

Conoco Phillips Company

Arapahoe County, Colorado

Sec. 28-T4S-R64W

Tebo 29-2H

Plan C

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

28 February, 2014

Well Coordinates: 1,672,349.01 N, 3,263,300.52 E (39° 40' 32.43" N, 104° 33' 52.45" W)

Ground Level: 5,838.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Tebo 29-2H

RKB 24 ft @ 5862.00usft (H&P 280)

N

True

API - US Survey Feet - Custom

HALLIBURTON

Design Report for Tebo 29-2H - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
2,107.59	0.78	204.30	2,107.48	-17.86	-9.00	11.87	0.02
Tie-On to Gyro Surveys @ 2107.59 ft							
2,181.00	0.68	205.41	2,180.88	-18.70	-9.39	12.40	0.14
First Sperry MWD Survey @ 2181.00 ft							
2,212.00	0.75	200.75	2,211.88	-19.06	-9.55	12.60	0.29
2,307.00	1.32	260.92	2,306.86	-19.81	-10.85	14.01	1.21
2,402.00	1.39	264.18	2,401.84	-20.10	-13.07	16.26	0.11
2,497.00	2.17	288.14	2,496.79	-19.66	-15.93	19.00	1.12
2,592.00	2.43	290.31	2,591.72	-18.40	-19.53	22.33	0.29
2,687.00	2.61	291.13	2,686.62	-16.92	-23.43	25.94	0.19
2,782.00	2.92	290.26	2,781.51	-15.31	-27.72	29.89	0.33
2,877.00	2.29	272.70	2,876.42	-14.38	-31.89	33.84	1.06
2,972.00	2.25	264.36	2,971.34	-14.47	-35.64	37.56	0.35
3,067.00	2.49	263.44	3,066.26	-14.89	-39.54	41.48	0.26
3,162.00	1.88	277.02	3,161.19	-14.94	-43.14	45.03	0.84
3,256.00	1.94	282.16	3,255.14	-14.41	-46.23	47.99	0.19
3,351.00	1.98	282.13	3,350.08	-13.73	-49.40	51.00	0.04
3,446.00	2.18	279.43	3,445.02	-13.09	-52.79	54.24	0.23
3,541.00	2.36	277.82	3,539.95	-12.53	-56.51	57.81	0.20
3,636.00	2.47	277.57	3,634.86	-11.99	-60.48	61.63	0.12
3,731.00	1.56	277.03	3,729.80	-11.56	-63.79	64.83	0.96
3,826.00	1.56	275.71	3,824.77	-11.28	-66.36	67.31	0.04
3,921.00	1.55	278.47	3,919.73	-10.96	-68.92	69.78	0.08
4,016.00	1.56	277.66	4,014.70	-10.60	-71.47	72.24	0.03
4,111.00	1.62	282.60	4,109.66	-10.13	-74.06	74.71	0.16
4,206.00	1.53	287.29	4,204.62	-9.46	-76.58	77.09	0.17
4,300.00	1.94	274.42	4,298.58	-8.96	-79.37	79.75	0.60
4,395.00	2.32	273.03	4,393.52	-8.74	-82.89	83.18	0.40
4,490.00	1.60	267.72	4,488.46	-8.69	-86.14	86.38	0.78
4,585.00	1.61	265.11	4,583.42	-8.86	-88.79	89.02	0.08
4,680.00	1.62	289.26	4,678.39	-8.53	-91.39	91.53	0.71
4,775.00	1.60	297.07	4,773.35	-7.48	-93.84	93.77	0.23
4,870.00	1.17	275.88	4,868.32	-6.78	-95.98	95.76	0.70
4,965.00	1.14	269.95	4,963.30	-6.68	-97.89	97.63	0.13
5,060.00	1.68	277.64	5,058.27	-6.50	-100.22	99.89	0.60
5,155.00	1.69	279.26	5,153.23	-6.08	-102.98	102.55	0.05
5,250.00	1.50	287.12	5,248.20	-5.49	-105.55	104.98	0.30
5,345.00	2.35	278.09	5,343.14	-4.85	-108.67	107.95	0.95
5,439.00	2.60	277.47	5,437.05	-4.31	-112.69	111.82	0.27
5,534.00	2.25	268.55	5,531.97	-4.07	-116.69	115.73	0.54
5,629.00	2.19	261.77	5,626.90	-4.38	-120.35	119.39	0.28
5,724.00	2.27	270.41	5,721.83	-4.63	-124.03	123.05	0.36
5,819.00	2.67	282.68	5,816.74	-4.13	-128.07	126.95	0.70
5,914.00	2.52	279.96	5,911.64	-3.28	-132.29	130.97	0.20
6,009.00	1.99	255.78	6,006.57	-3.32	-135.94	134.58	1.13
6,104.00	2.10	226.46	6,101.51	-4.93	-138.80	137.67	1.10
6,199.00	1.63	246.68	6,196.46	-6.66	-141.31	140.43	0.84
6,294.00	2.03	277.86	6,291.41	-6.97	-144.21	143.34	1.11
6,389.00	2.18	284.21	6,386.35	-6.29	-147.63	146.60	0.29

