

ENSIGN

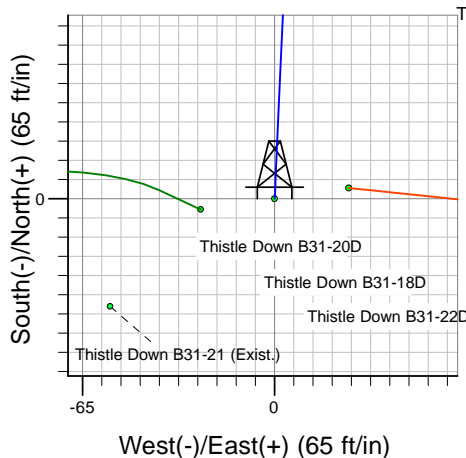
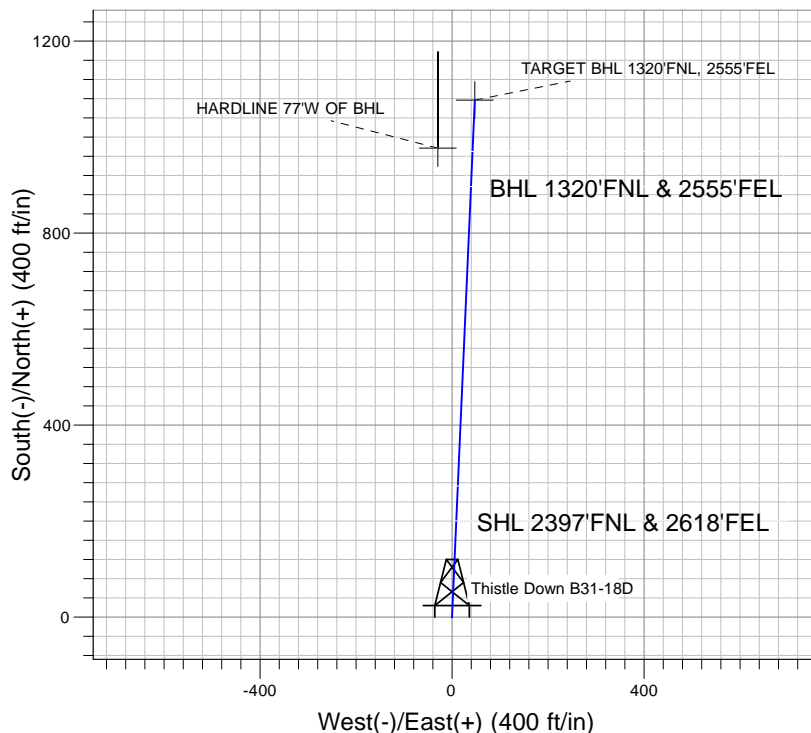
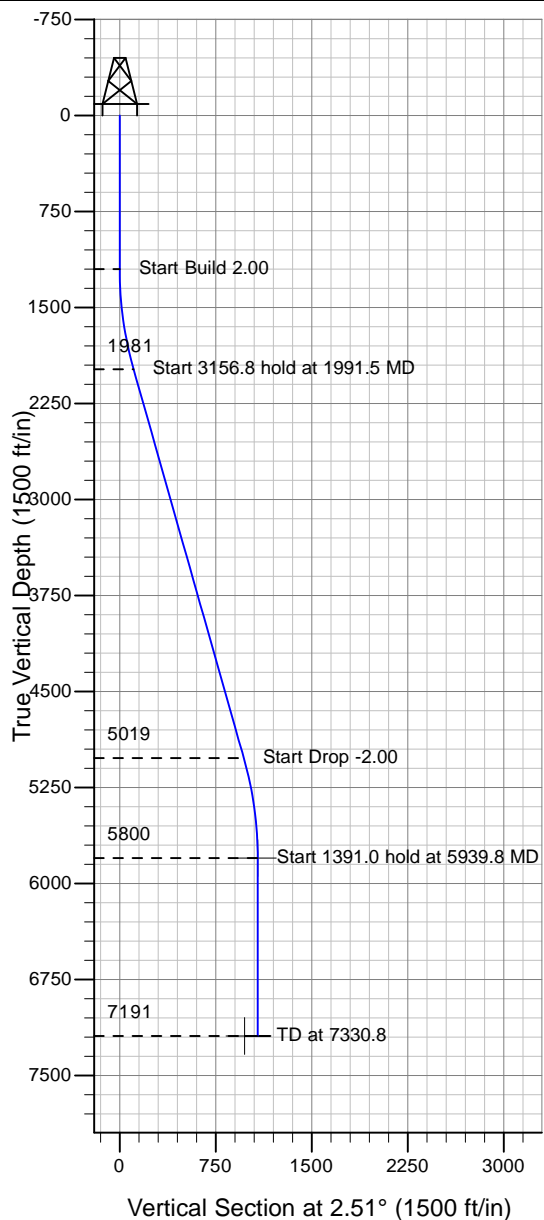
Directional

