

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

Well Name: **Sauer F33-77HN**

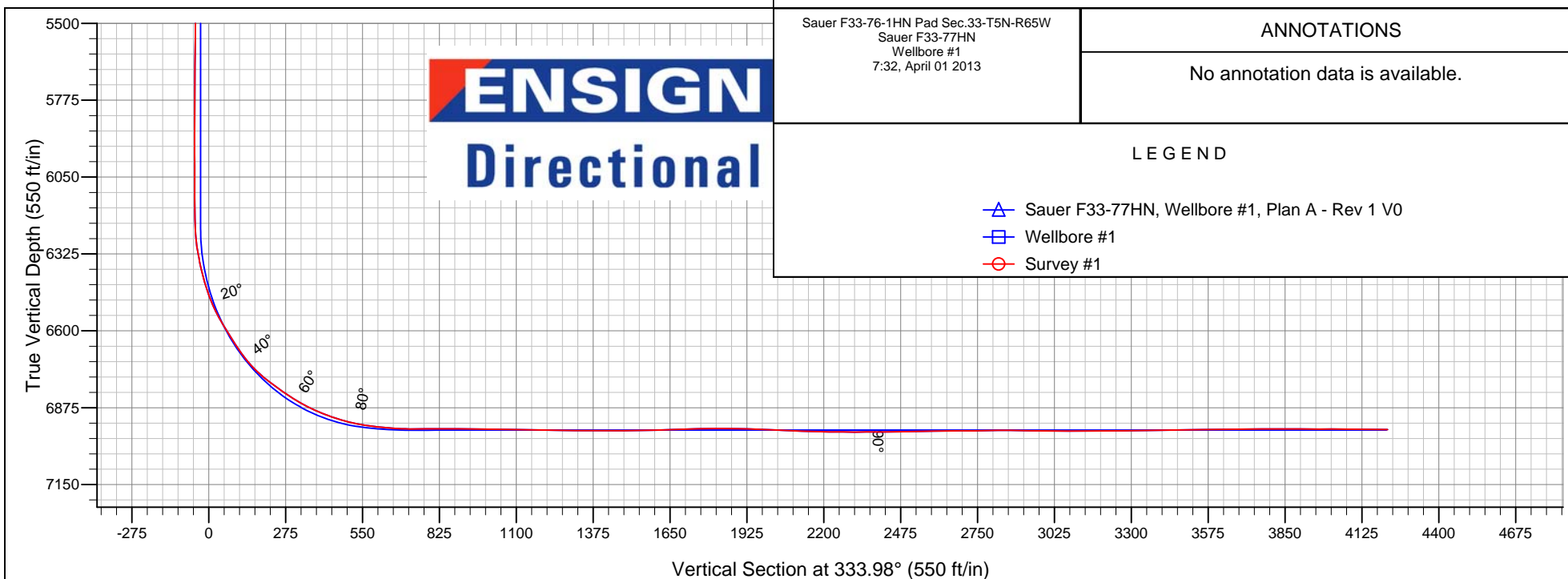
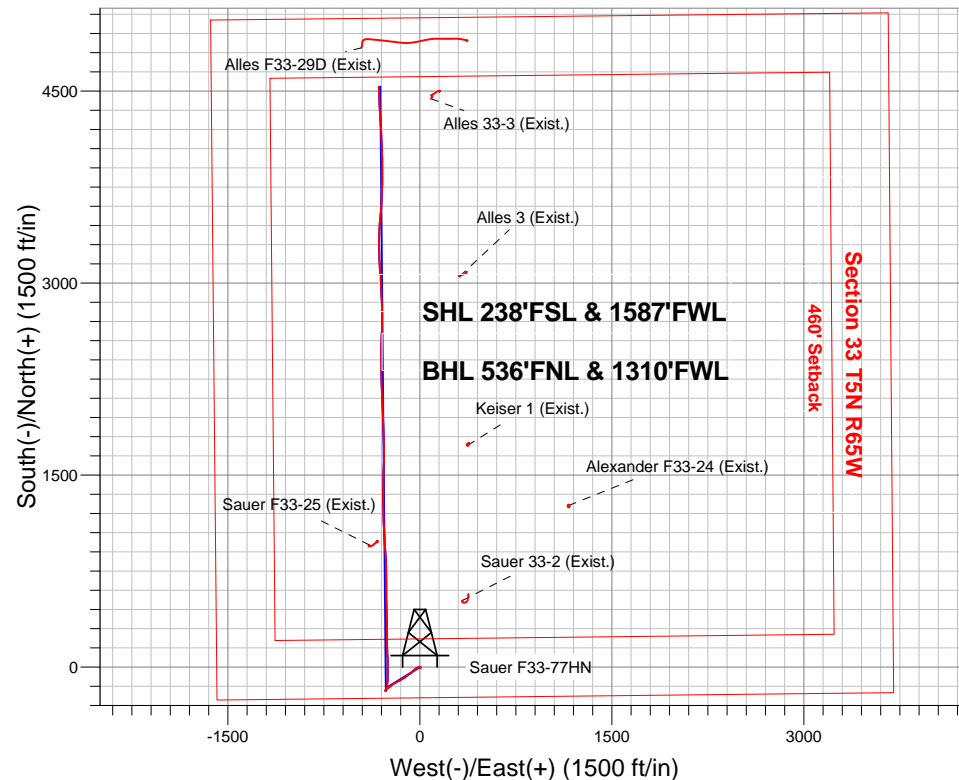
Surface Location: Sauer F33-76-1HN Pad Sec.33-T5N-R65W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4671.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1371105.72	3230731.67	40.349130	-104.672160	

