

Well Name: **Vigilant State AC16-07**

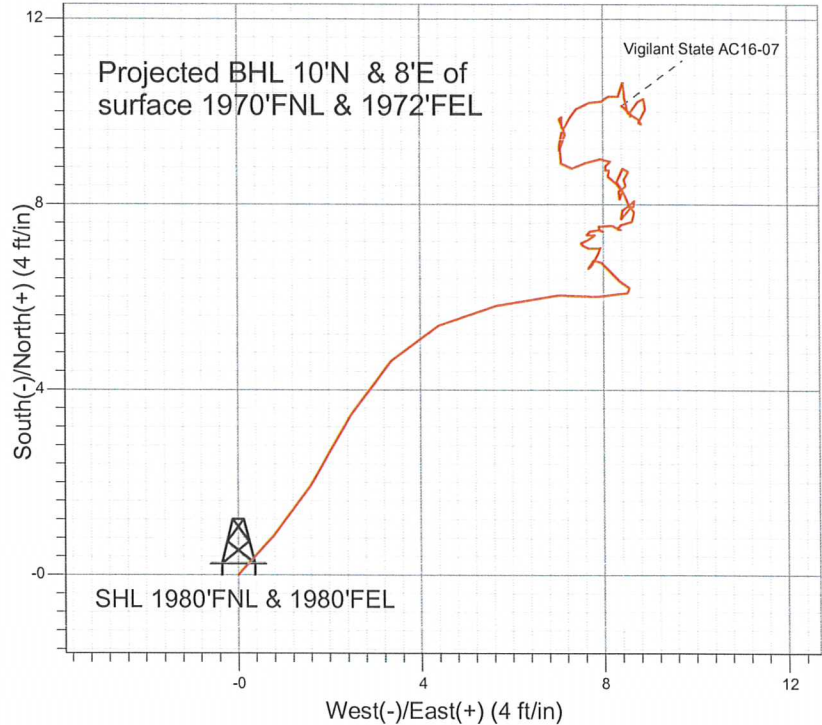
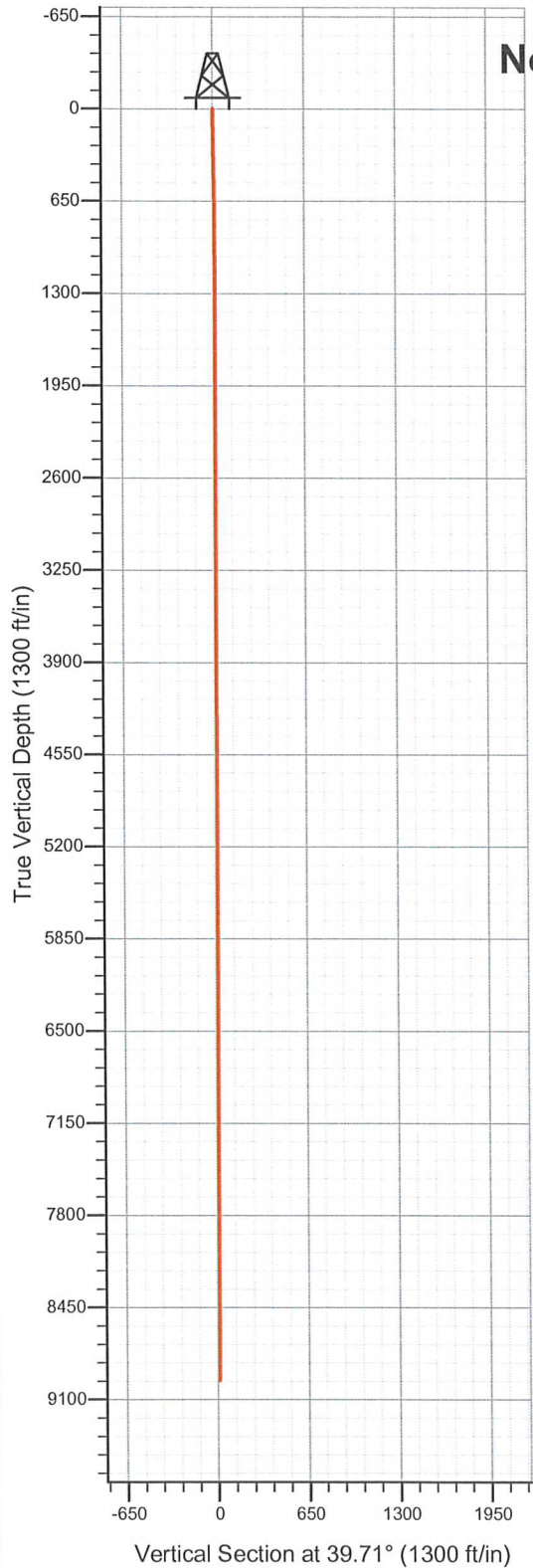
Surface Location: Vigilant State AC16-07 Pad Sec.16-T7N-R63W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1454441.13	3294719.73	40.576000	-104.439020	

