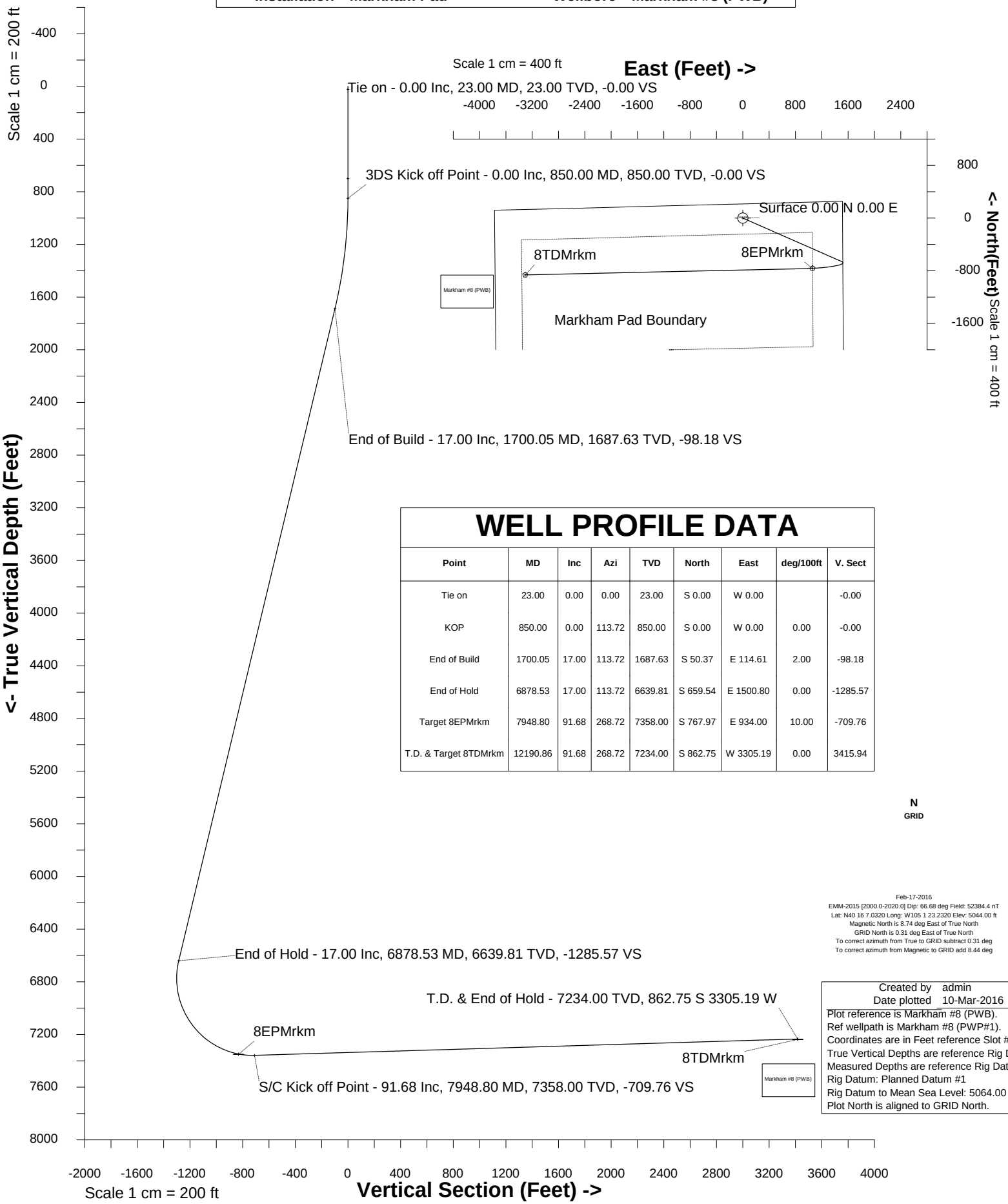
Cub Creek Energy, LLC

Location	**Weld County, CO**	**Slot**	**Slot #8**
Field	**WATTENBERG**	**Well**	**Markham #8**
Installation	**Markham Pad**	**Wellbore**	**Markham #8 (PWB)**



