

Project: SEC.27-T7N-R65W  
Site: Harper USX EE27-01D Pad Sec.27-T7N-R65W  
Well: Harper USX EE27-01D  
Plan: Wellbore #1



## **NOBLE ENERGY INC WELD COUNTY CO**

**SEC.27-T7N-R65W**

**Harper USX EE27-01D Pad Sec.27-T7N-R65W**

**Harper USX EE27-01D**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**18 July, 2011**



**Company:** NOBLE ENERGY INC WELD COUNTY CO  
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**Site:** Harper USX EE27-01D Pad Sec.27-T7N-R65W  
**Well:** Harper USX EE27-01D  
**Wellbore:** Wellbore #1  
**Design:** Wellbore #1

**Local Co-ordinate Reference:** Well Harper USX EE27-01D  
**TVD Reference:** WELL @ 4881.0ft (Original Well Elev)  
**MD Reference:** WELL @ 4881.0ft (Original Well Elev)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Database:** Landmark

<b>Project</b>	SEC.27-T7N-R65W, Weld County, Colorado		
<b>Map System:</b>	US State Plane 1983	<b>System Datum:</b>	Mean Sea Level
<b>Geo Datum:</b>	North American Datum 1983		Using Well Reference Point
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

**Site** Harper USX EE27-01D Pad Sec.27-T7N-R65W

<b>Site Position:</b>		<b>Northing:</b>	1,443,200.44 ft	<b>Latitude:</b>	40.546810
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,238,765.81 ft	<b>Longitude:</b>	-104.640830
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	"	<b>Grid Convergence:</b>	0.56 °

<b>Well</b>	Harper USX EE27-01D				
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b>	1,443,200.43 ft	<b>Latitude:</b> 40.546810
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b>	3,238,765.81 ft	<b>Longitude:</b> -104.640830
<b>Position Uncertainty</b>		0.0 ft	<b>Wellhead Elevation:</b>	ft	<b>Ground Level:</b> 4,868.0 ft

**Wellbore** Wellbore #1

<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	4/27/2011	8.83	67.19	53,235

**Design** Wellbore #1

**Audit Notes:**

<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
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<b>Vertical Section:</b>	<b>Depth From (TVD)</b>	<b>+N/-S</b>	<b>+E/-W</b>	<b>Direction</b>
	(ft)	(ft)	(ft)	(°)
	0.0	0.0	0.0	349.54

**Survey Program** Date 7/18/2011

<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
132.0	7,751.0	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
132.0	0.70	359.20	132.0	0.8	0.0	0.8	0.53	0.53	0.00
247.0	1.60	339.00	247.0	3.0	-0.6	3.1	0.85	0.78	-17.57
375.0	1.40	341.10	374.9	6.2	-1.7	6.4	0.16	-0.16	1.64
503.0	1.50	342.40	502.9	9.2	-2.8	9.6	0.08	0.08	1.02
643.0	1.50	334.60	642.8	12.6	-4.1	13.2	0.15	0.00	-5.57
766.0	2.10	338.40	765.8	16.2	-5.6	16.9	0.50	0.49	3.09
852.0	3.30	354.50	851.7	20.1	-6.4	20.9	1.64	1.40	18.72
938.0	5.20	359.20	937.4	26.5	-6.7	27.3	2.24	2.21	5.47
1,023.0	6.90	354.00	1,022.0	35.4	-7.3	36.1	2.10	2.00	-6.12
1,109.0	8.70	354.90	1,107.2	47.0	-8.4	47.8	2.10	2.09	1.05
1,194.0	9.70	356.70	1,191.1	60.6	-9.4	61.3	1.22	1.18	2.12
1,280.0	11.40	352.50	1,275.6	76.2	-10.9	77.0	2.17	1.98	-4.88



