

ENSIGN

Directional

Well Name: Horton D18-20D

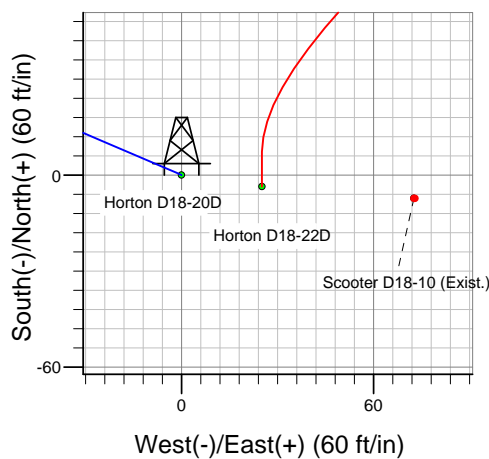
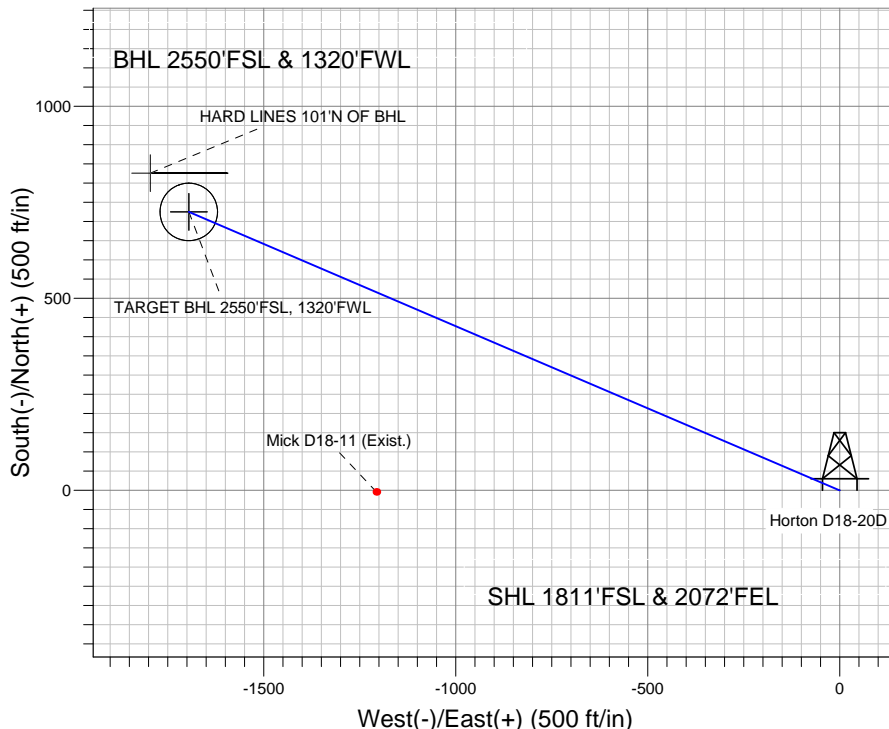
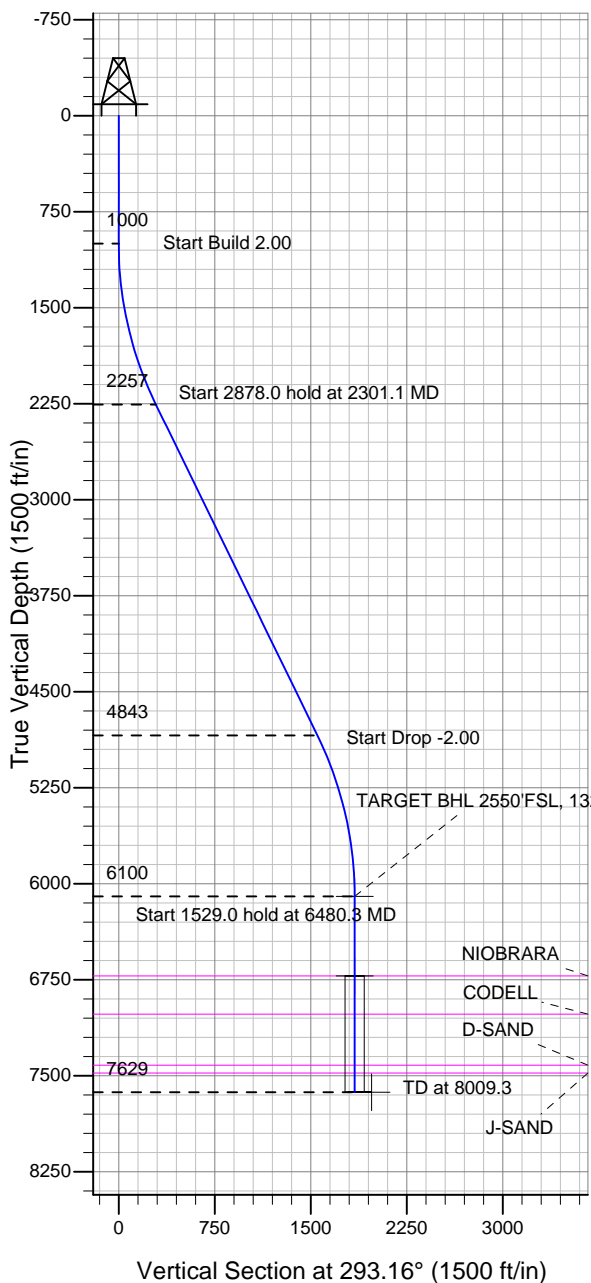
Surface Location: Horton D18-22D Pad Sec.18-T3N-R64W
 North American Datum 1983 US State Plane 1983 Colorado Northern Zone

