

## Noble Energy Inc.- Weld County, CO (Grid North)

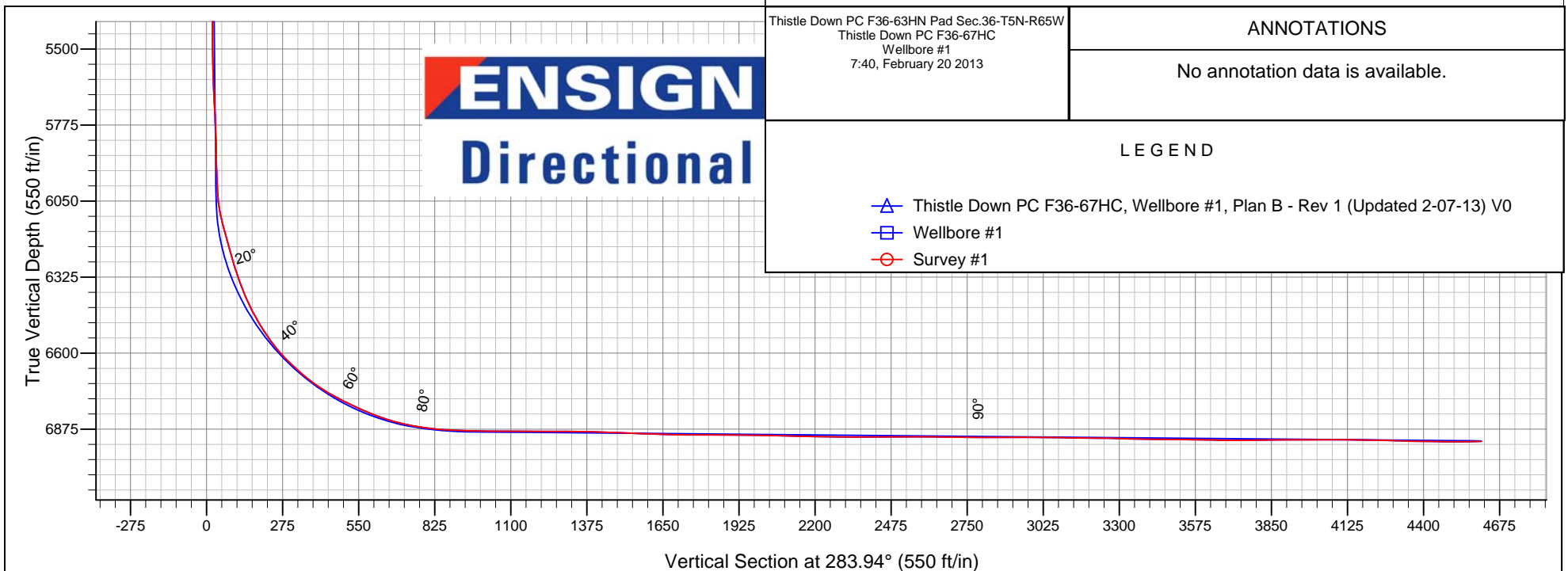
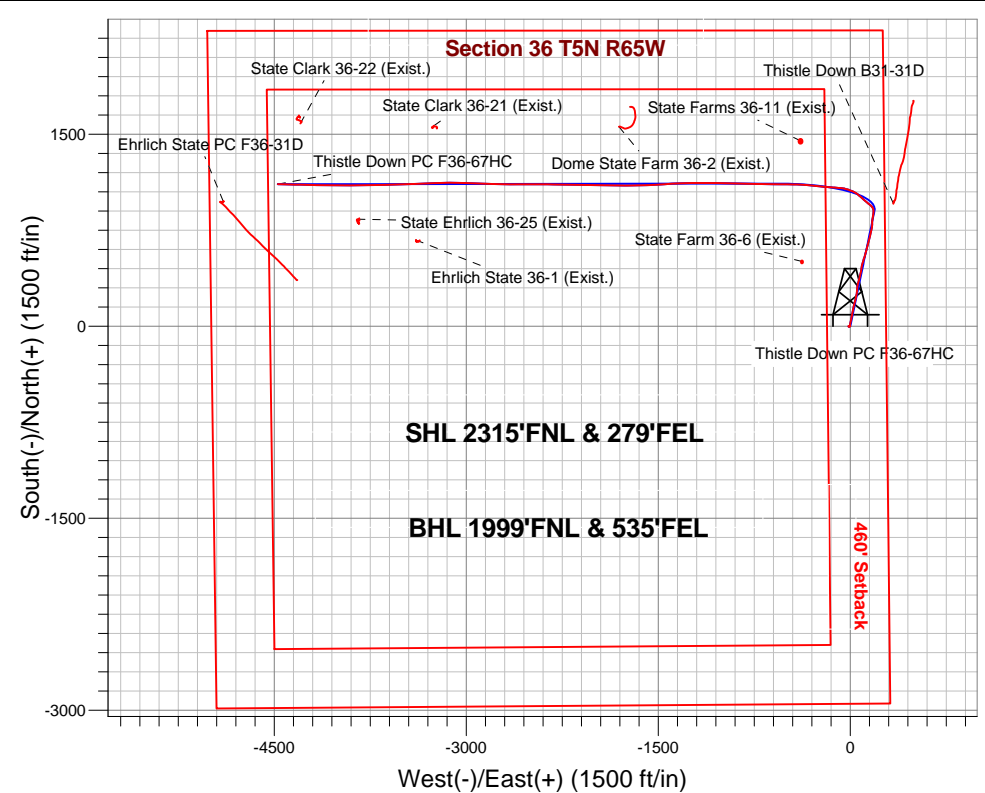
Well Name: **Thistle Down PC F36-67HC**

