

Conoco Phillips Company

Arapahoe County, Colorado

Sec. 4-T5S-R64W

Tebo 4-1H

Plan A

Plan: Plan A Rev 1 (Pilot Hole)

Sperry Drilling Services Proposal Report

10 May, 2013

Well Coordinates: 1,659,445.49 N, 3,263,185.27 E (39° 38' 24.92" N, 104° 33' 55.62" W)

Ground Level: 5,884.00 ft

Local Coordinate Origin:

Centered on Well Tebo 4-1H

Viewing Datum:

RKB 24 ft @ 5908.00ft (H&P 280)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Version: 2003.16 Build: 431

HALLIBURTON

Plan Report for Tebo 4-1H - Plan A Rev 1 (Pilot Hole)

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,825.00	0.00	0.00	1,825.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills Aquifer										
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,963.00	0.00	0.00	1,963.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pierre Shale (Base Fox Hills)										
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge 2200.00 ft										
2,300.00	2.00	180.00	2,299.98	-1.75	0.00	1.75	2.00	2.00	0.00	180.00
2,350.00	3.00	180.00	2,349.93	-3.93	0.00	3.93	2.00	2.00	0.00	0.00
End Nudge 2350.00 ft										
2,400.00	3.00	180.00	2,399.86	-6.54	0.00	6.54	0.00	0.00	0.00	0.00
2,500.00	3.00	180.00	2,499.73	-11.78	0.00	11.78	0.00	0.00	0.00	0.00
2,600.00	3.00	180.00	2,599.59	-17.01	0.00	17.01	0.00	0.00	0.00	0.00
2,700.00	3.00	180.00	2,699.45	-22.24	0.00	22.24	0.00	0.00	0.00	0.00
2,800.00	3.00	180.00	2,799.31	-27.48	0.00	27.48	0.00	0.00	0.00	0.00
2,900.00	3.00	180.00	2,899.18	-32.71	0.00	32.71	0.00	0.00	0.00	0.00
3,000.00	3.00	180.00	2,999.04	-37.94	0.00	37.94	0.00	0.00	0.00	0.00
Hold Inc 3.00°, Azi 180.00°										
3,100.00	3.00	180.00	3,098.90	-43.18	0.00	43.18	0.00	0.00	0.00	0.00
3,200.00	3.00	180.00	3,198.77	-48.41	0.00	48.41	0.00	0.00	0.00	0.00
3,300.00	3.00	180.00	3,298.63	-53.65	0.00	53.65	0.00	0.00	0.00	0.00
3,400.00	3.00	180.00	3,398.49	-58.88	0.00	58.88	0.00	0.00	0.00	0.00
3,500.00	3.00	180.00	3,498.36	-64.11	0.00	64.11	0.00	0.00	0.00	0.00
3,600.00	3.00	180.00	3,598.22	-69.35	0.00	69.35	0.00	0.00	0.00	0.00
3,700.00	3.00	180.00	3,698.08	-74.58	0.00	74.58	0.00	0.00	0.00	0.00
3,800.00	3.00	180.00	3,797.94	-79.81	0.00	79.81	0.00	0.00	0.00	0.00
3,900.00	3.00	180.00	3,897.81	-85.05	0.00	85.05	0.00	0.00	0.00	0.00
4,000.00	3.00	180.00	3,997.67	-90.28	0.00	90.28	0.00	0.00	0.00	0.00
4,100.00	3.00	180.00	4,097.53	-95.51	0.00	95.51	0.00	0.00	0.00	0.00
4,200.00	3.00	180.00	4,197.40	-100.75	0.00	100.75	0.00	0.00	0.00	0.00
4,300.00	3.00	180.00	4,297.26	-105.98	0.00	105.98	0.00	0.00	0.00	0.00
4,400.00	3.00	180.00	4,397.12	-111.21	0.00	111.21	0.00	0.00	0.00	0.00
4,500.00	3.00	180.00	4,496.98	-116.45	0.00	116.45	0.00	0.00	0.00	0.00
4,600.00	3.00	180.00	4,596.85	-121.68	0.00	121.68	0.00	0.00	0.00	0.00
4,700.00	3.00	180.00	4,696.71	-126.92	0.00	126.92	0.00	0.00	0.00	0.00
4,800.00	3.00	180.00	4,796.57	-132.15	0.00	132.15	0.00	0.00	0.00	0.00
4,900.00	3.00	180.00	4,896.44	-137.38	0.00	137.38	0.00	0.00	0.00	0.00

