

# Noble Energy

Weld County, CO

Sec. 2-T5N-R64W

Foe A35-73HN

Plan A

Design: MWD Survey

## Sperry Drilling Services Standard Report

24 January, 2012

Well Coordinates: 1,402,794.82 N, 3,274,622.93 E (40° 26' 05.57" N, 104° 30' 48.35" W)  
Ground Level: 4,610.00 ft

Local Coordinate Origin:

Centered on Well Foe A35-73HN

Viewing Datum:

KB @ 4634.00ft (H&P 343)

TVDs to System:

N

North Reference:

Grid

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 43I

**HALLIBURTON**

Design Report for Foe A35-73HN - MWD Survey

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
696.00	0.00	0.00	696.00	0.00	0.00	0.00	0.00
725.00	0.53	261.41	725.00	-0.02	-0.13	-0.03	1.83
818.00	0.56	268.29	818.00	-0.10	-1.01	-0.14	0.08
910.00	0.71	259.09	909.99	-0.22	-2.02	-0.30	0.20
1,003.00	0.57	252.77	1,002.98	-0.47	-3.03	-0.58	0.17
1,096.00	0.53	274.06	1,095.98	-0.57	-3.90	-0.72	0.22
1,197.00	0.62	276.83	1,196.97	-0.47	-4.91	-0.66	0.09
1,289.00	0.68	277.59	1,288.97	-0.34	-5.94	-0.57	0.07
1,382.00	0.65	276.81	1,381.96	-0.21	-7.01	-0.47	0.03
1,475.00	0.79	261.86	1,474.96	-0.24	-8.17	-0.54	0.25
1,567.00	1.00	248.15	1,566.94	-0.62	-9.55	-0.98	0.32
1,660.00	1.99	106.43	1,659.93	-1.38	-8.75	-1.71	3.06
1,844.00	1.60	99.19	1,843.84	-2.70	-3.15	-2.81	0.24
1,936.00	1.73	74.64	1,935.80	-2.53	-0.54	-2.55	0.78
2,036.00	1.58	58.35	2,035.76	-1.41	2.09	-1.33	0.49
2,131.00	0.96	55.99	2,130.73	-0.28	3.86	-0.13	0.65
2,227.00	0.30	355.92	2,226.73	0.42	4.51	0.59	0.89
2,322.00	0.22	54.39	2,321.73	0.78	4.64	0.95	0.28
2,418.00	0.62	39.51	2,417.73	1.28	5.12	1.48	0.43
2,513.00	0.57	49.27	2,512.72	1.99	5.81	2.21	0.12
2,609.00	3.43	59.35	2,608.65	3.77	8.64	4.09	2.99
2,704.00	4.80	54.63	2,703.41	7.52	14.32	8.05	1.48
2,799.00	7.12	53.45	2,797.89	13.32	22.30	14.16	2.45
2,895.00	9.08	51.54	2,892.92	21.58	33.01	22.81	2.06
2,990.00	11.01	47.54	2,986.46	32.37	45.57	34.06	2.16
3,086.00	10.16	45.86	3,080.83	44.45	58.41	46.62	0.94
3,181.00	9.35	43.90	3,174.46	55.85	69.78	58.44	0.92
3,277.00	8.15	51.01	3,269.34	65.75	80.47	68.74	1.68
3,372.00	10.45	43.76	3,363.09	76.21	91.67	79.62	2.71
3,468.00	9.61	41.49	3,457.62	88.50	103.00	92.33	0.97
3,563.00	12.16	42.62	3,550.90	101.80	115.03	106.07	2.69
3,659.00	13.70	43.06	3,644.47	117.55	129.64	122.36	1.61
3,754.00	10.60	46.06	3,737.33	131.84	143.61	137.17	3.33
3,850.00	7.02	47.32	3,832.18	141.95	154.29	147.67	3.73
3,945.00	1.93	79.94	3,926.87	146.16	160.14	152.10	5.78
4,041.00	0.62	225.22	4,022.85	146.08	161.36	152.07	2.57
4,136.00	0.46	258.32	4,117.85	145.64	160.62	151.60	0.36
4,232.00	0.13	225.00	4,213.85	145.49	160.17	151.43	0.37
4,327.00	0.25	212.49	4,308.85	145.23	159.98	151.17	0.13
4,422.00	0.37	232.15	4,403.85	144.87	159.62	150.79	0.17
4,518.00	0.65	237.51	4,499.84	144.39	158.92	150.29	0.30
4,614.00	0.75	232.18	4,595.84	143.71	157.97	149.57	0.12
4,804.00	1.45	200.96	4,785.80	140.70	156.12	146.50	0.47
4,900.00	1.49	205.58	4,881.77	138.44	155.15	144.20	0.13
5,091.00	0.36	195.58	5,072.74	135.63	153.92	141.34	0.60
5,282.00	0.13	196.05	5,263.74	134.84	153.70	140.55	0.12
5,377.00	0.32	314.21	5,358.74	134.92	153.48	140.62	0.42
5,473.00	0.37	294.82	5,454.74	135.24	153.00	140.92	0.13
5,568.00	0.46	329.39	5,549.73	135.69	152.53	141.36	0.27

