CAMECO RESOURCES,
CROW BUTTE OPERATION

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

(308) 665-2215
(308) 665-2341 – FAX

November 13, 2013

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Attn: Document Control Desk, Deputy Director
Decommissioning and Uranium Recovery Licensing Directorate
Division of Waste Management and Environmental Protection
Office of Federal and State Materials and Environmental Management Programs
Mailstop T8-F5
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Subject: Source Materials License SUA-1534
Docket No. 40-8943
Commercial Evaporation Pond #4 Potential Liner Leak

Dear Deputy Director:

On October 16, 2013 routine evaporation pond monitoring results of Cameco Resources - Crow Butte Operation (CBO) Commercial Evaporation Pond #4, water level readings from the North Middle, South Middle, and South West underdrains indicated a potential pond liner leak. A sample was collected from the underdrains and analyzed for chloride, alkalinity, conductivity, sodium, and sulfate on October 17, 2013, and these results indicated that the concentration of the indicator analytes in the underdrain were similar to the pond contents. Based upon these results, it was determined that a potential liner leak existed in Commercial Evaporation Pond #4. However, based on the details below CBO does not believe that a liner leak existed.

When the lab results were obtained, Mr. Ron Burrows of the Nuclear Regulatory Commission (NRC) was notified by e-mail on October 17, 2013 of the potential liner leak as required by License Condition 12.3. Also, as required by License Condition 12.3, this report provides analytical data, monitoring results, mitigative actions, and the results of those actions.

During the twelve months prior to the October 16, 2013 inspection, CBO had been actively flushing high conductivity water from the underdrains by adding clean water between the liners and removing the water by pumping it out of the underdrains. During this time period, 60,200 gallons of clean water (conductance ≈ 900 µmhos) was flushed through the underdrains and

FSME20

contributed to the underdrain's contents exceeding 6 inches in depth and reducing the underdrains conductivity measurements.

During the months of August, September, and early October, in an effort to thoroughly assess the condition of the upper pond liner, CBO had been transferring the contents of Commercial Evaporation Pond #4 into Commercial Evaporation Pond #3. Prior to October 16, 2013, this effort had resulted in Commercial Evaporation Pond #4 contents being reduced to a small pool of water on the floor of the pond; with very little water left to transfer. During the week of October 7, 2013, CBO received several inches of rain and snow, causing the water level to rise several inches in Commercial Evaporation Pond #4. The rain and snow caused the contents in the pond to dilute from a conductance of 220,800 µmhos to 12,160 µmhos.

The combination of these two activities resulted in CBO being required to report the potential liner leak. The contents in the standpipes for underdrains located at the North Middle, South Middle, and South West measured 8,800, 7,730, and 8,250 µmhos, respectively and all three's contents exceed 6 inches in depth. CBO's Evaporation Pond Onsite Inspection Program (December 1992, Revised February 1996) requires notification to NDEQ and NRC when an underdrain's standpipe exceeds 6 inches in depth and the conductivity of the contents of the standpipe is greater than half the conductivity of the pond contents.

On October 30 and 31, 2013, Colorado Liners were on site and in the upper liner numerous small tears near existing welds were found and repaired. The repairs were located on the side walls of the pond and near the top of the liner. The locations of these tears were above the water level in the pond and were not a contributing factor to the changes in the underdrain measurements. Pond liner samples were collected from several areas of the pond including the side walls, pond floor, and seam welds. The pond liner samples were cut out, surveyed from site, and sent to a third party lab for further analysis.

Attachment #1 contains copies of the Weekly Evaporation Pond Underdrain Analysis forms and the analytical results from the CBO laboratory. Samples were obtained on October 17, 23, and 30, 2013.

In addition to analysis of the underdrain, CBO obtained samples from pond monitor wells CPM-1 and CPM-2. These two monitor wells are completed in the first aquifer and are located down gradient of Commercial Evaporation Pond #4 at the fenced restricted area boundary. The samples were obtained and analyzed for the indicator analytes on October 28, 2013, to ensure that there was no indication of leakage in the secondary liner. Analytical results, contained in Attachment #2, were consistent with historical sampling results indicating no breach in the secondary liner.

Attachment #3 contains copies of the Commercial Pond Inspection Forms for the period of

October 16, 2013 to November 6, 2013.

If you have any questions or require any further information, please do not hesitate to call me at (308) 665-2215 ext 114.

