

# Cub Creek Energy, LLC

Location	Weld County, CO	Slot	OLANDER 19
Field	WATTENBERG	Well	W OLANDER 19
Installation	Olander Pad	Wellbore	W OLANDER 19 (PWB)

East (Feet) ->

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

N

GRID

## 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	1300.00	0.00	59.92	1300.00	S 0.00	W 0.00	0.00	0.00
End of Build	1932.73	12.65	59.92	1927.60	N 34.88	E 60.22	2.00	-27.95
End of Hold	6388.76	12.65	59.92	6275.38	N 524.16	E 904.94	0.00	-419.97
Target OLANDER 19 EP	7351.11	90.00	179.64	6898.82	S 44.63	E 1030.10	10.00	159.23
T.D. & Target OLA...2mi	17029.26	90.00	179.64	6898.82	S 9722.58	E 1091.11	0.00	9783.62

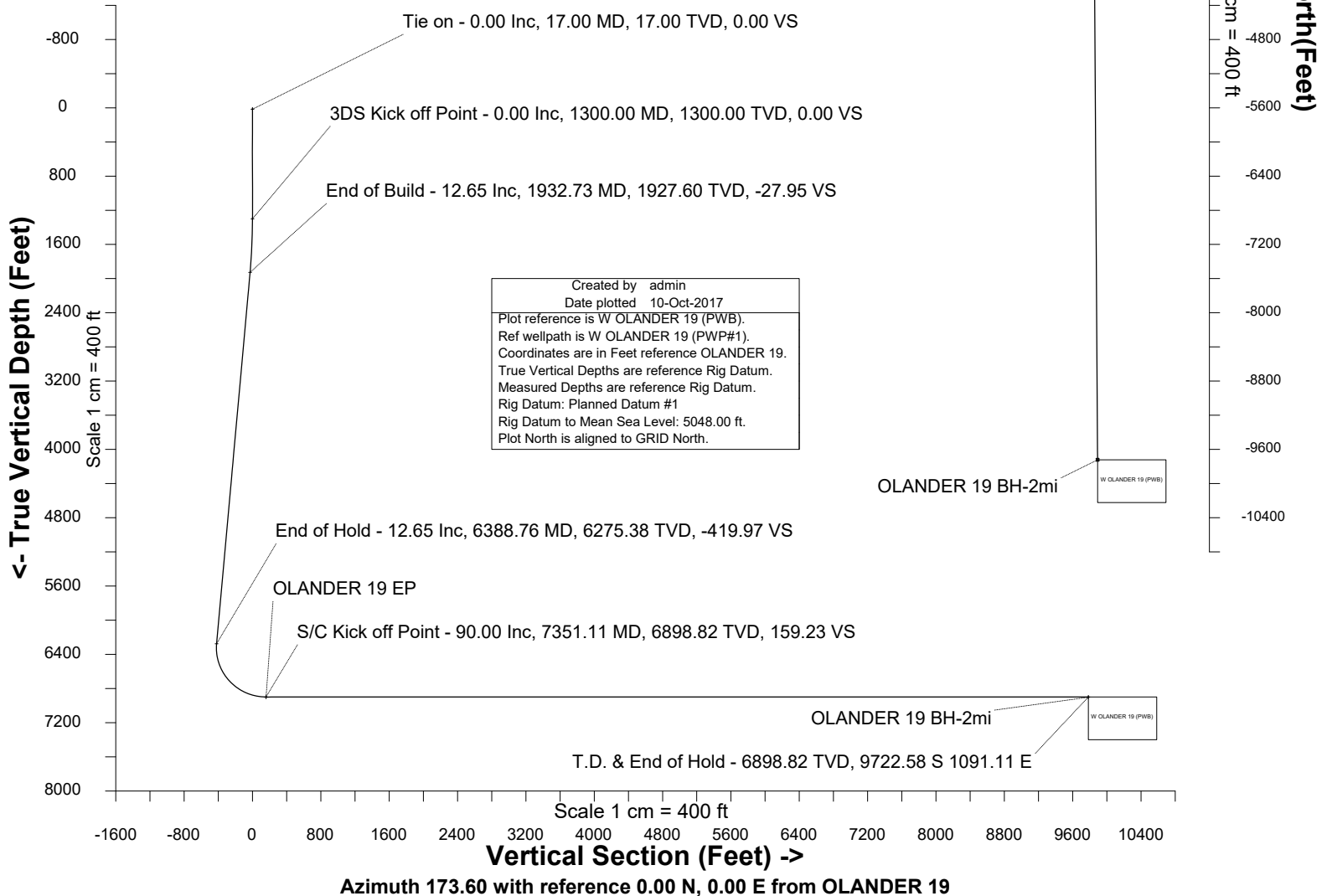
Surface 0.00 N 0.00 E

OLANDER 19 EP

<- North(Feet)  
Scale 1 cm = 400 ft

Jul-12-2017

EMM-2015 (2000.0-2020.0) Dip: 66.61 deg Field: 52203.1 nT  
Lat: N40 12 10.3680 Long: W105 1 31.6200 Elev: 5033.00 ft  
Magnetic North is 8.59 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 8.28 deg





SYSDRILL  
Well Design Combined Report  
Wellbore: W OLANDER 19 (PWB)



Wellhead Details							
Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
OLANDER 19	40.20281000	-105.02513000	1317081.2526	3132640.2648	25.02S	89.52E	0.00

Declination		
Date	Source	Time
Jul-12-2017	EMM-2015 [2000.0-2020.0]	14:01

Installation Details						
Name	Installation Position (Latitude)	Installation Position (Longitude)	Northing	Easting	Coord System Name	North Alignment
Olander Pad	40.20288000	-105.02545000	1317106.2735	3132550.7471	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	1317081.25	3132640.26
