

**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 21, 2016

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

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

Class III UIC Permit NE0122611
October 2016 Monthly Restoration Report

Dear Ms. Link:

Please find enclosed the October 2016 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:  - NRC
CBO - File
ec: CR - Electronic File
Nancy Harris - NDEQ Program Coordinator
Kory Winters - NDEQ Field Office

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
OCTOBER 2016
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 samples were collected during the month.

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
OCTOBER 2016
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 samples were collected during the month.

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
OCTOBER 2016
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 I536P, I539P, and I546P.
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-8, BL-9, CM1-7, CM2-4, P372, P392, P410, I535P, I543P, I544P, I545P, P6023, P6024, and P6029.

4. LIST WELLS SAMPLED DURING MONTH AND ASSAY RESULTS:

CM1-7, CM2-3, CM3-9, CM3-10, P390, P392, P394, P410, P456, I508P, I526P, I535P, I536P, I539P, I543P, I544P, I546P, I548P, I549P, I551P, P6023, P6024 and P6029.

Mine Unit 4 Restoration Data

Well Name	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
CM1-7	10/24/2016	415.0	18.64	173.0	5.03	375.0	301.5	1968	7.94	1214	-0.001	1.668	0.096
CM2-3	10/24/2016	310.0	12.50	135.0	2.30	268.9	190.4	1480	7.92	927	0.009	0.142	0.132
CM3-10	10/24/2016	332.0	13.39	95.0	3.10	238.9	142.4	1303	7.93	818	0.068	0.445	0.166
CM3-9	10/24/2016	243.0	10.90	64.0	2.30	158.0	78.0	882	7.96	555	0.085	0.558	0.237
I508P	10/24/2016	222.0	3.60	70.0	0.74	166.4	90.2	908	8.27	575	0.006	0.548	0.088
I526P	10/24/2016	216.0	9.38	51.0	1.60	133.9	73.5	758	8.01	526	0.023	0.382	0.017
I535P	10/24/2016	422.0	16.93	169.0	4.45	365.0	277.7	1908	8.12	1178	0.001	1.775	0.104
I536P	10/24/2016	433.0	23.68	151.0	6.45	348.7	285.7	1907	7.93	1177	-0.001	5.099	0.141
I539P	10/24/2016	446.0	19.69	161.0	5.40	358.5	261.7	1915	8.12	1182	0.012	1.697	0.194
I543P	10/24/2016	812.0	60.54	269.0	16.50	643.3	582.2	3466	7.62	2292	-0.001	5.737	0.159
I544P	10/24/2016	982.0	107.30	369.0	27.99	815.5	834.4	4491	7.54	2966	0.000	8.083	0.379
I546P	10/24/2016	742.0	62.57	273.0	16.33	634.7	553.5	3316	7.59	2198	0.029	2.110	0.061
I548P	10/24/2016	459.0	19.65	145.0	3.88	384.2	287.3	2030	7.93	1250	0.067	0.856	0.136
I549P	10/24/2016	311.0	15.92	90.0	3.01	242.7	175.8	1327	7.62	830	0.398	3.049	0.035
I551P	10/24/2016	387.0	13.66	97.0	2.99	279.9	175.2	1484	7.96	930	0.009	2.886	0.375
P390	10/24/2016	363.0	9.47	96.0	2.20	270.1	163.3	1434	8.17	901	0.004	1.514	0.106
P392													

Mine Unit 4 Restoration Data

Well Name	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P394	10/24/2016	810.0	75.58	287.0	18.81	667.2	621.0	3577	7.71	2379	-0.002	5.021	0.270
	10/24/2016	467.0	33.49	145.0	7.31	392.2	327.7	2129	7.60	1308	0.090	1.159	0.032
P410	10/24/2016	838.0	74.98	263.0	19.57	664.2	631.1	3610	7.61	2405	0.000	4.191	0.273
P456	10/24/2016	343.0	11.32	88.0	2.10	239.1	135.8	1296	8.15	814	0.178	0.893	0.057
P6023	10/24/2016	525.0	25.71	157.0	6.93	437.5	375.3	2258	7.50	1404	0.005	1.289	0.014
P6024	10/24/2016	642.0	42.21	202.0	10.61	517.2	432.7	2673	7.58	1719	0.063	0.992	0.029
P6029	10/24/2016		173.20	489.0	42.28	1153.0	1258.0	6184	7.37	3897	0.178	9.218	0.096

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
OCTOBER 2016
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 I685P, and P1117.
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:
 BL5-3, BL5-5, P683, I693P, P694, P699, I698P, P849, and P1156.

4. LIST WELLS SAMPLED DURING MONTH AND ASSAY RESULTS:

BL5-3, BL5-4, BL5-5, CPW-1, I685P, I693P, P694, P837, P849, P1117, P1156, and P1239.

