

Noble Energy

Weld County, CO

Sec. 5-T7N-R64W

Dillard USX AB05-99HZ

Design: Field Surveys

Sperry Drilling Services

Standard Report

25 August, 2010

Well Coordinates: 1,461,078.08 N, 3,259,299.46 E (40° 35' 43.12" N, 104° 33' 58.57" W)

Ground Level: 4,942.00 ft

Local Coordinate Origin:

Centered on Well Dillard USX AB05-99HZ

Viewing Datum:

RKB - 16' @ 4958.00ft (Cade 22)

TVDs to System:

N

North Reference:

Grid

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 431

HALLIBURTON

Design Report for Dillard USX AB05-99HZ - Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
886.00	0.50	249.77	885.99	-1.34	-3.63	1.77	0.06
980.00	0.49	246.81	979.99	-1.64	-4.38	2.12	0.03
1,074.00	0.48	257.81	1,073.98	-1.88	-5.14	2.51	0.10
1,167.00	0.40	268.68	1,166.98	-1.97	-5.84	2.97	0.12
1,290.00	0.50	276.23	1,289.98	-1.92	-6.80	3.71	0.09
1,381.00	0.62	262.04	1,380.97	-1.94	-7.69	4.34	0.20
1,474.00	0.55	270.63	1,473.97	-2.01	-8.63	4.99	0.12
1,599.00	0.73	289.50	1,598.96	-1.74	-9.98	6.17	0.22
1,695.00	0.95	294.25	1,694.95	-1.21	-11.28	7.49	0.24
1,758.00	0.98	297.63	1,757.94	-0.74	-12.24	8.51	0.10
1,854.00	0.97	295.12	1,853.93	-0.02	-13.70	10.07	0.05
1,945.00	0.90	302.04	1,944.91	0.69	-15.00	11.51	0.15
2,043.00	0.57	357.41	2,042.91	1.59	-15.68	12.61	0.76
2,138.00	0.73	352.11	2,137.90	2.66	-15.78	13.42	0.18
2,233.00	0.57	5.36	2,232.89	3.73	-15.82	14.17	0.23
2,329.00	0.30	23.19	2,328.89	4.43	-15.68	14.54	0.31
2,424.00	0.35	162.37	2,423.89	4.39	-15.49	14.37	0.64
2,519.00	0.51	143.83	2,518.89	3.77	-15.15	13.71	0.22
2,614.00	0.44	180.59	2,613.88	3.06	-14.91	13.05	0.32
2,709.00	0.67	158.99	2,708.88	2.18	-14.71	12.31	0.32
2,804.00	0.52	180.76	2,803.88	1.23	-14.52	11.52	0.28
2,899.00	0.62	182.55	2,898.87	0.28	-14.55	10.90	0.11
2,994.00	0.69	191.09	2,993.86	-0.79	-14.68	10.27	0.13
3,089.00	0.84	199.11	3,088.86	-2.01	-15.02	9.70	0.19
3,185.00	0.84	198.86	3,184.85	-3.34	-15.48	9.13	0.00
3,280.00	0.94	207.01	3,279.83	-4.69	-16.06	8.64	0.17
3,375.00	1.18	199.09	3,374.82	-6.31	-16.73	8.04	0.30
3,470.00	1.51	196.25	3,469.79	-8.44	-17.40	7.10	0.35
3,565.00	1.43	166.24	3,564.76	-10.79	-17.47	5.55	0.81
3,660.00	1.86	147.57	3,659.72	-13.24	-16.36	3.08	0.72
3,755.00	1.81	144.97	3,754.67	-15.77	-14.67	0.12	0.10
3,850.00	2.13	156.07	3,849.62	-18.62	-13.09	-2.96	0.52
3,945.00	2.26	154.01	3,944.55	-21.91	-11.56	-6.32	0.16
4,040.00	2.52	154.17	4,039.47	-25.48	-9.83	-10.01	0.27
4,135.00	2.69	151.78	4,134.37	-29.32	-7.86	-14.06	0.21
4,240.00	2.63	155.35	4,239.25	-33.68	-5.69	-18.61	0.17
4,388.00	2.55	163.42	4,387.10	-39.92	-3.34	-24.57	0.25
4,420.00	2.37	165.13	4,419.07	-41.25	-2.96	-25.74	0.61
4,515.00	1.91	168.96	4,514.01	-44.70	-2.16	-28.67	0.51
4,610.00	1.76	173.16	4,608.96	-47.70	-1.68	-31.05	0.21
4,706.00	1.86	168.10	4,704.91	-50.69	-1.18	-33.44	0.20
4,833.00	1.46	157.84	4,831.86	-54.20	-0.15	-36.58	0.39
4,897.00	1.40	142.09	4,895.84	-55.58	0.64	-38.09	0.62
5,056.00	1.56	106.44	5,054.79	-57.72	3.91	-41.95	0.58
5,150.00	1.23	108.39	5,148.76	-58.40	6.09	-44.01	0.35
5,182.00	1.19	113.67	5,180.75	-58.64	6.72	-44.64	0.37
5,309.00	0.78	116.04	5,307.73	-59.55	8.71	-46.72	0.32
5,404.00	0.84	122.48	5,402.73	-60.21	9.88	-48.02	0.11
5,499.00	0.88	132.92	5,497.71	-61.08	11.00	-49.44	0.17