Well Name: Thistle Down B31-18D

Surface Location: Thistle Down B31-22D Pad Sec.31-T5N-R64W
 North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
 Ground Elevation: 4789.0

+N/-S+E/-W Northing Easting Latitude Longitude Slot
 0.0 0.0 1373916.58 3252904.06 40° 21' 22.500 N 104° 35' 33.036 W
 Original Well Elev WELL @ 4801.0ft (Original Well Elev)

NOBLE ENERGY INC WELD COUNTY CO



Thistle Down B31-22D Pad Sec.31-T5N-R64W
 Thistle Down B31-18D
 Plan #1 (07-23-09)
 11:35, July 24 2009



Azimuths to True North
 Magnetic North: 8.99°
 Magnetic Field
 Strength: 53345.6snT
 Dip Angle: 67.12°
 Date: 7/23/2009
 Model: IGRF200510

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
TARGET BHL 1320'FNL, 2555'FEL	5800.0	1077.3	47.2	40° 21' 33.146 N	104° 35' 32.426 W	Point
HARDLINE 77'W OF BHL	7191.0	977.3	-29.8	40° 21' 32.157 N	104° 35' 33.421 W	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	1200.0	0.00	0.00	1200.0	0.0	0.0	0.00	0.00	0.0	
3	1991.5	15.83	2.51	1981.4	108.5	4.8	2.00	2.51	108.6	
4	5148.3	15.83	2.51	5018.6	968.8	42.5	0.00	0.00	969.7	
5	5939.8	0.00	0.00	5800.0	1077.3	47.2	2.00	180.00	1078.4	TARGET BHL 1320'FNL, 2555'FEL
6	7330.8	0.00	0.00	7191.0	1077.3	47.2	0.00	0.00	1078.4	



NOBLE ENERGY INC WELD COUNTY CO

SEC.31-T5N-R64W

Thistle Down B31-22D Pad Sec.31-T5N-R64W

Thistle Down B31-18D

Wellbore #1

Plan: Plan #1 (07-23-09)

Standard Planning Report

24 July, 2009



Database:	EDM den0-adp01 Server Data	Local Co-ordinate Reference:	Well Thistle Down B31-18D
Company:	NOBLE ENERGY INC WELD COUNTY CO	TVD Reference:	WELL @ 4801.0ft (Original Well Elev)
Project:	SEC.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	North Reference:	True
Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (07-23-09)		

Project	SEC.31-T5N-R64W		
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		Thistle Down B31-22D Pad Sec.31-T5N-R64W			
Site Position:		Northing:	1,373,920.49ft	Latitude:	40° 21' 22.536 N
From:	Lat/Long	Easting:	3,252,929.10ft	Longitude:	104° 35' 32.712 W
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.59 °

Well	Thistle Down B31-18D					
Well Position	+N-S	-3.7 ft	Northing:	1,373,916.58 ft	Latitude:	40° 21' 22.500 N
	+E-W	-25.1 ft	Easting:	3,252,904.06 ft	Longitude:	104° 35' 33.036 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,789.0 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	7/23/2009	8.99	67.12	53,346

Design	Plan #1 (07-23-09)			
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	2.51

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	
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.00	0.00	0.00	0.00	
1,991.5	15.83	2.51	1,981.4	108.5	4.8	2.00	2.00	0.00	2.51	
5,148.3	15.83	2.51	5,018.6	968.8	42.5	0.00	0.00	0.00	0.00	
5,939.8	0.00	0.00	5,800.0	1,077.3	47.2	2.00	-2.00	0.00	180.00	TARGET BHL 132C
7,330.8	0.00	0.00	7,191.0	1,077.3	47.2	0.00	0.00	0.00	0.00	

Database:	EDM den0-adp01 Server Data	Local Co-ordinate Reference:	Well Thistle Down B31-18D
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Project:	SEC.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	North Reference:	True
Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (07-23-09)		

