

## Design Report for Aggie State AA17-625 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
273.00	0.40	324.84	273.00	0.78	-0.55	-0.54	0.15
<b>First Gyro Survey at 273.00ft</b>							
642.00	0.40	63.64	641.99	2.40	-0.14	-0.11	0.16
920.00	0.50	214.64	919.99	1.84	0.04	0.07	0.31
<b>Final Gyro Survey at 920.00ft - Tie on to Gyro Survey at 920.00ft</b>							
934.00	0.46	215.64	933.99	1.74	-0.02	0.00	0.26
<b>9 5/8"</b>							
1,100.00	0.11	285.70	1,099.99	1.24	-0.57	-0.55	0.26
<b>First Sperry MWD Survey at 1100.00ft</b>							
1,377.00	0.57	215.18	1,376.98	0.18	-1.62	-1.62	0.20
1,653.00	0.47	213.98	1,652.97	-1.88	-3.04	-3.06	0.04
1,838.00	0.56	234.09	1,837.96	-3.04	-4.20	-4.23	0.11
2,114.00	0.32	235.46	2,113.95	-4.27	-5.93	-5.98	0.09
2,300.00	0.37	280.58	2,299.95	-4.45	-6.94	-7.00	0.14
2,392.00	0.39	316.47	2,391.95	-4.17	-7.45	-7.50	0.26
2,487.00	0.44	329.14	2,486.95	-3.62	-7.86	-7.90	0.11
2,581.00	0.25	330.54	2,580.95	-3.13	-8.15	-8.18	0.20
2,676.00	0.86	313.82	2,675.94	-2.46	-8.76	-8.79	0.66
2,866.00	0.94	334.78	2,865.92	-0.06	-10.46	-10.46	0.18
2,960.00	1.29	327.99	2,959.90	1.53	-11.35	-11.33	0.40
3,054.00	1.31	326.58	3,053.88	3.33	-12.50	-12.46	0.04
3,243.00	0.72	309.67	3,242.85	5.89	-14.60	-14.53	0.35
3,338.00	0.72	275.19	3,337.84	6.32	-15.66	-15.58	0.45
3,433.00	1.05	264.27	3,432.83	6.29	-17.12	-17.04	0.39
3,621.00	0.98	246.37	3,620.80	5.48	-20.30	-20.24	0.17
3,716.00	1.01	255.56	3,715.78	4.94	-21.86	-21.80	0.17
3,811.00	1.05	264.45	3,810.77	4.65	-23.54	-23.48	0.17
3,905.00	0.59	129.71	3,904.76	4.26	-24.02	-23.97	1.62
3,999.00	0.65	100.14	3,998.76	3.85	-23.12	-23.08	0.34
4,188.00	0.63	30.52	4,187.75	4.56	-21.54	-21.49	0.39
4,282.00	0.91	14.48	4,281.74	5.73	-21.09	-21.02	0.37
4,471.00	1.19	3.81	4,470.71	9.14	-20.59	-20.48	0.18
4,659.00	0.88	33.41	4,658.68	12.29	-19.66	-19.52	0.32
4,753.00	0.91	34.52	4,752.67	13.51	-18.84	-18.68	0.04
4,943.00	0.78	38.83	4,942.65	15.76	-17.18	-16.99	0.08
5,131.00	1.03	120.67	5,130.63	15.89	-14.92	-14.73	0.64
5,320.00	0.85	90.76	5,319.61	15.01	-12.06	-11.88	0.27
5,415.00	0.33	54.54	5,414.60	15.16	-11.13	-10.95	0.65
5,510.00	0.70	112.46	5,509.60	15.10	-10.37	-10.19	0.63
5,604.00	0.62	118.67	5,603.59	14.63	-9.39	-9.22	0.11
5,699.00	0.63	78.99	5,698.59	14.49	-8.43	-8.26	0.45
5,794.00	0.22	117.97	5,793.58	14.50	-7.76	-7.59	0.50
5,888.00	0.16	331.79	5,887.58	14.53	-7.66	-7.49	0.39
6,078.00	8.43	81.30	6,076.90	16.88	6.01	6.21	4.47
6,173.00	14.07	82.26	6,170.04	19.49	24.35	24.58	5.94
6,267.00	19.08	84.21	6,260.10	22.58	50.97	51.23	5.36
6,362.00	24.92	89.25	6,348.16	24.41	86.47	86.75	6.46
6,456.00	39.57	90.75	6,427.44	24.27	136.48	136.76	15.61
6,551.00	51.90	95.90	6,493.65	20.02	204.20	204.42	13.54

