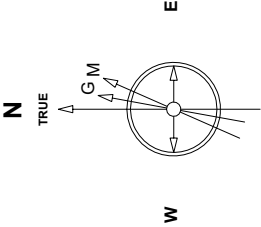


Great Western Operating Company, LLC

Location	Colorado	Slot	C13 - Schaefer LD 13-032HC
Field	Wattenburg	Well	Schaefer LD 13-032HC
Installation	Schaefer	Wellbore	Schaefer LD 13-032HC (AWB)

Created by	admin
Date plotted	16-Apr-2019
Plot reference is Schaefer LD 13-032HC (AWB).	
Ref wellpath is Schaefer LD 13-032HC (AWP#1).	
Coordinates are in Feet reference C13 - Schaefer LD 13-032HC.	
True Vertical Depths are reference Rig Datum.	
Measured Depths are reference Rig Datum.	
Rig Datum: Actual Datum #1	
Rig Datum to Mean Sea Level: 5041.40 ft.	
Plot North is aligned to TRUE North.	



Aug-2-2018  
EMLA-2015 (2000.0-2020.0) Dip: 88.28 deg Field: 51980.7 nT  
Lat: N39 56.40, 1480 Long: W104 50 5.204 Elev: 9021.40 ft  
Magnetic North is 8.18 deg East of TRUE North  
To correct azimuth from Magnetic to TRUE add 8.18 deg

East (Feet) ->

Scale 1 cm = 500 ft



BHL: 18,218 / 7751 MD/TVD, 237 FNL, 2241 FEL Sec 13  
5.5" Csg: 18,218 / 7751 MD/TVD, 237 FNL, 2241 FEL Sec 13  
PBTD: 18,208 / 7751 MD/TVD, 247 FNL, 2241 FEL Sec 13  
460 Setback: 17,995 / 7754 MD/TVD, 460 FNL, 2242 FEL Sec 13  
Btm Toe Sub: 17,985 / 7754 MD/TVD, 470 FNL, 2242 FEL Sec 13  
Btm Perf: 17,930 / 7755 MD/TVD, 525 FNL, 2242 FEL Sec 13

9.625" Csg: 1784 MD/TVD

460 Setback: 8335 / 7783 MD/TVD, 460 FSL, 2234 FEL Sec 24  
Top Perf: 8378 / 7782 MD/TVD, 503 FSL, 2236 FEL Sec 24  
BLM Entry Pt: 9633 / 7771 MD/TVD, 1756 FSL, 2284 FEL Sec 24  
BLM Exit Pt: 10,677 / 7762 MD/TVD, 2481 FNL, 2265 FEL Sec 24

Btm Perf: 17,930 / 7755 MD/TVD, 525 FNL, 2242 FEL Sec 13  
Btm Toe Sub: 17,985 / 7754 MD/TVD, 470 FNL, 2242 FEL Sec 13  
460 Setback: 17,995 / 7754 MD/TVD, 460 FNL, 2242 FEL Sec 13  
PBTD: 18,208 / 7751 MD/TVD, 247 FNL, 2241 FEL Sec 13  
5.5" Csg: 18,218 / 7751 MD/TVD, 237 FNL, 2241 FEL Sec 13  
BHL: 18,218 / 7751 MD/TVD, 237 FNL, 2241 FEL Sec 13

Top Perf: 8378 / 7782 MD/TVD, 503 FSL, 2236 FEL Sec 24  
460 Setback: 8335 / 7783 MD/TVD, 460 FSL, 2234 FEL Sec 24

BLM Exit Pt: 10,677 / 7762 MD/TVD, 2481 FNL, 2265 FEL Sec 24  
BLM Entry Pt: 9633 / 7771 MD/TVD, 1756 FSL, 2284 FEL Sec 24

Scale 1 cm = 800 ft

Vertical Section (Feet) ->

Azimuth 358.45 with reference 0.00 N, 0.00 E from C13 - Schaefer LD 13-032HC



<- True Vertical Depth (Feet)

<- North(Feet)

Scale 1 cm = 500 ft

Sec 25, T1S, R67W

Sec 13, T1S, R67W

Sec 24, T1S, R67W

BLM Exit Pt: 10,677 / 7762 MD/TVD, 2481 FNL, 2265 FEL Sec 24

BLM Lease

2265 FEL Sec 24

2284 FEL Sec 24

2236 FEL Sec 24

2234 FEL Sec 24

Great Western Operating Co, LLC  
Directional Survey Report  
Wellpath: Schaefer LD 13-032HC  
MDs and TVDs are from Rig Floor 5041.4ft above Mean Sea Level