WELL PROFILE DATA

Point	MD	Inc	Azi	TVD	North	East	deg/100ft	V. Sect
Tie on	23.00	0.00	0.00	23.00	S 0.00	W 0.00		-0.00
KOP	850.00	0.00	113.72	850.00	S 0.00	W 0.00	0.00	-0.00
End of Build	1700.05	17.00	113.72	1687.63	S 50.37	E 114.61	2.00	-98.18
End of Hold	6878.53	17.00	113.72	6639.81	S 659.54	E 1500.80	0.00	-1285.57
Target 8EPMrkm	7948.80	91.68	268.72	7358.00	S 767.97	E 934.00	10.00	-709.76
T.D. & Target 8TDMrkm	12190.86	91.68	268.72	7234.00	S 862.75	W 3305.19	0.00	3415.94

N
GRID

Feb-17-2016
EMM-2015 [2000.0-2020.0] Dip: 66.68 deg Field: 52384.4 nT
Lat: N40 16 7.0320 Long: W105 1 23.2320 Elev: 5044.00 ft
Magnetic North is 8.74 deg East of True North
GRID North is 0.31 deg East of True North
To correct azimuth from True to GRID subtract 0.31 deg
To correct azimuth from Magnetic to GRID add 8.44 deg

Created by admin
Date plotted 10-Mar-2016

Plot reference is Markham #8 (PWB).
Ref wellpath is Markham #8 (PWP#1).
Coordinates are in Feet reference Slot #8.
True Vertical Depths are reference Rig Datum
Measured Depths are reference Rig Datum.
Rig Datum: Planned Datum #1
Rig Datum to Mean Sea Level: 5064.00 ft.
Plot North is aligned to GRID North.

SYSDRILL
Well Design Combined Report
Wellbore: Markham #8 (PWB)

Wellhead Details

Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
Slot #8	N40 16 8.1480	W105 1 23.2680	1341170.4474	3133069.3672	112.92N	3.40W	0.00

Declination

Date	Source	Time
Feb-17-2016	EMM-2015 [2000.0-2020.0]	11:55

Installation Details

Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
Markham Pad	N40 16 7.0320	W105 1 23.2320	1341057.5349	3133072.7650	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
23.00	0.00	0.000	23.00	0.00N	0.00E		0.00	1341170.45	3133069.37
850.00	0.00	113.720	850.00	0.00N	0.00E	==>	0.00	1341170.45	3133069.37
1700.05	17.00	113.720	1687.63	50.37S	114.61E	2.00	-98.18	1341120.08	3133183.98
6878.53	17.00	113.720	6639.81	659.54S	1500.80E	==>	-1285.57	1340510.94	3134570.10
7948.80	91.68	268.720	7358.00	767.97S	934.00E	10.00	-709.76	1340402.51	3134003.33
12190.86	91.68	268.720	7234.00	862.75S	3305.19W	==>	3415.94	1340307.74	3129764.33

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	Rig Datum
23.00	0.00	0.000	23.00	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	1.00	113.720	900.00	0.18S	0.40E	2.00	-0.34	
1000.00	3.00	113.720	999.93	1.58S	3.59E	2.00	-3.08	
1100.00	5.00	113.720	1099.68	4.39S	9.98E	2.00	-8.55	
1200.00	7.00	113.720	1199.13	8.59S	19.55E	2.00	-16.75	
1300.00	9.00	113.720	1298.15	14.19S	32.29E	2.00	-27.66	
1400.00	11.00	113.720	1396.63	21.18S	48.19E	2.00	-41.28	
1500.00	13.00	113.720	1494.44	29.54S	67.22E	2.00	-57.58	
1600.00	15.00	113.720	1591.46	39.27S	89.37E	2.00	-76.55	
1700.00	17.00	113.720	1687.58	50.36S	114.60E	2.00	-98.16	
1800.00	17.00	113.720	1783.21	62.13S	141.37E	==>	-121.09	
1900.00	17.00	113.720	1878.84	73.89S	168.14E	==>	-144.02	
2000.00	17.00	113.720	1974.47	85.65S	194.90E	==>	-166.95	
2100.00	17.00	113.720	2070.10	97.42S	221.67E	==>	-189.88	
2200.00	17.00	113.720	2165.73	109.18S	248.44E	==>	-212.81	
2300.00	17.00	113.720	2261.36	120.94S	275.21E	==>	-235.74	
2400.00	17.00	113.720	2356.99	132.71S	301.98E	==>	-258.67	
2500.00	17.00	113.720	2452.62	144.47S	328.75E	==>	-281.60	
2600.00	17.00	113.720	2548.25	156.23S	355.51E	==>	-304.53	
2700.00	17.00	113.720	2643.88	168.00S	382.28E	==>	-327.46	
2800.00	17.00	113.720	2739.51	179.76S	409.05E	==>	-350.39	
2900.00	17.00	113.720	2835.14	191.52S	435.82E	==>	-373.32	

