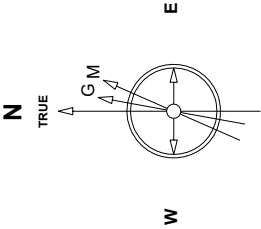


Great Western Operating Company, LLC

Location	Colorado	Slot	C14 - Schaefer LD 13-033HN
Field	Wattenburg	Well	Schaefer LD 13-033HN
Installation	Schaefer	Wellbore	Schaefer LD 13-033HN (AWB)

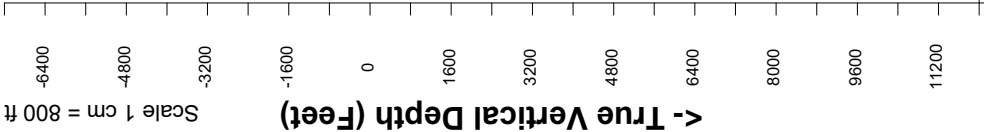
Created by	admin
Date plotted	16-Apr-2019
Plot reference is Schaefer LD 13-033HN (AWB).	
Ref wellpath is Schaefer LD 13-033HN (AWPH1).	
Coordinates are in Feet reference C14 - Schaefer LD 13-033HN.	
True Vertical Depths are reference Rig Datum.	
Measured Depths are reference Rig Datum.	
Rig Datum: Actual Datum #1	
Rig Datum to Mean Sea Level: 5041.40 ft.	
Plot North is aligned to TRUE North.	



Aug-2-2018  
EMLA2015 (2000.0-2020.0) Dip: 68.26 deg Field: 51980.7 nT  
Lat: N39 56.40, 1460 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

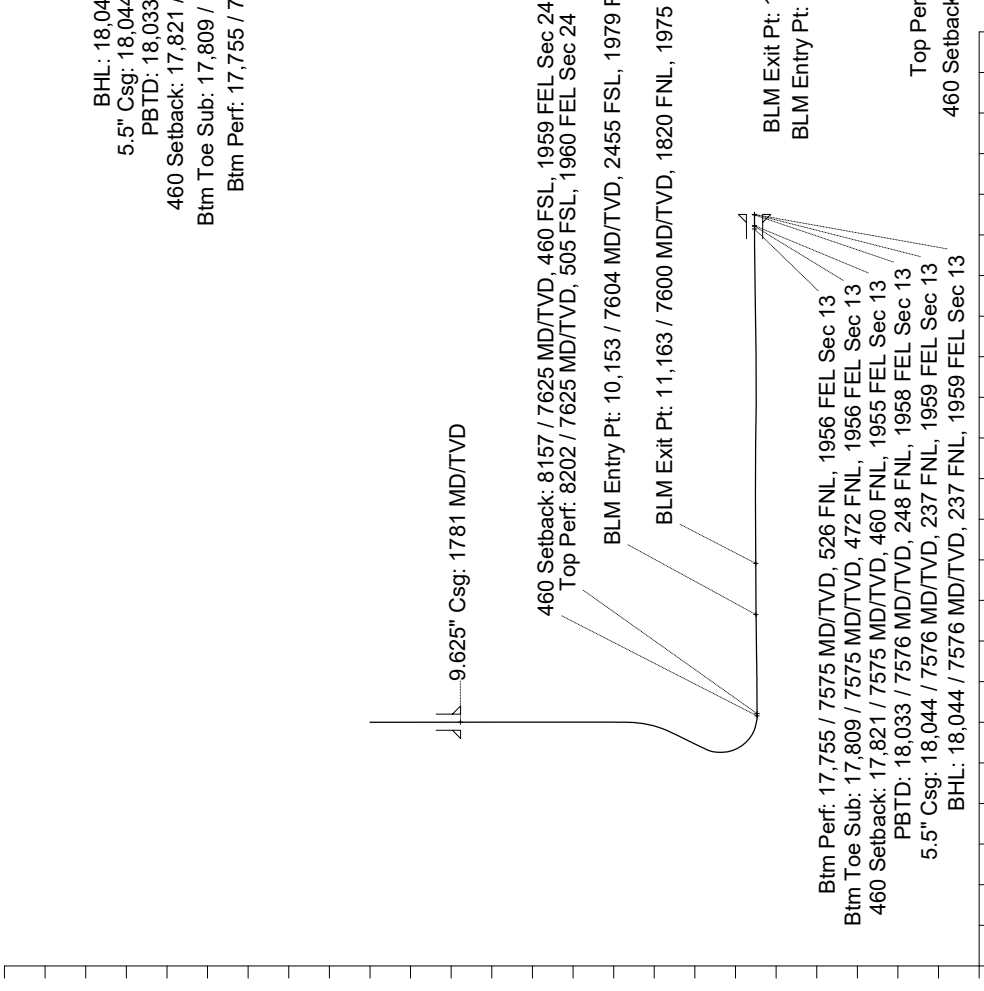
East (Feet) ->

Scale 1 cm = 500 ft



Scale 1 cm = 800 ft

<- True Vertical Depth (Feet)