**Wellbore Information**

Date Created	Date Revised	API #	RKB above GL	Well Name
Jan-31-2019	Apr-16-2019	05-001-10254	20.00	Schaefer LD 13-032HC

**Slot Coordinates**

Latitude	Longitude
39.94427900	-104.83478800

**Pad Information**

Pad Name	Ground Elev.
Schaefer	5021.40

**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	39.94427900	-104.83478800
20.00	0.00	231.390	20.00	0.00	0.00	==>	0.00	39.94427900	-104.83478800
160.00	0.40	231.390	160.00	-0.30	-0.38	0.29	-0.29	39.94427816	-104.83478936
245.00	0.18	55.700	245.00	-0.41	-0.50	0.68	-0.40	39.94427786	-104.83478980
305.00	0.26	83.210	305.00	-0.35	-0.29	0.22	-0.34	39.94427805	-104.83478904
395.00	0.18	326.400	395.00	-0.20	-0.17	0.42	-0.20	39.94427844	-104.83478859
485.00	0.48	343.980	485.00	0.28	-0.35	0.35	0.29	39.94427976	-104.83478924
575.00	0.57	35.390	574.99	1.00	-0.19	0.51	1.01	39.94428176	-104.83478869
665.00	0.57	45.940	664.99	1.68	0.39	0.12	1.67	39.94428361	-104.83478662
755.00	0.83	145.960	754.98	1.45	1.07	1.21	1.42	39.94428298	-104.83478417
845.00	0.70	179.730	844.98	0.36	1.44	0.51	0.32	39.94427999	-104.83478286
935.00	0.31	192.280	934.97	-0.43	1.39	0.45	-0.46	39.94427783	-104.83478303
1025.00	0.70	281.580	1024.97	-0.55	0.80	0.85	-0.58	39.94427748	-104.83478514
1115.00	0.48	319.540	1114.97	-0.16	0.02	0.49	-0.16	39.94427857	-104.83478793
1205.00	0.57	35.310	1204.96	0.50	0.03	0.72	0.49	39.94428036	-104.83478788
1295.00	0.70	47.870	1294.96	1.23	0.70	0.21	1.21	39.94428237	-104.83478550
1385.00	0.35	220.230	1384.96	1.39	0.93	1.16	1.36	39.94428281	-104.83478468
1475.00	0.44	241.760	1474.95	1.01	0.45	0.19	1.00	39.94428179	-104.83478640
1565.00	0.18	255.740	1564.95	0.82	0.01	0.30	0.82	39.94428124	-104.83478798
1655.00	0.44	158.180	1654.95	0.46	0.00	0.55	0.46	39.94428027	-104.83478801
1733.00	0.53	147.450	1732.95	-0.12	0.30	0.16	-0.13	39.94427867	-104.83478692
1784.00	0.28	136.870	1783.95	-0.41	0.51	0.52	-0.42	39.94427788	-104.83478616
1796.00	0.22	130.890	1795.95	-0.45	0.55	0.52	-0.46	39.94427778	-104.83478603
1885.00	0.09	124.720	1884.95	-0.60	0.74	0.15	-0.62	39.94427736	-104.83478537
1975.00	0.06	271.850	1974.95	-0.64	0.75	0.16	-0.66	39.94427725	-104.83478533
2064.00	0.10	117.200	2063.95	-0.67	0.77	0.18	-0.69	39.94427716	-104.83478525
2154.00	0.28	263.250	2153.95	-0.73	0.62	0.41	-0.75	39.94427699	-104.83478578
2243.00	0.51	154.230	2242.94	-1.11	0.58	0.74	-1.13	39.94427594	-104.83478593
2333.00	0.34	30.420	2332.94	-1.24	0.89	0.84	-1.27	39.94427558	-104.83478483
2422.00	0.04	168.860	2421.94	-1.05	1.03	0.42	-1.07	39.94427612	-104.83478433
2512.00	0.07	204.230	2511.94	-1.13	1.01	0.05	-1.16	39.94427590	-104.83478439
2602.00	0.07	16.670	2601.94	-1.13	1.01	0.16	-1.15	39.94427591	-104.83478441
2691.00	0.19	178.820	2690.94	-1.22	1.02	0.29	-1.25	39.94427565	-104.83478435
2781.00	0.07	267.520	2780.94	-1.37	0.97	0.22	-1.40	39.94427523	-104.83478453
