Cameco

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May 25, 2012

Mr. Lowell Spackman, District 1 Supervisor
Land Quality Division
Wyoming Department of Environmental Quality
Herschler Building, 3rd FL-West
122 West 25th Street
Cheyenne, WY 82002

CERTIFIED MAIL # 7011 0470 0000 7716 3394 RETURN RECEIPT REQUESTED

RE: Response to East Storage Pond Leak, Review of January 2012 Report
Permit 633, Cameco Resources (Wellfield Release Volume)

Dear Mr. Spackman:

Power Resources, Inc. d/b/a Cameco Resources (Cameco) is providing herein responses to the letter dated February 22, 2012 received February 27, 2012 containing review comments from the Wyoming Department of Environmental Quality (WDEQ) – Land Quality Division of the January 2012 East Storage Pond Leak Monthly Update. Attached are responses to the comments and a plan to investigate seepage into the groundwater required to be submitted within 90 days of receipt of the February 22, 2012 letter.

Please contact me at (307) 358-6541 ext. 476 or Kenneth_Garoutte@cameco.com if you have questions.

Sincerely,

Ken Garoutte
Safety, Health, Environment and Quality (SHEQ) Manager

KG/vg

cc: File SR 4.3.3.1 File SR 4.3.3.4
Special Volume: Impoundment Reports Start February 1999
Mr. Doug Mandeville – NRC Certified Mail # 7011 0470 0000 7716 3417
Document Control Desk, NRC Certified Mail # 7011 0470 0000 7716 3400
ec: CR-Cheyenne

FSHE20

Response to East Storage Pond Leak, Review of January 2012 Report
Permit 633, Cameco Resources

Cameco submitted the January 2012 East Storage Pond Leak Report to the Wyoming Department of Environmental Quality – Land Quality Division (LQD) in a letter dated January 27, 2012. LQD reviewed the report and provided comments in a letter received by Cameco on February 27, 2012. Cameco is to provide an investigation plan within 90 days to look at potential shallow groundwater contamination. The following offers LQD's comments and Cameco responses.

COMMENTS

1. *Postponement of the repairs to the pond is acceptable to LQD provided the water level in the pond is kept below the possible location of the leak or the pond is kept as dry as possible. This may require snow removal to minimize significant snow melt which would exceed the level of the leak. (SI/PCR)*

Cameco Response: Whenever a leak is detected in the sump, water levels are dropped until the leak stops and then kept at that level. Cameco then searches for a tear or other cause for the leak. Once a repair is made water is allowed to return to the pond to verify if the leak is fixed.

2. *Due to the numerous leaks in the storage ponds over the last 22 or more years, LQD is concerned that seepage from the ponds may be creating a plume of contaminated groundwater. During the November 2011 inspection, CR discussed possible installation of monitor wells around the ponds to monitor the water quality and the potential of a plume. LQD requests CR submit a plan for investigating potential groundwater contamination as a result of the high number of leaks at the ponds.* ***Please provide a plan to investigate seepage from the ponds to shallow groundwater within 90 days of receipt of this letter. (SI/PCR)***

Cameco Response: See the Smith Ranch Storage Ponds Investigation Work Plan attached.

3. *The November 2011 monthly report discusses the possibility that surface water was seeping under the liner at the top of the pond. The December 2011 report included before-and-after photos of the liner and repaired roadway. It does not appear that an anchor trench was included in the liner design which would have helped prevent seepage under the liner. If cleaner surface water is entering the sump the water quality in the sump would be expected to be much better than that reported. If the source of the water in the sump is surface water, the water is becoming contaminated, either by surface contamination on the road or remnant contamination in the sand layer under the pond. If either is occurring the problem would possibly require cleanup and/or control measures. LQD requests the source of the leak be adequately investigated and an anchor trench be used in the future if it was not used previously. (SI/PCR)*

Cameco Response: The source of the leak is being investigated. Repairs have been made where failures in the liner have been detected. Cameco believes that if clean water reaches the sump it is contaminated by residue left in the sump from previous pond leak water that has evaporated. Cameco will continue to investigate sources of leaks, make repairs/improvements, and will provide updates to the LQD in the monthly Evaporation (Impoundment) Pond Leak Reports.

