

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

Well Name: **Rohn State LD04-64HN**

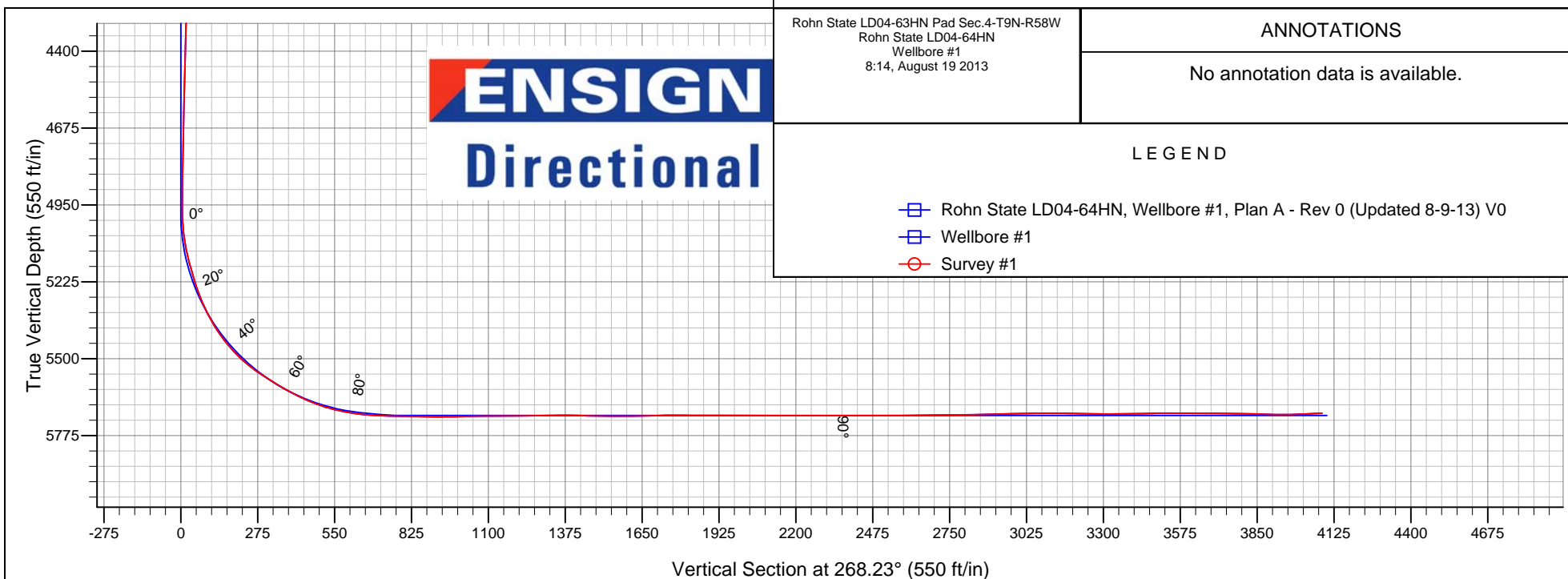
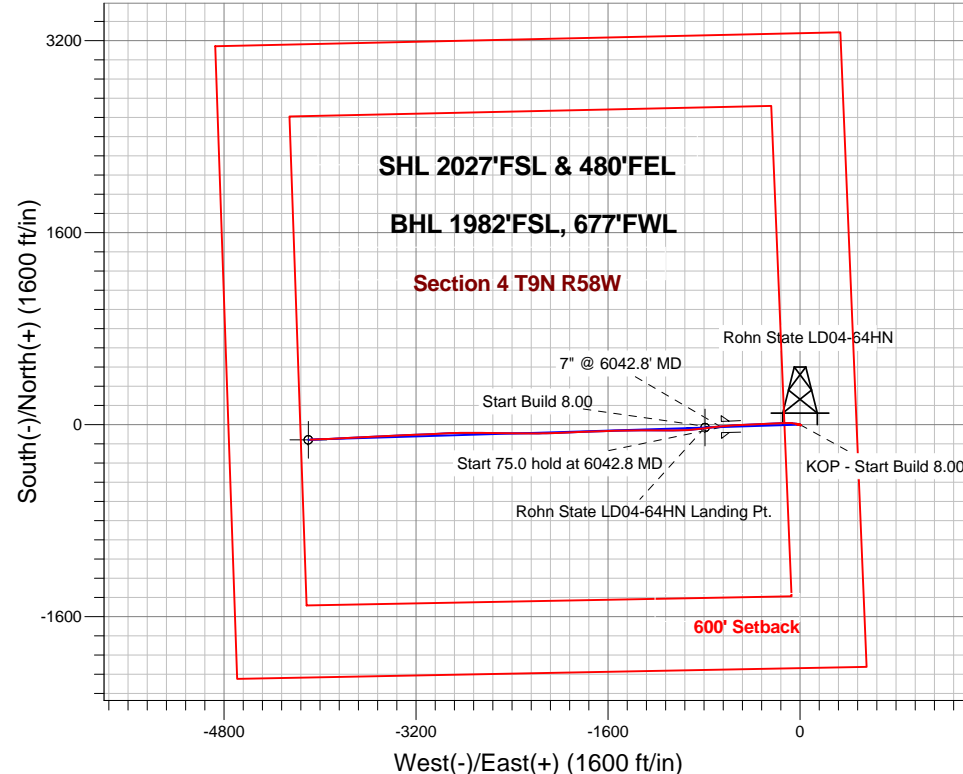
Surface Location: Rohn State LD04-63HN Pad Sec.4-T9N-R58W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4706.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1530723.97	3453655.99	40.778720	-103.861890	