2870.00	0.25	278.130	2869.94	-1.35	0.73	0.20	-1.37	39.94427530	-104.83478541
2960.00	0.11	330.120	2959.94	-1.25	0.49	0.22	-1.26	39.94427558	-104.83478626
3049.00	0.19	186.080	3048.94	-1.32	0.43	0.32	-1.33	39.94427538	-104.83478647
3139.00	0.07	137.850	3138.94	-1.51	0.45	0.17	-1.52	39.94427486	-104.83478639
3228.00	0.07	17.780	3227.94	-1.50	0.50	0.14	-1.51	39.94427489	-104.83478620
3318.00	0.03	43.000	3317.94	-1.43	0.54	0.05	-1.44	39.94427509	-104.83478608
3407.00	0.10	297.740	3406.94	-1.37	0.48	0.13	-1.39	39.94427523	-104.83478627
3497.00	0.25	272.040	3496.94	-1.33	0.22	0.18	-1.33	39.94427535	-104.83478722
3586.00	0.15	207.150	3585.94	-1.43	-0.03	0.26	-1.42	39.94427509	-104.83478810
3675.00	0.07	254.720	3674.94	-1.54	-0.13	0.13	-1.54	39.94427476	-104.83478848
3765.00	0.07	212.720	3764.94	-1.60	-0.22	0.06	-1.60	39.94427459	-104.83478877
3854.00	0.03	91.020	3853.94	-1.65	-0.22	0.10	-1.64	39.94427447	-104.83478880
3944.00	0.31	169.240	3943.94	-1.89	-0.15	0.34	-1.89	39.94427381	-104.83478855
4033.00	0.10	255.310	4032.94	-2.15	-0.18	0.36	-2.14	39.94427311	-104.83478866
4123.00	0.17	249.390	4122.94	-2.21	-0.39	0.08	-2.20	39.94427292	-104.83478937
4212.00	0.47	324.560	4211.94	-1.96	-0.72	0.51	-1.94	39.94427361	-104.83479057
4301.00	0.41	220.180	4300.94	-1.91	-1.14	0.78	-1.88	39.94427376	-104.83479206
4391.00	0.11	210.210	4390.94	-2.23	-1.39	0.34	-2.19	39.94427288	-104.83479295
4480.00	0.10	260.090	4479.94	-2.32	-1.51	0.10	-2.27	39.94427264	-104.83479338
4570.00	0.07	300.200	4569.94	-2.30	-1.63	0.07	-2.26	39.94427268	-104.83479382
4659.00	0.07	244.690	4658.93	-2.30	-1.73	0.07	-2.25	39.94427269	-104.83479417
4749.00	0.06	40.080	4748.93	-2.29	-1.75	0.14	-2.24	39.94427273	-104.83479424
4838.00	0.03	89.120	4837.93	-2.25	-1.70	0.05	-2.20	39.94427282	-104.83479405
4927.00	0.07	120.410	4926.93	-2.28	-1.63	0.05	-2.23	39.94427275	-104.83479380
5017.00	0.09	352.180	5016.93	-2.23	-1.59	0.16	-2.19	39.94427287	-104.83479366
5106.00	0.07	322.460	5105.93	-2.12	-1.63	0.05	-2.08	39.94427317	-104.83479381
5196.00	0.23	172.020	5195.93	-2.26	-1.64	0.33	-2.21	39.94427280	-104.83479384
5285.00	0.72	200.230	5284.93	-2.96	-1.81	0.59	-2.91	39.94427088	-104.83479444
5375.00	3.66	212.610	5374.86	-5.91	-3.55	3.29	-5.81	39.94426278	-104.83480066
5464.00	6.22	209.920	5463.52	-12.48	-7.49	2.89	-12.28	39.94424473	-104.83481470
5554.00	7.79	204.530	5552.84	-22.26	-12.45	1.89	-21.91	39.94421790	-104.83483241
5643.00	10.04	193.450	5640.77	-35.29	-16.76	3.17	-34.83	39.94418212	-104.83484778
5733.00	14.48	187.800	5728.70	-54.08	-20.12	5.10	-53.52	39.94413054	-104.83485974
5822.00	16.55	194.340	5814.46	-77.39	-24.77	3.04	-76.69	39.94406655	-104.83487633
5911.00	19.30	197.280	5899.13	-103.72	-32.28	3.25	-102.81	39.94399427	-104.83490311
6001.00	22.43	191.520	5983.23	-134.76	-40.13	4.15	-133.63	39.94390907	-104.83493110
6090.00	25.05	189.320	6064.69	-169.99	-46.57	3.11	-168.68	39.94381234	-104.83495408