9.625" Csg: 1781 MD/TVD

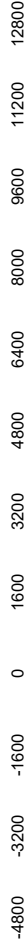
460 Setback: 8157 / 7625 MD/TVD, 460 FSL, 1959 FEL Sec 24  
Top Perf: 8202 / 7625 MD/TVD, 505 FSL, 1960 FEL Sec 24

BLM Entry Pt: 10,153 / 7604 MD/TVD, 2455 FSL, 1979 FEL Sec 24

BLM Exit Pt: 11,163 / 7600 MD/TVD, 1820 FNL, 1975 FEL Sec 24

Btm Perf: 17,755 / 7575 MD/TVD, 526 FNL, 1956 FEL Sec 13  
Btm Toe Sub: 17,809 / 7575 MD/TVD, 472 FNL, 1956 FEL Sec 13  
460 Setback: 17,821 / 7575 MD/TVD, 460 FNL, 1955 FEL Sec 13  
PBTD: 18,033 / 7576 MD/TVD, 248 FNL, 1958 FEL Sec 13  
5.5" Csg: 18,044 / 7576 MD/TVD, 237 FNL, 1959 FEL Sec 13  
BHL: 18,044 / 7576 MD/TVD, 237 FNL, 1959 FEL Sec 13

Top Perf: 8202 / 7625 MD/TVD, 505 FSL, 1960 FEL Sec 24  
460 Setback: 8157 / 7625 MD/TVD, 460 FSL, 1959 FEL Sec 24



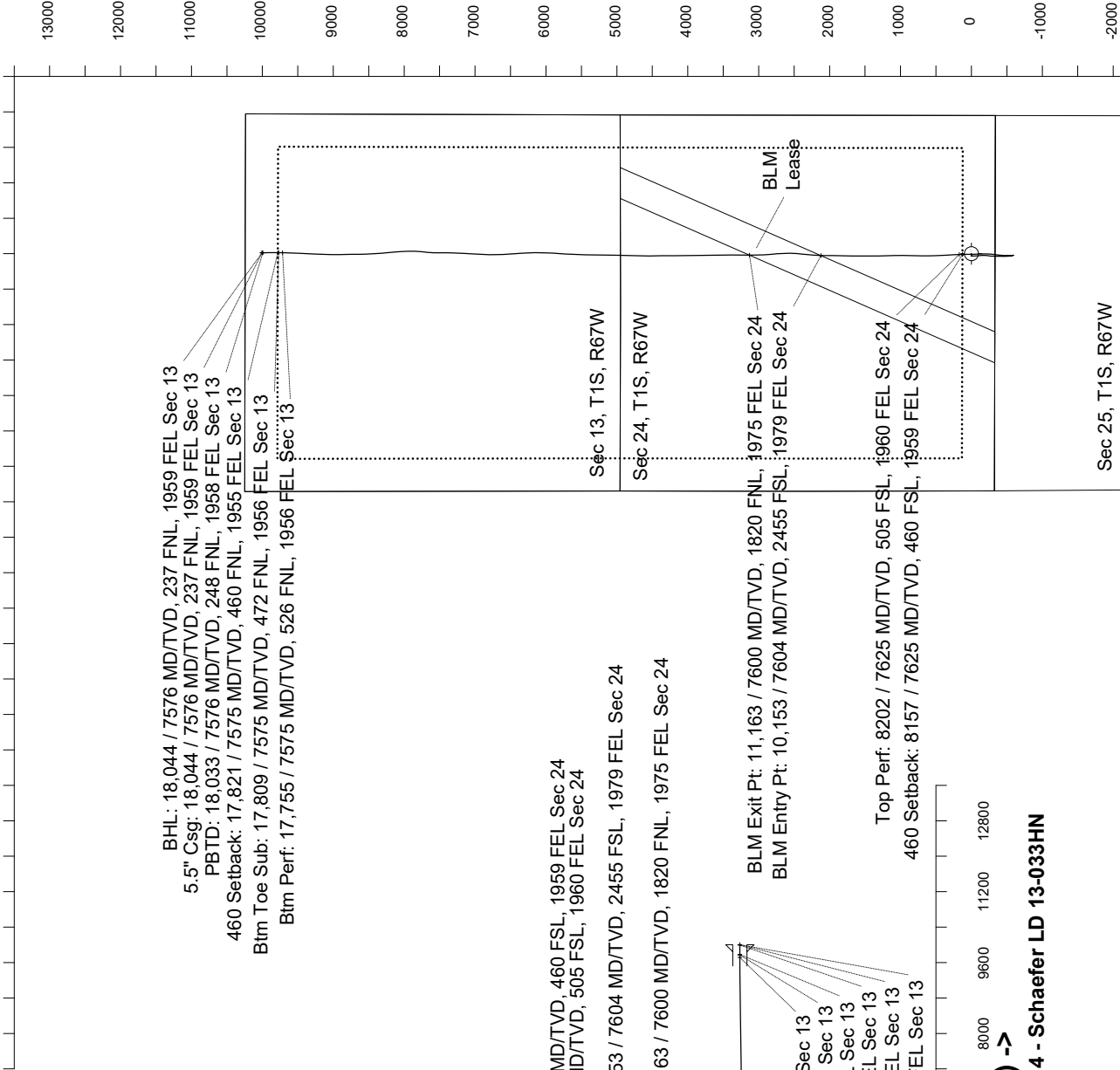
Scale 1 cm = 800 ft

Vertical Section (Feet) ->

Azimuth 0.07 with reference 0.00 N, 0.00 E from C14 - Schaefer LD 13-033HN

<- North(Feet)

