

Chama Oil & Minerals

Kiowa County, Colorado (NAD83)
 Sec. 16-T17S-R48W (Grid)
 API# Not Permitted
 Mc Bryde State 16-17-48 #1H
 600 FNL, 1980 FEL
 Job#
 Plan 1
 Nomac 14 (25')

HALLIBURTON
 Sperry Drilling

WELL DETAILS: Mc Bryde State 16-17-48 #1H

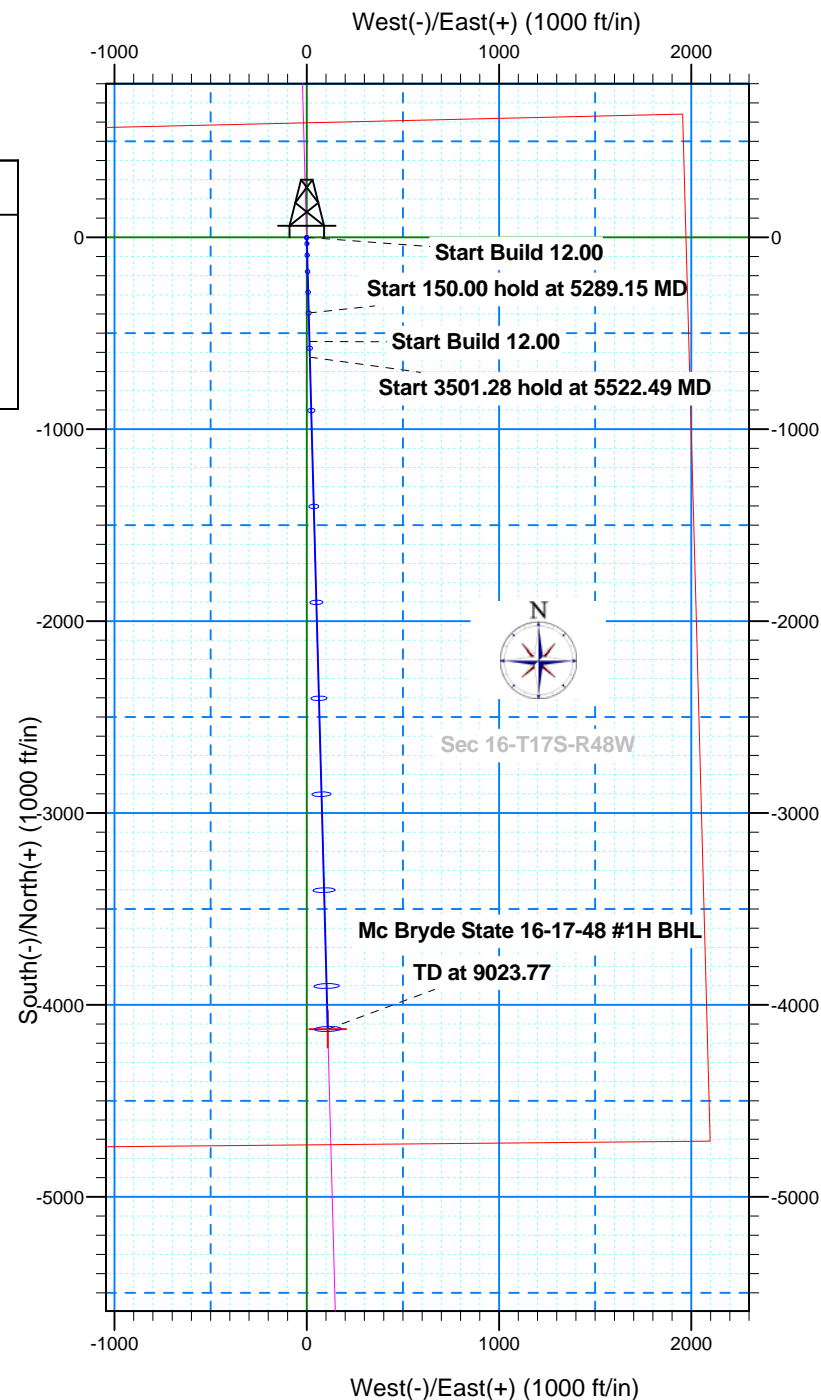
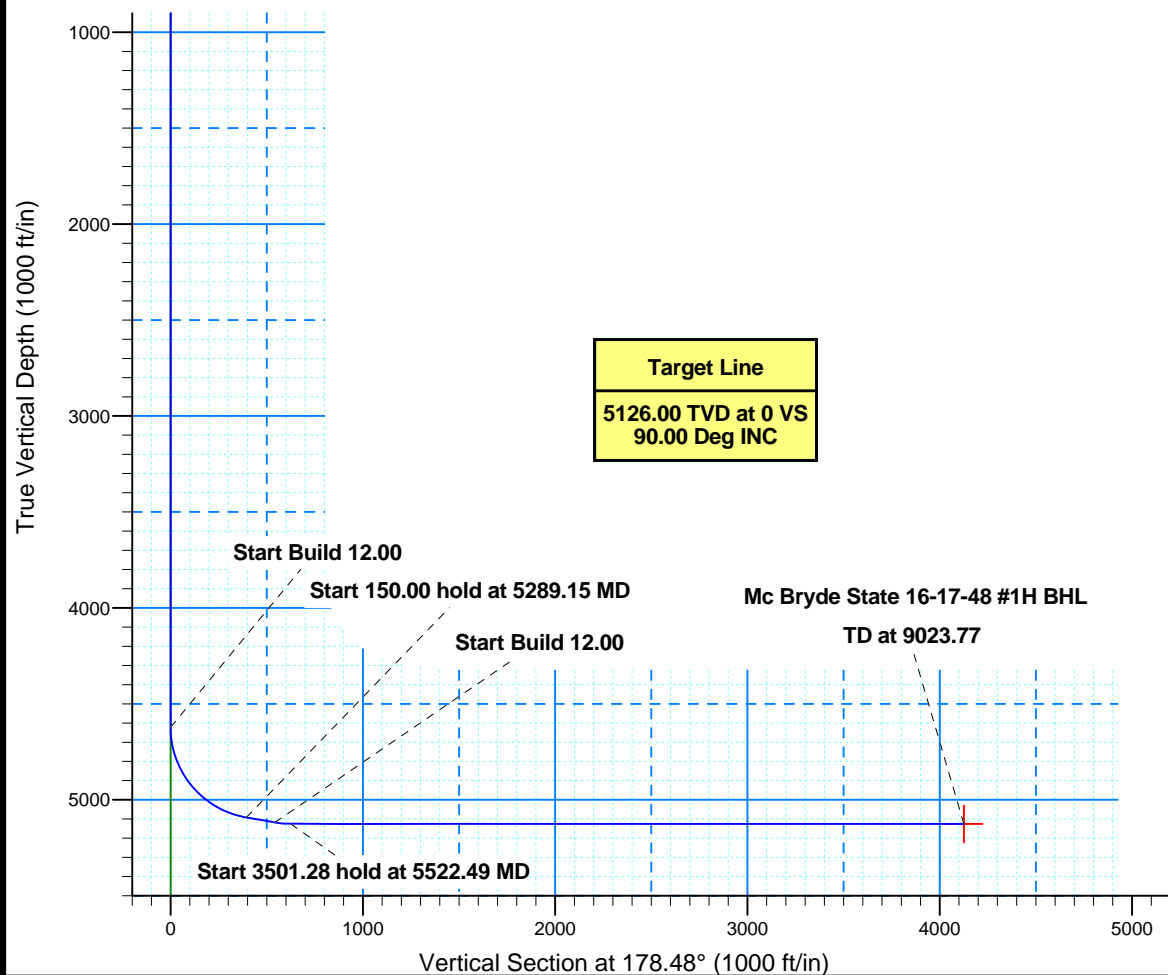
Nomac 14 (25') @ 4256.40ft (Original Well Elev)
 Ground Level: 4231.40

Northing 1709227.25 Easting 3773722.91 Latitude 38° 35' 0.852 N Longitude 102° 47' 35.174 W

