

**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 29, 2020

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

**ATTN: Document Control Desk, Director
Office of Nuclear Material Safety and Safeguards
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001**

**Subject: Source Materials License SUA-1534
Docket No. 40-8943
SM6-28 Monitor Well Excursion - Final Report**

Dear Document Control Desk:

On May 2, 2019, during routine biweekly water sampling of Cameco Resources, Crow Butte Operation (CBO) shallow monitor well SM6-28, the multiple parameter upper control limits (MCL) for alkalinity and conductivity were exceeded. As required by License Condition 11.1.5 of Source Materials License SUA-1534, a second sample was collected within 24 hours and analyzed for the three excursion indicator parameters. The results of the second sample exceeded the MCL for alkalinity and conductivity.

The region around the CBO facility was subject to a major winter storm on March 14 and 15, 2019, in which the site received an estimated 18" of snowfall accompanied by up to 90 mph wind gusts. As a result, a significant amount of snowmelt impacted the area around the well. This was followed by a second significant winter storm on April 10 and 11, 2019. The snowmelt from this storm provided additional impact to this part of the well field. Wet conditions have persisted since that time, and the site believes that these conditions are the cause of this excursion. This well was placed on excursion status in 2000, 2005, 2010, 2011, 2015, and 2016 during similar wet spring conditions.

In accordance with License Condition 11.1.5 of the UIC permit, CBO increased the sampling frequency for SM6-28 to weekly. Weekly samples were obtained from May 3, 2019, to January 28, 2020. The samples collected on December 23, 30, and 31, 2019, as well as the samples collected on January 7, 14, 21, and 28, 2020, were below the excursion criteria from Section B.1 of the permit. It is noted that an extra sample was collected during this six week period. This was to ensure that well was sampled every 7 days, at a minimum, during the Christmas holiday. Based on these results, CBO is removing SM6-28 from excursion status and is returning it to

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CROW BUTTE RESOURCES, INC.



Document Control Desk, Director

January 29, 2020

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routine biweekly sampling. Attached are copies of the analytical data for each of the last six weekly samples, as well as the additional Christmas holiday sample, and graphs for each parameter covering the period of September 24, 2019 through January 28, 2020.

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

Walt Nelson
SHEQ Coordinator

Enclosures: As Stated

cc: NRC - Deputy Director
CBO - File

cc: CBO



Crow Butte Project
Monitor Well Laboratory Report

Sample Date: 12/23/2019

Analysis Date: 12/23/2019

Well ID	Alkalinity (mg/L)	Alk SCL	Alk MCL	Conductivity (µMho/cm)	Cond SCL	Cond MCL	Chloride (mg/L)	Cl SCL	Cl MCL
SM04-001	155	248	206	369	772	643	3	52	43
SM04-002	194	513	393	643	1256	1039	12	127	88
SM04-005A	198	367	306	540	1236	1030	11	106	88
SM05-009	207	314	262	554	870	726	11	36	30
SM05-010	210	324	270	558	901	751	10	36	30
SM05-011	219	341	284	580	942	785	10	41	34
SM05-012	211	327	272	563	920	767	11	43	36
SM05-013	202	314	262	553	880	733	12	39	32
SM05-014	184	304	253	491	854	712	9.3	31	26
SM05-015	206	311	259	551	973	811	12	60	50
SM05-016	183	285	238	452	732	610	5.1	30	25
SM05-017	169	264	220	420	694	578	2.1	27	23
SM05-018	172	259	216	431	707	589	3.1	31	26
SM05-019	185	285	238	484	757	631	4.5	27	22
SM05-020	183	268	223	496	750	625	5.1	32	27
SM05-021	180	284	236	462	755	629	4.6	29	24
SM05-022	185	278	232	472	773	644	3.7	33	28
SM05-023	185	287	239	467	753	628	3.5	28	24
SM05-024	173	264	220	439	700	583	4.9	28	24
SM05-025	178	264	220	480	724	604	6.8	31	26
SM06-011	217	318	265	540	691	576	14	24	20
SM06-012	236	348	290	529	736	613	9.1	23	19
SM06-013	247	360	300	533	768	640	6.8	26	21
SM06-014	207	301	251	546	936	780	12	58	48
SM06-015	208	321	268	534	842	702	10	34	28
SM06-016	211	317	264	447	840	700	4	31	26
SM06-018	201	305	254	552	837	697	16	33	27
SM06-019	210	297	247	503	698	582	10	27	22
SM06-020	213	323	269	531	717	598	12	26	22
SM06-021	222	312	260	550	713	594	13	25	21
SM06-022	211	310	258	482	674	562	7.9	22	18
SM06-028	292	351	293	679	778	648	11	24	20



