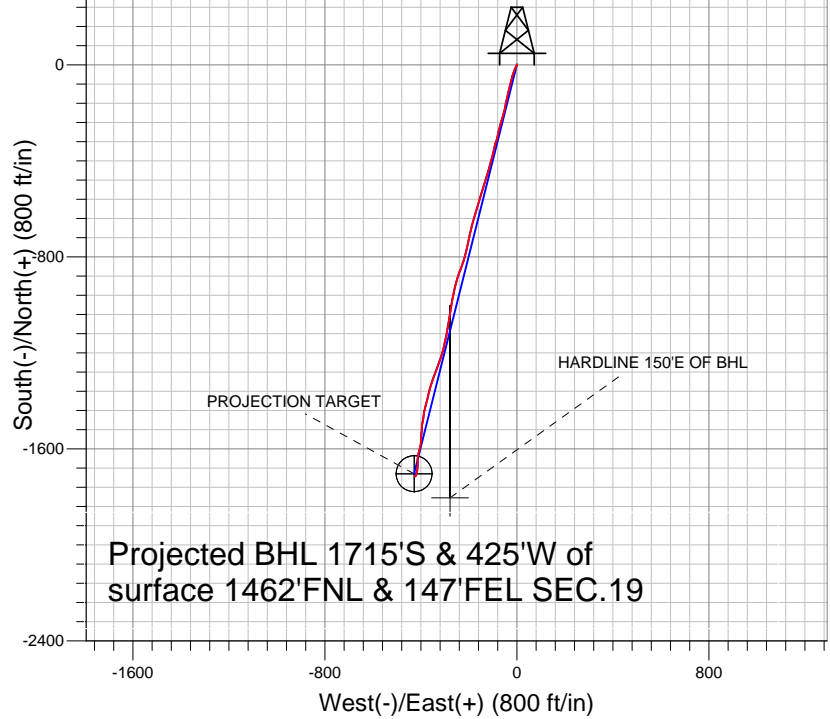


## NOBLE ENERGY INC WELD COUNTY CO

SHL 251'FSL & 269'FWL SEC.17

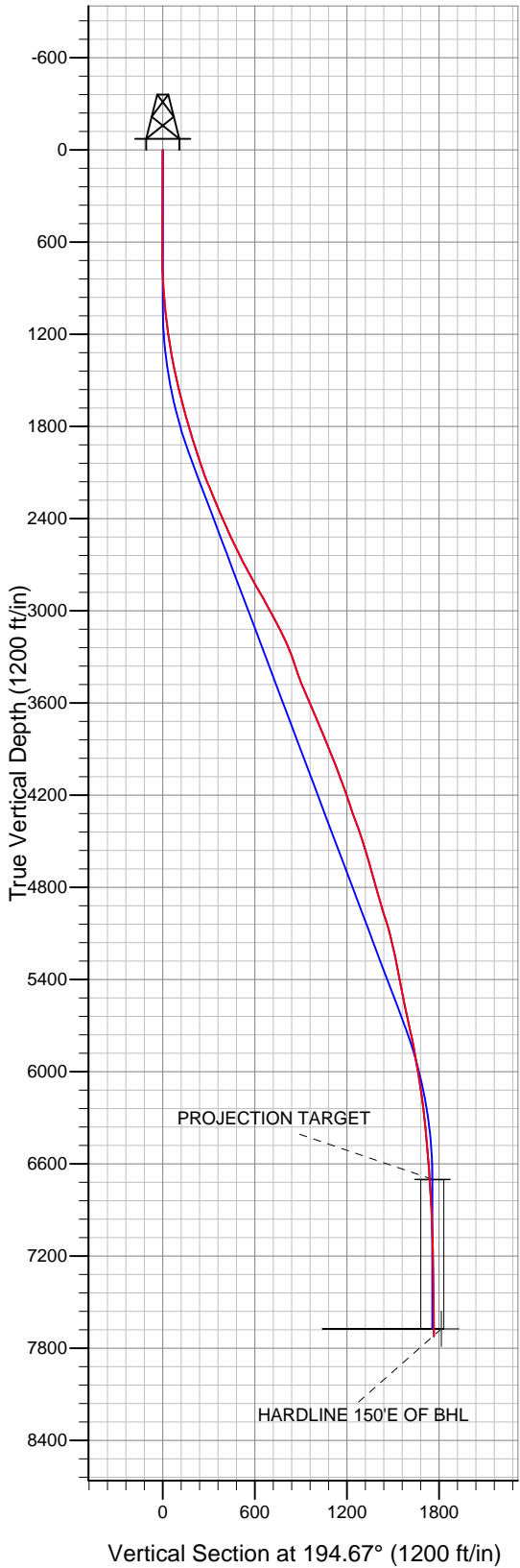


### LEGEND

- Thompson D20-31D, Wellbore #1, Noble Thompson D20-31D Plan #1 (12-16-09) V0
- Wellbore #1
- Survey #1

## Final Survey Plot

Projected Final Survey -  
8025'MD & 7724'TVD @ 1767' VS  
1.1 deg Inc 243.1 deg AZ



Project: SEC.17-T3N-R64W  
Site: LDS D20-29D Pad Sec.17-T3N-R64W  
Well: Thompson D20-31D  
Plan: Wellbore #1



## **Directional**

# **NOBLE ENERGY INC WELD COUNTY CO**

**SEC.17-T3N-R64W**

**LDS D20-29D Pad Sec.17-T3N-R64W**

**Thompson D20-31D**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**13 October, 2010**



<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well Thompson D20-31D
<b>Project:</b>	SEC.17-T3N-R64W	<b>TVD Reference:</b>	WELL @ 4776.0ft (Original Well Elev)
<b>Site:</b>	LDS D20-29D Pad Sec.17-T3N-R64W	<b>MD Reference:</b>	WELL @ 4776.0ft (Original Well Elev)
<b>Well:</b>	Thompson D20-31D	<b>North Reference:</b>	True
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	Landmark

<b>Project</b>	SEC.17-T3N-R64W, 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

<b>Site</b>	LDS D20-29D Pad Sec.17-T3N-R64W		
<b>Site Position:</b>		<b>Northing:</b>	1,323,837.46ft
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,255,960.73ft
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	"
		<b>Latitude:</b>	40° 13' 7.320 N
		<b>Longitude:</b>	104° 35' 0.240 W
		<b>Grid Convergence:</b>	0.59 °

<b>Well</b>	Thompson D20-31D		
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b> 1,323,855.46 ft
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b> 3,255,940.99 ft
<b>Position Uncertainty</b>	0.0 ft	<b>Wellhead Elevation:</b>	ft
		<b>Latitude:</b>	40° 13' 7.500 N
		<b>Longitude:</b>	104° 35' 0.492 W
		<b>Ground Level:</b>	4,763.0 ft

<b>Wellbore</b>	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>
	IGRF200510	12/16/2009	8.92	66.99	53,233

<b>Design</b>	Wellbore #1			
<b>Audit Notes:</b>				
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b> 0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Direction (°)</b>
	0.0	0.0	0.0	194.67

<b>Survey Program</b>	<b>Date</b>	10/13/2010		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
690.0	8,025.0	Survey #1 (Wellbore #1)	MWD	MWD - Standard