Ground Elevation: 4775.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1325372.29	3253590.76	40.222980	-104.591830	

Original Well Elev WELL @ 4788.0ft (Original Well Elev)

NOBLE ENERGY INC WELD COUNTY CO



Horton D18-22D Pad Sec.18-T3N-R64W
 Horton D18-20D
 Noble Horton D18-20D Plan #1 (4-04-11)
 15:26, April 12 2011



Azimuths to True North
 Magnetic North: 8.78°

Magnetic Field
 Strength: 53078.4snT
 Dip Angle: 66.94°
 Date: 4/4/2011
 Model: IGRF2010

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
TARGET BHL 2550'FSL, 1320'FWL	6100.0	725.0	-1695.0	40.224970	-104.597900	Point
TARGET CIRCLE 2550'FSL & 1320'FWL	6720.0	725.0	-1695.0	40.224970	-104.597900	Circle (Radius: 75.0)
HARD LINES 101'N OF BHL	7629.0	826.0	-1795.0	40.225247	-104.598258	Polygon

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	1000.0	0.00	0.00	1000.0	0.0	0.0	0.00	0.00	0.0	
3	2301.1	26.02	293.16	2256.9	114.2	-267.0	2.00	293.16	290.4	
4	5179.2	26.02	293.16	4843.1	610.8	-1428.0	0.00	0.00	1553.1	
5	6480.3	0.00	0.00	6100.0	725.0	-1695.0	2.00	180.00	1843.6	TARGET BHL 2550'FSL, 1320'FWL
6	8009.3	0.00	0.00	7629.0	725.0	-1695.0	0.00	0.00	1843.6	



Directional

NOBLE ENERGY INC WELD COUNTY CO

SEC.18-T3N-R64W

Horton D18-22D Pad Sec.18-T3N-R64W

Horton D18-20D

Wellbore #1

Plan: Noble Horton D18-20D Plan #1 (4-04-11)

Standard Planning Report

12 April, 2011



Database:	Landmark	Local Co-ordinate Reference:	Well Horton D18-20D
Company:	NOBLE ENERGY INC WELD COUNTY CO	TVD Reference:	WELL @ 4788.0ft (Original Well Elev)
Project:	SEC.18-T3N-R64W	MD Reference:	WELL @ 4788.0ft (Original Well Elev)
Site:	Horton D18-22D Pad Sec.18-T3N-R64W	North Reference:	True
Well:	Horton D18-20D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Noble Horton D18-20D Plan #1 (4-04-11)		

Project	SEC.18-T3N-R64W, Weld County, Colorado		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site Horton D18-22D Pad Sec.18-T3N-R64W					
Site Position:		Northing:	1,325,368.91 ft	Latitude:	40.222970
From:	Lat/Long	Easting:	3,253,615.93ft	Longitude:	-104.591740
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.59 °

