

**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, 2022

USPS PRIORITY MAIL
SIGNATURE CONFIRMATION

40-8943

DEPUTY DIRECTOR, DIVISION OF DECOMMISSIONING
USNRC

The enclosed report was provided to NDEE.

Class III UIC Permit NE0122611
December 2021 Monthly Restoration Report

Please find enclosed the Crow Butte Monthly Restoration Reports for Mine Units 2, 3, 4, 5, 6, 7 and 8.
The reverse osmosis (RO) units continue to inject permeate and reductant into Mine Units 2, 4, 6, 7, and 8.

Mine Unit 3 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

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 Jones – NDEE Program Coordinator

IEZ5
NMSS01
NMSS

CROW BUTTE MINE
 MONTHLY RESTORATION REPORT
 December 2021
 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):			

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 2021
 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 2021
 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		IX and RO I536P I549P I550P
d. Wellfield Recirculatoin		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)

I549P
I550P

Mine Unit 4 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
I549P													
	12/7/2021	455	24.46	130	6.91	399	368	1948	7.23	1208	0.13	1.58	0.08
I550P													
	12/7/2021	389	12.76	83	3.15	291	203	1407	7.52	872	0.01	1.06	0.22

CROW BUTTE MINE
 MONTHLY RESTORATION REPORT
 December 2021
 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 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 2021
 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		IX and RO P1337 P1399 P1461 P1625 P1628
d. Wellfield Recirculatoin		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)

CM5-16
 P1337
 P1399
 P1461
 P1625
 P1628

Mine Unit 6 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
CM5-16													
	12/14/2021	364	10.50	88	2.10	270	178	1324	8.28	821		1.10	0.75
P1337													
	12/7/2021	413	9.30	97	2.20	311	201	1484	8.13	920	0.01	1.83	0.52
P1399													
	12/7/2021	455	25.51	199	5.93	461	415	2277	8.02	1412	0.02	1.24	0.05
P1461													
	12/7/2021	358	16.50	179	4.16	402	377	1971	8.05	1222	0.01	0.99	0.26
P1625													
	12/7/2021	433	17.64	149	4.57	390	310	1859	8.12	1153	0.01	1.40	0.39
P1628													
	12/7/2021	310	9.58	142	2.68	318	278	1599	8.32	991	0.01	0.62	0.32

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
December 2021
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 I2185P P2216 P5220 CM4-14 I2429P P2226 P5230 CM4-15 I2502P P2316 P5250 CM4-16 P1972 P2384 P5283 CM4-17 P1986 P2401 I1971P P2014 P2476 I1973P P2038 P2505 I1975P P2040 P2523 I1978P P2103 P2538 I2183P P2188 P2610
d. Wellfield Recirculatoin		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	P1986	P2610
CM4-13	P2014	P5230
CM4-14	P2038	P5250
CM4-15	P2040	P5283
CM4-16	P2188	
CM4-17	P2216	
I1971P	P2226	
I1973P	P2316	
I1975P	P2384	
I1978P	P2401	
I2183P	P2476	
I2185P	P2481	
I2429P	P2505	
I2502P	P2523	
P1972	P2538	

Mine Unit 7 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
BL-17	12/7/2021	414	9.13	73	1.97	273	137	1306	8.31	810	0.00	0.39	1.45
CM4-13	12/7/2021	321	13.09	53	2.59	202	124	1047	7.96	649	0.01	0.48	0.24
CM4-14	12/7/2021	858	61.04	253	17.98	739	730	3547	7.47	2199	0.01	1.97	0.24
CM4-15	12/7/2021	786	54.01	206	15.52	667	595	3166	7.36	1963	0.01	1.24	0.41
CM4-16	12/7/2021	792	56.69	209	15.92	663	575	3162	7.47	1960	0.01	0.94	0.14
CM4-17	12/7/2021	669	43.31	176	12.93	542	437	2622	7.63	1626	0.04	0.58	-0.05
I1971P	12/7/2021	726	43.85	156	11.52	574	522	2739	7.44	1698	0.01	1.36	0.13
I1973P	12/7/2021	744	41.66	167	9.84	589	489	2764	7.53	1714	0.00	4.25	0.48
I1975P	12/7/2021	855	58.98	236	17.94	716	651	3422	7.49	2122	0.01	4.02	0.16
I1978P	12/7/2021	370	19.78	67	3.86	247	186	1290	7.6	800	0.01	1.04	0.38
I2183P	12/7/2021	538	40.82	136	9.36	431	403	2155	7.44	1336	0.01	5.39	0.80
I2185P	12/7/2021	957	59.76	230	18.73	829	755	3767	7.39	2336	0.01	3.36	1.95
I2429P	12/7/2021	392	20.40	114	5.67	318	261	1619	7.86	1004	0.01	2.03	0.35
I2502P	12/7/2021	327	19.44	191	4.89	406	377	2018	8.22	1251	0.01	0.50	0.08
P1972	12/7/2021	449	19.82	95	5.02	340	283	1695	7.33	1051	0.04	1.66	0.41
P1986	12/7/2021	484	22.09	159	6.28	443	354	2139	7.92	1326	0.00	1.31	0.46
P2014	12/7/2021	175	4.63	32	0.65	98	55	577	7.51	358	0.06	0.12	0.08
P2038	12/7/2021	580	34.38	154	9.98	476	430	2367	7.52	1468	0.01	1.78	0.08
P2040	12/7/2021	773	58.93	222	19.49	666	678	3293	7.4	2042	0.01	2.27	0.06

