

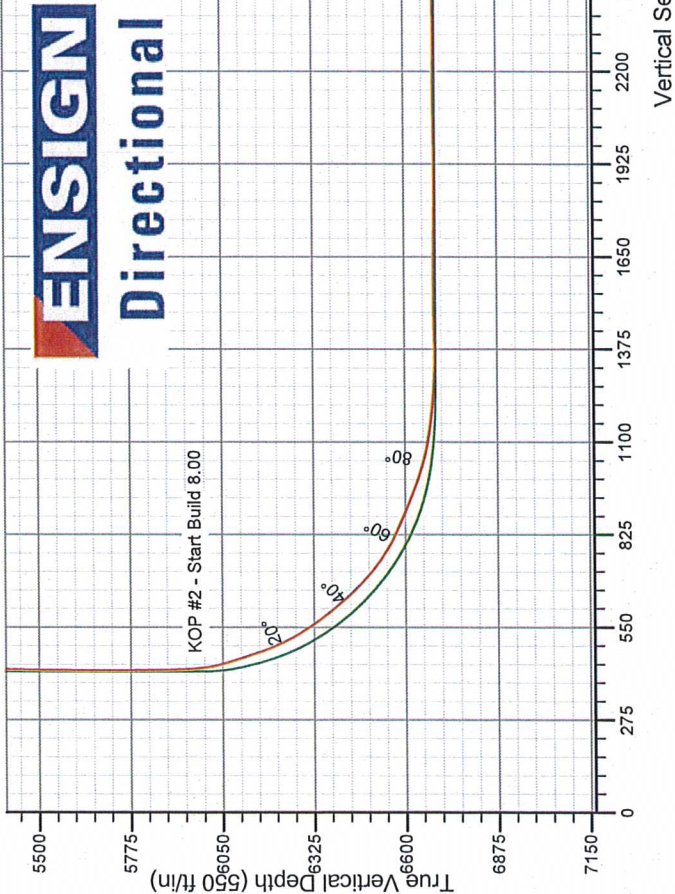
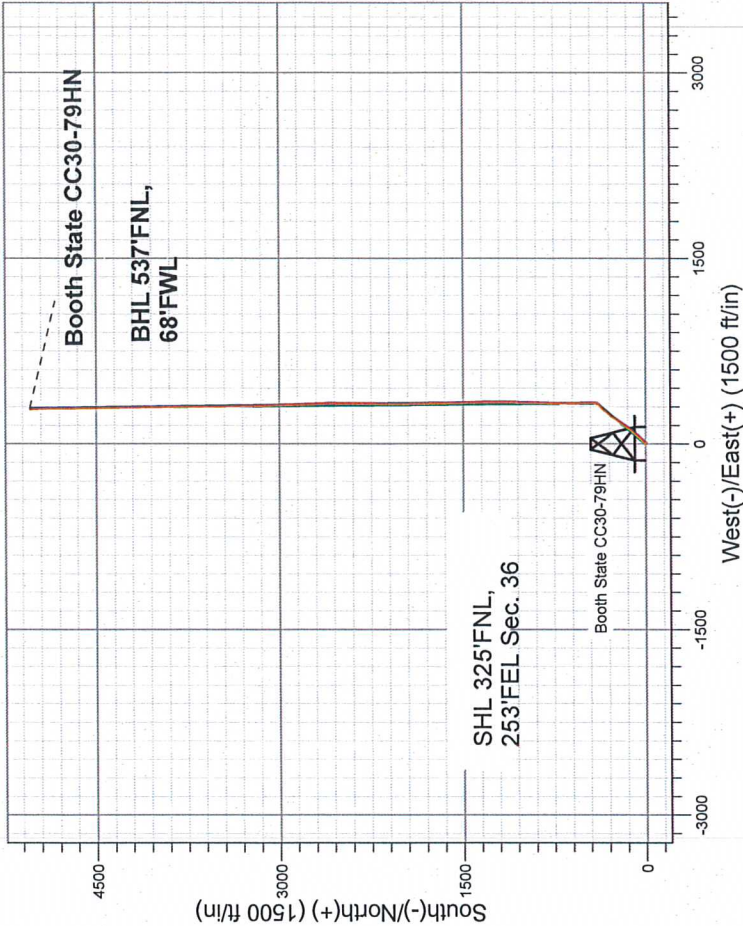
Noble Energy Inc.- Weld County, CO (Grid North)