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
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	0.00	0.00	1,040.0	0.0	0.0	0.0	0.00	0.00	0.00
1,080.0	0.00	0.00	1,080.0	0.0	0.0	0.0	0.00	0.00	0.00
1,120.0	0.00	0.00	1,120.0	0.0	0.0	0.0	0.00	0.00	0.00
1,160.0	0.00	0.00	1,160.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,240.0	0.80	2.51	1,240.0	0.3	0.0	0.3	2.00	2.00	0.00
1,280.0	1.60	2.51	1,280.0	1.1	0.0	1.1	2.00	2.00	0.00
1,320.0	2.40	2.51	1,320.0	2.5	0.1	2.5	2.00	2.00	0.00
1,360.0	3.20	2.51	1,359.9	4.5	0.2	4.5	2.00	2.00	0.00
1,400.0	4.00	2.51	1,399.8	7.0	0.3	7.0	2.00	2.00	0.00
1,440.0	4.80	2.51	1,439.7	10.0	0.4	10.0	2.00	2.00	0.00
1,480.0	5.60	2.51	1,479.6	13.7	0.6	13.7	2.00	2.00	0.00
1,520.0	6.40	2.51	1,519.3	17.8	0.8	17.9	2.00	2.00	0.00
1,560.0	7.20	2.51	1,559.1	22.6	1.0	22.6	2.00	2.00	0.00
1,600.0	8.00	2.51	1,598.7	27.9	1.2	27.9	2.00	2.00	0.00
1,640.0	8.80	2.51	1,638.3	33.7	1.5	33.7	2.00	2.00	0.00
1,680.0	9.60	2.51	1,677.8	40.1	1.8	40.1	2.00	2.00	0.00
1,720.0	10.40	2.51	1,717.1	47.0	2.1	47.1	2.00	2.00	0.00
1,760.0	11.20	2.51	1,756.4	54.5	2.4	54.6	2.00	2.00	0.00
1,800.0	12.00	2.51	1,795.6	62.5	2.7	62.6	2.00	2.00	0.00
1,840.0	12.80	2.51	1,834.7	71.1	3.1	71.2	2.00	2.00	0.00
1,880.0	13.60	2.51	1,873.6	80.2	3.5	80.3	2.00	2.00	0.00
1,920.0	14.40	2.51	1,912.4	89.9	3.9	90.0	2.00	2.00	0.00
1,960.0	15.20	2.51	1,951.1	100.1	4.4	100.2	2.00	2.00	0.00
1,991.5	15.83	2.51	1,981.4	108.5	4.8	108.6	2.00	2.00	0.00
2,000.0	15.83	2.51	1,989.6	110.9	4.9	111.0	0.00	0.00	0.00
2,040.0	15.83	2.51	2,028.1	121.8	5.3	121.9	0.00	0.00	0.00

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Project:	SEC.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	North Reference:	True
Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (07-23-09)		