Scale 1 cm = 500 ft



Sec 13, T1S, R67W

Sec 24, T1S, R67W

BLM Exit Pt: 11,163 / 7600 MD/TVD, 1820 FNL, 1975 FEL Sec 24  
BLM Entry Pt: 10,153 / 7604 MD/TVD, 2455 FSL, 1979 FEL Sec 24

BLM Lease

Sec 25, T1S, R67W

Great Western Operating Co, LLC  
Directional Survey Report  
Wellpath: Schaefer LD 13-033HN  
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
Feb-6-2019	Apr-16-2019	05-001-10253	20.00	Schaefer LD 13-033HN

**Slot Coordinates**

Latitude	Longitude
39.94423800	-104.83478700

**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	39.94423800	-104.83478700
20.00	0.00	316.380	20.00	0.00	0.00	==>	0.00	39.94423800	-104.83478700
160.00	0.40	316.380	160.00	0.35	-0.34	0.29	0.35	39.94423897	-104.83478820
245.00	0.53	265.840	245.00	0.54	-0.93	0.49	0.54	39.94423948	-104.83479033
305.00	0.70	269.270	304.99	0.52	-1.58	0.29	0.51	39.94423941	-104.83479262
395.00	1.85	276.570	394.97	0.67	-3.57	1.29	0.67	39.94423985	-104.83479973
485.00	1.71	276.390	484.93	0.99	-6.35	0.16	0.98	39.94424072	-104.83480964
575.00	1.27	250.730	574.90	0.81	-8.62	0.88	0.80	39.94424022	-104.83481776
665.00	1.14	251.340	664.88	0.19	-10.41	0.15	0.18	39.94423853	-104.83482414
755.00	1.63	260.750	754.85	-0.30	-12.53	0.60	-0.31	39.94423718	-104.83483167
845.00	1.54	284.390	844.82	-0.20	-14.96	0.73	-0.22	39.94423744	-104.83484035
935.00	1.49	283.510	934.78	0.37	-17.27	0.06	0.35	39.94423902	-104.83484859
1025.00	1.76	276.390	1024.75	0.80	-19.78	0.37	0.77	39.94424019	-104.83485755
1115.00	1.05	266.810	1114.72	0.91	-21.98	0.83	0.88	39.94424049	-104.83486538
1205.00	1.10	249.320	1204.71	0.56	-23.61	0.37	0.53	39.94423952	-104.83487120
1295.00	0.97	262.770	1294.69	0.15	-25.17	0.31	0.12	39.94423842	-104.83487678
1385.00	0.83	285.000	1384.68	0.23	-26.56	0.41	0.19	39.94423862	-104.83488172
1475.00	1.05	288.520	1474.67	0.66	-27.97	0.25	0.62	39.94423981	-104.83488675
1565.00	0.62	302.760	1564.66	1.18	-29.16	0.53	1.15	39.94424125	-104.83489100
1655.00	0.79	288.610	1654.65	1.64	-30.16	0.27	1.61	39.94424252	-104.83489456
1730.00	0.48	278.060	1729.65	1.85	-30.96	0.44	1.81	39.94424309	-104.83489742
1781.00	0.48	270.330	1780.64	1.89	-31.39	0.13	1.85	39.94424317	-104.83489894
1843.00	0.50	261.290	1842.64	1.85	-31.92	0.13	1.81	39.94424307	-104.83490083
1932.00	0.06	102.650	1931.64	1.78	-32.25	0.63	1.74	39.94424288	-104.83490203
2022.00	0.14	0.580	2021.64	1.88	-32.21	0.18	1.84	39.94424315	-104.83490186
2112.00	0.09	309.270	2111.64	2.03	-32.26	0.12	1.99	39.94424358	-104.83490206
2201.00	0.09	140.490	2200.64	2.02	-32.27	0.20	1.98	39.94424355	-104.83490209
2290.00	0.06	155.750	2289.64	1.92	-32.21	0.04	1.88	39.94424328	-104.83490186
2380.00	0.03	32.550	2379.64	1.90	-32.17	0.09	1.86	39.94424322	-104.83490175
2470.00	0.11	43.200	2469.64	1.98	-32.10	0.09	1.94	39.94424345	-104.83490149
2559.00	0.22	61.660	2558.64	2.13	-31.89	0.14	2.09	39.94424384	-104.83490075
2649.00	0.47	243.490	2648.64	2.05	-32.07	0.77	2.00	39.94424361	-104.83490138
2738.00	0.26	53.030	2737.64	2.00	-32.24	0.82	1.96	39.94424350	-104.83490197
