

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

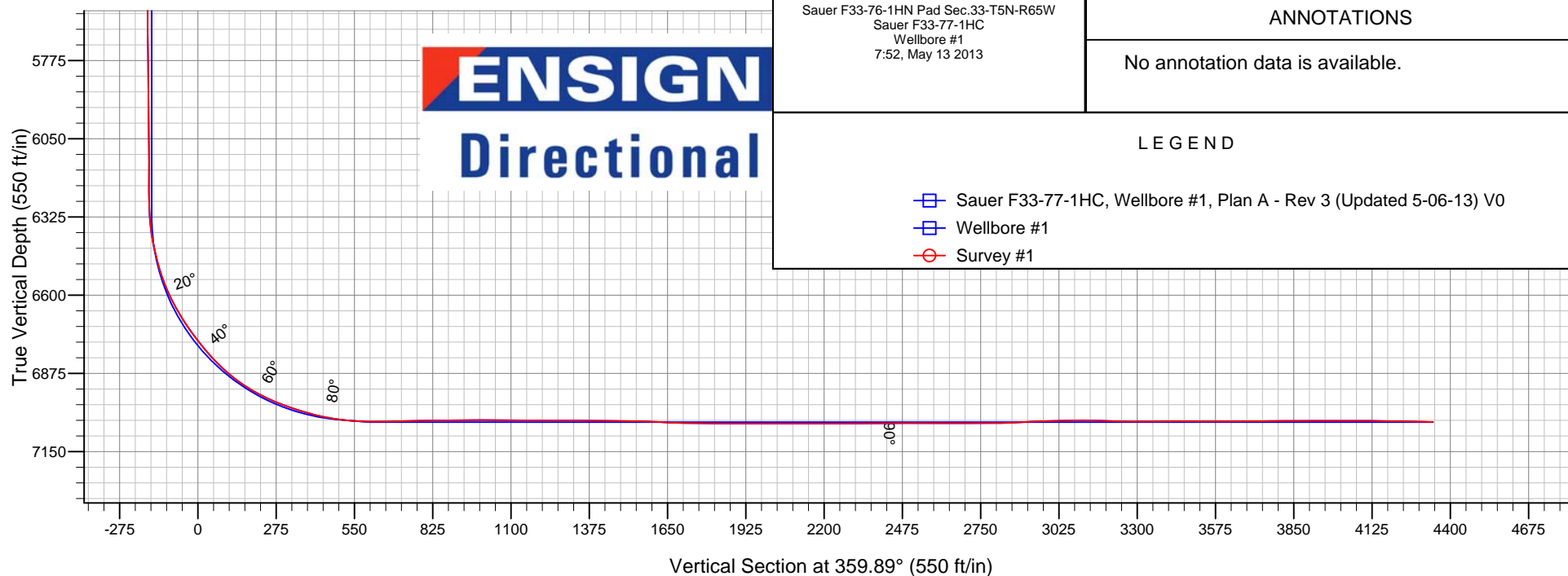
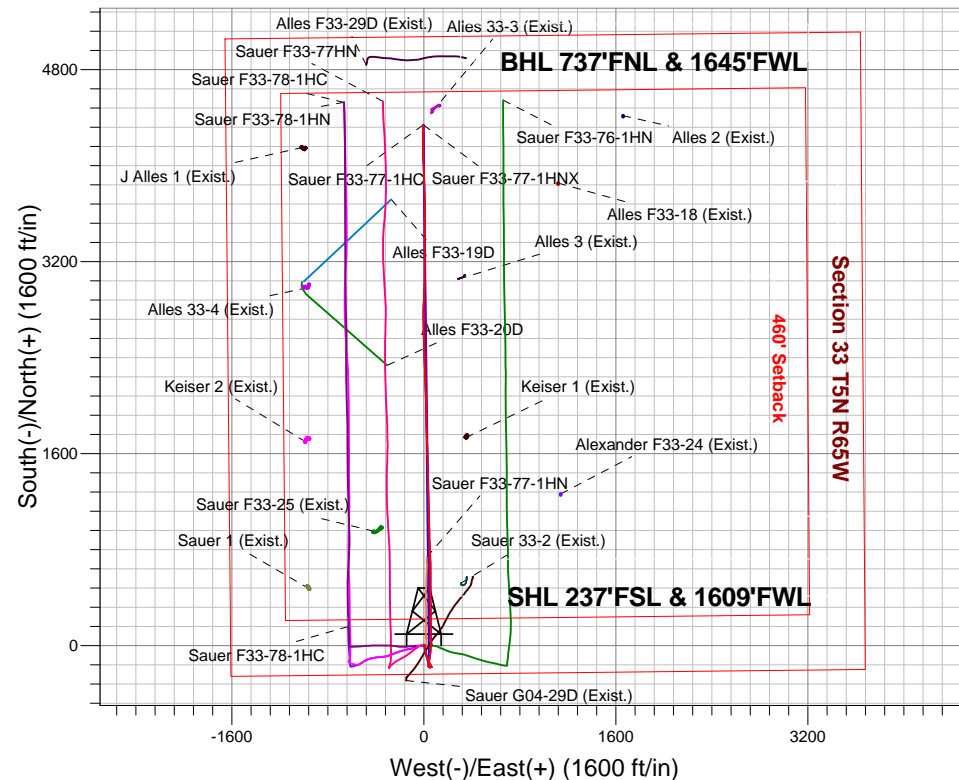
Well Name: **Sauer F33-77-1HC**