Original Well Elev WELL @ 0.0ft (Original Well Elev)

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



LEGEND

- Wellbore #1
- Survey #1

Final Survey Plot

Projected Final Survey -
8966'MD & 8966'TVD @
10' VS 0.20 deg Inc 312.90
deg AZ

Project: SEC.16-T7N-R63W
Site: Vigilant State AC16-07 Pad Sec.16-T7N-R63W
Well: Vigilant State AC16-07
Plan: Wellbore #1



Directional

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

SEC.16-T7N-R63W

Vigilant State AC16-07 Pad Sec.16-T7N-R63W

Vigilant State AC16-07

Wellbore #1

Survey: Survey #1

Standard Survey Report

09 July, 2013

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Vigilant State AC16-07
Project:	SEC.16-T7N-R63W	TVD Reference:	WELL @ 0.0ft (Original Well Elev)
Site:	Vigilant State AC16-07 Pad Sec.16-T7N-R63W	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	Vigilant State AC16-07	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	SEC.16-T7N-R63W		
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	Vigilant State AC16-07 Pad Sec.16-T7N-R63W				
Site Position:		Northing:	1,454,441.14 ft	Latitude:	40.576000
From:	Lat/Long	Easting:	3,294,719.73 ft	Longitude:	-104.439020
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.69 °

Well	Vigilant State AC16-07					
Well Position	+N/-S	0.0 ft	Northing:	1,454,441.13 ft	Latitude:	40.576000
	+E/-W	0.0 ft	Easting:	3,294,719.73 ft	Longitude:	-104.439020
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	0.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/3/2013	8.43	67.17	53,081

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	39.71

Survey Program	Date 7/9/2013				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
120.0	8,966.0	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	
120.0	1.10	42.70	120.0	0.8	0.8	1.2	0.92	0.92	0.00	
187.0	1.20	31.40	187.0	1.9	1.6	2.5	0.37	0.15	-16.87	
283.0	0.90	28.60	283.0	3.4	2.5	4.2	0.32	-0.31	-2.92	
378.0	0.90	45.20	378.0	4.6	3.4	5.7	0.27	0.00	17.47	
472.0	0.70	64.70	471.9	5.4	4.4	7.0	0.36	-0.21	20.74	
568.0	0.90	76.30	567.9	5.8	5.7	8.1	0.27	0.21	12.08	
662.0	0.80	85.10	661.9	6.0	7.0	9.1	0.17	-0.11	9.36	
730.0	0.60	102.30	729.9	6.0	7.9	9.6	0.42	-0.29	25.29	
861.0	0.20	357.90	860.9	6.1	8.5	10.1	0.52	-0.31	-79.69	
956.0	0.10	132.90	955.9	6.2	8.6	10.2	0.29	-0.11	142.11	
1,051.0	0.40	306.70	1,050.9	6.3	8.4	10.2	0.53	0.32	182.95	

