – A brief explanation was provided as to why water samples couldn't be obtained from the lysimeters in either of the irrigators. CR attempted to prime the lysimeters, but still no water from the irrigation was obtained. The poor permeability of the soils is likely one reason the lysimeters aren't collecting water. As a reminder, in the 2007-08 responses to comments, CR made a commitment to assess the merit of changing the sampling period to August, 2009. **Please include the assessment of taking the samples in August of each year as outlined in the Soil Water Comment No. 14 from the 2007-08 Annual Report review. In addition, CR has included a statement that they are evaluating replacing the lysimeters at Irrigator No. 2. This same evaluation should be included for Irrigator No. 1 if it is to be used again. (LS)**
- 26 During the review of the Surety Bond calculation early in 2010, both CR and the LQD agreed that in the interim, the contingency portion of the reclamation bond would be used to cover the cost of mitigating toxic and phytotoxic constituents in the soils and vegetation within the irrigation circles. Including the mitigation of the elevated constituents in the contingency was agreed pending the completion and results of the Golder Associates characterization study that was initiated to address the irrigator comments from the 2007-2008 Annual Report. The complete results of the Se characterization study are still pending. However, the initial results from the treated irrigation waste water that has been used on Irrigator No. 2 has shown Se to decrease in the vegetation to below the 5 mg/kg threshold. Assuming this trend holds, the concerns with Se concentrations in the soils of the irrigators have been reduced. Therefore, **the LQD will not require that the surety include the cost for a minimum depth of soil and vegetation removal at this time. CR must continue to monitor the soils and vegetation in the irrigation circles. The LQD will continue to evaluate the soil and vegetation concentration data to determine if further mitigation will be required in the future. CR must develop a plan to mitigate the high concentration of Se in Irrigator No. 1 be this by restarting this irrigator or using some other clean source of irrigation water. (LS)**
- 27 Annual Report Comments 19-22 from the 2007-2008 Report remain outstanding. Updates of these comments were included in a letter dated October 8, 2012 as tracked under TFN 5 6/348. Further responses to these comments are pending results of further investigations and research. Additional comments related to these concerns are not included with this Annual Report Review, since the comments are being addressed through TFN 5 6/348. No response is necessary for this comment. (LS)

- 28 Table 10-2, Plugged and Abandonment Report. CR has requested bond release for plug and abandonment of 195 drill holes. LQ D will inspect these holes for adequate plugging within one year of the submittal of the AR. No response required. **(PCR)**
- 29 Page 36, 2011-2012 Delineation Drilling. The 195 drill holes reported in the discussion should include a reference to the LQD approval of the drill holes. LQD has discussed this with CR (phone conversation on 11/7/12) and understands that the approvals may occur under a previous annual report review or a separate TFN. In addition, the number of drill holes reported as plugged and abandoned may not reflect the number of drill holes approved due to a cut-off date for reporting in the annual report. CR understands the need to document the approvals in the annual report. Future Annual Reports must include explanation of the approvals of drill holes that have been plugged and discussion of any differences in the number of holes that are plugged compared to the holes that were approved for the drilling period. No Response Required. **(PCR)**
- 30 Page 36, 2011-2012 Delineation Drilling. The first paragraph references 195 new holes that have been reclaimed and reported in Table 10-2 including a bond release request. This is an incorrect statement. The 195 holes are shown on Table 10-1. The text should discuss the intent of Table 10-1 is to provide drill hole completion information for LQD inspection for verification of plug and abandonment. Please provide the corrections. **(PCR)**
- 31 Table 10-1, Delineation Drill Holes (April 1, 2010 through April 30, 2011) found in the 2010-2011 Annual Report includes 66 drill holes located in MUs D, E, F and I. The list of plugged holes in the 2011-2012 AR does not include these holes. Please explain the status of these drill holes in the discussion on Page 36. **(PCR)**
- 32 Please provide a map for the drill holes reported as plugged and abandoned with a bond release request (i.e., Table 10-2). **(PCR)**
- 33 Please provide a map for the drill holes requesting vegetation bond release (i.e., Table 10-3). **(PCR)**
- 34 It would be helpful to have better reference for Plates 3-1 through 3-5 in the discussion on Page 36 and 37. Also, it would be helpful to have a consistent nomenclature between the legend and the Plates. **(PCR)**
- 35 Table 10-3, Vegetation Bond Release Request. CR has requested bond release for 86 drill holes. Please provide a column on the Table indicating the date of plug and abandonment and also indicate LQD approval for the P&A. NOTE: LQD will inspect these holes within one year of the submittal of the AR. **(PCR)**
- 36 The Annual Report does not include a proposal for new drill holes for the report period as TFN 5 4/312 was approved on June 19, 2012 for the addition of 170 drill holes. Drilling

proposals under the Annual Report should be made clear in the text discussion. No response necessary. **(PCR)**

