

# Minimum Radius of Curvature

**API: 42-283-37270**      **Well: Menn Unit A LAS 2H**      **Wellhead Location N+/S- : 28.454474**  
**Operator: Chesapeake Energy**      **Area: Eagleford**      **E+/W- : -99.262070**  
**Rig: Cactus 140**      **Type: U-Lateral**      **Magnetic Declination: 4.21**  
**TD: 18,231'**      **Plane of Proposal: 133.00**

Measured Depth Ft	Drift Angle Deg	Azimuth Direction Deg	Course Length Ft	TVD Ft	Vertical Section Ft	COORDINATES		CLOSURE		Dog Leg Severity Deg/100'	Build / Drop Deg/100'	Left / Right Deg/100'
						N-S Ft	E-W Ft	Distance FT	Direction Deg			
0.00	0.00	0.00		0.0	0.00	0.00	0.00	0.00	0.00			
60.00	0.16	254.07	60	60.0	91.96	-0.02	-0.08	0.08	254.07	0.27	0.27	423.45
150.00	0.41	253.38	90	150.0	91.73	-0.15	-0.51	0.53	253.65	0.28	0.28	-0.77
246.00	0.57	30.37	96	246.0	91.45	0.16	-0.60	0.62	285.36	0.95	0.17	-232.30
341.00	1.94	47.69	95	341.0	91.48	1.65	0.83	1.85	26.66	1.48	1.44	18.23
437.00	2.74	52.13	96	436.9	91.98	4.16	3.84	5.66	42.76	0.85	0.83	4.63
532.00	3.61	52.30	95	531.7	92.82	7.38	8.00	10.89	47.32	0.92	0.92	0.18
627.00	4.61	56.23	95	626.5	94.18	11.33	13.54	17.66	50.08	1.09	1.05	4.14
723.00	4.69	55.06	96	722.2	95.88	15.72	19.97	25.41	51.78	0.13	0.08	-1.22
913.00	6.35	54.88	190	911.3	99.67	26.22	34.93	43.67	53.11	0.87	0.87	-0.09
1009.00	7.16	47.42	96	1006.6	101.22	33.32	43.68	54.94	52.66	1.24	0.84	-7.77
1104.00	8.37	39.85	95	1100.8	101.30	42.63	52.47	67.61	50.90	1.67	1.27	-7.97
1199.00	8.24	39.02	95	1194.8	100.45	53.23	61.18	81.10	48.98	0.19	-0.14	-0.87
1295.00	8.02	45.41	96	1289.8	100.25	63.28	70.29	94.57	48.00	0.97	-0.23	6.66
1390.00	7.98	49.86	95	1383.9	101.32	72.18	80.05	107.79	47.96	0.65	-0.04	4.68
1486.00	9.06	50.55	96	1478.8	103.11	81.28	90.98	122.00	48.22	1.13	1.13	0.72
1581.00	10.13	50.23	95	1572.5	105.14	91.38	103.17	137.82	48.47	1.13	1.13	-0.34
1676.00	9.93	50.81	95	1666.0	107.30	101.90	115.94	154.36	48.69	0.24	-0.21	0.61
1772.00	9.61	50.83	96	1760.6	109.52	112.19	128.57	170.64	48.89	0.33	-0.33	0.02
1867.00	9.26	50.78	95	1854.4	111.64	122.03	140.64	186.20	49.05	0.37	-0.37	-0.05
1962.00	8.92	50.96	95	1948.2	113.69	131.50	152.28	201.21	49.19	0.36	-0.36	0.19
2058.00	8.55	51.64	96	2043.0	115.79	140.62	163.66	215.77	49.33	0.40	-0.39	0.71
2153.00	9.19	52.47	95	2136.9	118.10	149.62	175.21	230.41	49.50	0.69	0.67	0.87
2248.00	10.00	54.69	95	2230.6	121.02	159.01	187.96	246.20	49.77	0.94	0.85	2.34
2344.00	9.48	55.29	96	2325.2	124.39	168.33	201.26	262.38	50.09	0.55	-0.54	0.63
2439.00	9.00	55.68	95	2419.0	127.69	176.98	213.83	277.57	50.39	0.51	-0.51	0.41
2534.00	8.69	54.62	95	2512.8	130.77	185.32	225.82	292.13	50.63	0.37	-0.33	-1.12