Design Report for Dillard USX AB05-99HZ - Field Surveys

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,593.00	0.81	106.47	5,591.70	-61.76	12.16	-50.76	0.42
5,656.00	0.78	97.49	5,654.70	-61.94	13.02	-51.51	0.20
5,751.00	1.46	101.16	5,749.68	-62.26	14.85	-53.07	0.72
5,846.00	1.71	110.14	5,844.64	-62.98	17.36	-55.41	0.37
6,024.00	1.48	102.93	6,022.57	-64.41	22.10	-59.86	0.17
6,119.00	1.55	101.74	6,117.54	-64.95	24.55	-62.03	0.08
6,214.00	1.00	83.34	6,212.52	-65.11	26.63	-63.68	0.71
6,246.00	1.10	99.60	6,244.51	-65.13	27.21	-64.12	0.98
6,277.00	0.95	95.72	6,275.51	-65.21	27.76	-64.57	0.53
6,309.00	0.48	61.81	6,307.51	-65.17	28.14	-64.83	1.92
6,341.00	1.46	330.60	6,339.50	-64.75	28.06	-64.48	4.83
6,372.00	4.30	324.92	6,370.46	-63.46	27.20	-62.97	9.20
6,403.00	7.42	326.50	6,401.29	-60.84	25.43	-59.89	10.08
6,435.00	10.38	323.22	6,432.90	-56.80	22.56	-55.05	9.38
6,466.00	13.04	319.97	6,463.26	-51.89	18.64	-48.84	8.84
6,498.00	16.01	317.54	6,494.23	-45.87	13.33	-40.86	9.47
6,530.00	19.20	315.65	6,524.73	-38.85	6.68	-31.21	10.13
6,562.00	21.56	313.58	6,554.72	-31.03	-1.26	-20.07	7.71
6,593.00	24.08	312.47	6,583.30	-22.83	-10.06	-8.05	8.25
6,625.00	26.17	312.67	6,612.27	-13.64	-20.06	5.54	6.54
6,657.00	28.08	315.34	6,640.75	-3.50	-30.54	20.12	7.08
6,689.00	29.59	318.47	6,668.78	7.77	-41.08	35.50	6.67
6,721.00	32.46	319.79	6,696.20	20.25	-51.86	51.88	9.22
6,753.00	35.81	318.84	6,722.68	33.86	-63.57	69.71	10.60
6,784.00	39.09	316.28	6,747.29	47.76	-76.30	88.49	11.71
6,815.00	42.45	314.59	6,770.77	62.17	-90.51	108.70	11.41
6,847.00	45.06	313.22	6,793.88	77.51	-106.46	130.83	8.68
6,879.00	46.32	311.98	6,816.23	93.00	-123.31	153.72	4.82
6,911.00	47.91	312.30	6,838.01	108.74	-140.70	177.17	5.02
6,943.00	49.50	312.37	6,859.12	124.93	-158.47	201.21	4.97
6,974.00	51.57	312.65	6,878.83	141.10	-176.11	225.14	6.71
7,006.00	54.40	312.95	6,898.09	158.46	-194.85	250.69	8.88
7,038.00	57.92	312.58	6,915.91	176.50	-214.36	277.26	11.04
7,070.00	61.12	311.98	6,932.14	195.05	-234.77	304.84	10.13
7,102.00	64.49	311.54	6,946.76	214.00	-256.00	333.29	10.60
7,133.00	67.51	312.27	6,959.37	232.92	-277.07	361.61	9.98
7,165.00	69.78	313.50	6,971.02	253.20	-298.90	391.41	7.95
7,197.00	72.02	313.88	6,981.49	274.09	-320.77	421.64	7.09
7,228.00	73.80	314.09	6,990.60	294.66	-342.09	451.26	5.78
7,260.00	75.92	313.98	6,998.96	316.13	-364.29	482.14	6.63
7,291.00	78.00	313.53	7,005.95	337.02	-386.10	512.33	6.86
7,323.00	79.65	313.17	7,012.15	358.57	-408.93	543.72	5.27
7,355.00	81.95	312.74	7,017.27	380.09	-432.05	575.30	7.31
7,380.00	83.27	312.99	7,020.48	396.95	-450.22	600.10	5.37
7,435.00	86.54	312.75	7,025.37	434.22	-490.37	654.87	5.96
7,465.00	87.03	312.70	7,027.05	454.54	-512.37	684.82	1.64
7,496.00	87.84	312.19	7,028.44	475.44	-535.22	715.79	3.09
7,527.00	88.21	312.05	7,029.51	496.22	-558.20	746.77	1.28
7,589.00	88.52	313.68	7,031.28	538.38	-603.63	808.74	2.68
7,650.00	89.20	314.19	7,032.49	580.69	-647.54	869.71	1.39