2828.00	0.43	155.140	2827.64	1.82	-31.93	0.61	1.78	39.94424300	-104.83490089
2918.00	0.16	233.110	2917.64	1.44	-31.89	0.47	1.40	39.94424195	-104.83490074
3007.00	0.07	51.030	3006.64	1.40	-31.95	0.26	1.36	39.94424184	-104.83490094
3096.00	0.04	190.120	3095.64	1.40	-31.91	0.12	1.36	39.94424185	-104.83490081
3186.00	0.07	0.860	3185.64	1.43	-31.92	0.12	1.39	39.94424191	-104.83490083
3276.00	0.10	186.740	3275.64	1.40	-31.92	0.19	1.36	39.94424185	-104.83490086
3365.00	0.03	160.230	3364.64	1.30	-31.93	0.08	1.26	39.94424158	-104.83490086
3455.00	0.03	11.910	3454.64	1.30	-31.91	0.06	1.26	39.94424158	-104.83490082
3544.00	0.04	174.800	3543.64	1.30	-31.91	0.08	1.26	39.94424156	-104.83490079
3633.00	0.07	61.370	3632.64	1.29	-31.85	0.10	1.25	39.94424154	-104.83490061
3722.00	0.03	199.290	3721.64	1.30	-31.81	0.11	1.26	39.94424156	-104.83490046
3812.00	0.03	293.800	3811.64	1.28	-31.84	0.05	1.24	39.94424152	-104.83490057
3902.00	0.06	283.650	3901.64	1.30	-31.91	0.03	1.26	39.94424158	-104.83490081
3991.00	0.07	352.680	3990.64	1.37	-31.96	0.08	1.33	39.94424176	-104.83490100
4080.00	0.03	272.880	4079.64	1.42	-31.99	0.08	1.38	39.94424191	-104.83490110
4170.00	0.07	321.830	4169.64	1.47	-32.05	0.06	1.43	39.94424203	-104.83490131
4259.00	0.07	133.250	4258.64	1.47	-32.05	0.16	1.43	39.94424204	-104.83490129
4349.00	0.15	25.210	4348.64	1.54	-31.95	0.20	1.50	39.94424223	-104.83490097
4438.00	0.07	319.890	4437.64	1.69	-31.94	0.15	1.65	39.94424264	-104.83490091
4528.00	0.07	237.150	4527.64	1.70	-32.02	0.10	1.66	39.94424267	-104.83490120
4617.00	0.07	344.340	4616.64	1.72	-32.08	0.13	1.68	39.94424273	-104.83490142
4707.00	0.10	161.010	4706.64	1.70	-32.07	0.19	1.66	39.94424267	-104.83490138
4796.00	0.33	136.340	4795.64	1.44	-31.87	0.27	1.40	39.94424196	-104.83490066
4885.00	0.04	202.240	4884.64	1.23	-31.70	0.35	1.19	39.94424138	-104.83490007
4975.00	0.11	230.450	4974.64	1.15	-31.78	0.09	1.11	39.94424115	-104.83490035
5064.00	0.09	160.040	5063.63	1.03	-31.82	0.13	0.99	39.94424082	-104.83490050
5154.00	3.20	185.120	5153.59	-1.54	-32.02	3.47	-1.58	39.94423376	-104.83490121
5243.00	5.93	190.860	5242.30	-8.53	-33.11	3.11	-8.58	39.94421457	-104.83490510
5333.00	7.24	187.550	5331.70	-18.72	-34.73	1.51	-18.77	39.94418660	-104.83491088
5422.00	9.88	170.330	5419.72	-31.81	-34.19	4.10	-31.86	39.94415067	-104.83490893
5511.00	13.02	168.730	5506.93	-49.18	-30.95	3.55	-49.22	39.94410300	-104.83489737
5601.00	15.69	179.330	5594.13	-71.30	-28.82	4.15	-71.33	39.94404228	-104.83488979
5690.00	18.19	178.230	5679.26	-97.22	-28.25	2.83	-97.25	39.94397112	-104.83488776
5780.00	21.09	175.250	5764.02	-127.40	-26.48	3.41	-127.44	39.94388826	-104.83488142
5869.00	23.46	177.770	5846.38	-161.07	-24.46	2.87	-161.10	39.94379585	-104.83487424
5959.00	25.84	183.790	5928.18	-198.55	-25.06	3.84	-198.58	39.94369295	-104.83487637
6049.00	26.00	187.860	6009.13	-237.67	-29.05	1.98	-237.70	39.94358557	-104.83489062
6138.00	25.28	188.190	6089.37	-275.80	-34.43	0.82	-275.85	39.94348089	-104.83490979

