



Job Number: MD-140625
 Company: Approach Operating LLC
 Lease/Well: University 45 #741HA
 Location: Crockett Co., TX
 Rig Name: Nabors M23
 RKB:
 G.L. or M.S.L.:

State/Country: Texas/USA
 Declination: 6.08
 Grid: -0.46
 File name: C:\WINSERVE\140625.SVY
 Date/Time: 17-Jun-14 / 13:58
 Curve Name: University 45_741HA

LEAM Drilling Systems

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane .14
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
Gyro .00	.00	.00	.00	.00	.00	.00	.00	.00	.00
Gyro 200.00	.19	72.62	200.00	.10	.32	.10	.33	72.62	.10
Gyro 400.00	.21	251.93	400.00	.08	.28	.09	.30	73.47	.20
Gyro 600.00	.15	223.26	600.00	-.22	-.24	-.22	.33	227.90	.05
Gyro 800.00	.11	278.62	800.00	-.38	-.61	-.38	.72	238.07	.06
Gyro 1000.00	.19	332.58	1000.00	-.06	-.96	-.06	.96	266.49	.08
Gyro 1200.00	.41	293.41	1199.99	.52	-1.76	.52	1.84	286.42	.14
1344.00	.40	102.40	1343.99	.62	-1.75	.61	1.85	289.45	.56
1535.00	.40	111.30	1534.99	.23	-.47	.23	.53	296.02	.03
1726.00	.10	94.10	1725.99	-.02	.31	-.02	.31	94.14	.16
1918.00	.00	69.80	1917.99	-.03	.48	-.03	.48	94.13	.05
2107.00	.00	44.40	2106.99	-.03	.48	-.03	.48	94.13	.00
2298.00	.30	99.50	2297.99	-.12	.97	-.11	.98	96.86	.16
2488.00	.70	94.10	2487.98	-.28	2.62	-.28	2.64	96.14	.21
2679.00	.40	158.60	2678.97	-.99	4.03	-.98	4.15	103.76	.33
2869.00	.30	195.90	2868.97	-2.08	4.13	-2.07	4.63	116.73	.13
3061.00	1.40	252.00	3060.94	-3.29	1.77	-3.29	3.73	151.78	.65
3252.00	3.30	240.90	3251.78	-6.69	-5.26	-6.70	8.50	218.18	1.02
3443.00	4.60	257.00	3442.32	-11.08	-17.52	-11.13	20.73	237.69	.89
3634.00	3.30	282.90	3632.88	-11.58	-30.35	-11.65	32.48	249.12	1.14

