

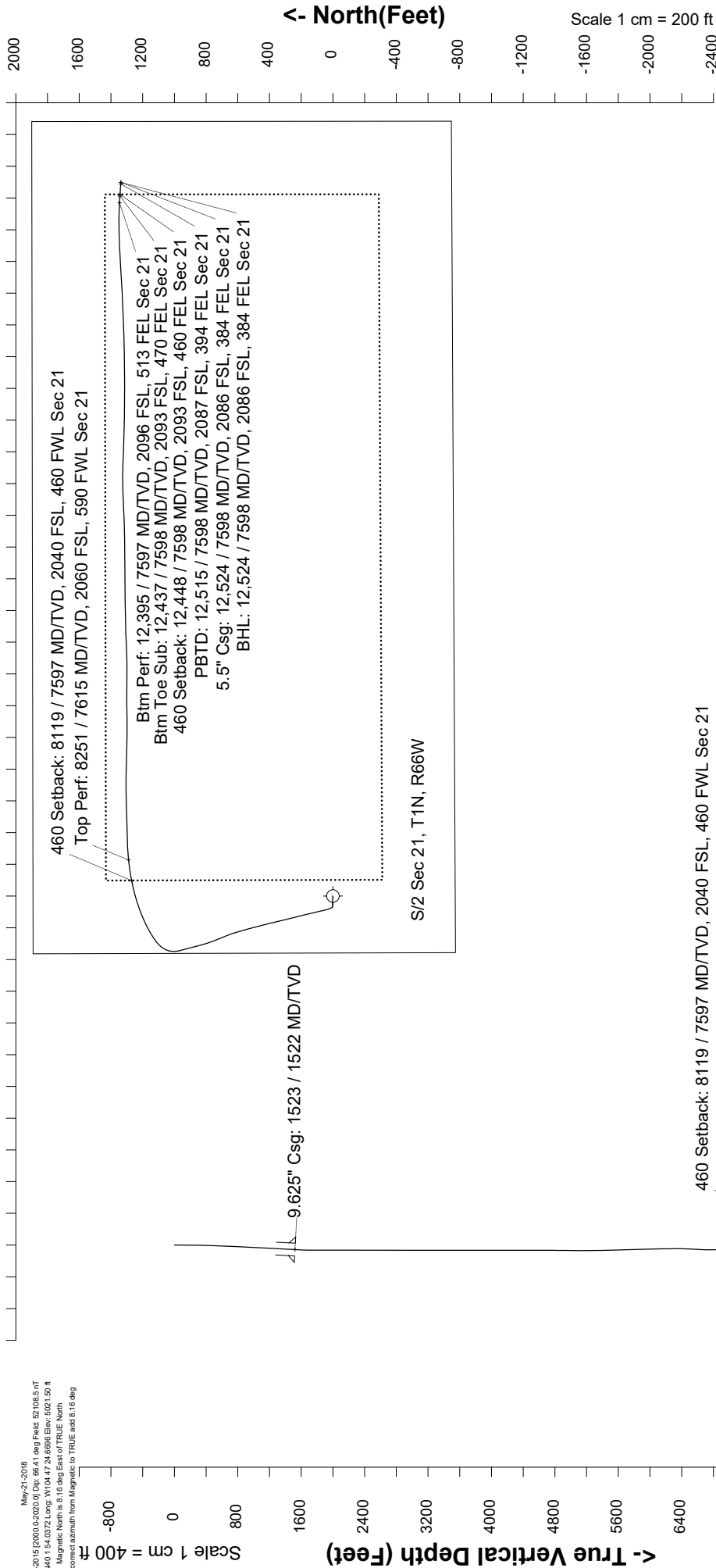
Great Western Operating Company, LLC

Location	Colorado	Slot	W04 - Sack KE 21-242HC
Field	Wattenburg	Well	Sack KE 21-242HC
Installation	Sack	Wellbore	Sack KE 21-242HC (AWB)

Created by	admin
Date plotted	24-Apr-2019
Plot reference is Sack KE 21-242HC (AWB).	
Ref wellpath is Sack KE 21-242HC (AWP#1).	
Coordinates are in Feet reference W04 - Sack KE 21-242HC.	
True Vertical Depths are reference Rig Datum.	
Measured Depths are reference Rig Datum.	
Rig Datum: Actual Datum #1	
Rig Datum to Mean Sea Level: 5041.50 ft.	
Plot North is aligned to TRUE North.	

