

HRM Resources

| | | | |
|--------------|-------------------|----------|----------------------------------|
| Location | DJ Basin | Slot | PC SOUTH 1S-66-2928-18NH |
| Field | WATTENBERG | Well | W PC SOUTH 1S-66-2928-18NH |
| Installation | PC 1S-66-2928 PAD | Wellbore | W PC SOUTH 1S-66-2928-18NH (PWB) |

N
GRID

East (Feet) ->

-3200 -1600 0 1600 3200 4800 6400 8000 9600 11200
Scale 1 cm = 800 ft

Jan-24-2017
EMM-2015 [2000.0-2020.0] Dip: 66.34 deg Field: 52071.6 nT
Lat: N39 56 7.4760 Long: W104 48 15.5520 Elev: 9723.01 ft
Magnetic North is 8.36 deg East of True North
GRID North is 0.45 deg East of True North
To correct azimuth from True to GRID subtract 0.45 deg
To correct azimuth from Magnetic to GRID add 7.91 deg

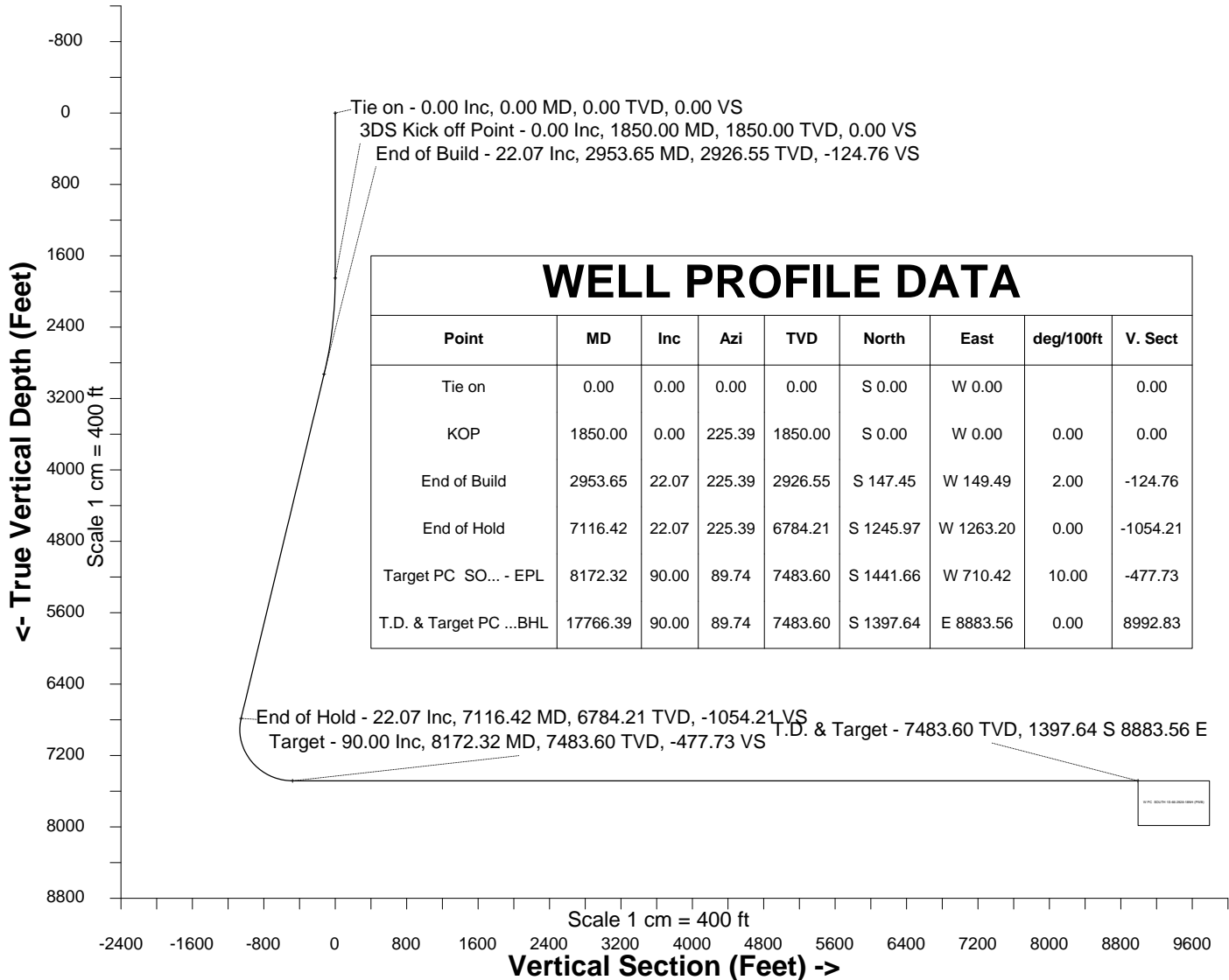
| | |
|---|------------|
| Created by | admin |
| Date plotted | 1-Feb-2017 |
| Plot reference is W PC SOUTH 1S-66-2928-18NH (PWB). Ref wellpath is W PC SOUTH 1S-66-2928-18NH (PWP#1). Coordinates are in Feet reference PC SOUTH 1S-66-2928-18NH. True Vertical Depths are reference Rig Datum. Measured Depths are reference Rig Datum. Rig Datum: Planned Datum #1 Rig Datum to Mean Sea Level: 5062.60 ft. Plot North is aligned to GRID North. | |