Smith Ranch Storage Ponds Investigation Work Plan

Prepared For

Cameco Resources
Smith Ranch-Highland Operation
PO Box 1210
Glenrock, WY 82637

Prepared By

Wright Environmental Services Inc.
201 Linden Street, Suite 301
Fort Collins, CO 80524

May 18, 2012

Wright
Environmental Services, Inc.

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1.0 INTRODUCTION

In a letter dated February 22, 2012, Wyoming Department of Environmental Quality (WDEQ), Land Quality Division (LQD) notified Cameco Resources that an investigation into potential seepage from the Smith Ranch Project storage ponds was needed. LQD expressed a concern that "seepage from the storage ponds may be creating a plume of contaminated groundwater."

This work plan presents the methods to be employed in investigating potential seepage from the Smith Ranch Project storage ponds into shallow hydrostratigraphic units by assessing available existing site data (i.e., geologic, pond construction and operational data) as well as water quality conditions in the shallow hydrostratigraphic units beneath the Smith Ranch Project storage ponds. The objective of this work plan is to establish investigative procedures to determine if there have been impacts to groundwater quality beneath the storage pond.

2.0 PROJECT HISTORY

2.1 Storage Pond History

Two lined storage ponds were constructed in 1981 and authorized under NRC License SUA-1387. The ponds are currently authorized under LQD Permit to Mine 633 and NRC License SUA-1548. These ponds are located in Section 36 of Township 36 North, Range 74 West north of the Central Processing Plant (CPP) at the Smith Ranch Facility. The ponds were intended as interim storage for operational liquid wastes containing high total dissolved solids.

2.1.1 Storage Pond Construction

As outlined in the Smith Ranch Project Technical Report (Cameco, 2012) submitted as part of the NRC License SUA-1548 Renewal, each storage pond is double lined, constructed with a synthetic primary liner underlain by a compacted sandy clay base liner. The bottom of each pond has a two way slope toward the center. A sand layer

was placed over the compacted sandy clay pond base. A leak detection system consisting of a network of perforated pipes was installed in the sand layer with the pipes draining to a collection sump. The sand layer is overlain by a 30-millimeter thick Hypalon® liner. Should a leak in the primary liner occur, the water will flow through the sand above the sandy clay base liner, enter a perforated pipe, and flow to the collection sump. As outlined in the SR-HUP Application-Reynolds Ranch Amendment (Power Resources, 2006) to NRC License SUA-1548, each storage pond has a capacity of 0.78 acre feet of water. Each pond is 100 feet by 100 feet and eight feet in depth. During operation, three feet of freeboard is maintained in each pond to protect the berms from wind generated wave action.

2.1.2 Storage Pond Operations

The storage ponds have been used to manage process fluids with high dissolved solids concentrations, liquids from well swabbing of operational wells, soils and fluids accumulating during spill remediation activities, and other fluids with high solids content that are generated during operational activities at the facility prior to disposal of these fluids in the deep disposal injection wells. Tears or breaks in the Hypalon® liner have been identified and repaired over the life of the storage ponds (Cameco, 2012).

2.1.3 Storage Pond Monitoring

A summary of recent water quality results is included in Appendix A. This information was included in a letter to LQD dated March 29, 2012. The water quality of samples collected from the standpipe resembles that of the liquids in the pond, which contain elevated levels of chloride, sulfate, and uranium. Thus, it is observed and believed that water from the pond is seeping through holes within the primary liner, which were identified and summarized within the March 29, 2012 letter.