1300.00	0.00	59.920	1300.00	0.00N	0.00E	==>	0.00	1317081.25	3132640.26
1932.73	12.65	59.920	1927.60	34.88N	60.22E	2.00	-27.95	1317116.13	3132700.48
6388.76	12.65	59.920	6275.38	524.16N	904.94E	==>	-419.97	1317605.39	3133545.17
7351.11	90.00	179.640	6898.82	44.63S	1030.10E	10.00	159.23	1317036.63	3133670.32
17029.26	90.00	179.640	6898.82	9722.58S	1091.11E	==>	9783.62	1307359.10	3133731.32

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	59.920	1300.00	0.00N	0.00E	==>	0.00	
1400.00	2.00	59.920	1399.98	0.87N	1.51E	2.00	-0.70	
1500.00	4.00	59.920	1499.84	3.50N	6.04E	2.00	-2.80	
1517.00	4.34	59.920	1516.79	4.12N	7.11E	2.00	-3.30	
1617.00	6.34	59.920	1616.35	8.78N	15.16E	2.00	-7.04	
1717.00	8.34	59.920	1715.53	15.18N	26.22E	2.00	-12.17	
1817.00	10.34	59.920	1814.20	23.32N	40.26E	2.00	-18.68	
1917.00	12.34	59.920	1912.24	33.17N	57.27E	2.00	-26.58	
2017.00	12.65	59.920	2009.82	44.13N	76.19E	==>	-35.36	
2117.00	12.65	59.920	2107.39	55.11N	95.15E	==>	-44.16	
2217.00	12.65	59.920	2204.96	66.09N	114.11E	==>	-52.96	
2317.00	12.65	59.920	2302.53	77.07N	133.06E	==>	-61.75	
2417.00	12.65	59.920	2400.10	88.05N	152.02E	==>	-70.55	
2517.00	12.65	59.920	2497.68	99.03N	170.98E	==>	-79.35	
2617.00	12.65	59.920	2595.25	110.01N	189.93E	==>	-88.15	
2717.00	12.65	59.920	2692.82	120.99N	208.89E	==>	-96.94	
2817.00	12.65	59.920	2790.39	131.97N	227.85E	==>	-105.74	
2917.00	12.65	59.920	2887.96	142.96N	246.81E	==>	-114.54	
3017.00	12.65	59.920	2985.53	153.94N	265.76E	==>	-123.34	