Scale 1 cm = 200 ft

East (Feet) ->



460 Setback: 8119 / 7597 MD/TVD, 2040 FSL, 460 FWL Sec 21  
Top Perf: 8251 / 7615 MD/TVD, 2060 FSL, 590 FWL Sec 21

Btm Perf: 12,395 / 7597 MD/TVD, 2096 FSL, 513 FEL Sec 21  
Btm Toe Sub: 12,437 / 7598 MD/TVD, 2093 FSL, 470 FEL Sec 21  
460 Setback: 12,448 / 7598 MD/TVD, 2093 FSL, 460 FEL Sec 21  
PBD: 12,515 / 7598 MD/TVD, 2087 FSL, 394 FEL Sec 21  
5.5\"/>

Scale 1 cm = 400 ft

Vertical Section (Feet) ->

Azimuth 73.45 with reference 0.00 N, 0.00 E from W04 - Sack KE 21-242HC

Great Western Operating Co, LLC Directional Survey Report Wellpath: Sack KE 21-242HC MDs and TVDs are from Rig Floor 5041.5ft above Mean Sea Level
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Wellbore Information

Date Created	Date Revised	API #	RKB above GL	Well Name
Jul-25-2018	Apr-23-2019	05-123-46994	20.00	Sack KE 21-242HC