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
Distance FT	Direction Deg								
3825.00	5.20	291.00	3823.35	-7.25	-43.79	-7.36	44.38	260.60	1.04
4015.00	4.10	290.40	4012.72	-1.80	-58.19	-1.94	58.22	268.23	.58
4206.00	4.00	267.90	4203.26	.34	-71.25	.17	71.25	270.27	.83
4398.00	3.50	254.60	4394.85	-1.46	-83.59	-1.67	83.61	269.00	.52
4589.00	3.60	258.30	4585.48	-4.23	-95.09	-4.46	95.18	267.46	.13
4780.00	3.90	258.80	4776.07	-6.70	-107.33	-6.96	107.54	266.43	.16
4971.00	1.60	246.10	4966.84	-9.04	-116.14	-9.33	116.49	265.55	1.24
5162.00	.60	201.30	5157.81	-11.06	-118.94	-11.35	119.45	264.69	.65
5353.00	.40	342.50	5348.80	-11.35	-119.51	-11.64	120.04	264.57	.50
5500.00	.10	112.70	5495.80	-10.91	-119.54	-11.21	120.04	264.78	.32
5554.00	1.00	340.20	5549.80	-10.49	-119.66	-10.78	120.12	264.99	1.98
5585.00	4.80	338.40	5580.75	-9.03	-120.23	-9.32	120.56	265.71	12.26
5617.00	9.10	345.60	5612.51	-5.33	-121.35	-5.63	121.47	267.49	13.68
5648.00	12.80	354.60	5642.94	.47	-122.28	.17	122.28	270.22	13.11
5680.00	14.90	358.30	5674.01	8.11	-122.74	7.81	123.01	273.78	7.12
5712.00	18.50	357.40	5704.66	17.30	-123.09	16.99	124.30	278.00	11.28
5744.00	22.10	355.10	5734.67	28.37	-123.84	28.07	127.04	282.90	11.52
5776.00	25.50	355.30	5763.94	41.24	-124.91	40.93	131.54	288.27	10.63
5808.00	29.20	354.80	5792.36	55.88	-126.19	55.57	138.01	293.89	11.58
5839.00	32.60	354.80	5818.95	71.73	-127.63	71.42	146.41	299.34	10.97
5871.00	33.40	356.90	5845.79	89.11	-128.89	88.80	156.69	304.66	4.36
5903.00	33.30	359.20	5872.52	106.69	-129.49	106.37	167.78	309.49	3.96
5934.00	34.30	.20	5898.28	123.93	-129.57	123.62	179.30	313.73	3.69
5966.00	36.00	359.00	5924.45	142.36	-129.71	142.04	192.59	317.66	5.73
5998.00	36.30	359.50	5950.29	161.23	-129.95	160.91	207.08	321.13	1.31
6030.00	37.30	358.50	5975.91	180.40	-130.29	180.08	222.53	324.16	3.64
6061.00	38.90	357.10	6000.31	199.51	-131.03	199.19	238.69	326.70	5.87
6093.00	40.20	356.70	6024.98	219.85	-132.13	219.53	256.50	328.99	4.14
6125.00	41.10	356.70	6049.26	240.66	-133.33	240.34	275.13	331.01	2.81
6157.00	40.90	357.80	6073.41	261.63	-134.34	261.30	294.11	332.82	2.34
6189.00	40.10	358.60	6097.74	282.41	-134.99	282.07	313.01	334.45	2.98
6221.00	41.80	359.70	6121.91	303.37	-135.30	303.04	332.18	335.96	5.77
6252.00	44.40	.40	6144.54	324.55	-135.28	324.22	351.62	337.37	8.53
6284.00	47.40	359.40	6166.81	347.53	-135.32	347.20	372.95	338.72	9.64
6316.00	50.60	357.80	6187.80	371.67	-135.92	371.34	395.74	339.91	10.69
6347.00	53.40	356.70	6206.89	396.07	-137.10	395.73	419.12	340.91	9.45
6379.00	56.00	356.00	6225.38	422.13	-138.76	421.79	444.35	341.80	8.32
6411.00	58.40	356.90	6242.71	448.97	-140.43	448.63	470.42	342.63	7.86
6443.00	61.10	357.20	6258.83	476.57	-141.85	476.23	497.24	343.42	8.48
6475.00	63.20	357.60	6273.78	504.84	-143.13	504.49	524.74	344.17	6.65
6506.00	64.90	358.50	6287.34	532.69	-144.08	532.34	551.83	344.87	6.07
6538.00	68.50	358.60	6300.00	562.07	-144.82	561.71	580.43	345.55	11.25
6570.00	72.40	359.00	6310.70	592.21	-145.45	591.86	609.81	346.20	12.24
6602.00	75.10	358.60	6319.66	622.93	-146.09	622.57	639.83	346.80	8.52
6634.00	77.90	359.00	6327.13	654.03	-146.75	653.67	670.29	347.35	8.83