All data is in Feet unless otherwise stated  
Coordinates are from Slot MD's are from Rig ( Planned Datum #1 5048.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 173.600 degrees  
Bottom hole distance is 9783.62 Feet on azimuth 173.60 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 10-Oct-2017



SYSDRILL  
Well Design Combined Report  
Wellbore: W OLANDER 19 (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
3117.00	12.65	59.920	3083.10	164.92N	284.72E	==>	-132.13	
3217.00	12.65	59.920	3180.67	175.90N	303.68E	==>	-140.93	
3317.00	12.65	59.920	3278.24	186.88N	322.63E	==>	-149.73	
3417.00	12.65	59.920	3375.81	197.86N	341.59E	==>	-158.53	
3517.00	12.65	59.920	3473.38	208.84N	360.55E	==>	-167.32	
3617.00	12.65	59.920	3570.95	219.82N	379.50E	==>	-176.12	
3717.00	12.65	59.920	3668.53	230.80N	398.46E	==>	-184.92	
3817.00	12.65	59.920	3766.10	241.78N	417.42E	==>	-193.72	
3917.00	12.65	59.920	3863.67	252.76N	436.38E	==>	-202.52	
4017.00	12.65	59.920	3961.24	263.74N	455.33E	==>	-211.31	
4117.00	12.65	59.920	4058.81	274.72N	474.29E	==>	-220.11	
4217.00	12.65	59.920	4156.38	285.70N	493.25E	==>	-228.91	
4317.00	12.65	59.920	4253.95	296.68N	512.20E	==>	-237.71	
4417.00	12.65	59.920	4351.52	307.66N	531.16E	==>	-246.50	
4517.00	12.65	59.920	4449.09	318.64N	550.12E	==>	-255.30	
4617.00	12.65	59.920	4546.66	329.62N	569.07E	==>	-264.10	
4717.00	12.65	59.920	4644.23	340.60N	588.03E	==>	-272.90	
4817.00	12.65	59.920	4741.80	351.58N	606.99E	==>	-281.69	
4917.00	12.65	59.920	4839.38	362.56N	625.94E	==>	-290.49	
5017.00	12.65	59.920	4936.95	373.54N	644.90E	==>	-299.29	
5117.00	12.65	59.920	5034.52	384.52N	663.86E	==>	-308.09	
5217.00	12.65	59.920	5132.09	395.50N	682.82E	==>	-316.88	
5317.00	12.65	59.920	5229.66	406.48N	701.77E	==>	-325.68	
5417.00	12.65	59.920	5327.23	417.46N	720.73E	==>	-334.48	
5517.00	12.65	59.920	5424.80	428.44N	739.69E	==>	-343.28	
5617.00	12.65	59.920	5522.37	439.42N	758.64E	==>	-352.08	
5717.00	12.65	59.920	5619.94	450.40N	777.60E	==>	-360.87	
5817.00	12.65	59.920	5717.51	461.38N	796.56E	==>	-369.67	
5917.00	12.65	59.920	5815.08	472.36N	815.51E	==>	-378.47	
6017.00	12.65	59.920	5912.65	483.34N	834.47E	==>	-387.27	
6117.00	12.65	59.920	6010.23	494.32N	853.43E	==>	-396.06	
6217.00	12.65	59.920	6107.80	505.30N	872.38E	==>	-404.86	
6317.00	12.65	59.920	6205.37	516.28N	891.34E	==>	-413.66	
6417.00	11.54	72.340	6303.00	526.57N	910.32E	10.00	-421.77	
6517.00	12.83	120.750	6400.99	523.92N	929.44E	10.00	-417.00	
6617.00	19.84	146.920	6497.02	503.98N	948.29E	10.00	-395.08	
6717.00	28.63	158.710	6588.17	467.34N	966.30E	10.00	-356.66	
6817.00	37.99	165.180	6671.67	415.13N	982.91E	10.00	-302.92	
6917.00	47.58	169.380	6744.99	348.93N	997.62E	10.00	-235.49	
7017.00	57.29	172.440	6805.89	270.74N	1009.99E	10.00	-156.42	
7117.00	67.05	174.900	6852.53	182.96N	1019.64E	10.00	-68.10	
7217.00	76.84	177.030	6883.49	88.24N	1026.27E	10.00	26.77	
7317.00	86.65	178.990	6897.83	10.54S	1029.69E	10.00	125.31	
7417.00	90.00	179.640	6898.82	110.52S	1030.52E	==>	224.76	
7517.00	90.00	179.640	6898.82	210.52S	1031.15E	==>	324.20	
7617.00	90.00	179.640	6898.82	310.51S	1031.78E	==>	423.64	
7717.00	90.00	179.640	6898.82	410.51S	1032.41E	==>	523.09	
7817.00	90.00	179.640	6898.82	510.51S	1033.04E	==>	622.53	
7917.00	90.00	179.640	6898.82	610.51S	1033.67E	==>	721.98	
8017.00	90.00	179.640	6898.82	710.51S	1034.30E	==>	821.42	
8117.00	90.00	179.640	6898.82	810.50S	1034.93E	==>	920.87	
8217.00	90.00	179.640	6898.82	910.50S	1035.56E	==>	1020.31	
8317.00	90.00	179.640	6898.82	1010.50S	1036.19E	==>	1119.76	
8417.00	90.00	179.640	6898.82	1110.50S	1036.82E	==>	1219.20	
8517.00	90.00	179.640	6898.82	1210.50S	1037.45E	==>	1318.65	
8617.00	90.00	179.640	6898.82	1310.49S	1038.08E	==>	1418.09	
8717.00	90.00	179.640	6898.82	1410.49S	1038.71E	==>	1517.53	
8817.00	90.00	179.640	6898.82	1510.49S	1039.34E	==>	1616.98	
8917.00	90.00	179.640	6898.82	1610.49S	1039.97E	==>	1716.42	