SECTION DETAILS

Plan 1

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	4622.49	0.00	0.00	4622.49	0.00	0.00	0.00	0.00	0.00
3	5289.15	80.00	178.48	5092.70	-394.42	10.48	12.00	178.48	394.55
4	5439.15	80.00	178.48	5118.75	-542.08	14.40	0.00	0.00	542.28
5	5522.49	90.00	178.48	5126.00	-624.97	16.60	12.00	0.00	625.19
6	9023.77	90.00	178.48	5126.00	-4125.02	109.56	0.00	0.00	4126.47



Job#

Rig: Nomac 14 (25')

Chama Oil & Minerals

Kiowa County, Colorado (NAD83) Sec. 16-T17S-R48W (Grid)

API# Not Permitted

Mc Bryde State 16-17-48 #1H (600 FNL, 1980 FEL)

Wellbore #1

Plan: Plan 1

Sperry Drilling Services Combo Report

16 May, 2013

Well Coordinates: 38° 35' 00.85" N
102° 47' 35.17" W

North American Datum 1983
Colorado Southern Zone
1,709,227.25 N
3,773,722.91 E

Ground Level: 4,231.40 ft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Centered on Well Mc Bryde State 16-17-48 #1H
Nomac 14 (25') @ 4256.40ft (Original Well Elev)

N

Grid

API US New

Version: 2003.21 Build: 46

HALLIBURTON

Plan Report for Mc Bryde State 16-17-48 #1H - Plan 1

Measured Depth (ft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates (ft)		Map Coordinates (ft)		Dogleg Rate (°/100ft)	Vertical Section (ft)	Comments
0.00	0.00	0.00	1.65	-4,256.40	0.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
100.00	0.00	0.00	1.65	-4,156.40	100.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
200.00	0.00	0.00	1.65	-4,056.40	200.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
300.00	0.00	0.00	1.65	-3,956.40	300.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
400.00	0.00	0.00	1.65	-3,856.40	400.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
500.00	0.00	0.00	1.65	-3,756.40	500.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
600.00	0.00	0.00	1.65	-3,656.40	600.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
700.00	0.00	0.00	1.65	-3,556.40	700.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
800.00	0.00	0.00	1.65	-3,456.40	800.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
900.00	0.00	0.00	1.65	-3,356.40	900.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
1,000.00	0.00	0.00	1.65	-3,256.40	1,000.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
1,100.00	0.00	0.00	1.65	-3,156.40	1,100.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
1,200.00	0.00	0.00	1.65	-3,056.40	1,200.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
1,300.00	0.00	0.00	1.65	-2,956.40	1,300.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
1,400.00	0.00	0.00	1.65	-2,856.40	1,400.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
1,500.00	0.00	0.00	1.65	-2,756.40	1,500.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
1,600.00	0.00	0.00	1.65	-2,656.40	1,600.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
1,700.00	0.00	0.00	1.65	-2,556.40	1,700.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
1,800.00	0.00	0.00	1.65	-2,456.40	1,800.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
1,900.00	0.00	0.00	1.65	-2,356.40	1,900.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
2,000.00	0.00	0.00	1.65	-2,256.40	2,000.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
2,100.00	0.00	0.00	1.65	-2,156.40	2,100.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
2,200.00	0.00	0.00	1.65	-2,056.40	2,200.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
2,300.00	0.00	0.00	1.65	-1,956.40	2,300.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
2,400.00	0.00	0.00	1.65	-1,856.40	2,400.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
2,500.00	0.00	0.00	1.65	-1,756.40	2,500.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
2,600.00	0.00	0.00	1.65	-1,656.40	2,600.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
2,700.00	0.00	0.00	1.65	-1,556.40	2,700.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
2,800.00	0.00	0.00	1.65	-1,456.40	2,800.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
2,900.00	0.00	0.00	1.65	-1,356.40	2,900.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
3,000.00	0.00	0.00	1.65	-1,256.40	3,000.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
3,100.00	0.00	0.00	1.65	-1,156.40	3,100.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
3,200.00	0.00	0.00	1.65	-1,056.40	3,200.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
3,300.00	0.00	0.00	1.65	-956.40	3,300.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
3,400.00	0.00	0.00	1.65	-856.40	3,400.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
3,500.00	0.00	0.00	1.65	-756.40	3,500.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
3,600.00	0.00	0.00	1.65	-656.40	3,600.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	
3,700.00	0.00	0.00	1.65	-556.40	3,700.00	0.00	N 0.00	E 1,709,227.25	3,773,722.91	0.00	0.00	

