

**CAMECO RESOURCES  
CROW BUTTE OPERATION**



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

(308) 665-2215  
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January 16, 2020

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

Subject: Quarterly Excursion Monitoring Report  
Source Materials License No. SUA-1534, Docket No. 40-8943

Dear Sir or Madam:

Enclosed please find one copy of the Excursion Monitoring Report for the Crow Butte Uranium Project. The report is provided in accordance with License Condition 11.1(A) of Source Materials License SUA-1534. This report covers the fourth quarter of 2019.

If you have any questions concerning the report, please feel free to call me at (308) 665-2215 ext. 117.

Sincerely,  
CAMECO RESOURCES  
CROW BUTTE OPERATION

Walter D. Nelson  
SHEQ Coordinator

cc: Deputy Director, Division of Decommissioning  
Uranium Recovery and Waste Programs  
Office of Nuclear Material Safety and Safeguards  
U.S. Nuclear Regulatory Commission  
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CBO – File

ec: CR – Electronic File

NM5520

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**CROW BUTTE URANIUM PROJECT**

**EXCURSION MONITORING  
REPORT**

**for**

**FOURTH QUARTER, 2019**

**USNRC Source Materials License SUA 1534**

**CAMECO RESOURCES  
CROW BUTTE OPERATION**



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**Excursion Monitoring and Corrective Actions**

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 wellfield. This caused the excursion indicator parameters to rise in a number of shallow monitor wells, particularly those located in the northern portion of the wellfield. A second significant winter storm impacted the area on April 10 and 11, 2019. The region continued to receive above normal springtime precipitation combined with unusually cool temperatures for most of the quarter. In total, seven shallow monitor wells were placed on excursion status due to these conditions (two wells at the end of March, 2019, five during the second quarter). No additional corrective actions were assigned for any of the wells other than placing the affected wells on a weekly sampling frequency. All of these wells were removed from excursion status prior to the fourth quarter of 2019 with the exception of SM6-28.

SM6-28 was placed on excursion status on May 3, 2019, as a result of the wet, cool, springtime conditions. This well has been placed on excursion status six times in the past during similar environmental conditions. The well remained on excursion status at the end of the quarter. The parameters in the well are trending down slowly and are very near the multiple control limits. In fact, sampling results from November 26, December 3, and December 10 were below the excursion parameters. However, because the results remained so near the excursion limits, the well was not removed from excursion parameters. The results from December 23 and December 30 were below the excursion criteria. The well has been on excursion status for a period of greater than sixty days. Injection has been suspended in the area around the well.

A summary of the weekly excursion indicator parameters and laboratory reports for SM6-28 are included in Appendix A and Appendix B respectively.

**Appendix A**  
**Summary of**  
**Weekly Excursion Indicator Parameter Values**  
**Fourth Quarter, 2019**

Submitted by:  
Crow Butte Resources, Inc.  
P.O. Box 169  
Crawford, NE 69339

NRC  
Excursion Monitoring Report  
Quarter 4 of 2019

Submitted to:  
Document Control Desk, Director  
Office of Nuclear Material Safety &  
Safeguards  
U.S.Nuclear Regulatory Commission  
Washington, DC 20555-0001

Permit No. SUA-153

Well ID	Alkalinity			Conductivity			Chloride		
	Min	Max	Mean	Min	Max	Mean	Min	Max	Mean
BOW96-001	221	226	224	505	522	512	7.4	8	7.6
CM02-005	321	344	328	1949	2053	1987	184	196	190.1
CM02-006	280	290	284	1085	1264	1160	70	98	81.3
CM02-007	263	274	268	1138	1301	1208	80	102	89
CM03-005	297	305	300	1935	1961	1953	177	185	181
CM03-006	297	302	299	1939	1958	1950	178	188	181.7
CM04-001	306	315	311	1855	1877	1866	172	182	176.1
CM04-002	304	310	307	1854	1874	1868	173	178	176.3
CM04-003	300	309	304	1845	1870	1862	171	176	173
CM04-004	299	311	304	1849	1887	1868	170	177	173.6
CM05-001	299	305	302	1711	1732	1722	148	154	151.3
CM05-002	301	307	303	1840	1856	1847	169	176	172.8
CM05-003	304	311	307	1843	1866	1857	171	180	175.2
CM05-004	306	312	310	1853	1874	1867	175	178	176.2
CM05-005	300	308	305	1843	1869	1860	171	175	173.5
CM05-006	301	308	304	1853	1868	1861	170	176	173
CM05-007	301	306	303	1847	1867	1859	170	179	174.5
CM05-008	303	311	307	1861	1892	1880	170	176	173.3
CM05-009	299	306	301	1861	1880	1869	169	178	173
CM05-010	288	297	292	1886	1906	1897	166	174	170.3
CM05-011	304	312	307	1906	1937	1919	171	177	174.3
CM05-012	295	299	298	1896	1908	1902	175	183	178.2
CM05-013	291	301	295	1890	1903	1898	173	182	176.7
CM05-018	297	314	302	1913	1935	1923	175	183	180.3
CM05-019	305	315	308	1822	1841	1832	159	167	164
CM05-020	317	327	322	1830	1872	1853	157	168	162.5
CM05-021	299	306	301	1914	1941	1925	176	180	178.2

CM05-022	296	304	299	1910	1931	1922	175	179	176.5
CM05-023	294	300	297	1901	1929	1916	173	179	175.7
CM05-024	295	304	299	1923	1940	1933	172	184	176.5
CM05-025	291	298	295	1933	1953	1943	164	172	167
CM05-026	291	303	298	1940	1961	1950	175	182	178.2
CM05-027	297	300	299	1939	1961	1950	176	183	179.2
CM06-001	286	295	289	1848	1870	1857	168	179	172.7
CM06-002	288	296	293	1895	1920	1912	171	180	175
CM06-003	291	297	294	1919	1929	1923	172	180	175.3
CM06-004	296	303	299	1924	1933	1927	174	181	177
CM06-005	287	292	289	1943	1956	1951	173	181	176.5
CM06-006	295	300	297	1929	1941	1934	172	178	174.5
CM06-007	277	283	280	1964	1973	1969	172	179	174.7
CM06-008	289	293	291	1926	1937	1931	171	178	174.3
CM06-009	293	300	296	1916	1942	1935	171	178	175.4
CM06-010	293	296	294	1928	1950	1944	172	182	176.6
CM06-012	297	302	300	1919	1940	1929	177	183	179.8
CM06-013	297	304	301	1917	1942	1932	177	184	179.5
CM06-014	294	303	297	1914	1932	1922	174	180	176.5
CM06-015	293	300	296	1915	1943	1927	172	182	176.3
CM06-016A	290	296	293	1919	1943	1929	171	177	173.7
CM06-017	299	307	303	1901	1931	1916	175	179	176.7
CM06-018	304	309	306	1905	1922	1912	173	179	177.3
CM06-019	305	313	308	1896	1920	1907	174	179	176.2
CM06-025	302	308	304	1848	1900	1885	170	182	176.7
CM06-026	301	305	303	1876	1894	1883	171	179	175.7
CM06-028	315	326	320	1821	1838	1829	168	175	171.1
CM06-029	309	317	313	1850	1887	1865	165	172	168.9
CM06-030	313	318	315	1837	1860	1847	168	176	171.7
CM06-031	314	321	317	1850	1877	1864	168	177	173.4
CM06-032	314	321	317	1862	1889	1878	170	178	173.9
CM07-010	293	301	298	1878	1902	1889	178	185	181.7

