

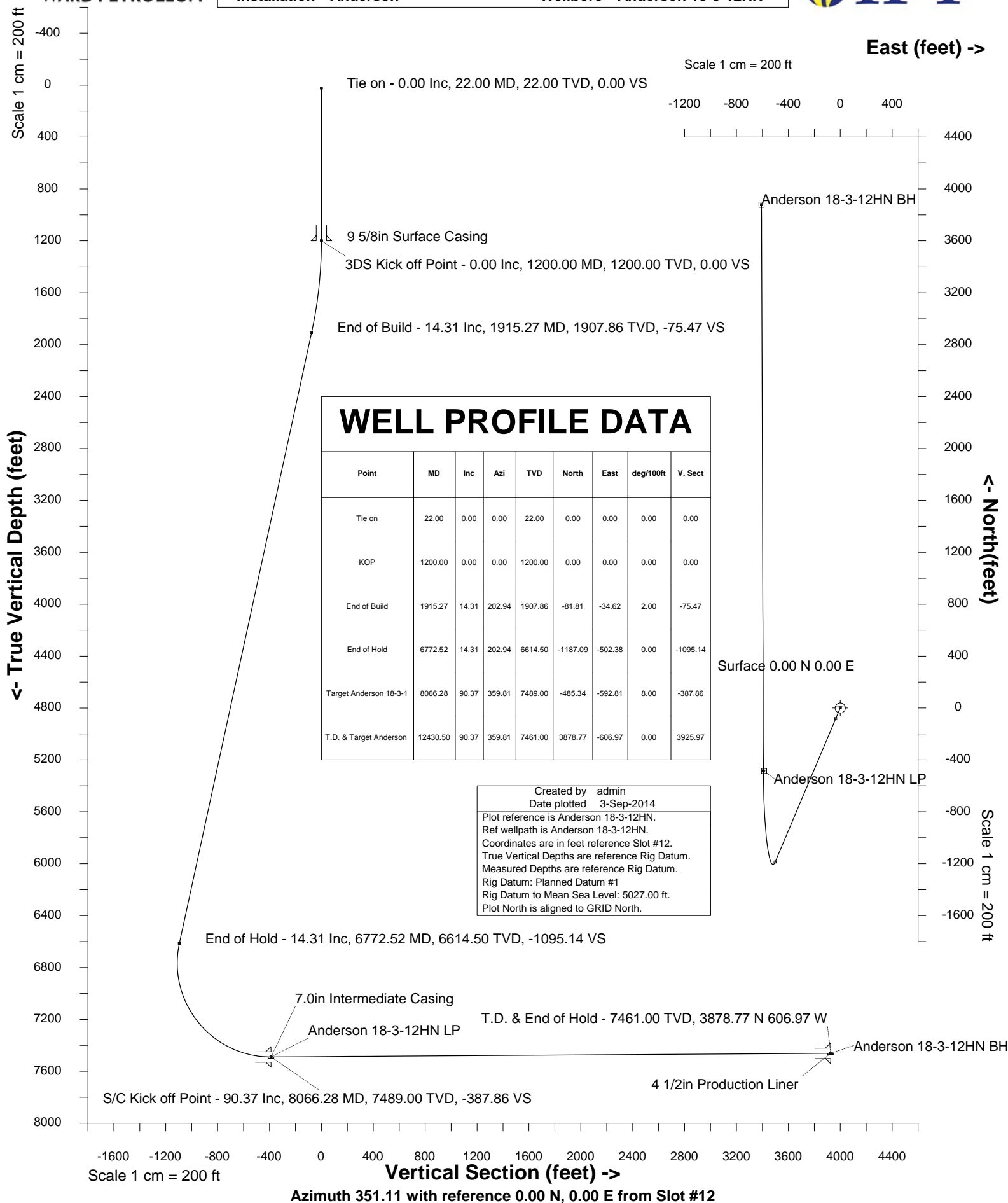


WARD PETROLEUM

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Location ADAMS COUNTY, CO
Field West Brighton
Installation Anderson

Slot Slot #12
Well Anderson 18-3-12HN
Wellbore Anderson 18-3-12HN





WARD PETROLEUM

INTEGRATED PETROLEUM TECHNOLOGIES, INC
SYSDRILL

Well Design Combined Report
Wellbore: Anderson 18-3-12HN



Wellhead Details							
Name	Northing	Easting	Latitude	Longitude	North	East	Elevation Above Inst.
Slot #12	1229147.5822	3189497.5390	39.96041000	-104.82398000	11.57S	84.01W	-0.00

Declination			
Date	Source	Time	
28-Aug-2014	IGRF Model [1900.0-2015.0]	10:16	

Site Details				
Name	Northing	Easting	Coord System Name	North Alignment
Anderson	1229159.1513	3189581.5481	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
22.00	0.00	0.000	22.00	0.00N	0.00E		0.00	1229147.58	3189497.54
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
1915.27	14.31	202.940	1907.86	81.81S	34.62W	2.00	-75.47	1229065.78	3189462.92
6772.52	14.31	202.940	6614.50	1187.09S	502.38W	==>	-1095.14	1227960.53	3188995.18
8066.28	90.37	359.810	7489.00	485.34S	592.81W	8.00	-387.86	1228662.25	3188904.74
12430.50	90.37	359.810	7461.00	3878.77N	606.97W	==>	3925.97	1233026.22	3188890.59

Interpolated 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	1229147.58	3189497.54
22.00	0.00	0.000	22.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
1178.00	0.00	0.000	1178.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	1229147.58	3189497.54
1278.00	1.56	202.940	1277.99	0.98S	0.41W	2.00	-0.90	1229146.60	3189497.13
1378.00	3.56	202.940	1377.89	5.09S	2.15W	2.00	-4.70	1229142.49	3189495.38
1478.00	5.56	202.940	1477.56	12.41S	5.25W	2.00	-11.45	1229135.17	3189492.29
1578.00	7.56	202.940	1576.90	22.93S	9.71W	2.00	-21.16	1229124.65	3189487.83
1678.00	9.56	202.940	1675.79	36.64S	15.51W	2.00	-33.80	1229110.94	3189482.03
1778.00	11.56	202.940	1774.09	53.52S	22.65W	2.00	-49.37	1229094.07	3189474.89
1878.00	13.56	202.940	1871.69	73.54S	31.12W	2.00	-67.85	1229074.04	3189466.42
1900.00	14.00	202.940	1893.06	78.37S	33.17W	2.00	-72.30	1229069.22	3189464.37
1915.27	14.31	202.940	1907.86	81.81S	34.62W	2.00	-75.47	1229065.78	3189462.92
2000.00	14.31	202.940	1989.96	101.09S	42.78W	==>	-93.26	1229046.50	3189454.76
2100.00	14.31	202.940	2086.86	123.84S	52.41W	==>	-114.25	1229023.74	3189445.13
2200.00	14.31	202.940	2183.76	146.60S	62.04W	==>	-135.24	1229000.99	3189435.50
2300.00	14.31	202.940	2280.66	169.35S	71.67W	==>	-156.24	1228978.24	3189425.87
2400.00	14.31	202.940	2377.56	192.11S	81.30W	==>	-177.23	1228955.48	3189416.24
2500.00	14.31	202.940	2474.46	214.86S	90.93W	==>	-198.22	1228932.73	3189406.61
2600.00	14.31	202.940	2571.36	237.62S	100.56W	==>	-219.21	1228909.97	3189396.98
2700.00	14.31	202.940	2668.26	260.37S	110.19W	==>	-240.21	1228887.22	3189387.35
2800.00	14.31	202.940	2765.16	283.13S	119.82W	==>	-261.20	1228864.46	3189377.72
2900.00	14.31	202.940	2862.06	305.88S	129.45W	==>	-282.19	1228841.71	3189368.09
3000.00	14.31	202.940	2958.96	328.64S	139.08W	==>	-303.19	1228818.95	3189358.46
3100.00	14.31	202.940	3055.86	351.39S	148.71W	==>	-324.18	1228796.20	3189348.83

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Vertical Section is from 0.00N 0.00E on azimuth 351.110 degrees
Bottom hole distance is 3925.97 Feet on azimuth 351.11 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 3-Sep-2014



WARD PETROLEUM

INTEGRATED PETROLEUM TECHNOLOGIES, INC SYSDRILL

Well Design Combined Report
Wellbore: Anderson 18-3-12HN



Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Northing	Easting
3200.00	14.31	202.940	3152.76	374.15S	158.34W	==>	-345.17	1228773.44	3189339.20
3300.00	14.31	202.940	3249.65	396.90S	167.97W	==>	-366.16	1228750.69	3189329.57
3400.00	14.31	202.940	3346.55	419.66S	177.60W	==>	-387.16	1228727.94	3189319.94
3500.00	14.31	202.940	3443.45	442.42S	187.23W	==>	-408.15	1228705.18	3189310.31
3600.00	14.31	202.940	3540.35	465.17S	196.86W	==>	-429.14	1228682.43	3189300.68
3700.00	14.31	202.940	3637.25	487.93S	206.49W	==>	-450.14	1228659.67	3189291.05
3800.00	14.31	202.940	3734.15	510.68S	216.12W	==>	-471.13	1228636.92	3189281.42
3900.00	14.31	202.940	3831.05	533.44S	225.75W	==>	-492.12	1228614.16	3189271.79
4000.00	14.31	202.940	3927.95	556.19S	235.38W	==>	-513.11	1228591.41	3189262.16
4100.00	14.31	202.940	4024.85	578.95S	245.01W	==>	-534.11	1228568.65	3189252.53
4200.00	14.31	202.940	4121.75	601.70S	254.64W	==>	-555.10	1228545.90	3189242.90
4300.00	14.31	202.940	4218.65	624.46S	264.27W	==>	-576.09	1228523.14	3189233.27
4400.00	14.31	202.940	4315.55	647.21S	273.90W	==>	-597.08	1228500.39	3189223.65
4500.00	14.31	202.940	4412.44	669.97S	283.53W	==>	-618.08	1228477.64	3189214.02
4600.00	14.31	202.940	4509.34	692.72S	293.16W	==>	-639.07	1228454.88	3189204.39
4700.00	14.31	202.940	4606.24	715.48S	302.79W	==>	-660.06	1228432.13	3189194.76
4800.00	14.31	202.940	4703.14	738.23S	312.42W	==>	-681.06	1228409.37	3189185.13
4900.00	14.31	202.940	4800.04	760.99S	322.05W	==>	-702.05	1228386.62	3189175.50
5000.00	14.31	202.940	4896.94	783.74S	331.68W	==>	-723.04	1228363.86	3189165.87
5100.00	14.31	202.940	4993.84	806.50S	341.31W	==>	-744.03	1228341.11	3189156.24
5200.00	14.31	202.940	5090.74	829.25S	350.94W	==>	-765.03	1228318.35	3189146.61
5300.00	14.31	202.940	5187.64	852.01S	360.57W	==>	-786.02	1228295.60	3189136.98
5400.00	14.31	202.940	5284.54	874.77S	370.20W	==>	-807.01	1228272.85	3189127.35
5500.00	14.31	202.940	5381.44	897.52S	379.83W	==>	-828.01	1228250.09	3189117.72
5600.00	14.31	202.940	5478.34	920.28S	389.46W	==>	-849.00	1228227.34	3189108.09
5700.00	14.31	202.940	5575.24	943.03S	399.09W	==>	-869.99	1228204.58	3189098.46
5800.00	14.31	202.940	5672.13	965.79S	408.72W	==>	-890.98	1228181.83	3189088.83
5900.00	14.31	202.940	5769.03	988.54S	418.35W	==>	-911.98	1228159.07	3189079.20
6000.00	14.31	202.940	5865.93	1011.30S	427.98W	==>	-932.97	1228136.32	3189069.57
6100.00	14.31	202.940	5962.83	1034.05S	437.61W	==>	-953.96	1228113.56	3189059.94
6200.00	14.31	202.940	6059.73	1056.81S	447.24W	==>	-974.96	1228090.81	3189050.31
6300.00	14.31	202.940	6156.63	1079.56S	456.87W	==>	-995.95	1228068.05	3189040.68
6400.00	14.31	202.940	6253.53	1102.32S	466.51W	==>	-1016.94	1228045.30	3189031.05
6500.00	14.31	202.940	6350.43	1125.07S	476.14W	==>	-1037.93	1228022.55	3189021.42
6600.00	14.31	202.940	6447.33	1147.83S	485.77W	==>	-1058.93	1227999.79	3189011.79
6700.00	14.31	202.940	6544.23	1170.58S	495.40W	==>	-1079.92	1227977.04	3189002.16
6772.52	14.31	202.940	6614.50	1187.09S	502.38W	==>	-1095.14	1227960.53	3188995.18
6800.00	12.33	207.100	6641.24	1192.82S	505.04W	8.00	-1100.40	1227954.80	3188992.52
6900.00	6.43	242.600	6739.93	1204.92S	514.89W	8.00	-1110.83	1227942.70	3188982.67
7000.00	7.64	311.400	6839.34	1203.10S	524.87W	8.00	-1107.49	1227944.52	3188972.69
7100.00	14.25	336.510	6937.51	1187.39S	534.77W	8.00	-1090.44	1227960.23	3188962.78
7200.00	21.80	345.250	7032.55	1158.10S	544.42W	8.00	-1060.01	1227989.52	3188953.14
7300.00	29.58	349.600	7122.61	1115.81S	553.62W	8.00	-1016.80	1228031.81	3188943.94
7400.00	37.44	352.250	7205.93	1061.32S	562.19W	8.00	-961.64	1228086.30	3188935.37
7500.00	45.35	354.090	7280.88	995.71S	569.96W	8.00	-895.62	1228151.90	3188927.60
7600.00	53.28	355.490	7346.02	920.25S	576.78W	8.00	-820.01	1228227.36	3188920.77
7700.00	61.23	356.620	7400.07	836.41S	582.53W	8.00	-736.29	1228311.20	3188915.03
7800.00	69.18	357.590	7441.98	745.82S	587.09W	8.00	-646.09	1228401.79	3188910.47
7900.00	77.13	358.460	7470.94	650.24S	590.36W	8.00	-551.15	1228497.36	3188907.20
8000.00	85.09	359.280	7486.38	551.54S	592.29W	8.00	-453.34	1228596.06	3188905.26
8066.28	90.37	359.810	7489.00	485.34S	592.81W	8.00	-387.86	1228662.25	3188904.74
8100.00	90.37	359.810	7488.78	451.62S	592.92W	==>	-354.52	1228695.98	3188904.63
8200.00	90.37	359.810	7488.14	351.62S	593.25W	==>	-255.68	1228795.97	3188904.31
8300.00	90.37	359.810	7487.50	251.63S	593.57W	==>	-156.83	1228895.96	3188903.99
8400.00	90.37	359.810	7486.86	151.63S	593.90W	==>	-57.99	1228995.96	3188903.66
8500.00	90.37	359.810	7486.22	51.63S	594.22W	==>	40.86	1229095.95	3188903.34
8600.00	90.37	359.810	7485.58	48.37N	594.55W	==>	139.70	1229195.95	3188903.01
8700.00	90.37	359.810	7484.93	148.36N	594.87W	==>	238.55	1229295.94	3188902.69
8800.00	90.37	359.810	7484.29	248.36N	595.19W	==>	337.39	1229395.93	3188902.36
8900.00	90.37	359.810	7483.65	348.36N	595.52W	==>	436.24	1229495.93	3188902.04