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Lat - NAD 83	Long - NAD 83
6180.00	28.59	195.020	6145.01	-209.61	-55.24	4.86	-208.05	39.94370358	-104.83498501
6270.00	28.36	199.710	6224.13	-250.54	-68.03	2.50	-248.62	39.94359123	-104.83503063
6359.00	28.98	200.510	6302.22	-290.64	-82.71	0.82	-288.30	39.94348117	-104.83508299
6449.00	28.84	201.300	6381.01	-331.28	-98.24	0.45	-328.51	39.94336960	-104.83513836
6538.00	29.29	196.660	6458.81	-372.14	-112.28	2.58	-368.98	39.94325743	-104.83518843
6628.00	29.04	194.370	6537.40	-414.39	-124.01	1.27	-410.90	39.94314144	-104.83523028
6717.00	29.17	193.070	6615.16	-456.45	-134.28	0.73	-452.66	39.94302600	-104.83526689
6807.00	29.07	189.900	6693.79	-499.35	-143.00	1.72	-495.31	39.94290821	-104.83529798
6896.00	25.84	190.130	6772.76	-539.76	-150.13	3.63	-535.51	39.94279730	-104.83532341
6986.00	17.51	198.040	6856.34	-572.00	-157.79	9.79	-567.54	39.94270878	-104.83535072
7076.00	13.80	232.840	6943.17	-591.41	-170.57	11.02	-586.59	39.94265551	-104.83539630
7165.00	10.02	264.310	7030.33	-598.60	-186.75	8.29	-593.34	39.94263578	-104.83545402
7254.00	9.48	298.720	7118.11	-595.84	-200.90	6.48	-590.21	39.94264334	-104.83550447
7343.00	12.36	315.960	7205.52	-585.47	-213.95	4.86	-579.48	39.94267182	-104.83555103
7433.00	18.26	326.320	7292.30	-566.79	-228.48	7.20	-560.42	39.94272309	-104.83560285
7522.00	25.27	341.430	7374.97	-537.12	-242.29	10.02	-530.39	39.94280454	-104.83565210
7612.00	32.21	351.300	7453.88	-495.13	-252.05	9.32	-488.15	39.94291982	-104.83568692
7701.00	39.47	352.250	7525.98	-443.58	-259.47	8.18	-436.42	39.94306132	-104.83571336
7791.00	46.49	354.560	7591.78	-382.67	-266.43	7.99	-375.34	39.94322853	-104.83573819
7880.00	53.86	356.950	7648.75	-314.55	-271.41	8.53	-307.12	39.94341551	-104.83575595
7969.00	62.53	358.610	7695.61	-239.05	-274.28	9.87	-231.56	39.94362279	-104.83576620
8059.00	68.57	358.500	7732.85	-157.18	-276.35	6.71	-149.67	39.94384751	-104.83577358
8148.00	74.81	357.810	7760.79	-72.77	-279.08	7.05	-65.22	39.94407922	-104.83578331
8237.00	83.06	358.050	7777.86	14.44	-282.23	9.27	22.05	39.94431863	-104.83579455
8327.00	90.71	358.880	7782.75	104.21	-284.63	8.55	111.85	39.94456505	-104.83580312
8334.99	90.70	358.710	7782.65	112.19	-284.80	2.10	119.84	39.94458698	-104.83580372
8378.00	90.66	357.810	7782.14	155.18	-286.10	2.10	162.84	39.94470498	-104.83580838
8416.00	90.62	357.010	7781.71	193.14	-287.82	2.10	200.83	39.94480919	-104.83581451
8506.00	90.74	355.970	7780.65	282.96	-293.33	1.16	290.77	39.94505576	-104.83583416
8595.00	90.09	355.180	7780.00	371.69	-300.20	1.15	379.66	39.94529934	-104.83585865
8684.00	90.15	355.550	7779.81	460.40	-307.39	0.42	468.53	39.94554285	-104.83588431
