

Conoco Phillips Company

Arapahoe County, Colorado

Sec. 34-T4S-R64W

Grimm 34-4H

Actual Field Surveys

Survey: Pilot Hole

Sperry Drilling Services

Standard Report

18 September, 2012

Well Coordinates: 1,664,126.41 N, 3,269,515.04 E (39° 39' 10.53" N, 104° 32' 34.08" W)

Ground Level: 5,772.00 ft

Local Coordinate Origin:

Centered on Well Grimm 34-4H

Viewing Datum:

RKB 24 ft @ 5796.00ft (H&P 280)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Version: 2003.16 Build: 43I

HALLIBURTON

Survey Report for Grimm 34-4H - Pilot Hole

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
2,080.00	0.00	0.00	2,080.00	0.00	0.00	0.00	0.00
Tie-On to Surface Casing (Assuming Vertical) @ 2080.00 ft							
2,198.00	1.99	70.95	2,197.98	0.67	1.94	1.05	1.69
First Sperry MWD Survey (Pilot Hole) @ 2198.00 ft							
2,293.00	1.08	81.15	2,292.94	1.34	4.38	2.20	1.00
2,388.00	0.37	137.30	2,387.93	1.26	5.47	2.34	0.98
2,483.00	0.53	132.40	2,482.93	0.74	6.01	1.93	0.17
2,578.00	1.12	196.22	2,577.92	-0.45	6.07	0.78	1.06
2,673.00	1.21	179.95	2,672.90	-2.35	5.81	-1.13	0.36
2,768.00	1.80	196.78	2,767.87	-4.78	5.38	-3.59	0.77
2,863.00	1.36	206.07	2,862.83	-7.22	4.46	-6.17	0.53
2,958.00	1.39	199.34	2,957.81	-9.32	3.58	-8.41	0.17
3,053.00	1.51	201.90	3,052.78	-11.57	2.73	-10.78	0.14
3,148.00	1.56	196.15	3,147.74	-13.97	1.90	-13.30	0.17
3,243.00	1.49	193.94	3,242.71	-16.41	1.25	-15.82	0.10
3,338.00	1.56	212.28	3,337.68	-18.70	0.26	-18.27	0.52
3,433.00	1.33	224.59	3,432.65	-20.58	-1.21	-20.40	0.41
3,528.00	1.30	227.09	3,527.62	-22.10	-2.77	-22.21	0.07
3,623.00	1.39	217.79	3,622.59	-23.75	-4.26	-24.12	0.25
3,719.00	0.92	216.09	3,718.57	-25.29	-5.43	-25.86	0.49
3,813.00	0.88	190.12	3,812.56	-26.61	-6.00	-27.27	0.43
3,908.00	0.71	186.91	3,907.55	-27.91	-6.20	-28.59	0.18
4,003.00	2.05	214.10	4,002.53	-29.90	-7.23	-30.75	1.53
4,098.00	1.62	197.18	4,097.48	-32.59	-8.57	-33.65	0.72
4,194.00	1.39	183.31	4,193.44	-35.05	-9.04	-36.16	0.45
4,288.00	1.52	166.52	4,287.41	-37.40	-8.82	-38.41	0.47
4,384.00	1.01	168.77	4,383.39	-39.47	-8.36	-40.35	0.53
4,479.00	0.33	239.90	4,478.38	-40.43	-8.43	-41.30	1.01
4,574.00	0.33	128.26	4,573.38	-40.74	-8.45	-41.60	0.57
4,669.00	0.41	3.95	4,668.38	-40.57	-8.21	-41.39	0.69
4,764.00	0.37	163.32	4,763.38	-40.52	-8.10	-41.32	0.81
4,859.00	0.79	286.87	4,858.38	-40.62	-8.64	-41.53	1.10
4,954.00	0.11	359.24	4,953.38	-40.34	-9.27	-41.38	0.80
5,049.00	0.11	95.95	5,048.38	-40.26	-9.18	-41.29	0.17
5,144.00	0.59	260.30	5,143.37	-40.35	-9.57	-41.45	0.73
5,239.00	0.40	250.38	5,238.37	-40.55	-10.37	-41.80	0.22
5,334.00	0.46	258.23	5,333.37	-40.74	-11.05	-42.13	0.09
5,429.00	0.68	253.29	5,428.36	-40.98	-11.96	-42.55	0.24
5,524.00	0.63	257.18	5,523.36	-41.25	-13.01	-43.03	0.07
5,619.00	0.28	146.33	5,618.36	-41.56	-13.39	-43.41	0.82
5,714.00	0.91	346.36	5,713.35	-41.02	-13.44	-42.89	1.24
5,809.00	0.42	70.13	5,808.35	-40.17	-13.29	-42.03	1.01
5,904.00	0.54	115.94	5,903.34	-40.25	-12.56	-41.96	0.41
5,999.00	0.73	347.65	5,998.34	-39.85	-12.29	-41.51	1.21
6,094.00	0.75	344.59	6,093.33	-38.66	-12.59	-40.41	0.05
6,189.00	0.73	341.55	6,188.33	-37.49	-12.94	-39.33	0.05
6,284.00	0.18	4.63	6,283.32	-36.77	-13.12	-38.66	0.60
6,379.00	0.40	18.32	6,378.32	-36.30	-13.01	-38.18	0.24
6,474.00	0.26	331.65	6,473.32	-35.80	-13.00	-37.69	0.31
6,569.00	0.13	293.79	6,568.32	-35.57	-13.20	-37.50	0.19