H&P 273 RKB - 24' WELL @ 4730.0ft (H&P 273 RKB - 24')

FINAL SURVEY

Projected Bottom Hole Location
9476' MD 5695' TVD 124' S & 4080' W of SHL
92.8 degree Incl @ 268.4 degree AZM





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

Sec.4-T9N-R58W

Rohn State LD04-63HN Pad Sec.4-T9N-R58W

Rohn State LD04-64HN

Wellbore #1

Survey: Survey #1

Standard Survey Report

19 August, 2013

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Rohn State LD04-64HN
Project:	Sec.4-T9N-R58W	TVD Reference:	WELL @ 4730.0ft (H&P 273 RKB - 24')
Site:	Rohn State LD04-63HN Pad Sec.4-T9N-R58W	MD Reference:	WELL @ 4730.0ft (H&P 273 RKB - 24')
Well:	Rohn State LD04-64HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	Sec.4-T9N-R58W		
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		Rohn State LD04-63HN Pad Sec.4-T9N-R58W			
Site Position:		Northing:	1,530,647.50ft	Latitude:	40.778510
From:	Lat/Long	Easting:	3,453,657.40ft	Longitude:	-103.861890
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	1.06 °

Well	Rohn State LD04-64HN					
Well Position	+N-S	0.0 ft	Northing:	1,530,723.97 ft	Latitude:	40.778720
	+E-W	0.0 ft	Easting:	3,453,655.99 ft	Longitude:	-103.861890
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,706.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	8/9/2013	8.11	67.42	53,194

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	268.23	

Survey Program	Date 8/19/2013			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
420.0	9,476.0	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
420.0	0.50	97.80	420.0	-0.2	1.8	-1.8	0.12	0.12	0.00
820.0	1.00	179.80	820.0	-4.0	3.6	-3.4	0.26	0.13	20.50
1,150.0	1.20	63.80	1,149.9	-5.3	6.7	-6.5	0.57	0.06	-35.15
1,282.0	0.10	123.60	1,281.9	-4.8	8.0	-7.9	0.87	-0.83	45.30
1,563.0	0.40	308.90	1,562.9	-4.3	7.4	-7.3	0.18	0.11	-62.17
1,752.0	0.60	356.00	1,751.9	-2.9	6.9	-6.8	0.23	0.11	24.92
1,942.0	0.40	305.00	1,941.9	-1.5	6.2	-6.2	0.25	-0.11	-26.84
2,132.0	0.60	276.20	2,131.9	-1.0	4.7	-4.7	0.17	0.11	-15.16
2,321.0	1.20	292.40	2,320.9	-0.2	1.9	-1.9	0.34	0.32	8.57
2,510.0	1.00	286.20	2,509.8	1.0	-1.5	1.5	0.12	-0.11	-3.28
2,700.0	0.80	267.90	2,699.8	1.4	-4.4	4.4	0.18	-0.11	-9.63