- 37 Appendix D, Table 4, Water Sampling Data, Environmental Monitoring Sites, 3rd & 4th Quarters 2011: Cameco listed the monitoring frequency as 3rd & 4th quarter and did not list the dates the samples were collected. Please list the 3rd & 4th quarter sample collection dates on Table 4 and provide the dates samples were collected for 2012 1st & 2nd quarters.

Cameco listed “Not Running” as a reason for not sampling the ground water wells and windmills. Please explain why samples were not collected during the quarterly monitoring period.

The GW-20 groundwater well location is not illustrated on the Plate 1 Smith Ranch – Highland Uranium Project. Please illustrate the location on Plate 1 and associated Plates 1-1 through 1-8.

The GW-7 groundwater well location is illustrated on the Plate 1 Smith Ranch – Highland Uranium Project. The GW-7 monitoring data was not listed on Table 4, Water Sampling Data, Environmental Monitoring Sites, 3rd & 4th Quarters 2011. Please submit the monitoring results for the GW-7 or explain why the groundwater well was not sample and monitoring results were excluded from the AR. **(BG)**

- 38 Table 10-6, Weather Station Data Summary, May 2011 – April 2012: Cameco listed the Rain Daily Average in Table 10-6 and for the month of Dec-11 the value listed was 12.30 inches of Rain Fall Total. Please explain or correct recorded value listed on Table 10-6, Weather Station Data Summary, May 2011- April 2012. **(BG)**
- 39 Table 10-6 lists the total rainfall for December 2011 as 12.3 inches. The Douglas weather station only recorded 0.37 inches over the same period. Please check this value for errors. Note this would also reduce the total annual rainfall from 23.08 inches. **(SI)**
- 40 Table 7.4, Irrigator No. 2. It is noted that CR used the irrigator for only two months during the report period, applying a total of 88.9 AF of irrigation fluid. During the 2010-2011 report period, it was also used only two months, applying a total of 57.3 AF. The three years prior to 2010, the reported volumes of irrigation fluid ranged from 123.6 AF to 165.9 AF over several months of application. CR has emphasized the reason for delays in restoration for the backlog of wellfields that need to be restored, is a deficiency in disposal capacity. CR has increased the number of waste disposal wells on the permit areas, yet the use of the irrigator has decreased. Please explain in the Annual Report the limited use of the available irrigation capacity at Irrigator No. 2. **(PCR)**
- 41 The approved permit requires annual surveys for mule deer and pronghorn. Please address this requirement in the Annual Report. **(PCR)**
- 42 Page 28, Wildlife Data. The discussion lists surveys that were conducted during 2011 with reference to Appendix F, 2011 Wildlife Survey Report. The Report does not include

information pertaining to listed items: 1) survey results for bald eagle winter roost sites; 2) Mountain Plover survey results; 3) Swift Fox survey results, and 4) results of the disturbance and reclamation surveys with indications of different wildlife habitat types. Please include information in the Report which addresses these topics. Also, please provide a map showing location of identified wildlife use (i.e., raptor nests, waterfowl, etc.). **(PCR)**

- 43 Appendix A, Restoration Schedule. The restoration schedule is out of date. TFN 5 1/119 includes an attempt to update the schedule and water balance for Permit 603. LQD sent a final review to CR on September 21, 2012 requiring response to the final two outstanding comments and a request for a Form 11 to approve the revision with a permit condition. **Please provide the responses and Form 11 by December 15, 2012 so that this TFN can be approved and an updated restoration schedule can be incorporated into the permit. (PCR)**
- 44 CR provided responses to Comments 38-44 addressing the 2010-2011 Annual Report. All of the comments address the surety. Therefore, when the surety is reviewed under separate cover letter later this year, the responses will be reviewed. **(PCR)**
- 45 Responses to previous annual reports remain deficient. CR should evaluate past annual report review comments particularly the 2010-2011 review that may also apply to the 2011-2012 report. LQD has not taken the time to restate comments from previous reports that apply to this report. It is CR's responsibility to ensure the report is accurate. **(PCR)**