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Crow Butte Project
Monitor Well Laboratory Report

Sample Date: 12/30/2019

Analysis Date: 12/30/2019

Well ID	Alkalinity (mg/L)	Alk SCL	Alk MCL	Conductivity (µMho/cm)	Cond SCL	Cond MCL	Chloride (mg/L)	Cl SCL	Cl MCL
CM02-005	321	490	408	1959	3394	2828	191	384	320
CM02-006	286	432	360	1264	3145	2621	98	295	246
CM02-007	274	436	364	1301	3059	2549	102	287	239
CM04-001	312	435	362	1869	2850	2375	182	251	209
CM04-002	308	419	349	1866	2951	2459	178	291	242
CM04-003	304	446	372	1868	3211	2676	176	379	316
CM04-004	302	433	361	1866	3002	2502	177	310	258
CM10-020	343	464	386	1904	2678	2232	179	253	211
CM10-021	318	468	390	1827	2693	2244	167	259	216
CM10-022	323	469	391	1835	2693	2244	165	253	211
CM10-023	326	475	396	1840	2750	2292	165	275	229
CM10-024	322	454	378	1844	2707	2256	168	259	216
CM10-025	323	461	384	1847	2779	2316	172	287	239
CM10-026	323	461	384	1831	2664	2220	169	253	211
CM10-027	317	449	374	1843	2707	2256	173	265	221
CM10-032	317	454	378	1869	2851	2376	161	317	264
CM10-033	345	426	355	1806	2866	2388	166	337	281
CM10-034	357	422	352	1879	3197	2664	169	468	390
SM04-007	171	513	393	501	1256	1039	17	127	88
SM04-009	273	374	312	656	1027	856	12	23	19
SM06-028	292	351	293	677	778	648	11	24	20
SM07-001	184	252	210	453	677	564	4.8	30	25
SM07-002	167	259	216	401	661	551	3.4	34	29
SM07-003	172	256	214	426	700	583	3.9	35	29
SM07-004	167	255	212	397	671	559	3.2	33	28
SM07-005	168	248	206	422	648	540	4	26	22
SM07-006	158	209	174	363	636	530	3	41	34
SM07-007	171	253	211	429	648	540	4.5	23	19
SM07-008	169	238	198	476	802	668	8.4	50	42
SM07-009	170	262	218	416	660	550	4.3	29	24
SM07-010	169	253	211	432	680	566	3.7	25	21
SM07-011	145	216	180	341	539	449	3	27	22