2627.00	8.48	53.21	93	2604.8	133.40	193.50	237.04	305.99	50.77	0.32	-0.23	-1.52
2725.00	8.42	50.02	98	2701.7	135.55	202.43	248.32	320.38	50.81	0.48	-0.06	-3.26
2821.00	8.16	46.43	96	2796.7	136.82	211.65	258.65	334.20	50.71	0.60	-0.27	-3.74
2916.00	8.11	46.22	95	2890.8	137.60	220.93	268.37	347.61	50.54	0.06	-0.05	-0.22
3043.00	9.13	49.50	127	3016.3	139.24	233.67	282.50	366.62	50.40	0.89	0.80	2.58
3138.00	9.15	48.82	95	3110.1	140.86	243.54	293.91	381.70	50.35	0.12	0.02	-0.72
3234.00	10.42	53.23	96	3204.7	143.18	253.76	306.61	398.00	50.39	1.54	1.32	4.59
3329.00	10.68	57.02	95	3298.1	146.84	263.70	320.88	415.33	50.59	0.78	0.27	3.99
3425.00	10.67	56.44	96	3392.5	151.06	273.45	335.75	433.02	50.84	0.11	-0.01	-0.60
3520.00	10.26	55.14	95	3485.9	154.88	283.15	350.02	450.21	51.03	0.50	-0.43	-1.37
3616.00	9.72	52.96	96	3580.4	158.08	292.92	363.50	466.84	51.14	0.69	-0.56	-2.27
3711.00	9.26	50.05	95	3674.1	160.41	302.66	375.76	482.49	51.15	0.70	-0.48	-3.06
3806.00	9.04	47.38	95	3767.9	161.91	312.62	387.12	497.58	51.08	0.50	-0.23	-2.81
3902.00	8.84	44.10	96	3862.8	162.63	323.02	397.80	512.43	50.92	0.57	-0.21	-3.42
3997.00	8.65	56.06	95	3956.7	164.39	332.25	408.81	526.80	50.90	1.92	-0.20	12.59
4093.00	7.72	53.48	96	4051.7	167.19	340.12	419.98	540.43	51.00	1.04	-0.97	-2.69
4188.00	8.09	55.33	95	4145.8	169.78	347.72	430.60	553.47	51.08	0.47	0.39	1.95
4283.00	7.26	51.74	95	4239.9	172.12	355.24	440.82	566.14	51.14	1.01	-0.87	-3.78
4379.00	9.22	62.35	96	4334.9	175.59	362.57	452.39	579.75	51.29	2.58	2.04	11.05
4474.00	8.69	62.04	95	4428.8	180.45	369.47	465.47	594.28	51.56	0.56	-0.56	-0.33
4570.00	9.51	59.35	96	4523.6	185.05	376.91	478.70	609.28	51.78	0.96	0.85	-2.80
4665.00	8.82	58.48	95	4617.4	189.20	384.72	491.66	624.29	51.96	0.74	-0.73	-0.92
4761.00	8.20	55.48	96	4712.3	192.65	392.44	503.58	638.44	52.07	0.79	-0.65	-3.13
4856.00	7.10	49.27	95	4806.5	194.75	400.12	513.61	651.07	52.08	1.45	-1.16	-6.54
4952.00	6.37	49.56	96	4901.8	196.01	407.44	522.16	662.31	52.04	0.76	-0.76	0.30
5047.00	8.12	55.32	95	4996.0	198.04	414.68	531.69	674.28	52.05	1.99	1.84	6.06
5142.00	9.96	56.20	95	5089.8	201.35	423.07	544.03	689.17	52.13	1.94	1.94	0.93
5238.00	10.53	55.12	96	5184.3	205.09	432.70	558.13	706.21	52.21	0.63	0.59	-1.13
5333.00	8.98	48.21	95	5277.9	207.59	442.61	570.78	722.28	52.21	2.04	-1.63	-7.27
5429.00	8.96	46.88	96	5372.8	208.77	452.71	581.82	737.20	52.11	0.22	-0.02	-1.39
5524.00	12.07	54.23	95	5466.2	211.21	463.58	595.28	754.50	52.09	3.56	3.27	7.74