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	15.83	2.51	2,066.6	132.7	5.8	132.8	0.00	0.00	0.00	
2,120.0	15.83	2.51	2,105.1	143.6	6.3	143.7	0.00	0.00	0.00	
2,160.0	15.83	2.51	2,143.6	154.5	6.8	154.6	0.00	0.00	0.00	
2,200.0	15.83	2.51	2,182.1	165.4	7.2	165.5	0.00	0.00	0.00	
2,240.0	15.83	2.51	2,220.5	176.3	7.7	176.4	0.00	0.00	0.00	
2,280.0	15.83	2.51	2,259.0	187.2	8.2	187.3	0.00	0.00	0.00	
2,320.0	15.83	2.51	2,297.5	198.1	8.7	198.3	0.00	0.00	0.00	
2,360.0	15.83	2.51	2,336.0	209.0	9.2	209.2	0.00	0.00	0.00	
2,400.0	15.83	2.51	2,374.5	219.9	9.6	220.1	0.00	0.00	0.00	
2,440.0	15.83	2.51	2,413.0	230.8	10.1	231.0	0.00	0.00	0.00	
2,480.0	15.83	2.51	2,451.4	241.7	10.6	241.9	0.00	0.00	0.00	
2,520.0	15.83	2.51	2,489.9	252.6	11.1	252.8	0.00	0.00	0.00	
2,560.0	15.83	2.51	2,528.4	263.5	11.5	263.7	0.00	0.00	0.00	
2,600.0	15.83	2.51	2,566.9	274.4	12.0	274.6	0.00	0.00	0.00	
2,640.0	15.83	2.51	2,605.4	285.3	12.5	285.5	0.00	0.00	0.00	
2,680.0	15.83	2.51	2,643.9	296.2	13.0	296.4	0.00	0.00	0.00	
2,720.0	15.83	2.51	2,682.3	307.1	13.5	307.4	0.00	0.00	0.00	
2,760.0	15.83	2.51	2,720.8	318.0	13.9	318.3	0.00	0.00	0.00	
2,800.0	15.83	2.51	2,759.3	328.9	14.4	329.2	0.00	0.00	0.00	
2,840.0	15.83	2.51	2,797.8	339.8	14.9	340.1	0.00	0.00	0.00	
2,880.0	15.83	2.51	2,836.3	350.7	15.4	351.0	0.00	0.00	0.00	
2,920.0	15.83	2.51	2,874.8	361.6	15.8	361.9	0.00	0.00	0.00	
2,960.0	15.83	2.51	2,913.2	372.5	16.3	372.8	0.00	0.00	0.00	
3,000.0	15.83	2.51	2,951.7	383.4	16.8	383.7	0.00	0.00	0.00	
3,040.0	15.83	2.51	2,990.2	394.3	17.3	394.6	0.00	0.00	0.00	
3,080.0	15.83	2.51	3,028.7	405.2	17.8	405.6	0.00	0.00	0.00	
3,120.0	15.83	2.51	3,067.2	416.1	18.2	416.5	0.00	0.00	0.00	
3,160.0	15.83	2.51	3,105.7	427.0	18.7	427.4	0.00	0.00	0.00	
3,200.0	15.83	2.51	3,144.1	437.9	19.2	438.3	0.00	0.00	0.00	
3,240.0	15.83	2.51	3,182.6	448.8	19.7	449.2	0.00	0.00	0.00	
3,280.0	15.83	2.51	3,221.1	459.7	20.2	460.1	0.00	0.00	0.00	
3,320.0	15.83	2.51	3,259.6	470.6	20.6	471.0	0.00	0.00	0.00	
3,360.0	15.83	2.51	3,298.1	481.5	21.1	481.9	0.00	0.00	0.00	
3,400.0	15.83	2.51	3,336.6	492.4	21.6	492.8	0.00	0.00	0.00	
3,440.0	15.83	2.51	3,375.0	503.3	22.1	503.8	0.00	0.00	0.00	
3,480.0	15.83	2.51	3,413.5	514.2	22.5	514.7	0.00	0.00	0.00	
3,520.0	15.83	2.51	3,452.0	525.1	23.0	525.6	0.00	0.00	0.00	
3,560.0	15.83	2.51	3,490.5	536.0	23.5	536.5	0.00	0.00	0.00	
3,600.0	15.83	2.51	3,529.0	546.9	24.0	547.4	0.00	0.00	0.00	
3,640.0	15.83	2.51	3,567.5	557.8	24.5	558.3	0.00	0.00	0.00	
3,680.0	15.83	2.51	3,605.9	568.7	24.9	569.2	0.00	0.00	0.00	
3,720.0	15.83	2.51	3,644.4	579.6	25.4	580.1	0.00	0.00	0.00	
3,760.0	15.83	2.51	3,682.9	590.5	25.9	591.0	0.00	0.00	0.00	
3,800.0	15.83	2.51	3,721.4	601.4	26.4	602.0	0.00	0.00	0.00	
3,840.0	15.83	2.51	3,759.9	612.3	26.8	612.9	0.00	0.00	0.00	
3,880.0	15.83	2.51	3,798.4	623.2	27.3	623.8	0.00	0.00	0.00	
3,920.0	15.83	2.51	3,836.8	634.1	27.8	634.7	0.00	0.00	0.00	
3,960.0	15.83	2.51	3,875.3	645.0	28.3	645.6	0.00	0.00	0.00	
4,000.0	15.83	2.51	3,913.8	655.9	28.8	656.5	0.00	0.00	0.00	
4,040.0	15.83	2.51	3,952.3	666.8	29.2	667.4	0.00	0.00	0.00	
4,080.0	15.83	2.51	3,990.8	677.7	29.7	678.3	0.00	0.00	0.00	
4,120.0	15.83	2.51	4,029.3	688.6	30.2	689.2	0.00	0.00	0.00	
4,160.0	15.83	2.51	4,067.7	699.5	30.7	700.2	0.00	0.00	0.00	

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Project:	SEC.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	North Reference:	True
Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (07-23-09)		