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Site:	Vigilant State AC16-07 Pad Sec.16-T7N-R63W	MD Reference:	WELL @ 0.0ft (Original Well Elev)
Well:	Vigilant State AC16-07	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)
1,145.0	0.30	326.10	1,144.9	6.7	8.0	10.3	0.16	-0.11	20.64
1,240.0	0.20	192.30	1,239.9	6.8	7.8	10.2	0.49	-0.11	-140.84
1,334.0	0.10	267.70	1,333.9	6.6	7.7	10.0	0.21	-0.11	80.21
1,430.0	0.20	67.00	1,429.9	6.7	7.7	10.1	0.31	0.10	165.94
1,525.0	0.20	353.30	1,524.9	6.9	7.9	10.4	0.25	0.00	-77.58
1,619.0	0.10	101.20	1,618.9	7.1	7.9	10.5	0.27	-0.11	114.79
1,714.0	0.10	274.00	1,713.9	7.1	7.9	10.5	0.21	0.00	181.90
1,809.0	0.20	266.50	1,808.9	7.0	7.7	10.3	0.11	0.11	-7.89
1,904.0	0.10	26.30	1,903.9	7.1	7.6	10.3	0.28	-0.11	126.11
1,999.0	0.10	250.80	1,998.9	7.2	7.5	10.3	0.19	0.00	-142.63
2,093.0	0.30	66.40	2,092.9	7.2	7.7	10.5	0.43	0.21	186.81
2,188.0	0.10	275.30	2,187.9	7.3	7.8	10.6	0.41	-0.21	-159.05
2,283.0	0.10	268.40	2,282.9	7.3	7.6	10.5	0.01	0.00	-7.26
2,378.0	0.20	63.30	2,377.9	7.4	7.7	10.6	0.31	0.11	163.05
2,472.0	0.10	116.20	2,471.9	7.5	7.9	10.8	0.17	-0.11	56.28
2,567.0	0.00	162.10	2,566.9	7.4	8.0	10.8	0.11	-0.11	0.00
2,662.0	0.10	286.30	2,661.9	7.4	7.9	10.8	0.11	0.11	0.00
2,757.0	0.10	42.00	2,756.9	7.5	7.9	10.8	0.18	0.00	121.79
2,852.0	0.30	99.70	2,851.9	7.5	8.2	11.0	0.27	0.21	60.74
2,947.0	0.10	229.60	2,946.9	7.4	8.4	11.1	0.39	-0.21	136.74
3,041.0	0.10	353.10	3,040.9	7.5	8.3	11.1	0.19	0.00	131.38
3,135.0	0.10	89.80	3,134.9	7.6	8.4	11.2	0.16	0.00	102.87
3,230.0	0.20	64.80	3,229.9	7.6	8.6	11.4	0.12	0.11	-26.32
3,325.0	0.20	323.40	3,324.9	7.8	8.7	11.6	0.33	0.00	-106.74
3,420.0	0.00	127.20	3,419.9	8.0	8.6	11.6	0.21	-0.21	0.00
3,514.0	0.10	112.80	3,513.9	7.9	8.6	11.6	0.11	0.11	0.00
3,609.0	0.10	317.30	3,608.9	8.0	8.7	11.7	0.21	0.00	-163.68
3,704.0	0.10	51.70	3,703.9	8.1	8.7	11.8	0.15	0.00	99.37
3,799.0	0.10	234.80	3,798.9	8.1	8.7	11.8	0.21	0.00	-186.21
3,894.0	0.30	229.00	3,893.9	7.9	8.4	11.4	0.21	0.21	-6.11
3,989.0	0.20	95.40	3,988.9	7.7	8.4	11.3	0.49	-0.11	-140.63
4,084.0	0.30	4.00	4,083.9	7.9	8.6	11.6	0.38	0.11	-96.21
4,179.0	0.20	299.70	4,178.9	8.3	8.4	11.7	0.29	-0.11	-67.68
4,272.0	0.20	358.00	4,271.9	8.5	8.3	11.8	0.21	0.00	62.69
4,369.0	0.20	51.30	4,368.9	8.8	8.4	12.1	0.18	0.00	54.95
4,463.0	0.20	184.40	4,462.9	8.7	8.5	12.2	0.39	0.00	141.60
4,558.0	0.10	261.00	4,557.9	8.5	8.4	12.0	0.21	-0.11	80.63
4,653.0	0.20	132.20	4,652.9	8.4	8.5	11.9	0.29	0.11	-135.58
4,747.0	0.20	297.80	4,746.9	8.4	8.5	11.8	0.42	0.00	176.17
4,842.0	0.20	171.70	4,841.9	8.3	8.3	11.7	0.38	0.00	-132.74
4,937.0	0.00	86.50	4,936.9	8.1	8.4	11.6	0.21	-0.21	0.00
5,031.0	0.20	19.00	5,030.9	8.3	8.4	11.7	0.21	0.21	0.00
5,126.0	0.20	271.70	5,125.9	8.4	8.3	11.8	0.34	0.00	-112.95
5,221.0	0.20	345.70	5,220.9	8.6	8.1	11.8	0.25	0.00	77.89
5,316.0	0.10	113.90	5,315.9	8.7	8.1	11.9	0.29	-0.11	134.95
5,411.0	0.20	286.20	5,410.9	8.7	8.1	11.9	0.32	0.11	181.37
5,505.0	0.20	76.60	5,504.9	8.8	8.1	11.9	0.41	0.00	160.00
5,600.0	0.10	315.90	5,599.9	8.9	8.2	12.1	0.28	-0.11	-127.05
5,695.0	0.20	268.90	5,694.9	9.0	7.9	12.0	0.16	0.11	-49.47
5,790.0	0.20	239.60	5,789.9	8.9	7.6	11.7	0.11	0.00	-30.84
5,885.0	0.20	258.40	5,884.9	8.8	7.3	11.4	0.07	0.00	19.79
5,979.0	0.20	332.60	5,978.9	8.9	7.1	11.4	0.26	0.00	78.94
6,074.0	0.20	18.60	6,073.9	9.2	7.1	11.6	0.16	0.00	48.42

