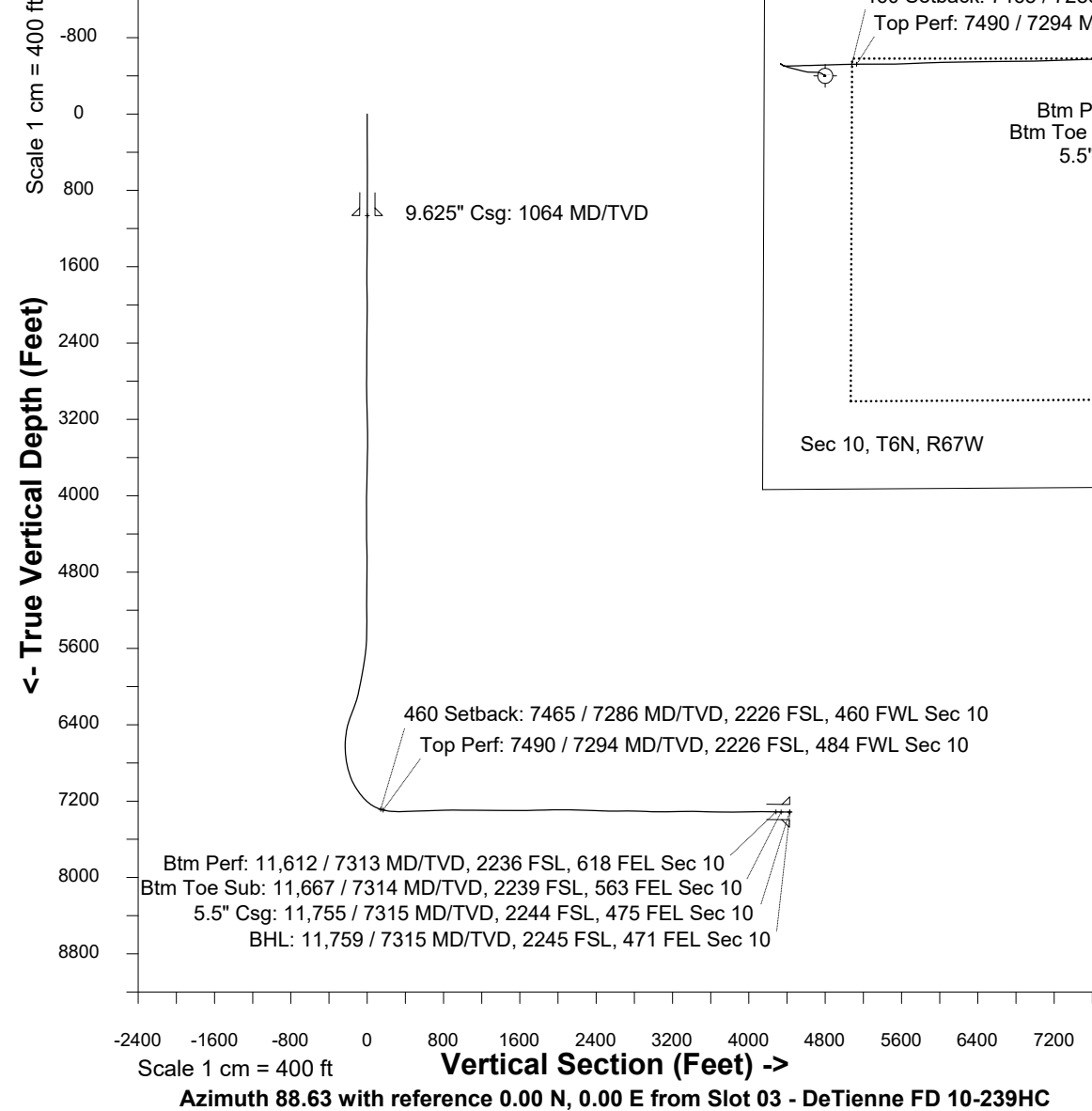


Nov-12-2014  
IGRF-12 Dip: 66.99 deg Field: 52812.0 nT  
Lat: N40 30 0.5184 Long: W104 53 15.8604 Elev: 4839.00 ft  
Magnetic North is 8.48 deg East of TRUE North  
To correct azimuth from Magnetic to TRUE add 8.48 deg



Great Western Operating Company, LLC			
Location	Colorado	Slot	Slot 03 - DeTienne FD 10-239HC
Field	Wattenburg	Well	DeTienne FD 10-239HC
Installation	DeTienne 10	Wellbore	DeTienne FD 10-239HC (AWB)

Created by	mmount
Date plotted	13-Aug-2020
Plot reference is DeTienne FD 10-239HC (AWB).	
Ref wellpath is DeTienne FD 10-239HC (AWP#1).	
Coordinates are in Feet reference Slot 03 - DeTienne FD 10-239HC.	
True Vertical Depths are reference Rig Datum.	
Measured Depths are reference Rig Datum.	
Rig Datum: Actual Datum #1	
Rig Datum to Mean Sea Level: 4855.20 ft.	
Plot North is aligned to TRUE North.	