Mine Unit 5 Restoration Data

Well Name	Date	Alk	Ca	Cl	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
BL5-3	10/24/2016	384	20.53	162	4.93	352.6	308.0	1918	8.16	1184	0.073	0.020	0.006
BL5-4	10/24/2016	393	12.92	123	3.14	322.1	236.3	1729	8.23	1082	0.081	0.167	0.006
BL5-5	10/24/2016	317	13.82	144	3.38	314.0	272.4	1676	8.44	1053	0.078	0.115	0.000
CPW-1	10/24/2016	294	6.20	81	1.43	227.9	150.9	1228	8.34	739	0.002	1.723	0.013
I685P	10/24/2016	464	20.00	204	5.55	461.8	395.1	2373	8.21	1499	-0.001	2.291	0.335
I693P	10/24/2016	315	8.63	124	1.98	293.1	238.9	1549	8.41	988	0.017	4.359	0.578
P1117	10/24/2016	258	8.72	115	2.34	252.5	216.6	1376	8.39	865	0.030	0.451	0.284
P1156	10/24/2016	522	24.10	209	6.10	476.1	396.9	2505	8.10	1597	0.040	4.867	0.159
P1239	10/24/2016	219	3.24	39	0.75	137.9	64.2	745	8.91	522	0.092	1.333	0.733
P694	10/24/2016	437	16.61	175	4.24	401.8	322.6	2096	8.20	1289	0.060	2.623	0.259
P837	10/24/2016	279	8.08	74	1.65	203.2	131.2	1127	8.29	680	0.018	1.257	0.061
P849	10/24/2016	317	13.86	178	3.30	366.3	344.3	1967	8.18	1214	0.018	0.929	0.027

CROW BUTTE MINE
MONTHLY RESTORATION REPORT
OCTOBER 2016
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 P1399, P1467, P1598, P1624, and P1868.
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:

P1273, P1288, P1314, P1315, P1402, P1404, P1426, P1440, P1449, P1461, P1476, P1494, P1506, P1532, P1582, P1611, P1704, P1721 and, P1765.

4. LIST WELLS SAMPLED DURING MONTH AND ASSAY RESULTS:

P1273, P1288, P1314, P1315, P1399, P1402, P1404, P1426, P1440, P1449, P1461, P1467, P1476, P1494, P1532, P1582, P1598, P1611, P1624, P1704, and P1721.

MU6 Restoration Data

Well Name	Date	Alk	Cl	Ca	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P1273	10/24/2016	688	311	37.67	9.91	630.1	511.6	3301	7.57	2184	0.12	12.820	0.239
P1288	10/24/2016	609	327	43.67	11.11	611.5	549.4	3298	7.62	2183	0.03	6.124	0.113
P1314	10/24/2016	787	367	37.37	11.33	754.8	631.7	3942	8.15	2630	0.02	3.437	1.145
P1315	10/24/2016	577	310	39.52	10.11	597.0	543.2	3228	8.14	2130	0.04	0.657	0.186
P1399	10/24/2016	515	194	31.25	7.46	457.3	373.1	2407	7.99	1524	0.04	1.615	0.401
P1402	10/24/2016	563	184	24.43	6.05	454.9	328.4	2364	7.98	1493	0.08	4.386	0.195
P1404	10/24/2016	750	298	41.30	10.52	674.0	519.3	3396	7.97	2260	0.03	4.649	0.180
P1426	10/24/2016	371	193	19.73	5.11	390.4	355.2	2114	8.11	1298	0.05	3.065	0.176
P1440	10/24/2016	571	207	24.18	7.28	455.0	324.9	2433	8.10	1540	0.01	2.030	2.369
P1449	10/24/2016	736	197	22.98	6.21	543.8	366.4	2790	8.07	1801	0.08	12.050	0.704
P1461	10/24/2016	426	248	22.84	6.27	480.3	445.9	2571	8.25	1644	0.02	2.603	0.618
P1467	10/24/2016	569	231	18.15	5.88	514.0	383.1	2643	8.22	1700	0.03	4.380	1.990
P1476	10/24/2016	465	175	15.16	3.95	403.6	322.0	2174	8.22	1338	0.02	7.242	0.600
P1494	10/24/2016	610	285	29.66	7.78	587.5	483.8	3085	7.67	2018	0.02	4.188	0.491
P1532	10/24/2016	796	344	47.31	11.55	744.7	618.6	3853	7.51	2591	0.00	4.499	0.028
P1582	10/24/2016	363	191	14.64	3.99	405.1	358.4	2129	8.10	1308	0.00	1.151	0.826
P1598	10/24/2016	526	170	16.89	5.04	417.1	276.7	2178	7.65	1342	0.02	6.473	2.320
P1611	10/24/2016	381	206	17.54	4.57	415.7	390.8	2261	8.24	1406	0.08	4.381	0.358
P1624													

MU6 Restoration Data

Well Name	Date	Alk	Cl	Ca	Mg	Na	SO4	Cond	pH	TDS	Fe	U	V
P1704	10/24/2016	347	94	6.34	1.88	261.4	165.1	1369	8.42	860	0.02	1.401	1.739
P1721	10/24/2016	633	288	24.61	6.86	590.7	476.1	3101	7.91	2031	0.05	8.912	0.402
	10/24/2016	840	387	35.46	11.46	777.8	603.4	4008	7.70	2661	0.00	7.794	1.131