Standard operating procedures detail the monitoring program for the leak detection system. The monitoring program for the lined ponds includes either a fluid level sensor in each pond sump with an alarm displayed at the CPP or a daily inspection of

each sump by an operator. The storage ponds are inspected daily for visual indications of leaks or embankment deterioration by an individual instructed in proper inspection procedures. The pond inspections are recorded and initialed by the inspector.

3.0 INVESTIGATION PLAN

The objective of the investigation is to determine if seepage from the ponds is migrating vertically past the leak detection system, infiltrating near-surface soils and shallow bedrock into the uppermost hydrostratigraphic unit. A preliminary review of geophysical logs (Appendix B) from wells near the facility (Figure 1) indicates sandy soils overlying shale. The top of the shale occurs at an approximate depth of 25 to 55 feet below ground surface and varies in thickness from 25 feet in M-210 (west) to 50 feet in M-211(near the southeast toe of the pond). The preliminary interpretation of the uppermost-sand unit below the shale is that it pinches-out to the west and is of limited areal extent.

However, there is poor resolution of lithology and saturation information in the uppermost 30 feet of the available borehole geophysical logs. The work plan is designed to ascertain both subsurface lithology and the presence or absence of saturated conditions above the shale unit (within 50 feet below ground surface) using test pits and drilling operations. The proposed locations of test pits and boreholes are presented on Figure 1.

3.1 Test Pits

An excavator or backhoe is proposed to excavate six test pits within the vicinity of the pond. The purpose of these test pits is to determine if seepage is occurring into the shallow subsurface from the ponds. Test pits will be excavated to a minimum depth of ten feet or until refusal or equipment limits. Test pit sidewalls will be logged by geologist, photographed, and left open for 24 hours. After 24 hours, the excavation will be photographed, the presence or absence of water documented and the pits backfilled. Water that accumulates in the test pits will be sampled remotely.

The test pits cannot be entered without shoring and approved confined space entry permit.

3.2 Drilling and Well Installation

Drilling and subsequent well installation will be conducted following the test pit excavation. A total of three boreholes are proposed for the locations identified in Figure 1. These boreholes will be located near the test pits in the anticipated down gradient direction from the ponds (west, south, and east), and will terminate at the top of uppermost-shale unit. A qualified geologist will be on-site to log the lithology in each borehole, identify saturated conditions, and determine the total depth of the borehole

Each borehole will be allowed to remain open for one hour at which time the presence or absence of standing water will be measured with a water level indicator. No monitoring wells will be constructed if ground water is not identified in the shallow sandy soils above the uppermost-shale unit.

3.2.1 Drilling Methods

The proposed drilling method will use either dry coring or air-rotary or a combination of these two methods, both of which have been used successfully on-site. The dry coring will allow continuous logging of lithology as well as identification of saturated conditions. If saturated conditions exist within the borehole, the hole will be reamed using dry rotary drilling methods to a diameter of eight inches to meet annular space requirements for well construction. Drilling equipment will be pressure washed between boreholes to minimize the potential for cross contamination. All boreholes not completed as monitoring wells will be abandoned using best management practices and in accordance with LQD Non-Coal Rules and Regulations Chapter 8 and Wyoming Statutes §35-11-404.

3.2.2 Well Installation Methods

If saturated conditions are identified, then a 4-inch well will be installed. The screened interval will be within the sandy soils and extend from the bottom of the borehole at the top of the shale and across the static water level, as measured at the cessation of drilling. A generalized well completion diagram is included as Figure 2. Wells will be constructed in accordance with Wyoming Water Quality Rules and Regulations (Chapter 26).

3.3 Well Development

Following well construction, wells will be developed. Development will take place a minimum of 24 hours after completion allowing settlement of well construction materials. Newly constructed wells will be developed using a combination of bailing, surging, and pumping. Development equipment will be pressure washed between boreholes to minimize the potential for cross contamination.