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Lat - NAD 83	Long - NAD 83
6228.00	25.99	180.690	6170.53	-314.55	-37.41	3.69	-314.60	39.94337452	-104.83492040
6317.00	25.44	178.180	6250.72	-353.16	-37.03	1.37	-353.21	39.94326854	-104.83491907
6407.00	26.69	179.380	6331.57	-392.69	-36.20	1.51	-392.74	39.94316001	-104.83491610
6496.00	26.29	179.300	6411.22	-432.39	-35.74	0.45	-432.43	39.94305105	-104.83491447
6586.00	26.57	180.360	6491.81	-472.45	-35.63	0.61	-472.49	39.94294108	-104.83491406
6675.00	26.44	180.550	6571.46	-512.16	-35.94	0.17	-512.21	39.94283205	-104.83491518
6765.00	22.41	172.640	6653.41	-549.24	-33.93	5.76	-549.28	39.94273028	-104.83490802
6854.00	13.88	162.180	6737.93	-576.28	-28.48	10.22	-576.32	39.94265604	-104.83488858
6944.00	4.40	153.460	6826.69	-589.68	-23.63	10.62	-589.71	39.94261926	-104.83487126
7034.00	0.32	4.190	6916.60	-592.52	-22.06	5.20	-592.55	39.94261147	-104.83486569
7123.00	7.56	350.450	7005.34	-586.49	-23.02	8.15	-586.52	39.94262802	-104.83486909
7212.00	14.11	359.900	7092.71	-569.85	-24.01	7.60	-569.88	39.94267370	-104.83487263
7301.00	22.00	359.900	7177.26	-542.29	-24.06	8.87	-542.32	39.94274936	-104.83487280
7391.00	29.03	357.880	7258.43	-503.56	-24.90	7.87	-503.59	39.94285568	-104.83487579
7480.00	36.28	0.330	7333.32	-455.58	-25.54	8.28	-455.61	39.94298738	-104.83487810
7570.00	43.30	6.920	7402.46	-398.22	-21.67	9.09	-398.25	39.94314485	-104.83486427
7659.00	50.90	8.140	7463.00	-333.64	-13.09	8.60	-333.66	39.94332212	-104.83483367
7749.00	57.87	4.780	7515.39	-260.99	-4.95	8.32	-261.00	39.94352155	-104.83480467
7838.00	64.91	358.570	7558.01	-182.99	-2.82	10.00	-182.99	39.94373567	-104.83479704
7927.00	74.46	357.240	7588.88	-99.68	-5.89	10.82	-99.69	39.94396436	-104.83480802
8016.00	77.30	358.780	7610.59	-13.44	-8.88	3.61	-13.45	39.94420112	-104.83481868
8106.00	85.93	359.950	7623.70	75.51	-9.86	9.67	75.50	39.94444529	-104.83482216
8151.00	90.55	359.430	7625.08	120.48	-10.10	10.33	120.46	39.94456872	-104.83482303
8156.98	90.53	359.320	7625.02	126.46	-10.17	1.86	126.44	39.94458514	-104.83482326
8195.00	90.37	358.630	7624.73	164.47	-10.85	1.86	164.46	39.94468949	-104.83482568
8202.00	90.36	358.460	7624.68	171.47	-11.02	2.42	171.45	39.94470870	-104.83482632
8285.00	90.28	356.450	7624.22	254.38	-14.71	2.42	254.36	39.94493630	-104.83483946
8374.00	90.31	356.220	7623.76	343.20	-20.40	0.26	343.17	39.94518011	-104.83485975
8463.00	90.25	357.270	7623.32	432.05	-25.45	1.18	432.02	39.94542403	-104.83487777
8553.00	90.25	358.890	7622.93	522.00	-28.47	1.80	521.96	39.94567094	-104.83488853
8642.00	90.22	359.220	7622.57	610.98	-29.93	0.37	610.94	39.94591522	-104.83489376
8732.00	90.09	359.820	7622.32	700.98	-30.69	0.68	700.94	39.94616227	-104.83489645
8821.00	90.34	2.280	7621.99	789.96	-29.06	2.78	789.92	39.94640652	-104.83489064
8910.00	90.58	1.870	7621.27	878.89	-25.84	0.53	878.86	39.94665067	-104.83487914
9000.00	90.58	359.330	7620.36	968.88	-24.89	2.82	968.85	39.94689768	-104.83487578
9089.00	90.89	359.220	7619.22	1057.86	-26.02	0.37	1057.83	39.94714196	-104.83487980
9178.00	91.14	358.640	7617.64	1146.83	-27.68	0.71	1146.80	39.94738619	-104.83488573
9268.00	90.74	357.940	7616.17	1236.78	-30.37	0.90	1236.74	39.94763311	-104.83489531
9357.00	90.86	359.410	7614.93	1325.75	-32.42	1.66	1325.70	39.94787732	-104.83490265
9447.00	90.58	0.280	7613.79	1415.74	-32.67	1.02	1415.69	39.94812436	-104.83490351
9536.00	90.71	359.280	7612.79	1504.73	-33.01	1.13	1504.69	39.94836866	-104.83490473
9626.00	90.80	0.410	7611.61	1594.72	-33.25	1.26	1594.68	39.94861569	-104.83490560
9716.00	90.86	0.410	7610.30	1684.71	-32.61	0.07	1684.67	39.94886272	-104.83490331
9805.00	90.83	1.580	7608.99	1773.68	-31.06	1.31	1773.64	39.94910697	-104.83489779
9895.00	90.99	1.180	7607.56	1863.65	-28.90	0.48	1863.61	39.94935392	-104.83489006
9984.00	90.89	0.960	7606.10	1952.62	-27.23	0.27	1952.58	39.94959816	-104.83488414
10074.00	90.74	359.670	7604.82	2042.61	-26.74	1.44	2042.57	39.94984519	-104.83488237
