

**CAMECO RESOURCES
CROW BUTTE OPERATION**



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

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

September 21, 2017

**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
August 2017 Monthly Restoration Report

Dear Ms. Link:

Please find enclosed the August 2017 Monthly Restoration Reports for Mine Units 2, 3, 4, 5 and 6. The reverse osmosis (RO) units continue to inject permeate and reductant into Mine Units 4, 5, and 6 with groundwater sweep continuing in portions of the three mine units.

Mine Units 2 and 3 remain in stability monitoring.

If you have any questions regarding this submittal, please feel free to contact me at (308) 665-2215, ext. 114.

Sincerely,
Cameco Resources
Crow Butte Operation

Larry Teahon
SHEQ Manager

Enclosures: As Stated

cc: Ron Burrows – NRC
CBO - File
ec: CR – Electronic File
Dave Miesbach – NDEQ Groundwater Unit Supervisor
Kory Winters – NDEQ Field Office
Amanda Jones – NDEQ Program Coordinator

CROW BUTTE MINE
 MONTHLY RESTORATION REPORT
 AUGUST 2017
 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
 AUGUST 2017
 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:

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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 wells were sampled during the month.

CROW BUTTE MINE
 MONTHLY RESTORATION REPORT
 AUGUST 2017
 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		RO and Reductant BL-9, BL-19, CM2-1, P392, P410, P430, I539P, I542P, I544P, I545P, I546P, P6023, P6024, and P6029.
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:

BL-10, CM1-7, CM2-4, and P372.

4. LIST WELLS SAMPLED DURING MONTH AND ASSAY RESULTS:

BL-8, BL-9, BL-10, BL-18, BL-19, BL-20, CM1-7, CM2-1, CM2-2, CM2-4, PM-3, P372, P391, P392, P393, P394, P410, P430, I534P, I535P, I536P, I537P, I538P, I539P, I841P, I542P, I544P, I545P, I546P, I547P, I550P, P6023, P6024, and P6029.

Mine Unit 4 Restoration Data

Well Name	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
BL-10	8/15/2017	339.0	11.51	118.0	2.69	274.0	176.4	1494	7.96	937	0.007	1.947	0.296
BL-18	8/15/2017	296.0	24.41	120.0	0.72	195.3	88.7	1125	8.35	679	0.019	1.013	0.314
BL-19	8/15/2017	231.0	2.30	44.0	0.22	150.5	60.1	781	8.10	527	0.014	1.143	0.268
BL-20	8/15/2017	252.0	5.77	68.0	0.24	174.1	86.2	924	8.16	584	0.076	0.434	0.031
BL-8	8/15/2017	281.0	7.36	50.0	0.52	164.6	58.2	857	8.35	539	0.245	0.745	0.040
BL-9	8/15/2017	239.0	8.92	87.0	2.01	195.2	120.3	1065	7.63	639	0.224	0.769	0.095
CM1-7	8/15/2017	381.0	11.56	124.0	2.94	304.4	205.2	1647	7.75	1039	0.007	1.845	0.056
CM2-1	8/15/2017	472.0	27.84	126.0	7.33	349.7	242.7	1901	7.57	1173	0.024	1.196	0.050
CM2-2	8/15/2017	222.0	44.57	133.0	0.94	140.2	50.0	950	8.65	587	0.017	0.314	0.098
CM2-4	8/15/2017	369.0	16.40	174.0	4.15	362.9	283.5	1936	7.86	1195	0.029	0.502	0.006
I534P	8/15/2017	308.0	7.96	93.0	1.02	224.3	119.2	1168	8.28	702	0.014	1.558	0.112
I535P	8/15/2017	308.0	5.86	57.0	1.02	193.8	84.4	1011	8.40	608	0.010	0.931	0.021
I536P	8/15/2017	403.0	16.46	142.0	4.06	339.2	245.1	1781	8.27	1109	0.009	6.043	0.042
I537P	8/15/2017	129.0	80.21	326.0	0.34	181.0	81.1	1463	7.86	916	0.021	0.047	-0.009
I538P	8/15/2017	220.0	8.79	7.0	0.60	152.9	66.2	844	8.35	536	0.018	0.403	0.024
I539P	8/15/2017	416.0	20.09	141.0	5.33	331.5	226.5	1776	8.15	1106	0.017	1.767	0.229
I541P													