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7,712.00	88.83	312.77	7,033.55	623.35	-692.52	931.70	2.37
7,773.00	91.85	312.82	7,033.19	664.79	-737.28	992.69	4.95
7,837.00	90.74	311.71	7,031.75	707.82	-784.63	1,056.67	2.45
7,901.00	87.72	310.83	7,032.61	750.02	-832.72	1,120.64	4.91
7,965.00	90.49	311.54	7,033.61	792.16	-880.88	1,184.60	4.47
8,029.00	91.17	310.76	7,032.68	834.27	-929.06	1,248.58	1.62
8,093.00	89.75	310.34	7,032.17	875.87	-977.69	1,312.53	2.31
8,156.00	89.44	310.84	7,032.61	916.86	-1,025.53	1,375.49	0.93
8,220.00	88.58	310.83	7,033.72	958.70	-1,073.94	1,439.45	1.34
8,284.00	87.34	311.28	7,035.99	1,000.71	-1,122.17	1,503.38	2.06
8,348.00	88.27	311.46	7,038.45	1,042.98	-1,170.17	1,567.32	1.48
8,411.00	87.47	311.28	7,040.79	1,084.59	-1,217.41	1,630.26	1.30
8,475.00	88.21	311.39	7,043.20	1,126.82	-1,265.43	1,694.20	1.17
8,538.00	89.13	311.06	7,044.66	1,168.33	-1,312.80	1,757.17	1.55
8,602.00	88.95	311.49	7,045.73	1,210.54	-1,360.90	1,821.14	0.73
8,666.00	90.00	311.06	7,046.32	1,252.76	-1,408.99	1,885.12	1.77
8,729.00	89.81	312.20	7,046.42	1,294.61	-1,456.08	1,948.11	1.83
8,793.00	89.63	314.04	7,046.74	1,338.36	-1,502.79	2,012.10	2.89
8,857.00	88.09	314.07	7,048.01	1,382.85	-1,548.78	2,076.07	2.41
8,921.00	89.01	313.77	7,049.63	1,427.23	-1,594.86	2,140.03	1.51
8,984.00	89.94	314.12	7,050.21	1,470.94	-1,640.22	2,203.01	1.58
9,048.00	89.57	313.60	7,050.48	1,515.29	-1,686.37	2,266.99	1.00
9,112.00	90.68	313.42	7,050.34	1,559.35	-1,732.78	2,330.98	1.76
9,175.00	89.57	313.75	7,050.20	1,602.78	-1,778.41	2,393.97	1.84
9,239.00	89.20	314.08	7,050.89	1,647.17	-1,824.52	2,457.95	0.77
9,303.00	89.26	313.61	7,051.75	1,691.50	-1,870.67	2,521.93	0.74
9,367.00	90.37	313.05	7,051.96	1,735.42	-1,917.22	2,585.92	1.94
9,431.00	89.07	312.84	7,052.27	1,779.02	-1,964.07	2,649.92	2.06
9,495.00	90.99	312.36	7,052.24	1,822.34	-2,011.18	2,713.92	3.09
9,558.00	88.89	312.92	7,052.30	1,865.01	-2,057.52	2,776.91	3.45
9,622.00	88.39	314.49	7,053.82	1,909.21	-2,103.77	2,840.88	2.57
9,686.00	89.81	315.16	7,054.83	1,954.32	-2,149.16	2,904.82	2.45
9,750.00	87.53	314.15	7,056.31	1,999.29	-2,194.67	2,968.76	3.90
9,814.00	88.70	313.83	7,058.42	2,043.72	-2,240.69	3,032.70	1.90
9,877.00	90.49	313.45	7,058.86	2,087.19	-2,286.28	3,095.69	2.90
9,941.00	90.99	314.33	7,058.04	2,131.56	-2,332.39	3,159.67	1.58
10,005.00	92.54	314.09	7,056.07	2,176.16	-2,378.25	3,223.61	2.45
10,069.00	91.55	313.28	7,053.78	2,220.34	-2,424.50	3,287.56	2.00
10,133.00	88.89	310.86	7,053.54	2,263.21	-2,472.00	3,351.54	5.62
10,197.00	89.51	310.93	7,054.43	2,305.10	-2,520.37	3,415.51	0.97
10,261.00	89.81	312.21	7,054.81	2,347.57	-2,568.25	3,479.49	2.05
10,324.00	89.69	313.48	7,055.08	2,390.41	-2,614.44	3,542.49	2.02
10,388.00	91.36	313.68	7,054.50	2,434.53	-2,660.80	3,606.48	2.63
10,452.00	90.87	314.19	7,053.25	2,478.92	-2,706.88	3,670.45	1.10
10,516.00	89.81	313.90	7,052.87	2,523.42	-2,752.88	3,734.43	1.72
10,579.00	88.64	313.27	7,053.72	2,566.84	-2,798.51	3,797.41	2.11
10,643.00	89.51	311.82	7,054.76	2,610.11	-2,845.65	3,861.40	2.64
10,707.00	90.62	311.13	7,054.69	2,652.50	-2,893.60	3,925.38	2.04
10,771.00	90.31	312.32	7,054.17	2,695.09	-2,941.37	3,989.37	1.92
10,835.00	90.93	312.50	7,053.47	2,738.25	-2,988.62	4,053.37	1.01
10,898.00	92.53	311.94	7,051.57	2,780.57	-3,035.25	4,116.34	2.69