Well Name: Booth State CC30-79HN			
Surface Location: Booth State CC Pad Sec.36-T4N-R64W			
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone			
+N/-S	+E/-W	Northing	Longitude
0.0	0.0	1344706.58	4759.0
		Eastings	Latitude
		0.0	40.275220
		Original Well Elev	-104.490730
		WELL @ 4772.0ft (Original Well Elev)	

Slot
4759.0

FINAL SURVEY

Projected Bottom Hole Location  
11026' MD 6692.3' TVD 5037' N & 282' E  
of SHL  
90.0 degree Incl @ 359.1 degree AZM



- LEGEND
- Booth State CC30-79HN, Wellbore #1, Plan A - Rev 0 (Updated 9-12-12) V0
  - Booth State CC30-79HN, Wellbore #1, Plan A - Rev 0 (Tied to curve survey) V0
  - Wellbore #1

Booth State CC Pad Sec.36-T4N-R64W  
Booth State CC30-79HN  
Wellbore #1  
14:53, September 20 2012



**Directional**

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

**Sec.36-T4N-R64W**

**Booth State CC Pad Sec.36-T4N-R64W**

**Booth State CC30-79HN**

**Wellbore #1**

**Design: Wellbore #1**

## **Standard Survey Report**

**20 September, 2012**



# **ENSIGN** Directional

## Survey Report

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Booth State CC30-79HN
Project:	Sec.36-T4N-R64W	TVD Reference:	WELL @ 4772.0ft (Original Well Elev)
Site:	Booth State CC Pad Sec.36-T4N-R64W	MD Reference:	WELL @ 4772.0ft (Original Well Elev)
Well:	Booth State CC30-79HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	Sec.36-T4N-R64W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site	Booth State CC Pad Sec.36-T4N-R64W				
Site Position:		Northing:	1,344,783.09ft	Latitude:	40.275430
From:	Lat/Long	Easting:	3,281,602.57ft	Longitude:	-104.490730
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.65 °

Well	Booth State CC30-79HN					
Well Position	+N/-S	0.0 ft	Northing:	1,344,706.58 ft	Latitude:	40.275220
	+E/-W	0.0 ft	Easting:	3,281,603.44 ft	Longitude:	-104.490730
Position Uncertainty	0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,759.0 ft	

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/17/2012	8.55	66.95	52,972

Design	Wellbore #1			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	3.28

Survey Program	Date 9/20/2012			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
644.0	11,026.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
Spike St GWS CC30-05 (P&A) - UPV 25-B14 (Exist.)									
1.0	0.00	0.00	1.0	0.0	0.0	0.0	0.00	0.00	0.00
Spike State GWS CC30-04 (Exist.) - Spike State CC30-13 (Exist.) - Spike State CC30-12 (Exist.)									
12.0	0.00	0.00	12.0	0.0	0.0	0.0	0.00	0.00	0.00
Booth 9-25 (Exist.)									
644.0	0.00	0.00	644.0	0.0	0.0	0.0	0.00	0.00	0.00
724.0	0.50	146.80	724.0	-0.3	0.2	-0.3	0.63	0.63	0.00
817.0	0.60	148.70	817.0	-1.0	0.7	-1.0	0.11	0.11	2.04
911.0	0.70	152.60	911.0	-2.0	1.2	-1.9	0.12	0.11	4.15
1,004.0	0.40	323.60	1,004.0	-2.2	1.3	-2.1	1.18	-0.32	183.87
1,097.0	0.80	359.60	1,097.0	-1.3	1.1	-1.2	0.57	0.43	38.71



Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Booth State CC30-79HN
Project:	Sec.36-T4N-R64W	TVD Reference:	WELL @ 4772.0ft (Original Well Elev)
Site:	Booth State CC Pad Sec.36-T4N-R64W	MD Reference:	WELL @ 4772.0ft (Original Well Elev)
Well:	Booth State CC30-79HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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)
1,196.0	0.30	205.50	1,196.0	-0.9	0.9	-0.8	1.09	-0.51	-155.66
1,291.0	0.20	11.40	1,291.0	-0.9	0.9	-0.9	0.52	-0.11	174.63
1,386.0	0.50	106.20	1,386.0	-0.9	1.3	-0.8	0.58	0.32	99.79
1,479.0	1.10	96.30	1,479.0	-1.1	2.6	-0.9	0.66	0.65	-10.65
1,574.0	2.20	54.70	1,573.9	-0.1	5.0	0.2	1.64	1.16	-43.79
1,669.0	4.00	39.50	1,668.8	3.5	8.6	4.0	2.07	1.89	-16.00
1,763.0	4.50	38.50	1,762.5	8.9	12.9	9.6	0.54	0.53	-1.06
1,858.0	6.20	46.00	1,857.1	15.4	19.0	16.4	1.93	1.79	7.89
1,952.0	7.60	43.90	1,950.4	23.4	26.9	24.9	1.51	1.49	-2.23
2,046.0	8.60	46.90	2,043.5	32.7	36.4	34.7	1.15	1.06	3.19
2,140.0	9.70	47.30	2,136.3	42.8	47.3	45.5	1.17	1.17	0.43
2,235.0	11.00	38.00	2,229.8	55.4	58.8	58.7	2.22	1.37	-9.79
2,330.0	11.70	42.70	2,322.9	69.6	70.9	73.6	1.22	0.74	4.95
2,425.0	13.30	44.30	2,415.6	84.5	85.1	89.3	1.72	1.68	1.68
2,520.0	15.10	38.00	2,507.7	102.1	100.3	107.7	2.49	1.89	-6.63
2,615.0	14.60	34.30	2,599.6	121.8	114.7	128.1	1.13	-0.53	-3.89
2,710.0	16.50	35.00	2,691.1	142.7	129.2	149.8	2.01	2.00	0.74
2,804.0	16.20	35.00	2,781.3	164.4	144.3	172.4	0.32	-0.32	0.00
2,899.0	15.90	33.90	2,872.6	186.0	159.2	194.8	0.45	-0.32	-1.16
2,994.0	15.30	31.10	2,964.1	207.6	172.9	217.1	1.01	-0.63	-2.95
3,089.0	17.30	34.10	3,055.3	230.0	187.3	240.3	2.28	2.11	3.16
3,184.0	16.40	30.80	3,146.2	253.2	202.1	264.4	1.38	-0.95	-3.47
3,279.0	14.80	31.50	3,237.7	275.1	215.3	286.9	1.70	-1.68	0.74
3,374.0	12.80	41.60	3,330.0	293.3	228.6	305.9	3.29	-2.11	10.63
3,469.0	12.00	42.00	3,422.7	308.5	242.2	321.9	0.85	-0.84	0.42
3,564.0	10.70	40.90	3,515.9	322.5	254.6	336.5	1.39	-1.37	-1.16
3,658.0	9.90	37.60	3,608.4	335.5	265.3	350.1	1.06	-0.85	-3.51
3,753.0	8.50	40.40	3,702.1	347.3	274.8	362.5	1.55	-1.47	2.95
3,848.0	8.80	44.80	3,796.1	357.8	284.5	373.5	0.76	0.32	4.63
3,943.0	8.70	46.40	3,890.0	367.9	294.8	384.2	0.28	-0.11	1.68
4,038.0	7.10	51.80	3,984.0	376.5	304.6	393.3	1.85	-1.68	5.68
4,133.0	6.80	49.20	4,078.3	383.8	313.5	401.1	0.46	-0.32	-2.74
4,228.0	6.20	38.10	4,172.7	391.5	320.9	409.3	1.46	-0.63	-11.68
4,323.0	4.80	22.80	4,267.3	399.2	325.6	417.2	2.12	-1.47	-16.11
4,418.0	3.30	24.10	4,362.1	405.4	328.3	423.5	1.58	-1.58	1.37
4,513.0	1.30	56.40	4,457.0	408.5	330.3	426.7	2.43	-2.11	34.00
4,607.0	0.50	342.20	4,551.0	409.5	331.1	427.7	1.34	-0.85	-78.94
4,702.0	0.80	19.50	4,646.0	410.5	331.1	428.8	0.53	0.32	39.26
4,797.0	0.80	223.80	4,741.0	410.6	330.9	428.9	1.65	0.00	-163.90
4,892.0	0.80	247.00	4,836.0	409.9	329.8	428.1	0.34	0.00	24.42
4,987.0	0.60	241.20	4,931.0	409.4	328.8	427.5	0.22	-0.21	-6.11
5,082.0	1.10	211.50	5,025.9	408.4	327.9	426.5	0.68	0.53	-31.26
5,177.0	0.80	223.60	5,120.9	407.1	326.9	425.2	0.38	-0.32	12.74
5,272.0	0.50	248.20	5,215.9	406.5	326.1	424.5	0.42	-0.32	25.89
5,367.0	1.70	257.90	5,310.9	406.1	324.3	423.9	1.27	1.26	10.21
5,461.0	1.50	251.00	5,404.9	405.4	321.8	423.1	0.30	-0.21	-7.34
5,556.0	1.20	183.30	5,499.8	404.0	320.6	421.6	1.60	-0.32	-71.26
5,651.0	1.00	123.90	5,594.8	402.5	321.2	420.2	1.16	-0.21	-62.53
5,746.0	1.40	82.60	5,689.8	402.2	323.1	420.0	0.97	0.42	-43.47
5,841.0	1.70	81.90	5,784.8	402.5	325.6	420.5	0.32	0.32	-0.74
5,936.0	1.20	75.60	5,879.7	403.0	328.0	421.1	0.55	-0.53	-6.63
6,031.0	5.30	5.40	5,974.6	407.6	329.3	425.8	5.29	4.32	-73.89
6,126.0	17.90	2.50	6,067.5	426.6	330.4	444.8	13.27	13.26	-3.05