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Vertical Section is from 0.00N 0.00E on azimuth 255.370 degrees
Bottom hole distance is 3415.94 Feet on azimuth 255.37 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 14-Apr-2016

SYSDRILL
Well Design Combined Report
Wellbore: Markham #8 (PWB)

IPT

Interpolated Wellpath

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
3000.00	17.00	113.720	2930.77	203.29S	462.59E	==>	-396.25	
3100.00	17.00	113.720	3026.40	215.05S	489.35E	==>	-419.18	
3200.00	17.00	113.720	3122.03	226.81S	516.12E	==>	-442.10	
3300.00	17.00	113.720	3217.66	238.58S	542.89E	==>	-465.03	
3400.00	17.00	113.720	3313.29	250.34S	569.66E	==>	-487.96	
3500.00	17.00	113.720	3408.92	262.10S	596.43E	==>	-510.89	
3600.00	17.00	113.720	3504.55	273.87S	623.20E	==>	-533.82	
3700.00	17.00	113.720	3600.18	285.63S	649.96E	==>	-556.75	
3800.00	17.00	113.720	3695.81	297.39S	676.73E	==>	-579.68	
3900.00	17.00	113.720	3791.44	309.16S	703.50E	==>	-602.61	
4000.00	17.00	113.720	3887.07	320.92S	730.27E	==>	-625.54	
4100.00	17.00	113.720	3982.70	332.68S	757.04E	==>	-648.47	
4200.00	17.00	113.720	4078.33	344.45S	783.81E	==>	-671.40	
4300.00	17.00	113.720	4173.96	356.21S	810.57E	==>	-694.33	
4400.00	17.00	113.720	4269.59	367.98S	837.34E	==>	-717.26	
4500.00	17.00	113.720	4365.22	379.74S	864.11E	==>	-740.19	
4600.00	17.00	113.720	4460.85	391.50S	890.88E	==>	-763.12	
4700.00	17.00	113.720	4556.48	403.27S	917.65E	==>	-786.04	
4800.00	17.00	113.720	4652.11	415.03S	944.41E	==>	-808.97	
4900.00	17.00	113.720	4747.74	426.79S	971.18E	==>	-831.90	
5000.00	17.00	113.720	4843.37	438.56S	997.95E	==>	-854.83	
5100.00	17.00	113.720	4939.00	450.32S	1024.72E	==>	-877.76	
5200.00	17.00	113.720	5034.63	462.08S	1051.49E	==>	-900.69	
5300.00	17.00	113.720	5130.26	473.85S	1078.26E	==>	-923.62	
5400.00	17.00	113.720	5225.89	485.61S	1105.02E	==>	-946.55	
5500.00	17.00	113.720	5321.52	497.37S	1131.79E	==>	-969.48	
5600.00	17.00	113.720	5417.15	509.14S	1158.56E	==>	-992.41	
5700.00	17.00	113.720	5512.78	520.90S	1185.33E	==>	-1015.34	
5800.00	17.00	113.720	5608.41	532.66S	1212.10E	==>	-1038.27	
5900.00	17.00	113.720	5704.04	544.43S	1238.86E	==>	-1061.20	
6000.00	17.00	113.720	5799.67	556.19S	1265.63E	==>	-1084.13	
6100.00	17.00	113.720	5895.30	567.95S	1292.40E	==>	-1107.05	
6200.00	17.00	113.720	5990.93	579.72S	1319.17E	==>	-1129.98	
6300.00	17.00	113.720	6086.56	591.48S	1345.94E	==>	-1152.91	
6400.00	17.00	113.720	6182.19	603.24S	1372.71E	==>	-1175.84	
6500.00	17.00	113.720	6277.82	615.01S	1399.47E	==>	-1198.77	
6600.00	17.00	113.720	6373.45	626.77S	1426.24E	==>	-1221.70	
6700.00	17.00	113.720	6469.08	638.53S	1453.01E	==>	-1244.63	
6800.00	17.00	113.720	6564.71	650.30S	1479.78E	==>	-1267.56	
6900.00	15.10	117.370	6660.44	662.08S	1506.16E	10.00	-1290.11	
7000.00	8.08	155.160	6758.47	674.48S	1520.72E	10.00	-1301.06	
7100.00	10.06	221.240	6857.45	687.46S	1517.90E	10.00	-1295.06	
7200.00	18.33	245.350	6954.39	700.62S	1497.80E	10.00	-1272.29	
7300.00	27.74	254.160	7046.34	713.56S	1461.02E	10.00	-1233.43	
7400.00	37.45	258.710	7130.50	725.90S	1408.68E	10.00	-1179.68	
7500.00	47.26	261.590	7204.32	737.26S	1342.38E	10.00	-1112.65	
7600.00	57.12	263.670	7265.55	747.29S	1264.12E	10.00	-1034.40	
7700.00	67.01	265.330	7312.34	755.68S	1176.28E	10.00	-947.29	
7800.00	76.92	266.770	7343.26	762.19S	1081.54E	10.00	-853.97	
7900.00	86.84	268.090	7357.37	766.62S	982.77E	10.00	-757.28	
8000.00	91.68	268.720	7356.50	769.12S	882.84E	==>	-659.96	
8100.00	91.68	268.720	7353.58	771.35S	782.91E	==>	-562.71	
8200.00	91.68	268.720	7350.66	773.59S	682.97E	==>	-465.45	
8300.00	91.68	268.720	7347.73	775.82S	583.04E	==>	-368.19	
8400.00	91.68	268.720	7344.81	778.06S	483.11E	==>	-270.94	
8500.00	91.68	268.720	7341.89	780.29S	383.18E	==>	-173.68	
8600.00	91.68	268.720	7338.96	782.52S	283.24E	==>	-76.42	