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 5048.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 173.600 degrees  
Bottom hole distance is 9783.62 Feet on azimuth 173.60 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 10-Oct-2017



SYS DRILL  
Well Design Combined Report  
Wellbore: W OLANDER 19 (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
9017.00	90.00	179.640	6898.82	1710.49S	1040.60E	==>	1815.87	
9117.00	90.00	179.640	6898.82	1810.48S	1041.23E	==>	1915.31	
9217.00	90.00	179.640	6898.82	1910.48S	1041.86E	==>	2014.76	
9317.00	90.00	179.640	6898.82	2010.48S	1042.49E	==>	2114.20	
9417.00	90.00	179.640	6898.82	2110.48S	1043.12E	==>	2213.65	
9517.00	90.00	179.640	6898.82	2210.48S	1043.75E	==>	2313.09	
9617.00	90.00	179.640	6898.82	2310.47S	1044.38E	==>	2412.53	
9717.00	90.00	179.640	6898.82	2410.47S	1045.01E	==>	2511.98	
9817.00	90.00	179.640	6898.82	2510.47S	1045.64E	==>	2611.42	
9917.00	90.00	179.640	6898.82	2610.47S	1046.27E	==>	2710.87	
10017.00	90.00	179.640	6898.82	2710.47S	1046.90E	==>	2810.31	
10117.00	90.00	179.640	6898.82	2810.46S	1047.53E	==>	2909.76	
10217.00	90.00	179.640	6898.82	2910.46S	1048.17E	==>	3009.20	
10317.00	90.00	179.640	6898.82	3010.46S	1048.80E	==>	3108.65	
10417.00	90.00	179.640	6898.82	3110.46S	1049.43E	==>	3208.09	
10517.00	90.00	179.640	6898.82	3210.46S	1050.06E	==>	3307.54	
10617.00	90.00	179.640	6898.82	3310.45S	1050.69E	==>	3406.98	
10717.00	90.00	179.640	6898.82	3410.45S	1051.32E	==>	3506.42	
10817.00	90.00	179.640	6898.82	3510.45S	1051.95E	==>	3605.87	
10917.00	90.00	179.640	6898.82	3610.45S	1052.58E	==>	3705.31	
11017.00	90.00	179.640	6898.82	3710.45S	1053.21E	==>	3804.76	
11117.00	90.00	179.640	6898.82	3810.44S	1053.84E	==>	3904.20	
11217.00	90.00	179.640	6898.82	3910.44S	1054.47E	==>	4003.65	
11317.00	90.00	179.640	6898.82	4010.44S	1055.10E	==>	4103.09	
11417.00	90.00	179.640	6898.82	4110.44S	1055.73E	==>	4202.54	
11517.00	90.00	179.640	6898.82	4210.44S	1056.36E	==>	4301.98	
11617.00	90.00	179.640	6898.82	4310.43S	1056.99E	==>	4401.42	