Surface 0.00 N 0.00 E

PC SOUTH 1S-66-2928-18NH - EPL
PC SOUTH 1S-66-2928-18NH - BHL

PC North Block Boundary

<- North(Feet)
1600
0
-1600
-3200
Scale 1 cm = 800 ft



Azimuth 98.94 with reference 0.00 N, 0.00 E from PC SOUTH 1S-66-2928-18NH



Wellhead Details

| Name | Latitude | Longitude | Northing | Easting | North | East | Slot Elevation Above Ground |
|--------------------------|---------------|-----------------|--------------|--------------|---------|--------|-----------------------------|
| PC SOUTH 1S-66-2928-18NH | N39 56 6.4320 | W104 48 15.1560 | 1219978.2885 | 3195111.5100 | 105.40S | 31.67E | 0.00 |

Declination

| Date | Source | Time |
|-------------|--------------------------|-------|
| Jan-24-2017 | EMM-2015 [2000.0-2020.0] | 09:32 |

Installation Details

| Name | Installation Position (Latitude) | Installation Position (Longitude) | Northing | Easting | Coord System Name | North Alignment |
|-------------------|----------------------------------|-----------------------------------|--------------|--------------|--|-----------------|
| PC 1S-66-2928 PAD | N39 56 7.4760 | W104 48 15.5520 | 1220083.6821 | 3195079.8360 | CO83-NF on NORTH AMERICAN DATUM 1983 datum | Grid |

Summary Wellpath

| MD[ft] | Inc[deg] | Azi[deg] | TVD[ft] | North[ft] | East[ft] | Dogleg [deg/100ft] | Vertical Section[ft] | Northing | Easting |
|----------|----------|----------|---------|-----------|----------|--------------------|----------------------|------------|------------|
| 0.00 | 0.00 | 0.000 | 0.00 | 0.00N | 0.00E | | 0.00 | 1219978.29 | 3195111.51 |
| 1850.00 | 0.00 | 225.390 | 1850.00 | 0.00N | 0.00E | ==> | 0.00 | 1219978.29 | 3195111.51 |
| 2953.65 | 22.07 | 225.390 | 2926.55 | 147.45S | 149.49W | 2.00 | -124.76 | 1219830.84 | 3194962.03 |
| 7116.42 | 22.07 | 225.390 | 6784.21 | 1245.97S | 1263.20W | ==> | -1054.21 | 1218732.36 | 3193848.35 |
| 8172.32 | 90.00 | 89.740 | 7483.60 | 1441.66S | 710.42W | 10.00 | -477.73 | 1218536.67 | 3194401.11 |
| 17766.39 | 90.00 | 89.740 | 7483.60 | 1397.64S | 8883.56E | ==> | 8992.83 | 1218580.70 | 3203994.80 |

Interpolated Wellpath

| MD[ft] | Inc[deg] | Azi[deg] | TVD[ft] | North[ft] | East[ft] | Dogleg [deg/100ft] | Vertical Section[ft] | All Station Comments |
|---------|----------|----------|---------|-----------|----------|--------------------|----------------------|----------------------|
| 0.00 | 0.00 | 0.000 | 0.00 | 0.00N | 0.00E | | 0.00 | Slot Datum |
| 100.00 | 0.00 | 0.000 | 100.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 200.00 | 0.00 | 0.000 | 200.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 300.00 | 0.00 | 0.000 | 300.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 400.00 | 0.00 | 0.000 | 400.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 500.00 | 0.00 | 0.000 | 500.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 600.00 | 0.00 | 0.000 | 600.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 700.00 | 0.00 | 0.000 | 700.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 800.00 | 0.00 | 0.000 | 800.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 900.00 | 0.00 | 0.000 | 900.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 1000.00 | 0.00 | 0.000 | 1000.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 1100.00 | 0.00 | 0.000 | 1100.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 1200.00 | 0.00 | 0.000 | 1200.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 1300.00 | 0.00 | 0.000 | 1300.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 1400.00 | 0.00 | 0.000 | 1400.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 1500.00 | 0.00 | 0.000 | 1500.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 1600.00 | 0.00 | 0.000 | 1600.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 1700.00 | 0.00 | 0.000 | 1700.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 1800.00 | 0.00 | 0.000 | 1800.00 | 0.00N | 0.00E | ==> | 0.00 | |
| 1900.00 | 1.00 | 225.390 | 1900.00 | 0.31S | 0.31W | 2.00 | -0.26 | |
| 2000.00 | 3.00 | 225.390 | 1999.93 | 2.76S | 2.80W | 2.00 | -2.33 | |
| 2100.00 | 5.00 | 225.390 | 2099.68 | 7.66S | 7.76W | 2.00 | -6.48 | |
| 2200.00 | 7.00 | 225.390 | 2199.13 | 15.00S | 15.20W | 2.00 | -12.69 | |
| 2300.00 | 9.00 | 225.390 | 2298.15 | 24.77S | 25.11W | 2.00 | -20.96 | |
| 2400.00 | 11.00 | 225.390 | 2396.63 | 36.96S | 37.47W | 2.00 | -31.27 | |
| 2500.00 | 13.00 | 225.390 | 2494.44 | 51.56S | 52.27W | 2.00 | -43.63 | |
| 2600.00 | 15.00 | 225.390 | 2591.46 | 68.55S | 69.50W | 2.00 | -58.00 | |
| 2700.00 | 17.00 | 225.390 | 2687.58 | 87.90S | 89.12W | 2.00 | -74.38 | |
| 2800.00 | 19.00 | 225.390 | 2782.68 | 109.60S | 111.12W | 2.00 | -92.73 | |
| 2900.00 | 21.00 | 225.390 | 2876.65 | 133.62S | 135.47W | 2.00 | -113.05 | |
| 3000.00 | 22.07 | 225.390 | 2969.50 | 159.68S | 161.89W | ==> | -135.11 | |
| 3100.00 | 22.07 | 225.390 | 3062.18 | 186.07S | 188.64W | ==> | -157.43 | |