CM07-011	290	294	293	1892	1915	1906	177	185	181
CM07-012	290	298	293	1892	1915	1908	176	184	179.6
CM07-013	290	294	291	1916	1937	1927	173	184	178
CM07-014	289	295	292	1928	1971	1948	174	183	178.1
CM07-015	295	301	298	1932	1955	1944	177	186	180.7
CM07-016	298	307	304	1947	1983	1967	179	189	182.7
CM08-001	291	298	294	1933	1951	1946	172	179	175.3
CM08-002	288	300	294	1924	1942	1935	176	179	177.6
CM08-003	301	317	308	1965	1999	1987	183	186	184.4
CM08-004	294	297	296	1896	1936	1926	172	181	177
CM08-005	285	291	288	1890	1916	1907	175	180	177
CM08-006	298	302	300	1905	1926	1921	175	180	177.1
CM08-007	313	324	319	1934	1978	1959	178	187	182.1
CM08-008	321	325	323	1946	1979	1964	181	189	185
CM08-009	313	316	314	1860	1882	1876	170	176	172.3
CM08-010	310	316	313	1827	1856	1846	171	175	172.9
CM08-011	310	320	314	1836	1865	1849	169	172	170.4
CM08-012	317	323	320	1858	1879	1872	169	174	171.1
CM08-019	313	321	316	1822	1842	1834	163	171	166.9
CM08-020	313	323	317	1815	1832	1826	164	173	167.1
CM08-021	315	319	317	1828	1842	1834	163	169	166
CM08-022	314	323	319	1828	1844	1838	164	169	166.6
CM08-026	312	319	314	1827	1837	1831	164	169	166.6
CM08-027	315	321	318	1824	1852	1837	164	172	168.7
CM08-028	316	321	319	1821	1848	1833	165	173	168.7
CM09-008	296	304	299	1800	1819	1808	171	178	173.9
CM09-009	298	305	303	1784	1814	1799	170	179	173.9
CM09-010	298	303	301	1777	1792	1786	171	177	173.4
CM09-011	299	304	301	1792	1809	1802	172	181	174.9
CM09-012	299	303	301	1804	1821	1813	172	177	174.7
CM09-013	296	304	300	1799	1822	1809	170	179	174.8
CM09-014	299	304	302	1821	1838	1829	171	178	174.3
CM09-015	299	308	303	1823	1852	1838	172	178	174.8

CM09-016	299	305	301	1824	1842	1831	173	179	175.5
CM09-017	298	305	301	1834	1845	1841	173	179	176.5
CM09-018	297	303	299	1824	1845	1837	174	183	177.8
CM09-019	298	303	300	1841	1856	1848	175	180	176.7
CM09-020	291	296	293	1856	1874	1865	175	184	177.7
CM10-001	313	316	314	1843	1867	1858	168	173	170.4
CM10-002	313	317	314	1843	1863	1854	166	172	169.3
CM10-003	309	314	310	1842	1861	1850	168	173	170.4
CM10-004	329	335	333	1947	1977	1963	186	194	189.9
CM10-005	332	342	337	1984	2012	2000	196	199	197.1
CM10-006	314	316	315	1823	1859	1845	165	172	168
CM10-007	314	320	316	1824	1864	1844	164	171	166.1
CM10-008	320	329	324	1856	1874	1863	168	172	170
CM10-009	315	317	316	1840	1854	1847	164	173	167.9
CM10-010	330	339	333	1885	1920	1902	171	174	172.7
CM10-011	324	328	326	1811	1825	1817	161	165	163.4
CM10-012	347	355	350	1867	1886	1877	169	177	171.1
CM10-013	345	353	348	1760	1772	1765	161	167	163.1
CM10-014	356	362	358	1802	1827	1814	164	172	167.3
CM10-015	327	333	330	1809	1823	1817	157	163	159
CM10-016	309	316	312	1843	1860	1853	156	160	157.9
CM10-017	321	329	324	1850	1869	1860	157	166	160.9
CM10-020	340	343	341	1878	1904	1896	169	179	174.3
CM10-021	317	321	318	1814	1836	1827	160	167	163.9
CM10-022	320	323	322	1823	1842	1832	160	165	162.6
CM10-023	321	331	324	1829	1845	1838	162	167	163.9
CM10-024	319	324	321	1834	1852	1841	162	168	164.1
CM10-025	320	326	322	1829	1851	1841	163	172	166.9
CM10-026	317	323	319	1821	1840	1831	162	169	164.4
CM10-027	311	319	315	1839	1849	1843	164	173	168.3
CM10-028	314	320	316	1836	1848	1844	164	170	166.6
CM10-029	316	321	319	1840	1849	1844	165	173	167.9



<b>CM10-030</b>	316	324	320	1842	1855	1847	165	172	167.1
<b>CM10-031</b>	313	319	316	1836	1846	1841	164	167	165.1
<b>CM10-032</b>	312	320	316	1858	1870	1866	156	161	158.1
<b>CM10-033</b>	340	351	345	1786	1806	1795	159	166	162.6
<b>CM10-034</b>	347	358	353	1851	1879	1862	169	177	172.9
<b>CM11-001</b>	298	306	300	1849	1868	1860	169	179	174.1
<b>CM11-002A</b>	295	300	298	1841	1866	1852	170	179	174.3
<b>CM11-003</b>	299	318	307	1856	1921	1886	171	177	175.1
<b>CM11-004</b>	295	306	299	1806	1848	1834	168	176	171.4
<b>CM11-005</b>	295	301	297	1806	1834	1821	168	176	171.4
<b>CM11-006</b>	294	301	297	1814	1904	1840	168	177	172.1
<b>CM11-007</b>	292	301	296	1821	1838	1830	168	176	170.7
<b>CM11-008</b>	300	307	303	1852	1886	1869	167	177	171.7
<b>CM11-009</b>	291	296	293	1809	1833	1823	164	171	167.1
<b>CM11-010</b>	296	322	306	1830	1924	1859	170	175	172.4
<b>CM11-011</b>	306	312	310	1846	1880	1863	171	178	173.6
<b>CM11-012</b>	296	303	300	1791	1812	1804	163	172	167.1
<b>CM11-013</b>	298	304	301	1783	1807	1798	166	174	170.4
<b>CM11-014</b>	300	305	302	1786	1797	1792	169	176	170.9
<b>CM11-015</b>	294	298	296	1771	1789	1782	166	172	169.1
<b>CM11-016</b>	296	306	301	1762	1789	1783	169	175	171.6
<b>CM11-017</b>	299	308	303	1769	1797	1783	168	175	170.3
<b>CM11-018</b>	302	309	305	1783	1802	1795	167	175	170.7
<b>CM11-019</b>	299	306	302	1782	1802	1795	170	175	171.3
<b>IJ013P</b>	303	311	307	1241	1289	1265	93	99	95.7
<b>PR008</b>	330	345	336	1361	1380	1369	96	101	98.6
<b>PR015</b>	272	282	276	1065	1087	1072	73	78	76
<b>SM02-001</b>	187	190	188	521	528	523	14	14	14
<b>SM02-002</b>	164	167	166	455	461	457	11	11	11
<b>SM02-003</b>	194	197	196	540	549	544	15	15	15
<b>SM03-001</b>	202	207	205	650	664	658	11	12	11.7
<b>SM03-002</b>	175	179	177	438	444	440	1.3	3.8	3.3
<b>SM03-003</b>	174	179	176	447	454	450	5	5.6	5.5

