

**CAMECO RESOURCES,
CROW BUTTE OPERATION**

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



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

January 12, 2022

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

Attn: Document Control Desk Director
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

Source Materials License SUA-1534
Docket No. 40-8943
Commercial Evaporation Pond #1 Potential Liner Leak

Dear Document Control:

Water level readings from the north middle underdrain of Cameco Resources - Crow Butte Operation (CBO) Commercial Evaporation Pond #1 indicated a potential pond liner leak on December 14th, 2021. A sample was collected from the affected underdrain and analyzed for alkalinity, chloride, conductivity, sodium, and sulfate. The sample was analyzed in the CBO laboratory. The 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 #1.

When the lab results were obtained, a message was left on the phone of Mr. Tom Lancaster, Nuclear Regulatory Commission (NRC) (Mr Ron Burrows was away from the office) notifying him of the potential liner leak as required by License Conditions 11.1.6 and 11.2.1. This report provides analytical data, monitoring results, mitigative actions, and the results of those actions as required by License Conditions 11.1.6 and 11.2.1.

The Commercial Evaporation Ponds are a secondary option for disposal of wastewater. The reduction in wastewater disposal capacity until the liner can be repaired should not significantly impact the site's ability to continue with groundwater restoration plans.

Samples were collected from the north middle underdrain on December 15, 22, 29, 2021 and January 4, and 11, 2022. All samples were analyzed for alkalinity, chloride, conductivity, sodium, and sulfate. The results for these samples are included in Attachment #1.

NMSS20
NMSS

CAMECO RESOURCES,
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In addition to analysis of the underdrain, CBO obtained samples from pond monitor wells CPM-1 and CPM-2. CPM-1 and CPM-2 are completed in the first aquifer and are located at the fenced restricted area pond boundary. The samples were obtained and analyzed for the indicator analytes on December 15, 2021 and January 4, 2022 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.

Upon confirmation of the potential liner leak, CBO began lowering the level of Commercial Evaporation Pond #1 by transferring the contents to Commercial Evaporation Pond #4 to draw down the pond level. The level was lowered from 4.0' on December 14, to 3.4' on December 29, 2021. The liner was inspected immediately after the potential leak was detected and was inspected again after more of the liner was exposed.

A faulty patch was identified and repaired on January 4, 2022. CBO plans to add water to the pond until the new patch is covered. The underdrains will be monitored to verify this was indeed the source of the leak in the primary liner.

Attachment #3 contains copies of the Commercial Pond Inspection Forms for the period of December 14, 2021 to January 11, 2022.

If you have any questions or require any further information, please do not hesitate to call me at (308) 665-2215 ext 121.

Sincerely,
CAMECO RESOURCES
CROW BUTTE OPERATION

Tate Hagman
Restoration Manager

Enclosures: As Stated

cc: Mr. Ron Burrows – NRC
CBO File
cc: CBO File

Attachment #1

Commercial Evaporation Pond #1 Underdrain Analysis

12/15/2021

<u>Sample ID</u>	<u>Cl mg/L</u>	<u>ALK = CaCO3</u>	<u>COND microseimen/cm</u>	<u>Na mg/L</u>	<u>SO4 mg/L</u>
POND 1	16,308	3400	52,300	13700	3389
POND 1 NORTH WEST UNDERDRAIN	17,017	3100	52,400	13740	3183

12/22/2021

<u>Sample ID</u>	<u>Cl mg/L</u>	<u>ALK = CaCO3</u>	<u>COND microseimen/cm</u>	<u>Na mg/L</u>	<u>SO4 mg/L</u>
POND 1	21,981	4092	69,600	19240	4299
POND 1 NORTH WEST UNDERDRAIN	15,599	3050	54,800	14670	3264

12/29/2021

<u>Sample ID</u>	<u>Cl mg/L</u>	<u>ALK = CaCO3</u>	<u>COND microseimen/cm</u>	<u>Na mg/L</u>	<u>SO4 mg/L</u>
POND 1	21,981	4650	72,500	18,910	4723
POND 1 NORTH WEST UNDERDRAIN	17,017	3300	57,200	13,950	3613