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	15.83	2.51	4,106.2	710.4	31.1	711.1	0.00	0.00	0.00
4,240.0	15.83	2.51	4,144.7	721.3	31.6	722.0	0.00	0.00	0.00
4,280.0	15.83	2.51	4,183.2	732.2	32.1	732.9	0.00	0.00	0.00
4,320.0	15.83	2.51	4,221.7	743.1	32.6	743.8	0.00	0.00	0.00
4,360.0	15.83	2.51	4,260.2	754.0	33.1	754.7	0.00	0.00	0.00
4,400.0	15.83	2.51	4,298.6	764.9	33.5	765.6	0.00	0.00	0.00
4,440.0	15.83	2.51	4,337.1	775.8	34.0	776.5	0.00	0.00	0.00
4,480.0	15.83	2.51	4,375.6	786.7	34.5	787.4	0.00	0.00	0.00
4,520.0	15.83	2.51	4,414.1	797.6	35.0	798.3	0.00	0.00	0.00
4,560.0	15.83	2.51	4,452.6	808.5	35.4	809.3	0.00	0.00	0.00
4,600.0	15.83	2.51	4,491.1	819.4	35.9	820.2	0.00	0.00	0.00
4,640.0	15.83	2.51	4,529.5	830.3	36.4	831.1	0.00	0.00	0.00
4,680.0	15.83	2.51	4,568.0	841.2	36.9	842.0	0.00	0.00	0.00
4,720.0	15.83	2.51	4,606.5	852.1	37.4	852.9	0.00	0.00	0.00
4,760.0	15.83	2.51	4,645.0	863.0	37.8	863.8	0.00	0.00	0.00
4,800.0	15.83	2.51	4,683.5	873.9	38.3	874.7	0.00	0.00	0.00
4,840.0	15.83	2.51	4,722.0	884.8	38.8	885.6	0.00	0.00	0.00
4,880.0	15.83	2.51	4,760.4	895.7	39.3	896.5	0.00	0.00	0.00
4,920.0	15.83	2.51	4,798.9	906.6	39.7	907.5	0.00	0.00	0.00
4,960.0	15.83	2.51	4,837.4	917.5	40.2	918.4	0.00	0.00	0.00
5,000.0	15.83	2.51	4,875.9	928.4	40.7	929.3	0.00	0.00	0.00
5,040.0	15.83	2.51	4,914.4	939.3	41.2	940.2	0.00	0.00	0.00
5,080.0	15.83	2.51	4,952.8	950.2	41.7	951.1	0.00	0.00	0.00
5,120.0	15.83	2.51	4,991.3	961.1	42.1	962.0	0.00	0.00	0.00
5,148.3	15.83	2.51	5,018.6	968.8	42.5	969.7	0.00	0.00	0.00
5,160.0	15.60	2.51	5,029.8	972.0	42.6	972.9	2.00	-2.00	0.00
5,200.0	14.80	2.51	5,068.4	982.4	43.1	983.4	2.00	-2.00	0.00
5,240.0	14.00	2.51	5,107.2	992.4	43.5	993.3	2.00	-2.00	0.00
5,280.0	13.20	2.51	5,146.0	1,001.8	43.9	1,002.7	2.00	-2.00	0.00
5,320.0	12.40	2.51	5,185.1	1,010.6	44.3	1,011.6	2.00	-2.00	0.00
5,360.0	11.60	2.51	5,224.2	1,018.9	44.7	1,019.9	2.00	-2.00	0.00
5,400.0	10.80	2.51	5,263.4	1,026.7	45.0	1,027.7	2.00	-2.00	0.00
5,440.0	10.00	2.51	5,302.8	1,033.9	45.3	1,034.9	2.00	-2.00	0.00
5,480.0	9.20	2.51	5,342.2	1,040.6	45.6	1,041.6	2.00	-2.00	0.00
5,520.0	8.40	2.51	5,381.7	1,046.7	45.9	1,047.7	2.00	-2.00	0.00
5,560.0	7.60	2.51	5,421.3	1,052.2	46.1	1,053.2	2.00	-2.00	0.00
5,600.0	6.80	2.51	5,461.0	1,057.2	46.3	1,058.2	2.00	-2.00	0.00
5,640.0	6.00	2.51	5,500.8	1,061.7	46.5	1,062.7	2.00	-2.00	0.00
5,680.0	5.20	2.51	5,540.6	1,065.6	46.7	1,066.6	2.00	-2.00	0.00
5,720.0	4.40	2.51	5,580.4	1,068.9	46.9	1,069.9	2.00	-2.00	0.00
5,760.0	3.60	2.51	5,620.3	1,071.7	47.0	1,072.7	2.00	-2.00	0.00
5,800.0	2.80	2.51	5,660.3	1,073.9	47.1	1,075.0	2.00	-2.00	0.00
5,840.0	2.00	2.51	5,700.2	1,075.6	47.1	1,076.6	2.00	-2.00	0.00
5,880.0	1.20	2.51	5,740.2	1,076.7	47.2	1,077.7	2.00	-2.00	0.00
5,920.0	0.40	2.51	5,780.2	1,077.3	47.2	1,078.3	2.00	-2.00	0.00
5,939.8	0.00	0.00	5,800.0	1,077.3	47.2	1,078.4	2.00	-2.00	0.00
TARGET BHL 1320'FNL, 2555'FEL									
5,960.0	0.00	0.00	5,820.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,000.0	0.00	0.00	5,860.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,040.0	0.00	0.00	5,900.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,080.0	0.00	0.00	5,940.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,120.0	0.00	0.00	5,980.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,160.0	0.00	0.00	6,020.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00

Database:	EDM den0-adp01 Server Data	Local Co-ordinate Reference:	Well Thistle Down B31-18D
Company:	NOBLE ENERGY INC WELD COUNTY CO	TVD Reference:	WELL @ 4801.0ft (Original Well Elev)
Project:	SEC.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	North Reference:	True
Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (07-23-09)		