Plan Report for Mc Bryde State 16-17-48 #1H - Plan 1

Measured Depth (ft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates (ft)		Map Coordinates (ft)		Dogleg Rate (°/100ft)	Vertical Section (ft)	Comments
3,800.00	0.00	0.00	1.65	-456.40	3,800.00	0.00 N	0.00 E	1,709,227.25	3,773,722.91	0.00	0.00	
3,900.00	0.00	0.00	1.65	-356.40	3,900.00	0.00 N	0.00 E	1,709,227.25	3,773,722.91	0.00	0.00	
4,000.00	0.00	0.00	1.65	-256.40	4,000.00	0.00 N	0.00 E	1,709,227.25	3,773,722.91	0.00	0.00	
4,100.00	0.00	0.00	1.65	-156.40	4,100.00	0.00 N	0.00 E	1,709,227.25	3,773,722.91	0.00	0.00	
4,200.00	0.00	0.00	1.65	-56.40	4,200.00	0.00 N	0.00 E	1,709,227.25	3,773,722.91	0.00	0.00	
4,300.00	0.00	0.00	1.65	43.60	4,300.00	0.00 N	0.00 E	1,709,227.25	3,773,722.91	0.00	0.00	
4,400.00	0.00	0.00	1.65	143.60	4,400.00	0.00 N	0.00 E	1,709,227.25	3,773,722.91	0.00	0.00	
4,500.00	0.00	0.00	1.65	243.60	4,500.00	0.00 N	0.00 E	1,709,227.25	3,773,722.91	0.00	0.00	
4,600.00	0.00	0.00	1.65	343.60	4,600.00	0.00 N	0.00 E	1,709,227.25	3,773,722.91	0.00	0.00	
4,622.49	0.00	0.00	1.65	366.09	4,622.49	0.00 N	0.00 E	1,709,227.25	3,773,722.91	0.00	0.00	Start Build 12.00
4,625.00	0.30	178.48	180.13	368.60	4,625.00	0.01 S	0.00 E	1,709,227.24	3,773,722.91	12.00	0.01	
4,650.00	3.30	178.48	180.13	393.58	4,649.98	0.79 S	0.02 E	1,709,226.46	3,773,722.93	12.00	0.79	
4,675.00	6.30	178.48	180.13	418.49	4,674.89	2.88 S	0.08 E	1,709,224.36	3,773,722.99	12.00	2.88	
4,700.00	9.30	178.48	180.13	443.26	4,699.66	6.28 S	0.17 E	1,709,220.97	3,773,723.08	12.00	6.28	
4,725.00	12.30	178.48	180.13	467.81	4,724.21	10.96 S	0.29 E	1,709,216.29	3,773,723.20	12.00	10.96	
4,750.00	15.30	178.48	180.13	492.09	4,748.49	16.92 S	0.45 E	1,709,210.33	3,773,723.36	12.00	16.93	
4,775.00	18.30	178.48	180.13	516.02	4,772.42	24.14 S	0.64 E	1,709,203.11	3,773,723.55	12.00	24.15	
4,800.00	21.30	178.48	180.13	539.54	4,795.94	32.61 S	0.87 E	1,709,194.64	3,773,723.78	12.00	32.62	
4,825.00	24.30	178.48	180.13	562.58	4,818.98	42.29 S	1.12 E	1,709,184.96	3,773,724.03	12.00	42.31	
4,850.00	27.30	178.48	180.13	585.09	4,841.49	53.17 S	1.41 E	1,709,174.08	3,773,724.32	12.00	53.19	
4,875.00	30.30	178.48	180.13	606.99	4,863.39	65.21 S	1.73 E	1,709,162.04	3,773,724.64	12.00	65.23	
4,900.00	33.30	178.48	180.13	628.24	4,884.64	78.38 S	2.08 E	1,709,148.87	3,773,724.99	12.00	78.40	
4,925.00	36.30	178.48	180.13	648.76	4,905.16	92.64 S	2.46 E	1,709,134.61	3,773,725.37	12.00	92.67	
4,950.00	39.30	178.48	180.13	668.51	4,924.91	107.95 S	2.87 E	1,709,119.30	3,773,725.78	12.00	107.99	
4,975.00	42.30	178.48	180.13	687.44	4,943.84	124.28 S	3.30 E	1,709,102.97	3,773,726.21	12.00	124.33	
5,000.00	45.30	178.48	180.13	705.48	4,961.88	141.58 S	3.76 E	1,709,085.67	3,773,726.67	12.00	141.63	
5,025.00	48.30	178.48	180.13	722.59	4,978.99	159.79 S	4.24 E	1,709,067.45	3,773,727.15	12.00	159.85	
5,050.00	51.30	178.48	180.13	738.72	4,995.12	178.88 S	4.75 E	1,709,048.37	3,773,727.66	12.00	178.94	
5,075.00	54.30	178.48	180.13	753.84	5,010.24	198.78 S	5.28 E	1,709,028.46	3,773,728.19	12.00	198.85	
5,100.00	57.30	178.48	180.13	767.89	5,024.29	219.45 S	5.83 E	1,709,007.80	3,773,728.74	12.00	219.53	
5,125.00	60.30	178.48	180.13	780.83	5,037.23	240.83 S	6.40 E	1,708,986.42	3,773,729.31	12.00	240.91	
5,150.00	63.30	178.48	180.13	792.65	5,049.05	262.85 S	6.98 E	1,708,964.40	3,773,729.89	12.00	262.94	
5,175.00	66.30	178.48	180.13	803.29	5,059.69	285.46 S	7.58 E	1,708,941.79	3,773,730.49	12.00	285.56	
5,200.00	69.30	178.48	180.13	812.73	5,069.13	308.60 S	8.20 E	1,708,918.65	3,773,731.11	12.00	308.70	
5,225.00	72.30	178.48	180.13	820.95	5,077.35	332.19 S	8.82 E	1,708,895.05	3,773,731.73	12.00	332.31	
5,250.00	75.30	178.48	180.13	827.93	5,084.33	356.19 S	9.46 E	1,708,871.06	3,773,732.37	12.00	356.32	
5,275.00	78.30	178.48	180.13	833.63	5,090.03	380.52 S	10.11 E	1,708,846.73	3,773,733.02	12.00	380.65	