Great Western Operating Co, LLC  
 Directional Survey Report  
 Wellpath: DeTienne FD 10-239HC  
 MDs and TVDs are from Rig Floor 4855.2ft above Mean Sea Level

**Wellbore Information**

Date Created	Date Revised	API #	RKB above GL	Well Name
May-31-2017	Aug-13-2020	05-123-41180	16.20	DeTienne FD 10-239HC

**Slot Coordinates**

Latitude	Longitude
40.500062	-104.887741

**Pad Information**

Pad Name	Ground Elev.
DeTienne	4839.00

**Field**

Name
Wattensburg

**Wellpath Report**

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	DLS [deg/100ft]	Vertical Section[ft]	Lat - NAD 83	Long - NAD 83
0.00	0.00	0.00	0.00	0.00	0.00		0.00	40.500062	-104.887741
16.20	0.00	0.00	16.20	0.00	0.00	==>	0.00	40.500062	-104.887741
154.20	0.30	81.00	154.20	0.06	0.36	0.22	0.36	40.500062	-104.887740
185.20	0.20	126.00	185.20	0.04	0.48	0.69	0.48	40.500062	-104.887739
216.20	0.10	113.80	216.20	-0.01	0.55	0.34	0.55	40.500062	-104.887739
250.20	0.30	123.00	250.20	-0.07	0.65	0.59	0.65	40.500062	-104.887739
280.20	0.20	135.30	280.20	-0.15	0.75	0.38	0.75	40.500062	-104.887738
310.20	0.20	155.40	310.20	-0.23	0.81	0.23	0.81	40.500061	-104.887738
340.20	0.40	114.60	340.20	-0.32	0.93	0.94	0.92	40.500061	-104.887738
370.20	0.30	111.60	370.20	-0.39	1.10	0.34	1.09	40.500061	-104.887737
400.20	0.20	63.30	400.20	-0.40	1.22	0.75	1.21	40.500061	-104.887737
430.20	0.10	25.20	430.20	-0.35	1.28	0.45	1.27	40.500061	-104.887736
460.20	0.10	241.00	460.20	-0.34	1.26	0.63	1.26	40.500061	-104.887736
490.20	0.00	95.10	490.20	-0.35	1.24	0.33	1.23	40.500061	-104.887737
520.20	0.10	269.90	520.20	-0.35	1.21	0.33	1.21	40.500061	-104.887737
550.20	0.00	132.40	550.20	-0.35	1.19	0.33	1.18	40.500061	-104.887737
580.20	0.10	206.50	580.20	-0.38	1.18	0.33	1.17	40.500061	-104.887737
610.20	0.10	71.50	610.20	-0.39	1.19	0.62	1.18	40.500061	-104.887737
640.20	0.20	48.00	640.20	-0.35	1.25	0.38	1.24	40.500061	-104.887736
670.20	0.20	38.40	670.20	-0.27	1.33	0.11	1.32	40.500061	-104.887736
700.20	0.20	92.70	700.20	-0.23	1.41	0.61	1.40	40.500061	-104.887736
730.20	0.30	6.00	730.20	-0.16	1.47	1.17	1.47	40.500062	-104.887736
760.20	0.20	131.50	760.20	-0.12	1.52	1.49	1.51	40.500062	-104.887736
790.20	0.10	335.10	790.20	-0.13	1.55	0.98	1.54	40.500062	-104.887735
820.20	0.10	251.40	820.20	-0.11	1.51	0.44	1.51	40.500062	-104.887736
850.20	0.20	303.10	850.20	-0.09	1.44	0.53	1.44	40.500062	-104.887736
880.20	0.10	57.20	880.20	-0.05	1.42	0.86	1.42	40.500062	-104.887736
910.20	0.10	307.10	910.20	-0.02	1.42	0.55	1.42	40.500062	-104.887736
940.20	0.10	209.90	940.20	-0.03	1.39	0.50	1.39	40.500062	-104.887736
970.20	0.10	207.20	970.20	-0.07	1.36	==>	1.36	40.500062	-104.887736
1000.20	0.20	201.60	1000.20	-0.14	1.33	0.34	1.33	40.500062	-104.887736
1030.20	0.20	219.40	1030.20	-0.23	1.28	0.21	1.27	40.500061	-104.887736
1036.20	0.10	224.20	1036.20	-0.24	1.27	1.68	1.26	40.500061	-104.887736
1099.00	0.40	242.10	1098.99	-0.39	1.04	0.49	1.03	40.500061	-104.887737
1194.00	0.40	195.90	1193.99	-0.86	0.65	0.33	0.63	40.500060	-104.887739
1290.00	0.40	235.70	1289.99	-1.37	0.28	0.28	0.25	40.500058	-104.887740
1386.00	0.30	208.90	1385.99	-1.78	-0.12	0.20	-0.16	40.500057	-104.887741
1482.00	0.40	276.90	1481.99	-1.96	-0.57	0.42	-0.62	40.500057	-104.887743
1578.00	0.80	265.60	1577.98	-1.97	-1.57	0.43	-1.62	40.500057	-104.887747
1674.00	0.80	265.30	1673.97	-2.08	-2.91	==>	-2.95	40.500056	-104.887751
1770.00	1.40	55.20	1769.96	-1.46	-2.61	2.22	-2.65	40.500058	-104.887750
1866.00	1.50	31.10	1865.93	0.28	-1.00	0.64	-0.99	40.500063	-104.887745
1961.00	0.30	190.60	1960.93	1.10	-0.40	1.88	-0.38	40.500065	-104.887742
2057.00	0.60	188.20	2056.92	0.36	-0.52	0.31	-0.51	40.500063	-104.887743
2153.00	0.60	238.70	2152.92	-0.40	-1.02	0.53	-1.03	40.500061	-104.887745
2248.00	0.50	277.20	2247.91	-0.61	-1.86	0.39	-1.87	40.500060	-104.887748
2344.00	0.50	247.20	2343.91	-0.72	-2.66	0.27	-2.68	40.500060	-104.887751
2439.00	0.60	255.20	2438.91	-1.00	-3.52	0.13	-3.55	40.500059	-104.887754
2535.00	0.60	297.30	2534.90	-0.90	-4.46	0.45	-4.48	40.500060	-104.887757
2631.00	0.40	333.50	2630.90	-0.37	-5.05	0.38	-5.06	40.500061	-104.887759
2727.00	0.70	343.90	2726.89	0.49	-5.36	0.33	-5.35	40.500063	-104.887760
2823.00	0.50	255.50	2822.89	0.95	-5.93	0.88	-5.91	40.500065	-104.887762
2919.00	1.40	75.30	2918.88	1.14	-5.20	1.98	-5.17	40.500065	-104.887760