## Design Report for Foe A35-73HN - MWD Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
5,759.00	1.01	353.51	5,740.72	138.03	151.95	143.67	0.32
5,855.00	1.01	11.06	5,836.70	139.70	152.02	145.34	0.32
5,950.00	6.32	8.24	5,931.48	145.70	152.93	151.37	5.59
5,998.00	10.44	6.18	5,978.95	152.64	153.77	158.34	8.60
6,045.00	13.95	4.80	6,024.89	162.52	154.71	168.25	7.49
6,093.00	14.00	4.53	6,071.46	174.08	155.65	179.83	0.17
6,141.00	17.59	3.36	6,117.65	187.11	156.53	192.89	7.51
6,189.00	21.52	3.41	6,162.87	203.14	157.48	208.94	8.19
6,236.00	25.90	2.63	6,205.89	222.01	158.47	227.84	9.34
6,284.00	30.62	1.64	6,248.16	244.72	159.30	250.56	9.88
6,332.00	34.71	1.15	6,288.56	270.61	159.92	276.46	8.54
6,380.00	38.81	0.81	6,327.00	299.33	160.41	305.17	8.55
6,427.00	41.43	1.35	6,362.94	329.60	160.98	335.45	5.62
6,475.00	44.95	1.07	6,397.93	362.44	161.67	368.29	7.34
6,523.00	49.12	0.76	6,430.64	397.56	162.23	403.40	8.70
6,571.00	53.28	1.08	6,460.71	434.95	162.84	440.79	8.68
6,619.00	57.23	0.51	6,488.06	474.38	163.38	480.21	8.29
6,667.00	61.03	359.44	6,512.69	515.57	163.35	521.37	8.14
6,714.00	64.38	358.60	6,534.24	557.33	162.63	563.07	7.30
6,762.00	67.51	358.56	6,553.80	601.14	161.55	606.81	6.52
6,810.00	72.43	359.67	6,570.23	646.22	160.86	651.83	10.48
6,858.00	77.09	0.55	6,582.85	692.51	160.95	698.10	9.87
6,905.00	80.62	0.68	6,591.93	738.62	161.45	744.19	7.52
6,937.00	83.23	0.76	6,596.43	770.30	161.84	775.86	8.16
7,075.00	86.48	358.73	6,608.80	907.71	161.23	913.15	2.77
7,122.00	85.96	0.02	6,611.90	954.61	160.71	959.99	2.95
7,218.00	87.47	359.57	6,617.40	1,050.45	160.37	1,055.75	1.64
7,313.00	87.91	1.95	6,621.23	1,145.35	161.63	1,150.64	2.55
7,409.00	87.64	0.30	6,624.96	1,241.26	163.51	1,246.55	1.74
7,504.00	89.17	0.91	6,627.60	1,336.21	164.52	1,341.47	1.73
7,600.00	91.79	1.51	6,626.80	1,432.18	166.54	1,437.45	2.80
7,695.00	90.55	359.97	6,624.86	1,527.15	167.77	1,532.39	2.08
7,791.00	89.63	359.52	6,624.71	1,623.14	167.34	1,628.31	1.07
7,886.00	88.58	0.95	6,626.19	1,718.13	167.73	1,723.24	1.87
7,982.00	90.49	2.17	6,626.97	1,814.08	170.35	1,819.22	2.36
8,077.00	90.37	0.84	6,626.26	1,909.05	172.84	1,914.21	1.41
8,173.00	89.82	358.62	6,626.10	2,005.04	172.39	2,010.12	2.38
8,268.00	90.96	358.48	6,625.45	2,100.00	169.98	2,104.92	1.21
8,363.00	88.49	358.22	6,625.91	2,194.96	167.25	2,199.71	2.61
8,459.00	89.38	359.41	6,627.69	2,290.92	165.26	2,295.52	1.55
8,554.00	88.18	0.50	6,629.72	2,385.89	165.19	2,390.43	1.71
8,650.00	89.29	0.32	6,631.83	2,481.86	165.88	2,486.36	1.17
8,745.00	90.40	1.79	6,632.09	2,576.84	167.63	2,581.34	1.94
8,841.00	92.19	1.58	6,629.92	2,672.77	170.45	2,677.30	1.88
8,936.00	90.58	2.13	6,627.63	2,767.69	173.52	2,772.27	1.79
9,032.00	90.40	1.01	6,626.80	2,863.65	176.15	2,868.26	1.18
9,127.00	90.09	0.34	6,626.40	2,958.64	177.27	2,963.23	0.78
9,222.00	90.06	0.04	6,626.27	3,053.64	177.59	3,058.17	0.32
9,318.00	90.22	0.70	6,626.04	3,149.64	178.21	3,154.12	0.71
9,413.00	89.81	0.87	6,626.01	3,244.63	179.51	3,249.09	0.47