Surface Location: Thistle Down PC F36-63HN Pad Sec.36-T5N-R65W  
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone  
Ground Elevation: 4770.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1373981.43	3249968.64	40.356510	-104.603040	
Original Well Elev WELL @ 4786.0ft (Original Well Elev)						

# FINAL SURVEY

Projected Bottom Hole Location  
11330' MD 6919' TVD 1111' N & 4473' W of SHL  
90.8 degree Incl @ 272.0 degree AZM





# **Noble Energy Inc.- Weld County, CO (Grid North)**

**Sec.36-T5N-R65W**

**Thistle Down PC F36-63HN Pad Sec.36-T5N-R65W**

**Thistle Down PC F36-67HC**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**20 February, 2013**

<b>Company:</b>	Noble Energy Inc.- Weld County, CO (Grid North)	<b>Local Co-ordinate Reference:</b>	Well Thistle Down PC F36-67HC
<b>Project:</b>	Sec.36-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4786.0ft (Original Well Elev)
<b>Site:</b>	Thistle Down PC F36-63HN Pad	<b>MD Reference:</b>	WELL @ 4786.0ft (Original Well Elev)
<b>Well:</b>	Thistle Down PC F36-67HC	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

<b>Project</b>	Sec.36-T5N-R65W, Weld County, CO		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

Site	Thistle Down PC F36-63HN Pad Sec.36-T5N-R65W				
Site Position:		Northing:	1,373,934.09 ft	Latitude:	40.356380
From:	Lat/Long	Easting:	3,249,969.12 ft	Longitude:	-104.603040
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.58 °

Well	Thistle Down PC F36-67HC					
Well Position	+N-S	0.0 ft	Northing:	1,373,981.43 ft	Latitude:	40.356510
	+E-W	0.0 ft	Easting:	3,249,968.64 ft	Longitude:	-104.603040
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,770.0 ft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	1/3/2013	8.56	66.99	52,962

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	283.94	

<b>Survey Program</b>	<b>Date</b>	2/20/2013			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
639.0	11,330.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

<b>Survey</b>									
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
639.0	0.00	0.00	639.0	0.0	0.0	0.0	0.00	0.00	0.00
661.0	0.50	219.60	661.0	-0.1	-0.1	0.0	2.27	2.27	0.00
751.0	0.80	277.30	751.0	-0.3	-0.9	0.8	0.76	0.33	64.11
841.0	0.60	277.60	841.0	-0.2	-2.0	1.9	0.22	-0.22	0.33
931.0	1.00	292.40	931.0	0.2	-3.2	3.2	0.50	0.44	16.44
1,020.0	0.50	253.40	1,020.0	0.4	-4.3	4.3	0.77	-0.56	-43.82
1,128.0	1.00	249.20	1,128.0	-0.1	-5.6	5.5	0.47	0.46	-3.89
1,223.0	1.10	244.80	1,222.9	-0.8	-7.2	6.8	0.14	0.11	-4.63
1,318.0	0.80	281.10	1,317.9	-1.0	-8.7	8.2	0.69	-0.32	38.21
1,413.0	1.20	303.10	1,412.9	-0.3	-10.2	9.8	0.58	0.42	23.16

