

# Cub Creek Energy, LLC

N  
GRID

Location Weld County, CO  
Field WATTENBERG  
Installation Knight Pad

Slot KNIGHT 18  
Well W KNIGHT 18  
Wellbore W KNIGHT 18 (PWB)

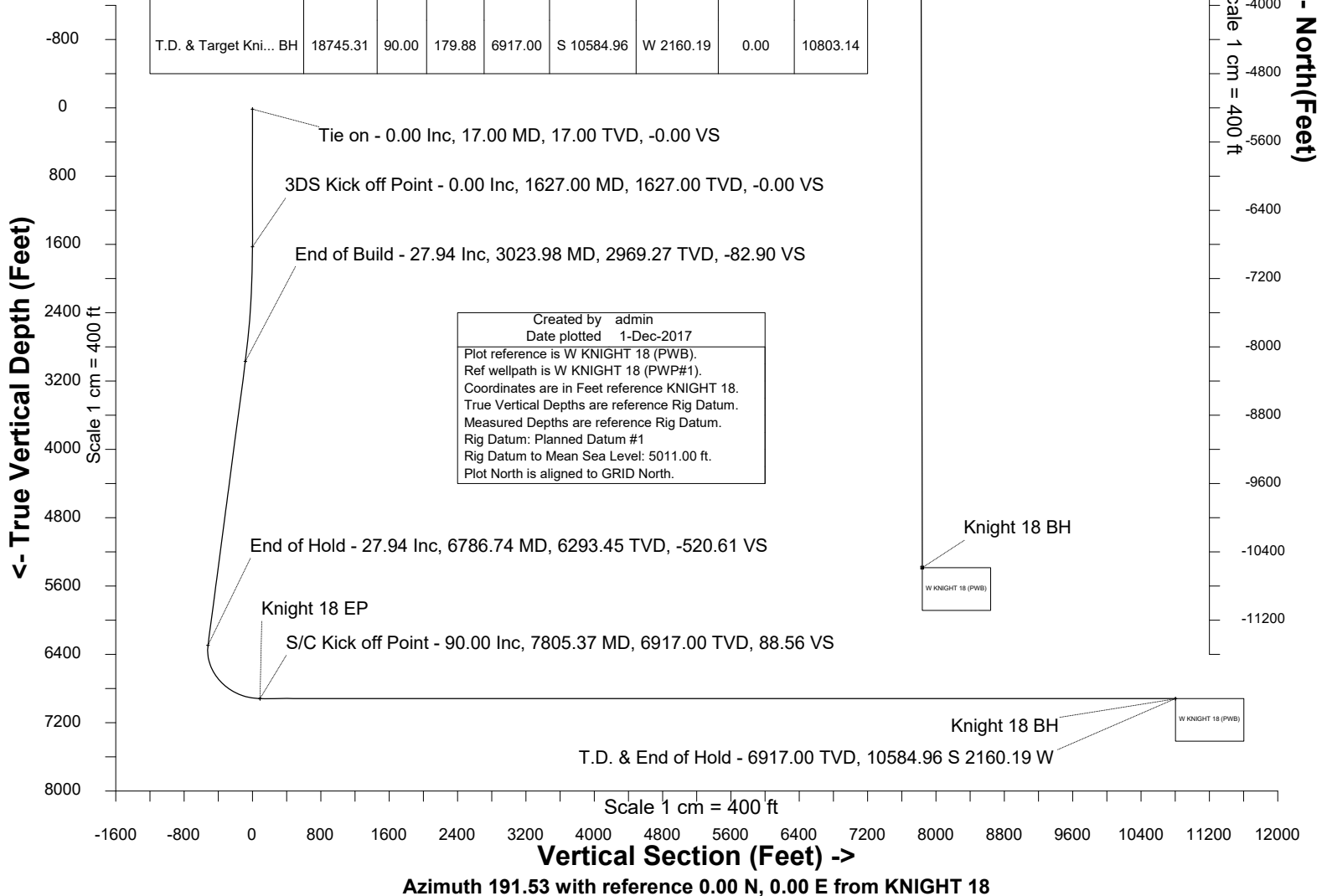
East (Feet) ->

-3200 -2400 -1600 -800 -0 800  
Scale 1 cm = 400 ft

Nov-6-2017  
EMMA-2015 [2000.0-2020.0] Dip: 66.59 deg Field: 52154.0 nT  
Lat: N40 11 52 9440 Long: W105 2 31 0020 Elev: 4903.00 ft  
Magnetic North is 8.54 deg East of True North  
GRID North is 0.30 deg East of True North  
To correct azimuth from True to GRID subtract 0.30 deg  
To correct azimuth from Magnetic to GRID add 8.25 deg