Surface Location: Sauer F33-76-1HN Pad Sec.33-T5N-R65W  
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone  
Ground Elevation: 4670.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1371105.94	3230753.96	40.349130	-104.672080	
Ensign 121 RKB - 13' WELL @ 4683.0ft (Ensign 121 RKB - 13')						

# FINAL SURVEY

Projected Bottom Hole Location  
11241' MD 7046' TVD 4338' N & 8' W of SHL  
88.7 degree Incl @ 359.4 degree AZM





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

**Sec.33-T5N-R65W**

**Sauer F33-76-1HN Pad Sec.33-T5N-R65W**

**Sauer F33-77-1HC**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**13 May, 2013**

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
	315.0	0.80	327.92	315.0	1.9	-1.2	1.9	0.25	0.25	0.00
	663.0	0.40	305.30	663.0	4.6	-3.4	4.6	0.13	-0.11	-6.50
	758.0	0.70	268.50	758.0	4.8	-4.3	4.8	0.47	0.32	-38.74
	853.0	1.20	44.60	853.0	5.5	-4.2	5.5	1.87	0.53	143.26
	948.0	1.30	25.60	947.9	7.2	-3.0	7.2	0.45	0.11	-20.00
	1,043.0	1.50	104.90	1,042.9	7.8	-1.4	7.8	1.89	0.21	83.47
	1,137.0	1.10	100.50	1,136.9	7.3	0.7	7.3	0.44	-0.43	-4.68
	1,232.0	1.60	90.30	1,231.9	7.2	2.9	7.2	0.58	0.53	-10.74
	1,326.0	1.70	134.20	1,325.8	6.2	5.3	6.2	1.32	0.11	46.70
	1,422.0	1.90	149.00	1,421.8	3.8	7.1	3.8	0.53	0.21	15.42
	1,517.0	2.00	168.70	1,516.7	0.9	8.2	0.8	0.71	0.11	20.74