<b>Company:</b>	Noble Energy Inc.- Weld County, CO (Grid North)	<b>Local Co-ordinate Reference:</b>	Well Thistle Down PC F36-67HC
<b>Project:</b>	Sec.36-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4786.0ft (Original Well Elev)
<b>Site:</b>	Thistle Down PC F36-63HN Pad	<b>MD Reference:</b>	WELL @ 4786.0ft (Original Well Elev)
<b>Well:</b>	Sec.36-T5N-R65W	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Thistle Down PC F36-67HC	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Design:</b>	Wellbore #1		

Survey									
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)
1,508.0	1.90	288.40	1,507.9	0.7	-12.5	12.3	0.84	0.74	-15.47
1,603.0	1.80	218.20	1,602.8	0.0	-14.9	14.5	2.24	-0.11	-73.89
1,698.0	0.60	75.50	1,697.8	-1.0	-15.4	14.7	2.43	-1.26	-150.21
1,793.0	0.40	325.60	1,792.8	-0.6	-15.1	14.5	0.87	-0.21	-115.68
1,888.0	0.90	115.20	1,887.8	-0.7	-14.6	14.0	1.33	0.53	157.47
1,999.0	1.10	105.40	1,998.8	-1.3	-12.8	12.1	0.24	0.18	-8.83
2,089.0	0.80	111.20	2,088.8	-1.8	-11.4	10.6	0.35	-0.33	6.44
2,179.0	1.00	116.40	2,178.8	-2.4	-10.1	9.2	0.24	0.22	5.78
2,269.0	0.90	102.20	2,268.8	-2.9	-8.7	7.7	0.28	-0.11	-15.78
2,359.0	0.90	121.00	2,358.8	-3.4	-7.4	6.4	0.33	0.00	20.89
2,449.0	2.30	26.30	2,448.7	-2.1	-6.0	5.3	2.82	1.56	-105.22
2,539.0	4.40	11.80	2,538.6	2.9	-4.5	5.0	2.50	2.33	-16.11
2,629.0	6.30	12.60	2,628.2	11.1	-2.7	5.3	2.11	2.11	0.89
2,718.0	7.70	11.30	2,716.5	21.7	-0.5	5.7	1.58	1.57	-1.46
2,809.0	9.80	11.80	2,806.5	35.2	2.3	6.2	2.31	2.31	0.55
2,898.0	9.90	9.40	2,894.1	50.2	5.1	7.1	0.47	0.11	-2.70
2,988.0	11.30	13.30	2,982.6	66.4	8.4	7.8	1.75	1.56	4.33
3,078.0	12.90	8.90	3,070.6	84.9	12.0	8.8	2.05	1.78	-4.89
3,168.0	14.20	11.50	3,158.1	105.7	15.7	10.2	1.59	1.44	2.89
3,258.0	14.60	15.00	3,245.3	127.5	20.9	10.4	1.06	0.44	3.89
3,348.0	14.00	9.40	3,332.5	149.2	25.6	11.1	1.67	-0.67	-6.22
3,438.0	14.50	12.00	3,419.7	170.9	29.7	12.3	0.90	0.56	2.89
3,527.0	15.10	18.20	3,505.8	192.8	35.7	11.8	1.90	0.67	6.97
3,617.0	15.90	12.40	3,592.5	216.0	42.0	11.3	1.94	0.89	-6.44
3,707.0	17.90	10.10	3,678.6	241.7	47.0	12.6	2.34	2.22	-2.56
3,797.0	17.10	6.40	3,764.4	268.4	50.9	15.2	1.52	-0.89	-4.11
3,887.0	18.90	5.70	3,850.0	296.1	53.9	19.0	2.01	2.00	-0.78
3,977.0	18.60	11.10	3,935.3	324.7	58.1	21.8	1.96	-0.33	6.00
4,067.0	17.40	15.20	4,020.9	351.8	64.4	22.2	1.94	-1.33	4.56
4,157.0	17.60	14.30	4,106.7	377.9	71.3	21.9	0.37	0.22	-1.00
4,247.0	16.70	11.80	4,192.7	403.8	77.3	22.3	1.29	-1.00	-2.78
4,337.0	16.50	12.60	4,279.0	428.9	82.7	23.0	0.34	-0.22	0.89
4,427.0	15.20	8.90	4,365.5	453.0	87.3	24.4	1.83	-1.44	-4.11
4,516.0	16.40	12.40	4,451.2	476.8	91.8	25.7	1.72	1.35	3.93
4,606.0	16.40	18.50	4,537.5	501.3	98.6	25.1	1.91	0.00	6.78
4,696.0	14.90	14.30	4,624.2	524.6	105.5	24.0	2.09	-1.67	-4.67
4,786.0	15.30	18.00	4,711.1	547.1	112.0	23.1	1.16	0.44	4.11
4,876.0	14.20	14.30	4,798.1	569.0	118.4	22.2	1.61	-1.22	-4.11
4,966.0	14.30	11.70	4,885.3	590.6	123.4	22.5	0.72	0.11	-2.89
5,055.0	16.40	18.70	4,971.2	613.3	129.6	21.9	3.14	2.36	7.87
5,145.0	16.00	17.50	5,057.6	637.2	137.4	20.1	0.58	-0.44	-1.33
5,235.0	14.60	14.00	5,144.4	660.0	143.9	19.3	1.86	-1.56	-3.89
5,325.0	14.20	10.80	5,231.6	681.8	148.7	19.9	0.99	-0.44	-3.56
5,415.0	13.90	9.60	5,318.9	703.4	152.6	21.3	0.46	-0.33	-1.33
5,505.0	15.50	16.10	5,405.9	725.6	157.7	21.7	2.55	1.78	7.22
5,594.0	15.10	12.40	5,491.8	748.3	163.5	21.5	1.19	-0.45	-4.16
5,684.0	14.60	7.30	5,578.8	771.0	167.5	23.2	1.55	-0.56	-5.67
5,774.0	15.70	5.20	5,665.7	794.4	170.0	26.3	1.37	1.22	-2.33
5,864.0	15.20	0.60	5,752.4	818.3	171.2	30.9	1.47	-0.56	-5.11
5,954.0	14.90	10.10	5,839.3	841.5	173.4	34.4	2.76	-0.33	10.56
6,044.0	17.10	10.40	5,925.8	865.9	177.8	36.0	2.45	2.44	0.33
6,134.0	17.90	5.20	6,011.7	892.7	181.5	38.9	1.95	0.89	-5.78
6,179.0	18.10	351.30	6,054.5	906.5	181.0	42.6	9.53	0.44	-30.89

