

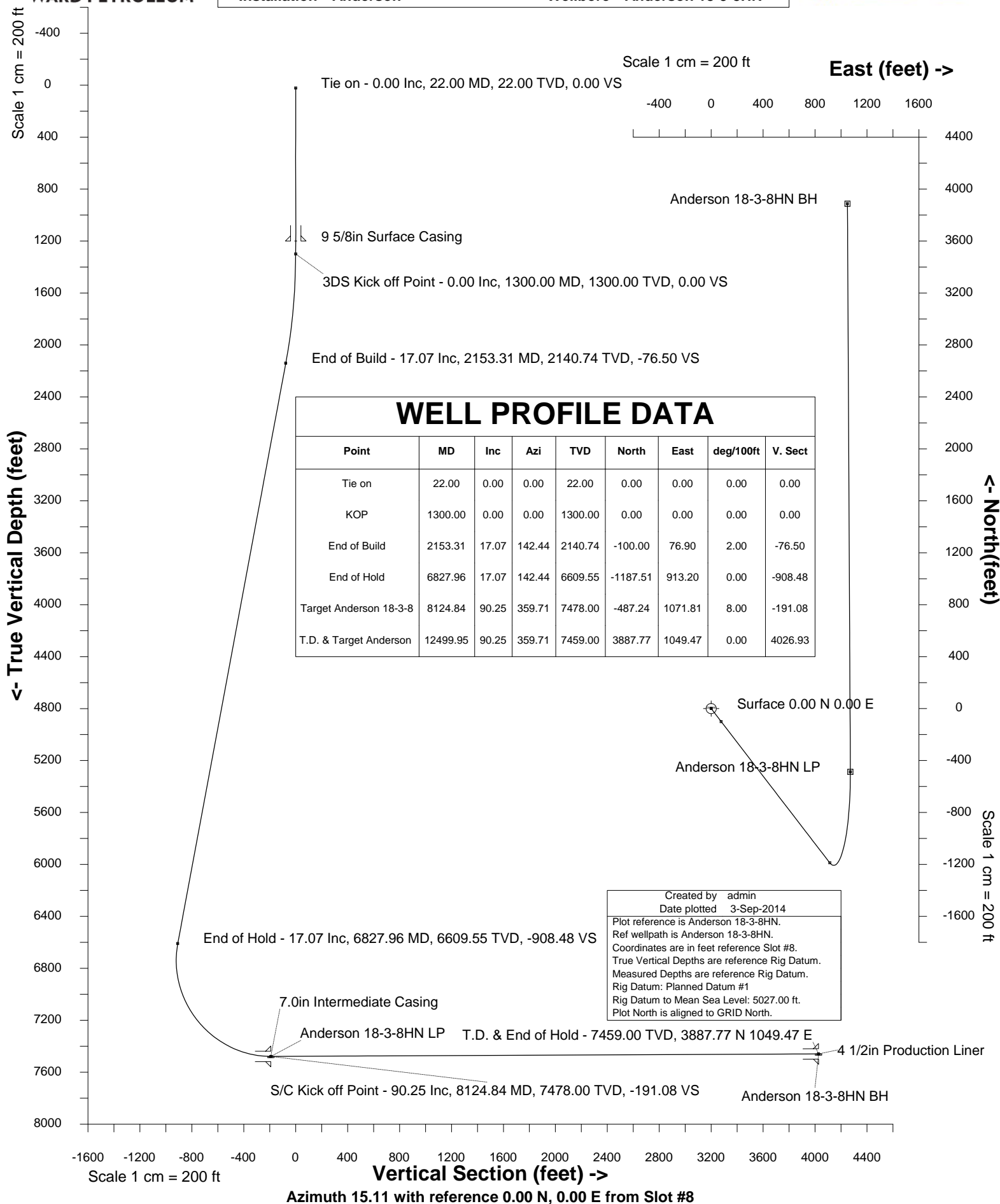


WARD PETROLEUM

WARD PETROLEUM

Location ADAMS COUNTY, CO
Field West Brighton
Installation Anderson

Slot Slot #8
Well Anderson 18-3-8HN
Wellbore Anderson 18-3-8HN





WARD PETROLEUM

INTEGRATED PETROLEUM TECHNOLOGIES, INC
SYSDRILL

Well Design Combined Report
Wellbore: Anderson 18-3-8HN



Wellhead Details							
Name	Northing	Easting	Latitude	Longitude	North	East	Elevation Above Inst.
Slot #8	1229148.0524	3189559.2068	39.96041000	-104.82376000	11.10S	22.34W	-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	1229148.05	3189559.21
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
2153.31	17.07	142.440	2140.74	100.00S	76.90E	2.00	-76.50	1229048.06	3189636.10
6827.96	17.07	142.440	6609.55	1187.51S	913.20E	==>	-908.48	1227960.58	3190472.38
8124.84	90.25	359.710	7478.00	487.24S	1071.81E	8.00	-191.08	1228660.82	3190630.98
12499.95	90.25	359.710	7459.00	3887.77N	1049.47E	==>	4026.93	1233035.70	3190608.64

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	1229148.05	3189559.21
22.00	0.00	0.000	22.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
100.00	0.00	0.000	100.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
200.00	0.00	0.000	200.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
300.00	0.00	0.000	300.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
400.00	0.00	0.000	400.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
500.00	0.00	0.000	500.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
600.00	0.00	0.000	600.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
700.00	0.00	0.000	700.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
800.00	0.00	0.000	800.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
900.00	0.00	0.000	900.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
1000.00	0.00	0.000	1000.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
