

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

Well Name: **Todd LC25-760**

Surface Location: Todd LC25-760 Pad Sec.25-T9N-R59W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

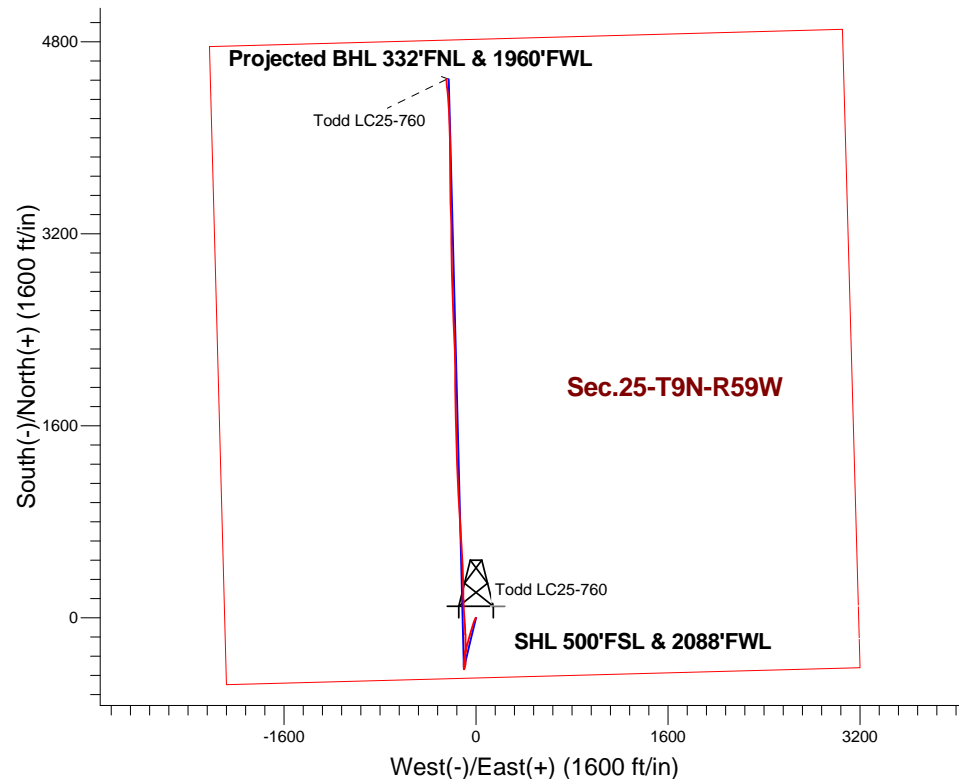
Ground Elevation: 4973.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1507472.72	3435769.75	40.715800	-103.927950	
H&P 326 RKB - 30' WELL @ 5003.0ft (H&P 326 RKB - 30')						