<b>Company:</b>	Noble Energy Inc.- Weld County, CO (Grid North)	<b>Local Co-ordinate Reference:</b>	Well Thistle Down PC F36-67HC
<b>Project:</b>	Sec.36-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4786.0ft (Original Well Elev)
<b>Site:</b>	Thistle Down PC F36-63HN Pad	<b>MD Reference:</b>	WELL @ 4786.0ft (Original Well Elev)
<b>Well:</b>	Thistle Down PC F36-67HC	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

Survey									
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)
6,223.0	18.70	336.20	6,096.3	919.7	177.1	49.6	10.89	1.36	-34.32
6,269.0	19.10	323.50	6,139.8	932.5	169.7	59.9	8.97	0.87	-27.61
6,313.0	17.70	311.40	6,181.6	942.8	160.4	71.4	9.23	-3.18	-27.50
6,358.0	16.70	307.90	6,224.6	951.2	150.1	83.4	3.20	-2.22	-7.78
6,403.0	17.60	308.60	6,267.6	959.5	139.7	95.5	2.05	2.00	1.56
6,448.0	20.70	309.10	6,310.1	968.7	128.2	108.9	6.90	6.89	1.11
6,493.0	22.60	313.00	6,351.9	979.6	115.7	123.6	5.29	4.22	8.67
6,538.0	25.30	312.10	6,393.0	992.0	102.3	139.7	6.05	6.00	-2.00
6,583.0	29.40	311.90	6,433.0	1,005.8	86.9	157.9	9.11	9.11	-0.44
6,628.0	32.40	309.80	6,471.6	1,020.9	69.4	178.5	7.08	6.67	-4.67
6,673.0	34.00	305.90	6,509.2	1,036.0	50.0	201.0	5.93	3.56	-8.67
6,718.0	35.50	296.60	6,546.2	1,049.2	28.1	225.5	12.23	3.33	-20.67
6,763.0	38.60	289.60	6,582.2	1,059.8	3.2	252.2	11.62	6.89	-15.56
6,808.0	44.20	287.30	6,615.9	1,069.2	-25.1	281.9	12.89	12.44	-5.11
6,853.0	47.60	280.30	6,647.2	1,076.8	-56.4	314.1	13.48	7.56	-15.56
6,898.0	49.20	273.20	6,677.1	1,080.8	-89.8	347.5	12.32	3.56	-15.78
6,942.0	53.90	273.60	6,704.5	1,082.8	-124.2	381.3	10.71	10.68	0.91
6,987.0	57.80	275.30	6,729.8	1,085.7	-161.3	418.1	9.21	8.67	3.78
7,032.0	61.60	275.30	6,752.5	1,089.3	-200.0	456.5	8.44	8.44	0.00
7,077.0	63.40	275.70	6,773.2	1,093.1	-239.7	495.9	4.08	4.00	0.89
7,122.0	65.10	275.90	6,792.8	1,097.2	-280.0	536.1	3.80	3.78	0.44
7,167.0	67.40	275.20	6,810.9	1,101.2	-321.0	576.8	5.31	5.11	-1.56