1100.00	0.00	0.000	1100.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
1200.00	0.00	0.000	1200.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
1278.00	0.00	0.000	1278.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
1300.00	0.00	0.000	1300.00	0.00N	0.00E	==>	0.00	1229148.05	3189559.21
1378.00	1.56	142.440	1377.99	0.84S	0.65E	2.00	-0.64	1229147.21	3189559.85
1478.00	3.56	142.440	1477.89	4.38S	3.37E	2.00	-3.35	1229143.67	3189562.58
1578.00	5.56	142.440	1577.56	10.68S	8.22E	2.00	-8.17	1229137.37	3189567.42
1678.00	7.56	142.440	1676.90	19.74S	15.18E	2.00	-15.10	1229128.31	3189574.39
1778.00	9.56	142.440	1775.79	31.54S	24.25E	2.00	-24.13	1229116.52	3189583.46
1878.00	11.56	142.440	1874.09	46.07S	35.42E	2.00	-35.24	1229101.99	3189594.63
1978.00	13.56	142.440	1971.69	63.30S	48.68E	2.00	-48.43	1229084.75	3189607.89
2078.00	15.56	142.440	2068.47	83.23S	64.00E	2.00	-63.67	1229064.83	3189623.21
2153.31	17.07	142.440	2140.74	100.00S	76.90E	2.00	-76.50	1229048.06	3189636.10
2200.00	17.07	142.440	2185.38	110.86S	85.25E	==>	-84.81	1229037.20	3189644.46
2300.00	17.07	142.440	2280.98	134.12S	103.14E	==>	-102.61	1229013.93	3189662.35
2400.00	17.07	142.440	2376.58	157.39S	121.03E	==>	-120.41	1228990.67	3189680.24
2500.00	17.07	142.440	2472.17	180.65S	138.92E	==>	-138.20	1228967.41	3189698.13
2600.00	17.07	142.440	2567.77	203.92S	156.81E	==>	-156.00	1228944.14	3189716.01
2700.00	17.07	142.440	2663.37	227.18S	174.70E	==>	-173.80	1228920.88	3189733.90
2800.00	17.07	142.440	2758.96	250.44S	192.59E	==>	-191.60	1228897.62	3189751.79
2900.00	17.07	142.440	2854.56	273.71S	210.48E	==>	-209.40	1228874.35	3189769.68
3000.00	17.07	142.440	2950.16	296.97S	228.37E	==>	-227.19	1228851.09	3189787.57
3100.00	17.07	142.440	3045.75	320.24S	246.26E	==>	-244.99	1228827.83	3189805.46
3200.00	17.07	142.440	3141.35	343.50S	264.15E	==>	-262.79	1228804.56	3189823.35

