

**CAMECO RESOURCES
CROW BUTTE OPERATION**



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

**(308) 665-2215
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January 19, 2023

Electronic Submittal

DOCUMENT CONTROL DESK, DIRECTOR
U.S. NUCLEAR REGULATORY COMMISSION
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

The enclosed report was provided to NDEE.

Class III UIC Permit NE0122611
December 2022 Monthly Restoration Report

Please find enclosed the Crow Butte Monthly Restoration Reports for Mine Units 2, 3, 4, 5, 6, 7 and 8. Mine Unit 6 is beginning stability monitoring and the first sample is planned to be taken in March. The reverse osmosis (RO) units continue to inject permeate and reductant into Mine Units 7 and 8. Mine Units 2, 3, 4 and 5 remained in stability monitoring.

If you have any questions regarding this submittal, please feel free to contact me at (308) 665-2215, ext. 121.

Sincerely,
Cameco Resources
Crow Butte Operation

A handwritten signature in blue ink that reads "Tate Hagman". The signature is written over a horizontal line.

Tate Hagman
Restoration Manager

Enclosures: As Stated

cc: Ron Burrows; Document Control Desk; Deputy Director, Division of Decommissioning – NRC
CBO - File
ec: CR – Electronic File
Kory Winters – NDEE Field Office
Amanda Osborn – NDEE Program Coordinator

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
December 2022
Mine Unit 2

1. RESTORATION ACTIVITY DURING MONTH:

	YES	NO	
a. Groundwater Transfer		X	(if yes, complete part 2)
b. Groundwater Sweep		X	(if yes, complete part 3)
c. Groundwater Treatment		X	
d. Wellfield Recirculatoin		X	
e. Other (explain):	X		The Mine Unit is in Stability Monitoring

2. LIST WELLS USED IN GROUNDWATER TRANSFER DURING THE MONTH:

3. LIST WELLS USED IN GROUNDWATER SWEEP DURING THE MONTH:

4. LIST WELLS SAMPLED DURING THE MONTH: (Assay results attached)

No in-house samples were collected during the month.

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
 December 2022
 Mine Unit 3

1. RESTORATION ACTIVITY DURING MONTH:

	YES	NO	
a. Groundwater Transfer		X	(if yes, complete part 2)
b. Groundwater Sweep		X	(if yes, complete part 3)
c. Groundwater Treatment		X	
d. Wellfield Recirculatoin		X	
e. Other (explain):	X		The Mine Unit is in Stability Monitoring

2. LIST WELLS USED IN GROUNDWATER TRANSFER DURING THE MONTH:

3. LIST WELLS USED IN GROUNDWATER SWEEP DURING THE MONTH:

4. LIST WELLS SAMPLED DURING THE MONTH: (Assay results attached)

No in-house samples were collected during the month.

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
December 2022
Mine Unit 4

1. RESTORATION ACTIVITY DURING MONTH:

	YES	NO	
a. Groundwater Transfer		X	(if yes, complete part 2)
b. Groundwater Sweep		X	(if yes, complete part 3)
c. Groundwater Treatment		X	
d. Wellfield Recirculatoin		X	
e. Other (explain):	X		The Mine Unit is in Stability Monitoring

2. LIST WELLS USED IN GROUNDWATER TRANSFER DURING THE MONTH:

3. LIST WELLS USED IN GROUNDWATER SWEEP DURING THE MONTH:

4. LIST WELLS SAMPLED DURING THE MONTH: (Assay results attached)

No in-house samples were collected during the month.

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
December 2022
Mine Unit 5

1. RESTORATION ACTIVITY DURING MONTH:

	YES	NO	
a. Groundwater Transfer		X	(if yes, complete part 2)
b. Groundwater Sweep		X	(if yes, complete part 3)
c. Groundwater Treatment		X	
d. Wellfield Recirculatoion		X	
e. Other (explain):	X		The Mine Unit is in Stability Monitoring

2. LIST WELLS USED IN GROUNDWATER TRANSFER DURING THE MONTH:

3. LIST WELLS USED IN GROUNDWATER SWEEP DURING THE MONTH:

4. LIST WELLS SAMPLED DURING THE MONTH: (Assay results attached)

No in-house samples were collected during the month.