All data is in Feet unless otherwise stated
Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5062.6ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 98.940 degrees
Bottom hole distance is 8992.83 Feet on azimuth 98.94 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 1-Feb-2017



SYSDRILL
Well Design Combined Report
Wellbore: W PC SOUTH 1S-66-2928-18NH (PWB)



| Interpolated Wellpath | | | | | | | | |
|-----------------------|----------|----------|---------|-----------|----------|-----------------------|-------------------------|-------------------------|
| MD[ft] | Inc[deg] | Azi[deg] | TVD[ft] | North[ft] | East[ft] | Dogleg [deg/100ft] | Vertical Section[ft] | All Station Comments |
| 3200.00 | 22.07 | 225.390 | 3154.85 | 212.46S | 215.40W | ==> | -179.76 | |
| 3300.00 | 22.07 | 225.390 | 3247.52 | 238.85S | 242.15W | ==> | -202.09 | |
| 3400.00 | 22.07 | 225.390 | 3340.19 | 265.24S | 268.91W | ==> | -224.42 | |
| 3500.00 | 22.07 | 225.390 | 3432.86 | 291.63S | 295.66W | ==> | -246.74 | |
| 3600.00 | 22.07 | 225.390 | 3525.53 | 318.02S | 322.41W | ==> | -269.07 | |
| 3700.00 | 22.07 | 225.390 | 3618.20 | 344.40S | 349.17W | ==> | -291.40 | |
| 3800.00 | 22.07 | 225.390 | 3710.87 | 370.79S | 375.92W | ==> | -313.73 | |
| 3900.00 | 22.07 | 225.390 | 3803.54 | 397.18S | 402.68W | ==> | -336.05 | |
| 4000.00 | 22.07 | 225.390 | 3896.21 | 423.57S | 429.43W | ==> | -358.38 | |
| 4100.00 | 22.07 | 225.390 | 3988.88 | 449.96S | 456.18W | ==> | -380.71 | |
| 4200.00 | 22.07 | 225.390 | 4081.55 | 476.35S | 482.94W | ==> | -403.04 | |
| 4300.00 | 22.07 | 225.390 | 4174.22 | 502.74S | 509.69W | ==> | -425.37 | |
| 4400.00 | 22.07 | 225.390 | 4266.89 | 529.13S | 536.45W | ==> | -447.69 | |
| 4500.00 | 22.07 | 225.390 | 4359.56 | 555.52S | 563.20W | ==> | -470.02 | |
| 4600.00 | 22.07 | 225.390 | 4452.23 | 581.91S | 589.95W | ==> | -492.35 | |
| 4700.00 | 22.07 | 225.390 | 4544.90 | 608.30S | 616.71W | ==> | -514.68 | |
| 4800.00 | 22.07 | 225.390 | 4637.58 | 634.68S | 643.46W | ==> | -537.00 | |
| 4900.00 | 22.07 | 225.390 | 4730.25 | 661.07S | 670.22W | ==> | -559.33 | |
| 5000.00 | 22.07 | 225.390 | 4822.92 | 687.46S | 696.97W | ==> | -581.66 | |
| 5100.00 | 22.07 | 225.390 | 4915.59 | 713.85S | 723.73W | ==> | -603.99 | |
| 5200.00 | 22.07 | 225.390 | 5008.26 | 740.24S | 750.48W | ==> | -626.31 | |
| 5300.00 | 22.07 | 225.390 | 5100.93 | 766.63S | 777.23W | ==> | -648.64 | |
| 5400.00 | 22.07 | 225.390 | 5193.60 | 793.02S | 803.99W | ==> | -670.97 | |
| 5500.00 | 22.07 | 225.390 | 5286.27 | 819.41S | 830.74W | ==> | -693.30 | |
| 5600.00 | 22.07 | 225.390 | 5378.94 | 845.80S | 857.50W | ==> | -715.63 | |
| 5700.00 | 22.07 | 225.390 | 5471.61 | 872.19S | 884.25W | ==> | -737.95 | |
| 5800.00 | 22.07 | 225.390 | 5564.28 | 898.58S | 911.00W | ==> | -760.28 | |
