

**CAMECO RESOURCES,  
CROW BUTTE OPERATION**



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

**(308) 665-2215  
(308) 665-2341 – FAX**

April 7, 2011

Mr. Keith I McConnell, 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 #3 Potential Liner Leak

Dear Mr. McConnell:

On March 9, 2011 routine evaporation pond monitoring results of Cameco Resources - Crow Butte Operation (CBO) Commercial Evaporation Pond #3, water level readings from the southeast underdrain indicated a potential pond liner leak. This was discovered when the data was reviewed on March 10, 2011. A sample was collected from the underdrain and analyzed for chloride, alkalinity, conductivity, sodium, and sulfate. The results of this sample 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 #3.

Mr. Ron Burrows of the Nuclear Regulatory Commission (NRC) was notified by voicemail and email on March 10, 2011 of the potential liner leak as required by License Condition 12.3. As required by License Condition 12.3, this report provides analytical data, monitoring results, mitigative actions, and the results of those actions.

Upon confirmation of the potential liner leak, CBO sampled the southeast underdrain contents. These samples were analyzed for alkalinity, chloride, sodium, conductivity, and sulfate. Attachment #1 contains copies of the Weekly Evaporation Pond Underdrain Analysis Forms and the analytical results from the CBO laboratory on samples obtained March 10 and 17, 2011.

In addition to weekly analysis of the underdrain, CBO obtained non-routine samples from pond monitor wells CPM-1 and CPM-2. CPM-1 and CPM-2 are completed in the first aquifer and are located down gradient of Commercial Evaporation Pond #3 at the fenced restricted area boundary. The samples were obtained and analyzed for the indicator analytes on March 10 and 17 to ensure that there was no indication of leakage in the secondary liner. Analytical results were consistent with historical sampling results and are contained in Attachment #2.

**CAMECO RESOURCES,  
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Mr. Keith I McConnell

April 7, 2011

Page 2 of 2

Upon confirmation of the potential liner leak, CBO began lowering the level of Commercial Evaporation Pond #3 using the Pond Water Treatment circuit to draw down the pond level. Concurrently, an immediate visual inspection of the pond liner was performed. Initial efforts to locate the leak were unsuccessful. The level of the pond was lowered from 8.3' to 8.0' in the first week following indications of a potential liner leak. In the subsequent weeks, the pond level has been lowered to 7.7'. In weekly monitoring of the underdrain level, the level has remained at .6' since the initial notification until March 30, 2011 when the underdrain level actually dropped to .5'. CBO has performed a number of visual inspections of the Pond#3 liner since March 10<sup>th</sup> and have been unable to locate any breach or tear in the upper liner. CBO will continue to monitor the underdrain level and inspect the upper liner for tears.

The slight rise in the underdrain level observed in the March 9<sup>th</sup> sample appears to be an anomaly. This rise did not continue in subsequent weeks and no tear or breach has been identified in the upper liner. In accordance with NRC Source Materials License SUA-1534, License Condition 11.4, weekly sampling of the underdrain for alkalinity, chloride, sodium, conductivity, and sulfate was discontinued on March 17, 2011.

Attachment #3 contains copies of the Commercial Pond Inspection Forms for the period of March 9, 2011 to April 6, 2011.

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  
SHEQ Manager

Enclosures:      As Stated

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

**Attachment #1**

**Commercial Evaporation Pond #3 Underdrain Analysis**

10-Mar-2011

SM/LT/MO

	<u><b>Alk</b></u> mg/L	<u><b>Cl</b></u> mg/L	<u><b>Cond</b></u> µmhos	<u><b>SO<sub>4</sub></b></u> mg/L	<u><b>Na</b></u> mg/L
Pond 3 SE	3500	66,652	141,000	6304	43,127

17-Mar-2011

SM/LT/MO

	<u>Alk</u> mg/L	<u>Cl</u> mg/L	<u>Cond</u> µmhos	<u>SO<sub>4</sub></u> mg/L	<u>Na</u> mg/L
Pond 3 SE	4440	64,524	140,600	6160	45,248