Ensign 121 RKB - 13' WELL @ 4684.0ft (Ensign 121 RKB - 13')

FINAL SURVEY

Projected Bottom Hole Location
11354' MD 6955' TVD 4536' N & 320' W of SHL
89.8 degree Incl @ 358.0 degree AZM



Sauer F33-76-1HN Pad Sec.33-T5N-R65W
Sauer F33-77HN
Wellbore #1
7:32, April 01 2013

ANNOTATIONS

No annotation data is available.

LEGEND

- △ Sauer F33-77HN, Wellbore #1, Plan A - Rev 1 V0
- Wellbore #1
- Survey #1



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

Sec.33-T5N-R65W

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

Sauer F33-77HN

Wellbore #1

Survey: Survey #1

Standard Survey Report

01 April, 2013

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Sauer F33-77HN
Project:	Sec.33-T5N-R65W	TVD Reference:	WELL @ 4684.0ft (Ensign 121 RKB - 13')
Site:	Sauer F33-76-1HN Pad Sec.33-T5N-R65W	MD Reference:	WELL @ 4684.0ft (Ensign 121 RKB - 13')
Well:	Sauer F33-77HN	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)
1,401.0	0.70	290.00	1,400.9	0.7	1.7	-0.1	0.32	0.32	2.00
1,496.0	0.20	25.10	1,495.9	1.0	1.3	0.4	0.78	-0.53	100.11
1,591.0	0.80	33.20	1,590.9	1.7	1.7	0.8	0.63	0.63	8.53
1,686.0	1.40	293.30	1,685.9	2.8	1.0	2.0	1.82	0.63	-105.16
1,781.0	1.80	268.40	1,780.9	3.2	-1.6	3.5	0.83	0.42	-26.21
1,876.0	3.30	243.90	1,875.8	1.9	-5.5	4.1	1.92	1.58	-25.79
1,971.0	4.50	250.40	1,970.6	-0.5	-11.5	4.6	1.34	1.26	6.84
2,066.0	6.30	247.80	2,065.1	-3.7	-19.8	5.3	1.91	1.89	-2.74
2,161.0	6.60	234.80	2,159.5	-8.9	-29.1	4.8	1.57	0.32	-13.68
2,255.0	6.50	228.10	2,252.9	-15.5	-37.5	2.5	0.82	-0.11	-7.13
2,350.0	6.10	230.60	2,347.4	-22.3	-45.4	-0.2	0.51	-0.42	2.63
2,445.0	6.00	226.70	2,441.8	-28.9	-52.9	-2.8	0.45	-0.11	-4.11
2,540.0	5.80	225.30	2,536.3	-35.7	-59.9	-5.8	0.26	-0.21	-1.47
2,634.0	6.20	233.90	2,629.8	-42.0	-67.4	-8.2	1.05	0.43	9.15
2,729.0	6.00	232.90	2,724.3	-48.1	-75.5	-10.1	0.24	-0.21	-1.05
2,824.0	5.60	233.90	2,818.8	-53.8	-83.2	-11.8	0.43	-0.42	1.05
2,919.0	6.40	237.10	2,913.3	-59.4	-91.4	-13.3	0.91	0.84	3.37
3,014.0	6.20	233.90	3,007.7	-65.3	-100.0	-14.8	0.43	-0.21	-3.37
3,108.0	5.70	229.90	3,101.2	-71.3	-107.7	-16.8	0.69	-0.53	-4.26
3,203.0	6.10	229.90	3,195.7	-77.6	-115.1	-19.2	0.42	0.42	0.00