| 5900.00 | 22.07 | 225.390 | 5656.95 | 924.97S | 937.76W | ==> | -782.61 | |
| 6000.00 | 22.07 | 225.390 | 5749.62 | 951.35S | 964.51W | ==> | -804.94 | |
| 6100.00 | 22.07 | 225.390 | 5842.29 | 977.74S | 991.27W | ==> | -827.26 | |
| 6200.00 | 22.07 | 225.390 | 5934.96 | 1004.13S | 1018.02W | ==> | -849.59 | |
| 6300.00 | 22.07 | 225.390 | 6027.63 | 1030.52S | 1044.77W | ==> | -871.92 | |
| 6400.00 | 22.07 | 225.390 | 6120.30 | 1056.91S | 1071.53W | ==> | -894.25 | |
| 6500.00 | 22.07 | 225.390 | 6212.97 | 1083.30S | 1098.28W | ==> | -916.57 | |
| 6600.00 | 22.07 | 225.390 | 6305.65 | 1109.69S | 1125.04W | ==> | -938.90 | |
| 6700.00 | 22.07 | 225.390 | 6398.32 | 1136.08S | 1151.79W | ==> | -961.23 | |
| 6800.00 | 22.07 | 225.390 | 6490.99 | 1162.47S | 1178.54W | ==> | -983.56 | |
| 6900.00 | 22.07 | 225.390 | 6583.66 | 1188.86S | 1205.30W | ==> | -1005.89 | |
| 7000.00 | 22.07 | 225.390 | 6676.33 | 1215.25S | 1232.05W | ==> | -1028.21 | |
| 7100.00 | 22.07 | 225.390 | 6769.00 | 1241.63S | 1258.81W | ==> | -1050.54 | |
| 7200.00 | 17.36 | 204.690 | 6862.97 | 1268.36S | 1279.62W | 10.00 | -1066.94 | |
| 7300.00 | 16.06 | 169.680 | 6958.98 | 1295.60S | 1283.38W | 10.00 | -1066.43 | |
| 7400.00 | 20.23 | 140.010 | 7054.19 | 1322.52S | 1269.76W | 10.00 | -1048.79 | |
| 7500.00 | 27.48 | 122.750 | 7145.69 | 1348.31S | 1239.16W | 10.00 | -1014.55 | |
| 7600.00 | 36.00 | 112.700 | 7230.72 | 1372.20S | 1192.52W | 10.00 | -964.77 | |
| 7700.00 | 45.07 | 106.160 | 7306.67 | 1393.45S | 1131.25W | 10.00 | -900.94 | |
| 7800.00 | 54.40 | 101.440 | 7371.26 | 1411.41S | 1057.22W | 10.00 | -825.02 | |
| 7900.00 | 63.88 | 97.730 | 7422.51 | 1425.55S | 972.67W | 10.00 | -739.30 | |
| 8000.00 | 73.44 | 94.570 | 7458.86 | 1435.43S | 880.18W | 10.00 | -646.39 | |
| 8100.00 | 83.04 | 91.720 | 7479.22 | 1440.75S | 782.55W | 10.00 | -549.12 | |
| 8200.00 | 90.00 | 89.740 | 7483.60 | 1441.54S | 682.73W | ==> | -450.40 | |
| 8300.00 | 90.00 | 89.740 | 7483.60 | 1441.08S | 582.74W | ==> | -351.69 | |
| 8400.00 | 90.00 | 89.740 | 7483.60 | 1440.62S | 482.74W | ==> | -252.97 | |
| 8500.00 | 90.00 | 89.740 | 7483.60 | 1440.16S | 382.74W | ==> | -154.26 | |
| 8600.00 | 90.00 | 89.740 | 7483.60 | 1439.70S | 282.74W | ==> | -55.55 | |
| 8700.00 | 90.00 | 89.740 | 7483.60 | 1439.24S | 182.74W | ==> | 43.16 | |
| 8800.00 | 90.00 | 89.740 | 7483.60 | 1438.78S | 82.74W | ==> | 141.88 | |
| 8900.00 | 90.00 | 89.740 | 7483.60 | 1438.32S | 17.26E | ==> | 240.59 | |
| 9000.00 | 90.00 | 89.740 | 7483.60 | 1437.87S | 117.26E | ==> | 339.30 | |

All data is in Feet unless otherwise stated
Coordinates are from Slot MD's are from Rig (Planned Datum #1 5062.6ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 98.940 degrees
Bottom hole distance is 8992.83 Feet on azimuth 98.94 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 1-Feb-2017