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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 15.110 degrees
Bottom hole distance is 4026.93 Feet on azimuth 15.11 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 18-3-8HN



Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Northing	Easting
3300.00	17.07	142.440	3236.95	366.77S	282.04E	==>	-280.59	1228781.30	3189841.24
3400.00	17.07	142.440	3332.54	390.03S	299.93E	==>	-298.38	1228758.04	3189859.13
3500.00	17.07	142.440	3428.14	413.29S	317.82E	==>	-316.18	1228734.77	3189877.02
3600.00	17.07	142.440	3523.74	436.56S	335.71E	==>	-333.98	1228711.51	3189894.91
3700.00	17.07	142.440	3619.33	459.82S	353.61E	==>	-351.78	1228688.25	3189912.80
3800.00	17.07	142.440	3714.93	483.09S	371.50E	==>	-369.58	1228664.98	3189930.69
3900.00	17.07	142.440	3810.53	506.35S	389.39E	==>	-387.37	1228641.72	3189948.58
4000.00	17.07	142.440	3906.12	529.61S	407.28E	==>	-405.17	1228618.46	3189966.47
4100.00	17.07	142.440	4001.72	552.88S	425.17E	==>	-422.97	1228595.19	3189984.36
4200.00	17.07	142.440	4097.32	576.14S	443.06E	==>	-440.77	1228571.93	3190002.25
4300.00	17.07	142.440	4192.91	599.41S	460.95E	==>	-458.56	1228548.67	3190020.14
4400.00	17.07	142.440	4288.51	622.67S	478.84E	==>	-476.36	1228525.40	3190038.03
4500.00	17.07	142.440	4384.11	645.93S	496.73E	==>	-494.16	1228502.14	3190055.92
4600.00	17.07	142.440	4479.70	669.20S	514.62E	==>	-511.96	1228478.88	3190073.81
4700.00	17.07	142.440	4575.30	692.46S	532.51E	==>	-529.76	1228455.61	3190091.70
4800.00	17.07	142.440	4670.90	715.73S	550.40E	==>	-547.55	1228432.35	3190109.59
4900.00	17.07	142.440	4766.49	738.99S	568.29E	==>	-565.35	1228409.09	3190127.48
5000.00	17.07	142.440	4862.09	762.25S	586.18E	==>	-583.15	1228385.82	3190145.37
5100.00	17.07	142.440	4957.69	785.52S	604.07E	==>	-600.95	1228362.56	3190163.26
5200.00	17.07	142.440	5053.28	808.78S	621.96E	==>	-618.74	1228339.30	3190181.14
5300.00	17.07	142.440	5148.88	832.05S	639.85E	==>	-636.54	1228316.03	3190199.03
5400.00	17.07	142.440	5244.48	855.31S	657.74E	==>	-654.34	1228292.77	3190216.92
5500.00	17.07	142.440	5340.07	878.57S	675.63E	==>	-672.14	1228269.51	3190234.81
5600.00	17.07	142.440	5435.67	901.84S	693.52E	==>	-689.93	1228246.24	3190252.70
5700.00	17.07	142.440	5531.27	925.10S	711.41E	==>	-707.73	1228222.98	3190270.59
5800.00	17.07	142.440	5626.86	948.37S	729.30E	==>	-725.53	1228199.72	3190288.48
5900.00	17.07	142.440	5722.46	971.63S	747.19E	==>	-743.33	1228176.45	3190306.37
6000.00	17.07	142.440	5818.06	994.90S	765.08E	==>	-761.13	1228153.19	3190324.26