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6,645.00	63.33	96.16	6,543.91	11.68	283.01	283.13	12.16
6,740.00	73.69	92.77	6,578.67	4.90	371.01	371.04	11.40
6,835.00	80.82	89.63	6,599.62	3.00	463.58	463.58	8.17
6,871.00	81.43	89.66	6,605.18	3.22	499.14	499.15	1.70
6,919.00	83.62	89.88	6,611.42	3.41	546.73	546.74	4.58
7"							
7,003.00	87.44	90.27	6,617.97	3.30	630.46	630.46	4.58
7,097.00	88.15	91.00	6,621.59	2.26	724.38	724.36	1.08
7,192.00	90.52	90.70	6,622.69	0.85	819.36	819.31	2.51
7,287.00	91.48	90.97	6,621.03	-0.54	914.34	914.27	1.05
7,382.00	91.63	91.18	6,618.46	-2.32	1,009.28	1,009.19	0.27
7,477.00	91.85	91.12	6,615.57	-4.23	1,104.22	1,104.09	0.24
7,571.00	92.19	89.98	6,612.26	-5.13	1,198.16	1,198.01	1.26
7,666.00	91.88	89.19	6,608.88	-4.44	1,293.09	1,292.95	0.89
7,760.00	92.31	89.05	6,605.45	-3.00	1,387.02	1,386.89	0.48
7,855.00	90.89	88.84	6,602.80	-1.25	1,481.96	1,481.85	1.51
7,950.00	88.92	88.09	6,602.95	1.30	1,576.92	1,576.83	2.22
8,045.00	89.88	88.10	6,603.95	4.45	1,671.86	1,671.80	1.01
8,140.00	89.57	87.74	6,604.40	7.90	1,766.80	1,766.77	0.50
8,235.00	88.86	87.26	6,605.71	12.05	1,861.70	1,861.71	0.90
8,330.00	89.54	87.00	6,607.03	16.80	1,956.57	1,956.63	0.77
8,425.00	90.86	87.15	6,606.70	21.65	2,051.44	2,051.56	1.40
8,520.00	90.15	88.16	6,605.86	25.54	2,146.36	2,146.51	1.30
8,614.00	89.66	88.89	6,606.02	27.96	2,240.33	2,240.50	0.94
8,709.00	89.97	89.59	6,606.33	29.22	2,335.32	2,335.50	0.81
8,804.00	89.51	89.71	6,606.76	29.80	2,430.31	2,430.50	0.50
8,899.00	90.18	90.42	6,607.01	29.69	2,525.31	2,525.49	1.03
8,993.00	89.20	89.90	6,607.52	29.43	2,619.31	2,619.48	1.18
9,088.00	89.94	89.85	6,608.24	29.63	2,714.31	2,714.47	0.78
9,182.00	89.05	88.47	6,609.06	31.01	2,808.29	2,808.46	1.75
9,277.00	89.94	88.40	6,609.90	33.61	2,903.25	2,903.44	0.94
9,371.00	91.66	89.22	6,608.59	35.56	2,997.22	2,997.43	2.03
9,466.00	90.65	88.15	6,606.67	37.74	3,092.17	3,092.40	1.55
9,561.00	89.78	89.02	6,606.32	40.08	3,187.14	3,187.39	1.30
9,655.00	91.08	89.43	6,605.61	41.35	3,281.12	3,281.38	1.45
9,750.00	90.92	89.44	6,603.95	42.29	3,376.10	3,376.37	0.17
9,844.00	91.29	89.10	6,602.14	43.49	3,470.08	3,470.35	0.53
9,939.00	90.68	87.95	6,600.51	45.93	3,565.03	3,565.33	1.37
10,033.00	89.78	87.42	6,600.13	49.73	3,658.95	3,659.28	1.11
10,127.00	90.52	88.43	6,599.88	53.13	3,752.89	3,753.25	1.33
10,222.00	90.46	90.11	6,599.07	54.34	3,847.87	3,848.25	1.77
10,317.00	90.52	89.85	6,598.26	54.38	3,942.87	3,943.24	0.28
10,411.00	89.97	89.14	6,597.86	55.21	4,036.87	4,037.24	0.96
10,506.00	90.09	90.61	6,597.81	55.41	4,131.86	4,132.23	1.55
10,600.00	88.86	91.06	6,598.67	54.04	4,225.85	4,226.19	1.39
10,695.00	90.28	91.27	6,599.38	52.11	4,320.82	4,321.14	1.51
10,789.00	89.63	91.27	6,599.46	50.03	4,414.80	4,415.08	0.69
10,883.00	89.08	90.72	6,600.51	48.40	4,508.78	4,509.04	0.83
10,978.00	89.32	90.94	6,601.84	47.02	4,603.76	4,603.99	0.34
11,044.00	89.26	91.01	6,602.66	45.90	4,669.74	4,669.96	0.14
Final Sperry MWD Survey at 11044.00ft							