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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)
1,366.0	12.60	353.30	1,359.7	94.0	-13.1	94.8	1.41	1.40	0.93
1,451.0	14.60	353.40	1,442.3	113.8	-15.5	114.7	2.35	2.35	0.12
1,537.0	16.60	349.20	1,525.2	136.7	-19.0	137.8	2.67	2.33	-4.88
1,622.0	17.90	352.30	1,606.4	161.5	-23.0	163.0	1.87	1.53	3.65
1,708.0	19.80	351.20	1,687.7	189.0	-27.0	190.8	2.25	2.21	-1.28
1,794.0	19.60	350.50	1,768.7	217.7	-31.6	219.8	0.36	-0.23	-0.81
1,879.0	20.20	349.80	1,848.6	246.2	-36.6	248.7	0.76	0.71	-0.82
1,965.0	20.50	350.50	1,929.3	275.6	-41.7	278.6	0.45	0.35	0.81
2,050.0	21.70	351.30	2,008.6	305.8	-46.5	309.2	1.45	1.41	0.94
2,136.0	23.30	351.70	2,088.0	338.4	-51.4	342.1	1.87	1.86	0.47
2,222.0	25.30	349.10	2,166.4	373.3	-57.3	377.5	2.64	2.33	-3.02
2,307.0	26.30	349.60	2,242.9	409.6	-64.2	414.5	1.20	1.18	0.59
2,393.0	25.80	349.70	2,320.2	446.8	-71.0	452.2	0.58	-0.58	0.12
2,478.0	26.10	348.00	2,396.6	483.3	-78.1	489.4	0.94	0.35	-2.00
2,564.0	25.90	348.40	2,473.9	520.2	-85.9	527.1	0.31	-0.23	0.47
2,650.0	25.40	347.50	2,551.4	556.6	-93.6	564.3	0.74	-0.58	-1.05
2,735.0	25.30	350.30	2,628.3	592.3	-100.6	600.7	1.42	-0.12	3.29
2,821.0	26.30	348.00	2,705.7	629.0	-107.7	638.1	1.65	1.16	-2.67
2,906.0	27.10	347.80	2,781.6	666.4	-115.7	676.3	0.95	0.94	-0.24
2,992.0	27.30	348.00	2,858.1	704.8	-123.9	715.6	0.26	0.23	0.23
3,078.0	27.70	343.70	2,934.4	743.3	-133.6	755.2	2.35	0.47	-5.00
3,163.0	26.90	343.60	3,009.9	780.7	-144.6	794.0	0.94	-0.94	-0.12
3,249.0	27.30	344.80	3,086.5	818.4	-155.3	833.0	0.79	0.47	1.40
3,334.0	26.10	348.80	3,162.4	855.5	-164.0	871.1	2.54	-1.41	4.71
3,420.0	26.40	347.20	3,239.6	892.8	-171.9	909.1	0.89	0.35	-1.86
3,506.0	26.50	350.40	3,316.6	930.3	-179.4	947.4	1.66	0.12	3.72
3,591.0	27.80	347.00	3,392.2	968.3	-187.0	986.2	2.38	1.53	-4.00
3,677.0	26.00	350.20	3,468.9	1,006.5	-194.7	1,025.1	2.69	-2.09	3.72
3,762.0	24.60	349.10	3,545.7	1,042.2	-201.2	1,061.4	1.74	-1.65	-1.29
3,848.0	24.40	353.80	3,624.0	1,077.4	-206.5	1,097.0	2.28	-0.23	5.47
3,934.0	25.00	351.90	3,702.1	1,113.1	-211.0	1,132.9	1.16	0.70	-2.21
4,019.0	24.30	349.10	3,779.4	1,148.0	-216.9	1,168.3	1.60	-0.82	-3.29
4,105.0	25.30	351.80	3,857.5	1,183.6	-222.8	1,204.4	1.76	1.16	3.14
4,190.0	27.30	350.70	3,933.7	1,220.8	-228.6	1,242.0	2.42	2.35	-1.29
4,276.0	28.90	348.80	4,009.5	1,260.7	-235.8	1,282.5	2.13	1.86	-2.21
4,362.0	30.20	348.40	4,084.3	1,302.2	-244.2	1,324.9	1.53	1.51	-0.47
4,447.0	31.50	350.80	4,157.3	1,345.1	-252.0	1,368.5	2.11	1.53	2.82
4,533.0	32.00	350.40	4,230.4	1,389.8	-259.4	1,413.8	0.63	0.58	-0.47
4,618.0	30.10	350.50	4,303.3	1,433.0	-266.7	1,457.6	2.24	-2.24	0.12
4,704.0	28.40	349.30	4,378.3	1,474.4	-274.0	1,499.6	2.09	-1.98	-1.40
4,790.0	27.40	347.40	4,454.3	1,513.8	-282.2	1,539.8	1.56	-1.16	-2.21
4,875.0	26.00	348.50	4,530.2	1,551.1	-290.1	1,578.0	1.75	-1.65	1.29
4,961.0	23.80	350.20	4,608.2	1,586.7	-296.9	1,614.2	2.69	-2.56	1.98
5,046.0	23.30	350.80	4,686.2	1,620.2	-302.5	1,648.2	0.65	-0.59	0.71
5,132.0	21.40	347.60	4,765.7	1,652.3	-308.6	1,680.9	2.62	-2.21	-3.72
5,218.0	19.10	347.40	4,846.4	1,681.4	-315.0	1,710.6	2.68	-2.67	-0.23
5,303.0	17.70	345.00	4,927.0	1,707.4	-321.4	1,737.4	1.87	-1.65	-2.82
5,389.0	16.00	343.70	5,009.3	1,731.4	-328.1	1,762.2	2.02	-1.98	-1.51
5,474.0	14.20	342.60	5,091.4	1,752.6	-334.5	1,784.2	2.14	-2.12	-1.29
5,560.0	13.30	342.70	5,174.9	1,772.1	-340.6	1,804.5	1.05	-1.05	0.12
5,646.0	11.20	343.10	5,259.0	1,789.6	-346.0	1,822.6	2.44	-2.44	0.47
5,731.0	8.40	339.70	5,342.7	1,803.3	-350.5	1,837.0	3.36	-3.29	-4.00
5,817.0	6.40	339.00	5,428.0	1,813.7	-354.4	1,847.9	2.33	-2.33	-0.81
5,902.0	5.40	342.90	5,512.5	1,821.9	-357.3	1,856.5	1.27	-1.18	4.59