11717.00	90.00	179.640	6898.82	4410.43S	1057.62E	==>	4500.87	
11817.00	90.00	179.640	6898.82	4510.43S	1058.25E	==>	4600.31	
11917.00	90.00	179.640	6898.82	4610.43S	1058.88E	==>	4699.76	
12017.00	90.00	179.640	6898.82	4710.43S	1059.51E	==>	4799.20	
12117.00	90.00	179.640	6898.82	4810.43S	1060.14E	==>	4898.65	
12217.00	90.00	179.640	6898.82	4910.42S	1060.77E	==>	4998.09	
12317.00	90.00	179.640	6898.82	5010.42S	1061.40E	==>	5097.54	
12417.00	90.00	179.640	6898.82	5110.42S	1062.03E	==>	5196.98	
12517.00	90.00	179.640	6898.82	5210.42S	1062.66E	==>	5296.43	
12617.00	90.00	179.640	6898.82	5310.42S	1063.29E	==>	5395.87	
12717.00	90.00	179.640	6898.82	5410.41S	1063.92E	==>	5495.31	
12817.00	90.00	179.640	6898.82	5510.41S	1064.55E	==>	5594.76	
12917.00	90.00	179.640	6898.82	5610.41S	1065.18E	==>	5694.20	
13017.00	90.00	179.640	6898.82	5710.41S	1065.81E	==>	5793.65	
13117.00	90.00	179.640	6898.82	5810.41S	1066.45E	==>	5893.09	
13217.00	90.00	179.640	6898.82	5910.40S	1067.08E	==>	5992.54	
13317.00	90.00	179.640	6898.82	6010.40S	1067.71E	==>	6091.98	
13417.00	90.00	179.640	6898.82	6110.40S	1068.34E	==>	6191.43	
13517.00	90.00	179.640	6898.82	6210.40S	1068.97E	==>	6290.87	
13617.00	90.00	179.640	6898.82	6310.40S	1069.60E	==>	6390.31	
13717.00	90.00	179.640	6898.82	6410.39S	1070.23E	==>	6489.76	
13817.00	90.00	179.640	6898.82	6510.39S	1070.86E	==>	6589.20	
13917.00	90.00	179.640	6898.82	6610.39S	1071.49E	==>	6688.65	
14017.00	90.00	179.640	6898.82	6710.39S	1072.12E	==>	6788.09	
14117.00	90.00	179.640	6898.82	6810.39S	1072.75E	==>	6887.54	
14217.00	90.00	179.640	6898.82	6910.38S	1073.38E	==>	6986.98	
14317.00	90.00	179.640	6898.82	7010.38S	1074.01E	==>	7086.43	
14417.00	90.00	179.640	6898.82	7110.38S	1074.64E	==>	7185.87	
14517.00	90.00	179.640	6898.82	7210.38S	1075.27E	==>	7285.32	
14617.00	90.00	179.640	6898.82	7310.38S	1075.90E	==>	7384.76	
14717.00	90.00	179.640	6898.82	7410.37S	1076.53E	==>	7484.20	
14817.00	90.00	179.640	6898.82	7510.37S	1077.16E	==>	7583.65	

