

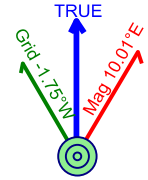


**Job Number:** 15xxxh  
**Company:** Black Hills Plateau Production Co  
**Lease/Well:** WHF 12-16BH  
**Location:** Mesa County, CO  
**Rig Name:**  
**State/County:** CO/ Mesa  
**Country:** USA

**Elev. GL:** 5081.00 ft    **RKB:** 25.00 ft  
**System:** US State Plane 1983  
**Group:** Colorado Central Zone  
**Datum:** GRS80  
**Mag. Decl.:** 10.01° (C:\HawkEye\IGRF2015.MIF)  
**Grid Conv.:** -1.74892 W  
**Date:** Tuesday, July 07, 2015

**NOVA Directional Inc. Survey Report**

Calculated by HawkEye Software  
 Minimum Curvature Method  
 Vertical Section Plane 180.00°  
 Northing (US ft): 1539266.46    Easting (US ft): 2215183.94  
 Latitude: 39°16'52.0936" N    Longitude: -108°16'22.8922" W  
 Well Location: Section 12, T9S, R98W, Sixth Principal Meridian, Mesa County, CO  
 Direction Reference: True North



Measured Depth (Ft)	INC Deg	AZM Deg	TVD (Ft)	NS (Ft)	EW (Ft)	VS (Ft)	DLS %/100 Ft	Latitude Dec. Deg	Longitude Dec. Deg
<b>Surface</b>									
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	39.2811371	-108.2730256
<b>Mesaverde</b>									
56.00	0.00	0.00	56.00	0.00	0.00	0.00	0.00	39.2811371	-108.2730256
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	39.2811371	-108.2730256
<b>Casing 10 3/4 "</b>									
1000.00	0.00	0.00	1000.00	0.00	0.00	0.00	0.00	39.2811371	-108.2730256
<b>Tangent - Build @ 2.00°/ 100 Ft</b>									
1200.00	0.00	259.92	1200.00	0.00	0.00	0.00	0.00	39.2811371	-108.2730256
1260.00	1.20	259.92	1260.00	-0.11	-0.62	0.11	2.00	39.2811368	-108.2730278
1320.00	2.40	259.92	1319.96	-0.44	-2.47	0.44	2.00	39.2811359	-108.2730344
1380.00	3.60	259.92	1379.88	-0.99	-5.57	0.99	2.00	39.2811344	-108.2730453
1440.00	4.80	259.92	1439.72	-1.76	-9.89	1.76	2.00	39.2811323	-108.2730606
1500.00	6.00	259.92	1499.45	-2.75	-15.45	2.75	2.00	39.2811296	-108.2730802
1560.00	7.20	259.92	1559.05	-3.96	-22.24	3.96	2.00	39.2811262	-108.2731042
1620.00	8.40	259.92	1618.50	-5.38	-30.26	5.38	2.00	39.2811223	-108.2731325
1680.00	9.60	259.92	1677.76	-7.02	-39.50	7.02	2.00	39.2811178	-108.2731652
1740.00	10.80	259.92	1736.81	-8.89	-49.96	8.89	2.00	39.2811127	-108.2732021
1800.00	12.00	259.92	1795.62	-10.96	-61.64	10.96	2.00	39.2811070	-108.2732434
1860.00	13.20	259.92	1854.18	-13.25	-74.52	13.25	2.00	39.2811007	-108.2732889
<b>Begin Hold @ 13.31°,259.92° Azm</b>									
1865.64	13.31	259.92	1859.67	-13.48	-75.80	13.48	2.00	39.2811001	-108.2732934
<b>Cameo</b>									
2095.14	13.31	259.92	2083.00	-22.73	-127.82	22.73	0.00	39.2810747	-108.2734772
2365.64	13.31	259.92	2346.23	-33.64	-189.15	33.64	0.00	39.2810447	-108.2736938
<b>Rollins</b>									
2427.06	13.31	259.92	2406.00	-36.12	-203.08	36.12	0.00	39.2810379	-108.2737430
<b>Cozzette</b>									
2623.34	13.31	259.92	2597.00	-44.03	-247.57	44.03	0.00	39.2810162	-108.2739002
<b>Corcoran</b>									
2828.86	13.31	259.92	2797.00	-52.32	-294.17	52.32	0.00	39.2809935	-108.2740648
2865.64	13.31	259.92	2832.80	-53.80	-302.51	53.80	0.00	39.2809894	-108.2740943
<b>Mancos</b>									
3118.64	13.31	259.92	3079.00	-64.00	-359.86	64.00	0.00	39.2809614	-108.2742969
3365.64	13.31	259.92	3319.36	-73.96	-415.86	73.96	0.00	39.2809340	-108.2744948
<b>Mancos A</b>									
3536.88	13.31	259.92	3486.00	-80.86	-454.68	80.86	0.00	39.2809151	-108.2746319
3865.64	13.31	259.92	3805.92	-94.12	-529.22	94.12	0.00	39.2808787	-108.2748952
<b>MOAB</b>									
4266.49	13.31	259.92	4196.00	-110.28	-620.09	110.28	0.00	39.2808343	-108.2752163
4365.64	13.31	259.92	4292.49	-114.28	-642.57	114.28	0.00	39.2808233	-108.2752957
<b>Mancos B</b>									
4685.76	13.31	259.92	4604.00	-127.19	-715.15	127.19	0.00	39.2807879	-108.2755521
4865.64	13.31	259.92	4779.05	-134.44	-755.93	134.44	0.00	39.2807680	-108.2756961