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Vertical Section is from 0.00N 0.00E on azimuth 255.370 degrees
Bottom hole distance is 3415.94 Feet on azimuth 255.37 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 14-Apr-2016

SYSDRILL
Well Design Combined Report
Wellbore: Markham #8 (PWB)

Interpolated Wellpath

MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
8700.00	91.68	268.720	7336.04	784.76S	183.31E	==>	20.83	
8800.00	91.68	268.720	7333.12	786.99S	83.38E	==>	118.09	
8900.00	91.68	268.720	7330.20	789.23S	16.55W	==>	215.35	
9000.00	91.68	268.720	7327.27	791.46S	116.49W	==>	312.61	
9100.00	91.68	268.720	7324.35	793.69S	216.42W	==>	409.86	
9200.00	91.68	268.720	7321.43	795.93S	316.35W	==>	507.12	
9300.00	91.68	268.720	7318.50	798.16S	416.28W	==>	604.38	
9400.00	91.68	268.720	7315.58	800.40S	516.21W	==>	701.63	
9500.00	91.68	268.720	7312.66	802.63S	616.15W	==>	798.89	
9600.00	91.68	268.720	7309.73	804.87S	716.08W	==>	896.15	
9700.00	91.68	268.720	7306.81	807.10S	816.01W	==>	993.40	
9800.00	91.68	268.720	7303.89	809.33S	915.94W	==>	1090.66	
9900.00	91.68	268.720	7300.96	811.57S	1015.88W	==>	1187.92	
10000.00	91.68	268.720	7298.04	813.80S	1115.81W	==>	1285.17	
10100.00	91.68	268.720	7295.12	816.04S	1215.74W	==>	1382.43	
10200.00	91.68	268.720	7292.20	818.27S	1315.67W	==>	1479.69	
10300.00	91.68	268.720	7289.27	820.50S	1415.61W	==>	1576.94	
10400.00	91.68	268.720	7286.35	822.74S	1515.54W	==>	1674.20	
10500.00	91.68	268.720	7283.43	824.97S	1615.47W	==>	1771.46	
10600.00	91.68	268.720	7280.50	827.21S	1715.40W	==>	1868.71	
10700.00	91.68	268.720	7277.58	829.44S	1815.33W	==>	1965.97	
10800.00	91.68	268.720	7274.66	831.68S	1915.27W	==>	2063.23	
10900.00	91.68	268.720	7271.73	833.91S	2015.20W	==>	2160.48	
11000.00	91.68	268.720	7268.81	836.14S	2115.13W	==>	2257.74	
11100.00	91.68	268.720	7265.89	838.38S	2215.06W	==>	2355.00	
11200.00	91.68	268.720	7262.96	840.61S	2315.00W	==>	2452.25	
11300.00	91.68	268.720	7260.04	842.85S	2414.93W	==>	2549.51	
11400.00	91.68	268.720	7257.12	845.08S	2514.86W	==>	2646.77	
11500.00	91.68	268.720	7254.19	847.31S	2614.79W	==>	2744.02	
11600.00	91.68	268.720	7251.27	849.55S	2714.73W	==>	2841.28	
11700.00	91.68	268.720	7248.35	851.78S	2814.66W	==>	2938.54	
11800.00	91.68	268.720	7245.43	854.02S	2914.59W	==>	3035.79	
11900.00	91.68	268.720	7242.50	856.25S	3014.52W	==>	3133.05	
12000.00	91.68	268.720	7239.58	858.49S	3114.45W	==>	3230.31	
12100.00	91.68	268.720	7236.66	860.72S	3214.39W	==>	3327.56	
12190.86	91.68	268.720	7234.00	862.75S	3305.19W	==>	3415.94	

