Cub Creek Energy, LLC

Location	**Weld County, CO**	**Slot**	**OLANDER 16**
Field	**WATTENBERG**	**Well**	**W OLANDER 16**
Installation	**Olander Pad**	**Wellbore**	**W OLANDER 16 (PWB)**

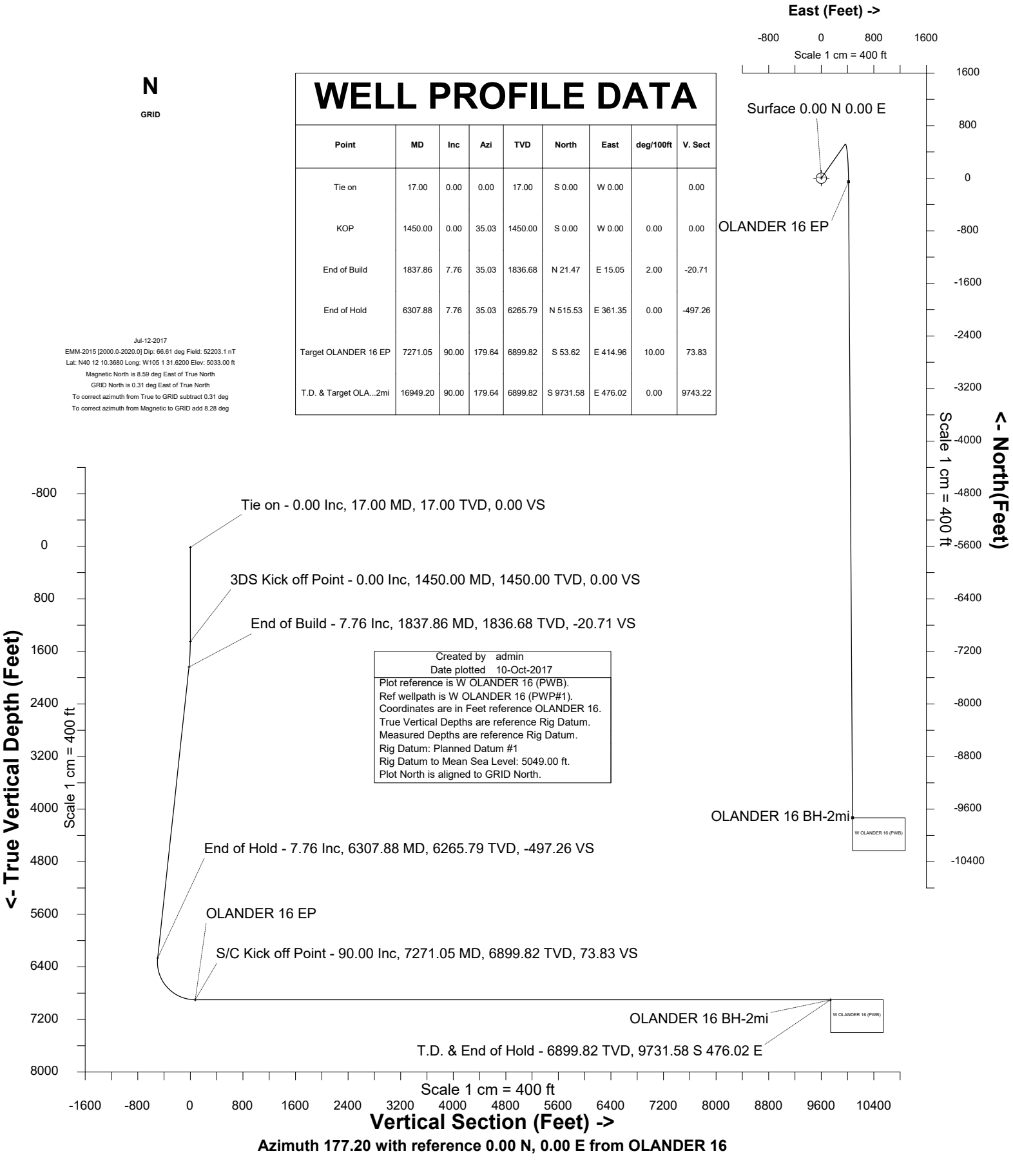
N

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	1450.00	0.00	35.03	1450.00	S 0.00	W 0.00	0.00	0.00
End of Build	1837.86	7.76	35.03	1836.68	N 21.47	E 15.05	2.00	-20.71
End of Hold	6307.88	7.76	35.03	6265.79	N 515.53	E 361.35	0.00	-497.26
Target OLANDER 16 EP	7271.05	90.00	179.64	6899.82	S 53.62	E 414.96	10.00	73.83
T.D. & Target OLA...2mi	16949.20	90.00	179.64	6899.82	S 9731.58	E 476.02	0.00	9743.22

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



Azimuth 177.20 with reference 0.00 N, 0.00 E from OLANDER 16

Paradigm

SYSDRILL
Well Design Combined Report
Wellbore: W OLANDER 16 (PWB)

IPT

Wellhead Details

Name	Latitude	Longitude	Northing	Easting	North	East	Slot Elevation Above Ground
OLANDER 16	40.20281000	-105.02529000	1317081.0133	3132595.5742	25.26S	44.83E	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	1317081.01	3132595.57
1450.00	0.00	35.030	1450.00	0.00N	0.00E	==>	0.00	1317081.01	3132595.57
1837.86	7.76	35.030	1836.68	21.47N	15.05E	2.00	-20.71	1317102.48	3132610.62
6307.88	7.76	35.030	6265.79	515.53N	361.35E	==>	-497.26	1317596.52	3132956.91
7271.05	90.00	179.640	6899.82	53.62S	414.96E	10.00	73.83	1317027.39	3133010.52
16949.20	90.00	179.640	6899.82	9731.58S	476.02E	==>	9743.22	1307349.87	3133071.57

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	1.00	35.030	1500.00	0.36N	0.25E	2.00	-0.34	
1517.00	1.34	35.030	1516.99	0.64N	0.45E	2.00	-0.62	
1617.00	3.34	35.030	1616.91	3.98N	2.79E	2.00	-3.84	
1717.00	5.34	35.030	1716.61	10.18N	7.14E	2.00	-9.82	
1817.00	7.34	35.030	1816.00	19.22N	13.47E	2.00	-18.54	
1917.00	7.76	35.030	1915.09	30.21N	21.18E	==>	-29.14	
2017.00	7.76	35.030	2014.18	41.27N	28.93E	==>	-39.80	
2117.00	7.76	35.030	2113.26	52.32N	36.67E	==>	-50.47	
2217.00	7.76	35.030	2212.35	63.37N	44.42E	==>	-61.13	
2317.00	7.76	35.030	2311.43	74.43N	52.17E	==>	-71.79	
2417.00	7.76	35.030	2410.52	85.48N	59.91E	==>	-82.45	
2517.00	7.76	35.030	2509.60	96.53N	67.66E	==>	-93.11	
2617.00	7.76	35.030	2608.69	107.58N	75.41E	==>	-103.77	
2717.00	7.76	35.030	2707.77	118.64N	83.16E	==>	-114.43	
2817.00	7.76	35.030	2806.86	129.69N	90.90E	==>	-125.09	
2917.00	7.76	35.030	2905.94	140.74N	98.65E	==>	-135.75	
3017.00	7.76	35.030	3005.03	151.80N	106.40E	==>	-146.42	

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Vertical Section is from 0.00N 0.00E on azimuth 177.200 degrees
Bottom hole distance is 9743.22 Feet on azimuth 177.20 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Microsoft
Date Printed: 10-Oct-2017

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	7.76	35.030	3104.11	162.85N	114.15E	==>	-157.08	
3217.00	7.76	35.030	3203.20	173.90N	121.89E	==>	-167.74	
3317.00	7.76	35.030	3302.28	184.95N	129.64E	==>	-178.40	
3417.00	7.76	35.030	3401.37	196.01N	137.39E	==>	-189.06	
3517.00	7.76	35.030	3500.45	207.06N	145.14E	==>	-199.72	
3617.00	7.76	35.030	3599.54	218.11N	152.88E	==>	-210.38	
3717.00	7.76	35.030	3698.62	229.16N	160.63E	==>	-221.04	
3817.00	7.76	35.030	3797.70	240.22N	168.38E	==>	-231.70	
3917.00	7.76	35.030	3896.79	251.27N	176.12E	==>	-242.37	
4017.00	7.76	35.030	3995.87	262.32N	183.87E	==>	-253.03	
4117.00	7.76	35.030	4094.96	273.38N	191.62E	==>	-263.69	
4217.00	7.76	35.030	4194.04	284.43N	199.37E	==>	-274.35	
4317.00	7.76	35.030	4293.13	295.48N	207.11E	==>	-285.01	
4417.00	7.76	35.030	4392.21	306.53N	214.86E	==>	-295.67	
4517.00	7.76	35.030	4491.30	317.59N	222.61E	==>	-306.33	
4617.00	7.76	35.030	4590.38	328.64N	230.36E	==>	-316.99	
4717.00	7.76	35.030	4689.47	339.69N	238.10E	==>	-327.65	
4817.00	7.76	35.030	4788.55	350.75N	245.85E	==>	-338.31	
4917.00	7.76	35.030	4887.64	361.80N	253.60E	==>	-348.98	
5017.00	7.76	35.030	4986.72	372.85N	261.34E	==>	-359.64	
5117.00	7.76	35.030	5085.81	383.90N	269.09E	==>	-370.30	
5217.00	7.76	35.030	5184.89	394.96N	276.84E	==>	-380.96	
5317.00	7.76	35.030	5283.98	406.01N	284.59E	==>	-391.62	
5417.00	7.76	35.030	5383.06	417.06N	292.33E	==>	-402.28	
5517.00	7.76	35.030	5482.15	428.11N	300.08E	==>	-412.94	
5617.00	7.76	35.030	5581.23	439.17N	307.83E	==>	-423.60	
5717.00	7.76	35.030	5680.32	450.22N	315.58E	==>	-434.26	
5817.00	7.76	35.030	5779.40	461.27N	323.32E	==>	-444.93	
5917.00	7.76	35.030	5878.49	472.33N	331.07E	==>	-455.59	
6017.00	7.76	35.030	5977.57	483.38N	338.82E	==>	-466.25	
6117.00	7.76	35.030	6076.66	494.43N	346.56E	==>	-476.91	
6217.00	7.76	35.030	6175.74	505.48N	354.31E	==>	-487.57	
6317.00	7.04	39.370	6274.83	516.46N	362.06E	10.00	-498.16	
6417.00	6.44	135.260	6374.40	517.22N	369.91E	10.00	-498.53	
6517.00	15.26	162.830	6472.57	500.62N	377.76E	10.00	-481.57	
6617.00	24.98	169.890	6566.36	467.18N	385.37E	10.00	-447.79	
6717.00	34.85	173.130	6652.94	417.90N	392.51E	10.00	-398.22	
6817.00	44.77	175.080	6729.66	354.28N	398.97E	10.00	-334.37	
6917.00	54.72	176.440	6794.20	278.27N	404.54E	10.00	-258.17	
7017.00	64.68	177.500	6844.59	192.15N	409.06E	10.00	-171.94	
7117.00	74.64	178.400	6879.30	98.57N	412.38E	10.00	-78.30	
7217.00	84.61	179.210	6897.28	0.35N	414.42E	10.00	19.90	
7317.00	90.00	179.640	6899.82	99.57S	415.25E	==>	119.74	
7417.00	90.00	179.640	6899.82	199.57S	415.88E	==>	219.65	
7517.00	90.00	179.640	6899.82	299.56S	416.52E	==>	319.56	
7617.00	90.00	179.640	6899.82	399.56S	417.15E	==>	419.47	
7717.00	90.00	179.640	6899.82	499.56S	417.78E	==>	519.38	
7817.00	90.00	179.640	6899.82	599.56S	418.41E	==>	619.28	
7917.00	90.00	179.640	6899.82	699.56S	419.04E	==>	719.19	
8017.00	90.00	179.640	6899.82	799.55S	419.67E	==>	819.10	
8117.00	90.00	179.640	6899.82	899.55S	420.30E	==>	919.01	
8217.00	90.00	179.640	6899.82	999.55S	420.93E	==>	1018.92	
8317.00	90.00	179.640	6899.82	1099.55S	421.56E	==>	1118.83	
8417.00	90.00	179.640	6899.82	1199.55S	422.19E	==>	1218.74	
8517.00	90.00	179.640	6899.82	1299.54S	422.82E	==>	1318.65	
8617.00	90.00	179.640	6899.82	1399.54S	423.45E	==>	1418.56	
8717.00	90.00	179.640	6899.82	1499.54S	424.09E	==>	1518.47	
8817.00	90.00	179.640	6899.82	1599.54S	424.72E	==>	1618.38	
8917.00	90.00	179.640	6899.82	1699.54S	425.35E	==>	1718.29	

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Vertical Section is from 0.00N 0.00E on azimuth 177.200 degrees
Bottom hole distance is 9743.22 Feet on azimuth 177.20 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Microsoft
Date Printed: 10-Oct-2017