8774.00	90.55	356.940	7779.26	550.21	-313.28	1.61	558.46	39.94578937	-104.83590533
8863.00	90.46	356.650	7778.48	639.06	-318.26	0.34	647.42	39.94603330	-104.83592308
8952.00	90.62	357.460	7777.64	727.94	-322.83	0.93	736.38	39.94627727	-104.83593939
9042.00	90.55	358.220	7776.72	817.87	-326.22	0.85	826.37	39.94652414	-104.83595150
9131.00	90.43	358.680	7775.96	906.84	-328.63	0.53	915.37	39.94676836	-104.83596009
9220.00	90.37	358.930	7775.34	995.81	-330.49	0.29	1004.37	39.94701262	-104.83596671
9310.00	90.52	0.450	7774.64	1085.81	-330.97	1.70	1094.34	39.94725966	-104.83596845
9400.00	91.14	0.020	7773.34	1175.80	-330.60	0.84	1184.29	39.94750669	-104.83596714
9489.00	90.28	358.860	7772.23	1264.78	-331.47	1.62	1273.26	39.94775097	-104.83597025
9579.00	90.62	0.040	7771.53	1354.77	-332.34	1.36	1363.25	39.94799800	-104.83597333
9632.54	90.60	359.400	7770.96	1408.31	-332.60	1.20	1416.77	39.94814497	-104.83597427
9668.00	90.58	358.970	7770.60	1443.76	-333.11	1.20	1452.23	39.94824229	-104.83597608
9758.00	90.31	359.350	7769.90	1533.75	-334.43	0.52	1542.22	39.94848932	-104.83598079
9847.00	90.46	1.010	7769.30	1622.75	-334.15	1.87	1631.17	39.94873362	-104.83597979
9937.00	90.74	3.660	7768.36	1712.66	-330.48	2.96	1720.95	39.94898044	-104.83596672
10026.00	91.14	3.670	7766.90	1801.46	-324.79	0.45	1809.57	39.94922422	-104.83594644
10116.00	90.77	0.090	7765.40	1891.39	-321.84	4.00	1899.38	39.94947107	-104.83593592
10206.00	90.58	359.880	7764.34	1981.38	-321.86	0.31	1989.34	39.94971812	-104.83593600
10295.00	90.77	1.260	7763.29	2070.37	-320.98	1.57	2078.27	39.94996240	-104.83593285
10384.00	89.48	1.060	7763.09	2159.35	-319.18	1.47	2167.17	39.95020666	-104.83592643
10474.00	90.00	1.360	7763.50	2249.33	-317.28	0.67	2257.07	39.95045366	-104.83591965
10564.00	90.62	1.910	7763.01	2339.29	-314.71	0.92	2346.93	39.95070061	-104.83591050
10653.00	90.49	1.890	7762.15	2428.24	-311.76	0.15	2435.76	39.95094478	-104.83589998
10676.92	90.47	1.870	7761.95	2452.14	-310.97	0.09	2459.64	39.95101041	-104.83589718
10743.00	90.43	1.830	7761.43	2518.19	-308.84	0.09	2525.60	39.95119170	-104.83588956
10832.00	90.52	2.280	7760.69	2607.12	-305.65	0.52	2614.42	39.95143585	-104.83587818
10921.00	90.22	1.360	7760.12	2696.08	-302.82	1.09	2703.26	39.95168004	-104.83586811
11011.00	90.52	2.360	7759.54	2786.03	-299.90	1.16	2793.10	39.95192696	-104.83585769
11101.00	90.58	0.650	7758.67	2875.99	-297.53	1.90	2882.97	39.95217391	-104.83584926
11190.00	90.62	359.350	7757.74	2964.98	-297.53	1.46	2971.93	39.95241821	-104.83584927
11280.00	90.34	358.650	7756.99	3054.96	-299.11	0.84	3061.92	39.95266522	-104.83585487
11369.00	90.18	358.750	7756.58	3143.94	-301.12	0.21	3150.92	39.95290947	-104.83586208