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
December 2022
Mine Unit 6

1. RESTORATION ACTIVITY DURING MONTH:

	YES	NO	
a. Groundwater Transfer		X	(if yes, complete part 2)
b. Groundwater Sweep		X	(if yes, complete part 3)
c. Groundwater Treatment	X		
d. Wellfield Recirculation		X	
e. Other (explain):	X		The Mine Unit is in Stability Monitoring

2. LIST WELLS USED IN GROUNDWATER TRANSFER DURING THE MONTH:

3. LIST WELLS USED IN GROUNDWATER SWEEP DURING THE MONTH:

4. LIST WELLS SAMPLED DURING THE MONTH: (Assay results attached)

I1600P
P1399
P1532

Mine Unit 6 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
I1600P													
	12/6/2022	242	12.08	63	2.21	192	108	914	8.53	567	0.01	0.50	0.13
P1399													
	12/6/2022	494	25.91	198	6.37	483	387	2336	8.23	1448	0.01	1.19	0.16
P1532													
	12/6/2022	426	14.61	170	3.95	436	338	2068	7.95	1282	0.01	0.35	0.07

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
December 2022
Mine Unit 7

1. RESTORATION ACTIVITY DURING MONTH:

	YES	NO	
a. Groundwater Transfer		X	(if yes, complete part 2)
b. Groundwater Sweep		X	(if yes, complete part 3)
c. Groundwater Treatment	X		IX and RO BL-17 P2040 CM4-14 P2384 CM4-15 P2476 CM4-16 P2505 I1971P P2523 I1973P P5230 I1975P P5271 I2183P I2185P P2038
d. Wellfield Recirculatoion		X	
e. Other (explain):		X	

2. LIST WELLS USED IN GROUNDWATER TRANSFER DURING THE MONTH:

3. LIST WELLS USED IN GROUNDWATER SWEEP DURING THE MONTH:

4. LIST WELLS SAMPLED DURING THE MONTH: (Assay results attached)

BL-17 P5230
 CM4-14 P5271
 CM4-15
 CM4-16
 I1971P
 I1973P
 I1975P
 I2183P
 I2185P
 P2038
 P2040
 P2384
 P2476
 P2505
 P2523

Mine Unit 7		Restoration Data											
Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
BL-17	12/6/2022	373	7.56	63	1.72	251	113	1141	8.09	707	0.00	0.29	1.59
CM4-14	12/6/2022	666	40.80	158	11.15	539	436	2550	7.45	1581	0.00	2.15	0.44
CM4-15	12/6/2022	810	59.22	217	16.34	674	599	3314	7.49	2055	0.01	0.79	0.48
CM4-16	12/6/2022	591	32.42	129	9.22	444	346	2206	7.57	1368	0.00	0.57	0.37
I1971P	12/6/2022	618	35.95	125	9.51	487	380	2280	7.48	1414	0.01	0.97	0.27
I1973P	12/6/2022	594	24.46	98	5.73	430	285	1966	7.73	1219	0.00	2.64	0.63
I1975P	12/6/2022	802	56.98	195	17.16	663	556	3118	7.41	1933	0.00	3.76	0.29
I2183P	12/6/2022	498	37.90	123	8.58	402	328	1970	7.49	1221	0.00	3.82	0.80
I2185P	12/6/2022	686	33.57	130	9.98	527	405	2458	7.63	1524	0.00	1.74	2.16
P2038	12/6/2022	624	47.30	163	13.73	531	468	2584	7.31	1602	0.01	2.11	0.23
P2040	12/6/2022	697	52.68	186	17.28	592	530	2890	7.29	1792	0.00	1.81	0.20
P2384	12/6/2022	611	48.60	167	14.04	531	496	2629	7.2	1630	0.01	3.51	0.53
P2476	12/6/2022	289	12.85	69	2.77	223	144	1082	7.69	671	0.02	0.45	0.60
P2505	12/6/2022	318	18.41	146	3.67	344	300	1712	8.1	1061	0.00	0.45	0.64
P2523	12/6/2022	234	5.95	42	1.36	161	71	734	7.62	455	0.00	0.10	0.68
P5230	12/6/2022	655	35.00	135	8.85	499	395	2411	7.68	1495	0.04	2.35	0.59
P5271	12/6/2022	643	37.36	143	10.24	502	389	2358	7.43	1462	0.01	1.29	0.70