7,212.0	69.60	273.80	6,827.4	1,104.5	-362.8	618.1	5.68	4.89	-3.11
7,257.0	73.10	272.00	6,841.8	1,106.6	-405.3	659.9	8.65	7.78	-4.00
7,302.0	76.90	270.60	6,853.4	1,107.6	-448.8	702.4	8.96	8.44	-3.11
7,307.4	77.25	270.58	6,854.6	1,107.7	-454.1	707.5	6.46	6.44	-0.45
<b>State Farm 36-11 (Exist.)</b>									
7,347.0	79.80	270.40	6,862.5	1,108.0	-492.9	745.2	6.46	6.44	-0.44
7,402.0	83.30	270.60	6,870.6	1,108.5	-547.2	798.1	6.37	6.36	0.36
7,411.7	83.63	270.60	6,871.7	1,108.6	-556.9	807.5	3.40	3.40	0.00
<b>End of Build Thistle Down PC F36-67HC</b>									
7,452.0	85.00	270.60	6,875.7	1,109.0	-597.0	846.5	3.40	3.40	0.00
7,470.0	86.50	271.80	6,877.0	1,109.4	-614.9	864.0	10.66	8.33	6.67
7,515.0	87.80	270.90	6,879.3	1,110.4	-659.9	907.9	3.51	2.89	-2.00
7,546.1	88.01	270.69	6,880.4	1,110.9	-690.9	938.1	0.94	0.67	-0.67
<b>Landing Pt. Thistle Down PC F36-67HC</b>									
7,560.0	88.10	270.60	6,880.9	1,111.0	-704.8	951.7	0.94	0.67	-0.67
7,650.0	90.50	272.00	6,882.0	1,113.1	-794.8	1,039.5	3.09	2.67	1.56
7,740.0	89.00	272.00	6,882.4	1,116.2	-884.7	1,127.5	1.67	-1.67	0.00
7,829.0	90.10	270.80	6,883.1	1,118.4	-973.7	1,214.4	1.83	1.24	-1.35
7,919.0	89.90	270.10	6,883.1	1,119.1	-1,063.7	1,301.9	0.81	-0.22	-0.78
8,009.0	88.80	269.40	6,884.1	1,118.7	-1,153.7	1,389.2	1.45	-1.22	-0.78
8,099.0	87.80	269.00	6,886.8	1,117.4	-1,243.6	1,476.2	1.20	-1.11	-0.44
8,189.0	87.80	268.80	6,890.2	1,115.7	-1,333.6	1,563.0	0.22	0.00	-0.22
8,279.0	88.00	266.40	6,893.5	1,111.9	-1,423.4	1,649.3	2.67	0.22	-2.67
8,369.0	90.10	266.60	6,895.0	1,106.5	-1,513.2	1,735.2	2.34	2.33	0.22
8,459.0	89.60	266.90	6,895.2	1,101.3	-1,603.1	1,821.1	0.65	-0.56	0.33
8,549.0	89.70	269.70	6,895.8	1,098.7	-1,693.0	1,907.8	3.11	0.11	3.11
8,639.0	89.10	271.10	6,896.7	1,099.3	-1,783.0	1,995.3	1.69	-0.67	1.56
8,729.0	88.50	270.10	6,898.6	1,100.2	-1,873.0	2,082.9	1.30	-0.67	-1.11
8,819.0	89.10	271.70	6,900.5	1,101.7	-1,963.0	2,170.5	1.90	0.67	1.78
8,908.0	88.50	270.80	6,902.4	1,103.6	-2,051.9	2,257.3	1.22	-0.67	-1.01