<b>Company:</b>	Noble Energy Inc.- Weld County, CO (Grid North)	<b>Local Co-ordinate Reference:</b>	Well Sauer F33-77-1HC
<b>Project:</b>	Sec.33-T5N-R65W	<b>TVD Reference:</b>	WELL @ 4683.0ft (Ensign 121 RKB - 13')
<b>Site:</b>	Sauer F33-76-1HN Pad Sec.33-T5N-R65W	<b>MD Reference:</b>	WELL @ 4683.0ft (Ensign 121 RKB - 13')
<b>Well:</b>	Sauer F33-77-1HC	<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)
1,612.0	2.40	175.90	1,611.7	-2.7	8.7	-2.8	0.51	0.42	7.58
1,707.0	4.60	176.40	1,706.5	-8.5	9.1	-8.6	2.32	2.32	0.53
1,802.0	5.60	178.00	1,801.1	-17.0	9.5	-17.0	1.06	1.05	1.68
1,897.0	7.20	173.60	1,895.5	-27.5	10.3	-27.5	1.76	1.68	-4.63
1,992.0	8.30	175.40	1,989.6	-40.3	11.5	-40.3	1.19	1.16	1.89
2,087.0	8.70	171.50	2,083.6	-54.2	13.1	-54.2	0.74	0.42	-4.11
2,182.0	9.10	163.90	2,177.5	-68.5	16.3	-68.6	1.31	0.42	-8.00
2,276.0	8.20	162.90	2,270.4	-82.1	20.3	-82.1	0.97	-0.96	-1.06
2,371.0	8.40	162.50	2,364.4	-95.2	24.4	-95.2	0.22	0.21	-0.42
2,466.0	7.90	161.70	2,458.4	-108.0	28.5	-108.0	0.54	-0.53	-0.84
2,561.0	8.10	158.30	2,552.5	-120.4	33.1	-120.5	0.54	0.21	-3.58
2,655.0	8.20	154.80	2,645.6	-132.6	38.4	-132.7	0.54	0.11	-3.72
2,750.0	7.90	142.00	2,739.6	-143.9	45.3	-144.0	1.91	-0.32	-13.47
2,845.0	6.50	150.40	2,833.9	-153.7	51.9	-153.8	1.84	-1.47	8.84
2,940.0	4.90	163.10	2,928.4	-162.3	55.8	-162.4	2.13	-1.68	13.37
3,035.0	2.70	169.00	3,023.2	-168.4	57.4	-168.5	2.35	-2.32	6.21
3,130.0	2.60	172.20	3,118.1	-172.7	58.1	-172.8	0.19	-0.11	3.37
3,225.0	1.10	147.40	3,213.0	-175.6	58.9	-175.7	1.75	-1.58	-26.11
3,319.0	0.40	10.70	3,307.0	-176.0	59.4	-176.1	1.51	-0.74	-145.43
3,414.0	0.40	73.10	3,402.0	-175.6	59.8	-175.7	0.44	0.00	65.68
3,509.0	0.40	18.70	3,497.0	-175.2	60.2	-175.3	0.38	0.00	-57.26
3,604.0	0.30	343.20	3,592.0	-174.7	60.3	-174.8	0.25	-0.11	-37.37
3,699.0	0.60	79.20	3,687.0	-174.3	60.7	-174.4	0.74	0.32	101.05
3,793.0	0.60	93.40	3,781.0	-174.3	61.7	-174.4	0.16	0.00	15.11