6100.00	17.07	142.440	5913.65	1018.16S	782.97E	==>	-778.92	1228129.93	3190342.15
6200.00	17.07	142.440	6009.25	1041.42S	800.86E	==>	-796.72	1228106.66	3190360.04
6300.00	17.07	142.440	6104.85	1064.69S	818.75E	==>	-814.52	1228083.40	3190377.93
6400.00	17.07	142.440	6200.44	1087.95S	836.64E	==>	-832.32	1228060.14	3190395.82
6500.00	17.07	142.440	6296.04	1111.22S	854.53E	==>	-850.11	1228036.87	3190413.71
6600.00	17.07	142.440	6391.64	1134.48S	872.42E	==>	-867.91	1228013.61	3190431.60
6700.00	17.07	142.440	6487.23	1157.74S	890.31E	==>	-885.71	1227990.35	3190449.49
6800.00	17.07	142.440	6582.83	1181.01S	908.20E	==>	-903.51	1227967.08	3190467.38
6827.96	17.07	142.440	6609.55	1187.51S	913.20E	==>	-908.48	1227960.58	3190472.38
6900.00	13.05	126.340	6679.14	1200.72S	926.21E	8.00	-917.85	1227947.37	3190485.39
7000.00	10.55	88.300	6777.16	1207.15S	944.48E	8.00	-919.29	1227940.94	3190503.66
7100.00	13.37	51.300	6875.12	1199.64S	962.68E	8.00	-907.30	1227948.45	3190521.85
7200.00	19.31	31.840	6971.11	1178.34S	980.45E	8.00	-882.10	1227969.75	3190539.62
7300.00	26.33	21.840	7063.27	1143.65S	997.45E	8.00	-844.19	1228004.44	3190556.62
7400.00	33.77	15.910	7149.78	1096.27S	1013.35E	8.00	-794.29	1228051.82	3190572.52
7500.00	41.39	11.940	7228.99	1037.10S	1027.83E	8.00	-733.40	1228110.99	3190587.00
7600.00	49.12	9.020	7299.33	967.30S	1040.62E	8.00	-662.68	1228180.78	3190599.79
7700.00	56.91	6.720	7359.45	888.23S	1051.47E	8.00	-583.51	1228259.85	3190610.64
7800.00	64.73	4.790	7408.17	801.43S	1060.16E	8.00	-497.45	1228346.65	3190619.34
7900.00	72.57	3.100	7444.55	708.59S	1066.53E	8.00	-406.15	1228439.49	3190625.71
8000.00	80.43	1.550	7467.87	611.51S	1070.46E	8.00	-311.40	1228536.56	3190629.63
8100.00	88.30	0.070	7477.68	512.08S	1071.86E	8.00	-215.05	1228635.99	3190631.03
8124.84	90.25	359.710	7478.00	487.24S	1071.81E	8.00	-191.08	1228660.82	3190630.98
8200.00	90.25	359.710	7477.67	412.09S	1071.42E	==>	-118.62	1228735.98	3190630.60
8300.00	90.25	359.710	7477.24	312.09S	1070.91E	==>	-22.21	1228835.97	3190630.09
8400.00	90.25	359.710	7476.81	212.09S	1070.40E	==>	74.20	1228935.97	3190629.57
8500.00	90.25	359.710	7476.37	112.09S	1069.89E	==>	170.61	1229035.96	3190629.06
8600.00	90.25	359.710	7475.94	12.10S	1069.38E	==>	267.02	1229135.96	3190628.55
8700.00	90.25	359.710	7475.50	87.90N	1068.87E	==>	363.42	1229235.95	3190628.04
8800.00	90.25	359.710	7475.07	187.90N	1068.36E	==>	459.83	1229335.95	3190627.53
8900.00	90.25	359.710	7474.63	287.90N	1067.85E	==>	556.24	1229435.94	3190627.02
9000.00	90.25	359.710	7474.20	387.89N	1067.34E	==>	652.65	1229535.93	3190626.51