<b>Company:</b>	Noble Energy Inc.- Weld County, CO (Grid North)	<b>Local Co-ordinate Reference:</b>	Well Thistle Down PC F36-67HC
<b>Project:</b>	Sec.36-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4786.0ft (Original Well Elev)
<b>Site:</b>	Thistle Down PC F36-63HN Pad	<b>MD Reference:</b>	WELL @ 4786.0ft (Original Well Elev)
<b>Well:</b>	Thistle Down PC F36-67HC	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

Survey										
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)	
8,998.0	90.70	270.60	6,903.0	1,104.7	-2,141.9	2,344.9	2.45	2.44	-0.22	
9,088.0	89.50	270.60	6,902.8	1,105.6	-2,231.9	2,432.5	1.33	-1.33	0.00	
9,178.0	90.60	271.80	6,902.8	1,107.5	-2,321.9	2,520.3	1.81	1.22	1.33	
9,268.0	89.60	270.20	6,902.6	1,109.1	-2,411.9	2,608.0	2.10	-1.11	-1.78	
9,358.0	89.40	269.70	6,903.4	1,109.0	-2,501.8	2,695.3	0.60	-0.22	-0.56	
9,448.0	89.30	269.40	6,904.4	1,108.3	-2,591.8	2,782.5	0.35	-0.11	-0.33	
9,538.0	90.90	270.60	6,904.2	1,108.3	-2,681.8	2,869.8	2.22	1.78	1.33	
9,628.0	89.50	272.70	6,903.9	1,110.9	-2,771.8	2,957.8	2.80	-1.56	2.33	
9,717.0	89.30	271.80	6,904.9	1,114.4	-2,860.7	3,044.9	1.04	-0.22	-1.01	
9,807.0	89.20	270.80	6,906.0	1,116.4	-2,950.7	3,132.7	1.12	-0.11	-1.11	
9,897.0	89.50	273.10	6,907.1	1,119.5	-3,040.6	3,220.7	2.58	0.33	2.56	
9,987.0	88.30	268.80	6,908.8	1,121.0	-3,130.6	3,308.4	4.96	-1.33	-4.78	
10,077.0	89.10	268.50	6,910.8	1,118.9	-3,220.5	3,395.2	0.95	0.89	-0.33	
10,167.0	89.30	267.40	6,912.1	1,115.7	-3,310.4	3,481.7	1.24	0.22	-1.22	
10,257.0	89.80	268.30	6,912.8	1,112.3	-3,400.4	3,568.2	1.14	0.56	1.00	
10,347.0	88.50	267.30	6,914.1	1,108.8	-3,490.3	3,654.6	1.82	-1.44	-1.11	
10,437.0	90.70	268.30	6,914.8	1,105.4	-3,580.2	3,741.1	2.69	2.44	1.11	
10,527.0	90.30	269.50	6,914.0	1,103.6	-3,670.2	3,828.0	1.41	-0.44	1.33	
10,617.0	90.50	268.80	6,913.3	1,102.3	-3,760.2	3,915.0	0.81	0.22	-0.78	
10,707.0	89.80	269.70	6,913.1	1,101.1	-3,850.2	4,002.1	1.27	-0.78	1.00	
10,797.0	90.70	269.50	6,912.7	1,100.5	-3,940.2	4,089.2	1.02	1.00	-0.22	
10,886.0	88.50	271.10	6,913.3	1,101.0	-4,029.2	4,175.7	3.06	-2.47	1.80	
10,976.0	88.20	270.20	6,915.9	1,102.0	-4,119.1	4,263.3	1.05	-0.33	-1.00	
11,066.0	89.00	271.50	6,918.1	1,103.3	-4,209.1	4,350.9	1.70	0.89	1.44	
11,156.0	89.10	270.90	6,919.6	1,105.2	-4,299.1	4,438.7	0.68	0.11	-0.67	
11,274.0	90.80	272.00	6,919.7	1,108.2	-4,417.0	4,553.9	1.72	1.44	0.93	
11,330.0	90.80	272.00	6,918.9	1,110.1	-4,473.0	4,608.7	0.00	0.00	0.00	
Thistle Down PC F36-67HC BHL 1200'FNL, 535'FEL										

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------