**Design Report for Foe A35-73HN - MWD Survey**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)
9,509.00	89.45	0.79	6,626.63	3,340.62	180.90	3,345.07	0.38
9,604.00	89.82	0.45	6,627.24	3,435.61	181.93	3,440.03	0.53
9,700.00	89.35	0.12	6,627.94	3,531.61	182.40	3,535.98	0.60
9,795.00	91.26	359.36	6,627.43	3,626.60	181.97	3,630.88	2.16
9,890.00	92.10	0.46	6,624.64	3,721.56	181.82	3,725.77	1.46
9,986.00	90.55	359.19	6,622.42	3,817.52	181.53	3,821.66	2.09
10,081.00	88.56	0.04	6,623.16	3,912.51	180.89	3,916.55	2.28
10,177.00	89.88	0.37	6,624.47	4,008.50	181.23	4,012.49	1.42
10,272.00	89.04	0.50	6,625.36	4,103.49	181.96	4,107.44	0.89
10,368.00	89.02	0.11	6,626.99	4,199.48	182.47	4,203.37	0.41
10,463.00	90.06	359.43	6,627.75	4,294.47	182.09	4,298.29	1.31
10,558.00	89.69	1.09	6,627.96	4,389.47	182.52	4,393.23	1.79
10,653.00	89.17	359.80	6,628.90	4,484.46	183.25	4,488.18	1.46
10,749.00	89.38	359.83	6,630.12	4,580.45	182.94	4,584.09	0.22
10,844.00	90.43	359.92	6,630.28	4,675.45	182.74	4,679.01	1.11
10,939.00	90.06	359.94	6,629.87	4,770.45	182.62	4,773.94	0.39
11,035.00	91.70	359.92	6,628.40	4,866.43	182.50	4,869.85	1.71
11,126.00	92.72	359.81	6,624.89	4,957.36	182.29	4,960.71	1.13
11,176.00	92.72	359.81	6,622.51	5,007.31	182.12	5,010.61	0.00

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Foe A35-73HN_PlanA - Rev2_BHL Tgt	2.16	Slot	0.00	0.00	0.00

**Survey tool program**

From (ft)	To (ft)	Survey/Plan	Survey Tool
696.00	11,176.00	Sperry MWD Surveys	MWD

