



Matt Mead, Governor

NRC039

Submitted: 8/25/2014

LK

# 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

May 17, 2011

CERTIFIED MAIL 7008 0500 0000 5500 8590

Ms. Dawn Kolkman  
Cameco Resources  
P.O. Box 1210  
Glenrock, WY 82637

**RE: Letter of Conference and Conciliation, Excursion at CM-32  
Permit 603, Cameco Resources**

Dear Ms Kolkman:

The Land Quality Division (LQD) has conducted a review of the records for Well-CM-32 which was on excursion from July 2007 through April 2011. During the review it was discovered that the location of CM-32 is within several hundred feet of the aquifer exemption boundary and the permit boundary. As a result of the injection of restoration fluid into the wellfield, subsequent to the onset of the excursion, there is concern that the lack of control of the excursion for almost four years may have caused fluid migration outside the exemption boundary.

The original notification letter to LQD explained the well was turned off for restoration retrofit activities which were anticipated to be complete and the wells turned on within the week to form the cone of depression to bring the excursion under control. However, the excursion monitor reports since that time show the UCLs for Chloride, Alkalinity and Conductivity continued to rise through 2007 and did not show declines until 2010. Although the well has recently been reported to be off excursion, there is concern that the extent of the excursion may have elevated slow moving parameters such as uranium beyond the monitor well ring. During the internal investigation of the excursion, the LQD inquired whether CR had conducted an investigation for the extent of the excursion beyond the monitor well (outside the wellfield). CR responded that an investigation has not been conducted.

This operation is being conducted under the permit provisions for non-coal operations required by the *Wyoming Environmental Quality Act (WEQA)* and the *Wyoming DEQ/LQD Noncoal Rules and Regulations (WR&R)*. Therefore, under the "Conference and Conciliation" provisions of the WEQA § 35-11-701(c), the following violations are identified:

- 1 According to the Wyoming Noncoal Rules and Regulations (R&R) Chapter 11, Section 12(d)(i), *If an excursion is not controlled within 30 days following confirmation of the*

Herschler Building • 122 West 25th Street • Cheyenne, Wyoming 82002 • <http://deq.state.wy.us>

ADMIN/OUTREACH  
(307) 777-7937  
FAX 777-3610

ABANDONED MINES  
(307) 777-6145  
FAX 777-6462

AIR QUALITY  
(307) 777-7391  
FAX 777-5616

INDUSTRIAL SITING  
(307) 777-7369  
FAX 777-5973

LAND QUALITY  
(307) 777-7756  
FAX 777-5864

SOLID & HAZ. WASTE  
(307) 777-7752  
FAX 777-5973

WATER QUALITY  
(307) 777-7781  
FAX 777-5973



*excursion, a sample must be collected from each of the affected monitoring wells and analyzed for... CR did not sample the well for the required parameters 30 days following confirmation.*

- 2 According to R&R, Chapter 11, Section 12(d)(ii), *If an excursion is not controlled within 60 days following confirmation of the excursion, the Administrator may... modify the mining operation...may include installation of additional monitor wells. Additional monitor wells have not been required to date, however, the LQD is concerned with the extended time of the well on excursion and the proximity of the aquifer exemption boundary and the permit boundary.*
- 3 According to R&R, Chapter 11, Section 12(d)(iii), *If the excursion is not controlled, but the fluid which moved out of the production zone during the excursion has not been recovered within 60 days following confirmation of the excursion (i.e., the monitor well is still "on excursion"), the operator will submit, within 90 days following confirmation of the excursion, a plan and compliance schedule, acceptable to the Department, for bringing the well (or wells) off excursion... CR did not provide a plan or schedule within 90 days of confirmation of the excursion.*

Since the LQD review of the Quarterly Monitoring Report (2011, 3<sup>rd</sup> Quarter), CR has provided the Guideline 8 sample for the water quality of CM-32, a plan and schedule to control the excursion and increased effort to pull the excursion water back into the wellfield, bringing the well off excursion. The LQD recognizes this effort, however, it was only provided after LQD identified the violation and requested the information.

Therefore, under the Conference and Conciliation provisions noted above, additional corrective actions are required. CR is required to investigate the extent of the excursion beyond the monitor well ring and the proximity to the aquifer exemption boundary and the permit boundary. A minimum of two monitor wells to investigate the extent of the excursion will be required. CR must consult with the LQD hydrogeologist on the locations of the proposed monitor wells prior to installation and ensure they are covered under the permit surety. **CR must submit a plan for additional wells within 15 days of receipt of this letter.**

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


Sincerely,



Pam Rothwell  
District 1 Assistant Supervisor  
Land Quality Division

cc: Joe Brister, Cameco Resources, Cheyenne, WY  
Doug Mandeville, Nuclear Regulatory Commission

## MEMORANDUM

**TO:** Lowell Spackman, District 1 Supervisor   
**FROM:** Pam Rothwell, Permit Coordinator  
**DATE:** May 12, 2011  
**SUBJECT:** Chronology of Events and Recommendations for Excursion Well CM-32  
Cameco Resources, Permit #603, Highland Uranium Project

---

### INTRODUCTION

Cameco Resources operates two in-situ leach (ISL) uranium mines in the Southern Powder River Basin; the Highland Uranium Project (HUP) and the Smith Ranch Mine (SR). The mines are located adjacent to each other including over 37,500 acres in Converse County. The combined production for the mines during the 2009-2010 report period was 1,902,403 pounds of uranium yellow cake.