Well	Horton D18-20D					
Well Position	+N/-S	3.6 ft	Northing:	1,325,372.29 ft	Latitude:	40.222980
	+E/-W	-25.1 ft	Easting:	3,253,590.76 ft	Longitude:	-104.591830
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,775.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	4/4/2011	8.78	66.94	53,078

Design	Noble Horton D18-20D Plan #1 (4-04-11)			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	293.16

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,301.1	26.02	293.16	2,256.9	114.2	-267.0	2.00	2.00	0.00	293.16	
5,179.2	26.02	293.16	4,843.1	610.8	-1,428.0	0.00	0.00	0.00	0.00	
6,480.3	0.00	0.00	6,100.0	725.0	-1,695.0	2.00	-2.00	0.00	180.00	TARGET BHL 255C
8,009.3	0.00	0.00	7,629.0	725.0	-1,695.0	0.00	0.00	0.00	0.00	

Database:	Landmark	Local Co-ordinate Reference:	Well Horton D18-20D
Company:	NOBLE ENERGY INC WELD COUNTY CO	TVD Reference:	WELL @ 4788.0ft (Original Well Elev)
Project:	SEC.18-T3N-R64W	MD Reference:	WELL @ 4788.0ft (Original Well Elev)
Site:	Horton D18-22D Pad Sec.18-T3N-R64W	North Reference:	True
Well:	Horton D18-20D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Noble Horton D18-20D Plan #1 (4-04-11)		

Planned 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
40.0	0.00	0.00	40.0	0.0	0.0	0.0	0.00	0.00	0.00
80.0	0.00	0.00	80.0	0.0	0.0	0.0	0.00	0.00	0.00
120.0	0.00	0.00	120.0	0.0	0.0	0.0	0.00	0.00	0.00
160.0	0.00	0.00	160.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
240.0	0.00	0.00	240.0	0.0	0.0	0.0	0.00	0.00	0.00
280.0	0.00	0.00	280.0	0.0	0.0	0.0	0.00	0.00	0.00
320.0	0.00	0.00	320.0	0.0	0.0	0.0	0.00	0.00	0.00
360.0	0.00	0.00	360.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
440.0	0.00	0.00	440.0	0.0	0.0	0.0	0.00	0.00	0.00
480.0	0.00	0.00	480.0	0.0	0.0	0.0	0.00	0.00	0.00
520.0	0.00	0.00	520.0	0.0	0.0	0.0	0.00	0.00	0.00
560.0	0.00	0.00	560.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
640.0	0.00	0.00	640.0	0.0	0.0	0.0	0.00	0.00	0.00
680.0	0.00	0.00	680.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
8 5/8"									
720.0	0.00	0.00	720.0	0.0	0.0	0.0	0.00	0.00	0.00
760.0	0.00	0.00	760.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