3.4 Well Sampling

Monitoring wells will be sampled in accordance with the procedures outlined in the recently submitted *Sampling and Analysis Plan for Shallow Monitoring Wells, Smith Ranch - Highland Facility* (2012). All samples will be analyzed for a full LQD Guideline 8 suite plus radionuclides. Samples will be sent to Energy Labs in Casper for analysis using standard EPA methods with appropriate laboratory reporting limits.

4.0 INVESTIGATION REPORT

A report summarizing the investigation will be submitted to Cameco Resources at the conclusion of the investigation. The investigation report will include test pit logs and photographs, well construction and lithologic logs, and ground water sampling results. In addition, recommendations for additional investigations or remediation alternatives will be included, if necessary.

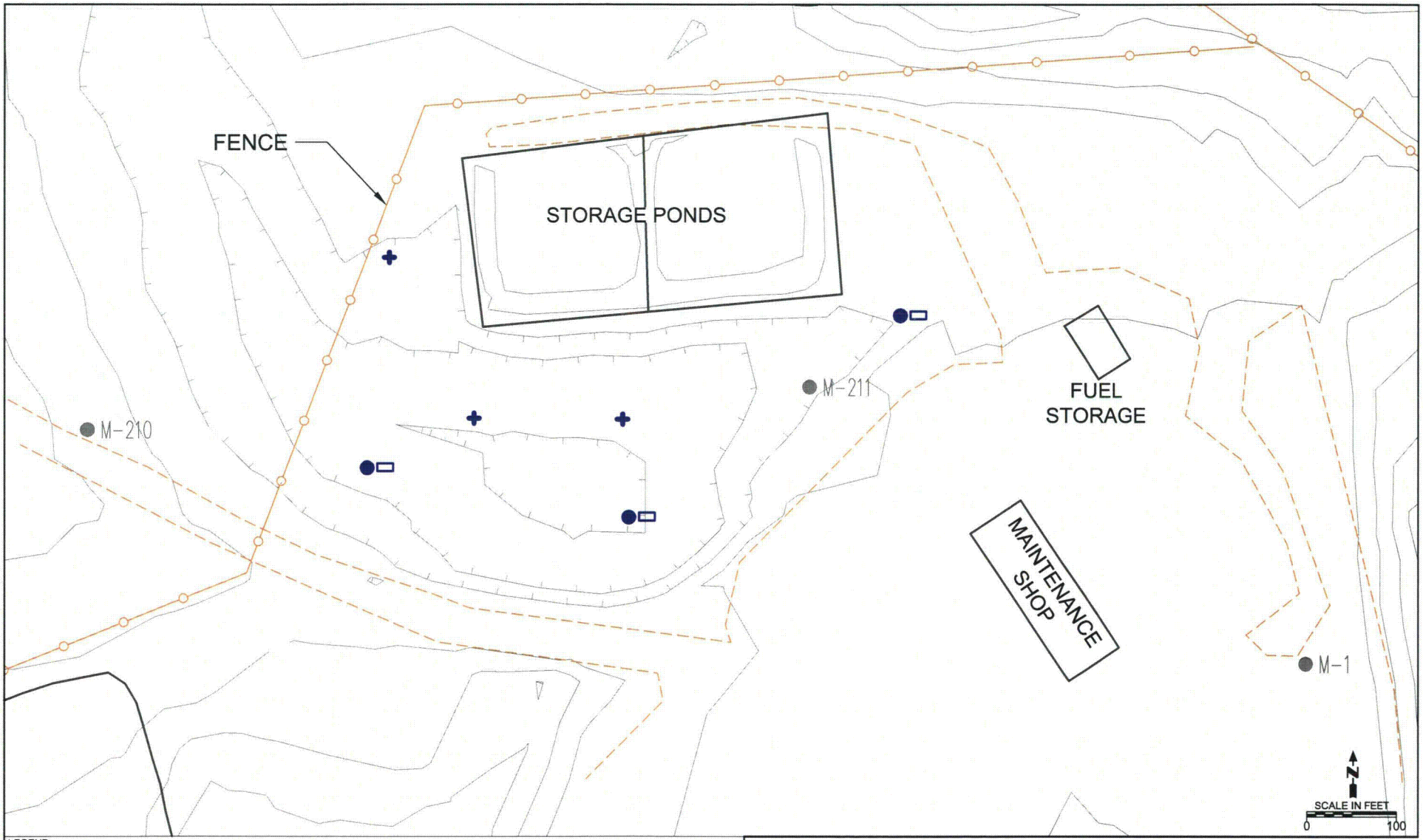
5.0 REFERENCES

Wright Environmental Services, Inc. 2012. Sampling and Analysis Plan for Casing Leak Investigation Shallow Monitoring Wells Smith Ranch - Highland Facility.

Cameco Resources. 2012. Nuclear Regulatory Commission Source Material License No. SUA-1548 License Renewal Application Technical Report.

Power Resources. 2006. Reynolds Ranch Amendment, License No. 1548 Smith Ranch- Highland Uranium Project

FIGURES



LEGEND

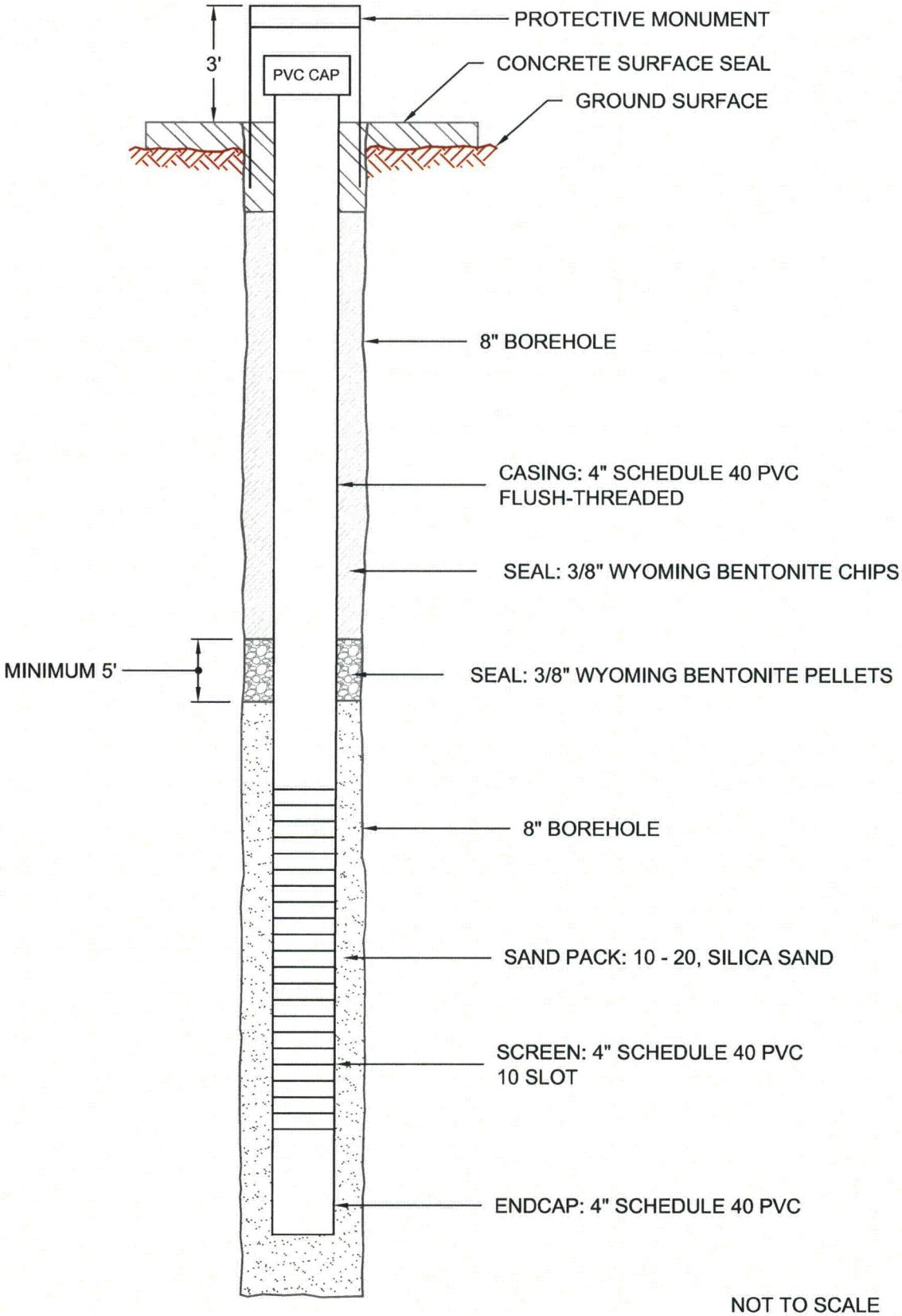
- PROPOSED BOREHOLE
- PROPOSED TEST PIT
- EXISTING WELL
- EXCAVATION SUMP FOR DRILLING

