



Well Name: **Cannon W15-18D**

Surface Location: Cannon W15-18D Pad Sec.15-T2N-R66W  
North American Datum 1983 US State Plane 1983 Colorado Northern Zone

Ground Elevation: 4989.0

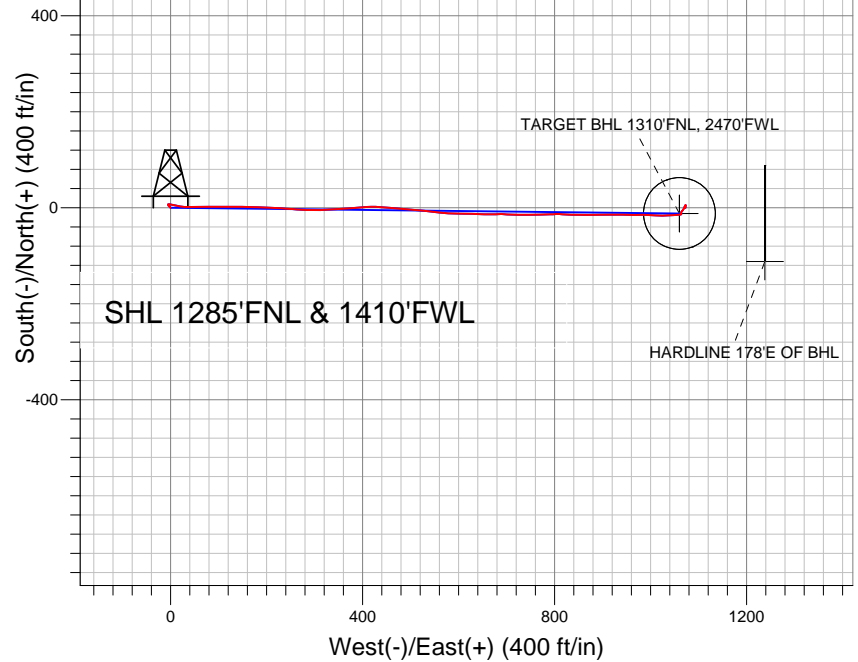
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1295368.38	3204716.21	40.141860	-104.767740

Original Well Elev WELL @ 5002.0ft (Original Well Elev)