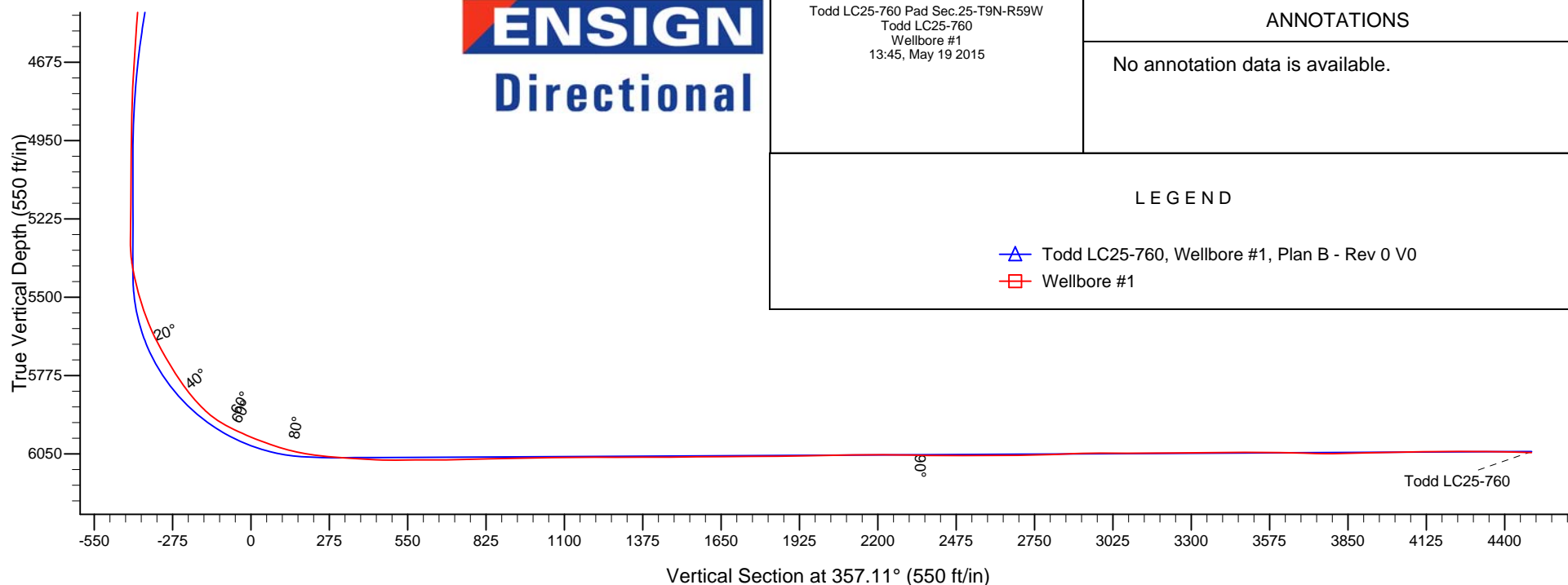
FINAL SURVEY

Projected Bottom Hole Location
10695'MD 6046'TVD 4487'N & 247'W of SHL
88.4 degree Incl @ 354.3 degree AZM

05-123-40675



ENSIGN
Directional



Todd LC25-760 Pad Sec.25-T9N-R59W
Todd LC25-760
Wellbore #1
13:45, May 19 2015

ANNOTATIONS

No annotation data is available.

LEGEND

- ▲ Todd LC25-760, Wellbore #1, Plan B - Rev 0 V0
- Wellbore #1



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

Sec.25-T9N-R59W

Todd LC25-760 Pad Sec.25-T9N-R59W

Todd LC25-760

Wellbore #1

Design: Wellbore #1

Standard Survey Report

19 May, 2015

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Todd LC25-760
Project:	Sec.25-T9N-R59W	TVD Reference:	WELL @ 5003.0ft (H&P 326 RKB - 30')
Site:	Todd LC25-760 Pad Sec.25-T9N-R59W	MD Reference:	WELL @ 5003.0ft (H&P 326 RKB - 30')
Well:	Todd LC25-760	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	Sec.25-T9N-R59W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site		Todd LC25-760 Pad Sec.25-T9N-R59W			
Site Position:		Northing:	1,507,472.73ft	Latitude:	40.715800
From:	Lat/Long	Easting:	3,435,769.75ft	Longitude:	-103.927950
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	1.02 °

Well	Todd LC25-760					
Well Position	+N-S	0.0 ft	Northing:	1,507,472.72 ft	Latitude:	40.715800
	+E-W	0.0 ft	Easting:	3,435,769.75 ft	Longitude:	-103.927950
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,973.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/28/2015	7.91	67.30	52,970