SM04-001	150	157	154	357	369	361	2.7	3.1	2.9
SM04-002	187	205	192	611	643	630	12	21	13.6
SM04-003	179	184	182	601	613	609	11	12	11.9
SM04-004	204	210	207	610	624	618	13	13	13
SM04-005A	193	198	196	526	540	532	11	11	11
SM04-006	264	287	271	615	657	637	13	26	17
SM04-007	170	190	175	499	508	504	16	22	17.6
SM04-008	287	294	290	684	696	688	11	12	11.2
SM04-009	265	273	268	649	657	653	12	12	12
SM04-010A	286	296	292	685	704	698	10	14	12
SM04-011A	284	295	289	688	699	692	10	12	11
SM05-001	228	232	230	582	598	592	11	12	11.7
SM05-002	189	199	193	442	478	451	5.2	5.7	5.4
SM05-003	222	225	224	569	587	579	12	12	12
SM05-004	203	208	207	502	558	543	12	15	14.5
SM05-005	230	235	233	575	597	588	10	11	10.8
SM05-006	201	210	207	541	567	555	12	13	12.5
SM05-007	210	225	214	561	590	568	9.3	10	9.5
SM05-008	204	206	205	545	555	548	12	12	12
SM05-009	203	207	204	540	554	544	11	11	11
SM05-010	206	210	208	546	558	549	9.2	10	9.9
SM05-011	213	219	215	562	580	568	9.7	10	10.0
SM05-012	206	211	208	542	563	551	10	11	10.2
SM05-013	196	202	198	529	553	540	11	12	11.8
SM05-014	177	184	181	478	491	483	8.2	9.4	8.9
SM05-015	200	206	202	536	551	541	11	12	11.8
SM05-016	180	184	182	439	452	443	4.8	5.1	4.9
SM05-017	164	169	166	407	420	411	1.8	2.3	2.1
SM05-018	168	173	171	421	431	426	2.6	3.2	3.0
SM05-019	179	185	183	470	484	476	4.4	4.8	4.5
SM05-020	177	183	179	481	496	485	4.9	5.1	5
SM05-021	174	180	177	451	462	454	4.2	4.9	4.7

SM05-022	179	186	183	460	472	464	3.6	3.8	3.7
SM05-023	179	185	182	454	467	459	2.9	3.9	3.5
SM05-024	167	173	170	430	439	434	4.8	6.1	5.2
SM05-025	169	178	173	449	480	464	5.7	6.8	6.2
SM06-001	205	213	209	527	544	532	6.7	7.4	6.9
SM06-002	204	209	206	538	554	543	9.8	10	9.9
SM06-003	200	206	202	533	547	537	9.5	9.9	9.7
SM06-004	205	210	207	519	532	523	8	8.4	8.2
SM06-005	211	215	212	510	521	513	6.8	7.4	7.1
SM06-006	219	227	224	470	483	474	3.1	3.4	3.4
SM06-007	222	227	224	490	504	494	6.8	7	6.9
SM06-008	204	212	206	496	507	499	9	9.5	9.2
SM06-009	218	225	221	478	494	485	5.8	6.8	6.3
SM06-010	201	208	204	486	501	491	7.7	8.8	8.2
SM06-011	213	217	215	532	540	537	13	14	13.8
SM06-012	229	238	234	527	535	529	8.6	10	9.2
SM06-013	241	247	243	523	537	529	6.8	7.2	7
SM06-014	201	209	205	445	547	527	3.8	13	10.6
SM06-015	203	208	206	525	538	531	9.9	11	10.3
SM06-016	204	211	207	440	554	479	4	13	6.9
SM06-017	232	238	234	479	490	482	3.8	4.1	3.9
SM06-018	194	201	198	542	552	547	15	16	15.3
SM06-019	198	210	206	501	545	510	10	16	11.7
SM06-020	208	213	211	528	539	532	12	13	12.2
SM06-021	217	222	219	545	551	549	13	14	13.2
SM06-022	206	211	208	473	482	476	7.7	8	7.8
SM06-023	262	277	270	560	581	571	7	8	7.6
SM06-024	238	245	242	544	552	549	8	8.4	8.2
SM06-025	214	221	218	543	548	546	12	13	12.9
SM06-026	201	207	205	473	478	476	7.8	8.3	8.1
SM06-027	228	241	232	511	528	519	7.7	8	7.8
SM06-028	291	295	293	675	696	688	11	12	11.3
SM07-001	174	194	182	431	487	457	4	6.2	4.9

SM07-002	162	167	165	399	405	402	3.3	3.7	3.5
SM07-003	166	172	169	426	429	427	3.7	4.3	3.9
SM07-004	162	167	165	393	397	395	3.1	3.6	3.3
SM07-005	164	168	167	418	425	422	3.7	4.2	3.9
SM07-006	152	158	154	360	365	362	2.9	3.1	3.0
SM07-007	165	171	168	425	430	428	4.4	4.7	4.5
SM07-008	165	169	168	463	476	469	7.8	8.4	8.1
SM07-009	164	170	167	415	419	417	4	4.5	4.3
SM07-010	164	169	167	428	432	430	1.4	3.9	3.4
SM07-011	140	145	142	338	341	340	3	3.3	3.1
SM07-012	163	169	165	438	441	439	2.8	3.9	3.5
SM07-013	146	154	150	356	367	359	3.7	4.6	4.2
SM07-014	133	138	135	330	335	333	3.8	4.3	4.0
SM07-015	139	144	141	320	325	323	3.4	3.7	3.5
SM07-016	137	141	139	323	328	325	3.1	3.3	3.2
SM07-017	174	182	179	394	416	407	3.5	4.3	4.0
SM07-018	137	143	140	329	333	331	2.7	3.1	2.9
SM07-019	140	145	142	343	348	346	3.5	3.9	3.7
SM07-020	144	149	146	333	339	336	1.7	2.2	2.0
SM07-021	141	145	143	333	338	336	2.6	2.9	2.7
SM07-022	145	150	147	336	340	338	2.3	2.7	2.5
SM07-023	176	180	177	455	461	458	4	4.5	4.2
SM07-024	184	189	186	571	578	575	7.6	7.9	7.8
SM07-025	154	157	155	356	361	359	1.2	3.8	3.0
SM08-001	233	235	234	510	518	513	7.1	7.8	7.4
SM08-002	238	243	241	520	527	523	5.9	6.4	6.2
SM08-003	228	231	230	509	529	518	7.9	9.9	8.4
SM08-004	221	226	223	526	529	527	10	11	10.7
SM08-005	250	254	252	567	578	573	8.6	9.3	9.0
SM08-006	246	252	248	563	588	576	9	10	9.5
SM08-007	247	253	249	574	586	581	9.5	10	9.7
SM08-008	237	242	240	509	517	514	6	6.6	6.3

