

**CAMECO RESOURCES
CROW BUTTE OPERATION**



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

**(308) 665-2215
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November 17, 2022

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
October 2022 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 6, 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



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
 October 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
 October 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
 October 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
 October 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	P1002
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
October 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		P1628
d. Wellfield Recirculation		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)

CM5-14	I1398P	P1376	P1628
CM5-15	I1423P	P1396	P1663
CM5-16	I1581P	P1399	P1689
CM5-17	I1600P	P1426	P1690
CM6-6	I1601P	P1439	P1703
CM6-7	I1602P	P1446	P1706
I1266P	I1667P	P1457	P1751
I1267P	P1265	P1494	P1765
I1270P	P1268	P1532	P1800
I1272P	P1269	P1584	P1832
I1274P	P1273	P1590	P1843
I1285P	P1318	P1611	
I1356P	P1348	P1612	
I1357P	P1355	P1624	
I1397P	P1358	P1625	

Mine Unit 6
Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
CM5-14	10/26/2022	337	20.56	0	4.62	437	403	2046	7.83	1269	0.02	-0.01	0.07
CM5-15	10/26/2022	334	15.91	0	2.92	282	194	1324	7.86	821	0.04	0.72	0.09
CM5-16	10/26/2022	391	11.71	0	2.57	313	202	1439	7.69	892	0.03	1.07	0.57
CM5-17	10/26/2022	376	21.21	191	5.46	444	399	2155	7.99	1336	0.03	0.07	0.06
CM6-6	10/26/2022	288	16.20	171	3.92	392	367	1894	8.52	1174	0.02	-0.01	0.06
CM6-7	10/26/2022	279	18.88	179	4.17	393	385	1922	8.5	1192	0.04	-0.01	0.05
I1266P	10/26/2022	223	3.23	50	0.48	163	75	732	7.17	454	0.02	0.60	0.58
I1267P	10/26/2022	257	4.77	65.4	1.06	214	130	983	7.22	609	0.04	0.89	0.15
I1270P	10/26/2022	342	11.82	0	2.48	270	165	1266	6.48	785	0.01	0.43	0.79
I1272P	10/26/2022	407	16.04	130	4.00	374	277	1770	8.03	1097	0.01	0.56	0.07
I1274P	10/26/2022	433	12.35	162	3.22	424	317	1986	7.96	1231	0.01	0.60	0.25
I1285P	10/26/2022	368	6.05	0	1.18	283	162	1274	6.49	790	0.00	1.80	0.40
I1356P	10/26/2022	164	3.07	38	0.32	123	44	565	8.45	350	0.06	0.22	0.09
I1357P	10/26/2022	323	23.86	149	5.28	364	340	1789	7.41	1109	0.05	1.29	0.08
I1397P	10/26/2022	322	10.28	100	1.67	296	211	1372	8.2	851	0.01	1.20	0.29
I1398P	10/26/2022	324	13.07	87	2.84	271	176	1273	8.25	789	0.01	0.55	0.13
I1423P	10/26/2022	294	12.23	0	2.66	343	290	1613	7.1	1000	0.01	1.39	0.47
I1581P	10/26/2022	303	13.98	176	3.59	392	347	1880	8.35	1166	0.02	0.79	0.14
I1600P	10/26/2022	165	15.48	57	2.61	150	119	748	7.24	464	0.12	0.77	0.80