Plan Report for Tebo 4-1H - Plan A Rev 1 (Pilot Hole)

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
5,000.00	3.00	180.00	4,996.30	-142.62	0.00	142.62	0.00	0.00	0.00	0.00
5,100.00	3.00	180.00	5,096.16	-147.85	0.00	147.85	0.00	0.00	0.00	0.00
5,200.00	3.00	180.00	5,196.03	-153.08	0.00	153.08	0.00	0.00	0.00	0.00
5,300.00	3.00	180.00	5,295.89	-158.32	0.00	158.32	0.00	0.00	0.00	0.00
5,400.00	3.00	180.00	5,395.75	-163.55	0.00	163.55	0.00	0.00	0.00	0.00
5,500.00	3.00	180.00	5,495.61	-168.78	0.00	168.78	0.00	0.00	0.00	0.00
5,600.00	3.00	180.00	5,595.48	-174.02	0.00	174.02	0.00	0.00	0.00	0.00
5,700.00	3.00	180.00	5,695.34	-179.25	0.00	179.25	0.00	0.00	0.00	0.00
5,800.00	3.00	180.00	5,795.20	-184.49	0.00	184.49	0.00	0.00	0.00	0.00
5,900.00	3.00	180.00	5,895.07	-189.72	0.00	189.72	0.00	0.00	0.00	0.00
6,000.00	3.00	180.00	5,994.93	-194.95	0.00	194.95	0.00	0.00	0.00	0.00
6,100.00	3.00	180.00	6,094.79	-200.19	0.00	200.19	0.00	0.00	0.00	0.00
6,200.00	3.00	180.00	6,194.66	-205.42	0.00	205.42	0.00	0.00	0.00	0.00
6,300.00	3.00	180.00	6,294.52	-210.65	0.00	210.65	0.00	0.00	0.00	0.00
6,400.00	3.00	180.00	6,394.38	-215.89	0.00	215.89	0.00	0.00	0.00	0.00
6,500.00	3.00	180.00	6,494.24	-221.12	0.00	221.12	0.00	0.00	0.00	0.00
6,600.00	3.00	180.00	6,594.11	-226.35	0.00	226.35	0.00	0.00	0.00	0.00
6,700.00	3.00	180.00	6,693.97	-231.59	0.00	231.59	0.00	0.00	0.00	0.00
6,800.00	3.00	180.00	6,793.83	-236.82	0.00	236.82	0.00	0.00	0.00	0.00
Begin Drop 6800.00 ft										
6,900.00	1.00	180.00	6,893.77	-240.31	0.00	240.31	2.00	-2.00	0.00	180.00
6,950.00	0.00	0.00	6,943.76	-240.75	0.00	240.75	2.00	-2.00	0.00	-180.00
End Drop 6950.00 ft										
7,000.00	0.00	0.00	6,993.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,093.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,193.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,293.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
7,400.00	0.00	0.00	7,393.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,493.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
7,570.24	0.00	0.00	7,564.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Sharon Springs Shale										
7,600.00	0.00	0.00	7,593.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
7,609.24	0.00	0.00	7,603.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Niobrara Fm.										
7,667.24	0.00	0.00	7,661.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Niobrara B										
7,700.00	0.00	0.00	7,693.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
7,719.24	0.00	0.00	7,713.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Niobrara C										
7,787.24	0.00	0.00	7,781.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Niobrara D Chalk										
7,800.00	0.00	0.00	7,793.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
7,900.00	0.00	0.00	7,893.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
7,914.24	0.00	0.00	7,908.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Fort Hays Limestone										
7,943.24	0.00	0.00	7,937.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Carlisle Shale										
8,000.00	0.00	0.00	7,993.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
8,012.24	0.00	0.00	8,006.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Greenhorn										
8,100.00	0.00	0.00	8,093.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
8,200.00	0.00	0.00	8,193.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
8,300.00	0.00	0.00	8,293.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
8,341.24	0.00	0.00	8,335.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
D Sand										
8,366.24	0.00	0.00	8,360.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Mowry Shale										
8,400.00	0.00	0.00	8,393.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00

