

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

Well Name: **Timbro State LD16-67HN**

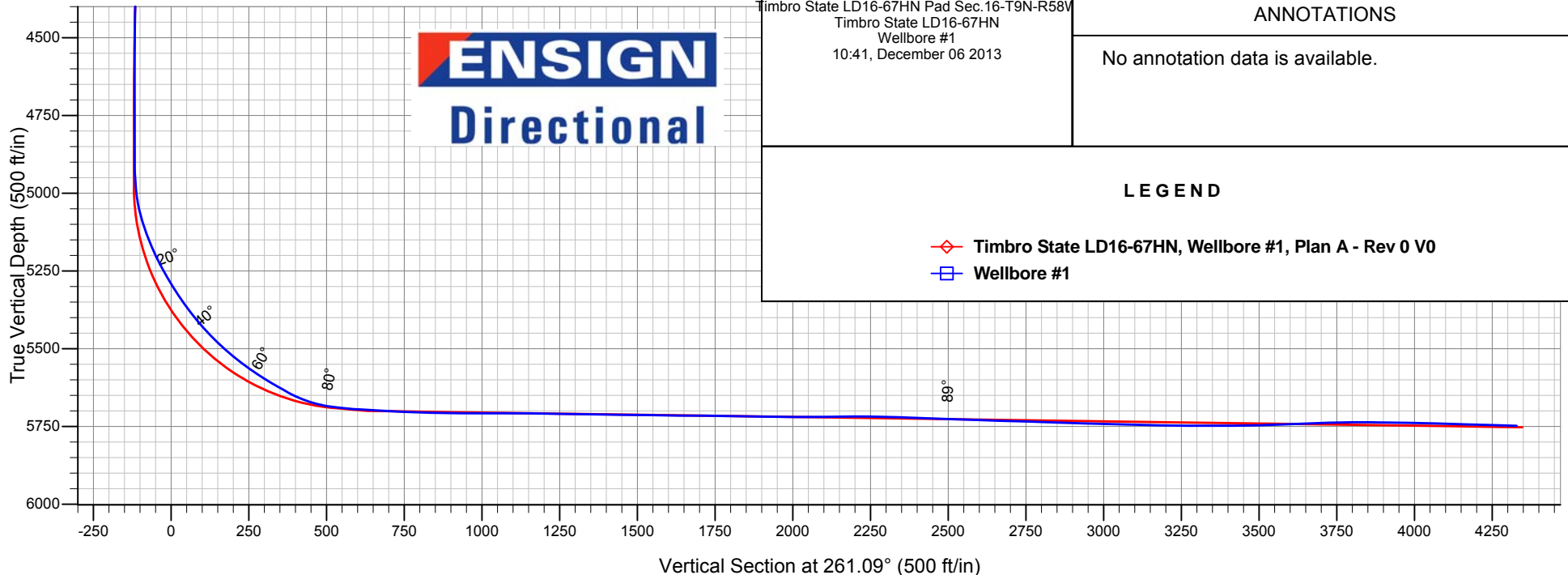
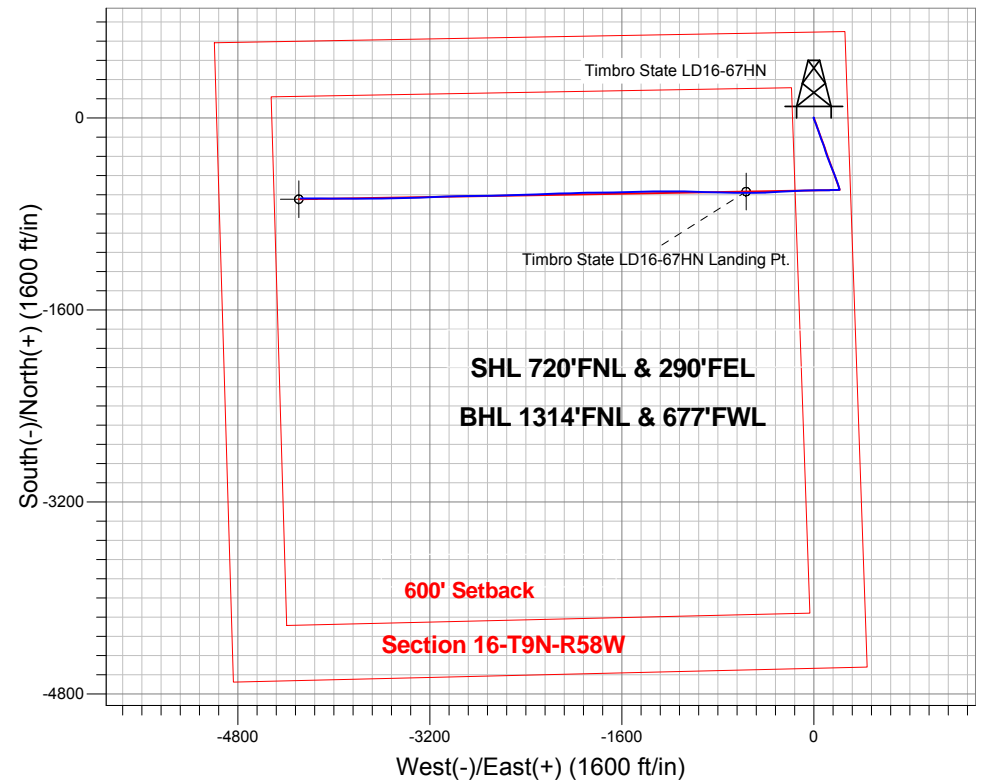
Surface Location: Timbro State LD16-67HN Pad Sec.16-T9N-R58W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone

Ground Elevation: 4725.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1522675.22	3454090.09	40.756610	-103.860860	
H&P 273 RKB -24' WELL @ 4749.0ft (H&P 273 RKB - 24')						

FINAL SURVEY

Projected Bottom Hole Location
9917'MD 5748'TVD 670'S & 4277'W of SHL
88.5 degree Incl @ 270.0 degree AZM





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

Sec.16-T9N-R58W

Timbro State LD16-67HN Pad Sec.16-T9N-R58W

Timbro State LD16-67HN

Wellbore #1

Design: Wellbore #1

Standard Survey Report

06 December, 2013

Survey	Wellbore Data									
	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)
Survey A	0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
	422.0	0.60	342.38	422.0	2.1	-0.7	0.3	0.14	0.14	0.00
	800.0	0.50	255.98	800.0	3.6	-2.9	2.3	0.20	-0.03	-22.86
	1,160.0	0.40	44.42	1,160.0	4.1	-3.5	2.8	0.24	-0.03	41.23
	1,280.0	0.40	205.70	1,280.0	4.0	-3.4	2.7	0.66	0.00	134.40
	1,465.0	0.30	187.90	1,465.0	3.0	-3.7	3.2	0.08	-0.05	-9.62
	1,558.0	1.80	181.40	1,558.0	1.3	-3.8	3.6	1.62	1.61	-6.99
	1,651.0	3.10	155.60	1,650.9	-2.5	-2.8	3.2	1.80	1.40	-27.74
	1,744.0	4.90	160.50	1,743.6	-8.5	-0.4	1.8	1.97	1.94	5.27
	1,839.0	5.90	161.40	1,838.2	-17.0	2.5	0.2	1.06	1.05	0.95