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Site:	Booth State CC Pad Sec.36-T4N-R64W	MD Reference:	WELL @ 4772.0ft (Original Well Elev)
Well:	Booth State CC30-79HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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)
6,221.0	17.40	1.40	6,158.0	455.4	331.4	473.6	0.63	-0.53	-1.16
6,316.0	27.70	0.00	6,245.6	491.8	331.7	510.0	10.86	10.84	-1.47
6,411.0	35.00	358.80	6,326.7	541.2	331.1	559.2	7.71	7.68	-1.26
6,506.0	40.40	357.90	6,401.8	599.2	329.4	617.1	5.71	5.68	-0.95
6,601.0	46.10	0.00	6,471.0	664.3	328.3	682.0	6.19	6.00	2.21
6,696.0	55.60	1.40	6,530.9	737.9	329.3	755.5	10.06	10.00	1.47
6,791.0	66.50	2.30	6,576.8	820.8	332.0	838.5	11.50	11.47	0.95
6,886.0	67.50	2.30	6,613.9	908.2	335.5	925.9	1.05	1.05	0.00
6,981.0	72.00	359.80	6,646.8	997.3	337.1	1,014.9	5.34	4.74	-2.63
7,028.0	76.30	1.40	6,659.7	1,042.5	337.6	1,060.1	9.72	9.15	3.40
7,075.0	80.10	0.30	6,669.3	1,088.5	338.3	1,106.0	8.40	8.09	-2.34
7,115.0	82.60	1.60	6,675.3	1,128.0	338.9	1,145.5	7.03	6.25	3.25
7,165.0	85.00	359.00	6,680.7	1,177.7	339.2	1,195.2	7.05	4.80	-5.20
7,179.2	85.09	359.75	6,681.9	1,191.8	339.0	1,209.2	5.33	0.62	5.31
<b>Landing Point (CC30-79HN)</b>									
7,197.0	85.20	0.70	6,683.4	1,209.6	339.1	1,227.0	5.33	0.63	5.31
7,244.0	85.50	0.30	6,687.2	1,256.4	339.5	1,273.8	1.06	0.64	-0.85
7,292.0	88.50	359.10	6,689.7	1,304.4	339.3	1,321.6	6.73	6.25	-2.50
7,339.0	90.30	358.80	6,690.2	1,351.3	338.4	1,368.5	3.88	3.83	-0.64
7,387.0	91.60	358.60	6,689.4	1,399.3	337.3	1,416.3	2.74	2.71	-0.42
7,482.0	90.70	358.60	6,687.5	1,494.3	335.0	1,511.0	0.95	-0.95	0.00
7,577.0	90.20	358.20	6,686.8	1,589.2	332.3	1,605.6	0.67	-0.53	-0.42
7,672.0	88.40	358.40	6,687.9	1,684.2	329.5	1,700.3	1.91	-1.89	0.21
7,767.0	89.80	359.10	6,689.4	1,779.1	327.4	1,795.0	1.65	1.47	0.74
7,862.0	89.60	358.90	6,689.9	1,874.1	325.8	1,889.7	0.30	-0.21	-0.21
7,957.0	90.20	0.00	6,690.1	1,969.1	324.9	1,984.5	1.32	0.63	1.16
8,052.0	91.50	359.50	6,688.7	2,064.1	324.5	2,079.3	1.47	1.37	-0.53
8,147.0	89.30	359.80	6,688.0	2,159.1	323.9	2,174.1	2.34	-2.32	0.32
8,242.0	89.60	359.80	6,688.9	2,254.1	323.5	2,268.9	0.32	0.32	0.00
8,337.0	91.00	1.20	6,688.4	2,349.1	324.4	2,363.8	2.08	1.47	1.47
8,432.0	90.40	1.00	6,687.3	2,444.1	326.2	2,458.7	0.67	-0.63	-0.21