## WELL PROFILE DATA

Point	MD	Inc	Azi	TVD	North	East	deg/100ft	V. Sect
Tie on	17.00	0.00	0.00	17.00	S 0.00	W 0.00		-0.00
KOP	1627.00	0.00	295.91	1627.00	S 0.00	W 0.00	0.00	-0.00
End of Build	3023.98	27.94	295.91	2969.27	N 145.91	W 300.35	2.00	-82.90
End of Hold	6786.74	27.94	295.91	6293.45	N 916.27	W 1886.14	0.00	-520.61
Target Knight 18 EP	7805.37	90.00	179.88	6917.00	N 354.95	W 2182.18	10.00	88.56
T.D. & Target Kni... BH	18745.31	90.00	179.88	6917.00	S 10584.96	W 2160.19	0.00	10803.14





SYSDRILL  
Well Design Combined Report  
Wellbore: W KNIGHT 18 (PWB)



Wellhead Details							
Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
KNIGHT 18	40.19779500	-105.04205500	1315229.5314	3127922.2663	89.37S	23.28W	0.00

Declination		
Date	Source	Time
Nov-6-2017	EMM-2015 [2000.0-2020.0]	14:52

Installation Details						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
Knight Pad	40.19804000	-105.04197000	1315318.9022	3127945.5490	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
17.00	0.00	0.000	17.00	0.00N	0.00E		0.00	1315229.53	3127922.27
1627.00	0.00	295.910	1627.00	0.00N	0.00E	==>	0.00	1315229.53	3127922.27
3023.98	27.94	295.910	2969.27	145.91N	300.35W	2.00	-82.90	1315375.43	3127621.93
6786.74	27.94	295.910	6293.45	916.27N	1886.14W	==>	-520.61	1316145.76	3126036.21
7805.37	90.00	179.880	6917.00	354.95N	2182.18W	10.00	88.56	1315584.47	3125740.18
18745.31	90.00	179.880	6917.00	10584.96S	2160.19W	==>	10803.14	1304645.04	3125762.18

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
17.00	0.00	0.000	17.00	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	1.46	295.910	1699.99	0.41N	0.84W	2.00	-0.23	
1800.00	3.46	295.910	1799.89	2.28N	4.70W	2.00	-1.30	
1900.00	5.46	295.910	1899.59	5.68N	11.69W	2.00	-3.23	
2000.00	7.46	295.910	1998.95	10.60N	21.81W	2.00	-6.02	
2100.00	9.46	295.910	2097.85	17.02N	35.04W	2.00	-9.67	
2200.00	11.46	295.910	2196.19	24.96N	51.37W	2.00	-14.18	
2300.00	13.46	295.910	2293.83	34.38N	70.78W	2.00	-19.54	
2400.00	15.46	295.910	2390.65	45.29N	93.24W	2.00	-25.74	
2500.00	17.46	295.910	2486.55	57.67N	118.72W	2.00	-32.77	
2600.00	19.46	295.910	2581.40	71.51N	147.20W	2.00	-40.63	
2700.00	21.46	295.910	2675.09	86.78N	178.64W	2.00	-49.31	
2800.00	23.46	295.910	2767.50	103.48N	213.00W	2.00	-58.79	
2900.00	25.46	295.910	2858.52	121.57N	250.25W	2.00	-69.07	
3000.00	27.46	295.910	2948.04	141.04N	290.32W	2.00	-80.14	
3100.00	27.94	295.910	3036.43	161.47N	332.39W	==>	-91.75	