In-situ mining utilizes the injection of a leaching solution (lixiviant) to remove the in-place uranium ore. The lixiviant is injected through injection wells which surround a production well where the lixiviant and uranium are recovered in solution. Several injection/production well patterns comprise a wellfield. A ring of monitor wells is located around the perimeter of each wellfield to detect lixiviant and/or production fluid migration outside the production pattern. In addition, wells are constructed to monitor the aquifers immediately above and below the production zone to identify contaminants moving vertically. If water sampling of a monitor ring well detects the presence of production fluid, the well is considered *on excursion* if two of three parameters (chloride, alkalinity, conductivity) exceeds an upper control limit (UCL) for the parameter. An excursion can also occur during the groundwater restoration where the fluids are monitored for chloride, conductivity and uranium.

### CHRONOLOGY

#### 2007

July 3, 2007	Scheduled sample for Well CM-32 exceeded upper control limits (UCLs)
July 5 & 6, 2007	CR collected excursion confirmation samples
July 10, 2007	Confirmation sampling results confirmed the excursion
July 11, 2007	CR verbally notified LQD
July 11, 2007	LQD received written notification of the excursion. Chloride and Conductivity exceeded the UCLs. CR indicated they were going to begin pumping seven adjacent wells to control the excursion in "adjacent Header House C-22". The wells were being retrofitted for restoration.
July-Dec 2007	<u>Quarterly Excursion Monitoring Reports (3<sup>rd</sup> and 4<sup>th</sup> Quarter):</u> All UCL parameters increased through the end of the Fourth Quarter, water level

also increased. Uranium values reported as high as 0.8 mg/l during this period. (EPA's maximum contaminant level (MCL) for uranium is 0.03 mg/l.

October 23, 2007 Quarterly Mechanical Integrity Test Report states the operator attributes the excursion to the abandoned underground mine workings.

**2008**

Jan-Dec 2008 Quarterly Excursion Monitoring Reports: All UCL parameters remained elevated and uranium values rose as high as 5.5 mg/l.

Jan 18, 2008 Quarterly Mechanical Integrity Test Report states the operator attributes the excursion to the abandoned underground mine workings.

April 22, 2008 Quarterly Mechanical Integrity Test Report states the operator attributes the excursion to the abandoned underground mine workings.

**2009**

Jan-Dec. 2009 Quarterly Excursion Monitoring Reports: All UCL parameters remained elevated with a uranium level reported at 4.0 mg/l.

**2010**

Jan-Dec. 2010 Quarterly Excursion Monitoring Reports: All UCL parameters remained elevated and uranium values rose as high as 4.0 mg/l.

August 17, 2010 LQD Inspector voiced concerns about adding reductant to the restoration fluid due to unanswered questions regarding calcium carbonate precipitation at the wells and/or in the formation. LQD told CR they could continue reverse osmosis (RO) and target areas to get CM-32 off excursion.

November 17, 2010 Quarterly Excursion Monitoring Report, (3<sup>rd</sup> Quarter): LQD review of the report notes the lack of water quality change in Well CM-32.

**2011**

January 25, 2011 LQD sent a letter to CR requiring a remediation plan for the CM-32 excursion within 45 days. LQD also requested a Guideline 8 parameter suite sample of CM-32.

February 1, 2011 A Mine Unit C potentiometric surface map constructed by LQD hydrogeologist, Steve Ingle, identified the minimal effect of pumping CMP-25 on remediation of the excursion. LQD suggested CR reassess the pumping well.

April 13, 2011 Meeting with LQD and Cameco to discuss groundwater restoration. LQD expressed concerns with the proposed method of combining RO and GWS and how to recover the lixiviant from the pattern area. LQD stated that CR should address the excursion well before working on wellfield restoration. If the wellfield is restored prior to remediation of an excursion, the treatment of the excursion potentially can re-contaminate the restored groundwater in the wellfield. Well CM-32 needs to be at baseline and CR should address this in an urgent manner, i.e., find a better way to get off excursion. CR agreed to rework the model.

April 19, 2011 CR responded to Third Quarter Monitoring Report comments. CR proposed a one year period to remove the well from excursion.

April 20, 2011 LQD Inspector requested the excursion Guideline 8 sample results and they were provided by CR confirming the sample was taken as requested.

	The inspector inquired whether Cameco has taken any action to determine the extent of the excursion beyond the monitor well as it was on excursion for so long a time period. CR reported no actions have been taken.
April 27, 2011	Meeting with LQD and Cameco to discuss MU-C restoration. CR stated they are working on areas of the excursion. LQD emphasized that the proposed plan to remove the well from excursion in one year was not acceptable.
April 28, 2011	CR notified LQD by telephone message that CM-32 has dropped below the UCLs and the well is off excursion.
May 2, 2011	LQD received the monthly Excursion Status Report for Permit 603 confirming the chloride and conductivity levels have trended below the UCLs.

### RECOMMENDATIONS

The LQD recommends CR construct additional monitor wells to investigate the extent of the excursion beyond the monitor well. The location of CM-32 is within several hundred feet of the aquifer exemption boundary and the permit boundary. With the injection of restoration fluid into the wellfield subsequent to the beginning of the excursion, there is concern that the lack of control of the excursion for almost four years could have caused fluid migration outside the exemption boundary.

CR should consult with LQD's hydrogeologist on the location of the proposed additional monitor wells prior to installation and ensure they are covered under the permit surety. The LQD is amenable to cooperative action by CR to try to identify the extent of the excursion without issuing a violation. It is recommended that the additional monitor wells be required through a Letter of Conference and Conciliation.