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)
6,200.0	0.00	0.00	6,060.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,240.0	0.00	0.00	6,100.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,280.0	0.00	0.00	6,140.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,320.0	0.00	0.00	6,180.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,360.0	0.00	0.00	6,220.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,400.0	0.00	0.00	6,260.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,440.0	0.00	0.00	6,300.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,480.0	0.00	0.00	6,340.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,520.0	0.00	0.00	6,380.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,560.0	0.00	0.00	6,420.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,600.0	0.00	0.00	6,460.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,640.0	0.00	0.00	6,500.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,680.0	0.00	0.00	6,540.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,720.0	0.00	0.00	6,580.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,760.0	0.00	0.00	6,620.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,800.0	0.00	0.00	6,660.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,840.0	0.00	0.00	6,700.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,876.8	0.00	0.00	6,737.0	1,077.3	47.2	1,078.4	0.00	0.00	0.00
NIORARA									
6,880.0	0.00	0.00	6,740.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,920.0	0.00	0.00	6,780.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
6,960.0	0.00	0.00	6,820.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
7,000.0	0.00	0.00	6,860.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
7,040.0	0.00	0.00	6,900.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
7,080.0	0.00	0.00	6,940.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
7,120.0	0.00	0.00	6,980.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
7,160.0	0.00	0.00	7,020.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
7,180.8	0.00	0.00	7,041.0	1,077.3	47.2	1,078.4	0.00	0.00	0.00
CODELL									
7,200.0	0.00	0.00	7,060.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
7,240.0	0.00	0.00	7,100.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
7,280.0	0.00	0.00	7,140.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
7,320.0	0.00	0.00	7,180.2	1,077.3	47.2	1,078.4	0.00	0.00	0.00
7,330.8	0.00	0.00	7,191.0	1,077.3	47.2	1,078.4	0.00	0.00	0.00
HARDLINE 77°W 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 BHL 1320'F	0.00	0.00	5,800.0	1,077.3	47.2	1,374,994.29	3,252,940.25	40° 21' 33.146 N	104° 35' 32.426 W
- plan hits target center									
- Point									
HARDLINE 77°W OF I	0.00	0.00	7,191.0	977.3	-29.8	1,374,893.48	3,252,864.26	40° 21' 32.157 N	104° 35' 33.421 W
- plan misses target center by 126.3ft at 7330.8ft MD (7191.0 TVD, 1077.3 N, 47.2 E)									
- Polygon									
Point 1			7,191.0	0.0	0.0	1,374,893.48	3,252,864.26		
Point 2			7,191.0	200.0	0.0	1,375,093.46	3,252,862.21		

Database:	EDM den0-adp01 Server Data	Local Co-ordinate Reference:	Well Thistle Down B31-18D
Company:	NOBLE ENERGY INC WELD COUNTY CO	TVD Reference:	WELL @ 4801.0ft (Original Well Elev)
Project:	SEC.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site:	Thistle Down B31-22D Pad	North Reference:	True
	Sec.31-T5N-R64W		
Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1 (07-23-09)		

Formations						
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)	
6,876.8	6,737.0	NIOBRARA		0.00		
7,180.8	7,041.0	CODELL		0.00		



NOBLE ENERGY INC WELD COUNTY CO

SEC.31-T5N-R64W

Thistle Down B31-22D Pad Sec.31-T5N-R64W

Thistle Down B31-18D

Wellbore #1

Plan #1 (07-23-09)

Anticollision Report

24 July, 2009



Company:	NOBLE ENERGY INC WELD COUNTY CO	Local Co-ordinate Reference:	Well Thistle Down B31-18D
Project:	SEC.31-T5N-R64W	TVD Reference:	WELL @ 4801.0ft (Original Well Elev)
Reference Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM den0-adp01 Server Data
Reference Design:	Plan #1 (07-23-09)	Offset TVD Reference:	Offset Datum

Reference	Plan #1 (07-23-09)		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.0ft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 2,000.0ft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program	Date 7/23/2009			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	7,330.8	Plan #1 (07-23-09) (Wellbore #1)	MWD	MWD - Standard

Summary						
Site Name	Reference Measured Depth (ft)	Offset Measured Depth (ft)	Distance Between Centres (ft)	Distance Between Ellipses (ft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Thistle Down B31-22D Pad Sec.31-T5N-R64W						
Thistle Down B31-20D - Wellbore #1 - Plan #1 (07-23-09)	400.0	400.0	25.3	23.8	16.110	CC, ES
Thistle Down B31-20D - Wellbore #1 - Plan #1 (07-23-09)	600.0	598.2	31.4	28.9	12.762	SF
Thistle Down B31-22D - Wellbore #1 - Plan #1 (07-23-09)	800.0	800.0	25.3	22.0	7.518	CC, ES
Thistle Down B31-22D - Wellbore #1 - Plan #1 (07-23-09)	900.0	899.1	27.0	23.2	7.104	SF