840.0	0.00	0.00	840.0	0.0	0.0	0.0	0.00	0.00	0.00
880.0	0.00	0.00	880.0	0.0	0.0	0.0	0.00	0.00	0.00
920.0	0.00	0.00	920.0	0.0	0.0	0.0	0.00	0.00	0.00
960.0	0.00	0.00	960.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,040.0	0.80	293.16	1,040.0	0.1	-0.3	0.3	2.00	2.00	0.00
1,080.0	1.60	293.16	1,080.0	0.4	-1.0	1.1	2.00	2.00	0.00
1,120.0	2.40	293.16	1,120.0	1.0	-2.3	2.5	2.00	2.00	0.00
1,160.0	3.20	293.16	1,159.9	1.8	-4.1	4.5	2.00	2.00	0.00
1,200.0	4.00	293.16	1,199.8	2.7	-6.4	7.0	2.00	2.00	0.00
1,240.0	4.80	293.16	1,239.7	4.0	-9.2	10.0	2.00	2.00	0.00
1,280.0	5.60	293.16	1,279.6	5.4	-12.6	13.7	2.00	2.00	0.00
1,320.0	6.40	293.16	1,319.3	7.0	-16.4	17.9	2.00	2.00	0.00
1,360.0	7.20	293.16	1,359.1	8.9	-20.8	22.6	2.00	2.00	0.00
1,400.0	8.00	293.16	1,398.7	11.0	-25.6	27.9	2.00	2.00	0.00
1,440.0	8.80	293.16	1,438.3	13.3	-31.0	33.7	2.00	2.00	0.00
1,480.0	9.60	293.16	1,477.8	15.8	-36.9	40.1	2.00	2.00	0.00
1,520.0	10.40	293.16	1,517.1	18.5	-43.3	47.1	2.00	2.00	0.00
1,560.0	11.20	293.16	1,556.4	21.5	-50.2	54.6	2.00	2.00	0.00
1,600.0	12.00	293.16	1,595.6	24.6	-57.6	62.6	2.00	2.00	0.00
1,640.0	12.80	293.16	1,634.7	28.0	-65.5	71.2	2.00	2.00	0.00
1,680.0	13.60	293.16	1,673.6	31.6	-73.9	80.3	2.00	2.00	0.00
1,720.0	14.40	293.16	1,712.4	35.4	-82.8	90.0	2.00	2.00	0.00
1,760.0	15.20	293.16	1,751.1	39.4	-92.1	100.2	2.00	2.00	0.00
1,800.0	16.00	293.16	1,789.6	43.6	-102.0	111.0	2.00	2.00	0.00
1,840.0	16.80	293.16	1,828.0	48.1	-112.4	122.3	2.00	2.00	0.00
1,880.0	17.60	293.16	1,866.2	52.7	-123.3	134.1	2.00	2.00	0.00
1,920.0	18.40	293.16	1,904.3	57.6	-134.7	146.5	2.00	2.00	0.00
1,960.0	19.20	293.16	1,942.1	62.7	-146.5	159.3	2.00	2.00	0.00
2,000.0	20.00	293.16	1,979.8	67.9	-158.8	172.8	2.00	2.00	0.00
2,040.0	20.80	293.16	2,017.3	73.4	-171.7	186.7	2.00	2.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Horton D18-20D
Company:	NOBLE ENERGY INC WELD COUNTY CO	TVD Reference:	WELL @ 4788.0ft (Original Well Elev)
Project:	SEC.18-T3N-R64W	MD Reference:	WELL @ 4788.0ft (Original Well Elev)
Site:	Horton D18-22D Pad Sec.18-T3N-R64W	North Reference:	True
Well:	Horton D18-20D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Noble Horton D18-20D Plan #1 (4-04-11)		