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10,962.00	92.60	311.95	7,048.71	2,823.30	-3,082.80	4,180.27	0.11
11,026.00	93.22	309.17	7,045.46	2,864.86	-3,131.36	4,244.14	4.44
11,089.00	93.15	310.10	7,041.96	2,904.98	-3,179.80	4,306.96	1.48
11,153.00	90.74	312.33	7,039.78	2,947.12	-3,227.91	4,370.89	5.13
11,216.00	88.33	313.83	7,040.30	2,990.15	-3,273.92	4,433.88	4.51
11,280.00	87.03	313.03	7,042.89	3,034.11	-3,320.36	4,497.82	2.38
11,344.00	87.22	312.75	7,046.10	3,077.61	-3,367.19	4,561.74	0.53
11,407.00	87.90	313.00	7,048.78	3,120.44	-3,413.31	4,624.68	1.15
11,471.00	86.91	314.11	7,051.68	3,164.49	-3,459.65	4,688.60	2.32
11,535.00	87.47	314.08	7,054.81	3,208.97	-3,505.56	4,752.51	0.88
11,598.00	88.09	313.79	7,057.25	3,252.65	-3,550.89	4,815.44	1.09
11,662.00	86.91	314.11	7,060.05	3,297.03	-3,596.92	4,879.36	1.91
11,726.00	86.91	314.35	7,063.50	3,341.60	-3,642.71	4,943.24	0.37
11,790.00	87.71	313.78	7,066.50	3,386.06	-3,688.65	5,007.15	1.53
11,854.00	87.28	314.10	7,069.30	3,430.43	-3,734.69	5,071.07	0.84
11,917.00	86.72	314.12	7,072.59	3,474.22	-3,779.86	5,133.96	0.89
11,981.00	86.91	313.74	7,076.15	3,518.55	-3,825.88	5,197.85	0.66
12,045.00	87.53	313.59	7,079.25	3,562.69	-3,872.13	5,261.76	1.00
12,109.00	87.59	312.95	7,081.98	3,606.52	-3,918.68	5,325.70	1.00
12,173.00	89.26	313.22	7,083.74	3,650.22	-3,965.41	5,389.67	2.64
12,236.00	90.25	313.64	7,084.01	3,693.53	-4,011.16	5,452.66	1.71
12,300.00	90.56	313.25	7,083.55	3,737.54	-4,057.62	5,516.65	0.78
12,364.00	91.85	312.00	7,082.21	3,780.86	-4,104.70	5,580.63	2.81
12,381.00	91.98	312.19	7,081.64	3,792.25	-4,117.31	5,597.62	1.35
12,418.00	91.98	312.19	7,080.36	3,817.09	-4,144.71	5,634.60	0.00