Offset Design		Thistle Down B31-22D Pad Sec.31-T5N-R64W - Thistle Down B31-20D - Wellbore #1 - Plan #1 (07-23-09)										Offset Site Error:		0.0 ft		
Survey Program: 0-MWD														Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis			Distance									
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning			
0.0	0.0	0.0	0.0	0.0	0.0	-98.26	-3.6	-25.1	25.3							
100.0	100.0	100.0	100.0	0.1	0.1	-98.26	-3.6	-25.1	25.3	25.1	0.22	112.768				
200.0	200.0	200.0	200.0	0.3	0.3	-98.26	-3.6	-25.1	25.3	24.7	0.67	37.589				
300.0	300.0	300.0	300.0	0.6	0.6	-98.26	-3.6	-25.1	25.3	24.2	1.12	22.554				
400.0	400.0	400.0	400.0	0.8	0.8	-98.26	-3.6	-25.1	25.3	23.8	1.57	16.110	CC, ES			
500.0	500.0	499.2	499.2	1.0	1.0	-96.25	-2.9	-26.6	26.8	24.8	2.01	13.308				
600.0	600.0	598.2	598.1	1.2	1.2	-91.37	-0.7	-31.3	31.4	28.9	2.46	12.762	SF			
700.0	700.0	696.7	696.2	1.5	1.5	-85.83	2.8	-39.0	39.3	36.4	2.91	13.510				
800.0	800.0	794.8	793.6	1.7	1.7	-82.54	6.5	-49.7	50.5	47.2	3.35	15.065				
900.0	900.0	892.1	889.9	1.9	2.0	-82.15	8.7	-63.3	64.7	60.9	3.80	17.041				
1,000.0	1,000.0	988.6	985.0	2.1	2.3	-83.18	9.5	-79.7	81.7	77.4	4.24	19.246				
1,100.0	1,100.0	1,084.0	1,078.4	2.4	2.7	-84.81	9.0	-98.8	101.5	96.8	4.70	21.610				
1,200.0	1,200.0	1,178.0	1,170.0	2.6	3.1	-86.64	7.1	-120.3	124.2	119.0	5.15	24.095				
1,300.0	1,300.0	1,271.8	1,260.6	2.8	3.5	-91.10	3.9	-144.3	149.7	144.1	5.62	26.655				
1,400.0	1,399.8	1,367.8	1,353.1	3.0	4.0	-93.63	0.4	-169.6	176.4	170.3	6.08	28.994				
1,500.0	1,499.5	1,463.4	1,445.2	3.3	4.5	-96.33	-3.2	-194.8	203.8	197.2	6.56	31.068				
1,600.0	1,598.7	1,558.5	1,536.9	3.5	5.0	-99.11	-6.7	-219.9	232.2	225.1	7.05	32.932				
1,700.0	1,697.5	1,652.9	1,627.9	3.8	5.6	-101.89	-10.2	-244.8	261.9	254.3	7.57	34.606				
1,800.0	1,795.6	1,746.6	1,718.2	4.1	6.1	-104.62	-13.7	-269.5	293.1	285.0	8.12	36.104				
1,900.0	1,893.1	1,839.4	1,807.7	4.4	6.6	-107.26	-17.1	-294.0	326.1	317.4	8.71	37.444				
2,000.0	1,989.6	1,931.3	1,896.2	4.8	7.1	-109.85	-20.5	-318.2	361.1	351.7	9.34	38.637				
2,100.0	2,085.9	2,022.7	1,984.3	5.2	7.6	-112.72	-23.9	-342.3	397.4	387.3	10.04	39.585				

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	NOBLE ENERGY INC WELD COUNTY CO	Local Co-ordinate Reference:	Well Thistle Down B31-18D
Project:	SEC.31-T5N-R64W	TVD Reference:	WELL @ 4801.0ft (Original Well Elev)
Reference Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM den0-adp01 Server Data
Reference Design:	Plan #1 (07-23-09)	Offset TVD Reference:	Offset Datum