Plan Report for Mc Bryde State 16-17-48 #1H - Plan 1

Measured Depth (ft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates Northing (ft)	Easting (ft)	Map Coordinates Northing (ft)	Easting (ft)	Dogleg Rate (°/100ft)	Vertical Section (ft)	Comments
5,289.15	80.00	178.48	180.13	836.30	5,092.70	394.42 S	10.48 E	1,708,832.83	3,773,733.39	12.00	394.55	Start 150.00 hold at 5289.15 MD
5,300.00	80.00	178.48	180.13	838.18	5,094.58	405.09 S	10.76 E	1,708,822.16	3,773,733.67	0.00	405.23	
5,400.00	80.00	178.48	180.13	855.55	5,111.95	503.54 S	13.37 E	1,708,723.71	3,773,736.28	0.00	503.72	
5,439.15	80.00	178.48	180.13	862.35	5,118.75	542.08 S	14.40 E	1,708,685.16	3,773,737.31	0.00	542.28	Start Build 12.00
5,450.00	81.30	178.48	180.13	864.11	5,120.51	552.78 S	14.68 E	1,708,674.47	3,773,737.59	12.00	552.98	
5,475.00	84.30	178.48	180.13	867.24	5,123.64	577.57 S	15.34 E	1,708,649.68	3,773,738.25	12.00	577.78	
5,500.00	87.30	178.48	180.13	869.07	5,125.47	602.49 S	16.00 E	1,708,624.76	3,773,738.91	12.00	602.71	
5,522.49	90.00	178.48	180.13	869.60	5,126.00	624.97 S	16.60 E	1,708,602.28	3,773,739.51	12.00	625.19	Start 3501.28 hold at 5522.49 MD
5,600.00	90.00	178.48	180.13	869.60	5,126.00	702.45 S	18.66 E	1,708,524.80	3,773,741.57	0.00	702.70	
5,700.00	90.00	178.48	180.13	869.60	5,126.00	802.42 S	21.31 E	1,708,424.83	3,773,744.22	0.00	802.70	
5,800.00	90.00	178.48	180.13	869.60	5,126.00	902.38 S	23.97 E	1,708,324.87	3,773,746.88	0.00	902.70	
5,900.00	90.00	178.48	180.13	869.60	5,126.00	1,002.34 S	26.62 E	1,708,224.91	3,773,749.53	0.00	1,002.70	
6,000.00	90.00	178.48	180.13	869.60	5,126.00	1,102.31 S	29.28 E	1,708,124.94	3,773,752.19	0.00	1,102.70	
6,100.00	90.00	178.48	180.13	869.60	5,126.00	1,202.27 S	31.93 E	1,708,024.98	3,773,754.84	0.00	1,202.70	
6,200.00	90.00	178.48	180.13	869.60	5,126.00	1,302.24 S	34.59 E	1,707,925.01	3,773,757.50	0.00	1,302.70	
6,300.00	90.00	178.48	180.13	869.60	5,126.00	1,402.20 S	37.24 E	1,707,825.05	3,773,760.15	0.00	1,402.70	
6,400.00	90.00	178.48	180.13	869.60	5,126.00	1,502.17 S	39.90 E	1,707,725.08	3,773,762.81	0.00	1,502.70	
6,500.00	90.00	178.48	180.13	869.60	5,126.00	1,602.13 S	42.55 E	1,707,625.12	3,773,765.46	0.00	1,602.70	
