

Chama Oil & Minerals

Bent County, Colorado (NAD83)
Sec. 28-24S-49W (Grid)

HALLIBURTON
Sperry Drilling

WELL DETAILS: Brown 28-24-49 #1

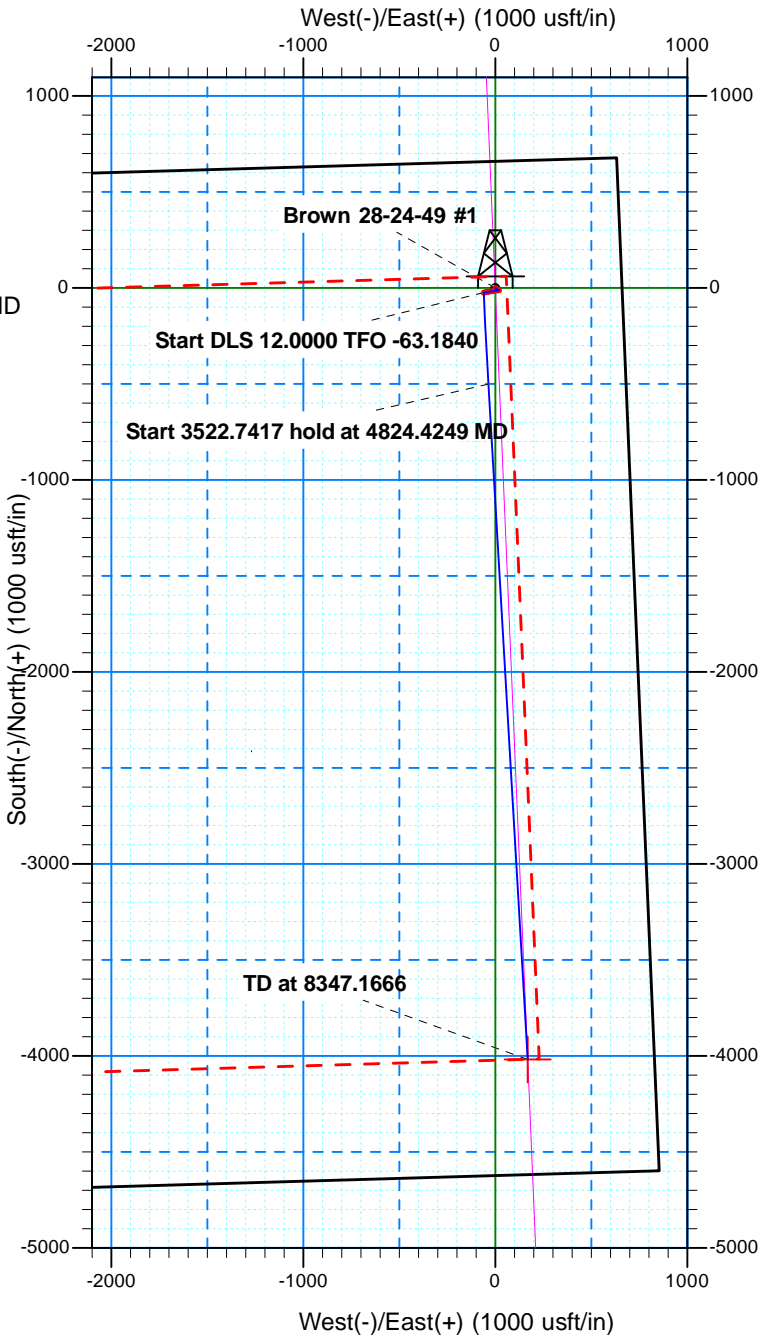
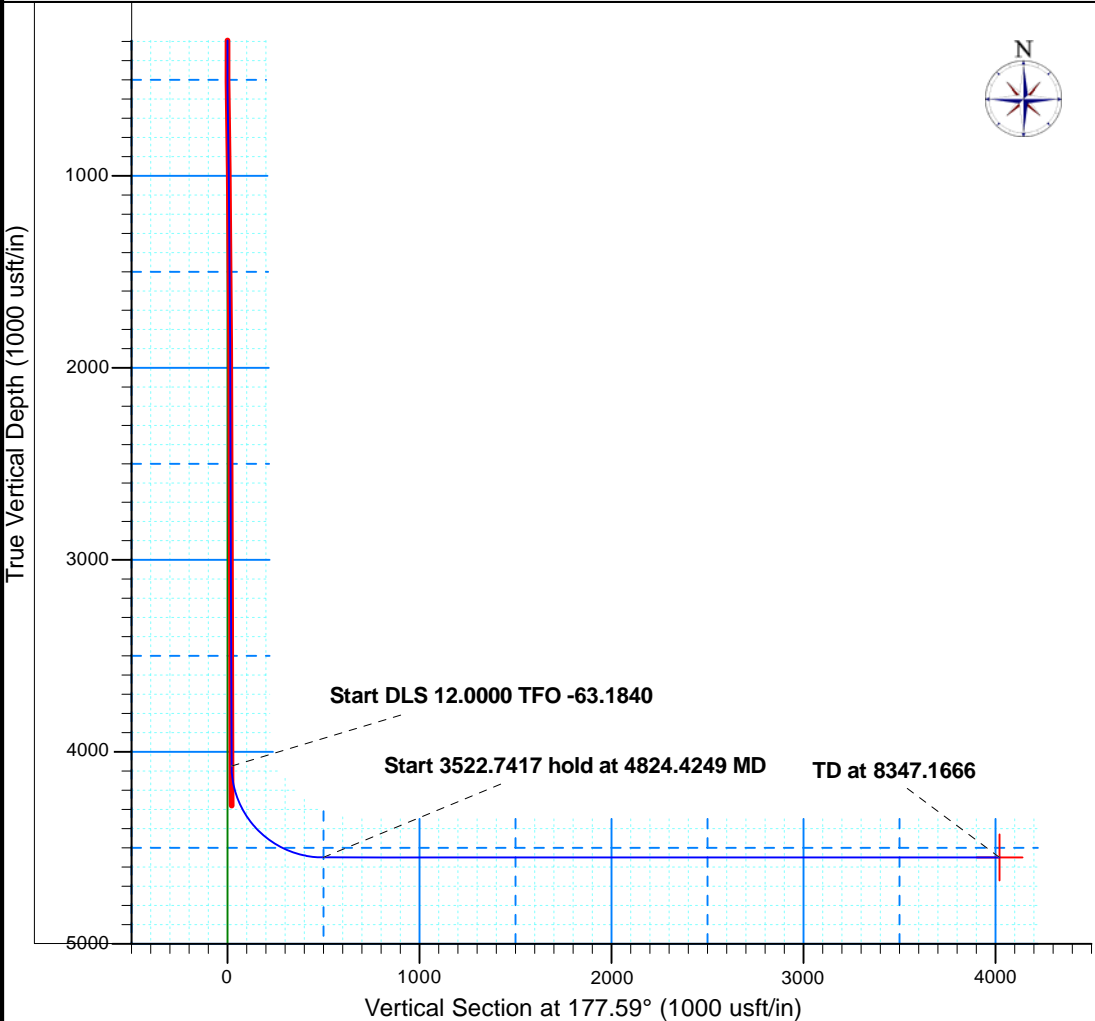
API#
Brown 28-24-49 #1
660 FNL, 660 FEL
Job#
Planned Horizontal
Plan 2
Unknown Rig