# Minimum Radius of Curvature

**API: 42-283-37270**      **Well: Menn Unit A LAS 2H**      **Wellhead Location N+/S- : 28.454474**  
**Operator: Chesapeake Energy**      **Area: Eagleford**      **E+/W- : -99.262070**  
**Rig: Cactus 140**      **Type: U-Lateral**      **Magnetic Declination: 4.21**  
**TD: 18,231'**      **Plane of Proposal: 133.00**

Measured Depth Ft	Drift Angle Deg	Azimuth Direction Deg	Course Length Ft	TVD Ft	Vertical Section Ft	COORDINATES		CLOSURE		Dog Leg Severity Deg/100'	Build / Drop Deg/100'	Left / Right Deg/100'
						N-S Ft	E-W Ft	Distance FT	Direction Deg			
5619.00	10.17	48.21	95	5559.4	213.90	474.97	609.60	772.79	52.08	2.34	-2.00	-6.34
5715.00	8.50	40.83	96	5654.1	214.40	485.99	620.56	788.21	51.93	2.14	-1.74	-7.69
5810.00	8.45	56.13	95	5748.1	215.72	495.19	630.94	802.06	51.87	2.37	-0.05	16.11
5905.00	8.77	65.51	95	5842.0	220.08	502.09	643.33	816.07	52.03	1.51	0.34	9.87
6000.00	9.45	64.20	95	5935.8	225.68	508.48	656.94	830.74	52.26	0.75	0.72	-1.38
6095.00	10.43	61.13	95	6029.4	231.17	516.03	671.50	846.87	52.46	1.17	1.03	-3.23
6191.00	10.29	61.03	96	6123.8	236.53	524.38	686.61	863.94	52.63	0.15	-0.15	-0.10
6286.00	9.77	60.81	95	6217.4	241.62	532.42	701.07	880.32	52.79	0.55	-0.55	-0.23
6381.00	9.16	59.32	95	6311.1	246.21	540.21	714.61	895.82	52.91	0.69	-0.64	-1.57
6477.00	8.21	58.47	96	6406.0	250.19	547.69	727.02	910.23	53.01	1.00	-0.99	-0.89
6572.00	7.61	55.47	95	6500.1	253.35	554.80	737.99	923.27	53.06	0.77	-0.63	-3.16
6668.00	6.90	51.97	96	6595.3	255.63	561.96	747.77	935.39	53.07	0.87	-0.74	-3.65
6763.00	10.46	53.94	95	6689.2	258.15	570.55	759.24	949.72	53.08	3.76	3.75	2.07
6859.00	9.53	52.98	96	6783.7	261.18	580.47	772.63	966.38	53.08	0.98	-0.97	-1.00
6954.00	8.84	51.75	95	6877.5	263.66	589.72	784.64	981.54	53.07	0.76	-0.73	-1.29
7050.00	7.83	48.64	96	6972.5	265.42	598.61	795.34	995.44	53.03	1.15	-1.05	-3.24
7146.00	7.98	43.96	96	7067.6	266.18	607.73	804.87	1008.54	52.94	0.69	0.16	-4.88
7241.00	11.31	48.61	95	7161.2	267.20	618.64	816.44	1024.35	52.85	3.60	3.51	4.89
7337.00	8.62	40.03	96	7255.8	267.75	630.37	828.13	1040.76	52.72	3.19	-2.80	-8.94
7432.00	7.40	36.80	95	7349.9	266.72	640.72	836.38	1053.59	52.55	1.37	-1.28	-3.40
7528.00	6.53	37.89	96	7445.2	265.56	649.98	843.43	1064.83	52.38	0.92	-0.91	1.14
7624.00	5.11	28.60	96	7540.7	264.01	658.05	848.83	1074.03	52.22	1.77	-1.48	-9.68
7719.00	5.29	71.18	95	7635.3	265.03	663.17	855.01	1082.05	52.20	3.97	0.19	44.82
7815.00	15.60	105.97	96	7729.7	278.66	661.04	871.66	1093.97	52.82	12.13	10.74	36.24
7910.00	25.69	109.48	95	7818.4	309.00	650.63	903.44	1113.34	54.24	10.70	10.62	3.69
8006.00	37.42	116.23	96	7900.1	356.19	630.73	949.39	1139.81	56.40	12.74	12.22	7.03
8101.00	49.58	121.02	95	7968.9	419.45	599.21	1006.51	1171.37	59.23	13.25	12.80	5.04