3,298.0	5.30	239.90	3,290.2	-83.0	-122.8	-20.8	1.34	-0.84	10.53
3,393.0	4.90	243.80	3,384.8	-87.0	-130.2	-21.1	0.56	-0.42	4.11
3,488.0	6.20	240.20	3,479.4	-91.4	-138.3	-21.4	1.42	1.37	-3.79
3,582.0	5.50	234.80	3,572.9	-96.5	-146.4	-22.5	0.95	-0.74	-5.74
3,677.0	5.30	242.50	3,667.5	-101.1	-154.0	-23.3	0.79	-0.21	8.11
3,772.0	6.10	244.80	3,762.0	-105.3	-162.5	-23.4	0.88	0.84	2.42
3,867.0	6.90	242.70	3,856.4	-110.1	-172.1	-23.4	0.88	0.84	-2.21
3,962.0	6.50	242.90	3,950.8	-115.1	-182.0	-23.7	0.42	-0.42	0.21
4,056.0	6.20	238.10	4,044.2	-120.3	-191.0	-24.3	0.65	-0.32	-5.11
4,151.0	6.90	242.40	4,138.6	-125.6	-200.4	-25.0	0.90	0.74	4.53
4,246.0	6.30	234.80	4,232.9	-131.3	-209.7	-25.9	1.11	-0.63	-8.00
4,341.0	7.50	231.50	4,327.2	-138.1	-218.9	-28.1	1.33	1.26	-3.47
4,436.0	8.30	229.30	4,421.3	-146.5	-228.9	-31.2	0.90	0.84	-2.32
4,530.0	6.70	236.60	4,514.5	-153.9	-238.6	-33.6	1.98	-1.70	7.77
4,625.0	6.30	226.90	4,608.9	-160.5	-247.1	-35.9	1.23	-0.42	-10.21
4,720.0	4.70	227.80	4,703.5	-166.7	-253.7	-38.5	1.69	-1.68	0.95
4,815.0	4.80	231.50	4,798.2	-171.8	-259.7	-40.4	0.34	0.11	3.89
4,910.0	3.30	239.50	4,892.9	-175.6	-265.2	-41.5	1.68	-1.58	8.42
5,005.0	2.20	224.60	4,987.8	-178.3	-268.8	-42.3	1.37	-1.16	-15.68
5,100.0	1.10	187.50	5,082.8	-180.5	-270.2	-43.7	1.56	-1.16	-39.05
5,194.0	0.60	197.40	5,176.8	-181.9	-270.5	-44.8	0.55	-0.53	10.53
5,289.0	0.80	180.50	5,271.8	-183.0	-270.7	-45.7	0.30	0.21	-17.79
5,384.0	0.60	164.00	5,366.7	-184.2	-270.5	-46.8	0.30	-0.21	-17.37
5,479.0	0.40	152.90	5,461.7	-184.9	-270.2	-47.6	0.23	-0.21	-11.68
5,574.0	0.50	148.80	5,556.7	-185.6	-269.9	-48.4	0.11	0.11	-4.32
5,669.0	0.70	126.00	5,651.7	-186.3	-269.2	-49.3	0.32	0.21	-24.00
5,763.0	0.40	120.20	5,745.7	-186.8	-268.4	-50.1	0.32	-0.32	-6.17
5,858.0	0.50	111.60	5,840.7	-187.1	-267.8	-50.7	0.13	0.11	-9.05
5,953.0	0.30	48.60	5,935.7	-187.1	-267.2	-50.9	0.48	-0.21	-66.32
6,048.0	0.20	12.10	6,030.7	-186.8	-267.0	-50.7	0.19	-0.11	-38.42
6,143.0	0.40	9.10	6,125.7	-186.3	-266.9	-50.3	0.21	0.21	-3.16
6,237.0	1.60	7.50	6,219.7	-184.7	-266.7	-49.0	1.28	1.28	-1.70
6,332.0	12.10	13.00	6,313.9	-173.6	-264.3	-40.1	11.06	11.05	5.79
6,427.0	18.40	12.80	6,405.5	-149.3	-258.7	-20.7	6.63	6.63	-0.21