SM08-009	234	241	238	504	517	512	5.8	6.6	6.4
SM08-010	234	249	243	549	573	562	8.8	9.4	9.1
SM08-011	232	237	235	541	548	544	8.4	8.9	8.7
SM08-012	241	249	246	566	583	573	8.7	9.6	9.3
SM08-013	229	234	230	540	547	543	11	11	11
SM08-014	233	238	235	549	555	552	9.3	9.9	9.5
SM08-015	223	227	226	539	547	542	8	8.7	8.3
SM08-016	229	235	232	571	596	579	8.9	9.3	9.0
SM08-017	240	248	243	571	579	574	8.8	9.4	9.1
SM08-018	234	238	236	554	564	558	10	11	10.4
SM08-019	236	244	238	553	568	559	8.5	9.4	9.0
SM08-020	225	231	228	557	572	566	8.5	9.4	8.9
SM08-021	226	233	229	549	564	556	8.6	9.2	8.9
SM08-022	245	251	248	617	651	629	9.1	11	9.8
SM08-023	226	232	228	544	554	550	8.7	8.9	8.8
SM08-024	227	235	229	543	559	550	9.3	9.6	9.5
SM08-025	257	263	259	660	676	665	11	12	11.4
SM08-026	223	234	228	526	539	533	8.8	9.6	9.3
SM08-027	228	244	235	503	529	518	6.8	7.4	7.2
SM08-028	245	256	249	553	588	572	7.5	8.1	7.8
SM08-029	266	272	269	681	699	688	13	14	13.7
SM08-030	207	214	209	472	490	480	8.4	9.1	8.8
SM08-031	229	236	233	511	517	514	6.3	6.8	6.5
SM09-001	165	172	169	411	427	415	3.6	4.2	3.9
SM09-002	159	163	161	375	386	378	2.9	3.6	3.3
SM09-003	158	164	161	373	389	378	3	3.6	3.3
SM09-004	145	150	148	359	370	363	4.1	4.4	4.2
SM09-005	141	145	143	313	320	316	2	2.8	2.5
SM09-006	137	143	140	298	303	299	1.5	2.4	2.1
SM09-007	160	165	162	391	396	392	3.2	4	3.5
SM09-008	160	165	162	386	391	388	2.3	3	2.8
SM09-009	150	155	152	362	366	363	3.1	3.5	3.3
SM09-010	143	148	145	340	344	341	2.7	3.1	3.0

SM09-011	141	151	147	346	351	348	2.2	3	2.8
SM09-012	158	164	161	383	390	386	2.3	3	2.7
SM09-013	141	146	143	330	335	332	2.9	3.4	3.1
SM09-014	138	145	140	314	323	317	1.6	2.3	1.9
SM09-015	138	143	140	314	321	316	1.2	2.2	1.8
SM09-016	138	144	141	294	304	299	1.1	2	1.5
SM09-017	139	144	141	313	323	317	2.7	3	2.9
SM09-018	141	146	142	313	324	318	1.3	1.9	1.7
SM09-019	134	139	136	305	312	307	2.7	2.9	2.9
SM09-020	137	141	139	307	313	309	1.9	2.3	2.1
SM10-001	293	310	303	688	724	708	13	14	13.7
SM10-002	229	235	231	527	543	534	7.3	8.7	8.3
SM10-003	246	254	251	544	560	554	7.1	7.8	7.5
SM10-004	238	242	240	524	534	530	6.1	7.2	6.7
SM10-005	236	242	240	519	532	528	6.7	7.1	6.9
SM10-006	292	339	322	672	765	728	12	13	12.6
SM10-007	289	313	303	675	720	698	12	14	13.3
SM10-008	261	293	280	611	688	656	12	14	13.1
SM10-009	234	254	244	523	575	548	7	9.2	8.3
SM10-010	234	240	238	524	538	534	7.9	8.2	8.1
SM10-011	242	252	245	567	588	575	8.6	10	9.6
SM10-012	255	264	258	599	616	604	9.8	11	10.3
SM10-013	232	238	235	537	545	542	8	9	8.7
SM10-014A	242	248	244	562	573	567	9.3	9.8	9.6
SM10-015	236	242	240	538	552	547	8.8	9.4	9.1
SM10-016	252	257	255	595	603	601	13	13	13
SM10-017	242	247	244	564	570	567	12	13	12.3
SM10-018	238	242	240	531	551	539	8	11	8.9
SM10-019	253	258	255	580	586	583	10	11	10.6
SM10-020	231	236	233	566	582	574	17	20	18.9
SM10-021	236	242	239	589	598	595	18	19	18.7
SM10-022	240	246	242	556	564	561	11	13	12

SM10-023	230	237	234	556	567	563	14	15	14.9
SM10-024	225	231	228	531	546	540	11	12	11.3
SM10-025	222	229	226	531	540	536	11	11	11
SM10-026	240	248	243	584	594	589	15	16	15.9
SM10-027	242	253	249	553	570	563	8.8	9.9	9.4
SM10-028A	222	229	224	592	607	600	27	28	27.1
SM10-029A	255	264	258	592	605	598	12	13	12.7
SM10-030	235	243	239	524	536	531	6.6	7.2	7.0
SM10-031	237	244	239	530	558	546	7	8.2	7.8
SM10-032	237	243	241	529	539	533	5.9	7.1	6.8
SM11-001	160	165	162	402	411	405	4.8	5.3	5.0
SM11-002	136	141	139	315	322	318	3.1	3.9	3.5
SM11-003	141	147	143	320	333	324	1.6	2.6	2.0
SM11-004	137	141	139	302	310	305	1.2	2.1	1.7
SM11-005	136	141	138	316	324	318	3.6	4.1	3.9
SM11-006	139	144	141	311	321	314	2.6	3.2	2.9
SM11-007	140	145	143	302	308	306	2	3.2	2.9
SM11-009	149	152	151	301	307	304	1.1	1.8	1.3
SM11-010	153	157	155	314	318	316	1.5	2.3	1.9
SM11-011	142	146	144	339	345	343	3.2	3.6	3.3
SM11-012	142	145	144	325	329	328	3.2	3.4	3.3
SM11-013	139	143	141	290	294	293	1.2	1.8	1.6
SM11-014	134	138	136	286	293	290	1.8	2.3	2.0
SM11-015	135	138	137	299	304	302	1.9	2.2	2.1
SM11-016	139	145	143	297	302	300	1.6	2.8	2.5
SM11-017	138	145	141	289	293	292	2.6	2.9	2.7
SM11-018	135	141	139	300	304	302	3.9	4.2	4.0
SM11-019	137	142	140	307	311	309	1.1	1.9	1.6
SM11-020	158	163	161	401	406	403	5.3	5.9	5.6
SM11-022	162	167	165	454	458	455	7.1	7.4	7.2
SM11-023	163	168	166	393	396	395	3.8	4.3	4.1
SM11-024	152	158	156	399	404	402	4.5	5	4.7
SM11-025	156	163	160	406	409	408	3	3.5	3.2