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	DLS [deg/100ft]	Vertical Section[ft]	Lat - NAD 83	Long - NAD 83
3015.00	1.30	94.50	3014.86	1.35	-2.98	0.48	-2.95	40.500066	-104.887752
3111.00	1.10	100.10	3110.83	1.11	-0.99	0.24	-0.96	40.500065	-104.887745
3207.00	1.00	118.80	3206.82	0.54	0.65	0.37	0.66	40.500063	-104.887739
3302.00	1.30	117.10	3301.80	-0.35	2.34	0.32	2.33	40.500061	-104.887733
3398.00	1.00	112.90	3397.78	-1.17	4.08	0.32	4.05	40.500059	-104.887726
3494.00	1.20	296.30	3493.77	-1.05	3.95	2.29	3.92	40.500059	-104.887727
3590.00	1.10	274.80	3589.76	-0.53	2.13	0.46	2.12	40.500061	-104.887733
3686.00	1.00	266.80	3685.74	-0.50	0.37	0.18	0.36	40.500061	-104.887740
3781.00	1.50	250.80	3780.72	-0.95	-1.63	0.64	-1.65	40.500059	-104.887747
3877.00	1.20	251.70	3876.69	-1.68	-3.77	0.31	-3.81	40.500057	-104.887755
3973.00	1.40	258.60	3972.67	-2.23	-5.87	0.26	-5.92	40.500056	-104.887762
4069.00	0.30	189.80	4068.65	-2.71	-7.06	1.38	-7.13	40.500055	-104.887766
4164.00	0.40	342.60	4163.65	-2.64	-7.21	0.72	-7.27	40.500055	-104.887767
4261.00	1.40	11.90	4260.64	-1.15	-7.06	1.10	-7.09	40.500059	-104.887766
4356.00	1.40	352.90	4355.61	1.13	-6.97	0.49	-6.94	40.500065	-104.887766
4452.00	1.50	48.50	4451.59	3.13	-6.17	1.41	-6.09	40.500071	-104.887763
4548.00	2.40	53.40	4547.53	5.16	-3.62	0.95	-3.49	40.500076	-104.887754
4644.00	1.10	24.40	4643.49	7.20	-1.62	1.60	-1.45	40.500082	-104.887747
4740.00	1.30	198.90	4739.48	7.01	-1.59	2.50	-1.43	40.500081	-104.887747
4836.00	1.40	220.20	4835.45	5.08	-2.70	0.53	-2.58	40.500076	-104.887751
4932.00	1.40	213.20	4931.42	3.20	-4.10	0.18	-4.03	40.500071	-104.887756
5028.00	0.40	179.70	5027.41	1.89	-4.74	1.13	-4.70	40.500067	-104.887758
5124.00	0.10	97.10	5123.41	1.54	-4.66	0.42	-4.62	40.500066	-104.887758
5220.00	0.20	133.20	5219.41	1.42	-4.45	0.14	-4.42	40.500066	-104.887757
5315.00	0.40	109.30	5314.41	1.19	-4.02	0.24	-3.99	40.500065	-104.887755
5411.00	1.20	330.40	5410.40	1.96	-4.20	1.59	-4.15	40.500067	-104.887756
5507.00	2.30	310.70	5506.36	4.09	-6.16	1.29	-6.06	40.500073	-104.887763
5602.00	7.10	301.20	5601.01	8.37	-12.63	5.10	-12.42	40.500085	-104.887786
5695.00	9.00	294.50	5693.09	14.37	-24.16	2.28	-23.81	40.500101	-104.887828
5787.00	9.90	279.60	5783.86	18.67	-38.51	2.82	-38.06	40.500113	-104.887879
5879.00	10.50	267.50	5874.41	19.63	-54.69	2.41	-54.20	40.500116	-104.887938
5971.00	11.30	266.10	5964.75	18.65	-72.06	0.92	-71.59	40.500113	-104.888000
6064.00	12.40	278.50	6055.78	19.50	-91.03	2.98	-90.53	40.500116	-104.888068
6156.00	16.40	283.40	6144.88	23.98	-113.44	4.54	-112.83	40.500128	-104.888149
6248.00	21.70	283.80	6231.81	31.05	-142.61	5.76	-141.83	40.500147	-104.888254
6340.00	23.30	285.60	6316.80	40.00	-176.66	1.89	-175.65	40.500172	-104.888376
6432.00	16.90	287.50	6403.16	48.92	-206.97	6.99	-205.74	40.500196	-104.888485
6477.00	8.70	295.40	6447.00	52.35	-216.29	18.59	-214.98	40.500206	-104.888519
6525.00	8.40	305.20	6494.47	55.93	-222.44	3.10	-221.04	40.500216	-104.888541