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Timbro State LD16-67HN
Project:	Sec.16-T9N-R58W	TVD Reference:	WELL @ 4749.0ft (H&P 273 RKB - 24')
Site:	Timbro State LD16-67HN Pad	MD Reference:	WELL @ 4749.0ft (H&P 273 RKB - 24')
Well:	Timbro State LD16-67HN	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)
1,934.0	6.90	155.90	1,932.6	-26.8	6.4	-2.1	1.23	1.05	-5.79
2,029.0	8.30	157.10	2,026.8	-38.3	11.3	-5.3	1.48	1.47	1.26
2,124.0	9.50	158.50	2,120.6	-51.9	16.9	-8.6	1.28	1.26	1.47
2,218.0	10.00	159.90	2,213.3	-66.8	22.5	-11.9	0.59	0.53	1.49
2,313.0	11.90	161.20	2,306.5	-83.8	28.5	-15.2	2.02	2.00	1.37
2,408.0	13.70	161.70	2,399.2	-103.8	35.2	-18.7	1.90	1.89	0.53
2,503.0	15.60	161.20	2,491.1	-126.6	42.9	-22.7	2.00	2.00	-0.53
2,598.0	16.60	159.60	2,582.4	-151.4	51.7	-27.6	1.15	1.05	-1.68
2,692.0	15.70	159.40	2,672.7	-175.9	60.9	-32.9	0.96	-0.96	-0.21
2,787.0	16.00	157.50	2,764.0	-200.0	70.4	-38.6	0.63	0.32	-2.00
2,882.0	15.50	161.40	2,855.5	-224.1	79.5	-43.8	1.23	-0.53	4.11
2,977.0	14.80	161.90	2,947.2	-247.7	87.3	-47.9	0.75	-0.74	0.53
3,072.0	15.40	164.30	3,038.9	-271.4	94.5	-51.3	0.91	0.63	2.53
3,167.0	17.20	161.20	3,130.1	-296.8	102.4	-55.2	2.10	1.89	-3.26
3,262.0	17.40	160.10	3,220.8	-323.5	111.8	-60.3	0.40	0.21	-1.16
3,356.0	17.20	159.60	3,310.5	-349.7	121.4	-65.8	0.27	-0.21	-0.53
3,451.0	17.20	158.90	3,401.3	-376.0	131.3	-71.5	0.22	0.00	-0.74
3,546.0	17.50	158.20	3,492.0	-402.3	141.7	-77.7	0.38	0.32	-0.74
3,641.0	17.10	157.30	3,582.7	-428.5	152.4	-84.2	0.51	-0.42	-0.95
3,735.0	15.80	156.60	3,672.8	-453.0	162.8	-90.7	1.40	-1.38	-0.74
3,830.0	13.40	156.40	3,764.7	-475.0	172.4	-96.7	2.53	-2.53	-0.21
3,925.0	12.80	161.50	3,857.3	-495.0	180.1	-101.3	1.37	-0.63	5.37
4,020.0	12.90	163.30	3,949.9	-515.2	186.5	-104.5	0.43	0.11	1.89
4,115.0	11.80	162.90	4,042.7	-534.6	192.4	-107.3	1.16	-1.16	-0.42
4,210.0	10.00	162.80	4,136.0	-551.8	197.7	-109.9	1.89	-1.89	-0.11
4,304.0	7.70	160.50	4,228.8	-565.5	202.2	-112.2	2.48	-2.45	-2.45
4,399.0	5.90	160.80	4,323.2	-576.1	205.9	-114.2	1.90	-1.89	0.32
4,494.0	4.80	160.30	4,417.8	-584.5	208.9	-115.8	1.16	-1.16	-0.53
4,589.0	3.30	165.60	4,512.5	-590.9	210.9	-116.9	1.63	-1.58	5.58
4,683.0	2.20	168.20	4,606.4	-595.2	212.0	-117.2	1.18	-1.17	2.77
4,778.0	0.40	334.00	4,701.4	-596.7	212.2	-117.2	2.73	-1.89	174.53
4,873.0	0.30	297.20	4,796.4	-596.3	211.8	-116.9	0.25	-0.11	-38.74
4,965.0	0.30	50.80	4,888.4	-596.1	211.8	-116.9	0.55	0.00	123.48
5,060.0	4.80	252.60	4,983.3	-597.1	208.2	-113.2	5.35	4.74	-166.53
5,154.0	15.70	263.80	5,075.6	-599.6	191.7	-96.5	11.73	11.60	11.91
5,249.0	23.20	271.20	5,165.2	-600.6	160.2	-65.2	8.29	7.89	7.79
5,344.0	29.30	267.70	5,250.3	-601.2	118.2	-23.7	6.62	6.42	-3.68
5,439.0	34.20	269.80	5,331.1	-602.2	68.3	25.8	5.29	5.16	2.21
5,534.0	39.30	270.30	5,407.2	-602.1	11.4	82.0	5.38	5.37	0.53
5,629.0	46.30	267.70	5,476.9	-603.4	-53.0	145.9	7.60	7.37	-2.74
5,723.0	53.00	267.70	5,537.7	-606.2	-124.6	217.0	7.13	7.13	0.00
5,818.0	57.10	267.10	5,592.1	-609.8	-202.3	294.4	4.35	4.32	-0.63
5,913.0	61.40	266.60	5,640.7	-614.3	-283.8	375.6	4.55	4.53	-0.53
6,007.0	74.40	266.00	5,676.0	-619.9	-370.6	462.1	13.84	13.83	-0.64
6,059.0	82.40	268.80	5,686.4	-622.2	-421.4	512.7	16.26	15.38	5.38
6,153.0	86.70	269.80	5,695.3	-623.3	-515.0	605.3	4.70	4.57	1.06
6,204.1	86.75	270.02	5,698.2	-623.4	-565.9	655.7	0.44	0.11	0.43
Timbro State LD16-67HN Landing Pt.									
6,246.0	86.80	270.20	5,700.6	-623.3	-607.8	697.0	0.44	0.11	0.43
6,339.0	87.80	271.00	5,705.0	-622.4	-700.7	788.6	1.38	1.08	0.86
6,434.0	89.60	271.60	5,707.1	-620.2	-795.6	882.1	2.00	1.89	0.63
6,529.0	89.70	271.60	5,707.7	-617.6	-890.6	975.5	0.11	0.11	0.00