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Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 5011.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 191.530 degrees  
Bottom hole distance is 10803.14 Feet on azimuth 191.53 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 1-Dec-2017



SYSDRILL  
Well Design Combined Report  
Wellbore: W KNIGHT 18 (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	27.94	295.910	3124.77	181.94N	374.53W	==>	-103.38	
3300.00	27.94	295.910	3213.12	202.42N	416.68W	==>	-115.01	
3400.00	27.94	295.910	3301.46	222.89N	458.82W	==>	-126.64	
3500.00	27.94	295.910	3389.81	243.36N	500.97W	==>	-138.28	
3600.00	27.94	295.910	3478.15	263.84N	543.11W	==>	-149.91	
3700.00	27.94	295.910	3566.49	284.31N	585.25W	==>	-161.54	
3800.00	27.94	295.910	3654.84	304.78N	627.40W	==>	-173.17	
3900.00	27.94	295.910	3743.18	325.26N	669.54W	==>	-184.81	
4000.00	27.94	295.910	3831.53	345.73N	711.69W	==>	-196.44	
4100.00	27.94	295.910	3919.87	366.20N	753.83W	==>	-208.07	
4200.00	27.94	295.910	4008.22	386.68N	795.98W	==>	-219.71	
4300.00	27.94	295.910	4096.56	407.15N	838.12W	==>	-231.34	
4400.00	27.94	295.910	4184.90	427.62N	880.26W	==>	-242.97	
4500.00	27.94	295.910	4273.25	448.10N	922.41W	==>	-254.60	
4600.00	27.94	295.910	4361.59	468.57N	964.55W	==>	-266.24	
4700.00	27.94	295.910	4449.94	489.04N	1006.70W	==>	-277.87	
4800.00	27.94	295.910	4538.28	509.52N	1048.84W	==>	-289.50	
4900.00	27.94	295.910	4626.62	529.99N	1090.99W	==>	-301.13	
5000.00	27.94	295.910	4714.97	550.46N	1133.13W	==>	-312.77	
5100.00	27.94	295.910	4803.31	570.94N	1175.27W	==>	-324.40	
5200.00	27.94	295.910	4891.66	591.41N	1217.42W	==>	-336.03	
5300.00	27.94	295.910	4980.00	611.88N	1259.56W	==>	-347.67	
5400.00	27.94	295.910	5068.35	632.36N	1301.71W	==>	-359.30	
5500.00	27.94	295.910	5156.69	652.83N	1343.85W	==>	-370.93	
5600.00	27.94	295.910	5245.03	673.30N	1386.00W	==>	-382.56	
5700.00	27.94	295.910	5333.38	693.78N	1428.14W	==>	-394.20	
5800.00	27.94	295.910	5421.72	714.25N	1470.29W	==>	-405.83	
5900.00	27.94	295.910	5510.07	734.72N	1512.43W	==>	-417.46	
6000.00	27.94	295.910	5598.41	755.20N	1554.57W	==>	-429.09	
6100.00	27.94	295.910	5686.75	775.67N	1596.72W	==>	-440.73	
6200.00	27.94	295.910	5775.10	796.14N	1638.86W	==>	-452.36	
6300.00	27.94	295.910	5863.44	816.62N	1681.01W	==>	-463.99	
6400.00	27.94	295.910	5951.79	837.09N	1723.15W	==>	-475.62	
6500.00	27.94	295.910	6040.13	857.56N	1765.30W	==>	-487.26	
6600.00	27.94	295.910	6128.48	878.04N	1807.44W	==>	-498.89	
6700.00	27.94	295.910	6216.82	898.51N	1849.58W	==>	-510.52	
6800.00	27.44	293.270	6305.19	918.83N	1891.74W	10.00	-522.01	
6900.00	25.49	271.130	6394.93	928.38N	1934.53W	10.00	-522.81	
7000.00	27.07	248.710	6484.81	920.53N	1977.35W	10.00	-506.55	
7100.00	31.66	230.480	6572.11	895.50N	2018.90W	10.00	-473.72	
7200.00	38.19	217.180	6654.18	854.06N	2057.93W	10.00	-425.31	
7300.00	45.82	207.480	6728.51	797.48N	2093.24W	10.00	-362.81	
7400.00	54.08	200.080	6792.86	727.46N	2123.77W	10.00	-288.10	
7500.00	62.70	194.130	6845.26	646.14N	2148.58W	10.00	-203.46	
7600.00	71.54	189.040	6884.13	555.98N	2166.92W	10.00	-111.46	
7700.00	80.50	184.460	6908.28	459.74N	2178.24W	10.00	-14.90	
7800.00	89.52	180.120	6916.98	360.32N	2182.18W	10.00	83.30	
7900.00	90.00	179.880	6917.00	260.32N	2181.99W	==>	181.24	
8000.00	90.00	179.880	6917.00	160.32N	2181.79W	==>	279.18	
8100.00	90.00	179.880	6917.00	60.32N	2181.59W	==>	377.12	
8200.00	90.00	179.880	6917.00	39.68S	2181.39W	==>	475.06	
8300.00	90.00	179.880	6917.00	139.68S	2181.19W	==>	573.00	
8400.00	90.00	179.880	6917.00	239.68S	2180.99W	==>	670.94	
8500.00	90.00	179.880	6917.00	339.68S	2180.79W	==>	768.88	
8600.00	90.00	179.880	6917.00	439.68S	2180.59W	==>	866.82	
8700.00	90.00	179.880	6917.00	539.67S	2180.39W	==>	964.76	
8800.00	90.00	179.880	6917.00	639.67S	2180.18W	==>	1062.70	
8900.00	90.00	179.880	6917.00	739.67S	2179.98W	==>	1160.64	
9000.00	90.00	179.880	6917.00	839.67S	2179.78W	==>	1258.58	