Slot Coordinates

Latitude	Longitude
40.03155400	-104.79018400

Pad Information

Pad Name	Ground Elev.
Sack	5021.50

Field

Name
Wattenburg

Wellpath Report

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Lat - NAD 83	Long - NAD 83
0.00	0.00	0.000	0.00	0.00	0.00		0.00	40.03155400	-104.79018400
20.00	0.00	269.650	20.00	0.00	0.00	==>	0.00	40.03155400	-104.79018400
154.00	0.62	269.650	154.00	0.00	-0.72	0.46	-0.70	40.03155399	-104.79018659
242.00	0.48	262.450	241.99	-0.06	-1.57	0.18	-1.52	40.03155385	-104.79018959
331.00	0.83	265.700	330.99	-0.15	-2.58	0.40	-2.52	40.03155358	-104.79019321
420.00	1.67	273.780	419.97	-0.12	-4.52	0.96	-4.36	40.03155368	-104.79020013
510.00	1.98	269.300	509.92	-0.05	-7.38	0.38	-7.09	40.03155387	-104.79021035
600.00	2.81	267.190	599.84	-0.18	-11.14	0.93	-10.73	40.03155352	-104.79022377
690.00	2.90	276.680	689.73	-0.02	-15.60	0.53	-14.96	40.03155395	-104.79023971
780.00	2.99	273.430	779.61	0.39	-20.21	0.21	-19.26	40.03155506	-104.79025616
870.00	3.16	280.110	869.48	0.96	-24.99	0.44	-23.68	40.03155664	-104.79027324
960.00	3.08	278.620	959.35	1.76	-29.82	0.13	-28.09	40.03155883	-104.79029050
1050.00	3.30	273.170	1049.21	2.27	-34.80	0.42	-32.71	40.03156022	-104.79030827
1140.00	3.12	273.430	1139.07	2.56	-39.83	0.20	-37.45	40.03156101	-104.79032624
1230.00	2.68	269.210	1228.95	2.67	-44.38	0.54	-41.78	40.03156134	-104.79034248
1320.00	2.86	270.530	1318.85	2.66	-48.73	0.21	-45.95	40.03156131	-104.79035801
1410.00	3.30	265.960	1408.72	2.50	-53.56	0.56	-50.63	40.03156087	-104.79037526
1474.00	3.25	267.190	1472.61	2.28	-57.21	0.13	-54.19	40.03156027	-104.79038829
1523.00	3.19	269.390	1521.53	2.20	-59.96	0.28	-56.85	40.03156004	-104.79039812
1570.00	3.14	271.580	1568.46	2.22	-62.55	0.28	-59.33	40.03156010	-104.79040738
1631.00	2.41	267.330	1629.39	2.21	-65.51	1.24	-62.16	40.03156007	-104.79041792
1720.00	0.36	237.750	1718.36	1.97	-67.61	2.36	-64.25	40.03155942	-104.79042544
1810.00	0.03	309.850	1808.36	1.84	-67.87	0.39	-64.53	40.03155904	-104.79042636
1899.00	0.09	272.840	1897.36	1.86	-67.96	0.08	-64.61	40.03155909	-104.79042667
1988.00	0.04	70.450	1986.36	1.87	-68.00	0.14	-64.65	40.03155913	-104.79042682
2078.00	0.00	98.290	2076.36	1.88	-67.97	0.04	-64.62	40.03155916	-104.79042671
2168.00	0.06	185.700	2166.36	1.83	-67.97	0.07	-64.63	40.03155903	-104.79042673
2257.00	0.14	233.630	2255.36	1.72	-68.06	0.12	-64.75	40.03155873	-104.79042706
2346.00	0.10	223.980	2344.36	1.60	-68.21	0.05	-64.92	40.03155840	-104.79042756
2436.00	0.22	199.390	2434.36	1.38	-68.32	0.15	-65.09	40.03155780	-104.79042796
2525.00	0.11	297.060	2523.36	1.26	-68.45	0.29	-65.25	40.03155746	-104.79042844
2614.00	0.04	309.980	2612.36	1.32	-68.55	0.08	-65.33	40.03155762	-104.79042879
2703.00	0.09	329.410	2701.36	1.40	-68.61	0.06	-65.37	40.03155784	-104.79042901
2792.00	0.11	336.330	2790.36	1.54	-68.68	0.03	-65.40	40.03155822	-104.79042926
2882.00	0.07	340.930	2880.36	1.67	-68.73	0.05	-65.41	40.03155858	-104.79042944
2971.00	0.03	320.300	2969.36	1.74	-68.77	0.05	-65.42	40.03155877	-104.79042956
3060.00	0.03	147.110	3058.36	1.74	-68.77	0.07	-65.42	40.03155877	-104.79042957
3150.00	0.00	98.290	3148.36	1.72	-68.75	0.03	-65.42	40.03155871	-104.79042952
3239.00	0.03	292.350	3237.36	1.73	-68.78	0.03	-65.43	40.03155874	-104.79042960
3329.00	0.06	183.830	3327.36	1.69	-68.80	0.08	-65.47	40.03155863	-104.79042969
3418.00	0.03	286.020	3416.36	1.65	-68.83	0.08	-65.50	40.03155852	-104.79042978