11459.00	90.09	359.540	7756.37	3233.93	-302.47	0.88	3240.91	39.95315650	-104.83586687
11548.00	90.37	0.320	7756.01	3322.93	-302.58	0.93	3329.88	39.95340081	-104.83586727
11638.00	90.31	359.670	7755.48	3412.93	-302.58	0.73	3419.85	39.95364787	-104.83586730
11727.00	90.22	359.390	7755.07	3501.92	-303.31	0.33	3508.83	39.95389217	-104.83586991
11817.00	90.22	359.940	7754.72	3591.92	-303.84	0.61	3598.81	39.95413922	-104.83587179
11906.00	90.31	2.870	7754.31	3680.88	-301.66	3.29	3687.68	39.95438344	-104.83586401
11995.00	91.45	3.490	7752.94	3769.73	-296.72	1.46	3776.36	39.95462734	-104.83584640
12085.00	90.52	1.430	7751.40	3859.63	-292.86	2.51	3866.13	39.95487412	-104.83583263
12174.00	90.74	359.690	7750.42	3948.62	-291.99	1.97	3955.06	39.95511840	-104.83582953
12263.00	90.55	357.490	7749.41	4037.58	-294.18	2.48	4044.05	39.95536261	-104.83583735
12353.00	90.49	355.730	7748.60	4127.41	-299.50	1.96	4133.99	39.95560922	-104.83585633
12442.00	90.43	358.780	7747.88	4216.30	-303.76	3.43	4222.96	39.95585322	-104.83587154
12532.00	90.55	1.700	7747.11	4306.28	-303.39	3.25	4312.90	39.95610024	-104.83587020
12621.00	90.46	359.820	7746.33	4395.27	-302.21	2.11	4401.82	39.95634451	-104.83586599
12711.00	90.12	354.900	7745.87	4485.14	-306.35	5.48	4491.78	39.95659123	-104.83588078
12800.00	89.45	358.540	7746.21	4573.98	-311.44	4.16	4580.72	39.95683510	-104.83589894
12890.00	89.88	4.010	7746.73	4663.92	-309.44	6.10	4670.57	39.95708200	-104.83589181
12979.00	89.78	2.180	7747.00	4752.79	-304.63	2.06	4759.28	39.95732595	-104.83587467
13069.00	89.05	0.480	7747.92	4842.76	-302.55	2.06	4849.16	39.95757292	-104.83586722
13158.00	89.17	2.710	7749.30	4931.71	-300.07	2.51	4938.01	39.95781709	-104.83585839
13248.00	89.08	3.140	7750.67	5021.58	-295.48	0.49	5027.72	39.95806380	-104.83584201
13337.00	89.08	1.500	7752.10	5110.49	-291.87	1.84	5116.51	39.95830788	-104.83582917
13426.00	89.17	0.270	7753.46	5199.47	-290.50	1.39	5205.41	39.95855213	-104.83582427
13516.00	88.98	359.460	7754.91	5289.46	-290.71	0.92	5295.37	39.95879916	-104.83582503
13605.00	90.06	359.190	7755.66	5378.45	-291.76	1.25	5384.36	39.95904344	-104.83582877
13695.00	89.91	359.730	7755.68	5468.44	-292.61	0.62	5474.34	39.95929049	-104.83583180
13785.00	89.94	359.280	7755.80	5558.44	-293.39	0.50	5564.33	39.95953754	-104.83583458
13874.00	89.69	358.260	7756.09	5647.42	-295.30	1.18	5653.33	39.95978179	-104.83584140
13963.00	89.20	358.520	7756.95	5736.38	-297.80	0.62	5742.32	39.96002600	-104.83585032
14053.00	89.02	358.230	7758.35	5826.33	-300.35	0.38	5832.31	39.96027293	-104.83585943
14142.00	88.12	357.760	7760.57	5915.24	-303.46	1.14	5921.28	39.96051702	-104.83587054