SYSDRILL
Well Design Combined Report
Wellbore: W PC SOUTH 1S-66-2928-18NH (PWB)



| Interpolated Wellpath | | | | | | | | |
|-----------------------|----------|----------|---------|-----------|----------|-----------------------|-------------------------|-------------------------|
| MD[ft] | Inc[deg] | Azi[deg] | TVD[ft] | North[ft] | East[ft] | Dogleg [deg/100ft] | Vertical Section[ft] | All Station Comments |
| 9100.00 | 90.00 | 89.740 | 7483.60 | 1437.41S | 217.26E | ==> | 438.01 | |
| 9200.00 | 90.00 | 89.740 | 7483.60 | 1436.95S | 317.26E | ==> | 536.73 | |
| 9300.00 | 90.00 | 89.740 | 7483.60 | 1436.49S | 417.25E | ==> | 635.44 | |
| 9400.00 | 90.00 | 89.740 | 7483.60 | 1436.03S | 517.25E | ==> | 734.15 | |
| 9500.00 | 90.00 | 89.740 | 7483.60 | 1435.57S | 617.25E | ==> | 832.86 | |
| 9600.00 | 90.00 | 89.740 | 7483.60 | 1435.11S | 717.25E | ==> | 931.58 | |
| 9700.00 | 90.00 | 89.740 | 7483.60 | 1434.65S | 817.25E | ==> | 1030.29 | |
| 9800.00 | 90.00 | 89.740 | 7483.60 | 1434.19S | 917.25E | ==> | 1129.00 | |
| 9900.00 | 90.00 | 89.740 | 7483.60 | 1433.74S | 1017.25E | ==> | 1227.71 | |
| 10000.00 | 90.00 | 89.740 | 7483.60 | 1433.28S | 1117.25E | ==> | 1326.43 | |
| 10100.00 | 90.00 | 89.740 | 7483.60 | 1432.82S | 1217.25E | ==> | 1425.14 | |
| 10200.00 | 90.00 | 89.740 | 7483.60 | 1432.36S | 1317.24E | ==> | 1523.85 | |
| 10300.00 | 90.00 | 89.740 | 7483.60 | 1431.90S | 1417.24E | ==> | 1622.56 | |
| 10400.00 | 90.00 | 89.740 | 7483.60 | 1431.44S | 1517.24E | ==> | 1721.28 | |
| 10500.00 | 90.00 | 89.740 | 7483.60 | 1430.98S | 1617.24E | ==> | 1819.99 | |
| 10600.00 | 90.00 | 89.740 | 7483.60 | 1430.52S | 1717.24E | ==> | 1918.70 | |
| 10700.00 | 90.00 | 89.740 | 7483.60 | 1430.06S | 1817.24E | ==> | 2017.41 | |
| 10800.00 | 90.00 | 89.740 | 7483.60 | 1429.60S | 1917.24E | ==> | 2116.13 | |
| 10900.00 | 90.00 | 89.740 | 7483.60 | 1429.15S | 2017.24E | ==> | 2214.84 | |
| 11000.00 | 90.00 | 89.740 | 7483.60 | 1428.69S | 2117.24E | ==> | 2313.55 | |
| 11100.00 | 90.00 | 89.740 | 7483.60 | 1428.23S | 2217.24E | ==> | 2412.26 | |
| 11200.00 | 90.00 | 89.740 | 7483.60 | 1427.77S | 2317.23E | ==> | 2510.98 | |
| 11300.00 | 90.00 | 89.740 | 7483.60 | 1427.31S | 2417.23E | ==> | 2609.69 | |
| 11400.00 | 90.00 | 89.740 | 7483.60 | 1426.85S | 2517.23E | ==> | 2708.40 | |
| 11500.00 | 90.00 | 89.740 | 7483.60 | 1426.39S | 2617.23E | ==> | 2807.11 | |
| 11600.00 | 90.00 | 89.740 | 7483.60 | 1425.93S | 2717.23E | ==> | 2905.83 | |
| 11700.00 | 90.00 | 89.740 | 7483.60 | 1425.47S | 2817.23E | ==> | 3004.54 | |