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Vertical Section is from 0.00N 0.00E on azimuth 15.110 degrees
Bottom hole distance is 4026.93 Feet on azimuth 15.11 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
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SYSDRILL

Well Design Combined Report
Wellbore: Anderson 18-3-8HN



WARD PETROLEUM

Interpolated Wellpath									
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	Northing	Easting
9100.00	90.25	359.710	7473.77	487.89N	1066.83E	==>	749.06	1229635.93	3190626.00
9200.00	90.25	359.710	7473.33	587.89N	1066.32E	==>	845.47	1229735.92	3190625.49
9300.00	90.25	359.710	7472.90	687.89N	1065.81E	==>	941.88	1229835.92	3190624.98
9400.00	90.25	359.710	7472.46	787.89N	1065.30E	==>	1038.29	1229935.91	3190624.47
9500.00	90.25	359.710	7472.03	887.88N	1064.79E	==>	1134.70	1230035.91	3190623.96
9600.00	90.25	359.710	7471.59	987.88N	1064.27E	==>	1231.11	1230135.90	3190623.45
9700.00	90.25	359.710	7471.16	1087.88N	1063.76E	==>	1327.52	1230235.90	3190622.94
9800.00	90.25	359.710	7470.73	1187.88N	1063.25E	==>	1423.92	1230335.89	3190622.43
9900.00	90.25	359.710	7470.29	1287.87N	1062.74E	==>	1520.33	1230435.89	3190621.92
10000.00	90.25	359.710	7469.86	1387.87N	1062.23E	==>	1616.74	1230535.88	3190621.40
10100.00	90.25	359.710	7469.42	1487.87N	1061.72E	==>	1713.15	1230635.87	3190620.89
10200.00	90.25	359.710	7468.99	1587.87N	1061.21E	==>	1809.56	1230735.87	3190620.38
10300.00	90.25	359.710	7468.55	1687.87N	1060.70E	==>	1905.97	1230835.86	3190619.87
10400.00	90.25	359.710	7468.12	1787.86N	1060.19E	==>	2002.38	1230935.86	3190619.36
10500.00	90.25	359.710	7467.69	1887.86N	1059.68E	==>	2098.79	1231035.85	3190618.85
10600.00	90.25	359.710	7467.25	1987.86N	1059.17E	==>	2195.20	1231135.85	3190618.34
10700.00	90.25	359.710	7466.82	2087.86N	1058.66E	==>	2291.61	1231235.84	3190617.83
10800.00	90.25	359.710	7466.38	2187.85N	1058.15E	==>	2388.02	1231335.84	3190617.32
10900.00	90.25	359.710	7465.95	2287.85N	1057.64E	==>	2484.42	1231435.83	3190616.81
11000.00	90.25	359.710	7465.51	2387.85N	1057.13E	==>	2580.83	1231535.82	3190616.30
11100.00	90.25	359.710	7465.08	2487.85N	1056.62E	==>	2677.24	1231635.82	3190615.79
11200.00	90.25	359.710	7464.65	2587.85N	1056.10E	==>	2773.65	1231735.81	3190615.28
11300.00	90.25	359.710	7464.21	2687.84N	1055.59E	==>	2870.06	1231835.81	3190614.77
11400.00	90.25	359.710	7463.78	2787.84N	1055.08E	==>	2966.47	1231935.80	3190614.26
11500.00	90.25	359.710	7463.34	2887.84N	1054.57E	==>	3062.88	1232035.80	3190613.75
11600.00	90.25	359.710	7462.91	2987.84N	1054.06E	==>	3159.29	1232135.79	3190613.23
11700.00	90.25	359.710	7462.47	3087.83N	1053.55E	==>	3255.70	1232235.79	3190612.72
11800.00	90.25	359.710	7462.04	3187.83N	1053.04E	==>	3352.11	1232335.78	3190612.21
11900.00	90.25	359.710	7461.61	3287.83N	1052.53E	==>	3448.52	1232435.78	3190611.70
12000.00	90.25	359.710	7461.17	3387.83N	1052.02E	==>	3544.93	1232535.77	3190611.19
12100.00	90.25	359.710	7460.74	3487.82N	1051.51E	==>	3641.33	1232635.76	3190610.68
12200.00	90.25	359.710	7460.30	3587.82N	1051.00E	==>	3737.74	1232735.76	3190610.17
12300.00	90.25	359.710	7459.87	3687.82N	1050.49E	==>	3834.15	1232835.75	3190609.66
12400.00	90.25	359.710	7459.43	3787.82N	1049.98E	==>	3930.56	1232935.75	3190609.15
12499.95	90.25	359.710	7459.00	3887.77N	1049.47E	==>	4026.93	1233035.70	3190608.64