Design Report for Tebo 29-2H - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
6,484.00	1.44	284.94	6,481.30	-5.54	-150.54	149.34	0.78
6,579.00	0.84	278.30	6,576.28	-5.13	-152.38	151.09	0.65
6,674.00	0.44	270.40	6,671.28	-5.03	-153.43	152.11	0.43
6,769.00	0.44	237.08	6,766.27	-5.23	-154.10	152.80	0.27
6,863.00	1.26	278.51	6,860.26	-5.27	-155.43	154.12	1.04
6,958.00	1.23	279.31	6,955.24	-4.95	-157.47	156.07	0.04
7,053.00	1.03	269.58	7,050.22	-4.79	-159.33	157.88	0.29
7,116.00	0.94	266.09	7,113.21	-4.83	-160.41	158.95	0.17
7,148.00	0.80	262.30	7,145.21	-4.88	-160.89	159.44	0.47
7,180.00	1.88	270.43	7,177.20	-4.90	-161.64	160.18	3.42
7,211.00	4.63	276.80	7,208.15	-4.75	-163.39	161.88	8.93
7,243.00	7.06	278.12	7,239.98	-4.32	-166.62	164.99	7.60
7,275.00	9.95	277.48	7,271.62	-3.68	-171.31	169.51	9.04
7,306.00	12.68	274.57	7,302.02	-3.06	-177.36	175.36	8.99
7,338.00	14.52	272.51	7,333.12	-2.61	-184.87	182.69	5.95
7,370.00	16.43	271.14	7,363.96	-2.34	-193.40	191.06	6.08
7,401.00	18.72	271.28	7,393.51	-2.14	-202.76	200.25	7.39
7,433.00	21.00	272.30	7,423.61	-1.80	-213.62	210.91	7.21
7,465.00	23.06	273.30	7,453.27	-1.21	-225.61	222.62	6.54
7,496.00	26.01	273.17	7,481.46	-0.48	-238.46	235.17	9.52
7,528.00	28.86	273.42	7,509.86	0.37	-253.18	249.54	8.91
7,559.00	31.51	273.09	7,536.66	1.25	-268.74	264.73	8.57
7,591.00	33.93	274.28	7,563.58	2.37	-286.00	281.56	7.82
7,623.00	36.92	274.37	7,589.65	3.77	-304.49	299.56	9.35
7,654.00	39.41	274.91	7,614.02	5.32	-323.58	318.12	8.10
7,686.00	42.61	275.18	7,638.17	7.17	-344.50	338.43	10.02
7,718.00	46.65	275.04	7,660.93	9.17	-366.88	360.16	12.63
7,749.00	50.69	275.12	7,681.40	11.23	-390.06	382.67	13.03
7,781.00	54.24	274.35	7,700.90	13.32	-415.35	407.25	11.26
7,812.00	58.40	273.18	7,718.08	15.01	-441.08	432.34	13.78
7,844.00	61.74	272.45	7,734.05	16.36	-468.78	459.41	10.62
7,876.00	64.38	271.54	7,748.54	17.35	-497.29	487.35	8.63
7,907.00	66.35	270.55	7,761.47	17.87	-525.46	515.04	6.99
7,939.00	69.29	269.95	7,773.55	17.99	-555.09	544.23	9.35
7,971.00	72.81	270.00	7,783.94	17.98	-585.35	574.07	11.00
8,002.00	76.86	270.73	7,792.04	18.17	-615.26	603.52	13.26
8,034.00	81.38	270.85	7,798.08	18.61	-646.67	634.42	14.13
8,065.00	84.06	270.71	7,802.01	19.03	-677.42	664.66	8.66
8,097.00	86.79	270.73	7,804.56	19.43	-709.31	696.04	8.53
8,109.00	87.47	270.58	7,805.16	19.56	-721.30	707.83	5.80
8,306.00	89.14	268.66	7,810.99	18.26	-918.19	902.16	1.29
8,400.00	89.07	268.22	7,812.46	15.70	-1,012.14	995.21	0.47
8,495.00	91.17	268.65	7,812.26	13.10	-1,107.10	1,089.26	2.26
8,527.00	91.11	268.50	7,811.62	12.31	-1,139.09	1,120.93	0.50
8,590.00	89.57	269.64	7,811.25	11.28	-1,202.07	1,183.20	3.04
8,685.00	88.83	271.16	7,812.58	11.95	-1,297.06	1,276.73	1.78
8,780.00	87.41	275.46	7,815.69	17.43	-1,391.82	1,369.24	4.76
8,875.00	86.66	276.40	7,820.61	27.23	-1,486.19	1,460.63	1.26
8,970.00	86.85	276.01	7,825.99	37.48	-1,580.48	1,551.87	0.46
9,065.00	87.59	274.93	7,830.59	46.52	-1,674.93	1,643.47	1.38
9,160.00	87.78	273.85	7,834.43	53.79	-1,769.58	1,735.56	1.15