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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)
6,169.0	0.20	20.40	6,168.9	9.5	7.2	11.9	0.01	0.00	1.89
6,264.0	0.20	229.40	6,263.9	9.6	7.1	11.9	0.41	0.00	-158.95
6,359.0	0.20	153.80	6,358.9	9.3	7.1	11.7	0.26	0.00	-79.58
6,454.0	0.10	279.70	6,453.9	9.2	7.0	11.5	0.29	-0.11	132.53
6,548.0	0.20	52.70	6,547.9	9.3	7.1	11.7	0.30	0.11	141.49
6,643.0	0.20	339.10	6,642.9	9.5	7.2	11.9	0.25	0.00	-77.47
6,738.0	0.20	337.70	6,737.9	9.8	7.0	12.1	0.01	0.00	-1.47
6,833.0	0.20	132.00	6,832.9	9.9	7.1	12.1	0.41	0.00	162.42
6,927.0	0.20	225.20	6,926.9	9.7	7.1	12.0	0.31	0.00	99.15
7,022.0	0.20	62.20	7,021.9	9.6	7.1	12.0	0.42	0.00	-171.58
7,117.0	0.20	354.70	7,116.9	9.9	7.3	12.2	0.23	0.00	-71.05
7,212.0	0.20	80.70	7,211.9	10.1	7.4	12.5	0.29	0.00	90.53
7,307.0	0.20	46.90	7,306.9	10.2	7.7	12.8	0.12	0.00	-35.58
7,402.0	0.20	119.50	7,401.9	10.2	8.0	13.0	0.25	0.00	76.42
7,497.0	0.20	349.30	7,496.9	10.3	8.1	13.1	0.38	0.00	-137.05
7,592.0	0.20	146.20	7,591.9	10.3	8.1	13.1	0.41	0.00	165.16
7,687.0	0.20	37.80	7,686.9	10.3	8.3	13.3	0.34	0.00	-114.11
7,782.0	0.20	355.80	7,781.9	10.6	8.4	13.6	0.15	0.00	-44.21
7,876.0	0.20	173.10	7,875.9	10.6	8.4	13.6	0.43	0.00	188.62
7,971.0	0.20	175.40	7,970.9	10.3	8.5	13.3	0.01	0.00	2.42
8,066.0	0.20	158.40	8,065.9	10.0	8.5	13.1	0.06	0.00	-17.89
8,161.0	0.20	82.20	8,160.9	9.8	8.8	13.2	0.26	0.00	-80.21
8,256.0	0.20	217.60	8,255.9	9.7	8.8	13.1	0.39	0.00	142.53
8,351.0	0.20	15.60	8,350.9	9.8	8.8	13.1	0.41	0.00	166.32
8,446.0	0.20	37.60	8,445.9	10.0	8.9	13.4	0.08	0.00	23.16
8,541.0	0.20	307.20	8,540.9	10.3	8.9	13.6	0.30	0.00	-95.16
8,636.0	0.20	180.30	8,635.9	10.2	8.8	13.5	0.38	0.00	-133.58
8,730.0	0.20	253.60	8,729.9	10.0	8.6	13.2	0.25	0.00	77.98
8,825.0	0.20	110.40	8,824.9	9.9	8.6	13.1	0.40	0.00	-150.74
8,886.0	0.20	312.90	8,885.9	9.9	8.6	13.1	0.64	0.00	-258.20
8,966.0	0.20	312.90	8,965.9	10.1	8.4	13.2	0.00	0.00	0.00

Checked By: _____ Approved By: _____ Date: _____