Mine Unit 4 Restoration Data

Well Name	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
I542P	8/15/2017	246.0	2.52	31.0	0.12	135.5	44.1	700	8.68	490	0.011	0.614	0.731
I544P	8/15/2017	563.0	36.10	127.0	9.84	409.4	312.9	2211	7.42	1368	0.009	3.014	0.296
I545P	8/15/2017	795.0	76.69	273.0	21.17	667.6	615.1	3619	7.29	2413	0.007	3.953	0.442
I546P	8/15/2017	640.0	52.85	216.0	14.16	532.8	446.3	2859	7.27	1855	0.048	1.567	-0.024
I547P	8/15/2017	440.0	14.80	86.0	2.82	314.6	210.3	1592	7.76	1010	0.104	1.934	0.013
I550P	8/15/2017	116.0	2.16	28.0	-0.11	69.6	21.9	386	7.71	235	1.144	0.023	0.078
P372	8/15/2017	389.0	19.39	167.0	4.79	344.8	249.0	1895	7.46	1170	0.039	6.553	0.110
P391	8/15/2017	346.0	8.74	69.0	1.07	218.4	97.6	1142	8.44	686	0.010	2.800	0.074
P392	8/15/2017	634.0	50.54	184.0	12.86	477.2	394.0	2690	7.56	1732	0.007	2.127	0.173
P393	8/15/2017	134.0	16.37	36.0	1.14	69.4	69.1	451	8.09	286	0.023	0.036	-0.017
P394	8/15/2017	176.0	8.91	38.0	0.84	104.7	47.2	590	7.95	383	0.026	0.099	-0.012
P410	8/15/2017	560.0	40.37	144.0	10.33	423.6	338.2	2332	7.50	1462	0.008	2.295	0.228
P430	8/15/2017	430.0	21.57	145.0	5.90	345.3	237.5	1868	7.65	1155	0.011	1.645	0.133
P6023	8/15/2017	406.0	19.64	116.0	5.18	326.3	261.7	1781	7.30	1109	0.017	0.919	0.000
P6024	8/15/2017	499.0	30.04	129.0	7.50	380.3	292.0	2046	7.21	1259	0.042	0.619	-0.024
P6029	8/15/2017		168.80	455.0	44.64	1209.0	1293.0	6396	7.21	4071	0.139	6.542	0.056

Mine Unit 4 Restoration Data

Well Name	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
PM-3	8/15/2017	257.0	13.01	101.0	2.78	214.0	154.2	1177	8.17	704	0.013	0.721	0.017

CROW BUTTE MINE
 MONTHLY RESTORATION REPORT
 AUGUST 2017
 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		RO and Reductant BL5-3, I685P, I688P, P691, P694, and P1156.
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:
 P699, and P1002.

4. LIST WELLS SAMPLED DURING MONTH AND ASSAY RESULTS:

BL5-3, I685P, I687P, P691, P694, P699, P1002, and P1156.

Mine Unit 5 Restoration Data

Well Name	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
BL5-3	8/15/2017	402	20.75	173	5.11	377.3	308.8	2118	7.95	1301	0.045	0.058	-0.022
I685P	8/15/2017	431	17.16	169	4.59	399.3	327.5	2209	8.00	1366	0.007	1.891	0.251
I687P	8/15/2017	338	14.45	157	3.16	346.7	290.4	1921	7.85	1186	0.027	3.481	0.304
P1002	8/15/2017	359	18.56	196	4.57	400.5	360.8	2224	8.08	1378	0.007	1.169	0.216
P1156	8/15/2017	464	17.57	152	4.30	387.5	281.1	2136	7.78	1312	0.015	3.644	0.143
P691	8/15/2017	234	6.67	75	1.26	177.1	109.3	932	7.86	584	0.013	1.526	0.716
P694	8/15/2017	375	9.20	110	2.04	297.8	206.0	1521	8.44	965	0.027	2.161	0.171
P699	8/15/2017	336	13.48	179	3.57	377.8	341.4	2091	8.11	1286	0.008	1.147	1.064

CROW BUTTE MINE
 MONTHLY RESTORATION REPORT
 AUGUST 2017
 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		RO and Reductant P1265, I1266P, I1270P, I1272P, P1273, P1314, P1315, P1348, P1358, P1396, P1402, P1404, P1426, P1440, P1449, P1461, P1467, P1494, P1532, P1582, P1584, P1585, P1598, I1602P, P1663, P1690, P1704, P1721, P1751, P1765, P1779, P1800, P1810, P1890.
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:

P1476 and P1611.

4. LIST WELLS SAMPLED DURING MONTH AND ASSAY RESULTS:

P1265, I1266P, I1270P, I1272P, P1273, P1314, P1315, P1348, P1396, P1402, P1404, P1426, P1440, P1449, P1461, P1467, P1476, P1494, P1532, P1582, P1584, P1598, I1602P, P1611, P1663, P1704, P1721, P1751, P1765, P1779, P1800, P1810, and P1890.