Design Report for Tebo 29-2H - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,255.00	88.70	271.91	7,837.35	58.56	-1,864.41	1,828.25	2.26
9,350.00	90.80	270.91	7,837.76	60.90	-1,959.37	1,921.48	2.45
9,444.00	88.39	269.22	7,838.43	61.00	-2,053.36	2,014.12	3.13
9,539.00	90.62	269.75	7,839.25	60.15	-2,148.34	2,107.91	2.41
9,634.00	88.70	268.40	7,839.81	58.62	-2,243.32	2,201.81	2.47
9,729.00	89.14	267.93	7,841.60	55.58	-2,338.26	2,295.91	0.68
9,824.00	86.85	267.30	7,844.93	51.63	-2,433.11	2,390.08	2.50
9,919.00	86.91	268.11	7,850.10	47.83	-2,527.89	2,484.16	0.85
10,014.00	86.66	268.38	7,855.42	44.92	-2,622.70	2,578.11	0.39
10,109.00	87.84	267.56	7,859.98	41.56	-2,717.53	2,672.17	1.51
10,204.00	92.35	269.39	7,859.82	39.03	-2,812.46	2,766.19	5.12
10,299.00	92.53	270.25	7,855.78	38.74	-2,907.38	2,859.81	0.92
10,394.00	92.22	271.82	7,851.84	40.45	-3,002.28	2,953.08	1.68
10,488.00	89.81	273.60	7,850.18	44.89	-3,096.14	3,044.88	3.19
10,583.00	89.81	275.93	7,850.49	52.78	-3,190.81	3,136.88	2.45
10,678.00	88.83	272.89	7,851.62	60.09	-3,285.51	3,229.02	3.36
10,773.00	90.93	273.46	7,851.82	65.35	-3,380.36	3,321.65	2.29
10,868.00	90.06	271.85	7,851.00	69.75	-3,475.25	3,414.46	1.93
10,963.00	85.98	270.03	7,854.28	71.31	-3,570.15	3,507.77	4.70
11,026.00	88.52	270.03	7,857.30	71.34	-3,633.08	3,569.79	4.03
11,090.00	90.56	271.19	7,857.82	72.02	-3,697.07	3,632.76	3.67
11,153.00	90.00	270.95	7,857.51	73.20	-3,760.05	3,694.67	0.97
11,248.00	89.38	270.40	7,858.02	74.32	-3,855.05	3,788.13	0.87
11,343.00	88.77	270.36	7,859.56	74.95	-3,950.03	3,881.66	0.64
11,438.00	88.89	273.18	7,861.50	77.88	-4,044.96	3,974.76	2.97
11,532.00	88.89	276.77	7,863.32	86.03	-4,138.57	4,065.68	3.82
11,627.00	88.46	280.28	7,865.52	100.11	-4,232.48	4,155.91	3.72
11,722.00	86.60	281.69	7,869.61	118.19	-4,325.65	4,244.73	2.46
11,817.00	86.73	283.35	7,875.14	138.75	-4,418.23	4,332.56	1.75
11,912.00	87.84	278.75	7,879.64	156.93	-4,511.33	4,421.30	4.98
12,007.00	89.75	276.93	7,881.64	169.88	-4,605.42	4,511.89	2.78
12,102.00	89.14	273.90	7,882.56	178.85	-4,699.98	4,603.61	3.25
12,196.00	88.64	270.96	7,884.38	182.83	-4,793.86	4,695.50	3.17
12,291.00	90.25	270.85	7,885.30	184.33	-4,888.84	4,788.89	1.70
12,371.00	90.49	269.50	7,884.78	184.58	-4,968.84	4,867.72	1.71
Final Sperry MWD Survey @ 12371.00 ft							
12,436.00	90.55	269.25	7,884.19	183.87	-5,033.83	4,931.91	0.40
Projection to TD @ 12436.00 ft							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,107.59	2,107.48	-17.86	-9.00	Tie-On to Gyro Surveys @ 2107.59 ft
2,181.00	2,180.88	-18.70	-9.39	First Sperry MWD Survey @ 2181.00 ft
12,371.00	7,884.78	184.58	-4,968.84	Final Sperry MWD Survey @ 12371.00 ft
12,436.00	7,884.19	183.87	-5,033.83	Projection to TD @ 12436.00 ft