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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
11,110.00	89.26	91.01	6,603.51	44.73	4,735.73	4,735.93	0.00
Aggie State AA17-625_BHL							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
273.00	273.00	0.78	-0.55	First Gyro Survey at 273.00ft
920.00	919.99	1.84	0.04	Final Gyro Survey at 920.00ft
920.00	919.99	1.84	0.04	Tie on to Gyro Survey at 920.00ft
1,100.00	1,099.99	1.24	-0.57	First Sperry MWD Survey at 1100.00ft
11,044.00	6,602.66	45.90	4,669.74	Final Sperry MWD Survey at 11044.00ft
11,110.00	6,603.51	44.73	4,735.73	Straight Line Projection to TD at 11110.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Aggie State AA17-625_BHL	89.33	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
273.00	920.00	Surface Surveys	Flexi-Shot
1,100.00	6,871.00	Intermediate Surveys	MWD+IFR1+MS_WY
7,003.00	11,110.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
934.00	933.99	9 5/8"	9-5/8	13-3/4
6,919.00	6,611.42	7"	7	8-3/4

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Aggie State AA17-625	0.00	0.00	0.00	0.02	0.00	1,420,157.29	3,286,995.59	40.482150	-104.468260
- actual wellpath misses target center by 0.02usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Aggie State AA17-625	0.00	0.00	6,599.00	55.62	4,739.91	1,420,212.89	3,291,735.33	40.482150	-104.451220
- actual wellpath misses target center by 12.51usft at 11110.00usft MD (6603.51 TVD, 44.73 N, 4735.73 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.34 °/100usft	Maximum Dogleg over Survey:	15.61 °/100usft at 6,456.00 usft
Net Tortousity applicable to Plans:	0.52 °/100usft	Directional Difficulty Index:	6.079

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*Audit Info*

North Reference Sheet for Sec. 17-T6N-R63W (Aggie State AA17) - Aggie State  
AA17-625 - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to KB = 24' @ 4690.00usft (H&P 273). Northing and Easting are relative to Aggie State AA 17-625

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996498

Grid Coordinates of Well: 1,420,157.27 usft N, 3,286,995.59 usft E

Geographical Coordinates of Well: 40° 28' 55.74" N, 104° 28' 05.74" W

Grid Convergence at Surface is: 0.67°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,110.00usft  
the Bottom Hole Displacement is 4,735.94usft in the Direction of 89.46° (Grid).

Magnetic Convergence at surface is: -7.66° (27 January 2015, , BGGM2014)