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Coordinates are from Slot MD's are from Rig and TVD's are from Rig ( Planned Datum #1 5011.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 191.530 degrees  
Bottom hole distance is 10803.14 Feet on azimuth 191.53 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 1-Dec-2017



SYS DRILL  
Well Design Combined Report  
Wellbore: W KNIGHT 18 (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	179.880	6917.00	939.67S	2179.58W	==>	1356.52	
9200.00	90.00	179.880	6917.00	1039.67S	2179.38W	==>	1454.46	
9300.00	90.00	179.880	6917.00	1139.67S	2179.18W	==>	1552.40	
9400.00	90.00	179.880	6917.00	1239.67S	2178.98W	==>	1650.34	
9500.00	90.00	179.880	6917.00	1339.67S	2178.78W	==>	1748.28	
9600.00	90.00	179.880	6917.00	1439.67S	2178.58W	==>	1846.22	
9700.00	90.00	179.880	6917.00	1539.67S	2178.37W	==>	1944.16	
9800.00	90.00	179.880	6917.00	1639.67S	2178.17W	==>	2042.10	
9900.00	90.00	179.880	6917.00	1739.67S	2177.97W	==>	2140.04	
10000.00	90.00	179.880	6917.00	1839.67S	2177.77W	==>	2237.98	
10100.00	90.00	179.880	6917.00	1939.67S	2177.57W	==>	2335.92	
10200.00	90.00	179.880	6917.00	2039.67S	2177.37W	==>	2433.86	
10300.00	90.00	179.880	6917.00	2139.67S	2177.17W	==>	2531.80	
10400.00	90.00	179.880	6917.00	2239.67S	2176.97W	==>	2629.74	
10500.00	90.00	179.880	6917.00	2339.67S	2176.77W	==>	2727.68	
10600.00	90.00	179.880	6917.00	2439.67S	2176.56W	==>	2825.62	
10700.00	90.00	179.880	6917.00	2539.67S	2176.36W	==>	2923.56	
10800.00	90.00	179.880	6917.00	2639.67S	2176.16W	==>	3021.50	
10900.00	90.00	179.880	6917.00	2739.67S	2175.96W	==>	3119.44	
11000.00	90.00	179.880	6917.00	2839.67S	2175.76W	==>	3217.38	
11100.00	90.00	179.880	6917.00	2939.67S	2175.56W	==>	3315.32	
11200.00	90.00	179.880	6917.00	3039.67S	2175.36W	==>	3413.26	
11300.00	90.00	179.880	6917.00	3139.67S	2175.16W	==>	3511.20	
11400.00	90.00	179.880	6917.00	3239.67S	2174.96W	==>	3609.14	
11500.00	90.00	179.880	6917.00	3339.67S	2174.76W	==>	3707.08	
11600.00	90.00	179.880	6917.00	3439.67S	2174.55W	==>	3805.02	