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INTEGRATED PETROLEUM TECHNOLOGIES, INC

SYSDRILL

Well Design Combined Report

Wellbore: Anderson 18-3-8HN



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	8124.00	7478.00	488.09S	1071.81E
6 1/8	8124.00	7478.00	488.09S	1071.81E	12499.95	7459.00	3887.77N	1049.47E

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	8124.00	7478.00	488.09S	1071.81E
4 1/2in Production Liner	7924.00	7451.36	685.60S	1067.70E	12499.95	7459.00	3887.77N	1049.47E

Targets

Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting	Last Revised
Anderson 18-3-8HN BH	3887.77N	1049.47E	7459.00	39.97106000	-104.81991000	1233035.70	3190608.64	28-Aug-2014
Anderson 18-3-8HN LP	487.24S	1071.81E	7478.00	39.95905000	-104.81995000	1228660.82	3190630.98	28-Aug-2014

Survey Tool Program

Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model
299580	Planned	12499.95	7459.00	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 15.110 degrees
Bottom hole distance is 4026.93 Feet on azimuth 15.11 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 18-3-8HN



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 18-3-8HN	28-Aug-2014	29-Aug-2014

Well		
Name	Government ID	Last Revised
Anderson 18-3-8HN		29-Aug-2014

Slot						
Name	Grid Northing	Grid Easting	Latitude	Longitude	North	East
Slot #8	1229148.0524	3189559.2068	39.96041000	-104.82376000	11.10S	22.34W

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 19-1-8HC	Anderson	12.28	1301.53	7766.89	9.44	1186.70	1.61	7781.19
Anderson 19-1-9HN	Anderson	13.79	1301.53	7570.90	10.95	1186.70	4.85	1186.70
Anderson 18-3-7HC	Anderson	14.02	1250.00	1250.00	11.18	1186.70	4.93	1186.70
Anderson 18-3-9HC	Anderson	16.82	1301.53	12497.94	13.98	1186.70	5.92	1186.70
Anderson 19-1-7HN	Anderson	24.95	1300.00	7689.51	22.11	1186.70	8.78	1186.70
Anderson 19-1-10HC	Anderson	24.95	1301.53	7677.95	22.11	1186.70	8.78	1186.70
Anderson 18-3-10HN	Anderson	30.83	1301.53	1301.53	28.00	1186.70	10.86	1186.70
Anderson 19-1-11HN	Anderson	40.74	1301.53	7438.88	37.90	1186.70	14.34	1186.70
Anderson 18-3-11HC	Anderson	44.85	1252.31	1252.31	42.01	1186.70	15.79	1186.70
Anderson 19-1-12HC	Anderson	54.37	1250.00	1250.00	51.53	1186.70	19.14	1186.70
Anderson 18-3-12HN	Anderson	61.67	1200.00	12499.95	58.81	1200.00	21.56	1200.00
W WAGNER #1 (AWB)	Offsets	1610.10	5378.98	5378.98	1583.29	5386.17	59.77	5501.00

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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]
W Wagner #1 (AWB)	Offsets	1610.10	5378.98	5378.98	1583.54	5386.17	60.09	5566.62