Measured Depth (Ft)	INC Deg	AZM Deg	TVD (Ft)	NS (Ft)	EW (Ft)	VS (Ft)	DLS %/100 Ft	Latitude Dec. Deg	Longitude Dec. Deg
5365.64	13.31	259.92	5265.61	-154.60	-869.28	154.60	0.00	39.2807126	-108.2760966
<b>Niobrara</b>									
5692.83	13.31	259.92	5584.00	-167.79	-943.46	167.79	0.00	39.2806764	-108.2763586
<b> casing 7 5/8 "</b>									
5742.00	13.31	259.92	5631.86	-169.77	-954.61	169.77	0.00	39.2806709	-108.2763980
<b>KOP - Build and Turn @ 8.00°/100 Ft</b>									
5842.68	13.31	259.92	5729.84	-173.83	-977.43	173.83	0.00	39.2806598	-108.2764787
5902.68	14.94	241.31	5788.05	-178.76	-991.03	178.76	8.00	39.2806462	-108.2765267
5962.68	17.74	227.36	5845.64	-188.67	-1004.55	188.67	8.00	39.2806190	-108.2765744
6022.68	21.24	217.48	5902.21	-203.49	-1017.89	203.49	8.00	39.2805783	-108.2766216
6082.68	25.16	210.42	5957.36	-223.13	-1030.97	223.13	8.00	39.2805244	-108.2766678
6142.68	29.33	205.20	6010.70	-247.44	-1043.69	247.44	8.00	39.2804577	-108.2767127
6202.68	33.65	201.20	6061.85	-276.25	-1055.97	276.25	8.00	39.2803786	-108.2767561
6262.68	38.08	198.02	6110.47	-309.37	-1067.71	309.37	8.00	39.2802876	-108.2767976
6322.68	42.57	195.42	6156.20	-346.55	-1078.83	346.55	8.00	39.2801856	-108.2768369
6382.68	47.12	193.23	6198.74	-387.54	-1089.26	387.54	8.00	39.2800730	-108.2768737
6442.68	51.70	191.34	6237.77	-432.05	-1098.93	432.05	8.00	39.2799508	-108.2769078
6502.68	56.31	189.68	6273.02	-479.76	-1107.76	479.76	8.00	39.2798198	-108.2769390
6562.68	60.94	188.19	6304.26	-530.36	-1115.69	530.36	8.00	39.2796809	-108.2769670
6622.68	65.58	186.82	6331.25	-583.46	-1122.68	583.46	8.00	39.2795351	-108.2769917
6682.68	70.23	185.55	6353.81	-638.72	-1128.66	638.72	8.00	39.2793834	-108.2770128
6742.68	74.90	184.36	6371.78	-695.73	-1133.59	695.73	8.00	39.2792268	-108.2770303
6802.68	79.57	183.22	6385.04	-754.10	-1137.45	754.10	8.00	39.2790666	-108.2770439
6862.68	84.24	182.11	6393.49	-813.42	-1140.21	813.42	8.00	39.2789037	-108.2770536
6922.68	88.91	181.02	6397.08	-873.28	-1141.84	873.28	8.00	39.2787394	-108.2770594
<b>Target - Hold @ 93.28°,180.00° Azm</b>									
6978.79	93.28	180.00	6396.00	-929.36	-1142.34	929.36	8.00	39.2785854	-108.2770611
7478.79	93.28	180.00	6367.35	-1428.53	-1142.33	1428.53	0.00	39.2772148	-108.2770610
7978.79	93.28	180.00	6338.70	-1927.71	-1142.33	1927.71	0.00	39.2758443	-108.2770609
8478.79	93.28	180.00	6310.05	-2426.89	-1142.33	2426.89	0.00	39.2744738	-108.2770608
8978.79	93.28	180.00	6281.40	-2926.07	-1142.33	2926.07	0.00	39.2731032	-108.2770608
9478.79	93.28	180.00	6252.75	-3425.25	-1142.33	3425.25	0.00	39.2717327	-108.2770607
9978.79	93.28	180.00	6224.10	-3924.43	-1142.32	3924.43	0.00	39.2703621	-108.2770606
10478.79	93.28	180.00	6195.45	-4423.61	-1142.32	4423.61	0.00	39.2689916	-108.2770605
10978.79	93.28	180.00	6166.80	-4922.78	-1142.32	4922.78	0.00	39.2676210	-108.2770604
11478.79	93.28	180.00	6138.15	-5421.96	-1142.32	5421.96	0.00	39.2662505	-108.2770603
11978.79	93.28	180.00	6109.50	-5921.14	-1142.32	5921.14	0.00	39.2648799	-108.2770602
12478.79	93.28	180.00	6080.86	-6420.32	-1142.31	6420.32	0.00	39.2635094	-108.2770602
12978.79	93.28	180.00	6052.21	-6919.50	-1142.31	6919.50	0.00	39.2621388	-108.2770601
13478.79	93.28	180.00	6023.56	-7418.68	-1142.31	7418.68	0.00	39.2607683	-108.2770600
13978.79	93.28	180.00	5994.91	-7917.86	-1142.31	7917.86	0.00	39.2593977	-108.2770599
14478.79	93.28	180.00	5966.26	-8417.03	-1142.30	8417.03	0.00	39.2580272	-108.2770598
14978.79	93.28	180.00	5937.61	-8916.21	-1142.30	8916.21	0.00	39.2566566	-108.2770597
15478.79	93.28	180.00	5908.96	-9415.39	-1142.30	9415.39	0.00	39.2552861	-108.2770596
<b>BH - Proposed End of Lateral</b>									
15966.78	93.28	180.00	5881.00	-9902.58	-1142.30	9902.58	0.00	39.2539484	-108.2770596