11700.00	90.00	179.880	6917.00	3539.67S	2174.35W	==>	3902.96	
11800.00	90.00	179.880	6917.00	3639.67S	2174.15W	==>	4000.90	
11900.00	90.00	179.880	6917.00	3739.67S	2173.95W	==>	4098.84	
12000.00	90.00	179.880	6917.00	3839.67S	2173.75W	==>	4196.78	
12100.00	90.00	179.880	6917.00	3939.67S	2173.55W	==>	4294.72	
12200.00	90.00	179.880	6917.00	4039.67S	2173.35W	==>	4392.66	
12300.00	90.00	179.880	6917.00	4139.67S	2173.15W	==>	4490.60	
12400.00	90.00	179.880	6917.00	4239.67S	2172.95W	==>	4588.54	
12500.00	90.00	179.880	6917.00	4339.67S	2172.74W	==>	4686.48	
12600.00	90.00	179.880	6917.00	4439.67S	2172.54W	==>	4784.42	
12700.00	90.00	179.880	6917.00	4539.67S	2172.34W	==>	4882.36	
12800.00	90.00	179.880	6917.00	4639.67S	2172.14W	==>	4980.30	
12900.00	90.00	179.880	6917.00	4739.67S	2171.94W	==>	5078.24	
13000.00	90.00	179.880	6917.00	4839.67S	2171.74W	==>	5176.18	
13100.00	90.00	179.880	6917.00	4939.67S	2171.54W	==>	5274.12	
13200.00	90.00	179.880	6917.00	5039.67S	2171.34W	==>	5372.06	
13300.00	90.00	179.880	6917.00	5139.67S	2171.14W	==>	5470.00	
13400.00	90.00	179.880	6917.00	5239.67S	2170.93W	==>	5567.94	
13500.00	90.00	179.880	6917.00	5339.67S	2170.73W	==>	5665.88	
13600.00	90.00	179.880	6917.00	5439.66S	2170.53W	==>	5763.82	
13700.00	90.00	179.880	6917.00	5539.66S	2170.33W	==>	5861.76	
13800.00	90.00	179.880	6917.00	5639.66S	2170.13W	==>	5959.70	
13900.00	90.00	179.880	6917.00	5739.66S	2169.93W	==>	6057.64	
14000.00	90.00	179.880	6917.00	5839.66S	2169.73W	==>	6155.58	
14100.00	90.00	179.880	6917.00	5939.66S	2169.53W	==>	6253.52	
14200.00	90.00	179.880	6917.00	6039.66S	2169.33W	==>	6351.46	
14300.00	90.00	179.880	6917.00	6139.66S	2169.13W	==>	6449.40	
14400.00	90.00	179.880	6917.00	6239.66S	2168.92W	==>	6547.34	
14500.00	90.00	179.880	6917.00	6339.66S	2168.72W	==>	6645.28	
14600.00	90.00	179.880	6917.00	6439.66S	2168.52W	==>	6743.22	
14700.00	90.00	179.880	6917.00	6539.66S	2168.32W	==>	6841.16	
14800.00	90.00	179.880	6917.00	6639.66S	2168.12W	==>	6939.10	
14900.00	90.00	179.880	6917.00	6739.66S	2167.92W	==>	7037.04	