Planned 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)
2,080.0	21.60	293.16	2,054.6	79.1	-185.0	201.2	2.00	2.00	0.00
2,120.0	22.40	293.16	2,091.7	85.0	-198.7	216.2	2.00	2.00	0.00
2,160.0	23.20	293.16	2,128.6	91.1	-213.0	231.7	2.00	2.00	0.00
2,200.0	24.00	293.16	2,165.2	97.4	-227.7	247.7	2.00	2.00	0.00
2,240.0	24.80	293.16	2,201.6	103.9	-242.9	264.2	2.00	2.00	0.00
2,280.0	25.60	293.16	2,237.8	110.6	-258.6	281.2	2.00	2.00	0.00
2,301.1	26.02	293.16	2,256.9	114.2	-267.0	290.4	2.00	2.00	0.00
2,320.0	26.02	293.16	2,273.8	117.5	-274.6	298.7	0.00	0.00	0.00
2,360.0	26.02	293.16	2,309.8	124.4	-290.8	316.3	0.00	0.00	0.00
2,400.0	26.02	293.16	2,345.7	131.3	-306.9	333.8	0.00	0.00	0.00
2,440.0	26.02	293.16	2,381.6	138.2	-323.0	351.4	0.00	0.00	0.00
2,480.0	26.02	293.16	2,417.6	145.1	-339.2	368.9	0.00	0.00	0.00
2,520.0	26.02	293.16	2,453.5	152.0	-355.3	386.5	0.00	0.00	0.00
2,560.0	26.02	293.16	2,489.5	158.9	-371.4	404.0	0.00	0.00	0.00
2,600.0	26.02	293.16	2,525.4	165.8	-387.6	421.6	0.00	0.00	0.00
2,640.0	26.02	293.16	2,561.4	172.7	-403.7	439.1	0.00	0.00	0.00
2,680.0	26.02	293.16	2,597.3	179.6	-419.9	456.7	0.00	0.00	0.00
2,720.0	26.02	293.16	2,633.3	186.5	-436.0	474.2	0.00	0.00	0.00
2,760.0	26.02	293.16	2,669.2	193.4	-452.1	491.7	0.00	0.00	0.00
2,800.0	26.02	293.16	2,705.2	200.3	-468.3	509.3	0.00	0.00	0.00
2,840.0	26.02	293.16	2,741.1	207.2	-484.4	526.8	0.00	0.00	0.00
2,880.0	26.02	293.16	2,777.0	214.1	-500.5	544.4	0.00	0.00	0.00
2,920.0	26.02	293.16	2,813.0	221.0	-516.7	561.9	0.00	0.00	0.00
2,960.0	26.02	293.16	2,848.9	227.9	-532.8	579.5	0.00	0.00	0.00
3,000.0	26.02	293.16	2,884.9	234.8	-548.9	597.0	0.00	0.00	0.00
3,040.0	26.02	293.16	2,920.8	241.7	-565.1	614.6	0.00	0.00	0.00
3,080.0	26.02	293.16	2,956.8	248.6	-581.2	632.1	0.00	0.00	0.00
3,120.0	26.02	293.16	2,992.7	255.5	-597.3	649.7	0.00	0.00	0.00
3,160.0	26.02	293.16	3,028.7	262.4	-613.5	667.2	0.00	0.00	0.00
3,200.0	26.02	293.16	3,064.6	269.3	-629.6	684.8	0.00	0.00	0.00
3,240.0	26.02	293.16	3,100.5	276.2	-645.7	702.3	0.00	0.00	0.00
3,280.0	26.02	293.16	3,136.5	283.1	-661.9	719.9	0.00	0.00	0.00
3,320.0	26.02	293.16	3,172.4	290.0	-678.0	737.4	0.00	0.00	0.00
3,360.0	26.02	293.16	3,208.4	296.9	-694.1	755.0	0.00	0.00	0.00
3,400.0	26.02	293.16	3,244.3	303.8	-710.3	772.5	0.00	0.00	0.00
3,440.0	26.02	293.16	3,280.3	310.7	-726.4	790.1	0.00	0.00	0.00
3,480.0	26.02	293.16	3,316.2	317.6	-742.6	807.6	0.00	0.00	0.00
3,520.0	26.02	293.16	3,352.2	324.5	-758.7	825.2	0.00	0.00	0.00
3,560.0	26.02	293.16	3,388.1	331.4	-774.8	842.7	0.00	0.00	0.00
3,600.0	26.02	293.16	3,424.0	338.3	-791.0	860.3	0.00	0.00	0.00
3,640.0	26.02	293.16	3,460.0	345.2	-807.1	877.8	0.00	0.00	0.00
3,680.0	26.02	293.16	3,495.9	352.1	-823.2	895.4	0.00	0.00	0.00
3,720.0	26.02	293.16	3,531.9	359.0	-839.4	912.9	0.00	0.00	0.00
3,760.0	26.02	293.16	3,567.8	365.9	-855.5	930.5	0.00	0.00	0.00
3,800.0	26.02	293.16	3,603.8	372.8	-871.6	948.0	0.00	0.00	0.00
3,840.0	26.02	293.16	3,639.7	379.7	-887.8	965.6	0.00	0.00	0.00
3,880.0	26.02	293.16	3,675.7	386.6	-903.9	983.1	0.00	0.00	0.00
3,920.0	26.02	293.16	3,711.6	393.5	-920.0	1,000.7	0.00	0.00	0.00
3,960.0	26.02	293.16	3,747.5	400.4	-936.2	1,018.2	0.00	0.00	0.00
4,000.0	26.02	293.16	3,783.5	407.3	-952.3	1,035.8	0.00	0.00	0.00
4,040.0	26.02	293.16	3,819.4	414.2	-968.4	1,053.3	0.00	0.00	0.00
4,080.0	26.02	293.16	3,855.4	421.1	-984.6	1,070.9	0.00	0.00	0.00
4,120.0	26.02	293.16	3,891.3	428.1	-1,000.7	1,088.4	0.00	0.00	0.00
4,160.0	26.02	293.16	3,927.3	435.0	-1,016.9	1,106.0	0.00	0.00	0.00