10152.50	90.55	1.630	7603.94	2121.09	-25.85	2.51	2121.06	39.95006064	-104.83487920
10163.00	90.52	1.890	7603.84	2131.59	-25.53	2.51	2131.55	39.95008945	-104.83487805
10253.00	90.31	4.120	7603.19	2221.45	-20.81	2.49	2221.43	39.95033615	-104.83486123
10342.00	90.83	5.470	7602.30	2310.14	-13.37	1.63	2310.12	39.95057959	-104.83483469
10432.00	90.74	5.350	7601.07	2399.73	-4.89	0.17	2399.72	39.95082553	-104.83480443
10521.00	90.00	3.700	7600.50	2488.44	2.13	2.03	2488.45	39.95106907	-104.83477939
10611.00	90.40	1.190	7600.18	2578.35	5.97	2.82	2578.36	39.95131588	-104.83476570
10700.00	90.77	355.810	7599.27	2667.29	3.64	6.06	2667.29	39.95156001	-104.83477400
10790.00	89.78	354.900	7598.84	2756.99	-3.64	1.49	2756.98	39.95180625	-104.83480000
10879.00	89.66	355.570	7599.28	2845.68	-11.04	0.76	2845.66	39.95204972	-104.83482637
10969.00	89.60	357.780	7599.86	2935.52	-16.26	2.46	2935.50	39.95229634	-104.83484498
11059.00	90.09	358.600	7600.10	3025.47	-19.10	1.06	3025.45	39.95254327	-104.83485512
11148.00	90.18	359.570	7599.89	3114.46	-20.52	1.09	3114.43	39.95278755	-104.83486019
11162.52	90.20	359.680	7599.84	3128.98	-20.62	0.76	3128.95	39.95282741	-104.83486053
11237.00	90.31	0.230	7599.51	3203.46	-20.68	0.76	3203.43	39.95303186	-104.83486075
11327.00	90.28	1.460	7599.05	3293.45	-19.35	1.37	3293.42	39.95327889	-104.83485601
11417.00	90.49	0.590	7598.44	3383.43	-17.74	0.99	3383.40	39.95352590	-104.83485027
11506.00	90.15	358.590	7597.95	3472.42	-18.38	2.28	3472.40	39.95377019	-104.83485254
11595.00	89.94	358.260	7597.88	3561.39	-20.82	0.44	3561.36	39.95401442	-104.83486127
11685.00	89.88	358.500	7598.02	3651.35	-23.37	0.27	3651.32	39.95426138	-104.83487034
11775.00	89.91	359.480	7598.18	3741.34	-24.95	1.09	3741.30	39.95450840	-104.83487600
11864.00	90.06	0.020	7598.20	3830.33	-25.34	0.63	3830.30	39.95475271	-104.83487739
11953.00	89.97	0.560	7598.18	3919.33	-24.89	0.62	3919.30	39.95499702	-104.83487578
12043.00	90.65	359.450	7597.69	4009.33	-24.88	1.45	4009.30	39.95524407	-104.83487575
12132.00	90.55	358.760	7596.76	4098.31	-26.27	0.78	4098.28	39.95548834	-104.83488071
12221.00	90.74	359.260	7595.76	4187.29	-27.81	0.60	4187.26	39.95573260	-104.83488620
12310.00	90.62	359.430	7594.70	4276.28	-28.83	0.23	4276.24	39.95597688	-104.83488983
12400.00	90.62	359.520	7593.73	4366.27	-29.65	0.10	4366.23	39.95622392	-104.83489277
12490.00	90.80	358.720	7592.62	4456.25	-31.03	0.91	4456.21	39.95647093	-104.83489770
12579.00	90.15	359.910	7591.88	4545.24	-32.10	1.52	4545.20	39.95671521	-104.83490150
12669.00	90.12	1.310	7591.67	4635.24	-31.14	1.56	4635.19	39.95696225	-104.83489808
12758.00	89.91	2.620	7591.64	4724.18	-28.09	1.49	4724.14	39.95720642	-104.83488719
12847.00	90.00	2.960	7591.71	4813.08	-23.76	0.40	4813.04	39.95745044	-104.83487174
12937.00	90.12	0.070	7591.62	4903.03	-21.38	3.21	4903.00	39.95769739	-104.83486325
13027.00	90.09	359.840	7591.45	4993.03	-21.45	0.26	4993.00	39.95794445	-104.83486351
13116.00	89.23	359.960	7591.98	5082.03	-21.60	0.98	5082.00	39.95818876	-104.83486406
13206.00	89.32	359.390	7593.12	5172.02	-22.11	0.64	5171.99	39.95843579	-104.83486588
13295.00	89.26	1.260	7594.22	5261.01	-21.61	2.10	5260.98	39.95868008	-104.83486408
13384.00	89.32	1.250	7595.33	5349.98	-19.66	0.07	5349.95	39.95892431	-104.83485713
13474.00	89.60	2.210	7596.17	5439.94	-16.94	1.11	5439.91	39.95917125	-104.83484744
13563.00	89.05	2.610	7597.22	5528.85	-13.20	0.76	5528.83	39.95941533	-104.83483409
13653.00	88.98	3.360	7598.77	5618.71	-8.51	0.84	5618.70	39.95966201	-104.83481737
13743.00	89.23	3.400	7600.18	5708.55	-3.21	0.28	5708.54	39.95990861	-104.83479845
13832.00	89.42	3.180	7601.22	5797.39	1.90	0.33	5797.39	39.96015251	-104.83478023
13921.00	89.32	2.370	7602.20	5886.28	6.21	0.92	5886.29	39.96039652	-104.83476486
14011.00	89.41	2.430	7603.20	5976.20	9.98	0.12	5976.21	39.96064335	-104.83475141
14100.00	89.35	2.040	7604.16	6065.13	13.45	0.44	6065.14	39.96088746	-104.83473903