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Lat - NAD 83	Long - NAD 83
14232.00	88.09	359.400	7763.55	6005.17	-305.69	1.82	6011.23	39.96076386	-104.83587849
14321.00	90.09	0.490	7764.96	6094.15	-305.78	2.56	6100.18	39.96100813	-104.83587880
14410.00	90.09	0.510	7764.82	6183.14	-305.00	0.02	6189.12	39.96125243	-104.83587603
14500.00	89.91	1.040	7764.82	6273.14	-303.78	0.62	6279.05	39.96149947	-104.83587170
14589.00	88.86	2.320	7765.78	6362.09	-301.17	1.86	6367.90	39.96174366	-104.83586239
14679.00	88.89	2.080	7767.54	6452.01	-297.72	0.27	6457.69	39.96199049	-104.83585007
14768.00	89.97	1.860	7768.43	6540.95	-294.66	1.24	6546.52	39.96223464	-104.83583916
14857.00	89.91	1.320	7768.52	6629.91	-292.19	0.61	6635.38	39.96247886	-104.83583036
14947.00	89.94	359.590	7768.64	6719.91	-291.48	1.92	6725.32	39.96272590	-104.83582781
15036.00	89.97	358.680	7768.71	6808.90	-292.82	1.02	6814.32	39.96297019	-104.83583261
15126.00	89.91	358.470	7768.80	6898.87	-295.06	0.24	6904.32	39.96321717	-104.83584060
15215.00	89.97	358.650	7768.90	6987.84	-297.29	0.21	6993.32	39.96346141	-104.83584858
15305.00	89.97	358.920	7768.94	7077.82	-299.20	0.30	7083.31	39.96370841	-104.83585539
15394.00	89.94	359.020	7769.01	7166.80	-300.80	0.12	7172.31	39.96395269	-104.83586110
15484.00	89.88	359.010	7769.15	7256.79	-302.35	0.07	7262.31	39.96419971	-104.83586663
15573.00	89.88	358.830	7769.34	7345.77	-304.03	0.20	7351.30	39.96444398	-104.83587262
15662.00	90.40	359.240	7769.12	7434.76	-305.53	0.74	7440.30	39.96468826	-104.83587797
15752.00	90.43	359.860	7768.47	7524.76	-306.23	0.69	7530.28	39.96493530	-104.83588049
15842.00	90.58	0.680	7767.68	7614.75	-305.81	0.93	7620.23	39.96518235	-104.83587898
15931.00	90.65	1.560	7766.72	7703.73	-304.07	0.99	7709.13	39.96542660	-104.83587278
16020.00	90.62	2.480	7765.74	7792.67	-300.93	1.03	7797.95	39.96567075	-104.83586159
16110.00	90.15	2.840	7765.13	7882.57	-296.76	0.66	7887.70	39.96591753	-104.83584670
16199.00	90.06	2.350	7764.97	7971.47	-292.73	0.56	7976.47	39.96616160	-104.83583233
16289.00	90.18	2.480	7764.78	8061.39	-288.93	0.20	8066.26	39.96640844	-104.83581880
16378.00	90.06	1.520	7764.59	8150.34	-285.83	1.09	8155.08	39.96665260	-104.83580772
16468.00	90.12	0.360	7764.45	8240.33	-284.35	1.29	8245.00	39.96689962	-104.83580246
16557.00	90.12	359.730	7764.27	8329.32	-284.28	0.71	8333.96	39.96714394	-104.83580221
16647.00	90.15	359.830	7764.05	8419.32	-284.63	0.12	8423.94	39.96739099	-104.83580345
16736.00	90.18	0.710	7763.80	8508.32	-284.21	0.99	8512.89	39.96763530	-104.83580196
16826.00	90.15	358.100	7763.54	8598.31	-285.14	2.90	8602.87	39.96788233	-104.83580529
16915.00	90.49	0.740	7763.04	8687.29	-286.04	2.99	8691.85	39.96812660	-104.83580851
17005.00	90.49	0.530	7762.27	8777.29	-285.05	0.23	8781.78	39.96837364	-104.83580496
17094.00	90.58	0.630	7761.44	8866.28	-284.14	0.15	8870.72	39.96861793	-104.83580175
17184.00	90.43	1.060	7760.65	8956.26	-282.82	0.51	8960.63	39.96886495	-104.83579702
17273.00	90.52	1.080	7759.91	9045.25	-281.16	0.10	9049.54	39.96910922	-104.83579109
17362.00	90.49	0.830	7759.13	9134.23	-279.67	0.28	9138.45	39.96935349	-104.83578580
17452.00	90.46	1.390	7758.38	9224.21	-277.93	0.62	9228.35	39.96960049	-104.83577958
17541.00	90.06	1.130	7757.98	9313.19	-275.97	0.54	9317.24	39.96984474	-104.83577261
17631.00	90.00	0.980	7757.93	9403.17	-274.31	0.18	9407.15	39.97009176	-104.83576670
17720.00	90.12	0.630	7757.83	9492.16	-273.06	0.42	9496.07	39.97033605	-104.83576224
17810.00	90.95	0.160	7756.99	9582.15	-272.44	1.06	9586.02	39.97058309	-104.83576003
17899.00	90.86	0.520	7755.59	9671.14	-271.92	0.42	9674.96	39.97082737	-104.83575815
17930.00	90.85	0.510	7755.13	9702.14	-271.64	0.04	9705.93	39.97091246	-104.83575715
17984.86	90.83	0.500	7754.32	9756.99	-271.15	0.04	9760.75	39.97106303	-104.83575542
17989.00	90.83	0.500	7754.26	9761.13	-271.11	0.04	9764.89	39.97107440	-104.83575529
17995.32	90.84	0.490	7754.17	9767.45	-271.06	0.18	9771.21	39.97109174	-104.83575510
18078.00	90.92	0.370	7752.90	9850.12	-270.44	0.18	9853.83	39.97131867	-104.83575289
18167.00	90.89	0.310	7751.50	9939.10	-269.91	0.08	9942.77	39.97156295	-104.83575101
18194.00	90.95	0.360	7751.06	9966.10	-269.75	0.29	9969.75	39.97163706	-104.83575044
18218.00	90.95	0.360	7750.67	9990.10	-269.60	==>	9993.73	39.97170293	-104.83574991