<b>Survey</b>									
<b>Measured Depth (ft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (ft)</b>	<b>+N/-S (ft)</b>	<b>+E/-W (ft)</b>	<b>Vertical Section (ft)</b>	<b>Dogleg Rate (°/100ft)</b>	<b>Build Rate (°/100ft)</b>	<b>Turn Rate (°/100ft)</b>
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
690.0	0.30	34.40	690.0	1.5	1.0	-1.7	0.04	0.04	0.00
775.0	1.10	196.50	775.0	0.9	0.9	-1.1	1.63	0.94	190.71
860.0	3.20	204.60	859.9	-2.0	-0.3	2.1	2.49	2.47	9.53
946.0	4.70	209.70	945.7	-7.3	-3.0	7.8	1.79	1.74	5.93
1,031.0	5.80	205.10	1,030.4	-14.2	-6.6	15.4	1.38	1.29	-5.41
1,116.0	6.90	201.40	1,114.8	-22.8	-10.3	24.7	1.38	1.29	-4.35
1,202.0	8.00	197.40	1,200.1	-33.4	-14.0	35.8	1.41	1.28	-4.65
1,287.0	9.80	197.50	1,284.1	-45.9	-17.9	49.0	2.12	2.12	0.12
1,373.0	10.60	194.30	1,368.7	-60.6	-22.1	64.2	1.14	0.93	-3.72
1,458.0	12.30	194.20	1,452.0	-76.9	-26.2	81.0	2.00	2.00	-0.12
1,543.0	13.50	193.50	1,534.9	-95.3	-30.7	100.0	1.42	1.41	-0.82
1,629.0	13.80	192.70	1,618.5	-115.1	-35.3	120.3	0.41	0.35	-0.93