MU6 Restoration Data

Well Name	Date	Alk	Cl	Ca	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
I1266P	8/15/2017	357	60	6.58	1.07	213.9	93.6	1078	8.61	646	0.03	5.801	2.364
I1270P	8/15/2017	361	63	4.54	0.89	215.6	88.3	1089	8.74	654	0.01	0.755	2.443
I1272P	8/15/2017	356	222	21.84	5.44	412.0	377.4	2210	8.44	1367	0.03	0.260	0.061
I1602P	8/15/2017	1062	504	64.80	19.31	1028.0	820.3	4962	7.85	3317	0.10	8.131	1.440
P1265	8/15/2017	552	241	33.03	9.06	502.0	403.0	2615	8.43	1682	0.02	0.473	0.015
P1273	8/15/2017	450	164	20.08	4.86	382.5	277.9	2007	8.40	1236	0.07	2.875	0.177
P1314	8/15/2017	705	291	30.89	9.30	639.7	495.6	3244	8.47	2142	0.01	2.838	1.126
P1315	8/15/2017	480	245	28.58	7.40	494.8	434.3	2598	8.47	1665	0.03	0.586	0.186
P1348	8/15/2017	440	144	12.94	3.40	350.0	230.8	1825	8.44	1131	0.02	2.805	0.528
P1396	8/15/2017	309	198	16.98	4.26	367.9	343.4	1986	8.44	1224	0.10	0.053	0.022
P1402	8/15/2017	457	135	17.48	4.04	348.2	233.8	1822	8.39	1130	0.09	2.306	0.466
P1404	8/15/2017	597	203	29.32	7.43	474.4	339.0	2483	8.39	1580	0.07	2.244	0.482
P1426	8/15/2017	336	178	17.08	4.23	353.4	312.1	1917	8.36	1183	0.03	2.251	0.098
P1440	8/15/2017	427	135	14.13	4.06	322.6	204.6	1683	8.46	1057	0.01	1.586	2.142
P1449	8/15/2017	645	115	11.87	2.96	412.0	217.4	2043	8.54	1258	0.02	6.225	1.058
P1461	8/15/2017	389	209	19.36	5.01	416.5	365.4	2235	8.48	1386	0.01	1.924	0.472
P1467	8/15/2017	389	117	7.96	2.15	301.0	187.7	1544	8.63	985	0.02	2.189	1.389
P1476	8/15/2017	418	195	16.42	4.20	428.5	359.7	2230	8.50	1382	0.01	5.246	0.427
P1494													

MU6 Restoration Data

Well Name	Date	Alk	Cl	Ca	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P1532	8/15/2017	499	216	21.76	5.49	475.1	370.4	2439	8.45	1541	0.09	3.130	0.224
P1582	8/15/2017	423	157	17.03	3.91	383.2	284.5	1933	7.79	1193	0.02	0.514	0.017
P1584	8/15/2017	376	174	14.25	3.81	383.5	305.2	1936	8.22	1195	0.01	1.308	0.942
P1598	8/15/2017	716	222	19.75	6.55	582.1	370.8	2761	7.92	1783	0.01	5.147	0.934
P1611	8/15/2017	348	92	7.39	1.89	259.3	154.3	1310	8.49	823	0.01	3.277	1.466
P1663	8/15/2017	346	194	17.76	4.10	394.4	354.8	2097	8.45	1289	0.15	2.899	0.355
P1704	8/15/2017	360	199	12.67	3.78	389.4	324.2	2051	8.29	1262	0.01	0.728	0.801
P1721	8/15/2017	385	154	10.83	2.74	354.0	267.2	1841	8.41	1140	0.07	2.530	0.401
P1751	8/15/2017	402	109	8.96	2.19	310.9	181.2	1503	8.30	947	0.03	3.437	1.316
P1765	8/15/2017	549	172	23.77	5.46	446.0	293.9	2178	7.85	1342	0.11	5.190	0.703
P1779	8/15/2017	590	208	18.86	4.84	502.3	347.1	2442	8.10	1541	0.11	7.892	0.662
P1800	8/15/2017	672	284	39.00	12.22	595.7	460.2	3101	7.82	2031	0.01	5.256	1.312
P1810	8/15/2017	573	207	28.06	7.25	478.0	323.6	2393	7.86	1514	0.01	2.710	0.496
P1890	8/15/2017	394	122	10.85	3.08	309.1	201.0	1594	8.31	1011	0.01	1.977	1.319
	8/15/2017	369	122	13.23	3.27	303.2	196.8	1523	7.96	967	0.02	4.495	0.459