Comments

MD[ft]	TVD[ft]	North[ft]	East[ft]	Lat - NAD 83	Long - NAD 83	Comment
1784.00	1783.95	-0.41	0.51	39.94427788	-104.83478616	9.625" Csg: 1784 MD/TVD
8334.99	7782.65	112.19	-284.80	39.94458698	-104.83580372	460 Setback: 8335 / 7783 MD/TVD, 460 FSL, 2234 FEL Sec 24
8378.00	7782.14	155.18	-286.10	39.94470498	-104.83580838	Top Perf: 8378 / 7782 MD/TVD, 503 FSL, 2236 FEL Sec 24
9632.54	7770.96	1408.31	-332.60	39.94814497	-104.83597427	BLM Entry Pt: 9633 / 7771 MD/TVD, 1756 FSL, 2284 FEL Sec 24
10676.92	7761.95	2452.14	-310.97	39.95101041	-104.83589718	BLM Exit Pt: 10,677 / 7762 MD/TVD, 2481 FNL, 2265 FEL Sec 24
17930.00	7755.13	9702.14	-271.64	39.97091246	-104.83575715	Btm Perf: 17,930 / 7755 MD/TVD, 525 FNL, 2242 FEL Sec 13
17984.86	7754.32	9756.99	-271.15	39.97106303	-104.83575542	Btm Toe Sub: 17,985 / 7754 MD/TVD, 470 FNL, 2242 FEL Sec 13
17995.32	7754.17	9767.45	-271.06	39.97109174	-104.83575510	460 Setback: 17,995 / 7754 MD/TVD, 460 FNL, 2242 FEL Sec 13
18208.48	7750.82	9980.58	-269.66	39.97167680	-104.83575012	PBTD: 18,208 / 7751 MD/TVD, 247 FNL, 2241 FEL Sec 13
18218.00	7750.67	9990.10	-269.60	39.97170293	-104.83574991	5.5" Csg: 18,218 / 7751 MD/TVD, 237 FNL, 2241 FEL Sec 13
18218.00	7750.67	9990.10	-269.60	39.97170293	-104.83574991	BHL: 18,218 / 7751 MD/TVD, 237 FNL, 2241 FEL Sec 13

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	1784.00	1783.95	-0.41	0.51
8.500	1784.00	1783.95	-0.41	0.51	18218.00	7750.67	9990.10	-269.60

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	1784.00	1783.95	-0.41	0.51
5 1/2in Casing	0.00	0.00	0.00	0.00	18218.00	7750.67	9990.10	-269.60

Survey Tool Program

Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool
520285	As Drilled - 20190202	18218.00	7750.67	MWD

Coordinates are from Slot  
MD's and TVD's are from Rig Floor 5041.4ft above Mean Sea Level  
Vertical Section is from 0.00 0.00 on azimuth 358.450 degrees  
Bottom hole distance is 9993.73 Feet on azimuth 358.45 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Great Western Operating Co.  
Date Printed: