





WARD PETROLEUM

INTEGRATED PETROLEUM TECHNOLOGIES, INC
SYSDRILL
Well Design Combined Report
Wellbore: Anderson 18-3-10HN



Wellhead Details							
Name	Northing	Easting	Latitude	Longitude	North	East	Elevation Above Inst.
Slot #10	1229147.8173	3189528.3729	39.96041000	-104.82387000	11.33S	53.18W	-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	1229147.82	3189528.37
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
1982.60	13.65	170.260	1976.16	79.77S	13.69E	2.00	-78.96	1229068.05	3189542.07
6743.64	13.65	170.260	6602.69	1187.29S	203.83E	==>	-1175.23	1227960.56	3189732.19
8041.10	90.33	359.570	7485.00	486.46S	233.37E	8.00	-473.80	1228661.37	3189761.74
12412.67	90.33	359.570	7460.00	3884.91N	200.22E	==>	3890.07	1233032.61	3189728.58

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	1229147.82	3189528.37
22.00	0.00	0.000	22.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
1278.00	0.00	0.000	1278.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	1229147.82	3189528.37
1378.00	1.56	170.260	1377.99	1.05S	0.18E	2.00	-1.04	1229146.77	3189528.55
1478.00	3.56	170.260	1477.89	5.45S	0.94E	2.00	-5.39	1229142.37	3189529.31
1578.00	5.56	170.260	1577.56	13.28S	2.28E	2.00	-13.15	1229134.53	3189530.65
1678.00	7.56	170.260	1676.90	24.54S	4.21E	2.00	-24.29	1229123.28	3189532.59
1778.00	9.56	170.260	1775.79	39.21S	6.73E	2.00	-38.81	1229108.61	3189535.10
1878.00	11.56	170.260	1874.09	57.27S	9.83E	2.00	-56.69	1229090.55	3189538.20
1978.00	13.56	170.260	1971.69	78.70S	13.51E	2.00	-77.91	1229069.11	3189541.88
1982.60	13.65	170.260	1976.16	79.77S	13.69E	2.00	-78.96	1229068.05	3189542.07
2000.00	13.65	170.260	1993.07	83.82S	14.39E	==>	-82.97	1229064.00	3189542.76
2100.00	13.65	170.260	2090.24	107.08S	18.38E	==>	-105.99	1229040.74	3189546.76
2200.00	13.65	170.260	2187.42	130.34S	22.38E	==>	-129.02	1229017.48	3189550.75
2300.00	13.65	170.260	2284.59	153.61S	26.37E	==>	-152.04	1228994.22	3189554.74
2400.00	13.65	170.260	2381.77	176.87S	30.36E	==>	-175.07	1228970.96	3189558.74
2500.00	13.65	170.260	2478.94	200.13S	34.36E	==>	-198.10	1228947.69	3189562.73
2600.00	13.65	170.260	2576.12	223.39S	38.35E	==>	-221.12	1228924.43	3189566.72
2700.00	13.65	170.260	2673.29	246.65S	42.34E	==>	-244.15	1228901.17	3189570.72
2800.00	13.65	170.260	2770.47	269.92S	46.34E	==>	-267.17	1228877.91	3189574.71
2900.00	13.65	170.260	2867.64	293.18S	50.33E	==>	-290.20	1228854.65	3189578.70
3000.00	13.65	170.260	2964.81	316.44S	54.32E	==>	-313.23	1228831.39	3189582.70
3100.00	13.65	170.260	3061.99	339.70S	58.32E	==>	-336.25	1228808.13	3189586.69

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 2.950 degrees
Bottom hole distance is 3890.07 Feet on azimuth 2.95 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 3-Sep-2014