8197.00	61.09	127.33	96	8023.5	497.33	554.72	1071.50	1206.57	62.63	13.14	11.99	6.57
8293.00	72.21	132.41	96	8061.5	585.17	498.20	1138.90	1243.10	66.37	12.56	11.58	5.29
8388.00	82.67	134.22	95	8082.1	677.76	434.66	1206.25	1282.18	70.18	11.17	11.01	1.91
8484.00	85.21	131.89	96	8092.3	773.21	369.50	1276.00	1328.42	73.85	3.58	2.65	-2.43
8579.00	85.65	131.38	95	8099.8	867.88	306.59	1346.78	1381.23	77.18	0.71	0.46	-0.54
8675.00	86.27	130.32	96	8106.6	963.57	243.95	1419.21	1440.03	80.25	1.28	0.65	-1.10
8770.00	87.88	131.28	95	8111.4	1058.37	181.96	1491.03	1502.09	83.04	1.97	1.69	1.01
8866.00	90.47	133.40	96	8112.8	1154.34	117.32	1561.97	1566.37	85.70	3.49	2.70	2.21
8961.00	91.62	133.80	95	8111.1	1249.32	51.82	1630.75	1631.58	88.18	1.28	1.21	0.42
9057.00	90.39	133.05	96	8109.4	1345.30	-14.16	1700.46	1700.52	90.48	1.50	-1.28	-0.78
9152.00	89.15	130.89	95	8109.8	1440.28	-77.69	1771.09	1772.79	92.51	2.62	-1.31	-2.27
9248.00	88.49	133.03	96	8111.8	1536.24	-141.86	1842.46	1847.91	94.40	2.33	-0.69	2.23
9343.00	89.51	137.03	95	8113.4	1631.14	-209.04	1909.57	1920.98	96.25	4.34	1.07	4.21
9438.00	86.49	133.60	95	8116.7	1725.98	-276.53	1976.32	1995.57	97.97	4.81	-3.18	-3.61
9534.00	85.49	131.41	96	8123.5	1821.73	-341.23	2046.91	2075.16	99.46	2.50	-1.04	-2.28
9629.00	85.28	131.53	95	8131.1	1916.39	-403.94	2117.86	2156.04	100.80	0.25	-0.22	0.13
9725.00	87.78	131.47	96	8136.9	2012.18	-467.43	2189.63	2238.96	102.05	2.60	2.60	-0.06
9820.00	88.58	131.51	95	8139.9	2107.09	-530.33	2260.75	2322.12	103.20	0.84	0.84	0.04
9915.00	89.13	131.85	95	8141.8	2202.05	-593.49	2331.69	2406.04	104.28	0.68	0.58	0.36
10011.00	89.17	131.86	96	8143.2	2298.02	-657.54	2403.19	2491.52	105.30	0.04	0.04	0.01
10106.00	89.66	132.16	95	8144.2	2393.00	-721.11	2473.77	2576.73	106.25	0.60	0.52	0.32
10202.00	88.38	128.58	96	8145.9	2488.87	-783.28	2546.89	2664.61	107.09	3.96	-1.33	-3.73
10297.00	88.30	128.40	95	8148.6	2583.53	-842.38	2621.21	2753.24	107.82	0.21	-0.08	-0.19
10393.00	88.57	128.89	96	8151.2	2679.22	-902.31	2696.16	2843.14	108.50	0.58	0.28	0.51
10489.00	89.01	129.13	96	8153.3	2774.97	-962.72	2770.74	2933.23	109.16	0.52	0.46	0.25
10584.00	89.04	128.87	95	8154.9	2869.72	-1022.50	2844.56	3022.75	109.77	0.28	0.03	-0.27
10680.00	87.65	128.03	96	8157.7	2965.38	-1082.17	2919.71	3113.80	110.34	1.69	-1.45	-0.88
10775.00	88.34	130.56	95	8161.0	3060.11	-1142.29	2993.18	3203.74	110.89	2.76	0.73	2.66
10870.00	89.79	133.28	95	8162.5	3155.07	-1205.74	3063.85	3292.56	111.48	3.24	1.53	2.86
10966.00	89.13	130.81	96	8163.4	3251.04	-1270.03	3135.13	3382.60	112.05	2.66	-0.69	-2.57
11061.00	87.93	126.96	95	8165.9	3345.75	-1329.63	3209.04	3473.59	112.51	4.24	-1.26	-4.05