Mine Unit 6
Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
I1601P													
	10/26/2022	282	4.25	62	0.78	215	108	973	8.82	603	0.17	1.08	2.58
I1602P													
	10/26/2022	337	10.21	118	2.61	315	208	1465	8.17	908	0.02	0.90	0.19
I1667P													
	10/26/2022	306	16.43	79	3.32	245	160	1169	8.17	725	0.01	0.28	0.08
P1265													
	10/26/2022	365	10.27	112	2.80	330	238	1547	8.17	959	0.01	0.44	0.10
P1268													
	10/26/2022	400	9.44	103	2.37	326	194	1502	8.22	931	0.01	1.29	1.48
P1269													
	10/26/2022	247	5.10	0	0.90	208	133	947	6.22	587	0.01	0.29	0.14
P1273													
	10/26/2022	444	12.22	114	2.58	371	249	1712	7.91	1061	0.02	3.28	0.11
P1318													
	10/26/2022	309	5.80	0	1.43	267	166	1228	7	761	0.01	0.43	1.05
P1348													
	10/26/2022	307	7.08	88	1.53	273	174	1260	8.18	781	0.03	0.80	0.19
P1355													
	10/26/2022	411	11.84	103	2.73	339	220	1560	8.25	967	0.03	2.34	0.27
P1358													
	10/26/2022	279	6.23	81	1.54	242	152	1126	8.36	698	0.03	0.72	0.54
P1376													
	10/26/2022	157	2.52	0	0.26	119	48	537	6.11	333	0.08	0.17	0.19
P1396													
	10/26/2022	289	15.74	171	4.05	377	345	1831	8.06	1135	0.01	0.07	0.06
P1399													
	10/26/2022	493	24.20	0	5.68	456	359	2159	7.01	1339	0.01	0.80	0.14
P1426													
	10/26/2022	322	12.78	0	2.92	343	293	1649	6.54	1022	0.04	1.20	0.08
P1439													
	10/26/2022	442	7.60	0	1.66	326	179	1460	6.7	905	0.03	1.66	0.96
P1446													
	10/26/2022	275	21.44	181	4.37	387	378	1918	7.99	1189	0.02	-0.02	0.06
P1457													
	10/26/2022	437	6.83	0	2.01	358	218	1623	6.77	1006	0.07	0.70	1.06
P1494													
	10/26/2022	314	6.61	68	1.26	244	132	1126	8.25	698	0.03	0.84	0.36

Mine Unit 6 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P1532	10/26/2022	449	18.31	193	4.75	477	386	2262	7.87	1402	0.00	0.35	0.06
P1584	10/26/2022	296	5.23	70	0.86	236	120	1078	8.58	668	0.02	1.08	0.54
P1590	10/26/2022	269	7.75	74	1.50	221	145	1036	8.3	642	0.04	3.39	0.09
P1611	10/26/2022	329	18.09	166	3.99	396	352	1898	8.06	1177	0.06	3.43	0.30
P1612	10/26/2022	298	4.63	55	0.92	227	123	1008	8.55	625	0.01	0.66	0.51
P1624	10/26/2022	210	3.08	41	0.55	158	70	701	8.69	435	0.02	0.59	0.69
P1625	10/26/2022	188	3.83	66	0.76	176	104	813	8.41	504	0.01	0.44	0.32
P1628	10/4/2022	292	7.63	108	2.07	289	213	1352	8.4	838	-0.02	0.57	0.44
P1663	10/26/2022	334	5.32	79	1.55	271	156	1217	8.42	755	0.00	0.93	0.52
P1689	10/26/2022	309	18.50	200	4.56	405	354	1974	8.18	1224	0.02	0.68	0.06
P1690	10/26/2022	380	17.56	170	4.73	405	315	1930	8.15	1197	0.01	1.42	0.11
P1703	10/26/2022	247	14.20	0	2.68	203	144	993	6.23	616	0.06	0.91	0.10
P1706	10/26/2022	282	2.30	0	0.50	192	95	845	6.41	524	0.01	0.77	1.89
P1751	10/26/2022	142	4.49	33	0.50	109	43	498	8.12	309	0.27	0.02	0.12
P1765	10/26/2022	446	8.15	82	1.86	330	169	1458	8.26	904	0.03	1.62	0.36
P1800	10/26/2022	343	9.59	90	1.82	283	171	1315	8.29	815	0.00	1.51	0.35
P1832	10/26/2022	431	12.30	93	3.20	330	192	1520	8.25	942	0.01	2.07	0.46
P1843	10/26/2022	453	9.12	130	2.48	390	235	1772	8.34	1099	0.01	2.31	2.03

