



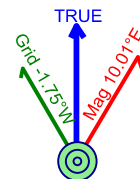
Job Number: 15xxxa
Company: Black Hills Plateau Production Co
Lease/Well: WHF 12-16AH
Location: Mesa County, CO
Rig Name:
State/Country: CO/ Mesa
Country: USA

Elev. GL: 5082.00 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.: -1.74897 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): 1539271.55 Easting (US ft): 2215159.47
Latitude: 39°16'52.1364" N Longitude: -108°16'23.2052" 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 |
|--|---------|---------|----------|---------|----------|---------|--------------|-------------------|--------------------|
| Surface | | | | | | | | | |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 39.2811490 | -108.2731126 |
| Mesaverde | | | | | | | | | |
| 57.00 | 0.00 | 0.00 | 57.00 | 0.00 | 0.00 | 0.00 | 0.00 | 39.2811490 | -108.2731126 |
| Tangent - Build @ 2.00°/ 100 Ft Casing 10 3/4 " | | | | | | | | | |
| 1000.00 | 0.00 | 266.72 | 1000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 39.2811490 | -108.2731126 |
| 1060.00 | 1.20 | 266.72 | 1060.00 | -0.04 | -0.63 | 0.04 | 2.00 | 39.2811489 | -108.2731148 |
| 1120.00 | 2.40 | 266.72 | 1119.96 | -0.14 | -2.51 | 0.14 | 2.00 | 39.2811486 | -108.2731214 |
| 1180.00 | 3.60 | 266.72 | 1179.88 | -0.32 | -5.64 | 0.32 | 2.00 | 39.2811481 | -108.2731325 |
| 1240.00 | 4.80 | 266.72 | 1239.72 | -0.57 | -10.03 | 0.57 | 2.00 | 39.2811474 | -108.2731480 |
| 1300.00 | 6.00 | 266.72 | 1299.45 | -0.90 | -15.67 | 0.90 | 2.00 | 39.2811465 | -108.2731679 |
| 1360.00 | 7.20 | 266.72 | 1359.05 | -1.29 | -22.55 | 1.29 | 2.00 | 39.2811455 | -108.2731922 |
| 1420.00 | 8.40 | 266.72 | 1418.50 | -1.76 | -30.68 | 1.76 | 2.00 | 39.2811442 | -108.2732210 |
| 1480.00 | 9.60 | 266.72 | 1477.76 | -2.29 | -40.05 | 2.29 | 2.00 | 39.2811427 | -108.2732541 |
| 1540.00 | 10.80 | 266.72 | 1536.81 | -2.90 | -50.66 | 2.90 | 2.00 | 39.2811410 | -108.2732915 |
| 1600.00 | 12.00 | 266.72 | 1595.62 | -3.58 | -62.50 | 3.58 | 2.00 | 39.2811392 | -108.2733334 |
| 1660.00 | 13.20 | 266.72 | 1654.18 | -4.33 | -75.57 | 4.33 | 2.00 | 39.2811371 | -108.2733795 |
| 1720.00 | 14.40 | 266.72 | 1712.44 | -5.14 | -89.86 | 5.14 | 2.00 | 39.2811349 | -108.2734300 |
| 1780.00 | 15.60 | 266.72 | 1770.40 | -6.03 | -105.36 | 6.03 | 2.00 | 39.2811324 | -108.2734848 |
| 1840.00 | 16.80 | 266.72 | 1828.02 | -6.99 | -122.07 | 6.99 | 2.00 | 39.2811298 | -108.2735438 |
| 1900.00 | 18.00 | 266.72 | 1885.27 | -8.01 | -139.98 | 8.01 | 2.00 | 39.2811270 | -108.2736071 |
| 1960.00 | 19.20 | 266.72 | 1942.13 | -9.11 | -159.09 | 9.11 | 2.00 | 39.2811240 | -108.2736746 |
| 2020.00 | 20.40 | 266.72 | 1998.59 | -10.27 | -179.38 | 10.27 | 2.00 | 39.2811208 | -108.2737463 |
| 2080.00 | 21.60 | 266.72 | 2054.60 | -11.50 | -200.85 | 11.50 | 2.00 | 39.2811174 | -108.2738221 |
| Cameo | | | | | | | | | |
| 2111.69 | 22.23 | 266.72 | 2084.00 | -12.18 | -212.66 | 12.18 | 2.00 | 39.2811156 | -108.2738638 |
| 2140.00 | 22.80 | 266.72 | 2110.15 | -12.80 | -223.48 | 12.80 | 2.00 | 39.2811139 | -108.2739021 |
| 2200.00 | 24.00 | 266.72 | 2165.21 | -14.16 | -247.27 | 14.16 | 2.00 | 39.2811101 | -108.2739861 |
| 2260.00 | 25.20 | 266.72 | 2219.77 | -15.58 | -272.20 | 15.58 | 2.00 | 39.2811062 | -108.2740742 |
| 2320.00 | 26.40 | 266.72 | 2273.79 | -17.08 | -298.28 | 17.08 | 2.00 | 39.2811021 | -108.2741663 |
| Begin Hold @ 27.14°,266.72° Azm | | | | | | | | | |
| 2357.10 | 27.14 | 266.72 | 2306.91 | -18.03 | -314.96 | 18.03 | 2.00 | 39.2810995 | -108.2742253 |
| Rollins | | | | | | | | | |
| 2469.58 | 27.14 | 266.72 | 2407.00 | -20.97 | -366.19 | 20.97 | 0.00 | 39.2810914 | -108.2744062 |
| Cozzette | | | | | | | | | |
| 2684.22 | 27.14 | 266.72 | 2598.00 | -26.56 | -463.95 | 26.56 | 0.00 | 39.2810761 | -108.2747516 |
| Corcoran | | | | | | | | | |
| 2908.97 | 27.14 | 266.72 | 2798.00 | -32.42 | -566.31 | 32.42 | 0.00 | 39.2810600 | -108.2751132 |
| Mancos | | | | | | | | | |
| 3225.86 | 27.14 | 266.72 | 3080.00 | -40.69 | -710.64 | 40.69 | 0.00 | 39.2810373 | -108.2756231 |
| 3357.10 | 27.14 | 266.72 | 3196.79 | -44.11 | -770.41 | 44.11 | 0.00 | 39.2810279 | -108.2758343 |
| Mancos A | | | | | | | | | |
| 3683.23 | 27.14 | 266.72 | 3487.00 | -52.61 | -918.95 | 52.61 | 0.00 | 39.2810045 | -108.2763590 |
| 4357.10 | 27.14 | 266.72 | 4086.67 | -70.19 | -1225.87 | 70.19 | 0.00 | 39.2809562 | -108.2774433 |