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Project:	SEC.18-T3N-R64W	MD Reference:	WELL @ 4788.0ft (Original Well Elev)
Site:	Horton D18-22D Pad Sec.18-T3N-R64W	North Reference:	True
Well:	Horton D18-20D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Noble Horton D18-20D Plan #1 (4-04-11)		

Planned 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)
4,200.0	26.02	293.16	3,963.2	441.9	-1,033.0	1,123.5	0.00	0.00	0.00
4,240.0	26.02	293.16	3,999.2	448.8	-1,049.1	1,141.1	0.00	0.00	0.00
4,280.0	26.02	293.16	4,035.1	455.7	-1,065.3	1,158.6	0.00	0.00	0.00
4,320.0	26.02	293.16	4,071.1	462.6	-1,081.4	1,176.2	0.00	0.00	0.00
4,360.0	26.02	293.16	4,107.0	469.5	-1,097.5	1,193.7	0.00	0.00	0.00
4,400.0	26.02	293.16	4,142.9	476.4	-1,113.7	1,211.3	0.00	0.00	0.00
4,440.0	26.02	293.16	4,178.9	483.3	-1,129.8	1,228.8	0.00	0.00	0.00
4,480.0	26.02	293.16	4,214.8	490.2	-1,145.9	1,246.4	0.00	0.00	0.00
4,520.0	26.02	293.16	4,250.8	497.1	-1,162.1	1,263.9	0.00	0.00	0.00
4,560.0	26.02	293.16	4,286.7	504.0	-1,178.2	1,281.5	0.00	0.00	0.00
4,600.0	26.02	293.16	4,322.7	510.9	-1,194.3	1,299.0	0.00	0.00	0.00
4,640.0	26.02	293.16	4,358.6	517.8	-1,210.5	1,316.6	0.00	0.00	0.00
4,680.0	26.02	293.16	4,394.6	524.7	-1,226.6	1,334.1	0.00	0.00	0.00
4,720.0	26.02	293.16	4,430.5	531.6	-1,242.7	1,351.7	0.00	0.00	0.00
4,760.0	26.02	293.16	4,466.4	538.5	-1,258.9	1,369.2	0.00	0.00	0.00
4,800.0	26.02	293.16	4,502.4	545.4	-1,275.0	1,386.8	0.00	0.00	0.00
4,840.0	26.02	293.16	4,538.3	552.3	-1,291.1	1,404.3	0.00	0.00	0.00
4,880.0	26.02	293.16	4,574.3	559.2	-1,307.3	1,421.9	0.00	0.00	0.00
4,920.0	26.02	293.16	4,610.2	566.1	-1,323.4	1,439.4	0.00	0.00	0.00
4,960.0	26.02	293.16	4,646.2	573.0	-1,339.6	1,457.0	0.00	0.00	0.00
5,000.0	26.02	293.16	4,682.1	579.9	-1,355.7	1,474.5	0.00	0.00	0.00
5,040.0	26.02	293.16	4,718.1	586.8	-1,371.8	1,492.1	0.00	0.00	0.00
5,080.0	26.02	293.16	4,754.0	593.7	-1,388.0	1,509.6	0.00	0.00	0.00
5,120.0	26.02	293.16	4,789.9	600.6	-1,404.1	1,527.2	0.00	0.00	0.00
