

Project: SEC.27-T3N-R64W  
Site: Rhino D27-20D Pad Sec.27-T3N-R64W  
Well: Rhino D27-19D  
Plan: Wellbore #1



**Directional**

**NOBLE ENERGY INC WELD  
COUNTY CO**

**SEC.27-T3N-R64W**

**Rhino D27-20D Pad Sec.27-T3N-R64W**

**Rhino D27-19D**

**Wellbore #1**

**Survey: Survey #1**

**Standard Survey Report**

**18 August, 2011**





**Company:** NOBLE ENERGY INC WELD COUNTY CO  
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**Well:** Rhino D27-19D  
**Wellbore:** Wellbore #1  
**Design:** Wellbore #1

**Local Co-ordinate Reference:** Well Rhino D27-19D  
**TVD Reference:** WELL @ 4879.0ft (Original Well Elev)  
**MD Reference:** WELL @ 4879.0ft (Original Well Elev)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Landmark

**Project** SEC.27-T3N-R64W, Weld County, Colorado

**Map System:** US State Plane 1983  
**Geo Datum:** North American Datum 1983  
**Map Zone:** Colorado Northern Zone  
**System Datum:** Mean Sea Level  
 Using Well Reference Point  
 Using geodetic scale factor

**Site** Rhino D27-20D Pad Sec.27-T3N-R64W

**Site Position:**  
**From:** Lat/Long  
**Position Uncertainty:** 0.0 ft  
**Northing:** 1,315,786.36 ft  
**Easting:** 3,268,687.89 ft  
**Slot Radius:** "  
**Latitude:** 40.196230  
**Longitude:** -104.538140  
**Grid Convergence:** 0.62 °

**Well** Rhino D27-19D

**Well Position** +N/-S 0.0 ft Northing: 1,315,786.58 ft Latitude: 40.196230  
 +E/-W 0.0 ft Easting: 3,268,710.24 ft Longitude: -104.538060  
**Position Uncertainty** 0.0 ft Wellhead Elevation: ft Ground Level: 4,866.0 ft

**Wellbore** Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/20/2011	8.75	66.93	53,065

**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	319.55

**Survey Program** Date 8/18/2011

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
870.0	7,557.0	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
870.0	0.40	114.00	870.0	-1.2	2.8	-2.7	0.05	0.05	0.00
963.0	1.30	307.90	963.0	-0.7	2.2	-2.0	1.82	0.97	-178.60
1,056.0	3.20	309.60	1,055.9	1.6	-0.6	1.6	2.04	2.04	1.83
1,150.0	4.40	310.40	1,149.7	5.6	-5.4	7.7	1.28	1.28	0.85
1,244.0	6.60	316.00	1,243.3	11.8	-11.9	16.7	2.41	2.34	5.96
1,339.0	8.50	315.40	1,337.4	20.7	-20.6	29.1	2.00	2.00	-0.63
1,432.0	10.60	306.10	1,429.1	30.7	-32.3	44.3	2.80	2.26	-10.00
1,526.0	11.30	311.60	1,521.4	41.9	-46.2	61.8	1.34	0.74	5.85
1,619.0	13.30	313.20	1,612.3	55.3	-60.8	81.5	2.18	2.15	1.72
1,713.0	14.80	314.70	1,703.5	71.1	-77.2	104.2	1.64	1.60	1.60
1,807.0	15.70	313.90	1,794.2	88.4	-94.9	128.8	0.98	0.96	-0.85
1,900.0	18.50	313.70	1,883.1	107.3	-114.7	156.0	3.01	3.01	-0.22