Survey Report for Grimm 34-4H - Pilot Hole

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
6,664.00	0.33	283.74	6,663.32	-35.46	-13.57	-37.47	0.21
6,758.00	0.31	337.48	6,757.32	-35.16	-13.93	-37.25	0.31
6,854.00	0.07	322.64	6,853.32	-34.87	-14.06	-36.99	0.25
6,948.00	0.57	307.75	6,947.31	-34.54	-14.47	-36.75	0.53
7,044.00	0.60	321.20	7,043.31	-33.86	-15.16	-36.22	0.15
7,138.00	0.98	312.79	7,137.30	-32.93	-16.06	-35.49	0.42
7,233.00	1.14	1.91	7,232.29	-31.43	-16.62	-34.14	0.94
7,328.00	1.09	346.01	7,327.27	-29.61	-16.81	-32.39	0.33
7,423.00	1.33	339.80	7,422.25	-27.70	-17.41	-30.64	0.29
7,518.00	0.81	316.35	7,517.23	-26.18	-18.25	-29.32	0.70
7,613.00	0.77	282.59	7,612.22	-25.55	-19.34	-28.93	0.48
7,709.00	0.66	269.61	7,708.21	-25.41	-20.52	-29.03	0.20
7,804.00	0.56	246.06	7,803.21	-25.61	-21.49	-29.42	0.28
7,898.00	0.12	264.95	7,897.21	-25.80	-22.01	-29.71	0.48
7,939.00	0.44	239.23	7,938.21	-25.89	-22.19	-29.83	0.82
Final Sperry MWD Survey (Pilot Hole) @ 7939.00 ft							
8,000.00	0.44	239.23	7,999.21	-26.13	-22.59	-30.15	0.00
Straight Line Projection to TD (Pilot Hole) @ 8000.00 ft							

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,080.00	2,080.00	0.00	0.00	Tie-On to Surface Casing (Assuming Vertical) @ 2080.00 ft
2,198.00	2,197.98	0.67	1.94	First Sperry MWD Survey (Pilot Hole) @ 2198.00 ft
7,939.00	7,938.21	-25.89	-22.19	Final Sperry MWD Survey (Pilot Hole) @ 7939.00 ft
8,000.00	7,999.21	-26.13	-22.59	Straight Line Projection to TD (Pilot Hole) @ 8000.00 ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
User	No Target (Freehand)	11.64	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
2,198.00	6,948.00	Pilot Hole	MWD
7,043.00	11,612.00	Lateral	MWD

North Reference Sheet for Sec. 34-T4S-R64W - Grimm 34-4H - Actual Field Surveys

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 @ 5796.00ft (H&P 280). Northing and Easting are relative to Grimm 34-4H
 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: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99998224

Grid Coordinates of Well: 1,664,126.41 ft N, 3,269,515.04 ft E
 Geographical Coordinates of Well: 39° 39' 10.53" N, 104° 32' 34.08" W
 Grid Convergence at Surface is: 0.60°

Based upon Minimum Curvature type calculations, at a Measured Depth of 8,000.00ft
 the Bottom Hole Displacement is 34.54ft in the Direction of 220.85° (True).

Magnetic Convergence at surface is: -7.97° (18 September 2012, , BGGM2012)