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Site:	Sauer F33-76-1HN Pad Sec.33-T5N-R65W	MD Reference:	WELL @ 4684.0ft (Ensign 121 RKB - 13')
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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)
6,522.0	25.20	5.10	6,493.7	-114.4	-253.6	8.4	7.75	7.16	-8.11
6,616.0	34.00	359.30	6,575.3	-68.1	-252.1	49.4	9.84	9.36	-6.17
6,711.0	35.30	359.30	6,653.5	-14.1	-252.8	98.2	1.37	1.37	0.00
6,806.0	45.80	0.30	6,725.6	47.5	-252.9	153.7	11.07	11.05	1.05
6,901.0	56.00	357.50	6,785.4	121.1	-254.5	220.5	10.98	10.74	-2.95
6,996.0	58.70	358.00	6,836.7	201.1	-257.6	293.7	2.88	2.84	0.53
7,091.0	67.40	0.30	6,879.7	285.6	-258.8	370.2	9.41	9.16	2.42
7,186.0	73.30	358.90	6,911.6	375.1	-259.4	450.9	6.36	6.21	-1.47
7,233.0	76.90	358.90	6,923.7	420.5	-260.3	492.0	7.66	7.66	0.00
7,302.0	81.00	359.10	6,936.9	488.2	-261.5	553.4	5.95	5.94	0.29
7,352.0	85.00	358.50	6,943.0	537.8	-262.5	598.4	8.09	8.00	-1.20
7,390.0	84.90	0.00	6,946.4	575.6	-263.0	632.7	3.94	-0.26	3.95
7,437.0	87.10	0.30	6,949.6	622.5	-262.9	674.7	4.72	4.68	0.64
7,442.6	87.34	0.19	6,949.9	628.1	-262.9	679.8	4.76	4.37	-1.88
Sauer F33-77HN Landing Pt.									
7,485.0	89.20	359.40	6,951.2	670.5	-263.0	717.9	4.76	4.38	-1.87
7,580.0	91.50	359.30	6,950.6	765.5	-264.1	803.7	2.42	2.42	-0.11
7,674.0	89.20	356.40	6,950.0	859.4	-267.6	889.7	3.94	-2.45	-3.09
7,769.0	88.70	357.00	6,951.8	954.2	-273.1	977.3	0.82	-0.53	0.63
7,864.0	89.20	356.10	6,953.5	1,049.0	-278.8	1,065.0	1.08	0.53	-0.95
7,959.0	89.00	357.70	6,955.0	1,143.9	-283.9	1,152.5	1.70	-0.21	1.68
8,054.0	89.50	358.00	6,956.3	1,238.8	-287.5	1,239.4	0.61	0.53	0.32
8,149.0	89.80	0.50	6,956.8	1,333.8	-288.7	1,325.3	2.65	0.32	2.63
8,244.0	90.10	1.20	6,956.9	1,428.8	-287.3	1,410.0	0.80	0.32	0.74
8,339.0	90.10	2.80	6,956.8	1,523.7	-284.0	1,493.9	1.68	0.00	1.68
8,433.0	91.10	0.70	6,955.8	1,617.6	-281.2	1,577.0	2.47	1.06	-2.23
8,528.0	91.70	359.30	6,953.4	1,712.6	-281.2	1,662.4	1.60	0.63	-1.47
8,623.0	91.50	358.70	6,950.8	1,807.6	-282.8	1,748.4	0.67	-0.21	-0.63
8,718.0	89.90	357.20	6,949.6	1,902.5	-286.2	1,835.2	2.31	-1.68	-1.58
