

**CAMECO RESOURCES
CROW BUTTE OPERATION**



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

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

November 17, 2020

**USPS PRIORITY MAIL
SIGNATURE CONFIRMATION**

**Marty Link, Water Quality Division Administrator
Nebraska Department of Environment and Energy
P.O. Box 98922
Lincoln, NE 68509-8922**

**Class III UIC Permit NE0122611
October 2020 Monthly Restoration Report**

Dear Ms. Link:

Please find enclosed the October 2020 Monthly Restoration Reports for Mine Units 2, 3, 4, 5, 6 and 7. The reverse osmosis (RO) units continue to inject permeate and reductant into Mine Units 2, 4, 6 and 7.

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. 117.

Sincerely,
Cameco Resources
Crow Butte Operation

A handwritten signature in black ink that reads "Walter D. Nelson". The signature is written in a cursive style with a long horizontal flourish at the end.

**Walter D. Nelson
SHEQ Coordinator**

Enclosures: As Stated

cc: **Ron Burrows** – NRC
CBO - File
ec: CR – Electronic File
Kory Winters – NDEE Field Office
Amanda Jones – NDEE Program Coordinator

CROW BUTTE MINE
MONTHLY RESTORATION REPORT

October 2020

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		P97, P118, P119, I175P, I180P, I188P
d. Wellfield Recirculation		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 MONTH AND ASSAY RESULTS:

P97, P118, P119, I175P, I180P, I188P.

Mine Unit 2 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
I175P	10/7/2020	201	2.52	52	0.54	160	93	776	7.94	481	0.01	1.21	0.09
I180P	10/7/2020	223	2.88	59	0.61	187	111	889	8.03	551	0.00	0.97	0.13
I188P	10/7/2020	227	6.33	67	1.31	178	103	890	8.02	552	-0.01	0.71	0.02
P118	10/7/2020	255	5.65	87	1.27	224	140	1093	7.76	678	0.01	1.48	0.02
P119	10/7/2020	306	9.96	114	2.56	276	181	1363	7.78	845	0.01	2.14	0.01
P97	10/7/2020	426	16.89	136	4.37	356	231	1745	7.82	1082	0.02	4.67	0.02

CROW BUTTE MINE
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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 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 MONTH AND ASSAY RESULTS:

No in-house samples were collected during the month.

CROW BUTTE MINE
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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		BL-8, CM1-7, I536P, I538P, I544P, I548P, I549P, I550P, I551P, I552P
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 MONTH AND ASSAY RESULTS:

BL-8, CM1-7, I536P, I538P, I544P, I548P, I549P, I550P, I551P, I552P.

Mine Unit 4 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
BL-8	10/7/2020	333	6.90	75	1.79	236	107	1134	8.12	703	-0.01	1.07	0.31
CM1-7	10/7/2020	376	8.84	99	2.39	287	171	1426	7.91	884	-0.01	2.40	0.06
I536P	10/7/2020	494	32.09	192	8.54	466	361	2311	7.91	1433	-0.01	7.11	0.08
I538P	10/7/2020	314	8.92	96	2.25	246	132	1236	8.08	766	-0.01	0.94	0.24
I544P	10/7/2020	449	17.00	113	4.62	349	226	1720	7.83	1066	-0.01	2.00	0.18
I548P	10/7/2020	534	31.52	161	8.91	447	330	2209	7.58	1370	0.00	0.88	0.15
I549P	10/7/2020	1099	80.95	355	22.89	1045	950	4868	7.32	3018	0.11	14.25	0.12
I550P	10/7/2020	963	105.20	334	27.08	912	866	4433	7.28	2748	0.04	9.67	0.22
I551P	10/7/2020	511	27.96	163	7.01	422	317	2196	7.64	1362	-0.01	2.79	0.30
I552P	10/7/2020	534	24.39	149	6.15	466	362	2269	7.48	1407	0.00	5.18	0.35

CROW BUTTE MINE
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October 2020

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 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:

P1002

4. LIST WELLS SAMPLED DURING MONTH AND ASSAY RESULTS:

P1002.

Mine Unit 5 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P1002	10/7/2020	341	15.72	178	4.07	396	332	2000	8.07	1240	-0.01	0.99	0.24

CROW BUTTE MINE
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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		CM5-17, I1270P, P1314, P1315, P1318, P1348, P1358, I1398P, P1399, P1439, P1457, P1461, P1532, I1581P, P1611, P1625, P1628, P1658, P1843
d. Wellfield Recirculation		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 MONTH AND ASSAY RESULTS:

CM5-14, CM5-15, CM5-17, CM6-6, CM6-7, P1265, I1266P, I1267P, P1268, P1269, I1270P, P1273, I1274P, I1285P, P1314, P1315, P1318, P1348, P1355, I1356P, I1357P, P1358, P1376, P1396, I1397P, I1398P, P1399, I1423P, P1426, P1439, P1446, P1457, P1461, P1494, P1532, I1581P, P1584, P1590, I1601P, I1602P, P1611, P1612, P1624, P1625, P1628, P1663, I1667, P1689, P1690, P1703, P1706, P1751, P1765, P1800, P1843.

Mine Unit 6 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
CM5-14	10/7/2020	292	19.88	197	4.02	395	363	2003	8.19	1242	0.00	0.08	0.00
CM5-15	10/7/2020	366	14.94	92	2.65	287	165	1405	8	871	0.02	1.50	0.06
CM5-17	10/7/2020	472	19.86	152	4.88	421	293	2103	7.99	1304	0.03	0.53	0.00
CM6-6	10/7/2020	295	15.61	189	3.73	398	355	1992	8.15	1235	0.01	0.03	-0.01
CM6-7	10/7/2020	279	19.26	185	4.17	385	380	2017	8.06	1251	0.02	0.05	-0.01
I1266P	10/7/2020	333	19.55	121	4.37	291	221	1499	8.04	929	0.02	0.56	0.12
I1267P	10/7/2020	265	7.52	94	1.88	240	160	1206	8.15	748	0.01	0.64	0.09
I1270P	10/7/2020	305	10.31	58	0.97	213	88	1001	8.69	621	0.01	1.20	3.31
I1274P	10/7/2020	538	22.50	199	4.84	492	326	2427	8.07	1505	0.17	1.43	0.10
I1285P	10/7/2020	373	4.29	70	0.95	265	115	1240	8.48	769	0.01	2.29	0.82
I1356P	10/7/2020	327	9.13	111	1.90	294	185	1451	8.05	900	0.02	2.19	0.07
I1357P	10/7/2020	330	24.24	154	4.98	353	306	1851	7.54	1148	0.18	1.87	0.01
I1397P	10/7/2020	318	9.02	108	1.42	286	182	1390	8.07	862	0.02	2.24	0.25
I1398P	10/7/2020	301	13.29	92	2.87	249	161	1281	8.25	794	-0.01	0.63	0.29
I1423P	10/7/2020	302	5.96	75	1.20	235	129	1153	8.29	715	0.02	1.78	0.75
I1581P	10/7/2020	334	10.40	142	2.74	342	252	1752	8.28	1086	-0.01	0.87	0.42
I1601P	10/7/2020	486	14.92	146	4.30	308	218	2000	8.66	1240	0.00	0.60	0.12
I1602P	10/7/2020	338	11.16	125	2.77	412	253	1587	7.96	984	0.06	2.99	1.58
I1667P	10/7/2020	331	23.84	117	4.84	283	202	1501	8.07	931	0.02	0.37	0.06

Mine Unit 6 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P1265	10/7/2020	309	11.39	131	2.91	323	246	1646	8.28	1021	-0.01	0.88	0.04
P1268	10/7/2020	342	6.38	75	1.43	250	129	1263	8.4	783	0.02	1.10	2.32
P1269	10/7/2020	270	4.67	70	0.94	222	119	1077	8.24	668	0.01	0.64	0.29
P1273	10/7/2020	414	9.17	127	2.33	367	229	1796	8.06	1114	0.03	3.80	0.08
P1314	10/7/2020	417	9.50	112	2.57	334	191	1641	8.2	1017	-0.01	2.46	1.48
P1315	10/7/2020	424	18.15	174	4.82	426	327	2146	7.98	1331	0.00	0.51	0.11
P1318	10/7/2020	332	6.25	98	1.58	279	172	1362	8.37	844	-0.01	0.97	1.03
P1348	10/7/2020	321	6.71	110	1.76	297	196	1466	8.01	909	0.05	1.27	0.19
P1355	10/7/2020	419	12.35	120	3.06	355	223	1687	8.02	1046	0.00	2.90	0.41
P1358	10/7/2020	308	12.53	158	3.35	347	293	1816	8.17	1126	-0.01	0.91	0.20
P1376	10/7/2020	330	9.43	126	1.92	316	220	1579	8.04	979	0.01	1.65	0.06
P1396	10/7/2020	292	14.02	166	3.58	358	304	1877	8.24	1164	0.00	0.07	0.01
P1399	10/7/2020	466	24.10	175	5.17	427	291	2110	7.81	1308	0.00	1.50	0.06
P1426	10/7/2020	335	14.46	174	3.50	393	311	1956	8.1	1213	0.04	1.90	0.02
P1439	10/7/2020	600	20.30	217	5.55	539	335	2576	7.92	1597	0.01	2.19	0.61
P1446	10/7/2020	280	25.80	194	4.43	393	364	2043	8.21	1267	0.03	0.04	0.00
P1457	10/7/2020	422	11.43	81	1.50	295	134	1400	8.62	868	0.10	2.36	1.71
P1461	10/7/2020	390	17.18	182	4.56	426	346	2169	8.02	1345	-0.01	1.08	0.33
P1494	10/7/2020	274	3.95	61	0.69	201	94	1021	8.32	633	0.03	0.61	0.77

Mine Unit 6 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P1532	10/7/2020	441	24.74	235	6.06	503	421	2627	7.75	1629	-0.01	0.17	-0.01
P1584	10/7/2020	258	5.78	64	0.86	198	102	965	8.65	598	0.00	1.08	0.60
P1590	10/7/2020	296	11.55	97	2.20	246	158	1295	8.31	803	0.03	8.15	0.04
P1611	10/7/2020	312	13.41	184	3.60	383	331	1998	8.08	1239	0.02	1.81	0.28
P1612	10/7/2020	341	5.30	55	0.88	232	103	1083	8.72	671	-0.01	1.44	1.54
P1624	10/7/2020	292	8.28	87	1.75	236	142	1188	8.3	737	-0.01	1.31	0.13
P1625	10/7/2020	428	15.92	149	4.29	374	256	1948	8.09	1208	-0.01	1.78	0.51
P1628	10/7/2020	324	8.82	137	2.58	323	238	1653	8.35	1025	-0.01	0.80	0.49
P1663	10/7/2020	330	3.66	63	0.91	226	102	1120	8.56	694	0.03	1.72	0.39
P1689	10/7/2020	290	19.61	261	4.07	420	325	2229	8.14	1382	0.01	0.65	0.02
P1690	10/7/2020	249	5.60	78	1.22	219	137	1119	8.52	694	-0.01	0.64	0.10
P1703	10/7/2020	271	22.31	96	4.06	231	162	1229	8.03	762	0.15	2.10	0.07
P1706	10/7/2020	304	3.03	58	0.72	221	107	1065	8.7	660	0.00	1.46	1.46
P1751	10/7/2020	218	6.38	71	1.06	187	112	949	7.86	588	0.08	0.04	0.02
P1765	10/7/2020	433	9.27	107	2.00	342	182	1645	8.25	1020	0.12	1.88	0.33
P1800	10/7/2020	269	9.30	102	1.38	256	176	1259	8.27	781	-0.01	1.27	0.14
P1843	10/7/2020	367	9.28	134	2.56	346	226	1700	8.25	1054	-0.01	2.01	1.25

CROW BUTTE MINE
MONTHLY RESTORATION REPORT

October 2020

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, CM3-7, CM4-14, CM4-15, CM4-16, CM4-17, CM4-18, I1971P, I1973P, I1975P, I1978P, I1982P, I1985P, P1986, P2038, P2040, P2103, P2125, I2183P, P2188, P2197, P2216, P2226, I2244P, P2264, I2429P, P2468, P2470, P2476, P2505, P2510, P2523, P2538, P2540, P2601, P2610, P2612, P2614, P2615, P2624, P5220, P5230, P5250.
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 MONTH AND ASSAY RESULTS:

BL-17, CM3-7, CM4-12, CM4-13, CM4-14, CM4-15, CM4-16, CM4-17, CM4-18, I1971P, I1973P, I1975P, I1978P, I1982P, I1985P, P1986, P2038, P2040, P2125, I2183P, P2188, P2216, P2226, I2244P, P2264, I2429P, P2468, P2470, P2476, P2481, P2505, P2510, P2523, P2538,

P2540, P2601, P2610, P2612, P2614, P2615, P2624, P5230, P5250.

Mine Unit 7 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
BL-17	10/7/2020	736	32.02	220	9.37	622	413	3157	7.87	1957	-0.01	1.11	1.46
CM3-7	10/7/2020	424	24.23	173	6.01	414	314	2210	8.13	1370	-0.01	0.29	0.20
CM4-12	10/7/2020	588	30.29	149	9.49	496	388	2497	7.41	1548	0.05	1.47	0.11
CM4-13	10/7/2020	728	47.21	188	13.78	622	522	3156	7.38	1957	0.02	1.79	0.15
CM4-14	10/7/2020	900	67.01	259	21.19	779	680	3960	7.42	2455	-0.01	1.29	0.39
CM4-15	10/7/2020	1005	71.15	277	21.31	844	715	4328	7.43	2683	-0.01	4.74	0.69
CM4-16	10/7/2020	1091	106.00	366	30.85	1041	997	5179	7.32	3211	-0.01	2.76	0.19
CM4-17	10/7/2020	1020	120.10	430	35.06	957	874	5123	7.28	3176	0.10	0.40	0.01
CM4-18	10/7/2020	605	40.12	202	10.66	495	353	2719	7.64	1686	0.00	0.54	0.59
I1971P	10/7/2020	1079	93.34	310	24.96	980	898	4760	7.35	2951	-0.01	2.62	0.24
I1973P	10/7/2020	843	54.07	210	12.95	707	552	3335	7.4	2068	0.00	6.30	0.59
I1975P	10/7/2020	816	53.98	214	16.31	689	537	3327	7.48	2063	-0.01	6.79	0.25
I1978P	10/7/2020	617	47.60	136	11.44	456	361	2433	7.53	1508	-0.01	1.63	0.40
I1982P	10/7/2020	456	31.19	117	6.70	353	263	1863	7.4	1155	-0.01	2.90	0.63
I1985P	10/7/2020	435	29.82	66	4.91	272	163	1458	7.8	904	-0.01	1.04	0.58
I2183P	10/7/2020	830	64.19	239	15.43	740	628	3638	7.48	2256	-0.01	8.08	0.82
I2244P	10/7/2020	256	10.06	104	2.43	243	164	1254	7.42	777	0.00	0.48	0.46
I2429P	10/7/2020	474	21.76	114	6.11	377	262	1877	7.63	1164	-0.01	3.67	0.55
P1986	10/7/2020	679	47.92	265	14.84	675	576	3416	7.65	2118	-0.01	1.92	0.70

Mine Unit 7 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P2038	10/7/2020	649	42.90	178	12.17	549	459	2750	7.32	1705	-0.01	2.08	0.16
P2040	10/7/2020	1023	87.26	309	27.02	946	874	4574	7.31	2836	-0.01	4.82	0.16
P2125	10/7/2020	459	18.86	93	4.55	339	223	1764	7.52	1094	0.04	1.15	0.08
P2188	10/7/2020	293	7.54	58	1.58	208	99	1076	7.58	667	-0.01	0.88	1.02
P2216	10/7/2020	318	19.45	134	4.65	300	221	1642	7.92	1018	0.00	3.00	0.63
P2226	10/7/2020	529	14.02	93	4.06	383	231	1847	7.62	1145	-0.01	2.79	0.57
P2264	10/7/2020	247	16.39	128	4.33	267	221	1506	7.7	934	0.00	0.41	0.39
P2468	10/7/2020	310	10.44	111	2.60	280	183	1451	7.57	900	-0.01	0.48	1.10
P2470	10/7/2020	393	26.81	132	5.72	337	251	1767	7.57	1096	-0.01	1.04	0.73
P2476	10/7/2020	596	38.43	161	10.78	487	385	2503	7.59	1552	-0.01	1.69	0.78
P2481	10/7/2020	979	59.91	273	17.54	877	715	4279	7.48	2653	-0.01	3.57	1.59
P2505	10/7/2020	307	15.92	133	3.47	305	237	1629	7.96	1010	-0.01	0.40	0.69
P2510	10/7/2020	338	22.76	128	4.74	309	232	1634	7.88	1013	-0.01	0.89	0.69
P2523	10/7/2020	404	15.02	79	3.59	288	179	1514	7.63	939	-0.01	1.06	0.55
P2538	10/7/2020	386	21.59	139	6.03	348	268	1909	7.53	1184	0.04	0.80	1.16
P2540	10/7/2020	438	37.25	102	6.15	309	200	1651	8	1024	-0.01	1.74	0.64
P2601	10/7/2020	410	21.35	189	5.57	429	331	2313	7.88	1434	0.03	0.38	0.69
P2610	10/7/2020	980	63.80	280	18.12	824	648	4277	7.45	2652	-0.01	3.74	0.95
P2612	10/7/2020	477	18.34	95	4.69	354	232	1829	7.65	1134	-0.01	2.12	1.04

Mine Unit 7 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P2614													
	10/7/2020	382	17.22	131	4.45	332	226	1803	8	1118	-0.01	0.49	0.27
P2615													
	10/7/2020	282	13.67	64	2.58	203	115	1114	7.83	691	0.01	0.40	1.16
P2624													
	10/7/2020	336	10.64	87	2.72	259	154	1395	7.79	865	-0.01	0.38	1.23
P5230													
	10/7/2020	339	16.52	76	3.09	257	186	1405	7.42	871	0.19	1.79	0.34
P5250													
	10/7/2020	588	37.87	151	10.50	486	388	2553	7.71	1583	-0.01	2.17	1.66