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	357.11	

Survey Program	Date 5/19/2015				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
546.0	1,193.0	Surface (Wellbore #1)	MWD	MWD - Standard	
1,489.0	6,427.0	Intermediate/Curve (Wellbore #1)	MWD	MWD - Standard	
6,543.0	10,695.0	Lateral (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
546.0	0.30	241.89	546.0	-0.7	-1.3	-0.6	0.05	0.05	0.00
1,193.0	0.30	193.09	1,193.0	-3.1	-3.1	-3.0	0.04	0.00	-7.54
1,489.0	0.41	169.04	1,489.0	-4.9	-3.1	-4.8	0.06	0.04	-8.13
1,581.0	0.48	180.47	1,581.0	-5.6	-3.1	-5.5	0.12	0.08	12.42
1,673.0	0.39	201.48	1,673.0	-6.3	-3.2	-6.1	0.20	-0.10	22.84
1,767.0	1.41	210.36	1,767.0	-7.6	-3.9	-7.4	1.09	1.09	9.45
1,951.0	5.58	207.19	1,950.6	-17.5	-9.1	-17.0	2.27	2.27	-1.72
2,136.0	7.43	202.80	2,134.4	-36.5	-17.9	-35.6	1.03	1.00	-2.37
2,228.0	8.48	197.79	2,225.5	-48.5	-22.2	-47.3	1.37	1.14	-5.45