Slot

## NOBLE ENERGY INC WELD COUNTY CO

Projected BHL 0'S & 1072'E of  
surface 1310'FNL & 2482'FWL



SHL 1285'FNL & 1410'FWL

TARGET BHL 1310'FNL, 2470'FWL

HARDLINE 178'E OF BHL

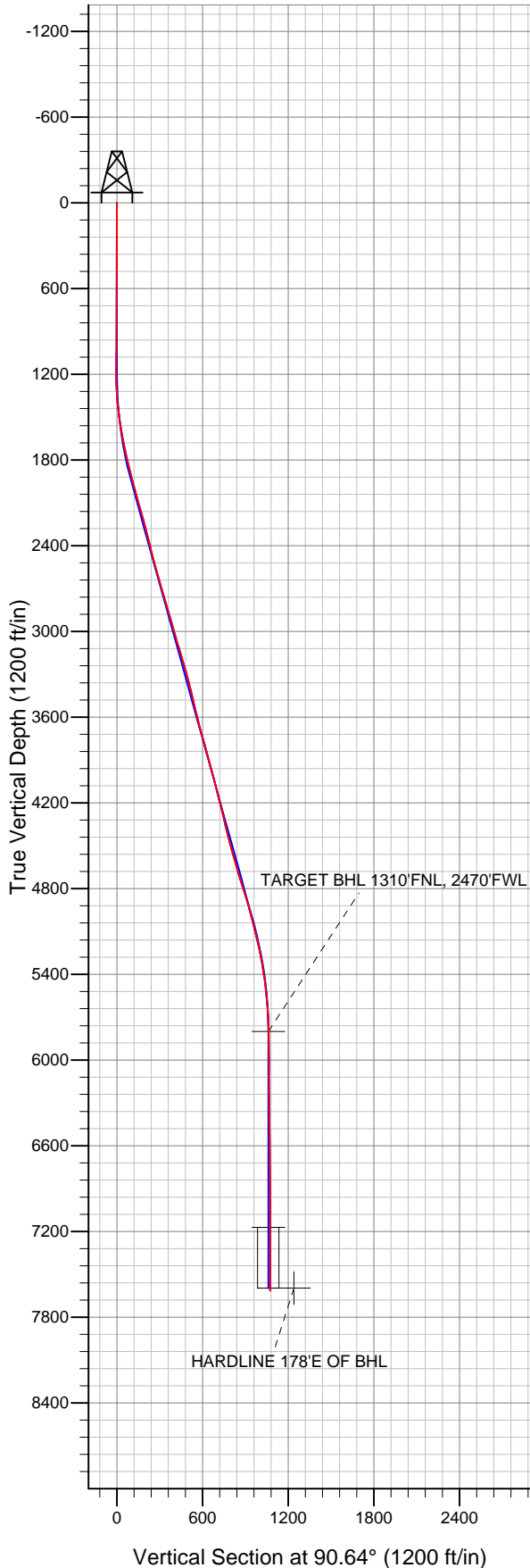
### LEGEND

- △ Cannon W15-18D, Wellbore #1, Noble Cannon W15-18D Plan #2 (01-14-10) VO
- Wellbore #1
- Survey #1

## Final Survey Plot

Projected Final Survey -  
7750'MD & 7615'TVD @ 1072'VS  
0.6 deg Inc 189.2 deg AZ

Project: SEC.15-T2N-R66W  
Site: Cannon W15-18D Pad Sec.15-T2N-R66W  
Well: Cannon W15-18D  
Plan: Wellbore #1





## **Directional**

# **NOBLE ENERGY INC WELD COUNTY CO**

**SEC.15-T2N-R66W**

**Cannon W15-18D Pad Sec.15-T2N-R66W**

**Cannon W15-18D**

**Wellbore #1**

**Survey: Survey #1**

## **Standard Survey Report**

**25 July, 2011**



<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well Cannon W15-18D
<b>Project:</b>	SEC.15-T2N-R66W	<b>TVD Reference:</b>	WELL @ 5002.0ft (Original Well Elev)
<b>Site:</b>	Cannon W15-18D Pad Sec.15-T2N-R66W	<b>MD Reference:</b>	WELL @ 5002.0ft (Original Well Elev)
<b>Well:</b>	Cannon W15-18D	<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.15-T2N-R66W, 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		
<b>Map Zone:</b>	Colorado Northern Zone		Using geodetic scale factor

<b>Site</b>	Cannon W15-18D Pad Sec.15-T2N-R66W		
<b>Site Position:</b>		<b>Northing:</b>	1,295,368.39 ft
<b>From:</b>	Lat/Long	<b>Easting:</b>	3,204,716.21 ft
<b>Position Uncertainty:</b>	0.0 ft	<b>Slot Radius:</b>	"
		<b>Latitude:</b>	40.141860
		<b>Longitude:</b>	-104.767740
		<b>Grid Convergence:</b>	0.47 °

<b>Well</b>	Cannon W15-18D		
<b>Well Position</b>	<b>+N/-S</b>	0.0 ft	<b>Northing:</b> 1,295,368.38 ft
	<b>+E/-W</b>	0.0 ft	<b>Easting:</b> 3,204,716.21 ft
<b>Position Uncertainty</b>	0.0 ft	<b>Wellhead Elevation:</b>	ft
		<b>Latitude:</b>	40.141860
		<b>Longitude:</b>	-104.767740
		<b>Ground Level:</b>	4,989.0 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>
	IGRF2010	7/13/2011	8.83	66.84	52,986

<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	90.64	

<b>Survey Program</b>	<b>Date</b>	7/25/2011			
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
1,015.0	7,750.0	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	
1,015.0	0.70	316.70	1,015.0	4.5	-4.3	-4.3	0.07	0.07	0.00	
1,109.0	0.70	319.30	1,109.0	5.4	-5.0	-5.1	0.03	0.00	2.77	
1,203.0	0.90	352.30	1,203.0	6.5	-5.5	-5.6	0.52	0.21	35.11	
1,297.0	2.90	92.90	1,296.9	7.1	-3.2	-3.3	3.39	2.13	107.02	
1,391.0	5.20	100.80	1,390.7	6.2	3.3	3.3	2.51	2.45	8.40	
1,484.0	8.00	103.50	1,483.1	3.9	13.8	13.7	3.03	3.01	2.90	
1,579.0	8.70	92.90	1,577.0	2.0	27.4	27.4	1.78	0.74	-11.16	
1,672.0	11.40	90.00	1,668.6	1.7	43.6	43.6	2.95	2.90	-3.12	
1,766.0	12.20	88.90	1,760.6	1.9	62.8	62.8	0.88	0.85	-1.17	
1,860.0	14.40	89.90	1,852.1	2.1	84.4	84.4	2.35	2.34	1.06	
1,954.0	15.10	90.00	1,943.0	2.1	108.4	108.3	0.75	0.74	0.11	
2,048.0	15.80	89.90	2,033.6	2.1	133.4	133.4	0.75	0.74	-0.11	