8,527.0	90.00	0.20	6,687.0	2,539.1	327.2	2,553.6	0.94	-0.42	-0.84
8,622.0	87.20	357.90	6,689.3	2,634.0	325.6	2,648.3	3.81	-2.95	-2.42
8,717.0	88.00	357.70	6,693.2	2,728.8	322.0	2,742.8	0.87	0.84	-0.21
8,812.0	89.90	358.40	6,695.0	2,823.8	318.7	2,837.4	2.13	2.00	0.74
8,907.0	89.30	358.20	6,695.7	2,918.7	315.9	2,932.0	0.67	-0.63	-0.21
9,002.0	90.80	358.40	6,695.6	3,013.7	313.1	3,026.6	1.59	1.58	0.21
9,096.0	89.60	358.60	6,695.2	3,107.6	310.6	3,120.3	1.29	-1.28	0.21
9,191.0	91.50	358.60	6,694.3	3,202.6	308.3	3,215.0	2.00	2.00	0.00
9,286.0	92.40	358.20	6,691.1	3,297.5	305.7	3,309.6	1.04	0.95	-0.42
9,381.0	92.60	358.40	6,687.0	3,392.4	302.9	3,404.1	0.30	0.21	0.21
9,476.0	92.30	359.50	6,682.9	3,487.3	301.1	3,498.8	1.20	-0.32	1.16
9,571.0	90.00	359.50	6,681.0	3,582.2	300.3	3,593.6	2.42	-2.42	0.00
9,666.0	89.00	359.30	6,681.8	3,677.2	299.3	3,688.3	1.07	-1.05	-0.21
9,761.0	89.30	359.30	6,683.2	3,772.2	298.1	3,783.1	0.32	0.32	0.00
9,856.0	88.90	0.00	6,684.7	3,867.2	297.6	3,877.9	0.85	-0.42	0.74
9,951.0	88.50	359.60	6,686.9	3,962.2	297.2	3,972.7	0.60	-0.42	-0.42
10,046.0	88.50	359.60	6,689.4	4,057.1	296.6	4,067.5	0.00	0.00	0.00
10,141.0	91.10	359.80	6,689.7	4,152.1	296.1	4,162.3	2.74	2.74	0.21
10,236.0	87.90	358.60	6,690.5	4,247.1	294.7	4,257.0	3.60	-3.37	-1.26
10,331.0	89.00	358.40	6,693.1	4,342.0	292.3	4,351.6	1.18	1.16	-0.21
10,426.0	89.70	358.60	6,694.2	4,437.0	289.8	4,446.3	0.77	0.74	0.21
10,520.0	90.00	358.90	6,694.4	4,531.0	287.7	4,540.0	0.45	0.32	0.32

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Well:	Booth State CC30-79HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	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)
10,615.0	90.10	358.80	6,694.3	4,626.0	285.8	4,634.7	0.15	0.11	-0.11
10,710.0	91.00	359.10	6,693.4	4,720.9	284.1	4,729.5	1.00	0.95	0.32
10,805.0	90.50	0.50	6,692.2	4,815.9	283.7	4,824.3	1.56	-0.53	1.47
10,900.0	90.00	358.40	6,691.8	4,910.9	282.8	4,919.0	2.27	-0.53	-2.21
10,970.0	90.00	359.10	6,691.8	4,980.9	281.3	4,988.8	1.00	0.00	1.00
11,026.0	90.00	359.10	6,691.8	5,036.9	280.4	5,044.7	0.00	0.00	0.00
Booth St. CC30-79HN BHL 535'FNL, 75'FWL									

Checked By: _____	Approved By: _____	Date: _____
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