6570.00	8.60	303.10	6538.98	59.66	-227.94	0.82	-226.46	40.500226	-104.888561
6617.00	4.20	302.50	6585.67	62.51	-232.34	9.36	-230.78	40.500234	-104.888576
6662.00	2.40	145.00	6630.64	62.62	-233.19	14.41	-231.63	40.500234	-104.888579
6709.00	5.50	128.20	6677.53	60.42	-230.86	6.97	-229.35	40.500228	-104.888571
6754.00	5.80	123.70	6722.31	57.83	-227.27	1.19	-225.83	40.500221	-104.888558
6801.00	9.20	122.10	6768.90	54.51	-222.11	7.25	-220.75	40.500212	-104.888540
6846.00	13.80	102.10	6813.00	51.47	-213.81	13.39	-212.52	40.500203	-104.888510
6893.00	14.70	84.50	6858.58	50.87	-202.38	9.38	-201.11	40.500202	-104.888469
6938.00	15.80	87.30	6901.99	51.71	-190.58	2.94	-189.29	40.500204	-104.888426
6986.00	19.70	90.10	6947.70	52.00	-175.96	8.32	-174.67	40.500205	-104.888374
7031.00	25.20	88.90	6989.27	52.17	-158.78	12.26	-157.49	40.500205	-104.888312
7082.00	30.40	87.20	7034.37	53.01	-135.02	10.31	-133.72	40.500208	-104.888227
7127.00	31.00	88.20	7073.06	53.93	-112.07	1.75	-110.75	40.500210	-104.888144
7178.00	35.60	88.90	7115.68	54.63	-84.08	9.05	-82.75	40.500212	-104.888043
7223.00	41.10	88.00	7150.96	55.40	-56.18	12.28	-54.85	40.500214	-104.887943
7274.00	46.40	88.10	7187.78	56.59	-20.95	10.39	-19.59	40.500217	-104.887816
7319.00	52.90	89.40	7216.90	57.32	13.32	14.61	14.68	40.500219	-104.887693
7370.00	58.60	88.30	7245.60	58.18	55.45	11.32	56.82	40.500222	-104.887542
7415.00	64.30	88.20	7267.09	59.39	94.94	12.67	96.33	40.500225	-104.887400
7464.00	70.16	88.87	7286.05	60.54	140.09	12.03	141.49	40.500228	-104.887237
7466.00	70.40	88.90	7286.73	60.58	141.97	12.08	143.37	40.500228	-104.887231
7511.00	77.50	89.80	7299.16	61.06	185.18	15.89	186.59	40.500230	-104.887075
7561.00	83.50	90.20	7307.41	61.06	234.48	12.03	235.87	40.500230	-104.886898
7630.00	90.33	89.70	7311.12	61.12	303.33	9.92	304.71	40.500230	-104.886650
7657.00	93.00	89.50	7310.33	61.31	330.32	9.92	331.69	40.500230	-104.886553
7752.00	91.90	87.90	7306.27	63.46	425.20	2.04	426.60	40.500236	-104.886212
7848.00	91.60	87.10	7303.34	67.65	521.07	0.89	522.53	40.500248	-104.885867
7944.00	91.20	89.00	7301.00	70.91	616.98	2.02	618.50	40.500257	-104.885523
8039.00	92.30	89.00	7298.09	72.57	711.92	1.16	713.45	40.500261	-104.885181
8135.00	91.70	89.20	7294.74	74.08	807.85	0.66	809.39	40.500265	-104.884836
8230.00	89.30	89.50	7293.92	75.15	902.83	2.55	904.37	40.500268	-104.884495
8327.00	89.50	89.90	7294.93	75.66	999.82	0.46	1001.34	40.500270	-104.884146
8423.00	89.70	88.40	7295.60	77.09	1095.81	1.58	1097.34	40.500274	-104.883801
8519.00	89.60	88.20	7296.19	79.93	1191.76	0.23	1193.33	40.500281	-104.883456
8615.00	90.20	87.20	7296.36	83.79	1287.69	1.21	1289.32	40.500292	-104.883111
8711.00	89.10	89.90	7296.94	86.22	1383.64	3.04	1385.31	40.500299	-104.882766
8807.00	89.60	88.90	7298.03	87.22	1479.63	1.16	1481.29	40.500301	-104.882421
8904.00	89.60	90.70	7298.71	87.56	1576.62	1.86	1578.26	40.500302	-104.882072
8999.00	91.20	92.10	7298.05	85.24	1671.59	2.24	1673.14	40.500296	-104.881730