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
December 2022
Mine Unit 8

1. RESTORATION ACTIVITY DURING MONTH:

	YES	NO	
a. Groundwater Transfer		X	(if yes, complete part 2)
b. Groundwater Sweep		X	(if yes, complete part 3)
c. Groundwater Treatment	X		IX and RO <div style="display: flex; flex-wrap: wrap;"> <div style="width: 25%;">CM6-21</div> <div style="width: 25%;">P2758</div> <div style="width: 25%;">P3246</div> <div style="width: 25%;">P3441</div> <div style="width: 25%;">I2671P</div> <div style="width: 25%;">P2764</div> <div style="width: 25%;">P3253</div> <div style="width: 25%;">P3698</div> <div style="width: 25%;">I2685P</div> <div style="width: 25%;">P2808</div> <div style="width: 25%;">P3266</div> <div style="width: 25%;">P3735</div> <div style="width: 25%;">I2688P</div> <div style="width: 25%;">P2900</div> <div style="width: 25%;">P3268</div> <div style="width: 25%;">P3876</div> <div style="width: 25%;">I2791</div> <div style="width: 25%;">P2904</div> <div style="width: 25%;">P3277</div> <div style="width: 25%;">P6103</div> <div style="width: 25%;">I3699P</div> <div style="width: 25%;">P2908</div> <div style="width: 25%;">P3287</div> <div style="width: 25%;">P6110</div> <div style="width: 25%;">P2696</div> <div style="width: 25%;">P2952</div> <div style="width: 25%;">P3356</div> <div style="width: 25%;">P6127</div> <div style="width: 25%;">P2698</div> <div style="width: 25%;">P2965</div> <div style="width: 25%;">P3358</div> <div style="width: 25%;">P2700</div> <div style="width: 25%;">P3189</div> <div style="width: 25%;">P3390</div> <div style="width: 25%;">P2724</div> <div style="width: 25%;">P3208</div> <div style="width: 25%;">P3415</div> </div>
d. Wellfield Recirculatoin		X	
e. Other (explain):		X	

2. LIST WELLS USED IN GROUNDWATER TRANSFER DURING THE MONTH:

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3. LIST WELLS USED IN GROUNDWATER SWEEP DURING THE MONTH:

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4. LIST WELLS SAMPLED DURING THE MONTH: (Assay results attached)

CM6-21	P2845	P3441
I2671P	P2900	P3698
I2674P	P2904	P3735
I2685P	P2908	
I2688P	P2952	
I2697P	P2977	
I2791P	P3189	
I3699P	P3208	
P2696	P3246	
P2700	P3266	
P2703	P3268	
P2724	P3277	
P2758	P3287	
P2764	P3356	
P2808	P3358	