| Measured Depth (Ft) | INC Deg | AZM Deg | TVD (Ft) | NS (Ft) | EW (Ft) | VS (Ft) | DLS °/100 Ft | Latitude Dec. Deg | Longitude Dec. Deg |
|--|------------|------------|-------------|------------|------------|------------|-----------------|-------------------------|--------------------------|
|  MOAB | | | | | | | | | |
| 4481.09 | 27.14 | 266.72 | 4197.00 | -73.42 | -1282.34 | 73.42 | 0.00 | 39.2809473 | -108.2776428 |
|  Mancos B | | | | | | | | | |
| 4939.58 | 27.14 | 266.72 | 4605.00 | -85.38 | -1491.16 | 85.38 | 0.00 | 39.2809145 | -108.2783805 |
| 5357.10 | 27.14 | 266.72 | 4976.55 | -96.26 | -1681.32 | 96.26 | 0.00 | 39.2808846 | -108.2790523 |
|  Niobrara | | | | | | | | | |
| 6040.85 | 27.14 | 266.72 | 5585.00 | -114.09 | -1992.73 | 114.09 | 0.00 | 39.2808355 | -108.2801525 |
|  Casing 7 5/8 " | | | | | | | | | |
| 6090.00 | 27.14 | 266.72 | 5628.73 | -115.37 | -2015.12 | 115.37 | 0.00 | 39.2808320 | -108.2802315 |
| KOP - Build and Turn @ 8.00°/100 Ft | | | | | | | | | |
| 6232.47 | 27.14 | 266.72 | 5755.51 | -119.09 | -2080.01 | 119.09 | 0.00 | 39.2808218 | -108.2804608 |
| 6292.47 | 27.89 | 256.45 | 5808.76 | -123.16 | -2107.33 | 123.16 | 8.00 | 39.2808106 | -108.2805573 |
| 6352.47 | 29.36 | 246.90 | 5861.45 | -132.23 | -2134.52 | 132.23 | 8.00 | 39.2807857 | -108.2806533 |
| 6412.47 | 31.44 | 238.34 | 5913.22 | -146.22 | -2161.38 | 146.22 | 8.00 | 39.2807473 | -108.2807482 |
| 6472.47 | 34.02 | 230.84 | 5963.72 | -165.04 | -2187.72 | 165.04 | 8.00 | 39.2806956 | -108.2808413 |
| 6532.47 | 36.99 | 224.35 | 6012.57 | -188.56 | -2213.37 | 188.56 | 8.00 | 39.2806310 | -108.2809319 |
| 6592.47 | 40.27 | 218.73 | 6059.45 | -216.62 | -2238.14 | 216.62 | 8.00 | 39.2805540 | -108.2810194 |
| 6652.47 | 43.79 | 213.85 | 6104.02 | -249.01 | -2261.85 | 249.01 | 8.00 | 39.2804651 | -108.2811031 |
| 6712.47 | 47.49 | 209.57 | 6145.97 | -285.50 | -2284.34 | 285.50 | 8.00 | 39.2803649 | -108.2811826 |
| 6772.47 | 51.34 | 205.78 | 6185.01 | -325.86 | -2305.46 | 325.86 | 8.00 | 39.2802541 | -108.2812572 |
| 6832.47 | 55.29 | 202.38 | 6220.86 | -369.78 | -2325.05 | 369.78 | 8.00 | 39.2801335 | -108.2813264 |
| 6892.47 | 59.33 | 199.30 | 6253.26 | -416.96 | -2342.97 | 416.96 | 8.00 | 39.2800039 | -108.2813897 |
| 6952.47 | 63.43 | 196.46 | 6282.00 | -467.07 | -2359.11 | 467.07 | 8.00 | 39.2798663 | -108.2814467 |
| 7012.47 | 67.59 | 193.82 | 6306.88 | -519.77 | -2373.35 | 519.77 | 8.00 | 39.2797216 | -108.2814970 |
| 7072.47 | 71.78 | 191.34 | 6327.71 | -574.67 | -2385.58 | 574.67 | 8.00 | 39.2795709 | -108.2815402 |