Mine Unit 7		Restoration Data											
Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P2188	12/7/2021	266	7.64	50	1.74	184	106	914	7.71	567	0.01	0.63	0.98
P2216	12/7/2021	453	24.57	169	5.28	439	377	2103	8.02	1304	0.01	2.85	0.52
P2226	12/7/2021	410	8.95	69	2.26	283	172	1349	7.98	836	0.01	1.56	0.63
P2316	12/7/2021	657	50.75	154	13.14	510	452	2528	7.57	1567	0.00	3.14	0.51
P2384	12/7/2021	602	46.49	169	13.55	509	524	2578	7.43	1598	0.01	2.33	0.42
P2401	12/7/2021	347	19.08	71	4.58	237	197	1274	7.69	790	0.01	0.56	0.27
P2476	12/7/2021	382	19.30	92	4.26	291	222	1450	7.78	899	0.02	0.91	0.53
P2481	12/7/2021	516	14.03	97	3.70	379	239	1764	7.92	1094	0.01	1.02	1.58
P2505	12/7/2021	289	16.78	129	3.10	294	257	1491	7.88	924	0.00	0.29	0.48
P2523	12/7/2021	290	7.56	50	1.46	197	113	957	8	593	0.01	0.57	0.59
P2538	12/7/2021	198	6.79	39	0.97	135	84	690	7.64	428	0.03	0.20	1.20
P2610	12/7/2021	660	27.77	152	8.34	512	355	2396	7.71	1486	0.01	1.67	1.00
P5230	12/7/2021	861	58.10	218	16.02	740	639	3402	7.53	2109	0.03	3.59	0.45
P5250	12/7/2021	469	24.82	112	7.00	361	284	1806	7.68	1120	0.01	0.84	1.06
P5283	12/7/2021	646	39.53	159	11.30	517	443	2488	7.68	1543	0.02	1.63	1.25

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
December 2021
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 CM6-11 P2724 P2855 P3178 P6109 CM6-20 P2734 P2863 P3189 P6110 CM6-21 P2740 P2880 P3192 P6111 I2671P P2758 P2904 P3209 P6112 I2672P P2764 P2908 P6101 P6127 I2692P P2765 P2926 P6102 P6140 P2689 P2770 P3153 P6103 P2701 P2774 P3166 P6104 P2702 P2808 P3170 P6105 P2715 P2844 P3173 P6107
d. Wellfield Recirculatoin		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)

CM6-11	P2724	P3170
CM6-20	P2729	P3173
CM6-21	P2734	P3178
CM6-22	P2758	P3189
CM6-23	P2764	P3192
CM6-24	P2765	P3209
I2671P	P2770	P6103
I2672P	P2774	P6104
I2685P	P2808	P6105
I2976P	P2844	P6107
P2686	P2855	P6109
P2689	P2904	P6110
P2700	P2908	P6112
P2702	P2926	P6127
P2715	P3153	P6140