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Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Northing	Easting
3200.00	13.65	170.260	3159.16	362.97S	62.31E	==>	-359.28	1228784.86	3189590.68
3300.00	13.65	170.260	3256.34	386.23S	66.31E	==>	-382.30	1228761.60	3189594.68
3400.00	13.65	170.260	3353.51	409.49S	70.30E	==>	-405.33	1228738.34	3189598.67
3500.00	13.65	170.260	3450.69	432.75S	74.29E	==>	-428.35	1228715.08	3189602.66
3600.00	13.65	170.260	3547.86	456.01S	78.29E	==>	-451.38	1228691.82	3189606.66
3700.00	13.65	170.260	3645.04	479.28S	82.28E	==>	-474.41	1228668.56	3189610.65
3800.00	13.65	170.260	3742.21	502.54S	86.27E	==>	-497.43	1228645.29	3189614.64
3900.00	13.65	170.260	3839.39	525.80S	90.27E	==>	-520.46	1228622.03	3189618.64
4000.00	13.65	170.260	3936.56	549.06S	94.26E	==>	-543.48	1228598.77	3189622.63
4100.00	13.65	170.260	4033.74	572.33S	98.25E	==>	-566.51	1228575.51	3189626.62
4200.00	13.65	170.260	4130.91	595.59S	102.25E	==>	-589.54	1228552.25	3189630.62
4300.00	13.65	170.260	4228.09	618.85S	106.24E	==>	-612.56	1228528.99	3189634.61
4400.00	13.65	170.260	4325.26	642.11S	110.23E	==>	-635.59	1228505.73	3189638.60
4500.00	13.65	170.260	4422.44	665.37S	114.23E	==>	-658.61	1228482.46	3189642.60
4600.00	13.65	170.260	4519.61	688.64S	118.22E	==>	-681.64	1228459.20	3189646.59
4700.00	13.65	170.260	4616.78	711.90S	122.21E	==>	-704.66	1228435.94	3189650.58
4800.00	13.65	170.260	4713.96	735.16S	126.21E	==>	-727.69	1228412.68	3189654.58
4900.00	13.65	170.260	4811.13	758.42S	130.20E	==>	-750.72	1228389.42	3189658.57
5000.00	13.65	170.260	4908.31	781.69S	134.19E	==>	-773.74	1228366.16	3189662.56
5100.00	13.65	170.260	5005.48	804.95S	138.19E	==>	-796.77	1228342.90	3189666.56
5200.00	13.65	170.260	5102.66	828.21S	142.18E	==>	-819.79	1228319.63	3189670.55
5300.00	13.65	170.260	5199.83	851.47S	146.18E	==>	-842.82	1228296.37	3189674.54
5400.00	13.65	170.260	5297.01	874.73S	150.17E	==>	-865.85	1228273.11	3189678.54
5500.00	13.65	170.260	5394.18	898.00S	154.16E	==>	-888.87	1228249.85	3189682.53
5600.00	13.65	170.260	5491.36	921.26S	158.16E	==>	-911.90	1228226.59	3189686.52
5700.00	13.65	170.260	5588.53	944.52S	162.15E	==>	-934.92	1228203.33	3189690.52
5800.00	13.65	170.260	5685.71	967.78S	166.14E	==>	-957.95	1228180.07	3189694.51
5900.00	13.65	170.260	5782.88	991.04S	170.14E	==>	-980.97	1228156.80	3189698.50
6000.00	13.65	170.260	5880.06	1014.31S	174.13E	==>	-1004.00	1228133.54	3189702.50
6100.00	13.65	170.260	5977.23	1037.57S	178.12E	==>	-1027.03	1228110.28	3189706.49
6200.00	13.65	170.260	6074.41	1060.83S	182.12E	==>	-1050.05	1228087.02	3189710.48
6300.00	13.65	170.260	6171.58	1084.09S	186.11E	==>	-1073.08	1228063.76	3189714.48
6400.00	13.65	170.260	6268.75	1107.36S	190.10E	==>	-1096.10	1228040.50	3189718.47
6500.00	13.65	170.260	6365.93	1130.62S	194.10E	==>	-1119.13	1228017.24	3189722.46
6600.00	13.65	170.260	6463.10	1153.88S	198.09E	==>	-1142.16	1227993.97	3189726.46
6700.00	13.65	170.260	6560.28	1177.14S	202.08E	==>	-1165.18	1227970.71	3189730.45
6743.64	13.65	170.260	6602.69	1187.29S	203.83E	==>	-1175.23	1227960.56	3189732.19
6800.00	9.24	165.580	6657.91	1198.24S	206.08E	8.00	-1186.04	1227949.62	3189734.45
6900.00	2.45	112.660	6757.38	1206.85S	210.06E	8.00	-1194.43	1227941.01	3189738.42
7000.00	7.39	17.230	6857.08	1201.52S	213.94E	8.00	-1188.91	1227946.34	3189742.30
7100.00	15.20	7.900	6955.08	1182.36S	217.65E	8.00	-1169.59	1227965.50	3189746.02
7200.00	23.14	4.860	7049.45	1149.73S	221.12E	8.00	-1136.83	1227998.12	3189749.49
7300.00	31.11	3.310	7138.38	1104.28S	224.29E	8.00	-1091.28	1228043.57	3189752.65
7400.00	39.09	2.350	7220.13	1046.89S	227.08E	8.00	-1033.82	1228100.96	3189755.45
7500.00	47.08	1.670	7293.10	978.68S	229.45E	8.00	-965.57	1228169.17	3189757.81
7600.00	55.07	1.150	7355.88	900.97S	231.35E	8.00	-887.86	1228246.88	3189759.71
7700.00	63.06	0.720	7407.24	815.27S	232.74E	8.00	-802.21	1228332.57	3189761.10
7800.00	71.06	0.350	7446.19	723.26S	233.59E	8.00	-710.28	1228424.58	3189761.96
7900.00	79.05	0.010	7471.96	626.72S	233.89E	8.00	-613.85	1228521.12	3189762.26
8000.00	87.04	359.690	7484.06	527.54S	233.64E	8.00	-514.81	1228620.30	3189762.00
8041.10	90.33	359.570	7485.00	486.46S	233.37E	8.00	-473.80	1228661.37	3189761.74
8100.00	90.33	359.570	7484.66	427.56S	232.93E	==>	-415.00	1228720.27	3189761.29
8200.00	90.33	359.570	7484.09	327.56S	232.17E	==>	-315.18	1228820.27	3189760.53
8300.00	90.33	359.570	7483.52	227.57S	231.41E	==>	-215.35	1228920.26	3189759.78
8400.00	90.33	359.570	7482.95	127.57S	230.65E	==>	-115.53	1229020.25	3189759.02
8500.00	90.33	359.570	7482.38	27.58S	229.89E	==>	-15.71	1229120.24	3189758.26
8600.00	90.33	359.570	7481.80	72.42N	229.13E	==>	84.12	1229220.23	3189757.50
8700.00	90.33	359.570	7481.23	172.42N	228.38E	==>	183.94	1229320.23	3189756.74
8800.00	90.33	359.570	7480.66	272.41N	227.62E	==>	283.76	1229420.22	3189755.98
8900.00	90.33	359.570	7480.09	372.41N	226.86E	==>	383.59	1229520.21	3189755.22