3,888.0	0.30	77.30	3,876.0	-174.2	62.4	-174.3	0.34	-0.32	-16.95
3,983.0	0.40	98.40	3,971.0	-174.2	63.0	-174.3	0.17	0.11	22.21
4,078.0	0.70	121.20	4,066.0	-174.6	63.8	-174.7	0.38	0.32	24.00
4,173.0	0.90	140.00	4,161.0	-175.4	64.8	-175.6	0.34	0.21	19.79
4,268.0	0.20	69.20	4,256.0	-176.0	65.4	-176.1	0.90	-0.74	-74.53
4,363.0	1.30	267.50	4,351.0	-175.9	64.5	-176.1	1.57	1.16	-170.21
4,457.0	1.70	253.90	4,445.0	-176.4	62.1	-176.5	0.57	0.43	-14.47
4,552.0	1.80	252.20	4,539.9	-177.2	59.3	-177.3	0.12	0.11	-1.79
4,647.0	1.50	246.40	4,634.9	-178.2	56.7	-178.3	0.36	-0.32	-6.11
4,742.0	1.70	225.80	4,729.8	-179.7	54.6	-179.8	0.64	0.21	-21.68
4,837.0	2.20	221.60	4,824.8	-182.0	52.4	-182.1	0.55	0.53	-4.42
4,931.0	1.00	261.70	4,918.8	-183.5	50.4	-183.6	1.67	-1.28	42.66
5,026.0	1.40	325.10	5,013.7	-182.6	48.9	-182.7	1.37	0.42	66.74
5,121.0	1.10	320.20	5,108.7	-181.0	47.6	-181.1	0.33	-0.32	-5.16
5,216.0	1.20	326.00	5,203.7	-179.5	46.5	-179.6	0.16	0.11	6.11
5,311.0	1.10	308.40	5,298.7	-178.1	45.2	-178.2	0.38	-0.11	-18.53
5,405.0	1.40	301.60	5,392.6	-176.9	43.5	-177.0	0.36	0.32	-7.23
5,500.0	1.00	273.80	5,487.6	-176.3	41.7	-176.3	0.73	-0.42	-29.26
5,595.0	1.00	240.90	5,582.6	-176.6	40.2	-176.7	0.60	0.00	-34.63
5,690.0	0.90	346.40	5,677.6	-176.3	39.3	-176.3	1.59	-0.11	111.05
5,785.0	0.50	339.00	5,772.6	-175.2	38.9	-175.2	0.43	-0.42	-7.79
5,879.0	1.00	302.80	5,866.6	-174.3	38.1	-174.4	0.71	0.53	-38.51
5,974.0	0.90	328.10	5,961.6	-173.3	37.0	-173.3	0.45	-0.11	26.63
6,069.0	0.40	320.70	6,056.6	-172.4	36.4	-172.4	0.53	-0.53	-7.79
6,164.0	0.40	255.20	6,151.6	-172.2	35.9	-172.3	0.46	0.00	-68.95
6,258.0	0.70	290.90	6,245.6	-172.1	35.0	-172.1	0.47	0.32	37.98
6,353.0	4.70	13.50	6,340.5	-168.1	35.4	-168.1	4.91	4.21	86.95
6,448.0	13.00	10.10	6,434.2	-153.7	38.2	-153.8	8.75	8.74	-3.58
6,543.0	17.60	11.20	6,525.9	-129.1	42.8	-129.2	4.85	4.84	1.16