## Design Report for Foe A35-73HN - MWD Survey

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
Foe A35-73HN_Sec	0.00	0.00	0.00	0.00	0.00	1,402,794.82	3,274,622.93	40° 26' 5.568 N	104° 30' 48.348 W
- actual wellpath hits target center									
- Polygon									
Point 1			-1,079.98	265.09		1,403,059.90	3,273,542.99		
Point 2			1,558.03	301.86		1,403,096.67	3,276,180.89		
Point 3			1,556.80	-2,344.14		1,400,450.77	3,276,179.66		
Point 4			1,541.57	-4,978.13		1,397,816.87	3,276,164.43		
Point 5			-1,094.44	-5,032.90		1,397,762.11	3,273,528.53		
Point 6			-3,731.44	-5,068.67		1,397,726.34	3,270,891.63		
Point 7			-3,723.21	-2,419.68		1,400,375.24	3,270,899.86		
Point 8			-3,715.98	229.32		1,403,024.13	3,270,907.09		
Point 9			-1,079.98	265.09		1,403,059.90	3,273,542.99		
Foe A35-73HN_Sec	0.00	0.00	0.00	0.00	0.00	1,402,794.82	3,274,622.93	40° 26' 5.568 N	104° 30' 48.348 W
- actual wellpath hits target center									
- Polygon									
Point 1			-1,079.94	725.09		1,403,519.89	3,273,543.03		
Point 2			-3,255.94	689.28		1,403,484.08	3,271,367.11		
Point 3			-3,295.75	2,859.29		1,405,654.00	3,271,327.30		
Point 4			-3,324.56	5,043.29		1,407,837.92	3,271,298.49		
Point 5			-1,126.56	5,054.10		1,407,848.72	3,273,496.41		
Point 6			1,045.45	5,116.91		1,407,911.53	3,275,668.33		
Point 7			1,072.26	2,938.91		1,405,733.61	3,275,695.14		
Point 8			1,098.07	761.90		1,403,556.69	3,275,720.95		
Point 9			-1,079.94	725.09		1,403,519.89	3,273,543.03		
Foe A35-73HN_Sec	0.00	0.00	0.00	0.00	0.00	1,402,794.82	3,274,622.93	40° 26' 5.568 N	104° 30' 48.348 W
- actual wellpath hits target center									
- Polygon									
Point 1			-1,079.98	265.09		1,403,059.90	3,273,542.99		
Point 2			-3,715.98	229.32		1,403,024.13	3,270,907.09		
Point 3			-3,755.75	2,859.33		1,405,654.04	3,270,867.32		
Point 4			-3,784.52	5,503.33		1,408,297.94	3,270,838.55		
Point 5			-1,126.52	5,514.10		1,408,308.71	3,273,496.45		
Point 6			1,505.49	5,576.87		1,408,371.48	3,276,128.36		
Point 7			1,532.26	2,938.87		1,405,733.57	3,276,155.12		
Point 8			1,558.03	301.86		1,403,096.67	3,276,180.89		
Point 9			-1,079.98	265.09		1,403,059.90	3,273,542.99		
Foe A35-73HN_Plar	0.00	0.00	6,616.00	5,008.09	189.22	1,407,802.72	3,274,812.14	40° 26' 55.032 N	104° 30' 45.180 W
- actual wellpath misses target center by 9.66ft at 11176.00ft MD (6622.51 TVD, 5007.31 N, 182.12 E)									
- Point									
Foe A35-73HN_Sec	0.00	0.00	0.00	0.00	0.00	1,402,794.82	3,274,622.93	40° 26' 5.568 N	104° 30' 48.348 W
- actual wellpath hits target center									
- Polygon									
Point 1			-1,080.02	-194.91		1,402,599.92	3,273,542.95		
Point 2			1,097.99	-158.10		1,402,636.73	3,275,720.87		
Point 3			1,096.80	-2,344.10		1,400,450.81	3,275,719.68		
Point 4			1,081.61	-4,518.09		1,398,276.90	3,275,704.49		
Point 5			-1,094.40	-4,572.90		1,398,222.09	3,273,528.57		
Point 6			-3,271.40	-4,608.71		1,398,186.28	3,271,351.65		
Point 7			-3,263.21	-2,419.72		1,400,375.20	3,271,359.84		
Point 8			-3,256.02	-230.72		1,402,564.11	3,271,367.03		
Point 9			-1,080.02	-194.91		1,402,599.92	3,273,542.95		

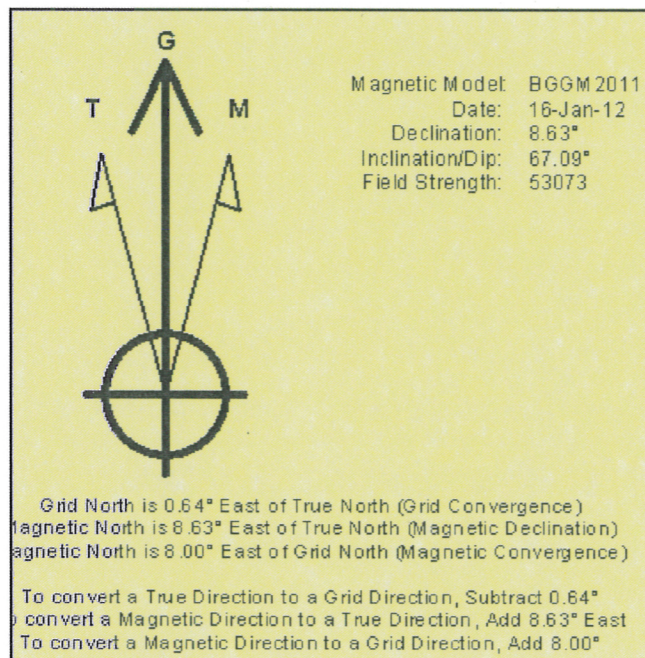
**North Reference Sheet for Sec. 2-T5N-R64W - Foe A35-73HN - Plan A**

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.  
Vertical Depths are relative to KB @ 4634.00ft (H&P 343). Northing and Easting are relative to Foe A35-73HN  
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: 0.99996200

Grid Coordinates of Well: 1,402,794.82 ft N, 3,274,622.93 ft E  
Geographical Coordinates of Well: 40° 26' 05.57" N, 104° 30' 48.35" W  
Grid Convergence at Surface is: 0.64°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,176.00ft  
the Bottom Hole Displacement is 5,010.62ft in the Direction of 2.08° (Grid).