| 7132.47 | 76.01 | 188.97 | 6344.35 | -631.40 | -2395.73 | 631.40 | 8.00 | 39.2794151 | -108.2815760 |
| 7192.47 | 80.26 | 186.69 | 6356.68 | -689.55 | -2403.72 | 689.55 | 8.00 | 39.2792555 | -108.2816042 |
| 7252.47 | 84.53 | 184.47 | 6364.62 | -748.73 | -2409.49 | 748.73 | 8.00 | 39.2790930 | -108.2816246 |
| 7312.47 | 88.80 | 182.27 | 6368.11 | -808.50 | -2413.01 | 808.50 | 8.00 | 39.2789289 | -108.2816370 |
| 7372.47 | 93.07 | 180.09 | 6367.14 | -868.47 | -2414.25 | 868.47 | 8.00 | 39.2787642 | -108.2816413 |
| Target - Hold @ 93.25°,180.00° Azm | | | | | | | | | |
| 7374.93 | 93.25 | 180.00 | 6367.00 | -870.92 | -2414.25 | 870.92 | 8.00 | 39.2787575 | -108.2816413 |
| 8374.93 | 93.25 | 180.00 | 6310.35 | -1869.31 | -2414.25 | 1869.31 | 0.00 | 39.2760163 | -108.2816410 |
| 9374.93 | 93.25 | 180.00 | 6253.71 | -2867.71 | -2414.25 | 2867.71 | 0.00 | 39.2732751 | -108.2816407 |
| 10374.93 | 93.25 | 180.00 | 6197.06 | -3866.10 | -2414.25 | 3866.10 | 0.00 | 39.2705339 | -108.2816403 |
| 11374.93 | 93.25 | 180.00 | 6140.42 | -4864.50 | -2414.25 | 4864.50 | 0.00 | 39.2677927 | -108.2816400 |
| 12374.93 | 93.25 | 180.00 | 6083.77 | -5862.89 | -2414.25 | 5862.89 | 0.00 | 39.2650515 | -108.2816397 |
| 13374.93 | 93.25 | 180.00 | 6027.13 | -6861.29 | -2414.24 | 6861.29 | 0.00 | 39.2623103 | -108.2816393 |
| 14374.93 | 93.25 | 180.00 | 5970.48 | -7859.68 | -2414.24 | 7859.68 | 0.00 | 39.2595691 | -108.2816390 |
| 15374.93 | 93.25 | 180.00 | 5913.84 | -8858.07 | -2414.24 | 8858.07 | 0.00 | 39.2568279 | -108.2816387 |
| 16374.93 | 93.25 | 180.00 | 5857.19 | -9856.47 | -2414.24 | 9856.47 | 0.00 | 39.2540867 | -108.2816383 |
| AH Proposed End of Lateral | | | | | | | | | |
| 16466.47 | 93.25 | 180.00 | 5852.01 | -9947.86 | -2414.24 | 9947.86 | 0.00 | 39.2538358 | -108.2816383 |



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

Elevation (To MSL) : 5082 ft
RKB : 25 ft
North Reference : True North
Latitude : 39°16'52.1365" N
Longitude : -108°16'23.2052" W



| CRITICAL POINTS - WHF 12-16AH 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 | |
| 1000.00 | 0.00 | 266.72 | 1000.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | |
| 2357.10 | 27.14 | 266.72 | 2306.91 | -314.96 | -18.03 | 18.03 | 315.48 | 266.72 | 2.00 | |
| 6232.47 | 27.14 | 266.72 | 5755.51 | -2080.01 | -119.09 | 119.09 | 2083.41 | 266.72 | 0.00 | |
| 7374.93 | 93.25 | 180.00 | 6367.00 | -2414.25 | -870.92 | 870.92 | 2566.54 | 250.16 | 8.00 | |
| 16466.47 | 93.25 | 180.00 | 5852.01 | -2414.24 | -9947.86 | 9947.86 | 10236.63 | 193.64 | 0.00 | |

CURVES LEGEND:
— WHF 12-16AH plan 7-07-15
— WHF 12-16BH plan 7-07-15
— WHF 12-16CH plan 7-07-15