**Attachment #2**

**Pond Monitor Well CPM-1 and CPM-2 Analysis**

**10-Mar-2011**

**SM/LT/MO**

	<u><b>Alk</b></u> mg/L	<u><b>Cl</b></u> mg/L	<u><b>Cond</b></u> umhos	<u><b>SO<sub>4</sub></b></u> mg/L	<u><b>Na</b></u> mg/L
<b>Commercial Pond Monitor #1</b>	201	8.0	450	13	15
<b>Commercial Pond Monitor #2</b>	184	6.7	420	13	14

17-Mar-2011

SM/LT/MO

	<u>Alk</u> mg/L	<u>Cl</u> mg/L	<u>Cond</u> umhos	<u>SO<sub>4</sub></u> mg/L	<u>Na</u> mg/L
Commercial Pond Monitor #1	198	7.4	450	14	16
Commercial Pond Monitor #2	185	6.0	430	14	14



**Attachment #3**

**Commercial Pond Inspection Forms**

62

**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
Depth = 17 feet	POND # 1	POND LEVEL	*			
		*FREEBOARD				
		NE UNDERDRAIN	0			
		NM UNDERDRAIN	1			
		NW UNDERDRAIN	1			
		SE UNDERDRAIN	0			
		SM UNDERDRAIN	0			
		SW UNDERDRAIN	9	66.7 ms	2.2	
Depth = 17.5 feet	POND # 3	POND LEVEL	8.3			
		*FREEBOARD	9.2			
		NE UNDERDRAIN	3			
		NM UNDERDRAIN	3			
		NW UNDERDRAIN	14	50.7 ms	1.1	
		SE UNDERDRAIN	7	75.8 ms	1.8	
		SM UNDERDRAIN	2			
		SW UNDERDRAIN	1			
Depth = 17.5 feet	POND # 4	POND LEVEL	*			
		*FREEBOARD				
		NE UNDERDRAIN	37	89.9 ms	2.7	
		NM UNDERDRAIN	59	92.3 ms	2.8	
		NW UNDERDRAIN	21	91.2 ms	2.1	
		SE UNDERDRAIN	46	89.2 ms	2.1	
		SM UNDERDRAIN	54	89.8 ms	2.4	
		SW UNDERDRAIN	58	98.7 ms	1.9	

**R & D POND LEVELS (Depth = 15 ft)**

EAST LEVEL: \*

\*\*EAST FREEBOARD:

EAST UNDERDRAIN: /

WEST LEVEL: \*

\*\*WEST FREEBOARD:

WEST UNDERDRAIN: 0

**REMARKS:** \* Snow on lines

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\*COMMERCIAL POND FREEBOARD = 5 FT MAX

\*\* R&D POND FREEBOARD = 3 FT MAX

SAMPLER: Pelton

DATE: 3-9-11

41

**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
Depth = 17 feet	POND # 1	POND LEVEL	4.1			
		*FREEBOARD	12.9			
		NE UNDERDRAIN	0			
		NM UNDERDRAIN	1			
		NW UNDERDRAIN	1			
		SE UNDERDRAIN	0			
		SM UNDERDRAIN	0			
		SW UNDERDRAIN	8	164.5 ms	2.4	
Depth = 17.5 feet	POND # 3	POND LEVEL	8.0			
		*FREEBOARD	9.5			
		NE UNDERDRAIN	3			
		NM UNDERDRAIN	2			
		NW UNDERDRAIN	14	52.4 ms	1.7	
		SE UNDERDRAIN	7	79.8 ms	1.7	
		SM UNDERDRAIN	2			
		SW UNDERDRAIN	1			
Depth = 17.5 feet	POND # 4	POND LEVEL	10.5			
		*FREEBOARD	11.0			
		NE UNDERDRAIN	37	91.1 ms	2.7	
		NM UNDERDRAIN	58	92.7 ms	2.6	
		NW UNDERDRAIN	21	92.6 ms	2.0	
		SE UNDERDRAIN	46	90.6 ms	2.3	
		SM UNDERDRAIN	53	90.8 ms	2.3	
		SW UNDERDRAIN	58	91.3 ms	2.0	