Plan Report for Tebo 4-1H - Plan A Rev 1 (Pilot Hole)

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
8,500.00	0.00	0.00	8,493.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
8,527.24	0.00	0.00	8,521.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Plainview										
8,600.00	0.00	0.00	8,593.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
8,691.24	0.00	0.00	8,685.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Morrison										
8,700.00	0.00	0.00	8,693.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
8,800.00	0.00	0.00	8,793.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
8,900.00	0.00	0.00	8,893.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
9,000.00	0.00	0.00	8,993.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
9,024.24	0.00	0.00	9,018.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Lykins										
9,100.00	0.00	0.00	9,093.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
9,200.00	0.00	0.00	9,193.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
9,277.24	0.00	0.00	9,271.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Forelle										
9,300.00	0.00	0.00	9,293.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
9,400.00	0.00	0.00	9,393.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
9,446.24	0.00	0.00	9,440.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Lyons										
9,500.00	0.00	0.00	9,493.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
9,600.00	0.00	0.00	9,593.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
9,700.00	0.00	0.00	9,693.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
9,800.00	0.00	0.00	9,793.76	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
9,806.24	0.00	0.00	9,800.00	-240.75	0.00	240.75	0.00	0.00	0.00	0.00
Total Depth 9806.24 ft										

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,200.00	2,200.00	0.00	0.00	Begin Nudge 2200.00 ft
2,350.00	2,349.93	-3.93	0.00	End Nudge 2350.00 ft
3,000.00	2,999.04	-37.94	0.00	Hold Inc 3.00°, Azi 180.00°
6,800.00	6,793.83	-236.82	0.00	Begin Drop 6800.00 ft
6,950.00	6,943.76	-240.75	0.00	End Drop 6950.00 ft
9,806.24	9,800.00	-240.75	0.00	Total Depth 9806.24 ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
TD	No Target (Freehand)	180.00	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	9,806.24	Plan A Rev 1 (Pilot Hole)	MWD

Plan Report for Tebo 4-1H - Plan A Rev 1 (Pilot Hole)

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,825.00	1,825.00	Fox Hills Aquifer		0.00	
1,963.00	1,963.00	Pierre Shale (Base Fox Hills)			
7,570.24	7,564.00	Sharon Springs Shale			
7,609.24	7,603.00	Niobrara Fm.			
7,667.24	7,661.00	Niobrara B			
7,719.24	7,713.00	Niobrara C			
7,787.24	7,781.00	Niobrara D Chalk			
7,914.24	7,908.00	Fort Hays Limestone			
7,943.24	7,937.00	Carlisle Shale			
8,012.24	8,006.00	Greenhorn			
8,341.24	8,335.00	D Sand			
8,366.24	8,360.00	Mowry Shale			
8,527.24	8,521.00	Plainview			
8,691.24	8,685.00	Morrison			
9,024.24	9,018.00	Lykins			
9,277.24	9,271.00	Forelle			
9,446.24	9,440.00	Lyons			
9,806.24	9,800.00	Pilot Hole TD			

Targets associated with this wellbore

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Tebo 4-1H PAR1_BHL tgt	7,665.00	-309.21	4,560.08	Point
Sec 4-T5S-R64W SL	0.00	0.00	0.00	Polygon
Sec 4-T5S-R64W SB (460)	0.00	0.00	0.00	Polygon

North Reference Sheet for Sec. 4-T5S-R64W - Tebo 4-1H - Plan A

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 @ 5908.00ft (H&P 280). Northing and Easting are relative to Tebo 4-1H
 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 -105.50°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:39° 45' 0.000 N°
 False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99998013
 Grid Coordinates of Well: 1,659,445.49 ft N, 3,263,185.27 ft E
 Geographical Coordinates of Well: 39° 38' 24.92" N, 104° 33' 55.62" W
 Grid Convergence at Surface is: 0.59°

Based upon Minimum Curvature type calculations, at a Measured Depth of 9,806.24ft
 the Bottom Hole Displacement is 240.75ft in the Direction of 180.00° (True).
 Magnetic Convergence at surface is: -7.90° (30 June 2013, , BGGM2012)