3507.00	0.07	301.800	3505.36	1.68	-68.90	0.05	-65.56	40.03155862	-104.79043002
3597.00	0.06	310.210	3595.36	1.74	-68.98	==>	-65.62	40.03155878	-104.79043032
3686.00	0.00	98.290	3684.36	1.77	-69.01	0.07	-65.65	40.03155886	-104.79043045
3775.00	0.04	248.900	3773.36	1.76	-69.04	0.04	-65.68	40.03155883	-104.79043055
3865.00	0.19	262.370	3863.36	1.73	-69.22	0.17	-65.86	40.03155875	-104.79043118
3954.00	0.07	332.870	3952.36	1.76	-69.39	0.20	-66.01	40.03155883	-104.79043179
4044.00	0.07	261.110	4042.36	1.80	-69.47	0.09	-66.08	40.03155894	-104.79043208
4133.00	0.07	290.570	4131.36	1.81	-69.57	0.04	-66.18	40.03155897	-104.79043245
4222.00	0.07	213.190	4220.36	1.78	-69.66	0.10	-66.26	40.03155889	-104.79043274
4312.00	0.10	173.450	4310.36	1.66	-69.68	0.07	-66.32	40.03155855	-104.79043282
4401.00	0.00	98.290	4399.36	1.58	-69.67	0.11	-66.33	40.03155834	-104.79043278
4490.00	0.03	146.160	4488.36	1.56	-69.65	0.03	-66.32	40.03155829	-104.79043274
4580.00	0.04	14.480	4578.36	1.57	-69.63	0.07	-66.30	40.03155832	-104.79043266
4669.00	0.09	304.270	4667.36	1.64	-69.68	0.10	-66.33	40.03155851	-104.79043284
4758.00	0.06	305.150	4756.36	1.71	-69.78	0.03	-66.40	40.03155869	-104.79043318
4847.00	2.29	327.660	4845.33	3.24	-70.77	2.51	-66.91	40.03156289	-104.79043672
4936.00	5.98	330.920	4934.09	8.79	-73.97	4.15	-68.40	40.03157814	-104.79044816
5026.00	9.69	337.260	5023.23	19.88	-79.18	4.23	-70.24	40.03160857	-104.79046676
5115.00	12.34	342.220	5110.59	35.85	-84.98	3.16	-71.25	40.03165241	-104.79048748
5205.00	13.43	345.090	5198.32	55.11	-90.61	1.40	-71.15	40.03170527	-104.79050757
5294.00	14.94	348.540	5284.61	76.34	-95.55	1.94	-69.84	40.03176356	-104.79052521
5384.00	17.72	348.450	5370.97	101.13	-100.60	3.09	-67.61	40.03183162	-104.79054323
5473.00	20.49	348.210	5455.06	129.66	-106.49	3.11	-65.14	40.03190992	-104.79056429
5562.00	24.97	346.960	5537.12	163.22	-113.92	5.06	-62.69	40.03200206	-104.79059080
5652.00	25.13	344.000	5618.66	200.10	-123.47	1.40	-61.34	40.03210329	-104.79062492
5741.00	27.58	345.890	5698.41	238.26	-133.71	2.91	-60.28	40.03220803	-104.79066147
5830.00	29.86	345.890	5776.45	279.73	-144.13	2.56	-58.46	40.03232188	-104.79069870
5920.00	29.80	347.130	5854.53	323.26	-154.57	0.69	-56.07	40.03244137	-104.79073599
6010.00	29.76	347.400	5932.64	366.86	-164.43	0.16	-53.09	40.03256106	-104.79077118
6099.00	29.51	345.910	6010.00	409.68	-174.58	0.87	-50.62	40.03267860	-104.79080744
6188.00	29.50	344.680	6087.46	452.07	-185.71	0.68	-49.21	40.03279497	-104.79084718
6277.00	29.81	345.520	6164.80	494.63	-197.03	0.58	-47.94	40.03291179	-104.79088761
6366.00	29.88	344.970	6242.00	537.46	-208.31	0.32	-46.55	40.03302936	-104.79092789
6456.00	30.03	344.150	6319.98	580.77	-220.27	0.48	-45.68	40.03314826	-104.79097062
6545.00	30.25	341.920	6396.95	623.51	-233.32	1.28	-46.00	40.03326558	-104.79101719
6634.00	30.34	338.520	6473.80	665.74	-248.50	1.93	-48.53	40.03338150	-104.79107143
6724.00	30.31	338.230	6551.49	707.98	-265.25	0.17	-52.54	40.03349746	-104.79113124
6814.00	30.16	338.540	6629.24	750.12	-281.95	0.24	-56.54	40.03361312	-104.79119085
6903.00	29.35	341.550	6706.51	791.62	-297.03	1.91	-59.18	40.03372704	-104.79124472
6992.00	29.86	345.220	6783.90	833.73	-309.58	2.12	-59.21	40.03384265	-104.79128956
7082.00	30.06	345.700	6861.87	877.24	-320.87	0.35	-57.63	40.03396208	-104.79132986
7171.00	30.18	345.150	6938.86	920.46	-332.11	0.34	-56.09	40.03408073	-104.79136999
7260.00	30.17	345.700	7015.80	963.76	-343.36	0.31	-54.55	40.03419958	-104.79141020