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Dillard USX AB05-99HZ Plan #3 BH Tgt	312.60	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
886.00	6,246.00	Sperry MWD Surveys (vertical wellbore)	MWD
6,277.00	7,380.00	Sperry MWD Survey	MWD
7,435.00	12,418.00	Lateral MWD Surveys	MWD

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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
Dillard USX AB05-99H	0.00	0.00	0.00	0.00	0.00	1,461,078.08	3,259,299.46	40° 35' 43.116 N	104° 33' 58.572 W
- actual wellpath hits target center									
- Polygon									
Point 1				-4,123.69	173.97	1,461,252.04	3,255,175.87		
Point 2				244.02	250.49	1,461,328.56	3,259,543.47		
Dillard USX AB05-99H	0.00	0.00	0.00	0.00	0.00	1,461,078.08	3,259,299.46	40° 35' 43.116 N	104° 33' 58.572 W
- actual wellpath hits target center									
- Polygon									
Point 1				-4,229.72	4,529.70	1,465,607.66	3,255,069.85		
Point 2				-4,123.69	173.97	1,461,252.04	3,255,175.87		
Dillard USX AB05-99H	0.00	0.00	7,080.00	3,681.75	-4,004.16	1,464,759.74	3,255,295.40	40° 36' 19.908 N	104° 34' 49.980 W
- actual wellpath misses target center by 5.48ft at 12222.81ft MD (7084.04 TVD, 3684.43 N, -4001.60 E)									
- Point									
Dillard USX AB05-99H	0.00	0.00	0.00	0.00	0.00	1,461,078.08	3,259,299.46	40° 35' 43.116 N	104° 33' 58.572 W
- actual wellpath hits target center									
- Polygon									
Point 1				146.35	4,626.19	1,465,704.15	3,259,445.81		
Point 2				244.02	250.49	1,461,328.56	3,259,543.47		
Dillard USX AB05-99H	0.00	0.00	0.00	0.00	0.00	1,461,078.08	3,259,299.46	40° 35' 43.116 N	104° 33' 58.572 W
- actual wellpath hits target center									
- Polygon									
Point 1				-4,583.69	-286.03	1,460,792.05	3,254,715.89		
Point 2				704.02	-209.51	1,460,868.57	3,260,003.46		
Dillard USX AB05-99H	0.00	0.00	0.00	0.00	0.00	1,461,078.08	3,259,299.46	40° 35' 43.116 N	104° 33' 58.572 W
- actual wellpath hits target center									
- Polygon									
Point 1				-4,689.72	4,989.70	1,466,067.65	3,254,609.86		
Point 2				606.35	5,086.19	1,466,164.14	3,259,905.80		
Dillard USX AB05-99H	0.00	0.00	0.00	0.00	0.00	1,461,078.08	3,259,299.46	40° 35' 43.116 N	104° 33' 58.572 W
- actual wellpath hits target center									
- Polygon									
Point 1				606.35	5,086.19	1,466,164.14	3,259,905.80		
Point 2				704.02	-209.51	1,460,868.57	3,260,003.46		
Dillard USX AB05-99H	0.00	0.00	0.00	0.00	0.00	1,461,078.08	3,259,299.46	40° 35' 43.116 N	104° 33' 58.572 W
- actual wellpath hits target center									
- Polygon									
Point 1				-4,229.72	4,529.70	1,465,607.66	3,255,069.85		
Point 2				146.35	4,626.19	1,465,704.15	3,259,445.81		
Dillard USX AB05-99H	0.00	0.00	0.00	0.00	0.00	1,461,078.08	3,259,299.46	40° 35' 43.116 N	104° 33' 58.572 W
- actual wellpath hits target center									
- Polygon									
Point 1				-4,689.72	4,989.70	1,466,067.65	3,254,609.86		
Point 2				-4,583.69	-286.03	1,460,792.05	3,254,715.89		

North Reference Sheet for Sec. 5-T7N-R64W - Dillard USX AB05-99HZ - Plan #3

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

Vertical Depths are relative to RKB - 16' @ 4958.00ft (Cade 22). Northing and Easting are relative to Dillard USX AB05-99HZ

Coordinate System is US State Plane 1983, Colorado Northern 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: 40° 47' 0.000 N°

False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99997489

Grid Coordinates of Well: 1,461,078.08 ft N, 3,259,299.46 ft E

Geographical Coordinates of Well: 40° 35' 43.12" N, 104° 33' 58.57" W

Grid Convergence at Surface is: 0.60°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,418.00ft

the Bottom Hole Displacement is 5,634.60ft in the Direction of 312.64° (Grid).

Magnetic Convergence at surface is: -8.24° (18 August 2010, , BGGM2010)