Crow Butte Project
Monitor Well Laboratory Report

Sample Date: 12/31/2019

Analysis Date: 12/31/2019

Well ID	Alkalinity (mg/L)	Alk SCL	Alk MCL	Conductivity (µMho/cm)	Cond SCL	Cond MCL	Chloride (mg/L)	Cl SCL	Cl MCL
SM04-010A	296	354	295	700	1053	877	12	36	30
SM04-011A	292	554	462	692	1469	1224	11	139	115
SM06-028	292	351	293	675	778	648	11	24	20
SM07-015	144	200	167	322	495	413	3.4	24	20
SM07-016	141	199	166	324	451	376	3.2	24	20
SM07-017	179	209	174	400	539	449	3.8	30	25
SM07-018	142	217	181	331	513	427	2.8	23	19
SM07-019	145	212	176	348	599	499	3.8	38	31
SM07-020	149	228	190	337	583	486	1.9	28	23
SM07-021	145	216	180	337	534	445	2.6	27	23
SM07-022	150	217	181	339	644	536	2.6	54	45
SM07-023	180	278	232	461	850	708	4.1	59	50
SM07-024	189	259	216	576	809	674	7.9	45	37
SM07-025	157	202	168	358	645	538	3.5	52	44
SM08-017	248	331	276	579	848	707	9.3	24	20
SM08-018	238	317	264	564	816	680	11	25	21
SM08-019	244	340	283	568	827	689	9.4	25	21
SM08-020	231	314	262	567	806	672	9	25	21
SM08-021	233	317	264	560	706	588	8.9	25	21
SM08-022	250	324	270	624	829	691	9.6	25	20
SM08-023	232	317	264	553	808	673	8.8	27	23
SM08-024	235	317	264	559	720	600	9.6	24	20
SM08-025	263	324	270	666	720	600	11	24	20
SM10-016	257	382	318	601	850	708	13	28	23
SM10-017	247	374	312	566	835	696	12	28	23
SM10-018	242	346	288	532	763	636	8.2	24	20
SM10-019	258	369	307	580	778	648	10	25	21
SM10-020	235	360	300	576	792	660	20	27	22
SM10-021	242	360	300	590	806	672	19	27	23
SM10-022	246	360	300	562	778	648	12	23	20
SM10-030	243	359	299	535	778	648	7.1	25	21
SM10-031	244	340	283	557	734	612	8.2	25	21



Crow Butte Project
Monitor Well Laboratory Report

Sample Date: 01/07/2020

Analysis Date: 01/07/2020

Well ID	Alkalinity (mg/L)	Alk SCL	Alk MCL	Conductivity (µMho/cm)	Cond SCL	Cond MCL	Chloride (mg/L)	Cl SCL	Cl MCL
CM06-009	293	428	356	1922	2866	2388	181	285	238
CM06-010	291	429	358	1934	2952	2460	183	327	272
CM08-001	291	455	379	1935	3110	2592	180	372	310
CM08-002	291	395	329	1926	3125	2604	179	334	278
CM08-003	299	432	360	1964	3211	2676	187	367	306
CM08-004	294	428	356	1922	3125	2604	181	328	274
CM08-005	287	425	354	1900	3067	2556	180	328	274
CM08-006	295	432	360	1909	3067	2556	179	317	264
CM08-007	320	425	354	1963	3154	2628	189	396	330
CM08-008	322	418	348	1965	3211	2676	190	415	346
CM08-009	310	452	377	1859	3053	2544	174	325	271
CM09-008	296	418	348	1816	2952	2460	173	366	305
CM09-009	302	475	396	1805	2923	2436	177	334	278
CM09-010	303	359	299	1789	2390	1992	181	292	244
CM09-011	300	445	371	1790	2707	2256	183	284	236
CM11-012	297	433	361	1792	2794	2328	170	268	223
CM11-013	301	418	348	1791	2722	2268	172	291	242
CM11-014	299	468	390	1782	3024	2520	172	357	298
CM11-015	295	431	359	1785	2765	2304	171	289	241
CM11-016	299	451	376	1784	2794	2328	176	276	230
CM11-017	303	438	365	1784	2837	2364	173	301	251
CM11-018	304	445	371	1793	2722	2268	174	297	247
CM11-019	300	448	373	1798	2779	2316	173	300	250
SM04-001	154	248	206	362	772	643	2.8	52	43
SM04-002	189	513	393	626	1256	1039	12	127	88
SM04-005A	196	367	306	528	1236	1030	11	106	88
SM06-028	287	351	293	669	778	648	11	24	20
SM08-001	236	374	312	507	763	636	7.2	25	21
SM08-002	241	353	294	516	778	648	6.3	24	20
SM08-003	229	331	276	502	720	600	7.9	24	20
SM08-004	223	323	269	519	819	683	11	25	21
SM08-005	253	346	288	572	749	624	9.4	23	19