Sincerely,
CAMECO RESOURCES
CROW BUTTE OPERATION

Larry Teahon

Larry Teahon
SHEQ Manager

Enclosures: As Stated

cc: Mr. Ronald Burrows – NRC
CBO - File
ec: CR - Cheyenne

Attachment #1

Commercial Evaporation Pond #4 North Middle, South Middle, and South West Underdrain Analysis

10/17/2013

Sample ID	Cl mg/L	ALK = CaCO3	COND microseimen/cm	Na mg/L	SO4 mg/L
Pond 4 North Middle Underdrain	3501	345	11690	2665	634
Pond 4 South Middle Underdrain	1675	1250	7260	1742	228
Pond 4 South West Underdrain	5672	1230	18570	4493	550

10/23/2013

Sample ID	Cl mg/L	ALK = CaCO3	COND microseimen/cm	Na mg/L	SO4 mg/L
Pond 4 North Middle Underdrain	3634	342	11870	2674	617
Pond 4 South Middle Underdrain	2659	750	9800	2244	482
Pond 4 South West Underdrain	6116	975	19420	4577	571

10/30/2013

Sample ID	Cl mg/L	ALK = CaCO3	COND microseimen/cm	Na mg/L	SO4 mg/L
Pond 4 North Middle Underdrain	3900	383	12970	2906	689
Pond 4 South Middle Underdrain	2482	700	9610	2209	464
Pond 4 South West Underdrain	5850	925	19080	4461	562

10/17/2013

Sample ID	Cl mg/L	ALK = CaCO3	COND microseimen/cm	Na mg/L	SO4 mg/L
POND 4 CONTENTS	5495	258	12160	3214	774

10/23/2013

Sample ID	Cl mg/L	ALK = CaCO3	COND microseimen/cm	Na mg/L	SO4 mg/L
POND 4 CONTENTS	6116	375	19390	4570	1040

10/30/2013

Sample ID	Cl mg/L	ALK = CaCO3	COND microseimen/cm	Na mg/L	SO4 mg/L
POND 4 CONTENTS	7622	410	19750	4679	1247

Attachment #2

Pond Monitor Well CPM-1 and CPM-2 Analysis

10-28-13

MO/LT

	Alk mg/L	Cl mg/L	Cond umhos	SO4 mg/L	Na mg/L
Commercial Pond Monitor #1	204	11.6	457	12.73	19.22
Commercial Pond Monitor #2	187	6.2	417	12.56	17.92

Attachment #3

Commercial Pond Inspection Forms

CAMECO RESOURCES/CROW BUTTE OPERATION
WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS

COMMERCIAL PONDS		UNDERDRAIN WATER DEPTH / INCHES	METER READING	TEMP °C	CONDUCTIVITY µmhos/cm	LAB RESULTS µmhos/cm
POND # 1 Depth = 17 feet	POND LEVEL	6'				
	*FREEBOARD	11' 0"				
	NE UNDERDRAIN	28" 0"				
	NM UNDERDRAIN	23" 23"	70.8ms	10.8		
	NW UNDERDRAIN	22" 22"	75.3ms	11.1		
	SE UNDERDRAIN	0" 2"				
	SM UNDERDRAIN	0"				
	SW UNDERDRAIN	2"				
POND # 3 Depth = 17.5 feet	POND LEVEL	10.1'				
	*FREEBOARD	7.4'				
	NE UNDERDRAIN	6"	422us	16.2		
	NM UNDERDRAIN	19"	15.47ms	15.9		
	NW UNDERDRAIN	20"	51.2ms	14.3		
	SE UNDERDRAIN	0"				
	SM UNDERDRAIN	2"				
	SW UNDERDRAIN	5"				
POND # 4 Depth = 17.5 feet	POND LEVEL	<1' T-40				
	*FREEBOARD	16.5'				
	NE UNDERDRAIN	2"				
	NM UNDERDRAIN	6"	8.8ms	11.8		
	NW UNDERDRAIN	6"	2370us	15.4		
	SE UNDERDRAIN	0"				
	SM UNDERDRAIN	10"	7.73ms	13.0		
	SW UNDERDRAIN	8"	8.25ms	11.1		

R & D POND LEVELS (Depth = 15 ft)	
EAST LEVEL:	9.8'
**EAST FREEBOARD:	5.2'
EAST UNDERDRAIN:	1"
WEST LEVEL:	6'
**WEST FREEBOARD:	9.0'
WEST UNDERDRAIN:	1"

REMARKS: Performed Monthly

*COMMERCIAL POND FREEBOARD = 5 FT MAX

** R&D POND FREEBOARD = 3 FT MAX

SAMPLER: Walt Nelson

DATE: 10/16/13

CAMECO RESOURCES/CROW BUTTE OPERATION
WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS

	COMMERCIAL PONDS	UNDERDRAIN WATER DEPTH / INCHES	METER READING	TEMP °C	CONDUCTIVITY µmhos/cm	LAB RESULTS µmhos/cm
POND # 1 Depth = 17 feet	POND LEVEL	6				
	*FREEBOARD	11.0				
	NE UNDERDRAIN	0				
	NM UNDERDRAIN	23	70.3 ms	10.2		
	NW UNDERDRAIN	22	75.1 ms	10.8		
	SE UNDERDRAIN	2				
	SM UNDERDRAIN	0				
	SW UNDERDRAIN	2				
POND # 3 Depth = 17.5 feet	POND LEVEL	10.3				
	*FREEBOARD	7.2				
	NE UNDERDRAIN	6	418 us	15.8		
	NM UNDERDRAIN	19	15.10 ms	15.3		
	NW UNDERDRAIN	20	50.9 ms	14.0		
	SE UNDERDRAIN	0				
	SM UNDERDRAIN	2				
	SW UNDERDRAIN	3				
POND # 4 Depth = 17.5 feet	POND LEVEL	<1 T-75				
	*FREEBOARD	16.5				
	NE UNDERDRAIN	0				
	NM UNDERDRAIN	4				
	NW UNDERDRAIN	6	1936 us	14.7		
	SE UNDERDRAIN	0				
	SM UNDERDRAIN	6	6.83 ms	12.0		
	SW UNDERDRAIN	3				