| 11800.00 | 90.00 | 89.740 | 7483.60 | 1425.02S | 2917.23E | ==> | 3103.25 | |
| 11900.00 | 90.00 | 89.740 | 7483.60 | 1424.56S | 3017.23E | ==> | 3201.96 | |
| 12000.00 | 90.00 | 89.740 | 7483.60 | 1424.10S | 3117.23E | ==> | 3300.68 | |
| 12100.00 | 90.00 | 89.740 | 7483.60 | 1423.64S | 3217.22E | ==> | 3399.39 | |
| 12200.00 | 90.00 | 89.740 | 7483.60 | 1423.18S | 3317.22E | ==> | 3498.10 | |
| 12300.00 | 90.00 | 89.740 | 7483.60 | 1422.72S | 3417.22E | ==> | 3596.81 | |
| 12400.00 | 90.00 | 89.740 | 7483.60 | 1422.26S | 3517.22E | ==> | 3695.53 | |
| 12500.00 | 90.00 | 89.740 | 7483.60 | 1421.80S | 3617.22E | ==> | 3794.24 | |
| 12600.00 | 90.00 | 89.740 | 7483.60 | 1421.34S | 3717.22E | ==> | 3892.95 | |
| 12700.00 | 90.00 | 89.740 | 7483.60 | 1420.89S | 3817.22E | ==> | 3991.66 | |
| 12800.00 | 90.00 | 89.740 | 7483.60 | 1420.43S | 3917.22E | ==> | 4090.38 | |
| 12900.00 | 90.00 | 89.740 | 7483.60 | 1419.97S | 4017.22E | ==> | 4189.09 | |
| 13000.00 | 90.00 | 89.740 | 7483.60 | 1419.51S | 4117.22E | ==> | 4287.80 | |
| 13100.00 | 90.00 | 89.740 | 7483.60 | 1419.05S | 4217.21E | ==> | 4386.51 | |
| 13200.00 | 90.00 | 89.740 | 7483.60 | 1418.59S | 4317.21E | ==> | 4485.23 | |
| 13300.00 | 90.00 | 89.740 | 7483.60 | 1418.13S | 4417.21E | ==> | 4583.94 | |
| 13400.00 | 90.00 | 89.740 | 7483.60 | 1417.67S | 4517.21E | ==> | 4682.65 | |
| 13500.00 | 90.00 | 89.740 | 7483.60 | 1417.21S | 4617.21E | ==> | 4781.36 | |
| 13600.00 | 90.00 | 89.740 | 7483.60 | 1416.76S | 4717.21E | ==> | 4880.08 | |
| 13700.00 | 90.00 | 89.740 | 7483.60 | 1416.30S | 4817.21E | ==> | 4978.79 | |
| 13800.00 | 90.00 | 89.740 | 7483.60 | 1415.84S | 4917.21E | ==> | 5077.50 | |
| 13900.00 | 90.00 | 89.740 | 7483.60 | 1415.38S | 5017.21E | ==> | 5176.22 | |
| 14000.00 | 90.00 | 89.740 | 7483.60 | 1414.92S | 5117.20E | ==> | 5274.93 | |
| 14100.00 | 90.00 | 89.740 | 7483.60 | 1414.46S | 5217.20E | ==> | 5373.64 | |
| 14200.00 | 90.00 | 89.740 | 7483.60 | 1414.00S | 5317.20E | ==> | 5472.35 | |
| 14300.00 | 90.00 | 89.740 | 7483.60 | 1413.54S | 5417.20E | ==> | 5571.07 | |
| 14400.00 | 90.00 | 89.740 | 7483.60 | 1413.08S | 5517.20E | ==> | 5669.78 | |
| 14500.00 | 90.00 | 89.740 | 7483.60 | 1412.63S | 5617.20E | ==> | 5768.49 | |
| 14600.00 | 90.00 | 89.740 | 7483.60 | 1412.17S | 5717.20E | ==> | 5867.20 | |
| 14700.00 | 90.00 | 89.740 | 7483.60 | 1411.71S | 5817.20E | ==> | 5965.92 | |
| 14800.00 | 90.00 | 89.740 | 7483.60 | 1411.25S | 5917.20E | ==> | 6064.63 | |
| 14900.00 | 90.00 | 89.740 | 7483.60 | 1410.79S | 6017.20E | ==> | 6163.34 | |