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 5048.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 173.600 degrees  
Bottom hole distance is 9783.62 Feet on azimuth 173.60 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 10-Oct-2017



SYS DRILL  
Well Design Combined Report  
Wellbore: W OLANDER 19 (PWB)



Interpolated Wellpath								
MD[ft]	Inc[deg]	Azi[deg]	TVD[ft]	North[ft]	East[ft]	Dogleg [deg/100ft]	Vertical Section[ft]	All Station Comments
14917.00	90.00	179.640	6898.82	7610.37S	1077.79E	==>	7683.09	
15017.00	90.00	179.640	6898.82	7710.37S	1078.42E	==>	7782.54	
15117.00	90.00	179.640	6898.82	7810.37S	1079.05E	==>	7881.98	
15217.00	90.00	179.640	6898.82	7910.36S	1079.68E	==>	7981.43	
15317.00	90.00	179.640	6898.82	8010.36S	1080.31E	==>	8080.87	
15417.00	90.00	179.640	6898.82	8110.36S	1080.94E	==>	8180.32	
15517.00	90.00	179.640	6898.82	8210.36S	1081.57E	==>	8279.76	
15617.00	90.00	179.640	6898.82	8310.36S	1082.20E	==>	8379.20	
15717.00	90.00	179.640	6898.82	8410.35S	1082.83E	==>	8478.65	
15817.00	90.00	179.640	6898.82	8510.35S	1083.46E	==>	8578.09	
15917.00	90.00	179.640	6898.82	8610.35S	1084.09E	==>	8677.54	
16017.00	90.00	179.640	6898.82	8710.35S	1084.72E	==>	8776.98	
16117.00	90.00	179.640	6898.82	8810.35S	1085.36E	==>	8876.43	
16217.00	90.00	179.640	6898.82	8910.34S	1085.99E	==>	8975.87	
16317.00	90.00	179.640	6898.82	9010.34S	1086.62E	==>	9075.32	
16417.00	90.00	179.640	6898.82	9110.34S	1087.25E	==>	9174.76	
16517.00	90.00	179.640	6898.82	9210.34S	1087.88E	==>	9274.21	
16617.00	90.00	179.640	6898.82	9310.34S	1088.51E	==>	9373.65	
16717.00	90.00	179.640	6898.82	9410.33S	1089.14E	==>	9473.09	
16817.00	90.00	179.640	6898.82	9510.33S	1089.77E	==>	9572.54	
16917.00	90.00	179.640	6898.82	9610.33S	1090.40E	==>	9671.98	
17017.00	90.00	179.640	6898.82	9710.33S	1091.03E	==>	9771.43	
17029.26	90.00	179.640	6898.82	9722.58S	1091.11E	==>	9783.62	

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 5048.0ft above Mean Sea Level )  
Vertical Section is from 0.00N 0.00E on azimuth 173.600 degrees  
Bottom hole distance is 9783.62 Feet on azimuth 173.60 degrees from Wellhead  
Calculation method uses Minimum Curvature method  
Prepared by Microsoft  
Date Printed: 10-Oct-2017



Targets							
Name	North[ft]	East[ft]	TVD[ft]	Latitude	Longitude	Northing	Easting
OLANDER 19 EP	44.63S	1030.10E	6898.82	40.20267230	-105.02144320	1317036.63	3133670.32
OLANDER 19 BH-2mi	9722.58S	1091.11E	6898.82	40.17610580	-105.02141180	1307359.10	3133731.32

Survey Tool Program						
Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model	
562522	Planned	1517.00	1516.79	WdW Rate Gyro	Standard	
562521	Planned	17029.26	6898.82	ISCWSA MWD	Rev 4 + SAG + FLT	

Notes