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Bottom hole distance is 3925.97 Feet on azimuth 351.11 degrees from Wellhead
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Wellbore: Anderson 18-3-12HN



Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Northing	Easting
9000.00	90.37	359.810	7483.01	448.36N	595.84W	==>	535.08	1229595.92	3188901.72
9100.00	90.37	359.810	7482.37	548.35N	596.17W	==>	633.93	1229695.92	3188901.39
9200.00	90.37	359.810	7481.73	648.35N	596.49W	==>	732.77	1229795.91	3188901.07
9300.00	90.37	359.810	7481.08	748.35N	596.82W	==>	831.62	1229895.91	3188900.74
9400.00	90.37	359.810	7480.44	848.34N	597.14W	==>	930.46	1229995.90	3188900.42
9500.00	90.37	359.810	7479.80	948.34N	597.46W	==>	1029.31	1230095.89	3188900.09
9600.00	90.37	359.810	7479.16	1048.34N	597.79W	==>	1128.16	1230195.89	3188899.77
9700.00	90.37	359.810	7478.52	1148.34N	598.11W	==>	1227.00	1230295.88	3188899.45
9800.00	90.37	359.810	7477.88	1248.33N	598.44W	==>	1325.85	1230395.88	3188899.12
9900.00	90.37	359.810	7477.24	1348.33N	598.76W	==>	1424.69	1230495.87	3188898.80
10000.00	90.37	359.810	7476.59	1448.33N	599.09W	==>	1523.54	1230595.86	3188898.47
10100.00	90.37	359.810	7475.95	1548.33N	599.41W	==>	1622.38	1230695.86	3188898.15
10200.00	90.37	359.810	7475.31	1648.32N	599.73W	==>	1721.23	1230795.85	3188897.82
10300.00	90.37	359.810	7474.67	1748.32N	600.06W	==>	1820.07	1230895.85	3188897.50
10400.00	90.37	359.810	7474.03	1848.32N	600.38W	==>	1918.92	1230995.84	3188897.18
10500.00	90.37	359.810	7473.39	1948.32N	600.71W	==>	2017.76	1231095.84	3188896.85
10600.00	90.37	359.810	7472.74	2048.31N	601.03W	==>	2116.61	1231195.83	3188896.53
10700.00	90.37	359.810	7472.10	2148.31N	601.36W	==>	2215.45	1231295.82	3188896.20
10800.00	90.37	359.810	7471.46	2248.31N	601.68W	==>	2314.30	1231395.82	3188895.88
10900.00	90.37	359.810	7470.82	2348.31N	602.00W	==>	2413.14	1231495.81	3188895.55
11000.00	90.37	359.810	7470.18	2448.30N	602.33W	==>	2511.99	1231595.81	3188895.23
11100.00	90.37	359.810	7469.54	2548.30N	602.65W	==>	2610.83	1231695.80	3188894.91
11200.00	90.37	359.810	7468.89	2648.30N	602.98W	==>	2709.68	1231795.79	3188894.58
11300.00	90.37	359.810	7468.25	2748.30N	603.30W	==>	2808.52	1231895.79	3188894.26
11400.00	90.37	359.810	7467.61	2848.29N	603.63W	==>	2907.37	1231995.78	3188893.93
11500.00	90.37	359.810	7466.97	2948.29N	603.95W	==>	3006.21	1232095.78	3188893.61
11600.00	90.37	359.810	7466.33	3048.29N	604.27W	==>	3105.06	1232195.77	3188893.28
11700.00	90.37	359.810	7465.69	3148.29N	604.60W	==>	3203.91	1232295.77	3188892.96
11800.00	90.37	359.810	7465.05	3248.28N	604.92W	==>	3302.75	1232395.76	3188892.64
11900.00	90.37	359.810	7464.40	3348.28N	605.25W	==>	3401.60	1232495.75	3188892.31
12000.00	90.37	359.810	7463.76	3448.28N	605.57W	==>	3500.44	1232595.75	3188891.99
12100.00	90.37	359.810	7463.12	3548.28N	605.90W	==>	3599.29	1232695.74	3188891.66
12200.00	90.37	359.810	7462.48	3648.27N	606.22W	==>	3698.13	1232795.74	3188891.34
12300.00	90.37	359.810	7461.84	3748.27N	606.54W	==>	3796.98	1232895.73	3188891.01
12400.00	90.37	359.810	7461.20	3848.27N	606.87W	==>	3895.82	1232995.72	3188890.69
12430.50	90.37	359.810	7461.00	3878.77N	606.97W	==>	3925.97	1233026.22	3188890.59

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SYSDRILL

Well Design Combined Report

Wellbore: Anderson 18-3-12HN



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 1/2	22.00	22.00	0.00N	0.00E	1200.00	1200.00	0.00N	0.00E
8 3/4	1200.00	1200.00	0.00N	0.00E	8066.00	7489.00	485.62S	592.81W
6 1/8	8066.00	7489.00	485.62S	592.81W	12430.50	7461.00	3878.77N	606.97W

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 Surface Casing	22.00	22.00	0.00N	0.00E	1200.00	1200.00	0.00N	0.00E
7.0in Intermediate Casing	22.00	22.00	0.00N	0.00E	8066.00	7489.00	485.62S	592.81W
4 1/2in Production Liner	7866.00	7462.59	683.18S	589.40W	12430.50	7461.00	3878.77N	606.97W