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Lat - NAD 83	Long - NAD 83
7350.00	29.08	0.700	7094.14	1007.60	-348.69	8.31	-47.16	40.03431994	-104.79142922
7439.00	30.22	21.840	7171.70	1050.14	-340.07	11.77	-26.78	40.03443671	-104.79139844
7529.00	32.44	42.320	7248.79	1089.13	-315.32	12.03	8.06	40.03454373	-104.79131005
7618.00	37.49	54.800	7321.80	1122.45	-277.04	9.81	54.24	40.03463522	-104.79117336
7707.00	43.14	59.920	7389.65	1153.35	-228.53	7.35	109.55	40.03472003	-104.79100011
7797.00	49.16	65.010	7451.99	1183.19	-170.97	7.83	173.22	40.03480195	-104.79079457
7886.00	56.98	68.880	7505.44	1210.91	-105.53	9.45	243.84	40.03487804	-104.79056088
7975.00	64.49	72.080	7548.92	1236.75	-32.40	9.00	321.31	40.03494898	-104.79029969
8065.00	71.56	77.150	7582.60	1258.78	48.01	9.43	404.67	40.03500946	-104.79001253
8118.07	76.30	78.870	7597.29	1269.36	97.88	9.45	455.48	40.03503850	-104.78983444
8154.00	79.51	80.000	7604.82	1275.80	132.42	9.45	490.42	40.03505617	-104.78971112
8244.00	87.32	83.860	7615.13	1288.32	220.85	9.67	578.76	40.03509052	-104.78939529
8251.00	87.54	84.160	7615.45	1289.05	227.81	5.33	585.63	40.03509253	-104.78937045
8333.00	90.15	87.670	7617.10	1294.88	309.56	5.33	665.66	40.03510855	-104.78907849
8423.00	90.18	89.190	7616.84	1297.35	399.53	1.69	752.60	40.03511531	-104.78875722
8512.00	90.00	87.630	7616.70	1299.82	488.49	1.76	838.58	40.03512209	-104.78843951
8601.00	90.12	88.390	7616.61	1302.91	577.44	0.86	924.72	40.03513057	-104.78812187
8691.00	90.12	89.170	7616.42	1304.83	667.42	0.87	1011.51	40.03513582	-104.78780054
8780.00	90.12	90.830	7616.23	1304.83	756.41	1.87	1096.82	40.03513581	-104.78748272
8869.00	89.85	91.920	7616.26	1302.69	845.38	1.26	1181.50	40.03512994	-104.78716498
8959.00	89.94	91.160	7616.42	1300.27	935.35	0.85	1267.05	40.03512330	-104.78684370
9048.00	89.94	90.840	7616.51	1298.72	1024.34	0.36	1351.90	40.03511902	-104.78652591
9138.00	90.03	89.150	7616.54	1298.73	1114.33	1.88	1438.17	40.03511903	-104.78620452
9227.00	90.65	89.250	7616.01	1299.97	1203.32	0.71	1523.83	40.03512243	-104.78588672
9316.00	90.86	90.410	7614.84	1300.23	1292.31	1.32	1609.20	40.03512315	-104.78556892
9406.00	90.83	90.700	7613.51	1299.36	1382.30	0.32	1695.21	40.03512074	-104.78524757
9495.00	90.98	89.310	7612.10	1299.35	1471.29	1.57	1780.51	40.03512070	-104.78492978
9584.00	89.91	87.770	7611.41	1301.62	1560.25	2.11	1866.43	40.03512691	-104.78461207
9673.00	89.88	87.160	7611.57	1305.56	1649.16	0.69	1952.78	40.03513770	-104.78429455
9763.00	89.85	88.260	7611.79	1309.15	1739.09	1.22	2040.00	40.03514756	-104.78397340
9852.00	89.75	90.120	7612.10	1310.41	1828.08	2.09	2125.66	40.03515099	-104.78365562
9941.00	89.94	89.750	7612.34	1310.51	1917.08	0.47	2211.00	40.03515125	-104.78333778
10031.00	90.86	89.430	7611.71	1311.16	2007.07	1.08	2297.45	40.03515300	-104.78301640
10120.00	91.02	89.200	7610.25	1312.22	2096.05	0.31	2383.05	40.03515590	-104.78269863
10209.00	90.92	89.010	7608.74	1313.61	2185.03	0.24	2468.73	40.03515970	-104.78238088
10299.00	90.92	89.090	7607.30	1315.10	2275.00	0.09	2555.40	40.03516377	-104.78205956
10388.00	90.99	88.710	7605.81	1316.81	2363.98	0.43	2641.17	40.03516844	-104.78174183
10478.00	90.58	86.710	7604.58	1320.41	2453.89	2.27	2728.39	40.03517828	-104.78142072
10567.00	90.00	88.300	7604.13	1324.28	2542.80	1.90	2814.72	40.03518889	-104.78110320
10656.00	90.00	89.940	7604.13	1325.65	2631.79	1.84	2900.40	40.03519262	-104.78078542
10746.00	89.82	92.000	7604.27	1324.12	2721.77	2.30	2986.22	40.03518841	-104.78046407
10835.00	89.91	92.650	7604.48	1320.51	2810.70	0.74	3070.43	40.03517847	-104.78014651
10924.00	89.97	91.490	7604.58	1317.30	2899.64	1.31	3154.77	40.03516962	-104.77982888
11013.00	89.42	90.400	7605.05	1315.83	2988.62	1.37	3239.65	40.03516556	-104.77951110
11103.00	89.42	90.270	7605.96	1315.31	3078.62	0.14	3325.76	40.03516409	-104.77918972
11192.00	90.83	90.770	7605.77	1314.50	3167.61	1.68	3410.84	40.03516184	-104.77887191
11282.00	91.08	89.960	7604.27	1313.92	3257.59	0.94	3496.93	40.03516023	-104.77855056
11371.00	90.92	89.300	7602.71	1314.50	3346.58	0.76	3582.39	40.03516178	-104.77823278
11460.00	90.74	89.090	7601.42	1315.75	3435.56	0.31	3668.04	40.03516518	-104.77791501
11550.00	90.98	88.110	7600.07	1317.95	3525.52	1.12	3754.90	40.03517118	-104.77759374
11639.00	90.46	87.500	7598.95	1321.36	3614.45	0.90	3841.11	40.03518050	-104.77727616
11729.00	90.40	88.150	7598.28	1324.77	3704.38	0.73	3928.29	40.03518984	-104.77695500
11818.00	90.37	87.270	7597.68	1328.33	3793.31	0.99	4014.54	40.03519956	-104.77663742
11908.00	90.28	86.150	7597.17	1333.49	3883.16	1.25	4102.14	40.03521370	-104.77631656
11997.00	90.09	86.400	7596.88	1339.28	3971.97	0.35	4188.92	40.03522954	-104.77599939
12086.00	90.12	87.230	7596.72	1344.22	4060.83	0.93	4275.51	40.03524307	-104.77568205
12176.00	90.03	87.970	7596.60	1347.99	4150.75	0.83	4362.77	40.03525338	-104.77536092
12265.00	90.03	89.780	7596.56	1349.74	4239.73	2.03	4448.56	40.03525813	-104.77504316
12355.00	89.51	92.470	7596.92	1347.97	4329.70	3.04	4534.30	40.03525324	-104.77472185
12395.00	89.56	93.080	7597.24	1346.03	4369.65	1.53	4572.05	40.03524790	-104.77457918
12437.43	89.62	93.730	7597.54	1343.51	4412.01	1.53	4611.93	40.03524096	-104.77442793
12444.00	89.63	93.830	7597.58	1343.08	4418.56	1.53	4618.09	40.03523977	-104.77440452
12447.94	89.63	93.890	7597.61	1342.81	4422.49	1.53	4621.78	40.03523904	-104.77439048
12489.00	89.60	94.520	7597.89	1339.80	4463.44	1.53	4660.17	40.03523076	-104.77424425
12514.55	89.60	94.520	7598.07	1337.79	4488.91	==>	4684.01	40.03522522	-104.77415329
12524.00	89.60	94.520	7598.13	1337.04	4498.33	==>	4692.83	40.03522317	-104.77411965