Job ID : 15xxx  
 Company : Black Hills Plateau Production Co  
 Lease/Well : WHF 12-16BH  
 Location : Mesa County, CO  
 Rig Name :

Elevation (To MSL) : 5081 ft  
 RKB : 25 ft  
 North Reference : True North  
 Latitude : 39°16'52.0936" N  
 Longitude : -108°16'22.8922" W



**CRITICAL POINTS - WHF 12-16BH PLAN 7-07-15**

MD	Inc	Azm	TVD	EW	NS	VS	CI	Cldir	DLS
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1200.00	0.00	259.92	1200.00	0.00	0.00	0.00	0.00	0.00	0.00
1865.64	13.31	259.92	1859.67	-75.80	-13.48	13.48	76.98	259.92	2.00
5842.68	13.31	259.92	5729.84	-977.43	-173.83	173.83	992.77	259.92	0.00
6978.79	93.28	180.00	6396.00	-1142.34	-929.36	929.36	1472.63	230.87	8.00
15966.78	93.28	180.00	5881.00	-1142.30	-9902.58	9902.58	9968.25	186.58	0.00

**CURVES LEGEND**  
 WHF 12-16BH plan 7-07-15  
 WHF 12-16BH Survey  
 WHF 12-16BH plan 7-07-15  
 WHF 12-16BH plan 7-07-15