R & D POND LEVELS (Depth = 15 ft)	
EAST LEVEL:	9.5
**EAST FREEBOARD:	5.5
EAST UNDERDRAIN:	1
WEST LEVEL:	9.4
**WEST FREEBOARD:	5.6
WEST UNDERDRAIN:	0

REMARKS: Took underdrain sample SE pond 4 + pond 3 cont. sampled CPM 1 + CPM 2
*COMMERCIAL POND FREEBOARD = 5 FT MAX
** R&D POND FREEBOARD = 3 FT MAX
SAMPLER: B. Bass
DATE: 3/16/11

**CAMECO RESOURCES/CROW BUTTE OPERATION  
WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS**

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Depth = 17 feet	POND # 1	POND LEVEL	4.1																												
		*FREEBOARD	12.4																												
		NE UNDERDRAIN	0																												
		NM UNDERDRAIN	1"																												
		NW UNDERDRAIN	1"																												
		SE UNDERDRAIN	0																												
		SM UNDERDRAIN	0																												
		SW UNDERDRAIN	8"	65.3 ms	2.7																										
Depth = 17.5 feet	POND # 3	POND LEVEL	8.0																												
		*FREEBOARD	9.5																												
		NE UNDERDRAIN	3"																												
		NM UNDERDRAIN	3"																												
		NW UNDERDRAIN	14"	53.1 ms	2.8																										
		SE UNDERDRAIN	7"	82.2 ms	3.2																										
		SM UNDERDRAIN	2"																												
		SW UNDERDRAIN	1"																												
Depth = 17.5 feet	POND # 4	POND LEVEL	6.4																												
		*FREEBOARD	11.1																												
		NE UNDERDRAIN	37"	103.3	8.2																										
		NM UNDERDRAIN	57"	82.6	4.0																										
		NW UNDERDRAIN	20"	101.2	6.1																										
		SE UNDERDRAIN	46"	93.4	4.6																										
		SM UNDERDRAIN	54"	92.8	2.9																										
		SW UNDERDRAIN	58"	97.1	2.1																										
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**WEEKLY EVAPORATION POND UNDERDRAIN ANALYSIS**

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		*FREEBOARD	9.8'																																																				
		NE UNDERDRAIN	4																																																				
		NM UNDERDRAIN	6	126.4 ms	3.3																																																		
		NW UNDERDRAIN	12	60.4 ms	4.7																																																		
		SE UNDERDRAIN	6	86.1 ms	5.0																																																		
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		NE UNDERDRAIN	37"	100.4 ms	6.3																																																		
		NM UNDERDRAIN	54"	89.0 ms	6.0																																																		
		NW UNDERDRAIN	21"	77.2 ms	6.4																																																		
		SE UNDERDRAIN	38"	103.9 ms	6.9																																																		
		SM UNDERDRAIN	53"	93.7 ms	4.9																																																		
		SW UNDERDRAIN	40"	101.9 ms	5.9																																																		
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	NM UNDERDRAIN	5																		
	NW UNDERDRAIN	11	61.5 ms	5.4																
	SE UNDERDRAIN	8	87.2 ms	5.6																
	SM UNDERDRAIN	4																		
	SW UNDERDRAIN	4																		
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	*FREEBOARD	11.2																		
	NE UNDERDRAIN	38	103.1 ms	7.0																
	NM UNDERDRAIN	53	101.0 ms	5.5																
	NW UNDERDRAIN	18	104.2 ms	6.9																
	SE UNDERDRAIN	35	105.7 ms	7.4																
	SM UNDERDRAIN	52	97.5 ms	6.0																
	SW UNDERDRAIN	5	99.1 ms	7.1																
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