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
October 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 P2316 CM4-15 P2359 CM4-16 P2384 I1971P P2476 I1973P P2505 I1975P P2523 I2183P P5230 I2185P P5271 P2038
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 P2505
 CM4-14 P2523
 CM4-15 P5230
 CM4-16 P5271
 I1971P
 I1973P
 I1975P
 I2183P
 I2185P
 P2038
 P2040
 P2316
 P2359
 P2384
 P2476

Mine Unit 7**Restoration Data**

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
BL-17	10/4/2022	363	7.20	62	1.37	237	114	1114	8.05	691	-0.02	0.30	1.56
CM4-14	10/4/2022	692	44.83	170	12.02	575	453	2661	7.36	1650	-0.02	2.31	0.35
CM4-15	10/4/2022	760	69.79	214	16.34	629	529	3009	7.29	1866	0.01	0.85	0.30
CM4-16	10/4/2022	607	37.23	145	10.63	476	380	2324	7.51	1441	-0.02	0.69	0.27
I1971P	10/4/2022	617	36.90	127	9.42	488	384	2275	7.38	1411	-0.02	0.97	0.21
I1973P	10/4/2022	589	23.43	99	5.41	423	277	1932	7.77	1198	-0.02	2.56	0.55
I1975P	10/4/2022	815	60.40	209	17.84	699	591	3175	7.47	1969	-0.01	4.08	0.21
I2183P	10/4/2022	495	39.08	122	8.46	398	322	1931	7.38	1197	-0.02	4.39	0.76
I2185P	10/4/2022	752	40.19	154	11.96	600	482	2762	7.42	1712	-0.02	2.12	1.97
P2038	10/4/2022	612	47.93	167	13.48	526	467	2530	7.23	1569	0.00	2.14	0.14
P2040	10/4/2022	715	56.36	201	18.24	614	563	2967	7.23	1840	-0.02	2.00	0.11
P2316	10/4/2022	491	41.55	111	9.92	373	300	1853	7.45	1149	-0.02	1.67	0.41
P2359	10/4/2022	488	27.03	105	7.08	364	289	1807	7.39	1120	0.02	2.11	0.24
P2384	10/4/2022	623	50.80	183	14.40	532	485	2691	7.32	1668	-0.02	3.49	0.42
P2476	10/4/2022	299	13.79	80	2.58	225	147	1149	7.48	712	0.00	0.53	0.51
P2505	10/4/2022	315	18.70	151	3.42	339	300	1702	7.88	1055	-0.02	0.44	0.56
P2523	10/4/2022	237	6.25	47	1.17	156	76	767	7.57	476	-0.02	0.14	0.60
P5230	10/4/2022	690	41.05	157	10.59	559	453	2624	7.59	1627	0.03	2.65	0.49
P5271	10/4/2022	635	35.31	148	9.50	513	382	2364	7.92	1466	-0.01	1.23	0.60

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
October 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 CM6-21 P2764 P3246 P6110 CM6-24 P2808 P3253 P6127 I2671P P2855 P3266 I2685P P2904 P3268 I2688P P2908 P3277 I2791 P2952 P3287 I3699P P3178 P3415 P2700 P3189 P3441 P2724 P3208 P3735 P2758 P3209 P6103
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)

CM6-21	P2845	P3735
CM6-24	P2855	
I2671P	P2904	
I2674P	P2908	
I2675P	P2952	
I2685P	P2977	
I2688P	P3178	
I2791P	P3189	
I3699P	P3208	
P2700	P3209	
P2703	P3246	
P2724	P3266	
P2758	P3277	
P2764	P3287	
P2808	P3441	