<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well Thompson D20-31D
<b>Project:</b>	SEC.17-T3N-R64W	<b>TVD Reference:</b>	WELL @ 4776.0ft (Original Well Elev)
<b>Site:</b>	LDS D20-29D Pad Sec.17-T3N-R64W	<b>MD Reference:</b>	WELL @ 4776.0ft (Original Well Elev)
<b>Well:</b>	Thompson D20-31D	<b>North Reference:</b>	True
<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)
1,714.0	15.30	192.90	1,700.7	-135.9	-40.1	141.6	1.77	1.76	0.24
1,800.0	16.60	193.00	1,783.4	-159.0	-45.4	165.3	1.51	1.51	0.12
1,885.0	17.20	192.10	1,864.7	-183.1	-50.7	190.0	0.77	0.71	-1.06
1,970.0	17.70	192.80	1,945.8	-208.0	-56.2	215.4	0.64	0.59	0.82
2,056.0	17.70	200.00	2,027.8	-233.0	-63.6	241.5	2.54	0.00	8.37
2,141.0	19.90	193.60	2,108.2	-259.2	-71.4	268.9	3.54	2.59	-7.53
2,227.0	23.50	192.00	2,188.1	-290.2	-78.4	300.6	4.24	4.19	-1.86
2,312.0	22.60	199.50	2,266.4	-322.2	-87.4	333.8	3.61	-1.06	8.82
2,397.0	22.70	193.30	2,344.8	-353.6	-96.6	366.5	2.81	0.12	-7.29
2,483.0	24.40	191.10	2,423.7	-387.1	-103.9	400.8	2.23	1.98	-2.56
2,568.0	24.00	195.70	2,501.2	-421.0	-111.9	435.6	2.27	-0.47	5.41
2,654.0	25.40	198.00	2,579.3	-455.4	-122.4	471.5	1.97	1.63	2.67
2,739.0	27.40	197.90	2,655.5	-491.4	-134.0	509.3	2.35	2.35	-0.12
2,824.0	28.70	195.90	2,730.5	-529.6	-145.6	549.2	1.89	1.53	-2.35
2,910.0	29.10	196.80	2,805.8	-569.5	-157.3	590.8	0.69	0.47	1.05
2,995.0	29.90	196.60	2,879.7	-609.6	-169.3	632.6	0.95	0.94	-0.24
3,081.0	28.90	196.20	2,954.7	-650.1	-181.3	674.8	1.18	-1.16	-0.47
3,166.0	27.80	193.90	3,029.5	-689.0	-191.8	715.1	1.82	-1.29	-2.71
3,251.0	27.70	190.70	3,104.7	-727.7	-200.2	754.7	1.76	-0.12	-3.76
3,337.0	25.90	193.30	3,181.5	-765.6	-208.2	793.4	2.50	-2.09	3.02
3,422.0	21.20	195.30	3,259.4	-798.5	-216.6	827.3	5.61	-5.53	2.35
3,508.0	17.90	199.20	3,340.4	-826.0	-225.0	856.1	4.12	-3.84	4.53
3,593.0	20.00	200.80	3,420.8	-851.9	-234.5	883.5	2.54	2.47	1.88
3,678.0	22.80	199.00	3,499.9	-881.1	-245.0	914.4	3.38	3.29	-2.12
3,764.0	23.40	194.20	3,579.0	-913.4	-254.6	948.1	2.30	0.70	-5.58
3,849.0	23.60	191.10	3,657.0	-946.5	-262.0	982.0	1.47	0.24	-3.65
3,935.0	23.10	191.40	3,735.9	-979.9	-268.7	1,016.0	0.60	-0.58	0.35
4,020.0	22.80	189.20	3,814.2	-1,012.5	-274.6	1,049.0	1.07	-0.35	-2.59
4,105.0	22.50	188.90	3,892.7	-1,044.8	-279.8	1,081.6	0.38	-0.35	-0.35
4,191.0	20.90	189.00	3,972.6	-1,076.2	-284.7	1,113.3	1.86	-1.86	0.12
4,276.0	20.90	190.40	4,052.0	-1,106.1	-289.8	1,143.5	0.59	0.00	1.65
4,362.0	19.90	191.00	4,132.6	-1,135.6	-295.4	1,173.4	1.19	-1.16	0.70
4,447.0	18.80	192.10	4,212.8	-1,163.2	-301.0	1,201.5	1.36	-1.29	1.29
4,532.0	18.60	197.20	4,293.3	-1,189.5	-307.9	1,228.7	1.94	-0.24	6.00
4,623.0	20.80	197.10	4,379.0	-1,218.8	-316.9	1,259.4	2.42	2.42	-0.11
4,708.0	19.70	198.30	4,458.7	-1,246.9	-325.9	1,288.7	1.38	-1.29	1.41
4,794.0	16.40	203.60	4,540.5	-1,271.8	-335.3	1,315.2	4.28	-3.84	6.16
4,879.0	15.60	201.50	4,622.2	-1,293.4	-344.3	1,338.4	1.16	-0.94	-2.47
4,922.0	15.60	199.40	4,663.6	-1,304.2	-348.3	1,349.9	1.31	0.00	-4.88
5,008.0	15.90	197.30	4,746.4	-1,326.4	-355.7	1,373.2	0.75	0.35	-2.44
5,093.0	16.70	193.70	4,827.9	-1,349.4	-362.0	1,397.1	1.52	0.94	-4.24
5,179.0	17.20	192.20	4,910.2	-1,373.8	-367.6	1,422.1	0.77	0.58	-1.74
5,265.0	17.50	195.50	4,992.3	-1,398.7	-373.8	1,447.7	1.20	0.35	3.84
5,350.0	15.30	195.20	5,073.8	-1,421.8	-380.1	1,471.7	2.59	-2.59	-0.35
5,436.0	13.10	190.70	5,157.2	-1,442.4	-384.9	1,492.8	2.86	-2.56	-5.23
5,521.0	12.10	187.70	5,240.2	-1,460.6	-387.9	1,511.3	1.41	-1.18	-3.53
5,607.0	11.60	190.00	5,324.3	-1,478.1	-390.6	1,528.8	0.80	-0.58	2.67
5,693.0	10.30	190.80	5,408.8	-1,494.2	-393.5	1,545.1	1.52	-1.51	0.93
5,778.0	11.30	184.60	5,492.3	-1,509.9	-395.6	1,560.9	1.80	1.18	-7.29
5,864.0	11.90	182.80	5,576.5	-1,527.2	-396.7	1,577.9	0.81	0.70	-2.09
5,949.0	12.20	183.50	5,659.6	-1,544.9	-397.7	1,595.3	0.39	0.35	0.82
6,035.0	12.60	183.80	5,743.6	-1,563.3	-398.9	1,613.4	0.47	0.47	0.35
6,121.0	12.10	187.70	5,827.6	-1,581.6	-400.7	1,631.5	1.13	-0.58	4.53
6,206.0	10.00	195.00	5,911.1	-1,597.6	-403.8	1,647.8	2.96	-2.47	8.59