All data is in Feet unless otherwise stated
Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5062.6ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 98.940 degrees
Bottom hole distance is 8992.83 Feet on azimuth 98.94 degrees from Wellhead
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SYS DRILL
Well Design Combined Report
Wellbore: W PC SOUTH 1S-66-2928-18NH (PWB)



| Interpolated Wellpath | | | | | | | | |
|-----------------------|----------|----------|---------|-----------|----------|-----------------------|-------------------------|-------------------------|
| MD[ft] | Inc[deg] | Azi[deg] | TVD[ft] | North[ft] | East[ft] | Dogleg [deg/100ft] | Vertical Section[ft] | All Station Comments |
| 15000.00 | 90.00 | 89.740 | 7483.60 | 1410.33S | 6117.19E | ==> | 6262.05 | |
| 15100.00 | 90.00 | 89.740 | 7483.60 | 1409.87S | 6217.19E | ==> | 6360.77 | |
| 15200.00 | 90.00 | 89.740 | 7483.60 | 1409.41S | 6317.19E | ==> | 6459.48 | |
| 15300.00 | 90.00 | 89.740 | 7483.60 | 1408.95S | 6417.19E | ==> | 6558.19 | |
| 15400.00 | 90.00 | 89.740 | 7483.60 | 1408.49S | 6517.19E | ==> | 6656.90 | |
| 15500.00 | 90.00 | 89.740 | 7483.60 | 1408.04S | 6617.19E | ==> | 6755.62 | |
| 15600.00 | 90.00 | 89.740 | 7483.60 | 1407.58S | 6717.19E | ==> | 6854.33 | |
| 15700.00 | 90.00 | 89.740 | 7483.60 | 1407.12S | 6817.19E | ==> | 6953.04 | |
| 15800.00 | 90.00 | 89.740 | 7483.60 | 1406.66S | 6917.19E | ==> | 7051.75 | |
| 15900.00 | 90.00 | 89.740 | 7483.60 | 1406.20S | 7017.18E | ==> | 7150.47 | |
| 16000.00 | 90.00 | 89.740 | 7483.60 | 1405.74S | 7117.18E | ==> | 7249.18 | |
| 16100.00 | 90.00 | 89.740 | 7483.60 | 1405.28S | 7217.18E | ==> | 7347.89 | |
| 16200.00 | 90.00 | 89.740 | 7483.60 | 1404.82S | 7317.18E | ==> | 7446.60 | |
| 16300.00 | 90.00 | 89.740 | 7483.60 | 1404.36S | 7417.18E | ==> | 7545.32 | |
| 16400.00 | 90.00 | 89.740 | 7483.60 | 1403.91S | 7517.18E | ==> | 7644.03 | |
| 16500.00 | 90.00 | 89.740 | 7483.60 | 1403.45S | 7617.18E | ==> | 7742.74 | |
| 16600.00 | 90.00 | 89.740 | 7483.60 | 1402.99S | 7717.18E | ==> | 7841.45 | |
| 16700.00 | 90.00 | 89.740 | 7483.60 | 1402.53S | 7817.18E | ==> | 7940.17 | |
| 16800.00 | 90.00 | 89.740 | 7483.60 | 1402.07S | 7917.18E | ==> | 8038.88 | |
| 16900.00 | 90.00 | 89.740 | 7483.60 | 1401.61S | 8017.17E | ==> | 8137.59 | |
| 17000.00 | 90.00 | 89.740 | 7483.60 | 1401.15S | 8117.17E | ==> | 8236.30 | |
| 17100.00 | 90.00 | 89.740 | 7483.60 | 1400.69S | 8217.17E | ==> | 8335.02 | |
| 17200.00 | 90.00 | 89.740 | 7483.60 | 1400.23S | 8317.17E | ==> | 8433.73 | |
| 17300.00 | 90.00 | 89.740 | 7483.60 | 1399.78S | 8417.17E | ==> | 8532.44 | |
| 17400.00 | 90.00 | 89.740 | 7483.60 | 1399.32S | 8517.17E | ==> | 8631.15 | |
| 17500.00 | 90.00 | 89.740 | 7483.60 | 1398.86S | 8617.17E | ==> | 8729.87 | |
| 17600.00 | 90.00 | 89.740 | 7483.60 | 1398.40S | 8717.17E | ==> | 8828.58 | |
| 17700.00 | 90.00 | 89.740 | 7483.60 | 1397.94S | 8817.17E | ==> | 8927.29 | |
| 17766.39 | 90.00 | 89.740 | 7483.60 | 1397.64S | 8883.56E | ==> | 8992.83 | |

All data is in Feet unless otherwise stated
Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5062.6ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 98.940 degrees
Bottom hole distance is 8992.83 Feet on azimuth 98.94 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by IPT
Date Printed: 1-Feb-2017



SYSDRILL
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| Targets | | | | | | | |
|--------------------------------------|-----------|----------|---------|----------------|-----------------|------------|------------|
| Name | North[ft] | East[ft] | TVD[ft] | Latitude | Longitude | Northing | Easting |
| PC SOUTH 1S-66-2928-18NH - BHL | 1397.64S | 8783.56E | 7483.60 | N39 55 51.9240 | W104 46 22.5480 | 1218580.70 | 3203894.81 |
| PC SOUTH 1S-66-2928-18NH - EPL | 1441.66S | 810.42W | 7483.60 | N39 55 52.2480 | W104 48 25.7040 | 1218536.67 | 3194301.12 |

| Survey Tool Program | | | | | |
|---------------------|-------------|----------|---------|---------------|-------------------|
| Reference | Survey Name | MD[ft] | TVD[ft] | Survey Tool | Error Model |
| 523366 | Planned | 1500.00 | 1500.00 | WdW Rate Gyro | Standard |
| 523365 | Planned | 17766.39 | 7483.60 | ISCWSA MWD | Rev 4 + SAG + FLT |

| Notes |
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SYSDRILL
Closest Approach + Clearance Factor Summary Report
Wellbore: W PC SOUTH 1S-66-2928-18NH (PWB)



| |
|--|
| Ellipse separations are reported ONLY if BOTH wells have uncertainty data |
| Only Depth and Magnetic Reference Field error terms are correlated across tie points |
| Scan limit is calculated on CENTRE to CENTRE distance |
| Summary data uses Closest Approach clearance calculation for all minima |
| Hole size/Casings ARE included |
| Hole size/Casings are NOT subtracted from Centre-Centre distance |
| Confidence limit of 95.00% / 2.80 SD. |

| Wellbore | | |
|----------------------------------|-------------|--------------|
| Name | Created | Last Revised |
| W PC SOUTH 1S-66-2928-18NH (PWB) | Jan-24-2017 | Jan-24-2017 |

| Well | | |
|----------------------------|---------------|--------------|
| Name | Government ID | Last Revised |
| W PC SOUTH 1S-66-2928-18NH | | Jan-24-2017 |