WELL @ 3946.0usft (Unknown Rig)
Ground Level: 3921.0

Northing 1473255.50 Easting 3747500.60 Latitude 37° 56' 16.440 N Longitude 102° 54' 27.720 W

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Annotation
1	4076.4	0.54	239.86	4074.6	-23.9	-59.2	0.00	0.00	21.4	Start DLS 12.0000 TFO -63.1840
2	4824.4	90.00	176.67	4550.0	-500.8	-35.5	12.00	-63.18	498.9	Start 3522.7417 hold at 4824.4249 MD
3	8347.2	90.00	176.67	4550.0	-4017.6	169.0	0.00	0.00	4021.2	TD at 8347.1666



Job#

Rig: Unknown Rig

Chama Oil & Minerals

Bent County, Colorado (NAD83) Sec. 28-24S-49W (Grid)

API#

Brown 28-24-49 #1 (660 FNL, 660 FEL)

Planned Horizontal

Plan: Plan 2

Sperry Drilling Services

Combo Report With Grid North & True North

19 April, 2013

Well Coordinates: 37° 56' 16.44" N
102° 54' 27.72" W

North American Datum 1983
Colorado Southern Zone
1,473,255.50 N
3,747,500.60 E

Ground Level: 3,921.00 usft

Local Coordinate Origin:

Centered on Well Brown 28-24-49 #1

Viewing Datum:

WELL @ 3946.0usft (Unknown Rig)

TVDs to System:

N

North Reference:

Grid

Unit System:

API - US Survey Feet

Version: 5000.1 Build: 56

HALLIBURTON

Plan Report for Brown 28-24-49 #1 - Plan 2

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
						Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)			
4,076.4	0.54	239.86	241.45	128.6	4,074.6	23.92 S	59.16 W	1,473,231.58	3,747,441.44	0.00	21.4	Start DLS 12.0000 TFO -63.1840
4,100.0	3.11	185.59	187.18	152.2	4,098.2	24.61 S	59.32 W	1,473,230.89	3,747,441.28	12.00	22.1	
4,200.0	15.08	178.46	180.05	250.7	4,196.7	40.37 S	59.23 W	1,473,215.14	3,747,441.37	12.00	37.8	
4,300.0	27.07	177.62	179.21	343.9	4,289.9	76.24 S	57.93 W	1,473,179.27	3,747,442.67	12.00	73.7	
4,400.0	39.07	177.27	178.86	427.5	4,373.5	130.65 S	55.48 W	1,473,124.85	3,747,445.12	12.00	128.2	
4,500.0	51.07	177.06	178.65	498.0	4,444.0	201.23 S	51.97 W	1,473,054.27	3,747,448.63	12.00	198.9	
4,600.0	63.07	176.92	178.51	552.3	4,498.3	284.90 S	47.56 W	1,472,970.60	3,747,453.04	12.00	282.7	
4,700.0	75.07	176.80	178.39	587.9	4,533.9	377.99 S	42.45 W	1,472,877.51	3,747,458.15	12.00	375.9	
4,800.0	87.07	176.70	178.29	603.4	4,549.4	476.44 S	36.86 W	1,472,779.06	3,747,463.74	12.00	474.5	
4,824.4	90.00	176.67	178.26	604.0	4,550.0	500.81 S	35.45 W	1,472,754.69	3,747,465.15	12.00	498.9	Start 3522.7417 hold at 4824.4249 MD
4,900.0	90.00	176.67	178.26	604.0	4,550.0	576.26 S	31.06 W	1,472,679.24	3,747,469.53	0.00	574.4	
5,000.0	90.00	176.67	178.26	604.0	4,550.0	676.09 S	25.26 W	1,472,579.41	3,747,475.34	0.00	674.4	
5,100.0	90.00	176.67	178.26	604.0	4,550.0	775.92 S	19.46 W	1,472,479.58	3,747,481.14	0.00	774.4	
5,200.0	90.00	176.67	178.26	604.0	4,550.0	875.76 S	13.66 W	1,472,379.75	3,747,486.94	0.00	874.4	
5,300.0	90.00	176.67	178.26	604.0	4,550.0	975.59 S	7.86 W	1,472,279.92	3,747,492.74	0.00	974.4	
5,400.0	90.00	176.67	178.26	604.0	4,550.0	1,075.42 S	2.05 W	1,472,180.08	3,747,498.55	0.00	1,074.4	
5,500.0	90.00	176.67	178.26	604.0	4,550.0	1,175.25 S	3.75 E	1,472,080.25	3,747,504.35	0.00	1,174.4	
5,600.0	90.00	176.67	178.26	604.0	4,550.0	1,275.08 S	9.55 E	1,471,980.42	3,747,510.15	0.00	1,274.4	
5,700.0	90.00	176.67	178.26	604.0	4,550.0	1,374.91 S	15.35 E	1,471,880.59	3,747,515.95	0.00	1,374.3	
5,800.0	90.00	176.67	178.26	604.0	4,550.0	1,474.75 S	21.16 E	1,471,780.76	3,747,521.76	0.00	1,474.3	
5,900.0	90.00	176.67	178.26	604.0	4,550.0	1,574.58 S	26.96 E	1,471,680.93	3,747,527.56	0.00	1,574.3	
6,000.0	90.00	176.67	178.26	604.0	4,550.0	1,674.41 S	32.76 E	1,471,581.09	3,747,533.36	0.00	1,674.3	
6,100.0	90.00	176.67	178.26	604.0	4,550.0	1,774.24 S	38.56 E	1,471,481.26	3,747,539.16	0.00	1,774.3	
6,200.0	90.00	176.67	178.26	604.0	4,550.0	1,874.07 S	44.37 E	1,471,381.43	3,747,544.97	0.00	1,874.3	
6,300.0	90.00	176.67	178.26	604.0	4,550.0	1,973.90 S	50.17 E	1,471,281.60	3,747,550.77	0.00	1,974.3	
6,400.0	90.00	176.67	178.26	604.0	4,550.0	2,073.73 S	55.97 E	1,471,181.77	3,747,556.57	0.00	2,074.3	
6,500.0	90.00	176.67	178.26	604.0	4,550.0	2,173.57 S	61.77 E	1,471,081.94	3,747,562.37	0.00	2,174.2	
6,600.0	90.00	176.67	178.26	604.0	4,550.0	2,273.40 S	67.58 E	1,470,982.11	3,747,568.17	0.00	2,274.2	
6,700.0	90.00	176.67	178.26	604.0	4,550.0	2,373.23 S	73.38 E	1,470,882.27	3,747,573.98	0.00	2,374.2	
6,800.0	90.00	176.67	178.26	604.0	4,550.0	2,473.06 S	79.18 E	1,470,782.44	3,747,579.78	0.00	2,474.2	
6,900.0	90.00	176.67	178.26	604.0	4,550.0	2,572.89 S	84.98 E	1,470,682.61	3,747,585.58	0.00	2,574.2	
7,000.0	90.00	176.67	178.26	604.0	4,550.0	2,672.72 S	90.79 E	1,470,582.78	3,747,591.38	0.00	2,674.2	
7,100.0	90.00	176.67	178.26	604.0	4,550.0	2,772.55 S	96.59 E	1,470,482.95	3,747,597.19	0.00	2,774.2	
7,200.0	90.00	176.67	178.26	604.0	4,550.0	2,872.39 S	102.39 E	1,470,383.12	3,747,602.99	0.00	2,874.2	
7,300.0	90.00	176.67	178.26	604.0	4,550.0	2,972.22 S	108.19 E	1,470,283.29	3,747,608.79	0.00	2,974.1	
7,400.0	90.00	176.67	178.26	604.0	4,550.0	3,072.05 S	114.00 E	1,470,183.45	3,747,614.59	0.00	3,074.1	
7,500.0	90.00	176.67	178.26	604.0	4,550.0	3,171.88 S	119.80 E	1,470,083.62	3,747,620.40	0.00	3,174.1	