<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well Cannon W15-18D
<b>Project:</b>	SEC.15-T2N-R66W	<b>TVD Reference:</b>	WELL @ 5002.0ft (Original Well Elev)
<b>Site:</b>	Cannon W15-18D Pad Sec.15-T2N-R66W	<b>MD Reference:</b>	WELL @ 5002.0ft (Original Well Elev)
<b>Well:</b>	Cannon W15-18D	<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)	
2,142.0	15.10	91.40	2,124.2	1.8	158.5	158.4	0.86	-0.74	1.60	
2,237.0	15.10	92.90	2,215.9	0.9	183.2	183.2	0.41	0.00	1.58	
2,331.0	14.50	91.50	2,306.8	0.0	207.2	207.2	0.74	-0.64	-1.49	
2,424.0	13.70	93.70	2,397.0	-1.0	229.8	229.8	1.04	-0.86	2.37	
2,518.0	15.10	95.20	2,488.1	-2.9	253.1	253.1	1.54	1.49	1.60	
2,612.0	15.40	91.80	2,578.7	-4.4	277.8	277.8	1.00	0.32	-3.62	
2,706.0	15.60	90.10	2,669.3	-4.8	302.9	302.9	0.53	0.21	-1.81	
2,800.0	16.40	87.90	2,759.7	-4.3	328.8	328.8	1.07	0.85	-2.34	
2,894.0	17.10	84.30	2,849.7	-2.5	355.8	355.8	1.33	0.74	-3.83	
2,988.0	16.60	85.30	2,939.7	0.0	382.9	382.9	0.61	-0.53	1.06	
3,082.0	15.70	86.50	3,030.0	1.9	409.0	409.0	1.02	-0.96	1.28	
3,176.0	16.80	94.70	3,120.2	1.5	435.3	435.2	2.70	1.17	8.72	
3,270.0	16.70	94.80	3,210.2	-0.7	462.3	462.2	0.11	-0.11	0.11	
3,364.0	15.60	93.70	3,300.5	-2.6	488.3	488.3	1.21	-1.17	-1.17	
3,458.0	13.80	95.60	3,391.4	-4.5	512.1	512.1	1.98	-1.91	2.02	
3,552.0	13.40	97.30	3,482.8	-7.0	534.1	534.1	0.60	-0.43	1.81	
3,646.0	13.20	96.90	3,574.3	-9.7	555.5	555.6	0.23	-0.21	-0.43	
3,740.0	15.40	92.40	3,665.4	-11.5	578.6	578.7	2.62	2.34	-4.79	
3,833.0	15.30	90.40	3,755.0	-12.1	603.3	603.4	0.58	-0.11	-2.15	
3,927.0	15.50	92.20	3,845.7	-12.7	628.2	628.3	0.55	0.21	1.91	
4,021.0	15.20	91.00	3,936.3	-13.4	653.1	653.2	0.46	-0.32	-1.28	
4,115.0	14.60	88.70	4,027.2	-13.3	677.2	677.3	0.90	-0.64	-2.45	
4,209.0	13.80	93.30	4,118.3	-13.7	700.3	700.4	1.47	-0.85	4.89	
4,303.0	14.40	91.10	4,209.5	-14.6	723.2	723.3	0.86	0.64	-2.34	
4,397.0	14.00	89.00	4,300.6	-14.6	746.2	746.3	0.69	-0.43	-2.23	
4,491.0	13.80	88.80	4,391.8	-14.2	768.8	768.9	0.22	-0.21	-0.21	
4,585.0	13.70	87.80	4,483.1	-13.5	791.1	791.2	0.27	-0.11	-1.06	
4,679.0	16.80	91.20	4,573.8	-13.4	815.8	815.9	3.43	3.30	3.62	
4,773.0	16.20	94.30	4,663.9	-14.6	842.5	842.6	1.13	-0.64	3.30	
4,867.0	17.10	88.50	4,754.0	-15.3	869.4	869.5	2.01	0.96	-6.17	
4,961.0	17.80	88.50	4,843.7	-14.5	897.6	897.7	0.74	0.74	0.00	
5,054.0	16.00	90.70	4,932.7	-14.3	924.6	924.7	2.05	-1.94	2.37	
5,148.0	14.50	91.50	5,023.3	-14.8	949.3	949.4	1.61	-1.60	0.85	
5,242.0	13.60	89.20	5,114.5	-14.9	972.1	972.2	1.13	-0.96	-2.45	
5,336.0	11.90	91.90	5,206.2	-15.1	992.9	993.0	1.92	-1.81	2.87	
5,430.0	10.80	92.70	5,298.4	-15.8	1,011.4	1,011.5	1.18	-1.17	0.85	
5,524.0	8.40	90.80	5,391.1	-16.3	1,027.0	1,027.1	2.58	-2.55	-2.02	
5,618.0	6.90	85.40	5,484.2	-16.0	1,039.5	1,039.6	1.77	-1.60	-5.74	
5,712.0	5.30	85.20	5,577.7	-15.2	1,049.5	1,049.6	1.70	-1.70	-0.21	
5,806.0	3.40	84.70	5,671.4	-14.5	1,056.6	1,056.7	2.02	-2.02	-0.53	
5,900.0	2.80	86.40	5,765.3	-14.1	1,061.6	1,061.7	0.65	-0.64	1.81	
5,934.7	1.87	75.23	5,799.9	-13.9	1,063.0	1,063.1	2.97	-2.67	-32.18	
TARGET BHL 1310°FNL, 2470°FWL										
5,994.0	1.00	7.40	5,859.2	-13.2	1,064.0	1,064.1	2.97	-1.47	-114.40	
6,088.0	0.70	350.70	5,953.2	-11.8	1,064.0	1,064.1	0.41	-0.32	-17.77	
6,182.0	0.90	349.20	6,047.2	-10.5	1,063.8	1,063.9	0.21	0.21	-1.60	
6,276.0	1.30	25.20	6,141.2	-8.8	1,064.1	1,064.2	0.83	0.43	38.30	
6,370.0	1.10	39.60	6,235.2	-7.2	1,065.2	1,065.2	0.38	-0.21	15.32	
6,464.0	1.50	37.70	6,329.1	-5.5	1,066.5	1,066.5	0.43	0.43	-2.02	
6,558.0	1.50	36.00	6,423.1	-3.5	1,068.0	1,067.9	0.05	0.00	-1.81	
6,652.0	1.30	24.50	6,517.1	-1.6	1,069.1	1,069.1	0.37	-0.21	-12.23	
6,746.0	1.00	21.00	6,611.1	0.2	1,069.9	1,069.8	0.33	-0.32	-3.72	
6,839.0	1.40	20.10	6,704.0	2.0	1,070.5	1,070.5	0.43	0.43	-0.97	
6,933.0	1.20	38.10	6,798.0	3.9	1,071.5	1,071.4	0.48	-0.21	19.15	