<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well Thompson D20-31D
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<b>Well:</b>	Thompson D20-31D	<b>North Reference:</b>	True
<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)	
6,292.0	9.20	195.00	5,995.8	-1,611.4	-407.5	1,662.1	0.93	-0.93	0.00	
6,377.0	8.90	191.40	6,079.8	-1,624.4	-410.6	1,675.5	0.75	-0.35	-4.24	
6,463.0	8.00	187.40	6,164.9	-1,636.9	-412.7	1,688.1	1.25	-1.05	-4.65	
6,549.0	7.20	177.70	6,250.1	-1,648.2	-413.2	1,699.1	1.75	-0.93	-11.28	
6,634.0	6.00	177.80	6,334.5	-1,658.0	-412.9	1,708.5	1.41	-1.41	0.12	
6,719.0	5.20	180.80	6,419.1	-1,666.3	-412.7	1,716.5	1.00	-0.94	3.53	
6,805.0	4.80	182.20	6,504.8	-1,673.8	-412.9	1,723.8	0.49	-0.47	1.63	
6,890.0	4.70	188.10	6,589.5	-1,680.8	-413.6	1,730.7	0.59	-0.12	6.94	
6,976.0	4.20	190.10	6,675.3	-1,687.4	-414.6	1,737.4	0.61	-0.58	2.33	
7,061.0	3.70	193.10	6,760.1	-1,693.1	-415.8	1,743.2	0.64	-0.59	3.53	
7,146.0	3.20	195.50	6,844.9	-1,698.1	-417.0	1,748.3	0.61	-0.59	2.82	
7,232.0	2.20	190.70	6,930.8	-1,702.0	-418.0	1,752.4	1.19	-1.16	-5.58	
7,317.0	1.80	192.80	7,015.7	-1,704.9	-418.6	1,755.3	0.48	-0.47	2.47	
7,403.0	1.40	197.30	7,101.7	-1,707.2	-419.2	1,757.7	0.49	-0.47	5.23	
7,488.0	1.20	198.00	7,186.7	-1,709.1	-419.8	1,759.6	0.24	-0.24	0.82	
7,573.0	1.00	200.40	7,271.7	-1,710.6	-420.3	1,761.3	0.24	-0.24	2.82	
7,659.0	0.80	202.00	7,357.7	-1,711.9	-420.8	1,762.6	0.23	-0.23	1.86	
7,830.0	0.80	235.90	7,528.7	-1,713.6	-422.2	1,764.7	0.27	0.00	19.82	
7,975.0	1.10	243.10	7,673.6	-1,714.8	-424.3	1,766.4	0.22	0.21	4.97	
8,025.0	1.10	243.10	7,723.6	-1,715.3	-425.2	1,767.0	0.00	0.00	0.00	

Design Targets										
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude	
- hit/miss target										
- Shape										
TARGET CIRCLE 14ft	0.00	0.00	6,704.0	-1,703.6	-427.8	1,322,147.61	3,255,530.84	40° 12' 50.665 N	104° 35' 6.006 W	
- survey misses by 19.1ft at 7006.0ft MD (6705.1 TVD, -1689.5 N, -415.0 E)										
- Circle (radius 75.0)										
HARDLINE 150'E OF	0.00	0.00	7,674.0	-1,803.6	-277.8	1,322,049.17	3,255,681.86	40° 12' 49.677 N	104° 35' 4.073 W	
- survey misses by 171.3ft at 7974.0ft MD (7672.6 TVD, -1714.8 N, -424.3 E)										
- Polygon										
Point 1			7,674.0	0.0	0.0	1,322,049.17	3,255,681.86			
Point 2			7,674.0	800.0	0.0	1,322,849.10	3,255,673.59			

Checked By: _____	Approved By: _____	Date: _____
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