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Todd LC25-760
Project:	Sec.25-T9N-R59W	TVD Reference:	WELL @ 5003.0ft (H&P 326 RKB - 30')
Site:	Todd LC25-760 Pad Sec.25-T9N-R59W	MD Reference:	WELL @ 5003.0ft (H&P 326 RKB - 30')
Well:	Todd LC25-760	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)
2,412.0	8.22	195.85	2,407.5	-74.1	-30.0	-72.5	0.21	-0.14	-1.05
2,598.0	8.48	195.85	2,591.6	-100.0	-37.3	-98.0	0.14	0.14	0.00
2,691.0	10.86	196.38	2,683.2	-115.0	-41.7	-112.8	2.56	2.56	0.57
2,783.0	11.43	196.47	2,773.5	-132.1	-46.7	-129.6	0.62	0.62	0.10
2,876.0	11.38	196.38	2,864.7	-149.7	-51.9	-146.9	0.06	-0.05	-0.10
2,971.0	11.21	195.50	2,957.8	-167.6	-57.0	-164.5	0.25	-0.18	-0.93
3,065.0	11.04	195.68	3,050.1	-185.1	-61.9	-181.7	0.18	-0.18	0.19
3,160.0	10.73	195.24	3,143.4	-202.4	-66.7	-198.8	0.34	-0.33	-0.46
3,254.0	10.20	194.54	3,235.8	-218.9	-71.1	-215.0	0.58	-0.56	-0.74
3,349.0	10.15	195.06	3,329.3	-235.1	-75.4	-231.0	0.11	-0.05	0.55
3,444.0	9.98	191.81	3,422.8	-251.3	-79.2	-246.9	0.62	-0.18	-3.42
3,538.0	10.11	192.34	3,515.4	-267.3	-82.7	-262.8	0.17	0.14	0.56
3,633.0	9.80	193.22	3,609.0	-283.3	-86.3	-278.6	0.36	-0.33	0.93
3,727.0	9.76	192.25	3,701.6	-298.9	-89.8	-294.0	0.18	-0.04	-1.03
3,822.0	9.80	192.25	3,795.2	-314.6	-93.2	-309.5	0.04	0.04	0.00
3,916.0	8.35	189.26	3,888.0	-329.2	-96.0	-323.9	1.62	-1.54	-3.18
4,011.0	8.04	189.18	3,982.1	-342.6	-98.2	-337.2	0.33	-0.33	-0.08
4,105.0	7.63	185.90	4,075.2	-355.3	-99.9	-349.8	0.65	-0.44	-3.49
4,200.0	7.08	182.58	4,169.4	-367.4	-100.8	-361.8	0.73	-0.58	-3.49
4,295.0	6.64	182.14	4,263.7	-378.7	-101.3	-373.1	0.47	-0.46	-0.46
4,390.0	6.15	179.33	4,358.1	-389.3	-101.4	-383.7	0.61	-0.52	-2.96
4,484.0	5.76	177.13	4,451.6	-399.1	-101.1	-393.4	0.48	-0.41	-2.34
4,579.0	4.13	177.57	4,546.3	-407.2	-100.7	-401.6	1.72	-1.72	0.46
4,673.0	3.58	171.13	4,640.1	-413.5	-100.1	-407.9	0.74	-0.59	-6.85
4,768.0	3.47	188.99	4,734.9	-419.3	-100.1	-413.7	1.16	-0.12	18.80
4,863.0	1.23	186.27	4,829.8	-423.1	-100.7	-417.5	2.36	-2.36	-2.86
4,957.0	1.27	181.09	4,923.8	-425.2	-100.8	-419.6	0.13	0.04	-5.51
5,052.0	0.62	139.25	5,018.8	-426.6	-100.5	-421.0	0.96	-0.68	-44.04
5,146.0	0.48	122.29	5,112.8	-427.2	-99.8	-421.6	0.23	-0.15	-18.04
5,241.0	0.48	144.53	5,207.8	-427.8	-99.3	-422.2	0.19	0.00	23.41
5,336.0	0.70	154.11	5,302.8	-428.6	-98.8	-423.1	0.25	0.23	10.08
5,430.0	10.55	17.10	5,396.3	-420.9	-96.0	-415.5	11.78	10.48	-145.76
5,525.0	16.44	14.10	5,488.6	-399.5	-90.2	-394.4	6.24	6.20	-3.16
5,620.0	20.70	357.40	5,578.7	-369.7	-87.6	-364.8	7.13	4.48	-17.58
5,714.0	28.04	359.51	5,664.3	-330.9	-88.6	-326.0	7.86	7.81	2.24
5,809.0	31.65	1.00	5,746.6	-283.6	-88.3	-278.8	3.88	3.80	1.57
5,903.0	36.52	359.85	5,824.5	-231.0	-88.0	-226.3	5.23	5.18	-1.22
5,998.0	46.29	0.03	5,895.6	-168.2	-88.0	-163.6	10.28	10.28	0.19
6,093.0	62.28	357.00	5,950.9	-91.4	-90.2	-86.7	17.03	16.83	-3.19
6,187.0	67.60	355.37	5,990.7	-6.5	-95.9	-1.6	5.87	5.66	-1.73
6,281.0	71.65	356.95	6,023.5	81.4	-101.8	86.5	4.59	4.31	1.68
6,376.0	79.07	359.15	6,047.4	173.2	-104.9	178.3	8.13	7.81	2.32
6,427.0	83.56	359.42	6,055.1	223.6	-105.5	228.7	8.82	8.80	0.53
6,543.0	86.06	358.01	6,065.6	339.1	-108.1	344.1	2.47	2.16	-1.22
6,637.0	87.60	357.31	6,070.8	432.9	-112.0	438.0	1.80	1.64	-0.74
6,729.0	90.91	357.29	6,072.0	524.8	-116.3	530.0	3.60	3.60	-0.02
6,822.0	89.49	355.73	6,071.7	617.6	-122.0	622.9	2.27	-1.53	-1.68
6,914.0	91.25	357.22	6,071.1	709.4	-127.6	714.9	2.51	1.91	1.62
7,009.0	91.80	356.61	6,068.6	804.2	-132.7	809.9	0.86	0.58	-0.64
7,103.0	91.07	357.39	6,066.2	898.1	-137.6	903.9	1.14	-0.78	0.83
7,198.0	91.12	356.25	6,064.4	992.9	-142.9	998.8	1.20	0.05	-1.20
7,292.0	90.73	357.13	6,062.9	1,086.7	-148.3	1,092.8	1.02	-0.41	0.94
7,386.0	90.02	357.66	6,062.3	1,180.6	-152.6	1,186.8	0.94	-0.76	0.56
7,480.0	90.24	357.39	6,062.1	1,274.5	-156.7	1,280.8	0.37	0.23	-0.29