<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well Cannon W15-18D
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<b>Well:</b>	Cannon W15-18D	<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)
7,027.0	0.70	19.00	6,892.0	5.2	1,072.3	1,072.2	0.62	-0.53	-20.32
7,121.0	0.20	40.90	6,986.0	5.8	1,072.6	1,072.5	0.55	-0.53	23.30
7,215.0	0.20	158.80	7,080.0	5.8	1,072.8	1,072.7	0.36	0.00	125.43
7,307.1	0.49	172.69	7,172.1	5.3	1,072.9	1,072.8	0.33	0.32	15.08
<b>TARGET CIRCLE 1310'FNL, 2470'FWL</b>									
7,309.0	0.50	172.80	7,174.0	5.3	1,072.9	1,072.8	0.33	0.33	5.97
7,403.0	0.70	173.40	7,268.0	4.3	1,073.0	1,072.9	0.21	0.21	0.64
7,497.0	1.00	189.30	7,362.0	2.9	1,073.0	1,072.9	0.40	0.32	16.91
7,591.0	0.80	187.90	7,456.0	1.4	1,072.7	1,072.7	0.21	-0.21	-1.49
7,700.0	0.60	189.20	7,565.0	0.1	1,072.5	1,072.5	0.18	-0.18	1.19
7,732.9	0.60	189.20	7,597.9	-0.2	1,072.5	1,072.4	0.00	0.00	0.00
<b>HARDLINE 178'E OF BHL</b>									
7,750.0	0.60	189.20	7,615.0	-0.4	1,072.5	1,072.4	0.00	0.00	0.00

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