R & D POND LEVELS (Depth = 15 ft)	
EAST LEVEL:	9.8
**EAST FREEBOARD:	5.2
EAST UNDERDRAIN:	1
WEST LEVEL:	5.9
**WEST FREEBOARD:	9.1
WEST UNDERDRAIN:	1

REMARKS:
*COMMERCIAL POND FREEBOARD = 5 FT MAX
** R&D POND FREEBOARD = 3 FT MAX
SAMPLER: B. Bass / R. Pelton
DATE: 10/23/13

CAMECO RESOURCES/CROW BUTTE OPERATION
WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS

COMMERCIAL PONDS		UNDERDRAIN WATER DEPTH / INCHES	METER READING	TEMP °C	CONDUCTIVITY µmhos/cm	LAB RESULTS µmhos/cm
POND # 1 Depth = 17 feet	POND LEVEL	6.1				
	*FREEBOARD	10.9				
	NE UNDERDRAIN	0				
	NM UNDERDRAIN	23	71.1 ms	10.0		
	NW UNDERDRAIN	22	75.16 ms	10.4		
	SE UNDERDRAIN	1				
	SM UNDERDRAIN	0				
	SW UNDERDRAIN	0				
POND # 3 Depth = 17.5 feet	POND LEVEL	10.3				
	*FREEBOARD	7.2				
	NE UNDERDRAIN	6	414 us	14.6		
	NM UNDERDRAIN	19	1.504 ms	15.0		
	NW UNDERDRAIN	20	50.1 ms	13.4		
	SE UNDERDRAIN	0				
	SM UNDERDRAIN	2				
	SW UNDERDRAIN	3				
POND # 4 Depth = 17.5 feet	POND LEVEL	<1 T-95				
	*FREEBOARD	16.5				
	NE UNDERDRAIN	7	5.80 ms	11.0		
	NM UNDERDRAIN	1				
	NW UNDERDRAIN	6	2414 us	14.2		
	SE UNDERDRAIN	5				
	SM UNDERDRAIN	8	6.62 ms	11.2		
	SW UNDERDRAIN	7	9.73 ms	11.6		

R & D POND LEVELS (Depth = 15 ft)	
EAST LEVEL:	9.8
**EAST FREEBOARD:	5.2
EAST UNDERDRAIN:	1
WEST LEVEL:	5.9
**WEST FREEBOARD:	9.1
WEST UNDERDRAIN:	1

REMARKS:
*COMMERCIAL POND FREEBOARD = 5 FT MAX
** R&D POND FREEBOARD = 3 FT MAX
SAMPLER: B. Bass / R. Pelton
DATE: 10/30/13

CAMECO RESOURCES/CROW BUTTE OPERATION
WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS

COMMERCIAL PONDS		UNDERDRAIN WATER DEPTH / INCHES	METER READING	TEMP °C	CONDUCTIVITY µmhos/cm	LAB RESULTS µmhos/cm
POND # 1 Depth = 17 feet	POND LEVEL	6.3				
	*FREEBOARD	10.7				
	NE UNDERDRAIN	0				
	NM UNDERDRAIN	19	72.4 ms	9.7		
	NW UNDERDRAIN	21	72.7 ms	9.2		
	SE UNDERDRAIN	2				
	SM UNDERDRAIN	1				
	SW UNDERDRAIN	0				
POND # 3 Depth = 17.5 feet	POND LEVEL	10.2				
	*FREEBOARD	7.3				
	NE UNDERDRAIN	10	578 us	13.3		
	NM UNDERDRAIN	17	15.76 ms	14.2		
	NW UNDERDRAIN	19	66.8 ms	12.4		
	SE UNDERDRAIN	0				
	SM UNDERDRAIN	2				
	SW UNDERDRAIN	3				
POND # 4 Depth = 17.5 feet	POND LEVEL	<1 T-100				
	*FREEBOARD	16.5				
	NE UNDERDRAIN	3				
	NM UNDERDRAIN	2				
	NW UNDERDRAIN	0				
	SE UNDERDRAIN	3				
	SM UNDERDRAIN	1				
	SW UNDERDRAIN	7	10.35 ms	10.3		

R & D POND LEVELS (Depth = 15 ft)	
EAST LEVEL:	*
**EAST FREEBOARD:	
EAST UNDERDRAIN:	1
WEST LEVEL:	6.0
**WEST FREEBOARD:	9.0
WEST UNDERDRAIN:	1

REMARKS: * Snow on liner

*COMMERCIAL POND FREEBOARD = 5 FT MAX

** R&D POND FREEBOARD = 3 FT MAX

SAMPLER: B. Bass / R. Pelton

DATE: 11-6-13