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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 2.950 degrees
Bottom hole distance is 3890.07 Feet on azimuth 2.95 degrees from Wellhead
Calculation method uses Minimum Curvature method
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Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Northing	Easting
9000.00	90.33	359.570	7479.52	472.40N	226.10E	==>	483.41	1229620.20	3189754.47
9100.00	90.33	359.570	7478.94	572.40N	225.34E	==>	583.24	1229720.20	3189753.71
9200.00	90.33	359.570	7478.37	672.39N	224.58E	==>	683.06	1229820.19	3189752.95
9300.00	90.33	359.570	7477.80	772.39N	223.82E	==>	782.88	1229920.18	3189752.19
9400.00	90.33	359.570	7477.23	872.38N	223.07E	==>	882.71	1230020.17	3189751.43
9500.00	90.33	359.570	7476.66	972.38N	222.31E	==>	982.53	1230120.16	3189750.67
9600.00	90.33	359.570	7476.08	1072.37N	221.55E	==>	1082.36	1230220.16	3189749.92
9700.00	90.33	359.570	7475.51	1172.37N	220.79E	==>	1182.18	1230320.15	3189749.16
9800.00	90.33	359.570	7474.94	1272.37N	220.03E	==>	1282.00	1230420.14	3189748.40
9900.00	90.33	359.570	7474.37	1372.36N	219.27E	==>	1381.83	1230520.13	3189747.64
10000.00	90.33	359.570	7473.80	1472.36N	218.52E	==>	1481.65	1230620.13	3189746.88
10100.00	90.33	359.570	7473.23	1572.35N	217.76E	==>	1581.48	1230720.12	3189746.12
10200.00	90.33	359.570	7472.65	1672.35N	217.00E	==>	1681.30	1230820.11	3189745.36
10300.00	90.33	359.570	7472.08	1772.34N	216.24E	==>	1781.12	1230920.10	3189744.61
10400.00	90.33	359.570	7471.51	1872.34N	215.48E	==>	1880.95	1231020.10	3189743.85
10500.00	90.33	359.570	7470.94	1972.33N	214.72E	==>	1980.77	1231120.09	3189743.09
10600.00	90.33	359.570	7470.37	2072.33N	213.96E	==>	2080.60	1231220.08	3189742.33
10700.00	90.33	359.570	7469.79	2172.32N	213.21E	==>	2180.42	1231320.07	3189741.57
10800.00	90.33	359.570	7469.22	2272.32N	212.45E	==>	2280.24	1231420.06	3189740.81
10900.00	90.33	359.570	7468.65	2372.32N	211.69E	==>	2380.07	1231520.06	3189740.05
11000.00	90.33	359.570	7468.08	2472.31N	210.93E	==>	2479.89	1231620.05	3189739.30
11100.00	90.33	359.570	7467.51	2572.31N	210.17E	==>	2579.71	1231720.04	3189738.54
11200.00	90.33	359.570	7466.93	2672.30N	209.41E	==>	2679.54	1231820.03	3189737.78
11300.00	90.33	359.570	7466.36	2772.30N	208.65E	==>	2779.36	1231920.03	3189737.02
11400.00	90.33	359.570	7465.79	2872.29N	207.90E	==>	2879.19	1232020.02	3189736.26
11500.00	90.33	359.570	7465.22	2972.29N	207.14E	==>	2979.01	1232120.01	3189735.50
11600.00	90.33	359.570	7464.65	3072.28N	206.38E	==>	3078.83	1232220.00	3189734.75
11700.00	90.33	359.570	7464.08	3172.28N	205.62E	==>	3178.66	1232319.99	3189733.99
11800.00	90.33	359.570	7463.50	3272.28N	204.86E	==>	3278.48	1232419.99	3189733.23
11900.00	90.33	359.570	7462.93	3372.27N	204.10E	==>	3378.31	1232519.98	3189732.47
12000.00	90.33	359.570	7462.36	3472.27N	203.35E	==>	3478.13	1232619.97	3189731.71
12100.00	90.33	359.570	7461.79	3572.26N	202.59E	==>	3577.95	1232719.96	3189730.95
12200.00	90.33	359.570	7461.22	3672.26N	201.83E	==>	3677.78	1232819.96	3189730.19
12300.00	90.33	359.570	7460.64	3772.25N	201.07E	==>	3777.60	1232919.95	3189729.44
12400.00	90.33	359.570	7460.07	3872.25N	200.31E	==>	3877.43	1233019.94	3189728.68
12412.67	90.33	359.570	7460.00	3884.91N	200.22E	==>	3890.07	1233032.61	3189728.58