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 North Reference: True  
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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)
1,993.0	20.00	316.70	1,970.9	129.1	-136.2	186.6	1.93	1.61	3.23
2,086.0	20.30	314.00	2,058.2	151.8	-158.8	218.5	1.05	0.32	-2.90
2,180.0	21.00	313.30	2,146.1	174.7	-182.7	251.5	0.79	0.74	-0.74
2,273.0	23.10	313.20	2,232.3	198.6	-208.2	286.2	2.26	2.26	-0.11
2,367.0	25.70	314.00	2,317.9	225.4	-236.3	324.8	2.79	2.77	0.85
2,461.0	25.70	313.30	2,402.6	253.6	-265.8	365.4	0.32	0.00	-0.74
2,555.0	24.80	312.30	2,487.6	280.8	-295.2	405.2	1.06	-0.96	-1.06
2,648.0	24.50	315.30	2,572.2	307.7	-323.2	443.8	1.38	-0.32	3.23
2,741.0	25.90	316.50	2,656.3	336.1	-350.7	483.3	1.60	1.51	1.29
2,834.0	27.50	316.20	2,739.4	366.3	-379.6	525.0	1.73	1.72	-0.32
2,928.0	29.20	314.60	2,822.1	398.1	-410.9	569.5	1.98	1.81	-1.70
3,021.0	28.00	314.90	2,903.8	429.4	-442.5	613.9	1.30	-1.29	0.32
3,115.0	27.30	312.60	2,987.0	459.6	-474.0	657.3	1.36	-0.74	-2.45
3,209.0	26.70	310.70	3,070.8	488.0	-505.9	699.5	1.12	-0.64	-2.02
3,303.0	25.40	311.40	3,155.2	515.1	-537.0	740.4	1.42	-1.38	0.74
3,398.0	25.60	311.80	3,241.0	542.2	-567.6	780.9	0.28	0.21	0.42
3,491.0	24.20	313.70	3,325.3	568.8	-596.4	819.8	1.73	-1.51	2.04
3,584.0	23.40	317.90	3,410.4	595.7	-622.6	857.2	2.01	-0.86	4.52
3,677.0	23.70	321.40	3,495.7	624.0	-646.6	894.3	1.54	0.32	3.76
3,771.0	24.50	320.70	3,581.5	653.8	-670.7	932.7	0.90	0.85	-0.74
3,864.0	24.70	319.50	3,666.1	683.5	-695.6	971.4	0.58	0.22	-1.29
3,957.0	24.70	322.30	3,750.6	713.7	-720.1	1,010.2	1.26	0.00	3.01
4,051.0	26.10	328.30	3,835.5	746.8	-742.9	1,050.3	3.12	1.49	6.38
4,145.0	27.20	323.90	3,919.5	781.8	-766.5	1,092.2	2.40	1.17	-4.68
4,238.0	26.90	323.00	4,002.3	815.7	-791.7	1,134.4	0.55	-0.32	-0.97
4,332.0	24.20	324.40	4,087.1	848.4	-815.7	1,174.8	2.94	-2.87	1.49
4,425.0	24.30	322.50	4,171.9	879.1	-838.4	1,212.9	0.85	0.11	-2.04
4,519.0	27.80	324.10	4,256.4	912.2	-863.1	1,254.1	3.80	3.72	1.70
4,613.0	25.60	327.20	4,340.3	947.0	-886.9	1,296.1	2.77	-2.34	3.30
4,707.0	26.60	326.50	4,424.7	981.6	-909.5	1,337.1	1.11	1.06	-0.74
4,800.0	26.20	327.90	4,508.1	1,016.4	-931.9	1,378.1	0.80	-0.43	1.51
4,894.0	25.00	325.30	4,592.8	1,050.3	-954.3	1,418.4	1.75	-1.28	-2.77
4,988.0	23.00	325.80	4,678.7	1,081.8	-975.9	1,456.4	2.14	-2.13	0.53
5,081.0	23.60	327.20	4,764.1	1,112.5	-996.2	1,492.9	0.88	0.65	1.51
5,174.0	26.10	324.80	4,848.5	1,144.9	-1,018.1	1,531.7	2.90	2.69	-2.58
5,268.0	22.20	325.50	4,934.3	1,176.4	-1,040.1	1,570.0	4.16	-4.15	0.74
5,362.0	21.50	326.90	5,021.5	1,205.5	-1,059.5	1,604.7	0.93	-0.74	1.49
5,456.0	22.60	322.80	5,108.6	1,234.3	-1,079.9	1,639.9	2.01	1.17	-4.36
5,549.0	19.20	322.50	5,195.5	1,260.7	-1,100.0	1,673.0	3.66	-3.66	-0.32
5,642.0	16.20	322.00	5,284.1	1,283.0	-1,117.3	1,701.2	3.23	-3.23	-0.54
5,737.0	13.40	324.20	5,375.9	1,302.4	-1,131.9	1,725.4	3.01	-2.95	2.32
5,831.0	10.60	326.20	5,467.9	1,318.4	-1,143.1	1,744.9	3.01	-2.98	2.13
5,925.0	9.10	331.30	5,560.5	1,332.1	-1,151.4	1,760.8	1.84	-1.60	5.43
6,018.0	7.80	344.50	5,652.5	1,344.7	-1,156.7	1,773.7	2.50	-1.40	14.19
6,111.0	6.20	353.40	5,744.8	1,355.7	-1,158.9	1,783.6	2.07	-1.72	9.57
6,204.0	4.30	352.00	5,837.4	1,364.2	-1,160.0	1,790.7	2.05	-2.04	-1.51
6,297.0	3.20	358.90	5,930.2	1,370.2	-1,160.5	1,795.6	1.28	-1.18	7.42
6,390.0	1.40	19.60	6,023.1	1,373.9	-1,160.2	1,798.2	2.10	-1.94	22.26
6,466.7	1.89	26.77	6,099.7	1,375.9	-1,159.3	1,799.2	0.69	0.64	9.35
TARGET BHL 1320'FNL, 1320'FWL									
6,484.0	2.00	27.90	6,117.1	1,376.4	-1,159.0	1,799.4	0.69	0.65	6.53
6,577.0	2.90	36.00	6,210.0	1,379.8	-1,156.9	1,800.5	1.03	0.97	8.71
6,671.0	3.40	37.70	6,303.8	1,383.9	-1,153.8	1,801.7	0.54	0.53	1.81
6,767.0	0.40	169.40	6,399.8	1,385.8	-1,152.0	1,802.0	3.83	-3.13	137.19