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Lat - NAD 83	Long - NAD 83
14190.00	89.35	358.650	7605.18	6155.11	13.99	3.77	6155.12	39.96113447	-104.83473710
14279.00	89.97	358.130	7605.71	6244.07	11.49	0.91	6244.08	39.96137868	-104.83474602
14368.00	89.72	357.060	7605.95	6332.99	7.75	1.23	6332.99	39.96162277	-104.83475934
14457.00	89.85	355.290	7606.29	6421.79	1.82	1.99	6421.78	39.96186653	-104.83478052
14547.00	89.88	355.890	7606.50	6511.52	-5.10	0.67	6511.51	39.96211286	-104.83480521
14636.00	89.82	357.070	7606.73	6600.35	-10.57	1.33	6600.33	39.96235671	-104.83482470
14726.00	89.91	358.750	7606.94	6690.29	-13.85	1.87	6690.26	39.96260360	-104.83483641
14815.00	89.85	1.060	7607.13	6779.28	-14.00	2.60	6779.26	39.96284789	-104.83483694
14905.00	90.00	2.330	7607.25	6869.24	-11.34	1.42	6869.22	39.96309484	-104.83482744
14994.00	90.06	2.560	7607.20	6958.16	-7.54	0.27	6958.14	39.96333893	-104.83481390
15084.00	89.85	3.080	7607.27	7048.05	-3.11	0.62	7048.04	39.96358569	-104.83479810
15173.00	90.06	3.680	7607.34	7136.89	2.14	0.71	7136.89	39.96382958	-104.83477938
15263.00	90.77	2.650	7606.69	7226.75	7.10	1.39	7226.75	39.96407625	-104.83476165
15352.00	90.28	1.650	7605.88	7315.68	10.44	1.25	7315.69	39.96432038	-104.83474974
15441.00	90.74	0.290	7605.08	7404.66	11.95	1.61	7404.67	39.96456464	-104.83474437
15531.00	90.62	359.900	7604.01	7494.66	12.10	0.45	7494.67	39.96481169	-104.83474384
15621.00	90.89	1.260	7602.83	7584.64	13.01	1.54	7584.65	39.96505871	-104.83474059
15710.00	90.92	6.900	7601.42	7673.37	19.34	6.34	7673.39	39.96530227	-104.83471801
15799.00	90.74	6.020	7600.13	7761.80	29.35	1.01	7761.83	39.96554501	-104.83468229
15889.00	91.36	0.940	7598.48	7851.58	34.81	5.69	7851.62	39.96579149	-104.83466281
15978.00	91.17	358.490	7596.52	7940.55	34.37	2.76	7940.59	39.96603572	-104.83466438
16068.00	91.35	356.240	7594.54	8030.43	30.23	2.51	8030.46	39.96628245	-104.83467914
16157.00	91.42	355.390	7592.39	8119.17	23.74	0.96	8119.19	39.96652604	-104.83470230
16246.00	91.35	354.850	7590.24	8207.82	16.17	0.61	8207.83	39.96676939	-104.83472931
16336.00	91.39	355.160	7588.08	8297.45	8.34	0.35	8297.46	39.96701545	-104.83475726
16425.00	91.26	356.250	7586.03	8386.18	1.67	1.23	8386.17	39.96725900	-104.83478103
16515.00	90.52	357.260	7584.63	8476.02	-3.42	1.39	8476.01	39.96750563	-104.83479920
16604.00	90.55	358.290	7583.80	8564.95	-6.88	1.16	8564.93	39.96774975	-104.83481153
16694.00	90.49	359.720	7582.98	8654.93	-8.44	1.59	8654.91	39.96799676	-104.83481710
16783.00	90.37	358.870	7582.31	8743.92	-9.53	0.96	8743.90	39.96824104	-104.83482101
16873.00	90.83	358.970	7581.37	8833.90	-11.23	0.52	8833.88	39.96848805	-104.83482706
16962.00	90.43	359.350	7580.39	8922.88	-12.53	0.62	8922.86	39.96873232	-104.83483172
17052.00	90.59	0.950	7579.59	9012.87	-12.30	1.79	9012.85	39.96897936	-104.83483088
17141.00	90.58	2.180	7578.68	9101.83	-9.87	1.38	9101.82	39.96922357	-104.83482221
17231.00	90.40	1.140	7577.91	9191.79	-7.26	1.17	9191.78	39.96947051	-104.83481290
17321.00	90.55	1.940	7577.17	9281.76	-4.84	0.90	9281.74	39.96971747	-104.83480428
17410.00	90.68	3.050	7576.21	9370.67	-0.97	1.26	9370.66	39.96996154	-104.83479045
17499.00	90.62	3.040	7575.20	9459.53	3.76	0.07	9459.53	39.97020549	-104.83477359
17589.00	90.00	2.650	7574.71	9549.42	8.23	0.81	9549.42	39.97045224	-104.83475765
17678.00	89.82	1.930	7574.85	9638.35	11.78	0.83	9638.36	39.97069636	-104.83474496
17755.00	89.79	1.470	7575.12	9715.31	14.07	0.60	9715.32	39.97090764	-104.83473682
17768.00	89.78	1.390	7575.17	9728.31	14.39	0.60	9728.32	39.97094331	-104.83473566
17809.16	89.83	0.630	7575.31	9769.46	15.11	1.86	9769.47	39.97105628	-104.83473308
17821.45	89.84	0.400	7575.34	9781.75	15.22	1.86	9781.76	39.97109002	-104.83473268
17857.00	89.88	359.740	7575.43	9817.30	15.27	1.86	9817.31	39.97118760	-104.83473253
17946.00	89.97	359.160	7575.55	9906.30	14.41	0.66	9906.31	39.97143191	-104.83473558
18020.00	90.03	358.850	7575.55	9980.29	13.13	0.43	9980.30	39.97163501	-104.83474016
18044.00	90.03	358.850	7575.54	10004.28	12.65	==>	10004.29	39.97170088	-104.83474188