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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	8041.00	7485.00	486.56S	233.37E
6 1/8	8041.00	7485.00	486.56S	233.37E	12412.67	7460.00	3884.91N	200.22E

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	8041.00	7485.00	486.56S	233.37E
4 1/2in Production Liner	7841.00	7458.38	684.12S	233.78E	12412.67	7460.00	3884.91N	200.22E

Targets

Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting	Last Revised
Anderson 18-3-10HN BH	3884.91N	200.22E	7460.00	39.97107000	-104.82305000	1233032.61	3189728.58	28-Aug-2014
Anderson 18-3-10HN LP	486.46S	222.37E	7485.00	39.95907000	-104.82309000	1228661.37	3189750.74	28-Aug-2014

Survey Tool Program

Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model
299630	Planned	12412.67	7460.00	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 2.950 degrees
 Bottom hole distance is 3890.07 Feet on azimuth 2.95 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 18-3-10HN



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 18-3-10HN	28-Aug-2014	3-Sep-2014

Well		
Name	Government ID	Last Revised
Anderson 18-3-10HN		29-Aug-2014

Slot						
Name	Grid Northing	Grid Easting	Latitude	Longitude	North	East
Slot #10	1229147.8173	3189528.3729	39.96041000	-104.82387000	11.33S	53.18W

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 19-1-11HN	Anderson	13.78	1317.93	7536.26	10.95	1186.70	4.85	1186.70
Anderson 19-1-10HC	Anderson	13.79	1301.53	7683.19	10.95	1186.70	1.60	7683.19
Anderson 18-3-9HC	Anderson	13.94	1383.55	1383.55	11.09	1383.55	4.83	1449.17
Anderson 18-3-11HC	Anderson	14.02	1252.31	1252.31	11.18	1186.70	4.93	1186.70
Anderson 19-1-9HN	Anderson	24.95	1301.53	7554.94	22.11	1186.70	8.78	1186.70
Anderson 19-1-12HC	Anderson	24.95	1252.31	7679.77	22.11	1186.70	8.78	1186.70
Anderson 18-3-8HN	Anderson	30.84	1300.00	1300.00	28.00	1186.70	10.86	1186.70
Anderson 18-3-12HN	Anderson	30.84	1200.00	12412.67	27.97	1200.00	10.78	1200.00
Anderson 19-1-8HC	Anderson	38.05	1301.53	7702.93	35.21	1186.70	13.38	1416.36
Anderson 18-3-7HC	Anderson	44.85	1250.00	1250.00	42.01	1186.70	15.79	1186.70
Anderson 19-1-7HN	Anderson	54.37	1300.00	7575.02	51.53	1186.70	19.14	1186.70
Schaefer 24-3-1HC (PWB)	Schaefer	1451.65	7469.51	7469.51	1407.23	7453.10	32.12	7338.27

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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	1818.62	7371.08	7371.08	1770.03	7354.68	37.07	7239.85