Targets								
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting	Last Revised
Anderson 18-3-12HN BH	3878.77N	606.97W	7461.00	39.97107000	-104.82604000	1233026.22	3188890.59	28-Aug-2014
Anderson 18-3-12HN LP	485.34S	587.81W	7489.00	39.95909000	-104.82609000	1228662.25	3188909.74	28-Aug-2014

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
299680	Planned	12430.50	7461.00	WdW Rate Gyro	Standard	

Notes

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 5027.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 351.110 degrees
Bottom hole distance is 3925.97 Feet on azimuth 351.11 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 3-Sep-2014



SYSDRILL
Closest Approach + Clearance Factor Summary Report
Wellbore: Anderson 18-3-12HN



Ellipse separations are reported ONLY if BOTH wells have uncertainty data
Only Depth and Magnetic Reference Field error terms are correlated across tie points
Proximities beyond 2000.00ft with expansion rate of 0.00ft/1000ft are not reported
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
Anderson 18-3-12HN	28-Aug-2014	3-Sep-2014

Well		
Name	Government ID	Last Revised
Anderson 18-3-12HN		29-Aug-2014

Slot						
Name	Grid Northing	Grid Easting	Latitude	Longitude	North	East
Slot #12	1229147.5822	3189497.5390	39.96041000	-104.82398000	11.57S	84.01W

Installation				
Name	Easting	Northing	Coord System Name	North Alignment
Anderson	3189581.5481	1229159.1513	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

Field				
Name	Easting	Northing	Coord System Name	North Alignment
West Brighton	3178196.4983	1231661.3262	CO83-NF on NORTH AMERICAN DATUM 1983 datum	Grid

Clearance Summary								
Offset Wellbore	Offset Structure	Separation [ft]	MD[ft]	Diverging From[ft]	Ellipse Separation [ft]	Ellipse MD[ft]	Clearance Factor	Clearance MD[ft]
Anderson 19-1-12HC	Anderson	13.79	1203.10	7705.11	10.93	1200.00	1.53	7715.57
Anderson 18-3-11HC	Anderson	16.82	1203.10	12430.50	13.96	1200.00	5.88	1200.00
Anderson 19-1-11HN	Anderson	24.95	1203.10	7536.25	22.09	1200.00	8.72	1200.00
Anderson 18-3-10HN	Anderson	30.84	1203.10	12430.50	27.97	1200.00	10.78	1200.00
Anderson 19-1-10HC	Anderson	40.74	1203.10	7660.71	37.88	1200.00	14.24	1200.00
Anderson 18-3-9HC	Anderson	44.85	1203.10	12430.50	41.99	1200.00	15.68	1200.00
Anderson 19-1-9HN	Anderson	54.37	1203.10	7461.89	51.51	1200.00	19.01	1200.00
Anderson 18-3-8HN	Anderson	61.67	1203.10	12430.50	58.81	1200.00	21.56	1200.00
Anderson 19-1-8HC	Anderson	68.16	1203.10	1203.10	65.30	1200.00	23.83	1200.00
Anderson 18-3-7HC	Anderson	75.69	1203.10	1203.10	72.83	1200.00	26.46	1200.00
Anderson 19-1-7HN	Anderson	84.81	1203.10	1203.10	81.94	1200.00	29.64	1200.00
Schaefer 24-3-1HC (PWB)	Schaefer	771.66	7527.01	7527.01	743.52	7518.72	26.00	7387.49

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Wellbore: Anderson 18-3-12HN



Offset Wellbore	Offset Structure	Separation [ft]	MD[ft]	Diverging From[ft]	Ellipse Separation [ft]	Ellipse MD[ft]	Clearance Factor	Clearance MD[ft]
Schaefer 24-3-2HN (PWB)	Schaefer	1043.38	7465.27	7465.27	1001.85	7453.10	24.49	7338.27
Schaefer 24-3-3HC (PWB)	Schaefer	1496.43	7554.79	7554.79	1452.51	7551.53	33.35	7403.89
Schaefer 24-3-4HN (PWB)	Schaefer	1874.03	7502.31	7502.31	1826.02	7485.91	38.39	7322.00