# Minimum Radius of Curvature

**API: 42-283-37270**      **Well: Menn Unit A LAS 2H**      **Wellhead Location N+/S- : 28.454474**  
**Operator: Chesapeake Energy**      **Area: Eagleford**      **E+/W- : -99.262070**  
**Rig: Cactus 140**      **Type: U-Lateral**      **Magnetic Declination: 4.21**  
**TD: 18,231'**      **Plane of Proposal: 133.00**

Measured Depth Ft	Drift Angle Deg	Azimuth Direction Deg	Course Length Ft	TVD Ft	Vertical Section Ft	COORDINATES		CLOSURE		Dog Leg Severity Deg/100'	Build / Drop Deg/100'	Left / Right Deg/100'
						N-S Ft	E-W Ft	Distance FT	Direction Deg			
11156.00	88.23	127.10	95	8169.1	3440.18	-1386.81	3284.83	3565.58	112.89	0.35	0.32	0.15
11252.00	89.13	132.49	96	8171.3	3535.97	-1448.22	3358.55	3657.48	113.33	5.69	0.94	5.61
11347.00	89.90	133.55	95	8172.1	3630.96	-1513.03	3428.00	3747.06	113.82	1.38	0.81	1.12
11442.00	88.02	131.59	95	8173.8	3725.94	-1577.28	3497.94	3837.11	114.27	2.86	-1.98	-2.06
11538.00	88.96	133.21	96	8176.3	3821.89	-1641.99	3568.81	3928.42	114.71	1.95	0.98	1.69
11634.00	89.63	133.74	96	8177.5	3917.88	-1708.03	3638.47	4019.43	115.15	0.89	0.70	0.55
11729.00	89.46	133.11	95	8178.3	4012.88	-1773.33	3707.46	4109.74	115.56	0.69	-0.18	-0.66
11824.00	88.41	131.53	95	8180.0	4107.85	-1837.28	3777.69	4200.77	115.94	2.00	-1.11	-1.66
11920.00	88.10	134.52	96	8182.9	4203.79	-1902.74	3847.83	4292.58	116.31	3.13	-0.32	3.11
12015.00	88.59	135.38	95	8185.7	4298.70	-1969.83	3915.03	4382.66	116.71	1.04	0.52	0.91
12110.00	89.02	135.73	95	8187.7	4393.58	-2037.64	3981.54	4472.65	117.10	0.58	0.45	0.37
12206.00	88.92	134.33	96	8189.4	4489.50	-2105.54	4049.37	4564.07	117.47	1.46	-0.10	-1.46
12301.00	88.74	133.52	95	8191.3	4584.47	-2171.43	4117.78	4655.24	117.80	0.87	-0.19	-0.85
12396.00	89.90	134.97	95	8192.5	4679.44	-2237.71	4185.83	4746.42	118.13	1.95	1.22	1.53
12491.00	90.03	134.84	95	8192.5	4774.38	-2304.77	4253.11	4837.45	118.45	0.19	0.14	-0.14
12587.00	90.95	134.87	96	8191.7	4870.33	-2372.48	4321.16	4929.62	118.77	0.96	0.96	0.03
12682.00	90.53	132.56	95	8190.5	4965.31	-2438.12	4389.82	5021.45	119.05	2.47	-0.44	-2.43
12777.00	88.11	118.40	95	8191.6	5059.24	-2493.12	4466.97	5115.61	119.17	15.12	-2.55	-14.91
12873.00	86.42	106.28	96	8196.2	5148.79	-2529.50	4555.49	5210.65	119.04	12.73	-1.76	-12.63
12968.00	87.92	94.69	95	8200.9	5228.66	-2546.73	4648.63	5300.53	118.72	12.29	1.58	-12.20
13064.00	89.04	82.00	96	8203.5	5296.78	-2543.96	4744.36	5383.37	118.20	13.27	1.17	-13.22
13159.00	89.05	70.41	95	8205.1	5348.71	-2521.35	4836.45	5454.21	117.53	12.20	0.01	-12.20
13255.00	88.72	59.04	96	8206.9	5384.18	-2480.44	4923.10	5512.67	116.74	11.85	-0.34	-11.84
13350.00	91.10	49.00	95	8207.1	5402.32	-2424.70	4999.87	5556.79	115.87	10.86	2.51	-10.57
13445.00	90.97	37.23	95	8205.4	5402.51	-2355.49	5064.67	5585.63	114.94	12.39	-0.14	-12.39
13541.00	91.38	24.88	96	8203.4	5382.68	-2273.42	5114.09	5596.64	113.97	12.87	0.43	-12.86
13637.00	89.88	10.57	96	8202.3	5341.80	-2182.23	5143.24	5587.04	112.99	14.99	-1.56	-14.91
13732.00	89.63	358.43	95	8202.7	5282.78	-2087.70	5150.68	5557.69	112.06	12.78	-0.26	366.17
13827.00	90.38	345.76	95	8202.7	5209.20	-1993.79	5137.64	5510.95	111.21	13.36	0.79	-13.34
13923.00	92.82	332.46	96	8200.0	5123.23	-1904.34	5103.51	5447.23	110.46	14.08	2.54	-13.85
14018.00	92.86	324.29	95	8195.3	5031.82	-1823.62	5053.80	5372.75	109.84	8.59	0.04	-8.60
14114.00	92.07	323.49	96	8191.2	4937.64	-1746.13	4997.27	5293.56	109.26	1.17	-0.82	-0.83
14209.00	91.94	321.81	95	8187.9	4844.04	-1670.66	4939.68	5214.55	108.69	1.77	-0.14	-1.77
14304.00	91.46	321.32	95	8185.0	4750.14	-1596.28	4880.65	5135.06	108.11	0.72	-0.51	-0.52
14400.00	91.40	320.74	96	8182.6	4655.11	-1521.67	4820.29	5054.77	107.52	0.61	-0.06	-0.60
14495.00	90.92	320.07	95	8180.7	4560.93	-1448.48	4759.76	4975.28	106.93	0.87	-0.51	-0.71
14590.00	91.12	319.57	95	8179.0	4466.61	-1375.91	4698.47	4895.79	106.32	0.57	0.21	-0.53
14686.00	91.44	318.88	96	8176.9	4371.21	-1303.23	4635.79	4815.49	105.70	0.79	0.33	-0.72
14781.00	91.40	318.33	95	8174.5	4276.69	-1231.99	4572.99	4736.04	105.08	0.58	-0.04	-0.58
14876.00	91.69	319.03	95	8172.0	4182.19	-1160.66	4510.29	4657.24	104.43	0.80	0.31	0.74
14971.00	91.42	320.21	95	8169.4	4087.86	-1088.32	4448.77	4579.96	103.75	1.27	-0.28	1.24
15066.00	91.42	324.47	95	8167.0	3994.17	-1013.16	4390.76	4506.13	102.99	4.48	0.00	4.48
15162.00	92.24	323.87	96	8164.0	3900.04	-935.37	4334.59	4434.36	102.18	1.06	0.85	-0.63
15257.00	90.84	322.30	95	8161.4	3806.54	-859.44	4277.55	4363.04	101.36	2.21	-1.47	-1.65
15352.00	90.30	321.21	95	8160.5	3712.66	-784.84	4218.75	4291.13	100.54	1.28	-0.57	-1.15
15448.00	90.02	321.10	96	8160.2	3617.63	-710.07	4158.54	4218.72	99.69	0.31	-0.29	-0.11
15543.00	89.97	320.52	95	8160.2	3523.51	-636.44	4098.51	4147.63	98.83	0.61	-0.05	-0.61
15638.00	89.62	319.21	95	8160.6	3429.19	-563.81	4037.27	4076.45	97.95	1.43	-0.37	-1.38
15733.00	90.41	319.34	95	8160.5	3334.76	-491.82	3975.29	4005.60	97.05	0.84	0.83	0.14
15829.00	91.10	319.68	96	8159.3	3239.39	-418.81	3912.97	3935.31	96.11	0.80	0.72	0.35
15924.00	91.95	320.26	95	8156.7	3145.13	-346.10	3851.88	3867.40	95.13	1.08	0.89	0.61
16019.00	92.27	320.19	95	8153.2	3050.95	-273.13	3791.15	3800.97	94.12	0.34	0.34	-0.07