Magnetic Convergence at surface is: -8.00° (16 January 2012, , BGGM2011)

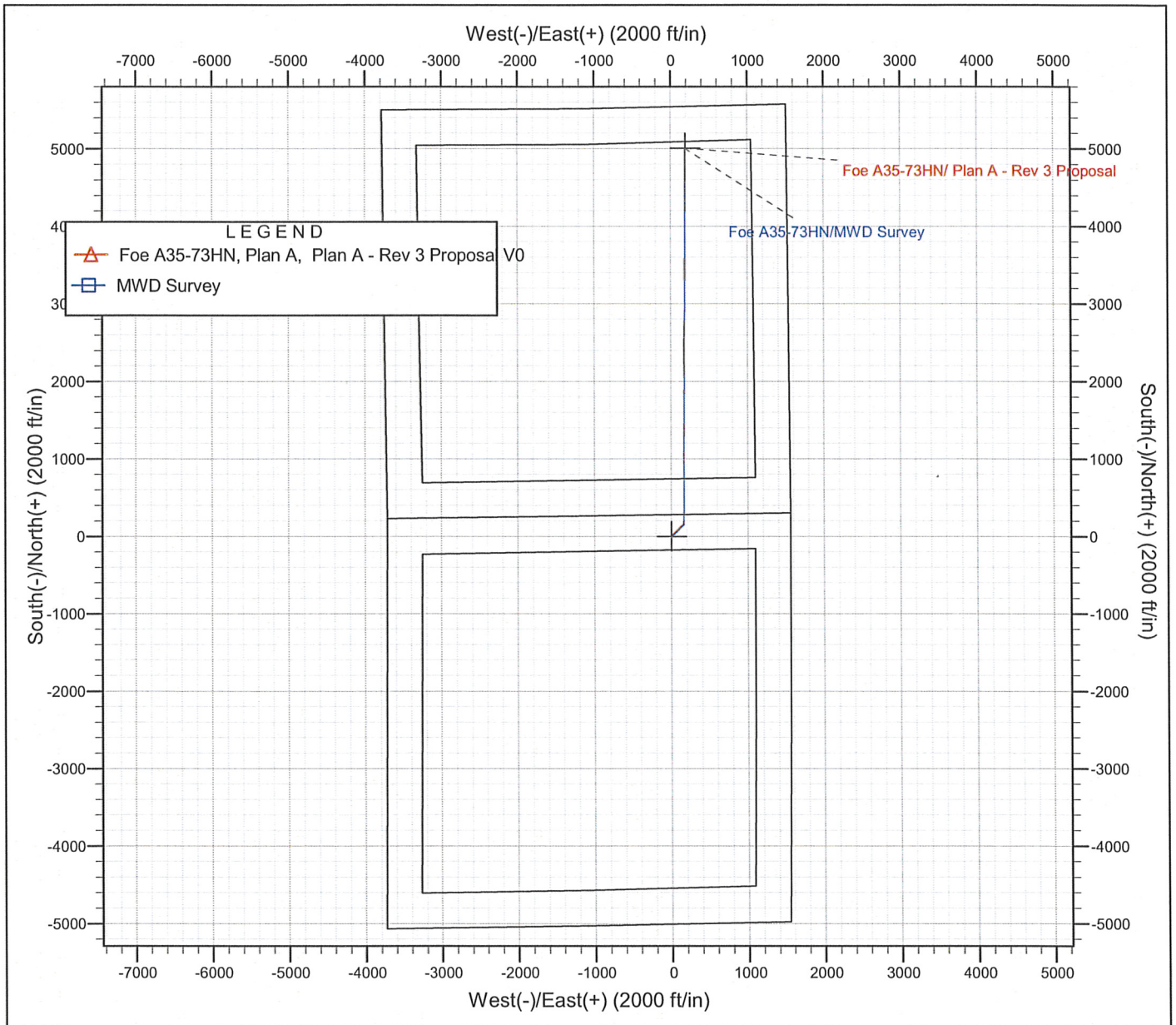




Project: Weld County, CO  
Site: Sec. 2-T5N-R64W  
Well: Foe A35-73HN  
Wellbore: Plan A  
Design: MWD Survey

# Noble Energy

HALLIBURTON



Project: Weld County, CO  
Site: Sec. 2-T5N-R64W  
Well: Foe A35-73HN  
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