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Rohn State LD04-64HN
Project:	Sec.4-T9N-R58W	TVD Reference:	WELL @ 4730.0ft (H&P 273 RKB - 24')
Site:	Rohn State LD04-63HN Pad Sec.4-T9N-R58W	MD Reference:	WELL @ 4730.0ft (H&P 273 RKB - 24')
Well:	Rohn State LD04-64HN	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)
2,890.0	1.10	287.30	2,889.8	1.9	-7.5	7.4	0.23	0.16	10.21
3,174.0	1.30	278.60	3,173.7	3.2	-13.3	13.2	0.10	0.07	-3.06
3,458.0	1.10	267.90	3,457.7	3.6	-19.2	19.1	0.11	-0.07	-3.77
3,743.0	2.00	288.30	3,742.6	5.1	-26.6	26.5	0.37	0.32	7.16
4,027.0	2.30	132.20	4,026.5	2.8	-27.1	27.0	1.48	0.11	-54.96
4,312.0	1.90	100.20	4,311.3	-1.9	-18.2	18.3	0.43	-0.14	-11.23
4,596.0	1.20	67.20	4,595.2	-1.6	-10.9	10.9	0.39	-0.25	-11.62
4,881.0	1.20	54.70	4,880.1	1.3	-5.7	5.6	0.09	0.00	-4.39
4,972.0	0.40	305.40	4,971.1	2.1	-5.2	5.1	1.52	-0.88	-120.11
5,067.0	8.10	282.70	5,065.8	3.7	-12.0	11.9	8.14	8.11	-23.89
5,162.0	15.60	279.50	5,158.7	7.3	-31.1	30.9	7.92	7.89	-3.37
5,256.0	18.70	277.60	5,248.5	11.4	-58.5	58.2	3.35	3.30	-2.02
5,351.0	26.60	270.20	5,336.2	13.5	-95.0	94.5	8.82	8.32	-7.79
5,446.0	35.40	267.70	5,417.5	12.5	-143.8	143.4	9.36	9.26	-2.63
5,541.0	45.50	268.10	5,489.7	10.2	-205.3	204.9	10.64	10.63	0.42
5,636.0	56.10	267.60	5,549.7	7.4	-278.8	278.4	11.17	11.16	-0.53
5,731.0	59.60	267.00	5,600.2	3.6	-359.1	358.8	3.72	3.68	-0.63
5,825.0	65.00	267.70	5,643.9	-0.2	-442.2	442.0	5.78	5.74	0.74
5,920.0	74.70	267.00	5,676.6	-4.3	-531.2	531.1	10.23	10.21	-0.74
5,988.0	79.80	265.10	5,691.6	-8.9	-597.4	597.4	7.98	7.50	-2.79
6,090.0	87.80	263.30	5,702.6	-19.2	-698.2	698.4	8.04	7.84	-1.76
6,182.6	88.50	262.80	5,705.6	-30.4	-790.1	790.6	0.92	0.75	-0.54
Rohn State LD04-64HN Landing Pt.									
6,183.0	88.50	262.80	5,705.6	-30.4	-790.4	791.0	0.92	0.75	-0.54
6,276.0	89.30	264.80	5,707.4	-40.4	-882.9	883.7	2.32	0.86	2.15
6,369.0	91.00	267.70	5,707.1	-46.5	-975.6	976.6	3.61	1.83	3.12
6,464.0	91.30	270.00	5,705.2	-48.4	-1,070.6	1,071.6	2.44	0.32	2.42
6,558.0	89.70	270.20	5,704.4	-48.3	-1,164.6	1,165.5	1.72	-1.70	0.21
6,653.0	91.40	269.90	5,703.5	-48.2	-1,259.6	1,260.5	1.82	1.79	-0.32
6,748.0	90.30	269.90	5,702.1	-48.4	-1,354.6	1,355.4	1.16	-1.16	0.00
6,843.0	88.00	269.00	5,703.5	-49.3	-1,449.6	1,450.4	2.60	-2.42	-0.95
6,938.0	89.80	268.10	5,705.3	-51.7	-1,544.5	1,545.4	2.12	1.89	-0.95
7,032.0	91.60	267.70	5,704.2	-55.1	-1,638.4	1,639.3	1.96	1.91	-0.43
7,127.0	90.70	268.80	5,702.3	-58.0	-1,733.4	1,734.3	1.50	-0.95	1.16
7,222.0	89.00	267.40	5,702.5	-61.2	-1,828.3	1,829.3	2.32	-1.79	-1.47
7,317.0	90.50	267.20	5,702.9	-65.6	-1,923.2	1,924.3	1.59	1.58	-0.21
7,411.0	89.10	268.80	5,703.3	-68.9	-2,017.1	2,018.3	2.26	-1.49	1.70
7,506.0	90.60	268.10	5,703.5	-71.5	-2,112.1	2,113.3	1.74	1.58	-0.74
7,601.0	89.40	270.20	5,703.5	-72.9	-2,207.1	2,208.3	2.55	-1.26	2.21
7,695.0	90.10	270.00	5,703.9	-72.7	-2,301.1	2,302.2	0.77	0.74	-0.21
7,790.0	90.90	270.90	5,703.1	-72.0	-2,396.1	2,397.1	1.27	0.84	0.95
7,885.0	89.80	270.60	5,702.5	-70.7	-2,491.1	2,492.0	1.20	-1.16	-0.32
7,980.0	89.40	270.60	5,703.2	-69.7	-2,586.0	2,587.0	0.42	-0.42	0.00
8,074.0	91.50	270.90	5,702.4	-68.5	-2,680.0	2,680.9	2.26	2.23	0.32
8,169.0	90.90	270.00	5,700.4	-67.8	-2,775.0	2,775.8	1.14	-0.63	-0.95
8,264.0	91.00	268.10	5,698.9	-69.3	-2,870.0	2,870.7	2.00	0.11	-2.00
8,359.0	91.30	267.00	5,697.0	-73.4	-2,964.9	2,965.7	1.20	0.32	-1.16
8,454.0	90.90	267.60	5,695.1	-77.9	-3,059.7	3,060.7	0.76	-0.42	0.63
8,549.0	89.10	267.70	5,695.1	-81.8	-3,154.7	3,155.7	1.90	-1.89	0.11
8,643.0	89.20	266.90	5,696.5	-86.2	-3,248.5	3,249.7	0.86	0.11	-0.85
8,738.0	89.80	267.20	5,697.4	-91.1	-3,343.4	3,344.6	0.71	0.63	0.32
8,833.0	91.90	267.90	5,695.9	-95.2	-3,438.3	3,439.6	2.33	2.21	0.74
8,928.0	89.90	267.40	5,694.5	-99.0	-3,533.2	3,534.6	2.17	-2.11	-0.53