SM11-026

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## **Appendix B**

### **Monitor Well Laboratory Reports**

**Fourth Quarter, 2019**



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**Crow Butte Project**  
**Monitor Well Laboratory Report**

Sample Date: 10/01/2019

Analysis Date: 10/01/2019

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	1941	2866	2388	175	285	238
CM06-010	293	429	358	1949	2952	2460	176	327	272
CM08-001	293	455	379	1944	3110	2592	175	372	310
CM08-002	297	395	329	1933	3125	2604	177	334	278
CM08-003	311	432	360	1999	3211	2676	185	367	306
CM08-004	296	428	356	1934	3125	2604	177	328	274
CM08-005	288	425	354	1916	3067	2556	177	328	274
CM08-006	299	432	360	1926	3067	2556	176	317	264
CM08-007	314	425	354	1942	3154	2628	178	396	330
CM08-008	321	418	348	1962	3211	2676	184	415	346
CM08-009	314	452	377	1882	3053	2544	171	325	271
CM09-008	297	418	348	1800	2952	2460	173	366	305
CM09-009	303	475	396	1784	2923	2436	171	334	278
CM09-010	298	359	299	1777	2390	1992	171	292	244
CM09-011	299	445	371	1792	2707	2256	172	284	236
CM11-012	296	433	361	1791	2794	2328	163	268	223
CM11-013	298	418	348	1783	2722	2268	166	291	242
CM11-014	300	468	390	1786	3024	2520	169	357	298
CM11-015	297	431	359	1771	2765	2304	168	289	241
CM11-016	296	451	376	1762	2794	2328	170	276	230
CM11-017	299	438	365	1769	2837	2364	168	301	251
CM11-018	302	445	371	1783	2722	2268	167	297	247
CM11-019	299	448	373	1782	2779	2316	170	300	250
SM04-001	155	248	206	361	772	643	2.8	52	43
SM04-002	205	513	393	611	1256	1039	21	127	88
SM04-005A	195	367	306	532	1236	1030	11	106	88
SM06-028	293	351	293	693	778	648	12	24	20
SM08-001	234	374	312	518	763	636	7.6	25	21
SM08-002	242	353	294	527	778	648	6.2	24	20
SM08-003	230	331	276	516	720	600	7.9	24	20
SM08-004	224	323	269	529	819	683	11	25	21
SM08-005	250	346	288	567	749	624	8.8	23	19



wv

**Crow Butte Project**  
**Monitor Well Laboratory Report**

Sample Date: 10/08/2019

Analysis Date: 10/08/2019

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	1910	2817	2347	182	281	234
CM07-012	291	422	352	1915	2794	2328	179	289	241
CM07-013	291	436	364	1933	2841	2368	177	287	239
CM07-014	295	422	352	1953	2772	2310	178	274	228
CM07-015	298	432	360	1952	2822	2352	179	284	236
CM07-016	305	441	367	1980	2831	2359	184	281	234
CM10-008	329	475	396	1874	2707	2256	168	265	221
CM10-009	316	468	390	1854	2693	2244	166	269	224
CM10-010	334	475	396	1920	2736	2280	174	275	229
CM10-011	324	481	401	1819	2808	2340	161	288	240
CM10-012	348	446	372	1867	2923	2436	169	327	272
CM10-013	347	481	401	1764	2779	2316	161	287	239
CM10-014	356	490	408	1802	2578	2148	164	251	209
CM10-015	330	504	420	1816	2491	2076	158	253	211
CM10-016	312	484	403	1852	2650	2208	156	253	211
CM10-017	323	475	396	1860	2664	2220	157	248	206
IJ013P	307	415	346	1280	2900	2417	99	278	232
PR008	338	484	403	1361	2866	2388	96	282	235
PR015	280	444	370	1087	2792	2327	77	268	223
SM03-001	205	374	312	660	1122	935	12	85	71
SM03-002	178	305	254	442	805	671	3.8	40	34
SM03-003	177	297	247	449	729	607	5.5	30	25
SM04-010A	296	354	295	699	1053	877	14	36	30
SM04-011A	289	554	462	688	1469	1224	11	139	115
SM06-028	294	351	293	694	778	648	12	24	20
SM07-015	141	200	167	323	495	413	3.5	24	20
SM07-016	139	199	166	324	451	376	3.2	24	20
SM07-017	182	209	174	411	539	449	4.1	30	25
SM07-018	143	217	181	331	513	427	3	23	19
SM07-019	141	212	176	343	599	499	3.8	38	31
SM07-020	147	228	190	337	583	486	2.2	28	23
SM07-021	143	216	180	335	534	445	2.7	27	23



WH

**Crow Butte Project**  
**Monitor Well Laboratory Report**

Sample Date: 10/15/2019

Analysis Date: 10/15/2019

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	298	428	356	1938	2866	2388	176	285	238
CM06-010	296	429	358	1942	2952	2460	178	327	272
CM08-001	292	455	379	1945	3110	2592	177	372	310
CM08-002	292	395	329	1934	3125	2604	178	334	278
CM08-003	308	432	360	1993	3211	2676	186	367	306
CM08-004	296	428	356	1931	3125	2604	177	328	274
CM08-005	288	425	354	1912	3067	2556	176	328	274
CM08-006	298	432	360	1923	3067	2556	176	317	264
CM08-007	313	425	354	1940	3154	2628	179	396	330
CM08-008	322	418	348	1956	3211	2676	184	415	346
CM08-009	313	452	377	1879	3053	2544	173	325	271
CM09-008	298	418	348	1805	2952	2460	171	366	305
CM09-009	304	475	396	1804	2923	2436	170	334	278
CM09-010	302	359	299	1790	2390	1992	173	292	244
CM09-011	302	445	371	1807	2707	2256	173	284	236
CM11-012	297	433	361	1809	2794	2328	166	268	223
CM11-013	302	418	348	1801	2722	2268	171	291	242
CM11-014	301	468	390	1797	3024	2520	169	357	298
CM11-015	296	431	359	1786	2765	2304	166	289	241
CM11-016	300	451	376	1789	2794	2328	171	276	230
CM11-017	303	438	365	1789	2837	2364	169	301	251
CM11-018	305	445	371	1801	2722	2268	171	297	247
CM11-019	302	448	373	1802	2779	2316	171	300	250
SM04-001	157	248	206	361	772	643	3	52	43
SM04-002	192	513	393	626	1256	1039	13	127	88
SM04-005A	197	367	306	533	1236	1030	11	106	88
SM06-028	295	351	293	696	778	648	12	24	20
SM08-001	234	374	312	513	763	636	7.8	25	21
SM08-002	242	353	294	522	778	648	6.4	24	20
SM08-003	230	331	276	515	720	600	8.1	24	20
SM08-004	223	323	269	527	819	683	11	25	21
SM08-005	250	346	288	568	749	624	9.1	23	19