8,813.0	88.60	356.80	6,950.9	1,997.3	-291.2	1,922.6	1.43	-1.37	-0.42
8,908.0	87.60	358.00	6,954.0	2,092.2	-295.5	2,009.8	1.64	-1.05	1.26
9,002.0	87.80	358.40	6,957.8	2,186.1	-298.4	2,095.4	0.48	0.21	0.43
9,097.0	89.00	358.60	6,960.5	2,281.0	-300.9	2,181.8	1.28	1.26	0.21
9,192.0	89.40	359.40	6,961.8	2,376.0	-302.6	2,267.9	0.94	0.42	0.84
9,287.0	90.50	0.50	6,961.9	2,471.0	-302.7	2,353.3	1.64	1.16	1.16
9,382.0	90.00	2.60	6,961.4	2,565.9	-300.1	2,437.5	2.27	-0.53	2.21
9,477.0	91.50	1.20	6,960.2	2,660.9	-296.9	2,521.4	2.16	1.58	-1.47
9,572.0	90.70	0.30	6,958.4	2,755.8	-295.7	2,606.2	1.27	-0.84	-0.95
9,667.0	90.00	357.50	6,957.8	2,850.8	-297.5	2,692.4	3.04	-0.74	-2.95
9,761.0	91.20	355.90	6,956.8	2,944.6	-302.9	2,779.1	2.13	1.28	-1.70
9,856.0	89.60	356.40	6,956.2	3,039.4	-309.3	2,867.0	1.76	-1.68	0.53
9,951.0	89.20	356.80	6,957.1	3,134.2	-314.9	2,954.7	0.60	-0.42	0.42
10,046.0	89.60	358.70	6,958.1	3,229.2	-318.7	3,041.7	2.04	0.42	2.00
10,141.0	90.10	0.80	6,958.4	3,324.2	-319.1	3,127.2	2.27	0.53	2.21
10,235.0	90.00	2.10	6,958.3	3,418.1	-316.7	3,210.6	1.39	-0.11	1.38
10,330.0	90.50	5.20	6,957.9	3,512.9	-310.7	3,293.1	3.31	0.53	3.26
10,425.0	91.40	4.90	6,956.3	3,607.5	-302.3	3,374.5	1.00	0.95	-0.32
10,520.0	91.10	2.10	6,954.2	3,702.3	-296.5	3,457.1	2.96	-0.32	-2.95
10,614.0	90.20	0.80	6,953.2	3,796.3	-294.1	3,540.5	1.68	-0.96	-1.38
10,709.0	89.90	359.60	6,953.1	3,891.3	-293.8	3,625.8	1.30	-0.32	-1.26
10,804.0	91.70	357.70	6,951.8	3,986.2	-296.0	3,712.1	2.75	1.89	-2.00
10,899.0	89.70	358.40	6,950.6	4,081.2	-299.3	3,798.8	2.23	-2.11	0.74
10,993.0	89.40	357.70	6,951.3	4,175.1	-302.5	3,884.6	0.81	-0.32	-0.74

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11,088.0	90.40	356.40	6,951.5	4,270.0	-307.4	3,972.0	1.73	1.05	-1.37
11,183.0	89.10	356.60	6,951.9	4,364.8	-313.2	4,059.8	1.38	-1.37	0.21
11,297.0	89.80	358.00	6,953.0	4,478.7	-318.5	4,164.5	1.37	0.61	1.23
11,354.0	89.80	358.00	6,953.2	4,535.6	-320.5	4,216.5	0.00	0.00	0.00
Sauer F33-77HN BHL 535'FNL, 1320'FWL									

Checked By: _____ Approved By: _____ Date: _____