16115.00	91.49	320.14	96	8150.1	2955.75	-199.46	3729.69	3735.01	93.06	0.81	-0.81	-0.05
16210.00	91.02	319.67	95	8148.0	2861.46	-126.80	3668.52	3670.71	91.98	0.70	-0.49	-0.49
16305.00	91.30	319.59	95	8146.1	2767.12	-54.44	3606.99	3607.41	90.86	0.31	0.29	-0.08
16401.00	91.45	319.09	96	8143.8	2671.73	18.37	3544.46	3544.51	89.70	0.54	0.16	-0.52
16496.00	90.97	318.55	95	8141.8	2577.24	89.85	3481.93	3483.08	88.52	0.76	-0.51	-0.57
16591.00	90.83	318.85	95	8140.3	2482.72	161.21	3419.23	3423.03	87.30	0.35	-0.15	0.32

## Minimum Radius of Curvature

**API: 42-283-37270**      **Well: Menn Unit A LAS 2H**      **Wellhead Location N+/S- : 28.454474**  
**Operator: Chesapeake Energy**      **Area: Eagleford**      **E+/W- : -99.262070**  
**Rig: Cactus 140**      **Type: U-Lateral**      **Magnetic Declination: 4.21**  
**TD: 18,231'**      **Plane of Proposal: 133.00**

Measured Depth Ft	Drift Angle Deg	Azimuth Direction Deg	Course Length Ft	TVD Ft	Vertical Section Ft	COORDINATES		CLOSURE		Dog Leg Severity Deg/100'	Build / Drop Deg/100'	Left / Right Deg/100'
						N-S Ft	E-W Ft	Distance FT	Direction Deg			
16687.00	90.16	319.92	96	8139.5	2387.33	234.08	3356.74	3364.90	86.01	1.32	-0.70	1.11
16782.00	91.44	321.69	95	8138.1	2293.22	307.69	3296.72	3311.04	84.67	2.30	1.35	1.86
16877.00	92.17	321.52	95	8135.1	2199.34	382.11	3237.74	3260.21	83.27	0.79	0.77	-0.18
16972.00	91.93	320.59	95	8131.7	2105.34	455.95	3178.07	3210.61	81.84	1.01	-0.25	-0.98
17068.00	91.92	320.15	96	8128.5	2010.18	529.85	3116.87	3161.59	80.35	0.46	-0.01	-0.46
17163.00	90.18	317.70	95	8126.8	1915.72	601.44	3054.47	3113.12	78.86	3.16	-1.83	-2.58
17258.00	91.30	320.12	95	8125.5	1821.24	673.03	2992.04	3066.80	77.32	2.81	1.18	2.55
17353.00	92.28	322.56	95	8122.6	1727.30	747.17	2932.73	3026.41	75.71	2.77	1.03	2.57
17449.00	90.92	320.73	96	8119.9	1632.43	822.41	2873.18	2988.57	74.03	2.37	-1.42	-1.91
17544.00	91.54	320.50	95	8117.9	1538.29	895.82	2812.92	2952.12	72.34	0.70	0.65	-0.24
17639.00	91.15	320.26	95	8115.6	1444.10	968.98	2752.35	2917.94	70.61	0.48	-0.41	-0.25
17735.00	91.32	320.52	96	8113.6	1348.92	1042.92	2691.16	2886.18	68.82	0.32	0.18	0.27
17830.00	91.63	320.53	95	8111.1	1254.77	1116.23	2630.79	2857.80	67.01	0.33	0.33	0.01
17925.00	91.61	320.57	95	8108.4	1160.63	1189.56	2570.45	2832.36	65.17	0.05	-0.02	0.04
18021.00	91.71	320.68	96	8105.6	1065.52	1263.73	2509.57	2809.80	63.27	0.15	0.10	0.11
18116.00	92.07	320.72	95	8102.5	971.43	1337.21	2449.43	2790.67	61.37	0.38	0.38	0.04
18193.00	92.37	320.57	77	8099.5	895.17	1396.70	2400.64	2777.38	59.81	0.44	0.39	-0.19
18231.00	92.44	320.55	38	8097.9	857.54	1426.02	2376.52	2771.54	59.03	0.19	0.18	-0.05