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	DLS [deg/100ft]	Vertical Section[ft]	Lat - NAD 83	Long - NAD 83
9095.00	91.60	91.00	7295.70	82.64	1767.52	1.22	1768.99	40.500289	-104.881385
9191.00	91.30	90.20	7293.27	81.64	1863.48	0.89	1864.90	40.500286	-104.881040
9286.00	90.60	89.10	7291.70	82.22	1958.47	1.37	1959.87	40.500287	-104.880699
9382.00	91.20	88.10	7290.19	84.56	2054.42	1.21	2055.86	40.500294	-104.880354
9477.00	88.90	88.20	7290.10	87.63	2149.37	2.42	2150.85	40.500302	-104.880012
9573.00	86.90	90.20	7293.62	88.97	2245.29	2.95	2246.77	40.500306	-104.879668
9668.00	87.70	92.50	7298.10	86.73	2340.15	2.56	2341.55	40.500300	-104.879326
9764.00	87.50	91.40	7302.12	83.47	2436.00	1.16	2437.30	40.500291	-104.878982
9860.00	89.60	91.70	7304.55	80.88	2531.93	2.21	2533.14	40.500284	-104.878637
9955.00	90.50	90.20	7304.46	79.30	2626.92	1.84	2628.06	40.500279	-104.878295
10051.00	90.20	88.70	7303.88	80.22	2722.91	1.59	2724.05	40.500282	-104.877950
10147.00	88.60	89.90	7304.88	81.39	2818.89	2.08	2820.03	40.500285	-104.877605
10242.00	88.10	87.90	7307.62	83.22	2913.83	2.17	2914.98	40.500290	-104.877264
10338.00	88.30	88.00	7310.63	86.65	3009.72	0.23	3010.93	40.500299	-104.876919
10434.00	90.10	88.10	7311.97	89.92	3105.65	1.88	3106.91	40.500308	-104.876574
10530.00	91.70	90.10	7310.47	91.42	3201.62	2.67	3202.89	40.500312	-104.876229
10626.00	91.30	89.00	7307.95	92.18	3297.58	1.22	3298.84	40.500314	-104.875884
10722.00	89.20	90.20	7307.53	92.85	3393.57	2.52	3394.82	40.500316	-104.875539
10818.00	88.60	92.90	7309.38	90.25	3489.51	2.88	3490.67	40.500309	-104.875194
10914.00	88.00	91.70	7312.23	86.40	3585.39	1.40	3586.43	40.500298	-104.874849
11010.00	89.00	91.80	7314.74	83.47	3681.31	1.05	3682.25	40.500290	-104.874504
11106.00	90.20	90.40	7315.41	81.63	3777.28	1.92	3778.16	40.500285	-104.874159
11201.00	90.80	89.50	7314.58	81.71	3872.28	1.14	3873.13	40.500285	-104.873817
11297.00	91.60	88.50	7312.57	83.39	3968.24	1.33	3969.10	40.500290	-104.873472
11393.00	90.10	88.20	7311.15	86.15	4064.19	1.59	4065.09	40.500298	-104.873127
11489.00	89.40	87.50	7311.56	89.75	4160.12	1.03	4161.08	40.500307	-104.872782
11585.00	89.00	87.10	7312.90	94.27	4256.00	0.59	4257.04	40.500320	-104.872438
11676.25	89.49	85.94	7314.11	99.81	4347.07	1.38	4348.22	40.500335	-104.872110
11679.00	89.50	85.90	7314.13	100.01	4349.82	1.50	4350.96	40.500335	-104.872100
11759.00	89.50	85.90	7314.83	105.73	4429.61	==>	4430.87	40.500351	-104.871813