Comments						
MD[ft]	TVD[ft]	North[ft]	East[ft]	Lat - NAD 83	Long - NAD 83	Comment
1523.00	1521.53	2.20	-59.96	40.03156004	-104.79039812	9.625" Csg: 1523 / 1522 MD/TVD
8118.07	7597.29	1269.36	97.88	40.03503850	-104.78983444	460 Setback: 8119 / 7597 MD/TVD, 2040 FSL, 460 FWL Sec 21
8251.00	7615.45	1289.05	227.81	40.03509253	-104.78937045	Top Perf: 8251 / 7615 MD/TVD, 2060 FSL, 590 FWL Sec 21
12395.00	7597.24	1346.03	4369.65	40.03524790	-104.77457918	Btm Perf: 12,395 / 7597 MD/TVD, 2096 FSL, 513 FEL Sec 21
12437.43	7597.54	1343.51	4412.01	40.03524096	-104.77442793	Btm Toe Sub: 12,437 / 7598 MD/TVD, 2093 FSL, 470 FEL Sec 21
12447.94	7597.61	1342.81	4422.49	40.03523904	-104.77439048	460 Setback: 12,448 / 7598 MD/TVD, 2093 FSL, 460 FEL Sec 21
12514.55	7598.07	1337.79	4488.91	40.03522522	-104.77415329	PBTD: 12,515 / 7598 MD/TVD, 2087 FSL, 394 FEL Sec 21
12524.00	7598.13	1337.04	4498.33	40.03522317	-104.77411965	5.5" Csg: 12,524 / 7598 MD/TVD, 2086 FSL, 384 FEL Sec 21
12524.00	7598.13	1337.04	4498.33	40.03522317	-104.77411965	BHL: 12,524 / 7598 MD/TVD, 2086 FSL, 384 FEL Sec 21