Mine Unit 8		Restoration Data											
Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
CM6-11	12/7/2021	448	28.77	223	7.00	477	440	2406	8.1	1492	0.01	0.55	-0.09
CM6-20	12/7/2021	401	15.70	153	3.69	365	278	1828	8.11	1133	0.05	0.73	0.13
CM6-21	12/7/2021	602	27.16	235	6.88	558	442	2691	8.33	1668	0.00	10.52	0.20
CM6-22	12/7/2021	353	16.93	131	3.44	316	230	1570	8.22	973	0.02	1.02	0.15
CM6-23	12/7/2021	372	6.78	134	2.19	342	250	1651	8.36	1024	0.01	1.10	0.79
CM6-24	12/7/2021	497	13.55	187	4.43	464	341	2203	8.14	1366	0.01	1.18	0.84
I2671P	12/7/2021	751	25.67	257	7.54	662	483	3086	8.1	1913	0.02	3.97	0.46
I2672P	12/7/2021	350	6.35	128	1.32	320	227	1570	8.38	973	0.02	0.64	-0.05
I2685P	12/7/2021	336	6.90	113	1.63	297	208	1439	8.21	892	0.00	1.83	0.61
I2976P	12/7/2021	480	11.26	188	3.42	457	344	2178	8.26	1350	0.01	1.08	0.59
P2686	12/7/2021	546	14.92	206	4.58	519	377	2405	8.22	1491	0.01	5.33	0.82
P2689	12/7/2021	507	14.20	202	3.86	493	391	2355	8.21	1460	0.03	3.53	-0.02
P2700	12/7/2021	477	27.15	237	7.34	509	423	2500	8.1	1550	0.01	1.26	0.15
P2702	12/7/2021	401	7.41	140	1.88	365	253	1737	8.26	1077	0.01	1.48	0.67
P2715	12/7/2021	341	9.14	127	2.49	312	223	1535	8.34	952	0.01	0.52	0.34
P2724	12/7/2021	703	21.25	294	8.37	716	537	3260	8.01	2021	0.01	3.70	1.12
P2729	12/7/2021	368	9.24	120	2.37	315	200	1537	8.46	953	0.02	1.03	0.81
P2734	12/7/2021	668	20.08	276	7.06	673	512	3077	8.14	1908	0.01	9.76	0.92
P2758	12/7/2021	389	5.70	133	1.62	355	242	1667	8.37	1034	0.01	1.42	1.45

Mine Unit 8		Restoration Data											
Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P2764	12/7/2021	629	21.81	264	7.50	620	475	2893	8.02	1794	0.01	6.60	0.98
P2765	12/7/2021	312	5.59	122	1.39	295	222	1456	8.27	903	0.03	0.73	0.17
P2770	12/7/2021	458	8.73	168	2.91	427	283	1999	8.61	1239	0.01	1.08	1.85
P2774	12/7/2021	409	11.43	160	2.99	388	288	1874	8.31	1162	0.01	1.94	0.59
P2808	12/7/2021	388	10.14	138	2.72	353	256	1720	8.35	1066	0.01	0.99	0.90
P2844	12/7/2021	418	12.00	190	3.53	421	333	2037	8.22	1263	0.01	0.91	0.73
P2855	12/7/2021	522	21.77	231	6.65	524	423	2516	8.14	1560	0.01	2.62	0.52
P2904	12/7/2021	532	25.25	239	7.07	532	428	2580	7.96	1600	0.01	1.66	0.38
P2908	12/7/2021	494	11.30	181	3.41	462	327	2183	8.22	1353	0.01	6.10	0.50
P2926	12/7/2021	384	13.07	141	3.30	346	255	1702	8.22	1055	0.01	1.30	0.62
P3153	12/7/2021	450	9.80	142	2.46	380	268	1848	8.47	1146	0.02	2.81	0.32
P3170	12/7/2021	420	16.04	167	4.00	392	313	1939	8.23	1202	0.01	1.20	0.18
P3173	12/7/2021	453	10.75	178	3.39	436	325	2081	8.17	1290	0.01	3.16	0.62
P3178	12/7/2021	492	12.88	186	3.56	451	334	2189	8.29	1357	0.09	1.94	0.26
P3189	12/7/2021	424	23.72	177	5.63	398	319	2015	8.12	1249	0.01	0.70	0.01
P3192	12/7/2021	519	24.78	217	6.05	501	409	2474	8.25	1534	0.02	1.08	-0.03
P3209	12/7/2021	505	15.80	200	4.24	481	371	2339	8.23	1450	0.01	3.84	0.08
P6103	12/7/2021	399	13.33	147	3.42	363	266	1783	8.3	1105	0.03	0.55	0.59
P6104	12/7/2021	587	22.73	255	7.78	586	460	2774	8.17	1720	0.01	0.96	0.47

Mine Unit 8 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P6105	12/7/2021	360	11.17	145	2.59	336	254	1677	8.28	1040	0.03	0.23	0.11
P6107	12/7/2021	360	9.16	138	2.17	336	255	1646	8.36	1021	0.01	0.50	0.27
P6109	12/7/2021	366	6.18	131	1.75	334	235	1603	8.52	994	0.01	0.69	0.57
P6110	12/7/2021	383	16.64	162	4.10	370	303	1841	8.37	1141	0.01	0.44	0.17
P6112	12/7/2021	379	8.26	175	2.49	392	303	1908	8.45	1183	0.01	0.20	0.15
P6127	12/7/2021	398	9.86	154	2.72	381	290	1845	8.32	1144	0.01	0.48	0.23
P6140	12/7/2021	468	14.82	183	4.63	435	331	2128	8.28	1319	0.01	0.45	0.50