Design Report for Tebo 29-2H - Actual Field Surveys

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	260.36	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
73.97	2,107.59	Surface_Gyro	NS-GYRO-MS
2,181.00	8,970.00	Vertical & Build_Sperry MWD Surveys	MWD
9,065.00	12,436.00	Lateral_Sperry MWD Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,117.00	9 5/8"		9-5/8	13-1/2

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
Tebo 29-2H_SB	0.00	0.00	0.00	0.00	0.00	1,672,349.01	3,263,300.52	39° 40' 32.430 N	104° 33' 52.448 W
- actual wellpath misses target center by 2107.57usft at 2107.59usft MD (2107.48 TVD, -17.86 N, -9.00 E)									
- Polygon									
Point 1				0.00	-2,816.18	-768.26	1,669,525.10	3,262,561.31	
Point 2				0.00	-2,754.45	-2,934.28	1,669,564.53	3,260,394.80	
Point 3				0.00	-2,700.47	-5,079.73	1,669,596.41	3,258,248.94	
Point 4				0.00	-527.57	-5,063.67	1,671,769.33	3,258,242.62	
Point 5				0.00	1,653.40	-5,037.20	1,673,950.43	3,258,246.64	
Point 6				0.00	1,523.09	-668.80	1,673,865.11	3,262,616.08	
Point 7				0.00	-620.69	-723.76	1,671,720.91	3,262,583.20	
Tebo 29-2H_SL	0.00	0.00	0.00	0.00	0.00	1,672,349.01	3,263,300.52	39° 40' 32.430 N	104° 33' 52.448 W
- actual wellpath misses target center by 2107.57usft at 2107.59usft MD (2107.48 TVD, -17.86 N, -9.00 E)									
- Polygon									
Point 1				0.00	-3,276.18	-308.26	1,669,069.87	3,263,026.02	
Point 2				0.00	-3,214.45	-2,934.28	1,669,104.56	3,260,399.54	
Point 3				0.00	-3,160.47	-5,539.73	1,669,131.71	3,257,793.71	
Point 4				0.00	-527.57	-5,523.67	1,671,764.60	3,257,782.65	