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**Crow Butte Project**  
**Monitor Well Laboratory Report**

Sample Date: 10/22/2019

Analysis Date: 10/22/2019

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	294	432	360	1900	2817	2347	177	281	234
CM07-012	298	422	352	1907	2794	2328	177	289	241
CM07-013	294	436	364	1920	2841	2368	174	287	239
CM07-014	295	422	352	1934	2772	2310	176	274	228
CM07-015	301	432	360	1932	2822	2352	177	284	236
CM07-016	307	441	367	1964	2831	2359	179	281	234
CM10-008	324	475	396	1859	2707	2256	171	265	221
CM10-009	316	468	390	1842	2693	2244	164	269	224
CM10-010	339	475	396	1908	2736	2280	171	275	229
CM10-011	328	481	401	1812	2808	2340	162	288	240
CM10-012	350	446	372	1886	2923	2436	170	327	272
CM10-013	353	481	401	1766	2779	2316	164	287	239
CM10-014	362	490	408	1804	2578	2148	165	251	209
CM10-015	333	504	420	1809	2491	2076	158	253	211
CM10-016	316	484	403	1852	2650	2208	158	253	211
CM10-017	329	475	396	1850	2664	2220	160	248	206
IJ013P	311	415	346	1283	2900	2417	97	278	232
PR008	345	484	403	1372	2866	2388	98	282	235
PR015	282	444	370	1072	2792	2327	75	268	223
SM03-001	205	374	312	657	1122	935	11	85	71
SM03-002	177	305	254	440	805	671	3.8	40	34
SM03-003	176	297	247	450	729	607	5.6	30	25
SM04-010A	286	354	295	685	1053	877	10	36	30
SM04-011A	295	554	462	699	1469	1224	12	139	115
SM06-028	293	351	293	695	778	648	12	24	20
SM07-015	142	200	167	323	495	413	3.7	24	20
SM07-016	139	199	166	325	451	376	3.2	24	20
SM07-017	181	209	174	410	539	449	4.2	30	25
SM07-018	139	217	181	331	513	427	3.1	23	19
SM07-019	142	212	176	345	599	499	3.8	38	31
SM07-020	147	228	190	337	583	486	1.8	28	23
SM07-021	143	216	180	336	534	445	2.6	27	23



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**Crow Butte Project**  
**Monitor Well Laboratory Report**

Sample Date: 10/29/2019

Analysis Date: 10/29/2019

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	300	428	356	1916	2866	2388	176	285	238
CM06-010	294	429	358	1928	2952	2460	174	327	272
CM08-001	297	455	379	1933	3110	2592	172	372	310
CM08-002	300	395	329	1924	3125	2604	176	334	278
CM08-003	317	432	360	1995	3211	2676	185	367	306
CM08-004	296	428	356	1896	3125	2604	172	328	274
CM08-005	291	425	354	1890	3067	2556	175	328	274
CM08-006	302	432	360	1905	3067	2556	175	317	264
CM08-007	320	425	354	1934	3154	2628	178	396	330
CM08-008	324	418	348	1946	3211	2676	181	415	346
CM08-009	315	452	377	1860	3053	2544	170	325	271
CM09-008	302	418	348	1803	2952	2460	174	366	305
CM09-009	305	475	396	1789	2923	2436	175	334	278
CM09-010	303	359	299	1779	2390	1992	172	292	244
CM09-011	304	445	371	1793	2707	2256	172	284	236
CM11-012	303	433	361	1796	2794	2328	167	268	223
CM11-013	304	418	348	1790	2722	2268	170	291	242
CM11-014	305	468	390	1786	3024	2520	169	357	298
CM11-015	297	431	359	1784	2765	2304	170	289	241
CM11-016	306	451	376	1789	2794	2328	171	276	230
CM11-017	308	438	365	1770	2837	2364	169	301	251
CM11-018	309	445	371	1787	2722	2268	169	297	247
CM11-019	306	448	373	1791	2779	2316	170	300	250
SM04-001	152	248	206	357	772	643	3	52	43
SM04-002	189	513	393	628	1256	1039	13	127	88
SM04-005A	194	367	306	526	1236	1030	11	106	88
SM06-028	294	351	293	691	778	648	12	24	20
SM08-001	235	374	312	510	763	636	7.5	25	21
SM08-002	240	353	294	520	778	648	6.1	24	20
SM08-003	228	331	276	509	720	600	7.9	24	20
SM08-004	222	323	269	526	819	683	10	25	21
SM08-005	253	346	288	570	749	624	8.8	23	19



WJ

**Crow Butte Project**  
**Monitor Well Laboratory Report**

Sample Date: 11/05/2019

Analysis Date: 11/05/2019

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	293	432	360	1904	2817	2347	179	281	234
CM07-012	292	422	352	1900	2794	2328	176	289	241
CM07-013	291	436	364	1922	2841	2368	173	287	239
CM07-014	289	422	352	1945	2772	2310	174	274	228
CM07-015	298	432	360	1934	2822	2352	178	284	236
CM07-016	306	441	367	1960	2831	2359	180	281	234
CM10-008	323	475	396	1856	2707	2256	170	265	221
CM10-009	316	468	390	1842	2693	2244	167	269	224
CM10-010	334	475	396	1906	2736	2280	174	275	229
CM10-011	326	481	401	1820	2808	2340	164	288	240
CM10-012	349	446	372	1875	2923	2436	170	327	272
CM10-013	349	481	401	1765	2779	2316	164	287	239
CM10-014	359	490	408	1812	2578	2148	170	251	209
CM10-015	333	504	420	1820	2491	2076	159	253	211
CM10-016	312	484	403	1854	2650	2208	158	253	211
CM10-017	326	475	396	1864	2664	2220	163	248	206
IJ013P	310	415	346	1289	2900	2417	96	278	232
PR008	339	484	403	1379	2866	2388	98	282	235
PR015	277	444	370	1067	2792	2327	77	268	223
SM03-001	205	374	312	661	1122	935	12	85	71
SM03-002	177	305	254	440	805	671	1.3	40	34
SM03-003	175	297	247	450	729	607	5.6	30	25
SM04-010A	292	354	295	700	1053	877	12	36	30
SM04-011A	288	554	462	692	1469	1224	11	139	115
SM06-028	294	351	293	694	778	648	11	24	20
SM07-015	141	200	167	323	495	413	3.4	24	20
SM07-016	138	199	166	324	451	376	3.3	24	20
SM07-017	182	209	174	413	539	449	4.3	30	25
SM07-018	138	217	181	331	513	427	3	23	19
SM07-019	142	212	176	348	599	499	3.7	38	31
SM07-020	146	228	190	336	583	486	2	28	23
SM07-021	142	216	180	338	534	445	2.6	27	23



WJ

**Crow Butte Project**  
**Monitor Well Laboratory Report**

Sample Date: 11/12/2019

Analysis Date: 11/12/2019

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	296	428	356	1935	2866	2388	174	285	238
CM06-010	294	429	358	1950	2952	2460	174	327	272
CM08-001	295	455	379	1951	3110	2592	173	372	310
CM08-002	292	395	329	1942	3125	2604	176	334	278
CM08-003	308	432	360	1989	3211	2676	183	367	306
CM08-004	297	428	356	1936	3125	2604	176	328	274
CM08-005	287	425	354	1914	3067	2556	175	328	274
CM08-006	300	432	360	1924	3067	2556	176	317	264
CM08-007	320	425	354	1967	3154	2628	182	396	330
CM08-008	323	418	348	1968	3211	2676	183	415	346
CM08-009	314	452	377	1878	3053	2544	171	325	271
CM09-008	296	418	348	1819	2952	2460	172	366	305
CM09-009	303	475	396	1806	2923	2436	175	334	278
CM09-010	301	359	299	1792	2390	1992	172	292	244
CM09-011	302	445	371	1808	2707	2256	174	284	236
CM11-012	303	433	361	1810	2794	2328	167	268	223
CM11-013	300	418	348	1797	2722	2268	170	291	242
CM11-014	301	468	390	1795	3024	2520	169	357	298
CM11-015	294	431	359	1787	2765	2304	169	289	241
CM11-016	300	451	376	1786	2794	2328	171	276	230
CM11-017	303	438	365	1786	2837	2364	170	301	251
CM11-018	306	445	371	1796	2722	2268	170	297	247
CM11-019	301	448	373	1799	2779	2316	170	300	250
SM04-001	154	248	206	362	772	643	2.8	52	43
SM04-002	190	513	393	637	1256	1039	12	127	88
SM04-005A	196	367	306	534	1236	1030	11	106	88
SM06-028	293	351	293	692	778	648	11	24	20
SM08-001	235	374	312	514	763	636	7.4	25	21
SM08-002	242	353	294	525	778	648	6.3	24	20
SM08-003	230	331	276	516	720	600	7.9	24	20
SM08-004	222	323	269	528	819	683	10	25	21
SM08-005	252	346	288	574	749	624	8.6	23	19





WN

**Crow Butte Project**  
**Monitor Well Laboratory Report**

Sample Date: 11/19/2019

Analysis Date: 11/19/2019

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	293	432	360	1915	2817	2347	180	281	234
CM07-012	292	422	352	1915	2794	2328	178	289	241
CM07-013	291	436	364	1932	2841	2368	177	287	239
CM07-014	291	422	352	1960	2772	2310	176	274	228
CM07-015	296	432	360	1952	2822	2352	179	284	236
CM07-016	305	441	367	1983	2831	2359	181	281	234
CM10-008	327	475	396	1866	2707	2256	169	265	221
CM10-009	316	468	390	1846	2693	2244	169	269	224
CM10-010	332	475	396	1908	2736	2280	173	275	229
CM10-011	327	481	401	1825	2808	2340	165	288	240
CM10-012	355	446	372	1873	2923	2436	171	327	272
CM10-013	348	481	401	1772	2779	2316	161	287	239
CM10-014	358	490	408	1816	2578	2148	165	251	209
CM10-015	328	504	420	1823	2491	2076	157	253	211
CM10-016	310	484	403	1859	2650	2208	158	253	211
CM10-017	323	475	396	1864	2664	2220	159	248	206
IJ013P	304	415	346	1259	2900	2417	93	278	232
PR008	334	484	403	1364	2866	2388	98	282	235
PR015	273	444	370	1069	2792	2327	73	268	223
SM03-001	204	374	312	664	1122	935	12	85	71
SM03-002	175	305	254	444	805	671	3.6	40	34
SM03-003	174	297	247	454	729	607	5.5	30	25
SM04-010A	293	354	295	704	1053	877	12	36	30
SM04-011A	284	554	462	692	1469	1224	10	139	115
SM06-028	295	351	293	693	778	648	11	24	20
SM07-015	140	200	167	325	495	413	3.5	24	20
SM07-016	137	199	166	328	451	376	3.2	24	20
SM07-017	181	209	174	416	539	449	4.2	30	25
SM07-018	137	217	181	333	513	427	3.1	23	19
SM07-019	141	212	176	348	599	499	3.7	38	31
SM07-020	144	228	190	339	583	486	1.7	28	23
SM07-021	141	216	180	338	534	445	2.9	27	23



# Crow Butte Project

## Monitor Well Laboratory Report

Sample Date: 11/26/2019

Analysis Date: 11/26/2019

Well ID	Alkalinity (mg/L)	Alk SCL	Alk MCL	Conductivity (µMho/cm)	Cond SCL	Cond MCL	Chloride (mg/L)	Cl SCL	Cl MCL
SM06-023	270	314	262	578	691	576	7.7	23	19
SM06-024	241	310	258	544	672	560	8	24	20
SM06-025	217	324	270	543	696	580	13	24	20
SM06-026	203	308	257	475	726	605	7.8	24	20
SM06-027	232	317	264	519	677	564	7.9	23	20
SM06-028	293	351	293	687	778	648	11	24	20
SM08-026	229	317	264	538	720	600	8.8	24	20
SM08-027	235	353	294	520	706	588	7.4	22	19
SM08-028	249	328	274	574	801	667	7.5	24	20
SM08-029	269	338	282	681	763	636	14	26	22
SM08-030	207	284	236	484	672	560	8.7	38	32
SM08-031	231	350	292	513	750	625	6.7	28	23
SM10-001	306	469	391	715	994	828	14	37	31
SM10-002	231	338	282	538	763	636	8.3	24	20
SM10-003	249	386	322	552	821	684	7.6	24	20
SM10-004	238	346	288	530	778	648	6.5	24	20
SM10-005	239	350	292	528	763	636	6.9	23	19
SM10-006	333	501	418	748	1123	936	13	33	28
SM10-007	307	403	336	711	965	804	13	33	27
SM10-008	282	403	336	659	907	756	13	31	26
SM10-009	239	389	324	537	835	696	8.3	28	23
SM10-010	237	353	294	530	792	660	8	30	25
SM10-011	247	373	311	579	835	696	9.9	30	25
SM10-012	255	415	346	599	850	708	10	31	26
SM10-013	234	350	292	543	778	648	8.4	30	25
SM10-014A	243	366	305	562	806	672	9.8	29	24
SM10-015	238	353	294	543	763	636	8.9	28	23
SM11-007	141	207	173	306	475	396	3	26	22
SM11-009	149	226	188	304	461	384	1.3	20	16
SM11-010	153	233	194	314	478	398	1.9	21	18
SM11-011	143	236	197	344	504	420	3.3	21	17
SM11-012	142	219	182	327	518	432	3.4	27	22