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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)
7,575.0	90.02	358.63	6,061.9	1,369.5	-160.0	1,375.8	1.33	-0.23	1.31
7,669.0	90.19	358.54	6,061.7	1,463.5	-162.3	1,469.8	0.20	0.18	-0.10
7,764.0	90.76	359.33	6,060.9	1,558.4	-164.1	1,564.7	1.03	0.60	0.83
7,858.0	90.51	358.54	6,059.9	1,652.4	-165.8	1,658.7	0.88	-0.27	-0.84
7,953.0	90.37	357.48	6,059.1	1,747.4	-169.1	1,753.7	1.13	-0.15	-1.12
8,047.0	90.24	359.15	6,058.6	1,841.3	-171.9	1,847.6	1.78	-0.14	1.78
8,142.0	91.25	359.77	6,057.4	1,936.3	-172.8	1,942.5	1.25	1.06	0.65
8,237.0	91.52	0.21	6,055.1	2,031.3	-172.8	2,037.4	0.54	0.28	0.46
8,331.0	90.11	358.80	6,053.8	2,125.2	-173.6	2,131.3	2.12	-1.50	-1.50
8,425.0	89.89	358.19	6,053.8	2,219.2	-176.1	2,225.3	0.69	-0.23	-0.65
8,519.0	88.84	357.66	6,054.8	2,313.1	-179.5	2,319.3	1.25	-1.12	-0.56
8,613.0	90.15	358.19	6,055.6	2,407.1	-182.9	2,413.2	1.50	1.39	0.56
8,708.0	89.71	357.13	6,055.7	2,502.0	-186.7	2,508.2	1.21	-0.46	-1.12
8,803.0	89.98	357.31	6,056.0	2,596.9	-191.3	2,603.2	0.34	0.28	0.19
8,897.0	90.99	358.28	6,055.2	2,690.8	-195.0	2,697.2	1.49	1.07	1.03
8,992.0	91.74	357.66	6,052.9	2,785.7	-198.3	2,792.2	1.02	0.79	-0.65
9,086.0	92.35	359.68	6,049.6	2,879.6	-200.5	2,886.1	2.24	0.65	2.15
9,181.0	90.11	359.95	6,047.5	2,974.6	-200.8	2,980.9	2.37	-2.36	0.28
9,275.0	89.54	359.16	6,047.8	3,068.6	-201.5	3,074.9	1.04	-0.61	-0.84
9,370.0	90.31	359.38	6,048.0	3,163.6	-202.8	3,169.8	0.84	0.81	0.23
9,558.0	91.08	358.01	6,045.7	3,351.5	-207.0	3,357.7	0.84	0.41	-0.73
9,653.0	89.85	358.10	6,044.9	3,446.5	-210.3	3,452.7	1.30	-1.29	0.09
9,747.0	89.45	359.86	6,045.5	3,540.4	-211.9	3,546.6	1.92	-0.43	1.87
9,841.0	88.57	358.36	6,047.1	3,634.4	-213.4	3,640.5	1.85	-0.94	-1.60
9,936.0	88.75	359.77	6,049.3	3,729.4	-214.9	3,735.5	1.50	0.19	1.48
10,030.0	91.21	359.85	6,049.4	3,823.4	-215.3	3,829.4	2.62	2.62	0.09
10,124.0	92.00	359.24	6,046.7	3,917.3	-216.0	3,923.2	1.06	0.84	-0.65
10,219.0	90.81	359.24	6,044.4	4,012.3	-217.3	4,018.1	1.25	-1.25	0.00
10,314.0	90.99	358.19	6,042.9	4,107.2	-219.4	4,113.1	1.12	0.19	-1.11
10,408.0	90.30	356.95	6,041.8	4,201.2	-223.4	4,207.1	1.51	-0.73	-1.32
10,503.0	89.93	356.17	6,041.7	4,296.0	-229.1	4,302.1	0.91	-0.39	-0.82
10,597.0	88.35	354.32	6,043.1	4,389.6	-236.9	4,396.0	2.59	-1.68	-1.97
10,635.0	88.40	354.30	6,044.1	4,427.4	-240.6	4,433.9	0.14	0.13	-0.05
10,695.0	88.40	354.30	6,045.8	4,487.1	-246.6	4,493.8	0.00	0.00	0.00

Checked By: _____ Approved By: _____ Date: _____