Point 5				0.00	2,113.36	-5,497.21	1,674,405.62	3,257,781.92	
Point 6				0.00	1,983.09	-208.84	1,674,329.81	3,263,071.28	
Point 7				0.00	-620.69	-263.76	1,671,725.64	3,263,043.17	
Tebo 29-2H_Rev C0_E	0.00	0.00	7,880.00	121.82	-5,037.13	1,672,418.95	3,258,262.48	39° 40' 33.629 N	104° 34' 56.870 W
- actual wellpath misses target center by 62.28usft at 12436.00usft MD (7884.19 TVD, 183.87 N, -5033.83 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.69 °/100usft	Maximum Dogleg over Survey:	14.13 °/100usft at 8,034.00 usft
Net Tortousity applicable to Plans:	0.94 °/100usft	Directional Difficulty Index:	6.225

Audit Info

North Reference Sheet for Sec. 28-T4S-R64W - Tebo 29-2H - Plan C

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

Vertical Depths are relative to RKB 24 ft @ 5862.00usft (H&P 280). Northing and Easting are relative to Tebo 29-2H

Coordinate System is US State Plane 1983, Colorado Central 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:39° 45' 0.000 N°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99998614

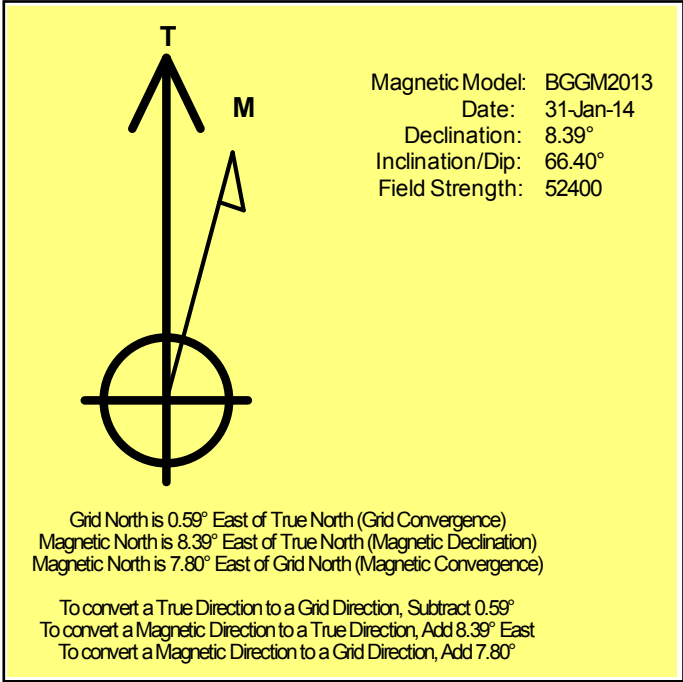
Grid Coordinates of Well: 1,672,349.01 usft N, 3,263,300.52 usft E

Geographical Coordinates of Well: 39° 40' 32.43" N, 104° 33' 52.45" W

Grid Convergence at Surface is: 0.59°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,436.00usft the Bottom Hole Displacement is 5,037.19usft in the Direction of 272.09° (True).

Magnetic Convergence at surface is: -7.80° (31 January 2014, , BGGM2013)



Site: Sec. 28-T4S-R64W
Well: Tebo 29-2H

LEGEND

- Actual Field Surveys
- Tebo 29-2H, Plan C