5,160.0	26.02	293.16	4,825.9	607.5	-1,420.2	1,544.7	0.00	0.00	0.00
5,179.2	26.02	293.16	4,843.1	610.8	-1,428.0	1,553.1	0.00	0.00	0.00
5,200.0	25.61	293.16	4,861.9	614.4	-1,436.3	1,562.2	2.00	-2.00	0.00
5,240.0	24.81	293.16	4,898.1	621.1	-1,452.0	1,579.2	2.00	-2.00	0.00
5,280.0	24.01	293.16	4,934.5	627.6	-1,467.2	1,595.7	2.00	-2.00	0.00
5,320.0	23.21	293.16	4,971.1	633.9	-1,481.9	1,611.8	2.00	-2.00	0.00
5,360.0	22.41	293.16	5,008.0	640.0	-1,496.1	1,627.3	2.00	-2.00	0.00
5,400.0	21.61	293.16	5,045.1	645.9	-1,509.9	1,642.3	2.00	-2.00	0.00
5,440.0	20.81	293.16	5,082.4	651.6	-1,523.2	1,656.7	2.00	-2.00	0.00
5,480.0	20.01	293.16	5,119.9	657.0	-1,536.0	1,670.7	2.00	-2.00	0.00
5,520.0	19.21	293.16	5,157.6	662.3	-1,548.4	1,684.1	2.00	-2.00	0.00
5,560.0	18.41	293.16	5,195.4	667.4	-1,560.2	1,697.0	2.00	-2.00	0.00
5,600.0	17.61	293.16	5,233.5	672.2	-1,571.6	1,709.4	2.00	-2.00	0.00
5,640.0	16.81	293.16	5,271.7	676.9	-1,582.5	1,721.2	2.00	-2.00	0.00
5,680.0	16.01	293.16	5,310.0	681.3	-1,592.9	1,732.5	2.00	-2.00	0.00
5,720.0	15.21	293.16	5,348.6	685.6	-1,602.8	1,743.2	2.00	-2.00	0.00
5,760.0	14.41	293.16	5,387.2	689.6	-1,612.2	1,753.5	2.00	-2.00	0.00
5,800.0	13.61	293.16	5,426.0	693.4	-1,621.1	1,763.1	2.00	-2.00	0.00
5,840.0	12.81	293.16	5,465.0	697.0	-1,629.5	1,772.3	2.00	-2.00	0.00
5,880.0	12.01	293.16	5,504.1	700.4	-1,637.4	1,780.9	2.00	-2.00	0.00
5,920.0	11.21	293.16	5,543.2	703.5	-1,644.8	1,788.9	2.00	-2.00	0.00
5,960.0	10.41	293.16	5,582.5	706.5	-1,651.7	1,796.4	2.00	-2.00	0.00
6,000.0	9.61	293.16	5,621.9	709.2	-1,658.1	1,803.4	2.00	-2.00	0.00
6,040.0	8.81	293.16	5,661.4	711.7	-1,663.9	1,809.8	2.00	-2.00	0.00
6,080.0	8.01	293.16	5,701.0	714.0	-1,669.3	1,815.6	2.00	-2.00	0.00
6,120.0	7.21	293.16	5,740.6	716.1	-1,674.2	1,820.9	2.00	-2.00	0.00
6,160.0	6.41	293.16	5,780.3	718.0	-1,678.6	1,825.7	2.00	-2.00	0.00
6,200.0	5.61	293.16	5,820.1	719.6	-1,682.4	1,829.8	2.00	-2.00	0.00
6,240.0	4.81	293.16	5,860.0	721.1	-1,685.7	1,833.5	2.00	-2.00	0.00
6,280.0	4.01	293.16	5,899.8	722.3	-1,688.6	1,836.6	2.00	-2.00	0.00