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<b>Well:</b>	Sauer F33-77-1HC	<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)
6,638.0	27.20	8.40	6,613.6	-93.5	48.8	-93.6	10.16	10.11	-2.95
6,733.0	33.00	5.40	6,695.7	-46.2	54.4	-46.3	6.31	6.11	-3.16
6,827.0	38.60	2.40	6,772.0	8.6	58.1	8.5	6.24	5.96	-3.19
6,922.0	45.30	359.20	6,842.6	72.1	58.8	72.0	7.40	7.05	-3.37
7,017.0	53.20	358.70	6,904.5	144.0	57.5	143.9	8.33	8.32	-0.53
7,112.0	64.30	359.10	6,953.8	225.1	56.0	225.0	11.69	11.68	0.42
7,207.0	70.10	0.80	6,990.6	312.6	55.9	312.5	6.32	6.11	1.79
7,254.0	72.60	0.10	7,005.6	357.1	56.3	357.0	5.50	5.32	-1.49
7,302.0	74.80	359.60	7,019.1	403.2	56.1	403.1	4.69	4.58	-1.04
7,358.0	79.90	358.70	7,031.3	457.8	55.3	457.7	9.24	9.11	-1.61
7,421.0	84.10	0.10	7,040.1	520.2	54.7	520.1	7.02	6.67	2.22
7,468.0	86.90	0.10	7,043.8	567.0	54.8	566.9	5.96	5.96	0.00
7,516.0	90.10	359.80	7,045.0	615.0	54.7	614.9	6.70	6.67	-0.63
7,530.3	90.33	359.50	7,045.0	629.3	54.6	629.2	2.63	1.58	-2.10
Sauer F33-77-1HC Landing Pt.									
7,611.0	91.60	357.80	7,043.6	710.0	52.7	709.9	2.63	1.58	-2.11
7,706.0	91.00	357.70	7,041.5	804.9	49.0	804.8	0.64	-0.63	-0.11
7,801.0	90.60	358.00	7,040.1	899.8	45.4	899.7	0.53	-0.42	0.32
7,896.0	90.20	359.30	7,039.5	994.8	43.2	994.7	1.43	-0.42	1.37
7,991.0	89.20	357.80	7,040.0	1,089.7	40.8	1,089.6	1.90	-1.05	-1.58
8,086.0	89.60	358.50	7,041.0	1,184.7	37.7	1,184.6	0.85	0.42	0.74
8,181.0	90.70	0.00	7,040.7	1,279.6	36.5	1,279.6	1.96	1.16	1.58
8,276.0	88.20	357.70	7,041.6	1,374.6	34.6	1,374.5	3.58	-2.63	-2.42
8,371.0	90.60	358.70	7,042.6	1,469.5	31.6	1,469.5	2.74	2.53	1.05
8,465.0	87.30	358.20	7,044.3	1,563.5	29.1	1,563.4	3.55	-3.51	-0.53
8,560.0	87.80	358.20	7,048.4	1,658.4	26.1	1,658.3	0.53	0.53	0.00
8,655.0	89.20	358.50	7,050.9	1,753.3	23.3	1,753.2	1.51	1.47	0.32
8,750.0	89.60	358.50	7,051.9	1,848.2	20.9	1,848.2	0.42	0.42	0.00
8,845.0	90.30	0.70	7,052.0	1,943.2	20.2	1,943.2	2.43	0.74	2.32
8,940.0	90.00	358.00	7,051.7	2,038.2	19.1	2,038.2	2.86	-0.32	-2.84
9,034.0	90.20	357.30	7,051.6	2,132.1	15.3	2,132.1	0.77	0.21	-0.74
9,129.0	89.70	356.80	7,051.6	2,227.0	10.4	2,227.0	0.74	-0.53	-0.53
9,224.0	90.90	358.90	7,051.1	2,321.9	6.8	2,321.9	2.55	1.26	2.21
9,319.0	90.00	358.90	7,050.4	2,416.9	5.0	2,416.9	0.95	-0.95	0.00
9,414.0	90.00	357.80	7,050.4	2,511.9	2.2	2,511.9	1.16	0.00	-1.16
9,509.0	89.90	357.80	7,050.5	2,606.8	-1.4	2,606.8	0.11	-0.11	0.00
9,604.0	90.00	358.50	7,050.6	2,701.8	-4.5	2,701.8	0.74	0.11	0.74
9,699.0	90.40	1.50	7,050.2	2,796.7	-4.5	2,796.7	3.19	0.42	3.16
9,793.0	93.30	4.50	7,047.2	2,890.5	0.4	2,890.5	4.44	3.09	3.19
9,888.0	91.90	1.00	7,042.9	2,985.3	5.0	2,985.3	3.96	-1.47	-3.68
9,983.0	91.00	0.80	7,040.5	3,080.3	6.5	3,080.3	0.97	-0.95	-0.21
10,078.0	87.20	358.90	7,042.0	3,175.2	6.2	3,175.2	4.47	-4.00	-2.00
10,172.0	89.50	0.50	7,044.7	3,269.2	5.8	3,269.2	2.98	2.45	1.70
10,267.0	90.70	1.20	7,044.5	3,364.2	7.2	3,364.2	1.46	1.26	0.74
10,362.0	90.30	0.70	7,043.7	3,459.2	8.7	3,459.1	0.67	-0.42	-0.53
10,457.0	90.00	359.40	7,043.4	3,554.2	8.8	3,554.1	1.40	-0.32	-1.37
10,552.0	89.20	357.80	7,044.1	3,649.1	6.5	3,649.1	1.88	-0.84	-1.68
10,646.0	91.50	359.40	7,043.5	3,743.1	4.2	3,743.1	2.98	2.45	1.70
10,741.0	90.20	359.40	7,042.1	3,838.1	3.2	3,838.1	1.37	-1.37	0.00
10,836.0	89.70	357.10	7,042.2	3,933.0	0.3	3,933.0	2.48	-0.53	-2.42
10,931.0	89.80	357.50	7,042.6	4,027.9	-4.2	4,027.9	0.43	0.11	0.42
11,025.0	90.20	0.00	7,042.6	4,121.9	-6.2	4,121.9	2.69	0.43	2.66
11,120.0	88.70	359.40	7,043.5	4,216.9	-6.7	4,216.9	1.70	-1.58	-0.63

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11,241.0	88.70	359.40	7,046.3	4,337.8	-8.0	4,337.8	0.00	0.00	0.00
Sauer F33-77-1HC BHL 735'FNL, 1650'FWL									

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_