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Vertical Section is from 0.00N 0.00E on azimuth 191.530 degrees  
Bottom hole distance is 10803.14 Feet on azimuth 191.53 degrees from Wellhead  
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Well Design Combined Report  
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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	179.880	6917.00	6839.66S	2167.72W	==>	7134.98	
15100.00	90.00	179.880	6917.00	6939.66S	2167.52W	==>	7232.92	
15200.00	90.00	179.880	6917.00	7039.66S	2167.32W	==>	7330.86	
15300.00	90.00	179.880	6917.00	7139.66S	2167.11W	==>	7428.80	
15400.00	90.00	179.880	6917.00	7239.66S	2166.91W	==>	7526.74	
15500.00	90.00	179.880	6917.00	7339.66S	2166.71W	==>	7624.68	
15600.00	90.00	179.880	6917.00	7439.66S	2166.51W	==>	7722.62	
15700.00	90.00	179.880	6917.00	7539.66S	2166.31W	==>	7820.56	
15800.00	90.00	179.880	6917.00	7639.66S	2166.11W	==>	7918.51	
15900.00	90.00	179.880	6917.00	7739.66S	2165.91W	==>	8016.45	
16000.00	90.00	179.880	6917.00	7839.66S	2165.71W	==>	8114.39	
16100.00	90.00	179.880	6917.00	7939.66S	2165.51W	==>	8212.33	
16200.00	90.00	179.880	6917.00	8039.66S	2165.30W	==>	8310.27	
16300.00	90.00	179.880	6917.00	8139.66S	2165.10W	==>	8408.21	
16400.00	90.00	179.880	6917.00	8239.66S	2164.90W	==>	8506.15	
16500.00	90.00	179.880	6917.00	8339.66S	2164.70W	==>	8604.09	
16600.00	90.00	179.880	6917.00	8439.66S	2164.50W	==>	8702.03	
16700.00	90.00	179.880	6917.00	8539.66S	2164.30W	==>	8799.97	
16800.00	90.00	179.880	6917.00	8639.66S	2164.10W	==>	8897.91	
16900.00	90.00	179.880	6917.00	8739.66S	2163.90W	==>	8995.85	
17000.00	90.00	179.880	6917.00	8839.66S	2163.70W	==>	9093.79	
17100.00	90.00	179.880	6917.00	8939.66S	2163.50W	==>	9191.73	
17200.00	90.00	179.880	6917.00	9039.66S	2163.29W	==>	9289.67	
17300.00	90.00	179.880	6917.00	9139.66S	2163.09W	==>	9387.61	
17400.00	90.00	179.880	6917.00	9239.66S	2162.89W	==>	9485.55	
17500.00	90.00	179.880	6917.00	9339.66S	2162.69W	==>	9583.49	
17600.00	90.00	179.880	6917.00	9439.66S	2162.49W	==>	9681.43	
17700.00	90.00	179.880	6917.00	9539.66S	2162.29W	==>	9779.37	
17800.00	90.00	179.880	6917.00	9639.66S	2162.09W	==>	9877.31	
17900.00	90.00	179.880	6917.00	9739.66S	2161.89W	==>	9975.25	
18000.00	90.00	179.880	6917.00	9839.66S	2161.69W	==>	10073.19	
18100.00	90.00	179.880	6917.00	9939.66S	2161.48W	==>	10171.13	
18200.00	90.00	179.880	6917.00	10039.66S	2161.28W	==>	10269.07	
18300.00	90.00	179.880	6917.00	10139.66S	2161.08W	==>	10367.01	
18400.00	90.00	179.880	6917.00	10239.66S	2160.88W	==>	10464.95	
18500.00	90.00	179.880	6917.00	10339.66S	2160.68W	==>	10562.89	
18600.00	90.00	179.880	6917.00	10439.66S	2160.48W	==>	10660.83	
18700.00	90.00	179.880	6917.00	10539.66S	2160.28W	==>	10758.77	
18745.31	90.00	179.880	6917.00	10584.96S	2160.19W	==>	10803.14	

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig ( Planned Datum #1 5011.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 191.530 degrees  
Bottom hole distance is 10803.14 Feet on azimuth 191.53 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 1-Dec-2017



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
Knight 18 EP	354.95N	2182.18W	6917.00	40.19880000	-105.04986000	1315584.47	3125740.18
Knight 18 BH	10584.96S	2160.19W	6917.00	40.16877000	-105.04998000	1304645.04	3125762.18

Notes