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# Crow Butte Project

## Monitor Well Laboratory Report

Sample Date: 12/03/2019

Analysis Date: 12/03/2019

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	1906	2817	2347	181	281	234
CM07-012	292	422	352	1912	2794	2328	180	289	241
CM07-013	291	436	364	1927	2841	2368	179	287	239
CM07-014	293	422	352	1944	2772	2310	180	274	228
CM07-015	299	432	360	1943	2822	2352	182	284	236
CM07-016	301	441	367	1970	2831	2359	181	281	234
CM10-008	320	475	396	1864	2707	2256	168	265	221
CM10-009	315	468	390	1840	2693	2244	165	269	224
CM10-010	330	475	396	1893	2736	2280	171	275	229
CM10-011	325	481	401	1818	2808	2340	162	288	240
CM10-012	350	446	372	1886	2923	2436	170	327	272
CM10-013	345	481	401	1765	2779	2316	162	287	239
CM10-014	359	490	408	1827	2578	2148	166	251	209
CM10-015	327	504	420	1820	2491	2076	157	253	211
CM10-016	309	484	403	1850	2650	2208	156	253	211
CM10-017	321	475	396	1857	2664	2220	158	248	206
IJ013P	306	415	346	1261	2900	2417	94	278	232
PR008	334	484	403	1380	2866	2388	99	282	235
PR015	275	444	370	1077	2792	2327	76	268	223
SM03-001	202	374	312	650	1122	935	11	85	71
SM03-002	177	305	254	438	805	671	3.3	40	34
SM03-003	174	297	247	447	729	607	5	30	25
SM04-010A	289	354	295	696	1053	877	12	36	30
SM04-011A	286	554	462	688	1469	1224	11	139	115
SM06-028	293	351	293	684	778	648	11	24	20
SM07-015	139	200	167	320	495	413	3.5	24	20
SM07-016	137	199	166	323	451	376	3.1	24	20
SM07-017	177	209	174	403	539	449	4	30	25
SM07-018	138	217	181	329	513	427	2.7	23	19
SM07-019	140	212	176	343	599	499	3.9	38	31
SM07-020	144	228	190	333	583	486	2.1	28	23
SM07-021	143	216	180	333	534	445	2.7	27	23



WV

**Crow Butte Project**  
**Monitor Well Laboratory Report**

Sample Date: 12/10/2019

Analysis Date: 12/10/2019

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	1937	2866	2388	178	285	238
CM06-010	294	429	358	1945	2952	2460	180	327	272
CM08-001	291	455	379	1948	3110	2592	179	372	310
CM08-002	288	395	329	1933	3125	2604	179	334	278
CM08-003	301	432	360	1965	3211	2676	183	367	306
CM08-004	295	428	356	1934	3125	2604	180	328	274
CM08-005	286	425	354	1912	3067	2556	180	328	274
CM08-006	298	432	360	1926	3067	2556	179	317	264
CM08-007	321	425	354	1978	3154	2628	187	396	330
CM08-008	323	418	348	1970	3211	2676	188	415	346
CM08-009	313	452	377	1880	3053	2544	174	325	271
CM09-008	298	418	348	1816	2952	2460	178	366	305
CM09-009	303	475	396	1799	2923	2436	179	334	278
CM09-010	301	359	299	1786	2390	1992	177	292	244
CM09-011	301	445	371	1799	2707	2256	178	284	236
CM11-012	300	433	361	1804	2794	2328	172	268	223
CM11-013	301	418	348	1803	2722	2268	174	291	242
CM11-014	301	468	390	1792	3024	2520	176	357	298
CM11-015	295	431	359	1789	2765	2304	172	289	241
CM11-016	299	451	376	1787	2794	2328	175	276	230
CM11-017	302	438	365	1785	2837	2364	172	301	251
CM11-018	305	445	371	1799	2722	2268	175	297	247
CM11-019	301	448	373	1800	2779	2316	173	300	250
SM04-001	150	248	206	358	772	643	2.7	52	43
SM04-002	188	513	393	634	1256	1039	12	127	88
SM04-005A	193	367	306	528	1236	1030	11	106	88
SM06-028	291	351	293	688	778	648	11	24	20
SM08-001	233	374	312	511	763	636	7.1	25	21
SM08-002	238	353	294	523	778	648	5.9	24	20
SM08-003	228	331	276	526	720	600	9.9	24	20
SM08-004	221	323	269	526	819	683	11	25	21
SM08-005	250	346	288	574	749	624	9.3	23	19

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# Crow Butte Project

## Monitor Well Laboratory Report

Sample Date: 12/17/2019

Analysis Date: 12/17/2019

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	290	432	360	1892	2817	2347	183	281	234
CM07-012	290	422	352	1892	2794	2328	183	289	241
CM07-013	290	436	364	1916	2841	2368	182	287	239
CM07-014	292	422	352	1928	2772	2310	183	274	228
CM07-015	295	432	360	1937	2822	2352	184	284	236
CM07-016	298	441	367	1947	2831	2359	185	281	234
CM10-008	320	475	396	1864	2707	2256	172	265	221
CM10-009	316	468	390	1849	2693	2244	171	269	224
CM10-010	331	475	396	1885	2736	2280	173	275	229
CM10-011	325	481	401	1811	2808	2340	165	288	240
CM10-012	347	446	372	1867	2923	2436	171	327	272
CM10-013	346	481	401	1760	2779	2316	163	287	239
CM10-014	356	490	408	1818	2578	2148	169	251	209
CM10-015	328	504	420	1823	2491	2076	161	253	211
CM10-016	309	484	403	1860	2650	2208	159	253	211
CM10-017	323	475	396	1869	2664	2220	163	248	206
IJ013P	303	415	346	1244	2900	2417	95	278	232
PR008	330	484	403	1364	2866	2388	101	282	235
PR015	272	444	370	1066	2792	2327	76	268	223
SM03-001	204	374	312	657	1122	935	12	85	71
SM03-002	177	305	254	439	805	671	3.6	40	34
SM03-003	176	297	247	451	729	607	5.6	30	25
SM04-010A	292	354	295	702	1053	877	12	36	30
SM04-011A	288	554	462	693	1469	1224	11	139	115
SM06-028	295	351	293	685	778	648	11	24	20
SM07-015	141	200	167	324	495	413	3.4	24	20
SM07-016	140	199	166	326	451	376	3.3	24	20
SM07-017	174	209	174	394	539	449	3.5	30	25
SM07-018	140	217	181	331	513	427	2.7	23	19
SM07-019	144	212	176	348	599	499	3.5	38	31
SM07-020	147	228	190	336	583	486	2	28	23
SM07-021	144	216	180	336	534	445	2.8	27	23



# 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



6.0

**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