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Vertical Section is from 0.00N 0.00E on azimuth 255.370 degrees
Bottom hole distance is 3415.94 Feet on azimuth 255.37 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Integrated Petroleum Technologies, Inc.
Date Printed: 14-Apr-2016

SYSDRILL
Well Design Combined Report
Wellbore: Markham #8 (PWB)

Targets

Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
8EPMrkm	762.97S	1059.00E	7348.00	N40 16 0.5520	W105 1 9.6600	1340407.51	3134128.32
8TDMrkm	862.75S	3305.19W	7234.00	N40 15 59.7960	W105 2 5.9640	1340307.74	3129764.33

Survey Tool Program

Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model
445515	Planned	12190.86	7234.00	ISCWSA MWD	Rev 4 + SAG + FLT

Notes

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Bottom hole distance is 3415.94 Feet on azimuth 255.37 degrees from Wellhead
Calculation method uses Minimum Curvature method
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Date Printed: 14-Apr-2016

SYSDRILL
Closest Approach + Clearance Factor Summary Report
Wellbore: Markham #8 (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
Markham #8 (PWB)	Feb-22-2016	Mar-10-2016

Well

Name	Government ID	Last Revised
Markham #8		Feb-22-2016

Slot

Name	Latitude	Longitude	Grid Northing	Grid Easting	North	East
Slot #8	N40 16 8.1480	W105 1 23.2680	1341170.4474	3133069.3672	112.92N	3.40W

Installation

Name	Installation Position (Latitude)	Installation Position (Longitude)	Easting	Northing	Coord System Name	North Alignment
Markham Pad	N40 16 7.0320	W105 1 23.2320	3133072.7650	1341057.5349	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]
Markham #7	14.57	750.00	7932.53	-144.26	12190.86	0.56	12190.86
Markham #9	14.57	850.00	12190.86	-145.05	12190.86	0.55	12190.86
Markham #6	31.33	1090.46	12190.86	19.80	1154.89	1.42	12190.86
Markham #10	32.47	876.02	12184.58	22.85	958.04	1.42	12190.86
Markham #5	47.36	850.03	12190.86	37.81	958.04	1.85	12190.86
Markham #11	47.36	859.61	12182.38	38.03	941.64	1.85	12190.86
Markham #12	61.99	850.00	12181.77	52.77	908.83	2.33	12190.86
Markham #4	65.57	749.00	749.00	57.45	794.00	2.34	12190.86
Markham #3	73.20	1286.12	12190.86	59.81	1318.93	3.24	12190.86
Markham #2	85.80	1310.41	1310.41	72.19	1335.34	3.71	12190.86
Markham #1	112.97	172.00	12190.86	110.31	223.00	4.22	12190.86
Markham #33-32D	331.74	9367.03	9367.03	187.24	9389.80	2.29	9400.00
Markham #44-32D	991.89	8061.72	8061.72	898.71	8061.72	10.63	8143.08

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Prepared by Integrated Petroleum Technologies, Inc.
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