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Crow Butte Project
Monitor Well Laboratory Report

Sample Date: 01/14/2020

Analysis Date: 01/14/2020

Well ID	Alkalinity (mg/L)	Alk SCL	Alk MCL	Conductivity (μMho/cm)	Cond SCL	Cond MCL	Chloride (mg/L)	Cl SCL	Cl MCL
CM07-011	292	432	360	1902	2817	2347	184	281	234
CM07-012	291	422	352	1900	2794	2328	185	289	241
CM07-013	290	436	364	1922	2841	2368	182	287	239
CM07-014	291	422	352	1936	2772	2310	184	274	228
CM07-015	295	432	360	1930	2822	2352	184	284	236
CM07-016	300	441	367	1964	2831	2359	187	281	234
CM10-008	320	475	396	1867	2707	2256	180	265	221
CM10-009	317	468	390	1847	2693	2244	175	269	224
CM10-010	329	475	396	1888	2736	2280	181	275	229
CM10-011	325	481	401	1817	2808	2340	170	288	240
CM10-012	345	446	372	1873	2923	2436	177	327	272
CM10-013	344	481	401	1755	2779	2316	167	287	239
CM10-014	356	490	408	1817	2578	2148	174	251	209
CM10-015	326	504	420	1820	2491	2076	165	253	211
CM10-016	306	484	403	1845	2650	2208	161	253	211
CM10-017	321	475	396	1863	2664	2220	166	248	206
IJ013P	302	415	346	1246	2900	2417	95	278	232
PR008	327	484	403	1366	2866	2388	103	282	235
PR015	270	444	370	1067	2792	2327	79	268	223
SM03-001	207	374	312	661	1122	935	12	85	71
SM03-002	178	305	254	441	805	671	3.5	40	34
SM03-003	178	297	247	450	729	607	5.6	30	25
SM04-010A	296	354	295	705	1053	877	12	36	30
SM04-011A	291	554	462	689	1469	1224	11	139	115
SM06-028	288	351	293	668	778	648	11	24	20
SM07-015	142	200	167	322	495	413	3.3	24	20
SM07-016	140	199	166	325	451	376	3.1	24	20
SM07-017	180	209	174	406	539	449	3.9	30	25
SM07-018	141	217	181	331	513	427	2.7	23	19
SM07-019	144	212	176	345	599	499	3.7	38	31
SM07-020	148	228	190	335	583	486	2	28	23
SM07-021	146	216	180	336	534	445	2.4	27	23