1/4/2022

<u>Sample ID</u>	<u>Cl mg/L</u>	<u>ALK = CaCO3</u>	<u>COND microseimen/cm</u>	<u>Na mg/L</u>	<u>SO4 mg/L</u>
POND 1	23,399	4750	73,500	19,130	4834
POND 1 NORTH WEST UNDERDRAIN	17,727	3740	60,200	15,380	3862

1/11/2022

<u>Sample ID</u>	<u>Cl mg/L</u>	<u>ALK = CaCO3</u>	<u>COND microseimen/cm</u>	<u>Na mg/L</u>	<u>SO4 mg/L</u>
POND 1	12,054	2200	41,500	9,997	1970
POND 1 NORTH WEST UNDERDRAIN	18,790	4000	65,400	16,720	4054

Attachment #2

Pond Monitor Well CPM-1 and CPM-2 Analysis

12-15-21

MO-LT

	<u>Alk</u>	<u>Cl</u>	<u>Cond</u>	<u>SO4</u>	<u>Na</u>
	mg/L	mg/L	umhos	mg/L	mg/L
Commercial Pond Monitor #1	201	16.1	489	27.19	21.64
Commercial Pond Monitor #2	185	9.8	445	30.84	16.03

1-4-22

MO-LT

	<u>Alk</u>	<u>Cl</u>	<u>Cond</u>	<u>SO4</u>	<u>Na</u>
	mg/L	mg/L	umhos	mg/L	mg/L
Commercial Pond Monitor #1	200	16.1	483	12.42	21.39
Commercial Pond Monitor #2	183	9.5	439	10.70	18.65

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
Depth = 17 feet	POND # 1	POND LEVEL	4.0'			
		*FREEBOARD	13.0'			
		NE UNDERDRAIN	1"			
		NM UNDERDRAIN	8"	52.7	7.3	52,400
		NW UNDERDRAIN	3"			
		SE UNDERDRAIN	1"			
		SM UNDERDRAIN	1"			
		SW UNDERDRAIN	3"			
Depth = 17.5 feet	POND # 3	POND LEVEL	6.8'			
		*FREEBOARD	10.7			
		NE UNDERDRAIN	8"	1.061	9.4	
		NM UNDERDRAIN	11"	2.285	6.9	
		NW UNDERDRAIN	9"	16.47	6.8	
		SE UNDERDRAIN	0"			
		SM UNDERDRAIN	4"			
		SW UNDERDRAIN	11"	28.71	7.0	
Depth = 17.5 feet	POND # 4	POND LEVEL	2.2'			
		*FREEBOARD	15.3'			
		NE UNDERDRAIN				
		NM UNDERDRAIN	3"			
		NW UNDERDRAIN				
		SE UNDERDRAIN				
		SM UNDERDRAIN	6"	.3267	6.9	
		SW UNDERDRAIN				
R & D POND LEVELS (Depth = 15 ft)						
EAST LEVEL: Snow						
**EAST FREEBOARD: -						
EAST UNDERDRAIN: 0						
WEST LEVEL: Snow						
**WEST FREEBOARD: -						
WEST UNDERDRAIN: 1"						
REMARKS: Snow at RVD						
Possible Leak Pond 1 NM						
*COMMERCIAL POND FREEBOARD = 5 FT MIN						
** R&D POND FREEBOARD = 3 FT MIN						
SAMPLER: Tate Hagman						
DATE: 12-14-21						

**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	3.9'				
	*FREEBOARD	13.1'				
	NE UNDERDRAIN	1"				
	NM UNDERDRAIN	10"	54.8	7.0		
	NW UNDERDRAIN	3"				
	SE UNDERDRAIN	1"				
	SM UNDERDRAIN	1"				
	SW UNDERDRAIN	2"				
Depth = 17.5 feet POND # 3	POND LEVEL	6.8'				
	*FREEBOARD	10.7'				
	NE UNDERDRAIN	8"	1.56	6.7		
	NM UNDERDRAIN	12"	2.254	6.5		
	NW UNDERDRAIN	10"	16.84	5.7		
	SE UNDERDRAIN	0"				
	SM UNDERDRAIN	4"				
	SW UNDERDRAIN	11"	28.24	6.2		
Depth = 17.5 feet POND # 4	POND LEVEL	2.9'				
	*FREEBOARD	14.6'				
	NE UNDERDRAIN					
	NM UNDERDRAIN	6"	33.34	4.7		
	NW UNDERDRAIN					
	SE UNDERDRAIN					
	SM UNDERDRAIN	6"	.36	5.1		
	SW UNDERDRAIN					
R & D POND LEVELS (Depth = 15 ft) EAST LEVEL: 6.9' **EAST FREEBOARD: 8.1' EAST UNDERDRAIN: 0" WEST LEVEL: SNOW **WEST FREEBOARD: SNOW WEST UNDERDRAIN: 1"			REMARKS: Transfer running 1 to 4 *COMMERCIAL POND FREEBOARD = 5 FT MIN ** R&D POND FREEBOARD = 3 FT MIN SAMPLER: Sate Hegman DATE: 12-22-21			