6,600.00	90.00	178.48	180.13	869.60	5,126.00	1,702.10 S	45.21 E	1,707,525.15	3,773,768.12	0.00	1,702.70	
6,700.00	90.00	178.48	180.13	869.60	5,126.00	1,802.06 S	47.86 E	1,707,425.19	3,773,770.77	0.00	1,802.70	
6,800.00	90.00	178.48	180.13	869.60	5,126.00	1,902.03 S	50.52 E	1,707,325.22	3,773,773.43	0.00	1,902.70	
6,900.00	90.00	178.48	180.13	869.60	5,126.00	2,001.99 S	53.17 E	1,707,225.26	3,773,776.08	0.00	2,002.70	
7,000.00	90.00	178.48	180.13	869.60	5,126.00	2,101.96 S	55.83 E	1,707,125.30	3,773,778.74	0.00	2,102.70	
7,100.00	90.00	178.48	180.13	869.60	5,126.00	2,201.92 S	58.48 E	1,707,025.33	3,773,781.39	0.00	2,202.70	
7,200.00	90.00	178.48	180.13	869.60	5,126.00	2,301.89 S	61.14 E	1,706,925.37	3,773,784.05	0.00	2,302.70	
7,300.00	90.00	178.48	180.13	869.60	5,126.00	2,401.85 S	63.79 E	1,706,825.40	3,773,786.70	0.00	2,402.70	
7,400.00	90.00	178.48	180.13	869.60	5,126.00	2,501.82 S	66.45 E	1,706,725.44	3,773,789.36	0.00	2,502.70	
7,500.00	90.00	178.48	180.13	869.60	5,126.00	2,601.78 S	69.10 E	1,706,625.47	3,773,792.01	0.00	2,602.70	
7,600.00	90.00	178.48	180.13	869.60	5,126.00	2,701.75 S	71.76 E	1,706,525.51	3,773,794.67	0.00	2,702.70	
7,700.00	90.00	178.48	180.13	869.60	5,126.00	2,801.71 S	74.41 E	1,706,425.54	3,773,797.32	0.00	2,802.70	
7,800.00	90.00	178.48	180.13	869.60	5,126.00	2,901.68 S	77.07 E	1,706,325.58	3,773,799.98	0.00	2,902.70	
7,900.00	90.00	178.48	180.13	869.60	5,126.00	3,001.64 S	79.72 E	1,706,225.61	3,773,802.63	0.00	3,002.70	
8,000.00	90.00	178.48	180.13	869.60	5,126.00	3,101.60 S	82.38 E	1,706,125.65	3,773,805.29	0.00	3,102.70	
8,100.00	90.00	178.48	180.13	869.60	5,126.00	3,201.57 S	85.03 E	1,706,025.69	3,773,807.94	0.00	3,202.70	
8,200.00	90.00	178.48	180.13	869.60	5,126.00	3,301.53 S	87.69 E	1,705,925.72	3,773,810.60	0.00	3,302.70	
8,300.00	90.00	178.48	180.13	869.60	5,126.00	3,401.50 S	90.34 E	1,705,825.76	3,773,813.25	0.00	3,402.70	
8,400.00	90.00	178.48	180.13	869.60	5,126.00	3,501.46 S	93.00 E	1,705,725.79	3,773,815.91	0.00	3,502.70	
8,500.00	90.00	178.48	180.13	869.60	5,126.00	3,601.43 S	95.65 E	1,705,625.83	3,773,818.56	0.00	3,602.70	