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Survey

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5,988.0	4.50	348.70	5,598.2	1,829.1	-359.1	1,863.9	1.20	-1.05	6.74
6,074.0	2.50	338.80	5,684.1	1,834.1	-360.5	1,869.1	2.42	-2.33	-11.51
6,159.0	1.60	337.50	5,769.0	1,837.0	-361.6	1,872.1	1.06	-1.06	-1.53
6,245.0	0.60	291.30	5,855.0	1,838.2	-362.5	1,873.5	1.47	-1.16	-53.72
6,416.0	0.60	324.40	6,026.0	1,839.3	-363.8	1,874.8	0.20	0.00	19.36
6,490.0	0.72	331.98	6,100.0	1,840.0	-364.3	1,875.6	0.21	0.17	10.24
<b>TARGET BHL 640'FNL, 640'FEL</b>									
6,587.0	0.90	338.60	6,197.0	1,841.3	-364.8	1,876.9	0.21	0.18	6.82
6,758.0	1.50	334.10	6,367.9	1,844.5	-366.3	1,880.4	0.35	0.35	-2.63
6,930.0	1.00	267.00	6,539.9	1,846.5	-368.8	1,882.7	0.84	-0.29	-39.01
7,101.0	0.40	265.10	6,710.9	1,846.3	-370.9	1,883.0	0.35	-0.35	-1.11
7,272.0	0.30	319.30	6,881.9	1,846.6	-371.8	1,883.4	0.19	-0.06	31.70
7,300.9	0.29	331.47	6,910.8	1,846.8	-371.8	1,883.6	0.22	-0.05	42.06
<b>LEGAL BOX 400' X 400' 677'FNL &amp; 655'FEL</b>									
7,301.1	0.29	331.56	6,911.0	1,846.8	-371.8	1,883.6	0.22	-0.02	43.75
<b>TARGET CIRCLE 640'FNL &amp; 640'FEL</b>									
7,443.0	0.40	22.40	7,052.9	1,847.5	-371.8	1,884.3	0.22	0.08	35.84
7,614.0	0.70	1.20	7,223.9	1,849.1	-371.6	1,885.9	0.21	0.18	-12.40
7,701.0	0.70	10.30	7,310.9	1,850.2	-371.5	1,886.9	0.13	0.00	10.46
7,751.0	0.70	10.30	7,360.9	1,850.8	-371.4	1,887.4	0.00	0.00	0.00

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