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Site:	Rohn State LD04-63HN Pad Sec.4-T9N-R58W	MD Reference:	WELL @ 4730.0ft (H&P 273 RKB - 24')
Well:	Rohn State LD04-64HN	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)	
9,023.0	89.10	267.00	5,695.3	-103.7	-3,628.1	3,629.6	0.94	-0.84	-0.42	
9,118.0	90.50	267.00	5,695.6	-108.7	-3,723.0	3,724.5	1.47	1.47	0.00	
9,212.0	88.00	267.40	5,696.8	-113.3	-3,816.8	3,818.5	2.69	-2.66	0.43	
9,307.0	89.10	266.90	5,699.2	-118.0	-3,911.7	3,913.5	1.27	1.16	-0.53	
9,421.0	92.80	268.40	5,697.4	-122.6	-4,025.5	4,027.4	3.50	3.25	1.32	
9,476.0	92.80	268.40	5,694.7	-124.2	-4,080.5	4,082.4	0.00	0.00	0.00	
Rohn State LD04-64HN BHL 1980'FSL, 660'FWL										

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										
Rohn State LD04-64H	0.00	0.00	5,703.0	-24.3	-790.9	1,530,699.68	3,452,865.09	40.778693		-103.864747
- survey misses target center by 6.6ft at 6182.6ft MD (5705.6 TVD, -30.4 N, -790.1 E)										
- Circle (radius 35.0)										
Rohn State LD04-64H	0.00	0.00	5,703.0	-126.3	-4,097.3	1,530,597.62	3,449,558.69	40.778580		-103.876690
- survey misses target center by 18.9ft at 9476.0ft MD (5694.7 TVD, -124.2 N, -4080.5 E)										
- Circle (radius 35.0)										

Checked By: _____	Approved By: _____	Date: _____
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