**Comments**

MD[ft]	TVD[ft]	North[ft]	East[ft]	Lat - NAD 83	Long - NAD 83	Comment
1781.00	1780.64	1.89	-31.39	39.94424317	-104.83489894	9.625" Csg: 1781 MD/TVD
8156.98	7625.02	126.46	-10.17	39.94458514	-104.83482326	460 Setback: 8157 / 7625 MD/TVD, 460 FSL, 1959 FEL Sec 24
8202.00	7624.68	171.47	-11.02	39.94470870	-104.83482632	Top Perf: 8202 / 7625 MD/TVD, 505 FSL, 1960 FEL Sec 24
10152.50	7603.94	2121.09	-25.85	39.95006064	-104.83487920	BLM Entry Pt: 10,153 / 7604 MD/TVD, 2455 FSL, 1979 FEL Sec 24
11162.52	7599.84	3128.98	-20.62	39.95282741	-104.83486053	BLM Exit Pt: 11,163 / 7600 MD/TVD, 1820 FNL, 1975 FEL Sec 24
17755.00	7575.12	9715.31	14.07	39.97090764	-104.83473682	Btm Perf: 17,755 / 7575 MD/TVD, 526 FNL, 1956 FEL Sec 13
17809.16	7575.31	9769.46	15.11	39.97105628	-104.83473308	Btm Toe Sub: 17,809 / 7575 MD/TVD, 472 FNL, 1956 FEL Sec 13
17821.45	7575.34	9781.75	15.22	39.97109002	-104.83473268	460 Setback: 17,821 / 7575 MD/TVD, 460 FNL, 1955 FEL Sec 13
18033.32	7575.54	9993.60	12.86	39.97167157	-104.83474111	PBTD: 18,033 / 7576 MD/TVD, 248 FNL, 1958 FEL Sec 13
18044.00	7575.54	10004.28	12.65	39.97170088	-104.83474188	5.5" Csg: 18,044 / 7576 MD/TVD, 237 FNL, 1959 FEL Sec 13
18044.00	7575.54	10004.28	12.65	39.97170088	-104.83474188	BHL: 18,044 / 7576 MD/TVD, 237 FNL, 1959 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	1781.00	1780.64	1.89	-31.39
8.500	1781.00	1780.64	1.89	-31.39	18044.00	7575.54	10004.28	12.65

**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	1783.64	1.89	-31.41
5 1/2in Casing	0.00	0.00	0.00	0.00	18044.00	7575.54	10004.28	12.65

**Survey Tool Program**

Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool
521155	As Drilled - 20190208	18044.00	7575.54	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 0.070 degrees  
Bottom hole distance is 10004.29 Feet on azimuth 0.07 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Great Western Operating Co.  
Date Printed: