

**CAMECO RESOURCES
CROW BUTTE OPERATION**



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

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

August 21, 2019

**USPS PRIORITY MAIL
SIGNATURE CONFIRMATION**

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

Class III UIC Permit NE0122611
July 2019 Monthly Restoration Report

Dear Ms. Link:

Please find enclosed the July 2019 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 Unit 6 as well as Mine Unit 7.

Mine Unit 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. 117.

Sincerely,
Cameco Resources
Crow Butte Operation

Walter D. Nelson
SHEQ Coordinator

Enclosures: As Stated

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

CROW BUTTE MINE
MONTHLY RESTORATION REPORT

July 2019

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 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 wells were sampled during the month.

CROW BUTTE MINE
MONTHLY RESTORATION REPORT

July 2019

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):			

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:

No in-house samples were collected during the month.

CROW BUTTE MINE
MONTHLY RESTORATION REPORT

July 2019

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 Recirculation		X	
e. Other (explain):			

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:

No in-house samples were collected during the month.

CROW BUTTE MINE
MONTHLY RESTORATION REPORT

July 2019

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):			

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	7/10/2019	348	16.09	184	4.36	396	329	2039	8.04	1264	-0.01	1.13	0.249

CROW BUTTE MINE
MONTHLY RESTORATION REPORT

July 2019

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 I1267P, I1272P, P1314, P1377, P1402, P1428, P1494, P1628.
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:

P1461.

4. LIST WELLS SAMPLED DURING MONTH AND ASSAY RESULTS:

CM5-14, CM5-15, CM5-16, CM5-17, P1265, I1266P, I1267P, P1268, P1269, I1270P, I1272P, P1273, I1274P, I1285P, P1314, P1315, P1318, P1348, P1355, I1356P, I1357P, P1358, P1376, P1377, P1396, I1398P, P1399, P1402, I1423P, P1426, P1428, P1439, P1446, P1457, P1461, P1494, P1532, I1581P, P1584, P1590, I1600P, I1602P, P1611, P1612, P1624, P1625, P1628, P1663, I1667P, P1689, P1690, P1703, P1706, P1751, P1765, P1800, P1832, P1843.

Mine Unit 6 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
CM5-14													
	7/10/2019	337	26.36	236	5.41	439	410	2230	7.98	1383	0.03	0.06	0.007
CM5-15													
	7/10/2019	292	10.95	78	2.02	223	137	1118	8.24	693	0.08	1.16	0.073
CM5-16													
	7/10/2019	410	14.66	93	3.32	290	157	1411	8.09	875	0.65	2.29	0.525
CM5-17													
	7/10/2019	716	57.27	384	16.58	790	692	3811	7.56	2363	0.15	0.06	0.006
I1266P													
	7/10/2019	192	2.82	46	0.51	137	69	674	9	418	0.03	0.38	0.668
I1267P													
	7/10/2019	330	14.42	148	4.11	319	239	1635	7.9	1014	-0.01	0.51	0.238
I1270P													
	7/10/2019	271	4.55	66	1.12	200	106	956	8.6	593	0.00	0.31	0.565
I1272P													
	7/10/2019	425	21.25	195	5.64	430	343	2163	7.87	1341	0.00	1.17	0.05
I1274P													
	7/10/2019	287	5.00	83	1.13	232	146	1149	8.24	712	0.08	0.95	0.189
I1285P													
	7/10/2019	405	5.82	98	1.41	300	160	1419	8.33	880	0.01	3.69	0.993
I1356P													
	7/10/2019	154	2.68	46	0.45	117	64	595	8.49	369	0.04	0.42	0.177
I1357P													
	7/10/2019	241	18.72	111	3.24	256	239	1334	7.29	827	0.06	0.05	0.012
I1397P													
	7/10/2019	227	16.99	108	0.92	193	115	1031	8.26	639	0.08	0.54	0.237
I1398P													
	7/10/2019	308	6.66	76	1.46	231	136	1147	8.61	711	0.01	0.86	0.575
I1423P													
	7/10/2019	319	7.22	91	1.70	252	154	1226	8.37	760	0.01	2.54	0.673
I1581P													
	7/10/2019	330	11.38	124	1.83	291	204	1473	8.39	913	0.00	2.69	0.351
I1600P													
	7/10/2019	376	20.02	118	1.65	271	141	1382	7.92	857	0.05	6.67	0.022
I1601P													
	7/10/2019	505	25.84	181	3.89	415	260	2023	8.41	1254	0.23	1.91	3.788
I1602P													
	7/10/2019	162	2.27	47	0.35	122	71	625	8.48	388	0.02	0.12	0.183

Mine Unit 6		Restoration Data											
Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
I1667P													
	7/10/2019	162	7.04	46	1.37	122	74	640	8.5	397	0.01	0.08	0.03
P1265													
	7/10/2019	365	16.15	157	4.44	366	288	1794	8.04	1112	0.01	0.59	0.024
P1268													
	7/10/2019	443	11.25	124	2.92	353	203	1659	8.18	1029	0.04	1.72	1.55
P1269													
	7/10/2019	267	4.56	84	1.03	221	140	1100	8.12	682	0.04	0.90	0.084
P1273													
	7/10/2019	366	10.00	117	2.36	312	206	1528	7.75	947	0.09	3.10	0.087
P1314													
	7/10/2019	508	14.03	142	4.14	403	246	1988	8.05	1233	0.00	3.63	1.317
P1315													
	7/10/2019	549	26.82	199	7.25	507	372	2509	7.82	1556	0.07	0.27	0.04
P1318													
	7/10/2019	364	3.78	79	1.19	258	116	1213	8.53	752	0.19	0.98	3.755
P1348													
	7/10/2019	646	27.23	182	6.13	533	350	2504	7.72	1552	0.05	5.70	0.275
P1355													
	7/10/2019	397	10.86	114	2.87	318	198	1549	8.18	960	0.01	2.78	0.491
P1358													
	7/10/2019	316	15.83	200	4.33	397	350	1960	7.98	1215	0.15	0.78	0.436
P1376													
	7/10/2019	149	2.37	43	0.25	112	55	551	8.37	342	0.13	0.06	0.33
P1377													
	7/10/2019	381	20.37	190	5.05	395	319	1981	7.8	1228	0.00	1.29	0.052
P1396													
	7/10/2019	298	16.25	188	4.34	392	365	1931	8.11	1197	0.02	0.05	0.033
P1399													
	7/10/2019	341	14.28	121	2.79	282	196	1426	8.02	884	0.02	0.86	0.098
P1402													
	7/10/2019	425	13.54	147	3.55	372	250	1823	7.83	1130	0.03	1.99	0.306
P1426													
	7/10/2019	260	10.87	173	3.00	339	305	1694	8.39	1050	0.03	0.96	0.034
P1428													
	7/10/2019	333	16.85	194	4.24	411	358	2074	7.9	1286	-0.01	2.30	0.103
P1439													
	7/10/2019	428	6.49	107	1.73	327	184	1539	8.41	954	0.04	1.75	1.214

Mine Unit 6		Restoration Data											
Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P1446	7/10/2019	287	27.56	196	4.60	387	374	1964	7.61	1218	0.03	0.00	-0.002
P1457	7/10/2019	465	8.78	126	2.36	356	198	1675	8.5	1039	0.18	2.53	0.614
P1461	7/10/2019	390	19.89	212	5.49	444	378	2272	7.95	1409	-0.01	1.56	0.382
P1494	7/10/2019	357	11.70	137	2.92	334	240	1654	7.94	1025	0.04	1.61	0.224
P1532	7/10/2019	417	16.00	142	2.92	372	255	1799	7.75	1115	0.00	0.20	0
P1584	7/10/2019	316	11.49	64	1.95	217	116	1056	8.39	655	0.00	3.51	0.034
P1590	7/10/2019	457	36.32	243	8.70	510	464	2559	7.66	1587	0.09	2.83	0.101
P1611	7/10/2019	320	19.83	202	4.10	387	351	1997	8.04	1238	0.22	5.12	0.308
P1612	7/10/2019	262	4.51	61	0.79	182	92	893	8.73	554	0.01	0.93	0.795
P1624	7/10/2019	348	6.78	81	1.69	250	132	1221	8.53	757	0.02	2.51	1.809
P1625	7/10/2019	287	7.09	92	1.76	230	139	1161	8.4	720	0.13	1.76	0.705
P1628	7/10/2019	319	7.47	133	2.35	303	215	1490	8.4	924	-0.01	0.92	0.951
P1663	7/10/2019	318	3.25	52	0.91	211	101	1013	8.62	628	0.07	1.88	0.6
P1689	7/10/2019	291	21.01	263	3.51	407	332	2140	8.06	1327	0.25	0.79	0.199
P1690	7/10/2019	285	10.85	87	1.85	227	141	1156	8.34	717	0.01	1.12	0.341
P1703	7/10/2019	184	10.08	59	1.70	140	92	750	8.1	465	0.12	0.28	0.115
P1706	7/10/2019	360	3.80	75	1.12	260	131	1224	8.55	759	0.01	2.16	1.944
P1751	7/10/2019	129	5.50	39	0.34	98	51	491	8.2	304	0.32	0.12	0.117
P1765	7/10/2019	355	5.69	84	1.48	269	144	1291	8.44	800	0.21	3.35	0.493

Mine Unit 6 Restoration Data

Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P1800													
	7/10/2019	200	7.38	59	0.83	149	75	753	8.45	467	0.01	0.52	0.466
P1832													
	7/10/2019	464	22.32	144	5.24	357	222	1783	8.12	1105	0.05	2.99	0.421
P1843													
	7/10/2019	247	7.94	66	1.09	182	96	925	8.36	574	0.07	0.69	1.727

CROW BUTTE MINE
MONTHLY RESTORATION REPORT

July 2019

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, P1957, P1972, P1986, P2014, P2038, P2040, P2108, P2125, P2188, P2241, P2264, P2303, P2316, P2340, P2359, P2361, P2384, P2395, P2399, I2429P, P2470, P2476, I2502P, P2510, P2523, P2538, P2588, P2601, P2610, P2612, P2614, P2642, P2660, P5271, P5278, P5279, .
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:

BL-17, P1957, P1972, P1986, P2014, P2038, P2040, P2108, P2125, P2241, P2264, P2303, P2316, P2340, P2359, P2361, P2384, P2395, P2399, I2429P, P2470, P2476, I2502P, P2510, P2523, P2538, P2588, P2601, P2610, P2612, P2614, P2642, P2660, P5271, P5278, P5279.

Mine Unit 7		Restoration Data											
Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
BL-17													
	7/10/2019	1004	63.53	367	19.18	961	768	4298	7.41	2665	0.00	3.97	1.529
I2429P													
	7/10/2019	719	30.27	144	8.84	527	364	2563	7.57	1589	0.02	7.58	0.713
I2502P													
	7/10/2019	641	19.44	231	5.15	417	365	2908	7.3	1803	0.00	0.72	0.037
P1957													
	7/10/2019	545	35.18	144	9.13	457	371	2262	7.08	1402	0.01	3.43	0.353
P1972													
	7/10/2019	741	53.82	234	15.81	680	628	3363	7.1	2085	0.03	4.60	0.617
P1986													
	7/10/2019	649	45.28	177	14.12	715	621	2577	7.31	1598	0.00	4.61	0.951
P2014													
	7/10/2019	579	33.62	143	9.23	461	336	2233	7.19	1384	0.01	1.14	0.423
P2038													
	7/10/2019	923	63.46	260	18.46	799	688	3778	7.29	2342	-0.01	4.77	0.241
P2040													
	7/10/2019		98.52	371	30.93	1127	1060	5249	7.24	3254	-0.01	6.77	0.139
P2108													
	7/10/2019	704	46.05	221	12.21	644	533	3006	7.19	1864	-0.01	3.06	0.188
P2125													
	7/10/2019		104.40	400	29.75	1167	1109	5344	7.01	3313	0.11	9.07	0.112
P2241													
	7/10/2019	542	32.53	269	9.98	573	490	2771	7.61	1718	0.00	2.53	0.853
P2264													
	7/10/2019	905	20.49	245	5.69	309	218	3673	7.22	2277	0.01	0.66	0.519
P2303													
	7/10/2019	699	47.29	215	13.90	602	524	2994	7.23	1856	0.15	1.42	0.347
P2316													
	7/10/2019		109.90	409	33.03	1146	1067	5265	7.09	3264	-0.01	4.74	1.043
P2340													
	7/10/2019	821	67.06	240	18.87	717	645	3521	7.29	2183	0.09	2.93	0.156
P2359													
	7/10/2019	1074	77.15	320	23.48	986	909	4714	7.16	2923	0.01	10.49	0.332
P2361													
	7/10/2019		88.66	328	23.75	1039	956	4854	7.66	3009	0.00	6.96	0.727
P2384													
	7/10/2019	968	81.94	276	24.04	855	812	4185	7.33	2595	0.00	3.67	0.821

Mine Unit 7		Restoration Data											
Well ID	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P2395	7/10/2019	660	54.41	139	12.31	471	366	2360	7.39	1463	0.01	3.16	0.439
P2399	7/10/2019	730	65.23	212	16.41	620	563	3091	7.23	1916	0.00	13.05	0.671
P2470	7/10/2019	658	46.04	210	11.12	604	523	2939	7.51	1822	0.00	4.05	0.974
P2476	7/10/2019	1072	76.43	354	24.26	1006	908	4789	7.42	2969	0.00	3.56	1.296
P2510	7/10/2019	532	29.45	194	7.45	477	373	2397	7.67	1486	0.00	2.47	0.728
P2523	7/10/2019	345	39.33	213	10.89	606	514	2055	8.09	1274	0.00	4.98	0.557
P2538	7/10/2019	344	39.49	200	11.19	536	424	2049	8.1	1270	0.00	1.54	1.62
P2588	7/10/2019		91.54	381	28.67	1124	1041	5043	7.34	3127	0.00	5.21	1.141
P2601	7/10/2019	695	50.82	291	14.01	679	570	3276	7.3	2031	0.05	2.23	0.841
P2610	7/10/2019		104.80	426	29.63	1181	1088	5367	7.15	3328	0.01	5.17	1.154
P2612	7/10/2019	734	56.55	312	16.98	789	657	3432	7.46	2128	0.00	5.95	1.149
P2614	7/10/2019	717	58.90	291	17.82	669	593	3338	7.65	2070	0.00	1.43	0.258
P2642	7/10/2019	429	23.78	217	6.42	489	418	2365	7.89	1466	0.01	1.28	0.522
P2660	7/10/2019	894	81.65	284	21.07	790	745	3920	7.2	2430	0.00	2.91	0.538
P5271	7/10/2019	781	58.20	231	16.12	675	593	3294	7.63	2042	-0.01	3.75	0.94
P5278	7/10/2019	1078	92.81	322	26.40	1005	953	4693	7.15	2910	-0.01	3.04	1.8
P5279	7/10/2019	672	38.92	137	7.62	489	332	2359	7.47	1463	0.01	6.83	1.388