Plan Report for Mc Bryde State 16-17-48 #1H - Plan 1

Measured Depth (ft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (ft)	Vertical Depth (ft)	Local Coordinates Northing (ft)	Local Coordinates Easting (ft)	Map Coordinates Northing (ft)	Map Coordinates Easting (ft)	Dogleg Rate (°/100ft)	Vertical Section (ft)	Comments
8,600.00	90.00	178.48	180.13	869.60	5,126.00	3,701.39 S	98.31 E	1,705,525.86	3,773,821.22	0.00	3,702.70	
8,700.00	90.00	178.48	180.13	869.60	5,126.00	3,801.36 S	100.96 E	1,705,425.90	3,773,823.87	0.00	3,802.70	
8,800.00	90.00	178.48	180.13	869.60	5,126.00	3,901.32 S	103.62 E	1,705,325.93	3,773,826.53	0.00	3,902.70	
8,900.00	90.00	178.48	180.13	869.60	5,126.00	4,001.29 S	106.27 E	1,705,225.97	3,773,829.18	0.00	4,002.70	
9,000.00	90.00	178.48	180.13	869.60	5,126.00	4,101.25 S	108.93 E	1,705,126.00	3,773,831.84	0.00	4,102.70	
9,023.77	90.00	178.48	180.13	869.60	5,126.00	4,125.02 S	109.56 E	1,705,102.24	3,773,832.47	0.00	4,126.47	TD at 9023.77

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
4,622.49	4,622.49	0.00	0.00	Start Build 12.00
5,289.15	5,092.70	-394.42	10.48	Start 150.00 hold at 5289.15 MD
5,439.15	5,118.75	-542.08	14.40	Start Build 12.00
5,522.49	5,126.00	-624.97	16.60	Start 3501.28 hold at 5522.49 MD
9,023.77	5,126.00	-4,125.02	109.56	TD at 9023.77

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	Origin +E/-W (ft)	Start TVD (ft)
TD	No Target (Freehand)	178.48	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	9,023.77	Plan 1	MWD+SC

Plan Report for Mc Bryde State 16-17-48 #1H - Plan 1

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Mc Bryde State 16-1 - plan hits target center - Point	0.00	0.00	5,126.00	-4,125.02	109.56	1,705,102.24	3,773,832.47	38° 34' 20.064 N	102° 47' 35.300 W

Directional Difficulty Index

Average Dogleg over Survey:	1.00 °/100ft	Maximum Dogleg over Survey:	12.00 °/100ft at 5,289.15 ft
Net Tortousity applicable to Plans:	1.00 °/100ft	Directional Difficulty Index:	5.980

Audit Info

North Reference Sheet for Sec. 16-T17S-R48W (Grid) - Mc Bryde State 16-17-48 #1H - Wellbore #1

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

Vertical Depths are relative to Nomac 14 (25') @ 4256.40ft (Original Well Elev). Northing and Easting are relative to Mc Bryde State 16-17-48 #1H

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

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is 105° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:38° 26' 0.000 N°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 1.00003088

Grid Coordinates of Well: 1,709,227.25 ft N, 3,773,722.91 ft E

Geographical Coordinates of Well: 38° 35' 00.85" N, 102° 47' 35.17" W

Grid Convergence at Surface is: 1.66°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,023.77ft
the Bottom Hole Displacement is 4,126.47ft in the Direction of 178.48° (Grid).

Magnetic Convergence at surface is: -5.85° (16 May 2013, , BGGM2012)