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**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
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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)
6,862.0	1.40	181.70	6,494.8	1,384.3	-1,152.0	1,800.8	1.07	1.05	12.95
6,957.0	1.90	183.40	6,589.7	1,381.6	-1,152.1	1,798.8	0.53	0.53	1.79
7,050.0	1.90	184.50	6,682.7	1,378.5	-1,152.3	1,796.6	0.04	0.00	1.18
7,097.6	1.85	184.75	6,730.3	1,377.0	-1,152.4	1,795.5	0.11	-0.11	0.52
TARGET CIRCLE 1320'FNL & 1320'FWL - LEGAL BOX 800' X 800' 1320'FNL & 1323'FWL									
7,144.0	1.80	185.00	6,776.6	1,375.5	-1,152.6	1,794.5	0.11	-0.11	0.55
7,238.0	1.40	188.40	6,870.6	1,372.9	-1,152.9	1,792.7	0.44	-0.43	3.62
7,332.0	0.90	187.70	6,964.6	1,371.0	-1,153.1	1,791.4	0.53	-0.53	-0.74
7,427.0	0.50	210.20	7,059.6	1,369.9	-1,153.4	1,790.8	0.50	-0.42	23.68
7,505.0	0.20	229.10	7,137.6	1,369.5	-1,153.7	1,790.7	0.41	-0.38	24.23
7,557.0	0.20	229.10	7,189.6	1,369.4	-1,153.8	1,790.7	0.00	0.00	0.00

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