| Slot | | | | | | |
|-----------------------------|---------------|-----------------|---------------|--------------|---------|--------|
| Name | Latitude | Longitude | Grid Northing | Grid Easting | North | East |
| PC SOUTH 1S-66-2928-18NH | N39 56 6.4320 | W104 48 15.1560 | 1219978.2885 | 3195111.5100 | 105.40S | 31.67E |

| Installation | | | | | | |
|-------------------|----------------------------------|-----------------------------------|--------------|--------------|--|-----------------|
| Name | Installation Position (Latitude) | Installation Position (Longitude) | Easting | Northing | Coord System Name | North Alignment |
| PC 1S-66-2928 PAD | N39 56 7.4760 | W104 48 15.5520 | 3195079.8360 | 1220083.6821 | CO83-NF on NORTH AMERICAN DATUM 1983 datum | Grid |

| Clearance Summary | | | | | | | |
|------------------------------|-----------------|---------|--------------------|-------------------------|----------------|------------------|------------------|
| Offset WellName | Separation [ft] | MD[ft] | Diverging From[ft] | Ellipse Separation [ft] | Ellipse MD[ft] | Clearance Factor | Clearance MD[ft] |
| W PC SOUTH 1S-66-2928-19C DH | 14.57 | 1800.00 | 17667.49 | -188.96 | 17683.73 | 0.67 | 17683.73 |
| W PC SOUTH 1S-66-2928-17N H | 14.57 | 1853.67 | 8172.32 | -374.82 | 17667.32 | 0.49 | 17667.32 |
| W PC SOUTH 1S-66-2928-20N H | 29.14 | 1749.85 | 17667.84 | -338.97 | 17683.73 | 0.54 | 17683.73 |
| W PC SOUTH 1S-66-2928-16C DH | 29.14 | 1853.67 | 17667.44 | -117.06 | 17667.44 | 0.82 | 17667.44 |
| W PC NORTH 1S-66-2928-8NH | 30.85 | 1450.10 | 17668.35 | 28.51 | 1450.10 | 3.46 | 17766.39 |
| W PC NORTH 1S-66-2928-7CD H | 34.12 | 1400.11 | 17670.66 | 31.86 | 1400.11 | 3.62 | 17766.39 |
| W PC NORTH 1S-66-2928-9NH | 34.12 | 1500.09 | 17669.62 | 31.70 | 1500.09 | 2.99 | 17766.39 |
| W PC NORTH 1S-66-2928-6NH | 42.44 | 1350.15 | 17669.93 | 40.26 | 1350.15 | 3.91 | 17766.39 |
| W PC NORTH 1S-66-2928-10C DH | 42.44 | 1549.98 | 1549.98 | 40.00 | 1558.40 | 2.83 | 17766.39 |
| W PC SOUTH 1S-66-2928-15N H | 43.72 | 1853.67 | 1850.00 | -0.03 | 17667.32 | 1.00 | 17667.32 |
| W PC NORTH 1S-66-2928-5NH | 53.50 | 1300.27 | 17671.36 | 51.41 | 1300.27 | 4.42 | 17766.39 |

All data is in Feet unless otherwise stated
Coordinates are from Slot MD's are from Rig and TVD's are from Rig (Planned Datum #1 5062.6ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 98.940 degrees
Prepared by IPT
Date Printed: 1-Feb-2017



SYS DRILL
Closest Approach + Clearance Factor Summary Report
Wellbore: W PC SOUTH 1S-66-2928-18NH (PWB)



| Clearance Summary | | | | | | | |
|------------------------------|-----------------|----------|--------------------|-------------------------|----------------|------------------|------------------|
| Offset WellName | Separation [ft] | MD[ft] | Diverging From[ft] | Ellipse Separation [ft] | Ellipse MD[ft] | Clearance Factor | Clearance MD[ft] |
| W PC SOUTH 1S-66-2928-14N H | 61.93 | 1853.67 | 17667.98 | 57.95 | 1886.48 | 1.51 | 17683.73 |
| W PC NORTH 1S-66-2928-4CD H | 69.19 | 1250.50 | 17670.75 | 67.17 | 1250.50 | 4.67 | 17766.39 |
| W PC SOUTH 1S-66-2928-13C DH | 76.50 | 1853.67 | 17667.32 | 72.52 | 1886.48 | 1.81 | 17700.13 |
| W PC NORTH 1S-66-2928-3NH | 82.48 | 1200.53 | 1200.53 | 80.55 | 1200.53 | 4.89 | 17766.39 |
| W PC SOUTH 1S-66-2928-12N H | 91.07 | 1853.67 | 1850.00 | 87.09 | 1886.48 | 2.02 | 17716.54 |
| W PC NORTH 1S-66-2928-2NH | 96.15 | 1150.67 | 17671.82 | 94.30 | 1150.67 | 5.29 | 17766.39 |
| W PC NORTH 1S-66-2928-11N H | 105.64 | 1853.67 | 17668.11 | 101.66 | 1886.48 | 2.50 | 17749.34 |
| W POLLARD #1 | 167.07 | 13547.77 | 13547.77 | -89.36 | 13549.87 | 0.65 | 13549.87 |