Hole Sections								
Diameter [in]	Start MD[ft]	Start TVD[ft]	Start North[ft]	Start East[ft]	End MD[ft]	End TVD[ft]	End North[ft]	End East[ft]
13.500	0.00	0.00	0.00	0.00	1523.00	1521.53	2.20	-59.96
8.500	1523.00	1521.53	2.20	-59.96	12524.00	7598.13	1337.04	4498.33

Casings								
Name	Top MD[ft]	Top TVD[ft]	Top North[ft]	Top East[ft]	Shoe MD[ft]	Shoe TVD[ft]	Shoe North[ft]	Shoe East[ft]
9 5/8in Casing	0.00	0.00	0.00	0.00	1523.00	1521.53	2.20	-59.96
5 1/2in Casing	0.00	0.00	0.00	0.00	12524.00	7598.13	1337.04	4498.33

Survey Tool Program				
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool
406023	As Drilled - 20180725	12524.00	7598.13	MWD

Coordinates are from Slot MD's and TVD's are from Rig Floor 5041.5ft above Mean Sea Level Vertical Section is from 0.00 0.00 on azimuth 73.450 degrees Bottom hole distance is 4692.83 Feet on azimuth 73.45 degrees from Wellhead Calculation method uses Minimum Curvature method Prepared by Great Western Operating Co. Date Printed:
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