

**CAMECO RESOURCES
CROW BUTTE OPERATION**



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

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

January 11, 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
December 2017 Monthly Restoration Report

Dear Ms. Link:

Please find enclosed the December 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. Spot treatment with permeate and reductant continued in P246 in Mine Unit 3.

Mine Unit 2 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
ec: CR – Electronic File
Kory Winters – NDEQ Field Office
Amanda Jones – NDEQ Program Coordinator

CROW BUTTE MINE
MONTHLY RESTORATION REPORT

December 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:

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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
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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		RO and Reductant P246
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:

P246

Mine Unit 3 Restoration Data

Well Name	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P246	12/11/2017	377	24.97	130	5.535	349.9	255.2	1622	7.65	1026	0.075	2.673	0.077

CROW BUTTE MINE
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December 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 P392, P410, P456, I544P, I545P, I546P, I551P, 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, CM2-4, and P372-9.

4. LIST WELLS SAMPLED DURING MONTH AND ASSAY RESULTS:

CM2-4, P392, P410, P456, I544P, I545P, I546P, P6024, and P6029.

Mine Unit 4 Restoration Data

Well Name	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
CM2-4	12/11/2017	370.0	16.75	164.0	4.35	399.2	296.2	1822	7.94	1130	0.262	0.554	0.033
I544P	12/11/2017	604.0	43.50	164.0	11.99	518.2	402.4	2402	7.61	1520	0.317	2.704	0.293
I545P	12/11/2017	486.0	28.98	135.0	7.50	409.1	289.8	1894	7.52	1170	0.194	1.532	0.304
I546P	12/11/2017	473.0	29.81	128.0	8.07	409.8	300.8	1884	7.47	1164	0.216	0.972	0.107
P392	12/11/2017	409.0	25.94	104.0	6.62	341.9	237.2	1579	7.64	1004	0.024	1.169	0.397
P410	12/11/2017	408.0	23.13	99.0	5.96	338.2	232.6	1534	7.60	977	0.235	1.568	0.281
P456	12/11/2017	370.0	17.79	90.0	5.25	302.6	205.5	1429	7.64	897	0.075	1.147	0.385
P6024	12/11/2017	472.0	32.25	121.0	7.95	412.2	323.1	1884	7.41	1164	0.003	0.480	0.028
P6029	12/11/2017		167.00	454.0	43.43	1307.0	1345.0	5986	7.25	3769	1.024	6.286	0.024

CROW BUTTE MINE
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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, P837, 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, I548P, I685P, I692P, P699, P700, P701, P789, P1002, P1039, and P1156.

Mine Unit 5 Restoration Data

Well Name	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
BL5-3	12/11/2017	368	18.31	151	4.71	399.6	309.3	1807	8.02	1122	0.421	0.116	0.006
I548P	12/11/2017	381	16.04	96	4.02	334.4	227.6	1522	7.65	966	0.083	2.029	0.467
I685P	12/11/2017	420	16.35	165	4.54	439.2	339.3	2005	8.02	1235	0.240	1.981	0.267
I692P	12/11/2017	449	13.60	116	3.05	402.9	265.3	1797	8.03	1118	0.722	5.377	0.107
P1002	12/11/2017	351	18.47	193	4.76	445.8	382.6	2056	7.94	1265	0.089	1.209	0.238
P1039	12/11/2017	335	16.79	188	3.32	443.6	388.3	2098	8.15	1290	0.107	1.133	1.131
P1156	12/11/2017	469	16.92	145	4.33	434.0	289.0	1940	7.93	1197	0.360	3.385	0.147
P699	12/11/2017	334	13.94	184	3.96	436.3	375.2	1976	8.11	1218	0.015	1.160	1.075
P700	12/11/2017	321	21.62	192	4.99	423.5	384.0	2046	7.89	1259	2.137	0.967	0.086
P701	12/11/2017	303	14.65	197	3.57	422.8	378.3	2022	8.08	1245	0.182	0.526	0.663
P789	12/11/2017	316	15.39	179	3.95	420.0	367.9	1992	7.75	1226	0.119	1.981	0.006

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		RO and Reductant P1265, I1272P, I1285P, I314, P1315, P1355, I1356P, P1358, P1402, P1404, P1449, P1494, P1532, P1582, P1584, P1585, I1602P, I1667P, P1690, P1704, P1751, P1765, P1800.
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:

I1267P, P1337, P1399, I1423P, and P1426.

4. LIST WELLS SAMPLED DURING MONTH AND ASSAY RESULTS:

P1265, I1272P, P1314, P1315, P1348, P1355, I1356P, P1358, P1396, P1402, P1404, P1449, P1494, P1532, P1582, I1602P, P1611, I1667P, P1690, P1704, and P1765.

MU6 Restoration Data

Well Name	Date	Alk	Cl	Ca	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
I1272P	12/11/2017	479	257	35.86	9.64	556.6	471.7	2621	7.77	1686	-0.02	2.108	0.041
I1356P	12/11/2017	330	125	16.37	4.31	302.3	192.7	1394	7.88	876	0.51	6.790	0.304
I1602P	12/11/2017	429	132	12.33	3.81	383.3	233.6	1664	8.26	1047	0.65	2.461	2.660
I1667P	12/11/2017	336	117	10.90	2.76	305.6	188.0	1339	8.28	838	1.55	8.962	2.020
P1265	12/11/2017	512	249	33.55	9.14	565.8	458.2	2605	7.87	1670	0.19	0.686	0.039
P1314	12/11/2017	612	196	21.39	6.50	571.2	379.7	2507	8.04	1600	0.07	3.493	1.629
P1315	12/11/2017	472	232	28.80	7.57	542.8	446.1	2514	7.85	1609	0.26	0.616	0.188
P1348	12/11/2017	511	159	16.72	4.55	479.4	321.2	2103	7.77	1292	1.25	3.608	0.439
P1355	12/11/2017	387	130	13.60	3.79	365.9	237.4	1646	8.09	1038	2.58	2.766	0.849
P1358	12/11/2017	340	193	17.16	4.63	449.3	398.0	2140	7.94	1314	0.28	1.590	0.204
P1396	12/11/2017	293	177	16.70	4.27	412.2	377.0	1989	8.04	1225	0.45	0.061	0.094
P1402	12/11/2017	426	147	17.31	4.37	406.0	271.0	1797	7.89	1118	0.81	1.986	0.452
P1404	12/11/2017	488	166	23.06	5.86	462.1	315.6	2081	7.79	1280	0.39	1.426	0.558
P1449	12/11/2017	571	114	10.53	2.80	452.5	238.8	1931	8.08	1191	0.04	4.848	0.846
P1494	12/11/2017	429	185	17.00	4.38	463.5	348.2	2089	7.89	1284	0.73	2.522	0.295
P1532	12/11/2017	403	172	18.94	4.07	438.1	334.1	1939	7.82	1196	0.72	0.622	0.001
P1582	12/11/2017	360	167	13.11	3.55	414.1	322.1	1860	8.22	1150	1.00	1.040	0.773
P1611	12/11/2017	315	180	16.67	4.01	429.1	381.4	2045	7.99	1258	0.23	3.421	0.247
P1690													

MU6 Restoration Data

Well Name	Date	Alk	Cl	Ca	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P1704	12/11/2017	776	341	53.81	15.49	787.1	614.9	3492	7.81	2307	0.15	6.497	0.537
P1765	12/11/2017	325	133	8.60	2.39	350.1	256.9	1592	7.86	1010	1.72	1.755	0.450
	12/11/2017	496	150	13.65	3.58	461.2	295.0	1954	8.18	1208	1.53	5.773	0.764