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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)
6,624.0	90.00	272.30	5,708.0	-614.3	-985.5	1,068.8	0.80	0.32	0.74
6,718.0	89.50	270.90	5,708.4	-611.7	-1,079.5	1,161.2	1.58	-0.53	-1.49
6,813.0	88.90	269.80	5,709.7	-611.1	-1,174.5	1,255.0	1.32	-0.63	-1.16
6,908.0	89.20	270.00	5,711.3	-611.3	-1,269.5	1,348.8	0.38	0.32	0.21
7,003.0	89.20	268.40	5,712.6	-612.6	-1,364.5	1,442.9	1.68	0.00	-1.68
7,098.0	89.20	268.80	5,713.9	-614.9	-1,459.4	1,537.1	0.42	0.00	0.42
7,193.0	89.30	268.80	5,715.2	-616.9	-1,554.4	1,631.2	0.11	0.11	0.00
7,288.0	89.50	268.80	5,716.2	-618.9	-1,649.4	1,725.3	0.21	0.21	0.00
7,383.0	89.50	268.90	5,717.0	-620.8	-1,744.3	1,819.5	0.11	0.00	0.11
7,478.0	88.50	269.50	5,718.7	-622.1	-1,839.3	1,913.5	1.23	-1.05	0.63
7,573.0	89.90	268.40	5,720.0	-623.9	-1,934.3	2,007.6	1.87	1.47	-1.16
7,667.0	90.80	268.40	5,719.4	-626.5	-2,028.3	2,100.8	0.96	0.96	0.00
7,762.0	90.70	268.40	5,718.2	-629.2	-2,123.2	2,195.0	0.11	-0.11	0.00
7,857.0	88.20	267.50	5,719.1	-632.6	-2,218.1	2,289.3	2.80	-2.63	-0.95
7,951.0	88.00	267.40	5,722.2	-636.7	-2,312.0	2,382.7	0.24	-0.21	-0.11
8,046.0	88.10	268.10	5,725.4	-640.5	-2,406.9	2,477.0	0.74	0.11	0.74
8,141.0	88.00	268.10	5,728.7	-643.6	-2,501.8	2,571.2	0.11	-0.11	0.00
8,236.0	88.50	269.10	5,731.6	-645.9	-2,596.7	2,665.4	1.18	0.53	1.05
8,331.0	88.00	269.30	5,734.5	-647.3	-2,691.6	2,759.4	0.57	-0.53	0.21
8,425.0	87.90	269.10	5,737.8	-648.6	-2,785.6	2,852.4	0.24	-0.11	-0.21
8,520.0	88.40	269.10	5,740.9	-650.1	-2,880.5	2,946.4	0.53	0.53	0.00
8,615.0	89.00	269.10	5,743.0	-651.6	-2,975.5	3,040.5	0.63	0.63	0.00
8,710.0	88.20	268.10	5,745.4	-653.9	-3,070.4	3,134.6	1.35	-0.84	-1.05
8,804.0	89.20	267.90	5,747.5	-657.2	-3,164.3	3,227.9	1.08	1.06	-0.21
8,899.0	90.30	267.50	5,747.9	-661.0	-3,259.2	3,322.3	1.23	1.16	-0.42
8,994.0	90.00	267.70	5,747.7	-664.9	-3,354.2	3,416.7	0.38	-0.32	0.21
9,089.0	91.80	268.60	5,746.2	-668.0	-3,449.1	3,510.9	2.12	1.89	0.95
9,184.0	92.60	268.80	5,742.5	-670.2	-3,544.0	3,605.0	0.87	0.84	0.21
9,278.0	91.90	269.50	5,738.8	-671.6	-3,637.9	3,698.0	1.05	-0.74	0.74
9,373.0	90.10	270.00	5,737.2	-672.0	-3,732.9	3,791.9	1.97	-1.89	0.53
9,468.0	89.60	270.00	5,737.4	-672.0	-3,827.9	3,885.8	0.53	-0.53	0.00
9,563.0	88.80	270.30	5,738.8	-671.7	-3,922.9	3,979.6	0.90	-0.84	0.32
9,658.0	88.50	270.30	5,741.0	-671.2	-4,017.8	4,073.3	0.32	-0.32	0.00
9,753.0	88.30	270.30	5,743.6	-670.7	-4,112.8	4,167.1	0.21	-0.21	0.00
9,847.0	88.50	270.00	5,746.3	-670.5	-4,206.8	4,259.9	0.38	0.21	-0.32
9,917.0	88.50	270.00	5,748.1	-670.5	-4,276.7	4,329.0	0.00	0.00	0.00
Timbro State LD16-67HN BHL 1320'FNL & 660'FWL									

Checked By: _____	Approved By: _____	Date: _____
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