Plan Report for Brown 28-24-49 #1 - Plan 2

Measured Depth (usft)	Inclination (°)	Grid Azimuth (°)	True Azimuth (°)	TVD below System (usft)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
						Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)			
7,600.0	90.00	176.67	178.26	604.0	4,550.0	3,271.71 S	125.60 E	1,469,983.79	3,747,626.20	0.00	3,274.1	
7,700.0	90.00	176.67	178.26	604.0	4,550.0	3,371.54 S	131.40 E	1,469,883.96	3,747,632.00	0.00	3,374.1	
7,800.0	90.00	176.67	178.26	604.0	4,550.0	3,471.38 S	137.21 E	1,469,784.13	3,747,637.80	0.00	3,474.1	
7,900.0	90.00	176.67	178.26	604.0	4,550.0	3,571.21 S	143.01 E	1,469,684.30	3,747,643.61	0.00	3,574.1	
8,000.0	90.00	176.67	178.26	604.0	4,550.0	3,671.04 S	148.81 E	1,469,584.46	3,747,649.41	0.00	3,674.0	
8,100.0	90.00	176.67	178.26	604.0	4,550.0	3,770.87 S	154.61 E	1,469,484.63	3,747,655.21	0.00	3,774.0	
8,200.0	90.00	176.67	178.26	604.0	4,550.0	3,870.70 S	160.41 E	1,469,384.80	3,747,661.01	0.00	3,874.0	
8,300.0	90.00	176.67	178.26	604.0	4,550.0	3,970.53 S	166.22 E	1,469,284.97	3,747,666.82	0.00	3,974.0	
8,347.2	90.00	176.67	178.26	604.0	4,550.0	4,017.62 S	168.95 E	1,469,237.88	3,747,669.55	0.00	4,021.2	TD at 8347.1666

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
4,076.4	4,074.6	-23.9	-59.2	Start DLS 12.0000 TFO -63.1840
4,824.4	4,550.0	-500.8	-35.5	Start 3522.7417 hold at 4824.4249 MD
8,347.2	4,550.0	-4,017.6	169.0	TD at 8347.1666

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Brown 28-24-49 #1 BHL	177.59	Slot	0.0	0.0	0.0

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
510.0	4,076.4	Professional Directional MWD	MWD+SC
4,076.4	8,347.2	Plan 2	

Plan Report for Brown 28-24-49 #1 - Plan 2

Design 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
Brown 28-24-49 #1 BH - plan hits target center - Point	0.00	358.41	4,550.0	-4,017.6	169.0	1,469,237.88	3,747,669.55	37° 55' 36.689 N	102° 54' 27.003 W

Directional Difficulty Index

Average Dogleg over Survey:	2.10 °/100usft	Maximum Dogleg over Survey:	12.00 °/100usft at 4,824.4 usft
Net Tortousity applicable to Plans:	2.10 °/100usft	Directional Difficulty Index:	5.902

Audit Info

North Reference Sheet for Sec. 28-24S-49W (Grid) - Brown 28-24-49 #1 - Planned Horizontal

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

Vertical Depths are relative to WELL @ 3946.0usft (Unknown Rig). Northing and Easting are relative to Brown 28-24-49 #1

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: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99994703

Grid Coordinates of Well: 1,473,255.50 usft N, 3,747,500.60 usft E

Geographical Coordinates of Well: 37° 56' 16.44" N, 102° 54' 27.72" W

Grid Convergence at Surface is: 1.59°

Based upon Minimum Curvature type calculations, at a Measured Depth of 8,347.17usft
the Bottom Hole Displacement is 4,021.17usft in the Direction of 177.59° (Grid).

Magnetic Convergence at surface is: -5.95° (19 April 2013, , BGGM2012)