**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	3.4'																															
		*FREEBOARD	13.6'																															
		NE UNDERDRAIN	1"																															
		NM UNDERDRAIN	11"	60.2	5.8																													
		NW UNDERDRAIN	3"																															
		SE UNDERDRAIN	1"																															
		SM UNDERDRAIN	1"																															
		SW UNDERDRAIN	3"																															
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		*FREEBOARD	10.7'																															
		NE UNDERDRAIN	8"	1.39	5.7																													
		NM UNDERDRAIN	12"	2.21	5.9																													
		NW UNDERDRAIN	10"	16.42	6.0																													
		SE UNDERDRAIN	0"																															
		SM UNDERDRAIN	5"																															
		SW UNDERDRAIN	13"	34.35	3.0																													
Depth = 17.5 feet	POND # 4	POND LEVEL	3.9'																															
		*FREEBOARD	13.6'																															
		NE UNDERDRAIN																																
		NM UNDERDRAIN	7"	36.3	3.8																													
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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	Snow			
		*FREEBOARD	—			
		NE UNDERDRAIN	2"			
		NM UNDERDRAIN	10"	63.9	5.1	
		NW UNDERDRAIN	2"			
		SE UNDERDRAIN	1"			
		SM UNDERDRAIN	1"			
		SW UNDERDRAIN	3"			
Depth = 17.5 feet	POND # 3	POND LEVEL	6.9'			
		*FREEBOARD	10.6'			
		NE UNDERDRAIN	6"	.958	7.5	
		NM UNDERDRAIN	12"	2.312	4.9	
		NW UNDERDRAIN	9"	17.43	4.6	
		SE UNDERDRAIN	0"			
		SM UNDERDRAIN	5"			
		SW UNDERDRAIN	12"	32.01	3.9	
Depth = 17.5 feet	POND # 4	POND LEVEL	Snow			
		*FREEBOARD	—			
		NE UNDERDRAIN				
		NM UNDERDRAIN	3"			
		NW UNDERDRAIN				
		SE UNDERDRAIN				
		SM UNDERDRAIN	5"			
		SW UNDERDRAIN				
R & D POND LEVELS (Depth = 15 ft) EAST LEVEL: Snow **EAST FREEBOARD: — EAST UNDERDRAIN: 0" WEST LEVEL: Snow **WEST FREEBOARD: — WEST UNDERDRAIN: 0"			REMARKS: Pond 1 Repaired *COMMERCIAL POND FREEBOARD = 5 FT MIN ** R&D POND FREEBOARD = 3 FT MIN SAMPLER: Tate Hagman DATE: 1-4-22			

**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	3.3'																														
		*FREEBOARD	13.7'																														
		NE UNDERDRAIN	1"																														
		NM UNDERDRAIN	10"	55.7	4.2																												
		NW UNDERDRAIN	3"																														
		SE UNDERDRAIN	1"																														
		SM UNDERDRAIN	1"																														
		SW UNDERDRAIN	3"																														
Depth = 17.5 feet	POND # 3	POND LEVEL	6.9'																														
		*FREEBOARD	10.6'																														
		NE UNDERDRAIN	6"	0.848	6.2																												
		NM UNDERDRAIN	12"	2.189	3.9																												
		NW UNDERDRAIN	10"	14.99	3.8																												
		SE UNDERDRAIN	0"																														
		SM UNDERDRAIN	6"	22.45	2.7																												
		SW UNDERDRAIN	12"	28.95	3.0																												
Depth = 17.5 feet	POND # 4	POND LEVEL	3.9'																														
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