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	6899.82	1799.53S	425.98E	==>	1818.20	
9117.00	90.00	179.640	6899.82	1899.53S	426.61E	==>	1918.11	
9217.00	90.00	179.640	6899.82	1999.53S	427.24E	==>	2018.02	
9317.00	90.00	179.640	6899.82	2099.53S	427.87E	==>	2117.93	
9417.00	90.00	179.640	6899.82	2199.53S	428.50E	==>	2217.84	
9517.00	90.00	179.640	6899.82	2299.52S	429.13E	==>	2317.74	
9617.00	90.00	179.640	6899.82	2399.52S	429.76E	==>	2417.65	
9717.00	90.00	179.640	6899.82	2499.52S	430.39E	==>	2517.56	
9817.00	90.00	179.640	6899.82	2599.52S	431.02E	==>	2617.47	
9917.00	90.00	179.640	6899.82	2699.52S	431.66E	==>	2717.38	
10017.00	90.00	179.640	6899.82	2799.51S	432.29E	==>	2817.29	
10117.00	90.00	179.640	6899.82	2899.51S	432.92E	==>	2917.20	
10217.00	90.00	179.640	6899.82	2999.51S	433.55E	==>	3017.11	
10317.00	90.00	179.640	6899.82	3099.51S	434.18E	==>	3117.02	
10417.00	90.00	179.640	6899.82	3199.51S	434.81E	==>	3216.93	
10517.00	90.00	179.640	6899.82	3299.50S	435.44E	==>	3316.84	
10617.00	90.00	179.640	6899.82	3399.50S	436.07E	==>	3416.75	
10717.00	90.00	179.640	6899.82	3499.50S	436.70E	==>	3516.66	
10817.00	90.00	179.640	6899.82	3599.50S	437.33E	==>	3616.57	
10917.00	90.00	179.640	6899.82	3699.50S	437.96E	==>	3716.48	
11017.00	90.00	179.640	6899.82	3799.49S	438.59E	==>	3816.39	
11117.00	90.00	179.640	6899.82	3899.49S	439.23E	==>	3916.30	
11217.00	90.00	179.640	6899.82	3999.49S	439.86E	==>	4016.20	
11317.00	90.00	179.640	6899.82	4099.49S	440.49E	==>	4116.11	
11417.00	90.00	179.640	6899.82	4199.49S	441.12E	==>	4216.02	
11517.00	90.00	179.640	6899.82	4299.49S	441.75E	==>	4315.93	
11617.00	90.00	179.640	6899.82	4399.48S	442.38E	==>	4415.84	
11717.00	90.00	179.640	6899.82	4499.48S	443.01E	==>	4515.75	
11817.00	90.00	179.640	6899.82	4599.48S	443.64E	==>	4615.66	
11917.00	90.00	179.640	6899.82	4699.48S	444.27E	==>	4715.57	
12017.00	90.00	179.640	6899.82	4799.48S	444.90E	==>	4815.48	
12117.00	90.00	179.640	6899.82	4899.47S	445.53E	==>	4915.39	
12217.00	90.00	179.640	6899.82	4999.47S	446.17E	==>	5015.30	
12317.00	90.00	179.640	6899.82	5099.47S	446.80E	==>	5115.21	
12417.00	90.00	179.640	6899.82	5199.47S	447.43E	==>	5215.12	
12517.00	90.00	179.640	6899.82	5299.47S	448.06E	==>	5315.03	
12617.00	90.00	179.640	6899.82	5399.46S	448.69E	==>	5414.94	
12717.00	90.00	179.640	6899.82	5499.46S	449.32E	==>	5514.85	
12817.00	90.00	179.640	6899.82	5599.46S	449.95E	==>	5614.76	
12917.00	90.00	179.640	6899.82	5699.46S	450.58E	==>	5714.66	
13017.00	90.00	179.640	6899.82	5799.46S	451.21E	==>	5814.57	
13117.00	90.00	179.640	6899.82	5899.45S	451.84E	==>	5914.48	
13217.00	90.00	179.640	6899.82	5999.45S	452.47E	==>	6014.39	
13317.00	90.00	179.640	6899.82	6099.45S	453.10E	==>	6114.30	
13417.00	90.00	179.640	6899.82	6199.45S	453.74E	==>	6214.21	
13517.00	90.00	179.640	6899.82	6299.45S	454.37E	==>	6314.12	
13617.00	90.00	179.640	6899.82	6399.44S	455.00E	==>	6414.03	
13717.00	90.00	179.640	6899.82	6499.44S	455.63E	==>	6513.94	
13817.00	90.00	179.640	6899.82	6599.44S	456.26E	==>	6613.85	
13917.00	90.00	179.640	6899.82	6699.44S	456.89E	==>	6713.76	
14017.00	90.00	179.640	6899.82	6799.44S	457.52E	==>	6813.67	
14117.00	90.00	179.640	6899.82	6899.43S	458.15E	==>	6913.58	
14217.00	90.00	179.640	6899.82	6999.43S	458.78E	==>	7013.49	
14317.00	90.00	179.640	6899.82	7099.43S	459.41E	==>	7113.40	
14417.00	90.00	179.640	6899.82	7199.43S	460.04E	==>	7213.31	
14517.00	90.00	179.640	6899.82	7299.43S	460.67E	==>	7313.22	
14617.00	90.00	179.640	6899.82	7399.42S	461.31E	==>	7413.12	
14717.00	90.00	179.640	6899.82	7499.42S	461.94E	==>	7513.03	
14817.00	90.00	179.640	6899.82	7599.42S	462.57E	==>	7612.94	

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Bottom hole distance is 9743.22 Feet on azimuth 177.20 degrees from Wellhead
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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
14917.00	90.00	179.640	6899.82	7699.42S	463.20E	==>	7712.85	
15017.00	90.00	179.640	6899.82	7799.42S	463.83E	==>	7812.76	
15117.00	90.00	179.640	6899.82	7899.41S	464.46E	==>	7912.67	
15217.00	90.00	179.640	6899.82	7999.41S	465.09E	==>	8012.58	
15317.00	90.00	179.640	6899.82	8099.41S	465.72E	==>	8112.49	
15417.00	90.00	179.640	6899.82	8199.41S	466.35E	==>	8212.40	
15517.00	90.00	179.640	6899.82	8299.41S	466.98E	==>	8312.31	
15617.00	90.00	179.640	6899.82	8399.40S	467.61E	==>	8412.22	
15717.00	90.00	179.640	6899.82	8499.40S	468.24E	==>	8512.13	
15817.00	90.00	179.640	6899.82	8599.40S	468.88E	==>	8612.04	
15917.00	90.00	179.640	6899.82	8699.40S	469.51E	==>	8711.95	
16017.00	90.00	179.640	6899.82	8799.40S	470.14E	==>	8811.86	
16117.00	90.00	179.640	6899.82	8899.39S	470.77E	==>	8911.77	
16217.00	90.00	179.640	6899.82	8999.39S	471.40E	==>	9011.68	
16317.00	90.00	179.640	6899.82	9099.39S	472.03E	==>	9111.58	
16417.00	90.00	179.640	6899.82	9199.39S	472.66E	==>	9211.49	
16517.00	90.00	179.640	6899.82	9299.39S	473.29E	==>	9311.40	
16617.00	90.00	179.640	6899.82	9399.38S	473.92E	==>	9411.31	
16717.00	90.00	179.640	6899.82	9499.38S	474.55E	==>	9511.22	
16817.00	90.00	179.640	6899.82	9599.38S	475.18E	==>	9611.13	
16917.00	90.00	179.640	6899.82	9699.38S	475.81E	==>	9711.04	
16949.20	90.00	179.640	6899.82	9731.58S	476.02E	==>	9743.22	

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 5049.0ft above Mean Sea Level)
Vertical Section is from 0.00N 0.00E on azimuth 177.200 degrees
Bottom hole distance is 9743.22 Feet on azimuth 177.20 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 16 EP	53.62S	414.96E	6899.82	40.20265670	-105.02380550	1317027.39	3133010.52
OLANDER 16 BH-2mi	9731.58S	476.02E	6899.82	40.17609020	-105.02377300	1307349.87	3133071.57

Survey Tool Program

Reference	Survey Name	MD[ft]	TVD[ft]	Survey Tool	Error Model
562456	Planned	1517.00	1516.99	WdW Rate Gyro	Standard
562455	Planned	16949.20	6899.82	ISCWSA MWD	Rev 4 + SAG + FLT

Notes

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Vertical Section is from 0.00N 0.00E on azimuth 177.200 degrees
Bottom hole distance is 9743.22 Feet on azimuth 177.20 degrees from Wellhead
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