Database:	Landmark	Local Co-ordinate Reference:	Well Horton D18-20D
Company:	NOBLE ENERGY INC WELD COUNTY CO	TVD Reference:	WELL @ 4788.0ft (Original Well Elev)
Project:	SEC.18-T3N-R64W	MD Reference:	WELL @ 4788.0ft (Original Well Elev)
Site:	Horton D18-22D Pad Sec.18-T3N-R64W	North Reference:	True
Well:	Horton D18-20D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Noble Horton D18-20D Plan #1 (4-04-11)		

Planned 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)	
6,320.0	3.21	293.16	5,939.8	723.3	-1,690.9	1,839.1	2.00	-2.00	0.00	
6,360.0	2.41	293.16	5,979.7	724.0	-1,692.7	1,841.0	2.00	-2.00	0.00	
6,400.0	1.61	293.16	6,019.7	724.6	-1,694.0	1,842.4	2.00	-2.00	0.00	
6,440.0	0.81	293.16	6,059.7	724.9	-1,694.7	1,843.3	2.00	-2.00	0.00	
6,480.0	0.01	293.16	6,099.7	725.0	-1,695.0	1,843.6	2.00	-2.00	0.00	
6,480.3	0.00	0.00	6,100.0	725.0	-1,695.0	1,843.6	2.00	-2.00	0.00	
TARGET BHL 2550'FSL, 1320'FWL										
6,520.0	0.00	0.00	6,139.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,560.0	0.00	0.00	6,179.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,600.0	0.00	0.00	6,219.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,640.0	0.00	0.00	6,259.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,680.0	0.00	0.00	6,299.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,720.0	0.00	0.00	6,339.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,760.0	0.00	0.00	6,379.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,800.0	0.00	0.00	6,419.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,840.0	0.00	0.00	6,459.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,880.0	0.00	0.00	6,499.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,920.0	0.00	0.00	6,539.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
6,960.0	0.00	0.00	6,579.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,000.0	0.00	0.00	6,619.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,040.0	0.00	0.00	6,659.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,080.0	0.00	0.00	6,699.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,100.3	0.00	0.00	6,720.0	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
NIOBRARA - TARGET CIRCLE 2550'FSL & 1320'FWL										
7,120.0	0.00	0.00	6,739.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,160.0	0.00	0.00	6,779.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,200.0	0.00	0.00	6,819.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,240.0	0.00	0.00	6,859.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,280.0	0.00	0.00	6,899.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,320.0	0.00	0.00	6,939.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,360.0	0.00	0.00	6,979.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,399.3	0.00	0.00	7,019.0	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
CODELL										
7,400.0	0.00	0.00	7,019.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,440.0	0.00	0.00	7,059.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,480.0	0.00	0.00	7,099.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,520.0	0.00	0.00	7,139.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,560.0	0.00	0.00	7,179.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,600.0	0.00	0.00	7,219.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,640.0	0.00	0.00	7,259.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,680.0	0.00	0.00	7,299.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,720.0	0.00	0.00	7,339.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,760.0	0.00	0.00	7,379.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,798.3	0.00	0.00	7,418.0	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
D-SAND										
7,800.0	0.00	0.00	7,419.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,840.0	0.00	0.00	7,459.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,859.3	0.00	0.00	7,479.0	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
J-SAND										
7,880.0	0.00	0.00	7,499.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,920.0	0.00	0.00	7,539.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
7,960.0	0.00	0.00	7,579.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
8,000.0	0.00	0.00	7,619.7	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	
8,009.3	0.00	0.00	7,629.0	725.0	-1,695.0	1,843.6	0.00	0.00	0.00	

Database:	Landmark	Local Co-ordinate Reference:	Well Horton D18-20D
Company:	NOBLE ENERGY INC WELD COUNTY CO	TVD Reference:	WELL @ 4788.0ft (Original Well Elev)
Project:	SEC.18-T3N-R64W	MD Reference:	WELL @ 4788.0ft (Original Well Elev)
Site:	Horton D18-22D Pad Sec.18-T3N-R64W	North Reference:	True
Well:	Horton D18-20D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Noble Horton D18-20D Plan #1 (4-04-11)		

Planned 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)
HARD LINES 101'N OF BHL									

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 25ft	0.00	0.00	6,720.0	725.0	-1,695.0	1,326,079.89	3,251,888.50	40.224970	-104.597900
- plan hits target center									
- Circle (radius 75.0)									
HARD LINES 101'N C	0.00	0.00	7,629.0	826.0	-1,795.0	1,326,179.83	3,251,787.48	40.225247	-104.598258
- plan misses target center by 142.1ft at 8009.3ft MD (7629.0 TVD, 725.0 N, -1695.0 E)									
- Polygon									
Point 1			7,629.0	0.0	0.0	1,326,179.83	3,251,787.48		
Point 2			7,629.0	0.0	200.0	1,326,181.88	3,251,987.46		
TARGET BHL 2550'F	0.00	0.00	6,100.0	725.0	-1,695.0	1,326,079.89	3,251,888.50	40.224970	-104.597900
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
700.0	700.0	8 5/8"	8-5/8	12-1/4	

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
7,100.3	6,720.0	NIOBRARA		0.00	
7,399.3	7,019.0	CODELL		0.00	
7,798.3	7,418.0	D-SAND		0.00	
7,859.3	7,479.0	J-SAND		0.00	