Mine Unit 8 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
CM6-21	10/4/2022	391	12.01	125	2.70	350	247	1647	8.3	1021	0.00	4.53	0.16
CM6-24	10/4/2022	277	4.59	58	0.99	204	104	940	8.76	583	-0.01	0.63	1.07
I2671P	10/4/2022	464	8.70	114	2.27	362	220	1696	8.35	1052	-0.01	2.13	0.94
I2674P	10/4/2022	0	65.67	0	22.47	1307	1084	5657	7.67	3507	0.02	23.87	1.07
I2675P	10/4/2022	0	60.99	0	21.40	1132	917	5127	7.85	3179	-0.02	10.23	0.61
I2685P	10/4/2022	301	4.07	66	0.71	231	123	1057	8.65	655	-0.01	1.66	0.96
I2688P	10/4/2022	529	17.24	182	5.02	476	313	2173	8.07	1347	-0.01	5.16	1.04
I2791P	10/4/2022	973	82.40	0	20.95	1032	900	4768	7.97	2956	0.13	7.33	0.03
I3699P	10/4/2022	0	83.41	0	24.59	1258	1090	5667	7.69	3514	-0.02	10.24	0.37
P2700	10/4/2022	519	32.47	250	8.51	546	452	2619	8	1624	0.03	0.95	0.13
P2703	10/4/2022	352	20.92	184	4.33	407	343	1968	8.19	1220	-0.01	0.06	0.01
P2724	10/4/2022	448	9.22	138	3.14	393	267	1812	8.29	1123	-0.02	2.64	1.90
P2758	10/4/2022	348	4.14	91	1.01	277	167	1334	8.44	827	-0.02	0.93	1.47
P2764	10/4/2022	278	6.50	76	1.71	220	138	1071	8.24	664	0.00	1.59	1.24
P2808	10/4/2022	238	2.90	47	0.37	167	80	782	8.75	485	-0.01	0.66	2.71
P2845	10/4/2022	492	31.27	216	7.98	495	369	2338	7.98	1450	-0.02	1.34	2.15
P2855	10/4/2022	290	10.11	74	2.08	225	132	1073	8.42	665	-0.01	0.96	0.75
P2904	10/4/2022	414	19.42	147	4.90	364	273	1809	8.1	1122	0.03	1.32	0.49
P2908	10/4/2022	273	4.31	56	0.89	191	103	930	8.63	577	-0.01	2.27	0.60

Mine Unit 8 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P2952	10/4/2022	466	21.23	163	5.38	421	324	2043	8.09	1267	0.03	3.20	0.57
P2977	10/4/2022	217	16.66	49	3.56	144	99	772	8.24	479	-0.02	0.30	0.37
P3178	10/4/2022	320	7.06	82	1.78	260	168	1223	8.26	758	0.00	1.74	0.46
P3189	10/4/2022	276	14.55	90	3.05	243	176	1195	8.02	741	0.00	0.51	0.09
P3208	10/4/2022	407	13.38	127	3.30	359	256	1731	8.18	1073	0.01	1.60	0.16
P3209	10/4/2022	335	8.29	108	2.01	298	204	1416	8.17	878	0.01	3.05	0.29
P3246	10/4/2022	876	38.37	337	11.84	857	661	3886	8.17	2409	0.07	28.57	0.80
P3266	10/4/2022	0	54.15	0	20.11	1209	995	5336	7.94	3308	0.04	9.15	0.66
P3277	10/4/2022	0	64.99	0	20.02	1145	959	5232	7.89	3244	0.01	9.40	0.42
P3287	10/4/2022	943	52.61	0	18.02	1111	902	4978	7.9	3086	-0.02	15.35	0.90
P3441	10/4/2022	867	50.76	0	15.02	931	759	4257	7.75	2639	-0.02	7.90	0.28
P3735	10/4/2022	0	80.95	0	25.37	1154	973	5371	7.67	3330	-0.02	15.81	0.52