Mine Unit 8		Restoration Data											
Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
CM6-21													
	12/6/2022	377	11.29	122	2.91	348	238	1630	8.11	1011	0.00	3.80	0.22
I2671P													
	12/6/2022	445	7.56	102	2.23	353	208	1612	8.41	999	0.01	2.04	1.02
I2674P													
	12/6/2022	803	32.69	333	10.68	802	612	3686	7.76	2285	0.00	16.41	1.28
I2685P													
	12/6/2022	321	7.02	85	1.72	272	154	1241	8.46	769	0.01	1.47	0.82
I2688P													
	12/6/2022	544	16.10	188	5.06	493	327	2306	7.99	1430	0.01	3.83	0.85
I2697P													
	12/6/2022	0	56.84	0	23.20	1304	1101	6115	7.8	3791	0.00	13.60	1.34
I2791P													
	12/6/2022	890	71.16	0	18.35	935	808	4408	7.77	2733	0.10	6.24	0.12
I3699P													
	12/6/2022	0	74.48	0	22.35	1201	1001	5472	7.69	3393	0.00	9.01	0.43
P2696													
	12/6/2022	646	21.55	284	6.96	681	547	3160	8.17	1959	0.03	5.18	0.52
P2700													
	12/6/2022	624	40.47	271	11.21	627	519	3042	7.68	1886	0.01	1.31	0.22
P2703													
	12/6/2022	366	20.31	180	4.53	407	339	1997	8.15	1238	0.01	-0.02	0.09
P2724													
	12/6/2022	441	8.09	128	2.89	379	245	1757	8.22	1089	0.00	2.83	1.86
P2758													
	12/6/2022	365	5.67	94	1.94	305	189	1399	8.41	867	0.01	0.77	1.57
P2764													
	12/6/2022	393	22.61	134	6.83	347	259	1703	8.13	1056	0.01	2.40	0.98
P2808													
	12/6/2022	298	4.96	90	1.44	266	171	1220	8.52	756	0.01	0.95	1.37
P2845													
	12/6/2022	503	29.64	209	7.84	494	380	2371	7.9	1470	0.00	0.99	1.85
P2900													
	12/6/2022	812	31.73	390	12.71	876	701	4017	8.04	2491	0.00	7.02	0.87
P2904													
	12/6/2022	404	16.30	148	4.37	373	276	1816	8.12	1126	0.01	1.03	0.51
P2908													
	12/6/2022	399	22.46	134	6.04	349	246	1716	8.14	1064	0.01	2.91	0.51

Mine Unit 8 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P2952	12/6/2022	530	26.65	192	7.61	492	391	2376	8.06	1473	0.02	3.88	0.33
P2977	12/6/2022	381	28.50	129	5.31	337	261	1652	8.05	1024	0.01	0.80	0.30
P3189	12/6/2022	381	25.95	140	6.17	347	274	1743	8.1	1081	0.01	0.57	0.14
P3208	12/6/2022	418	13.87	128	3.89	375	267	1787	8.29	1108	0.02	1.92	0.31
P3246	12/6/2022	680	27.75	291	8.82	688	534	3186	7.87	1975	0.05	15.48	0.66
P3266	12/6/2022	934	43.52	0	15.55	1009	823	4631	7.54	2871	0.02	8.73	0.66
P3268	12/6/2022	650	21.57	269	7.24	638	481	2973	7.91	1843	0.01	7.89	0.87
P3277	12/6/2022	742	31.09	363	10.27	800	628	3712	7.73	2301	0.01	5.17	0.51
P3287	12/6/2022	575	16.90	218	5.55	541	379	2528	8.14	1567	0.00	5.78	0.72
P3356	12/6/2022	384	16.57	192	4.30	431	356	2088	8.15	1295	0.01	0.76	0.08
P3358	12/6/2022	468	23.56	259	6.67	558	484	2682	8.12	1663	0.00	12.23	0.43
P3441	12/6/2022	862	47.84	0	14.61	904	708	4208	7.67	2609	0.01	7.60	0.34
P3698	12/6/2022	878	46.16	0	15.01	958	785	4424	7.83	2743	0.00	3.23	0.72
P3735	12/6/2022	0	73.11	0	23.67	1158	956	5308	7.8	3291	0.00	13.03	0.57