**Comments**

MD[ft]	TVD[ft]	North[ft]	East[ft]	Lat - NAD 83	Long - NAD 83	Comment
1063.73	1063.73	-0.29	1.20	40.500061	-104.887737	9.625" Csg: 1064 MD/TVD
7464.54	7286.23	60.55	140.59	40.500228	-104.887235	460 Setback: 7465 / 7286 MD/TVD, 2226 FSL, 460 FWL Sec 10
7490.00	7294.02	60.92	164.83	40.500229	-104.887148	Top Perf: 7490 / 7294 MD/TVD, 2226 FSL, 484 FWL Sec 10
11612.00	7313.34	95.72	4282.96	40.500324	-104.872341	Btm Perf: 11,612 / 7313 MD/TVD, 2236 FSL, 618 FEL Sec 10
11666.73	7314.02	99.15	4337.58	40.500333	-104.872144	Btm Toe Sub: 11,667 / 7314 MD/TVD, 2239 FSL, 563 FEL Sec 10
11755.00	7314.79	105.44	4425.62	40.500350	-104.871828	5.5" Csg: 11,755 / 7315 MD/TVD, 2244 FSL, 475 FEL Sec 10
11759.00	7314.83	105.73	4429.61	40.500351	-104.871813	BHL: 11,759 / 7315 MD/TVD, 2245 FSL, 471 FEL Sec 10

**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	16.20	16.20	0.00	0.00	1074.20	1074.20	-0.31	1.16
7.875	1074.20	1074.20	-0.31	1.16	11759.00	7314.83	105.73	4429.61

**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	16.20	16.20	0.00	0.00	1063.73	1063.73	-0.29	1.20
5 1/2in Casing	16.20	16.20	0.00	0.00	11755.00	7314.79	105.44	4425.62

**Survey Tool Program**

Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool
870547	As Drilled	11759.00	7314.83	MWD

Coordinates are from Slot  
MD's and TVD's are from Rig Floor 4855.2ft above Mean Sea Level  
Vertical Section is from Wellhead on azimuth 88.63 degrees  
Bottom hole distance is 4430.87 Feet on azimuth 88.63 degrees from Wellhead  
Survey calculation uses Minimum Curvature method