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
Distance FT	Direction Deg								
6666.00	80.60	359.50	6333.10	685.46	-147.16	685.10	701.08	347.88	8.58
6697.00	82.70	.20	6337.60	716.13	-147.24	715.77	731.11	348.38	7.13
6729.00	84.50	.80	6341.16	747.93	-146.96	747.57	762.23	348.88	5.93
6761.00	86.90	1.30	6343.56	779.83	-146.37	779.47	793.45	349.37	7.66
6793.00	87.60	1.10	6345.10	811.79	-145.70	811.43	824.76	349.82	2.27
6825.00	87.80	.90	6346.38	843.76	-145.15	843.40	856.15	350.24	.88
6920.00	91.30	1.60	6347.13	938.72	-143.07	938.37	949.56	351.33	3.76
7016.00	88.60	358.30	6347.21	1034.70	-143.16	1034.34	1044.55	352.12	4.44
7111.00	90.60	.40	6347.88	1129.68	-144.23	1129.32	1138.85	352.72	3.05
7207.00	90.90	359.00	6346.62	1225.66	-144.74	1225.31	1234.18	353.27	1.49
7302.00	89.30	357.40	6346.45	1320.61	-147.72	1320.25	1328.85	353.62	2.38
7398.00	89.30	1.30	6347.63	1416.58	-148.81	1416.21	1424.37	354.00	4.06
7493.00	89.90	3.60	6348.29	1511.48	-144.75	1511.13	1518.40	354.53	2.50
7589.00	89.50	3.00	6348.79	1607.32	-139.22	1606.98	1613.34	355.05	.75
7684.00	89.40	4.80	6349.70	1702.09	-132.76	1701.76	1707.26	355.54	1.90
7780.00	90.30	2.70	6349.96	1797.88	-126.48	1797.57	1802.33	355.98	2.38
7876.00	89.50	1.10	6350.12	1893.83	-123.30	1893.52	1897.83	356.27	1.86
7969.00	89.20	.80	6351.18	1986.81	-121.76	1986.50	1990.53	356.49	.46
8064.00	88.90	359.20	6352.75	2081.79	-121.76	2081.49	2085.35	356.65	1.71
8160.00	89.10	358.60	6354.43	2177.76	-123.60	2177.45	2181.26	356.75	.66
8255.00	90.90	359.40	6354.43	2272.74	-125.26	2272.43	2276.19	356.85	2.07
8347.00	90.20	356.20	6353.55	2364.65	-128.79	2364.33	2368.16	356.88	3.56
8438.00	88.50	354.40	6354.58	2455.33	-136.25	2454.99	2459.11	356.82	2.72
8529.00	88.40	354.40	6357.04	2545.87	-145.12	2545.50	2550.00	356.74	.11
8622.00	89.80	355.70	6358.50	2638.50	-153.15	2638.12	2642.95	356.68	2.05
8714.00	91.20	359.00	6357.70	2730.39	-157.40	2729.99	2734.92	356.70	3.90
8806.00	92.20	359.70	6354.97	2822.34	-158.44	2821.94	2826.78	356.79	1.33
8899.00	90.50	.20	6352.78	2915.31	-158.52	2914.91	2919.62	356.89	1.91
8990.00	90.90	.20	6351.67	3006.30	-158.21	3005.91	3010.46	356.99	.44
9081.00	89.30	.20	6351.51	3097.30	-157.89	3096.90	3101.32	357.08	1.76
9172.00	87.80	.20	6353.81	3188.27	-157.57	3187.87	3192.16	357.17	1.65
9268.00	87.90	359.90	6357.41	3284.20	-157.49	3283.80	3287.97	357.25	.33
9364.00	90.00	.90	6359.17	3380.17	-156.82	3379.78	3383.81	357.34	2.42
9459.00	90.00	.00	6359.17	3475.17	-156.07	3474.78	3478.67	357.43	.95
9555.00	88.70	357.80	6360.26	3571.14	-157.91	3570.74	3574.63	357.47	2.66
9650.00	88.60	356.40	6362.50	3665.99	-162.72	3665.58	3669.60	357.46	1.48
9746.00	89.20	357.40	6364.34	3761.83	-167.91	3761.41	3765.57	357.44	1.21
9841.00	89.60	359.00	6365.34	3856.77	-170.89	3856.34	3860.56	357.46	1.74
9937.00	89.10	.20	6366.42	3952.76	-171.56	3952.33	3956.48	357.51	1.35
10033.00	89.80	3.20	6367.35	4048.70	-168.71	4048.28	4052.22	357.61	3.21
10128.00	89.30	2.30	6368.09	4143.59	-164.16	4143.18	4146.84	357.73	1.08
10224.00	89.40	2.90	6369.18	4239.48	-159.80	4239.08	4242.50	357.84	.63
10319.00	90.10	4.40	6369.60	4334.29	-153.75	4333.90	4337.01	357.97	1.74
10415.00	87.90	1.60	6371.27	4430.13	-148.73	4429.75	4432.62	358.08	3.71
10510.00	87.40	1.10	6375.17	4525.02	-146.49	4524.65	4527.39	358.15	.74