WJ

Crow Butte Project
Monitor Well Laboratory Report

Sample Date: 01/21/2020

Analysis Date: 01/21/2020

Well ID	Alkalinity (mg/L)	Alk SCL	Alk MCL	Conductivity (µMho/cm)	Cond SCL	Cond MCL	Chloride (mg/L)	Cl SCL	Cl MCL
CM06-009	295	428	356	1921	2866	2388	178	285	238
CM06-010	294	429	358	1940	2952	2460	179	327	272
CM08-001	293	455	379	1938	3110	2592	179	372	310
CM08-002	291	395	329	1927	3125	2604	180	334	278
CM08-003	303	432	360	1973	3211	2676	185	367	306
CM08-004	295	428	356	1933	3125	2604	182	328	274
CM08-005	285	425	354	1908	3067	2556	182	328	274
CM08-006	299	432	360	1906	3067	2556	180	317	264
CM08-007	323	425	354	1959	3154	2628	188	396	330
CM08-008	325	418	348	1966	3211	2676	189	415	346
CM08-009	310	452	377	1859	3053	2544	176	325	271
CM09-008	296	418	348	1804	2952	2460	172	366	305
CM09-009	299	475	396	1782	2923	2436	174	334	278
CM09-010	298	359	299	1774	2390	1992	176	292	244
CM09-011	298	445	371	1780	2707	2256	176	284	236
CM11-012	295	433	361	1787	2794	2328	172	268	223
CM11-013	299	418	348	1789	2722	2268	172	291	242
CM11-014	300	468	390	1784	3024	2520	173	357	298
CM11-015	294	431	359	1777	2765	2304	171	289	241
CM11-016	298	451	376	1768	2794	2328	173	276	230
CM11-017	300	438	365	1769	2837	2364	171	301	251
CM11-018	302	445	371	1780	2722	2268	174	297	247
CM11-019	298	448	373	1776	2779	2316	174	300	250
SM04-001	152	248	206	359	772	643	2.9	52	43
SM04-002	187	513	393	630	1256	1039	13	127	88
SM04-005A	194	367	306	527	1236	1030	11	106	88
SM06-028	287	351	293	669	778	648	11	24	20
SM08-001	233	374	312	508	763	636	7.2	25	21
SM08-002	239	353	294	518	778	648	6.2	24	20
SM08-003	228	331	276	508	720	600	7.7	24	20
SM08-004	223	323	269	518	819	683	10	25	21
SM08-005	251	346	288	568	749	624	9.4	23	19



WV

Crow Butte Project
Monitor Well Laboratory Report

Sample Date: 01/28/2020

Analysis Date: 01/28/2020

Well ID	Alkalinity (mg/L)	Alk SCL	Alk MCL	Conductivity (µMho/cm)	Cond SCL	Cond MCL	Chloride (mg/L)	Cl SCL	Cl MCL
CM07-011	291	432	360	1913	2817	2347	187	281	234
CM07-012	292	422	352	1912	2794	2328	185	289	241
CM07-013	290	436	364	1935	2841	2368	183	287	239
CM07-014	292	422	352	1955	2772	2310	182	274	228
CM07-015	298	432	360	1948	2822	2352	186	284	236
CM07-016	303	441	367	1970	2831	2359	187	281	234
CM10-008	321	475	396	1862	2707	2256	176	265	221
CM10-009	317	468	390	1840	2693	2244	172	269	224
CM10-010	330	475	396	1889	2736	2280	179	275	229
CM10-011	328	481	401	1821	2808	2340	170	288	240
CM10-012	348	446	372	1886	2923	2436	179	327	272
CM10-013	347	481	401	1769	2779	2316	169	287	239
CM10-014	359	490	408	1830	2578	2148	176	251	209
CM10-015	329	504	420	1828	2491	2076	166	253	211
CM10-016	311	484	403	1862	2650	2208	164	253	211
CM10-017	327	475	396	1875	2664	2220	167	248	206
IJ013P	304	415	346	1247	2900	2417	94	278	232
PR008	327	484	403	1378	2866	2388	103	282	235
PR015	271	444	370	1076	2792	2327	79	268	223
SM03-001	207	374	312	657	1122	935	12	85	71
SM03-002	180	305	254	439	805	671	3.5	40	34
SM03-003	177	297	247	450	729	607	5.6	30	25
SM04-010A	297	354	295	700	1053	877	12	36	30
SM04-011A	290	554	462	691	1469	1224	11	139	115
SM06-028	290	351	293	666	778	648	11	24	20
SM07-015	144	200	167	321	495	413	3.3	24	20
SM07-016	140	199	166	324	451	376	3.1	24	20
SM07-017	183	209	174	411	539	449	4.1	30	25
SM07-018	140	217	181	328	513	427	2.8	23	19
SM07-019	145	212	176	345	599	499	3.7	38	31
SM07-020	149	228	190	335	583	486	1.3	28	23
SM07-021	144	216	180	335	534	445	2.7	27	23

SM06-028