PROJECT: 386500	TASK: 001
PREPARED BY: Wright Environmental Services, Inc	

PREPARED FOR: Cameco — Cameco Resources

FIGURE 1
PROPOSED TEST PIT AND BOREHOLE LOCATIONS

5/18/2012 R:\Highland_Smith_Ranch\East_Storage_Pond\Calculations\AutoCad\CPP Evap Ponds.dwg



NOT TO SCALE

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PROJECT: 382200	TASK: 001
PREPARED BY: Wright Environmental Services, Inc	

FIGURE 2
GENERALIZED WELL COMPLETION

PREPARED FOR: Cameco
Cameco Resources

APPENDIX A

March 29, 2012 Letter from Cameco Resources, Smith Ranch-Highland Uranium Project, to LQD

Cameco

CAMECO RESOURCES
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March 29, 2012

Mr. Lowell Spackman, District 1 Supervisor
Land Quality Division
Wyoming Department of Environmental Quality
Herschler Building
122 West 25th Street
Cheyenne, WY 82002

CERTIFIED MAIL # 7011 0470 0001 0202 1774 RETURN RECEIPT REQUESTED

RE: East Evaporation Pond Leak, Cameco Resources, Smith Ranch-Highland Uranium Project, Permit to Mine No. 633

Dear Mr. Spackman:

On June 20, 2011, Power Resources, Inc. d/b/a Cameco Resources (Cameco) provided written notification to the Wyoming Department of Environmental Quality, Land Quality Division (LQD) and the Nuclear Regulatory Commission (NRC) regarding a leak into secondary containment (sump) discovered on June 13, 2011 at the East Evaporation Pond. Cameco drained the pond to investigate the reason for water in the sump and repaired a tear in the primary liner on July 7, 2011. Following repairs, water was returned to the pond.

On August 15, 2011 water was again discovered in the sump. Verbal notification was made to the LQD and NRC on August 16, 2011 with written notification following in the monthly report on August 31, 2011. The pond level was lowered for the second time to reexamine the primary liner. Another tear was discovered and repairs were made August 29, 2011. Following repairs, water was returned to the pond.

On November 4, 2011 water was again discovered in the sump. Verbal notification was made to the LQD and NRC on November 7, 2011.

Samples have continued to be taken on a weekly basis, when obtainable and results are provided in the table below. As reported in previous monthly updates, Cameco no longer has the ability to complete sulfate analysis at our on-site lab, therefore, monthly samples obtained are being sent to an external lab for analysis of sulfate. Cameco would like to note that results for these analyses will take additional time to receive, often times 30 days or more.