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
10606.00	88.60	1.10	6378.52	4620.94	-144.65	4620.57	4623.20	358.21	1.25
10701.00	91.40	1.30	6378.52	4715.91	-142.66	4715.55	4718.07	358.27	2.95
10797.00	89.10	.90	6378.10	4811.89	-140.82	4811.53	4813.95	358.32	2.43
10892.00	90.80	2.50	6378.18	4906.84	-138.00	4906.49	4908.78	358.39	2.46
10988.00	87.30	2.30	6379.77	5002.72	-133.98	5002.38	5004.52	358.47	3.65
11083.00	87.10	1.60	6384.41	5097.56	-130.76	5097.22	5099.23	358.53	.77
11179.00	88.00	1.50	6388.52	5193.43	-128.16	5193.10	5195.01	358.59	.94
11274.00	87.00	.60	6392.66	5288.32	-126.42	5288.00	5289.83	358.63	1.42
11370.00	87.10	.00	6397.60	5384.19	-125.92	5383.87	5385.67	358.66	.63
11466.00	87.80	359.70	6401.87	5480.10	-126.17	5479.77	5481.55	358.68	.79
11561.00	87.50	359.50	6405.77	5575.02	-126.83	5574.69	5576.46	358.70	.38
11657.00	88.60	359.20	6409.03	5670.95	-127.92	5670.62	5672.40	358.71	1.19
11752.00	91.30	359.00	6409.12	5765.93	-129.41	5765.60	5767.38	358.71	2.85
11848.00	92.80	358.50	6405.68	5861.84	-131.51	5861.51	5863.32	358.71	1.65
11944.00	93.60	357.90	6400.32	5957.65	-134.52	5957.30	5959.17	358.71	1.04
12039.00	90.70	356.50	6396.76	6052.45	-139.15	6052.10	6054.05	358.68	3.39
12135.00	89.30	357.40	6396.76	6148.31	-144.26	6147.94	6150.01	358.66	1.73
12230.00	89.40	358.10	6397.84	6243.23	-147.99	6242.85	6244.99	358.64	.74
12325.00	90.40	.90	6398.00	6338.22	-148.82	6337.84	6339.97	358.65	3.13
12421.00	89.50	.20	6398.09	6434.21	-147.90	6433.83	6435.91	358.68	1.19
12516.00	89.00	359.50	6399.33	6529.20	-148.15	6528.82	6530.89	358.70	.91
12612.00	89.50	1.50	6400.59	6625.19	-147.31	6624.81	6626.83	358.73	2.15
12707.00	90.10	2.20	6400.92	6720.14	-144.24	6719.76	6721.68	358.77	.97
12803.00	90.60	1.30	6400.33	6816.09	-141.31	6815.72	6817.55	358.81	1.07
12898.00	90.00	.40	6399.84	6911.08	-139.90	6910.71	6912.49	358.84	1.14
12994.00	89.30	358.90	6400.42	7007.07	-140.49	7006.70	7008.48	358.85	1.72
13089.00	89.30	359.00	6401.58	7102.05	-142.23	7101.68	7103.47	358.85	.11
13185.00	89.50	358.50	6402.59	7198.02	-144.32	7197.64	7199.46	358.85	.56
13278.00	89.60	357.60	6403.32	7290.96	-147.49	7290.58	7292.45	358.84	.97
13374.00	89.90	357.60	6403.74	7386.87	-151.51	7386.48	7388.43	358.83	.31
13469.00	89.30	356.70	6404.40	7481.75	-156.23	7481.35	7483.38	358.80	1.14
13565.00	89.30	355.10	6405.57	7577.50	-163.09	7577.08	7579.25	358.77	1.67
13660.00	89.60	354.60	6406.49	7672.11	-171.62	7671.67	7674.03	358.72	.61
13702.00	89.60	354.40	6406.78	7713.91	-175.65	7713.46	7715.91	358.70	.48
Proj. TD									
13755.00	89.60	354.40	6407.15	7766.66	-180.82	7766.20	7768.76	358.67	.00