Weekly Sample Results

Sample Date	Chloride (mg/L)	Conductivity (mS/cm)
06/15/2011	257	3194
06/20/2011	413	3645
08/15/2011	464	3647
08/16/2011	435	3924
11/04/2011	407	3869
12/14/2011	402	4133
12/28/2011	241	2439
01/10/2012	247	2607
01/19/2012	295	3336
02/8/2012	241	2663
02/15/2012	203	2407
02/29/2012	173	2256
03/12/2012	184	2213

Monthly Sample Results

Sample Date	Chloride (mg/L)	Conductivity (mS/cm)	Bicarbonate (mg/L)	Uranium (mg/L)	Sulfate (ppm)
06/20/2011	413	3645	925	248	905
08/16/2011	435	3924	811	158	947
11/04/2011	407	3869	650	179	-
12/28/2011	241	2439	442	134	900
01/10/2012	247	2607	424	135	-
02/01/2012	-	-	-	-	1080
02/21/2012	182	2286	540	105	-
02/29/2012	173	2256	511	106	-
03/01/2012	-	-	-	-	771
03/12/2012	184	2213	259	94	-

Recently, with warmer weather and ice melt, two tears were found in the primary liner. Repairs were made to the tears on March 16, 2012. Since the repairs, water has been returned to the pond and the sump has not taken on water.

Cameco is in the process of obtaining a contractor to assist with formulating a plan to effectively address LQD's concerns stated in the Review of the January 2012 East Storage Pond Leak report letter dated February 22, 2012. The plan and responses will be submitted to LQD within the 90 day deadline. Routine monitoring will continue to be conducted and a monthly report will to be submitted until a plan has been implemented.

Please contact me at (307) 358-6541 ext. 476 or Kenneth_Garoutte@cameco.com if you have questions.

Sincerely,

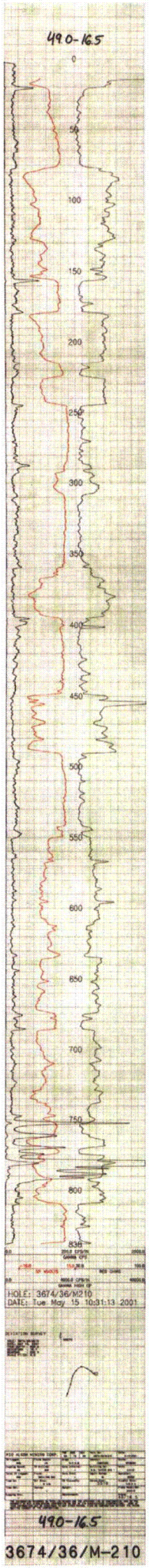
Ken Garoutte
Safety, Health, Environment and Quality (SHEQ) Manager
KG/vg

cc: File SR 4.3.3.1 File SR 4.3.3.4
Special Volume: Wellfield Release Reports, Evaporation Ponds, Spill Reports
Mr. Doug Mandeville – NRC Certified Mail # 7011 0470 0001 0202 1781
Document Control Desk, NRC Certified Mail # 7011 0470 0001 0202 1798

ec: Cameco-Cheyenne

APPENDIX B
Geophysical Logs

490-16.5



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3674/36/M-210

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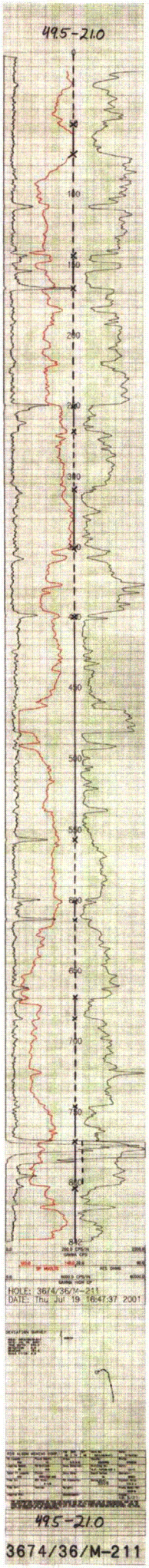

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3674/36/M-211