Offset Design		Thistle Down B31-22D Pad Sec.31-T5N-R64W - Thistle Down B31-20D - Wellbore #1 - Plan #1 (07-23-C)										Offset Site Error:		0.0 ft
Survey Program: 0-MWD												Offset Well Error:		0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		+N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)				
2,200.0	2,182.1	2,114.1	2,072.4		5.6	8.1	-115.12	-27.3	-366.4	434.5	423.7	10.76	40.392	
2,300.0	2,278.3	2,205.5	2,160.6		6.1	8.6	-117.15	-30.7	-390.5	472.1	460.6	11.49	41.088	
2,400.0	2,374.5	2,296.9	2,248.7		6.6	9.2	-118.88	-34.1	-414.6	510.2	498.0	12.24	41.697	
2,500.0	2,470.7	2,388.3	2,336.8		7.0	9.7	-120.38	-37.5	-438.7	548.6	535.7	12.99	42.234	
2,600.0	2,566.9	2,479.7	2,424.9		7.5	10.2	-121.69	-40.9	-462.8	587.4	573.6	13.75	42.712	
2,700.0	2,663.1	2,571.1	2,513.0		8.0	10.7	-122.83	-44.3	-486.9	626.3	611.8	14.52	43.142	
2,800.0	2,759.3	2,662.5	2,601.1		8.6	11.2	-123.84	-47.7	-511.0	665.5	650.2	15.29	43.530	
2,900.0	2,855.5	2,753.9	2,689.2		9.1	11.8	-124.74	-51.1	-535.1	704.8	688.7	16.06	43.883	
3,000.0	2,951.7	2,845.3	2,777.3		9.6	12.3	-125.55	-54.5	-559.2	744.2	727.4	16.84	44.205	
3,100.0	3,047.9	2,936.8	2,865.4		10.1	12.8	-126.28	-57.9	-583.3	783.8	766.2	17.61	44.501	
3,200.0	3,144.1	3,028.2	2,953.5		10.6	13.3	-126.93	-61.2	-607.4	823.4	805.1	18.39	44.773	
3,300.0	3,240.3	3,119.6	3,041.7		11.2	13.8	-127.53	-64.6	-631.5	863.2	844.0	19.17	45.024	
3,400.0	3,336.6	3,211.0	3,129.8		11.7	14.4	-128.07	-68.0	-655.6	903.0	883.0	19.95	45.257	
3,500.0	3,432.8	3,302.4	3,217.9		12.2	14.9	-128.57	-71.4	-679.7	942.9	922.1	20.73	45.473	
3,600.0	3,529.0	3,393.8	3,306.0		12.8	15.4	-129.03	-74.8	-703.8	982.8	961.3	21.52	45.675	
3,700.0	3,625.2	3,485.2	3,394.1		13.3	15.9	-129.46	-78.2	-727.9	1,022.8	1,000.5	22.30	45.863	
3,800.0	3,721.4	3,576.6	3,482.2		13.8	16.5	-129.85	-81.6	-752.0	1,062.8	1,039.7	23.08	46.039	
3,900.0	3,817.6	3,668.0	3,570.3		14.4	17.0	-130.21	-85.0	-776.1	1,102.8	1,079.0	23.87	46.205	
4,000.0	3,913.8	3,759.4	3,658.4		14.9	17.5	-130.55	-88.4	-800.2	1,142.9	1,118.3	24.65	46.360	
4,100.0	4,010.0	3,850.8	3,746.5		15.4	18.0	-130.86	-91.8	-824.3	1,183.1	1,157.6	25.44	46.506	
4,200.0	4,106.2	3,942.3	3,834.6		16.0	18.6	-131.16	-95.2	-848.4	1,223.2	1,197.0	26.22	46.644	
4,300.0	4,202.4	4,033.7	3,922.7		16.5	19.1	-131.43	-98.6	-872.5	1,263.4	1,236.4	27.01	46.774	
4,400.0	4,298.6	4,125.1	4,010.9		17.1	19.6	-131.69	-102.0	-896.6	1,303.6	1,275.8	27.80	46.897	
4,500.0	4,394.8	4,216.5	4,099.0		17.6	20.1	-131.93	-105.3	-920.7	1,343.8	1,315.2	28.58	47.014	
4,600.0	4,491.1	4,307.9	4,187.1		18.2	20.7	-132.16	-108.7	-944.8	1,384.1	1,354.7	29.37	47.124	
4,700.0	4,587.3	4,399.3	4,275.2		18.7	21.2	-132.38	-112.1	-968.9	1,424.3	1,394.2	30.16	47.230	
4,800.0	4,683.5	4,490.7	4,363.3		19.2	21.7	-132.58	-115.5	-993.0	1,464.6	1,433.6	30.94	47.329	
4,900.0	4,779.7	4,582.1	4,451.4		19.8	22.2	-132.78	-118.9	-1,017.1	1,504.9	1,473.1	31.73	47.424	
5,000.0	4,875.9	4,673.5	4,539.5		20.3	22.8	-132.96	-122.3	-1,041.2	1,545.2	1,512.7	32.52	47.515	
5,100.0	4,972.1	4,764.9	4,627.6		20.9	23.3	-133.14	-125.7	-1,065.3	1,585.5	1,552.2	33.31	47.601	
5,200.0	5,068.4	4,856.5	4,715.9		21.4	23.8	-133.61	-129.1	-1,089.4	1,625.5	1,591.4	34.17	47.575	
5,300.0	5,165.5	4,948.9	4,805.0		21.8	24.3	-134.27	-132.5	-1,113.8	1,663.6	1,628.6	35.02	47.505	
5,400.0	5,263.4	5,042.3	4,895.0		22.1	24.9	-134.78	-136.0	-1,138.4	1,699.4	1,663.6	35.83	47.427	
5,500.0	5,362.0	5,136.4	4,985.7		22.4	25.4	-135.17	-139.5	-1,163.2	1,732.9	1,696.3	36.60	47.348	
5,600.0	5,461.0	5,231.3	5,077.1		22.7	26.0	-135.44	-143.0	-1,188.2	1,764.1	1,726.8	37.32	47.271	
5,700.0	5,560.5	5,326.7	5,169.1		22.9	26.5	-135.59	-146.5	-1,213.4	1,793.0	1,755.0	37.99	47.200	
5,800.0	5,660.3	5,450.1	5,288.2		23.1	27.1	-135.53	-151.1	-1,245.5	1,819.3	1,780.6	38.66	47.063	
5,900.0	5,760.2	5,556.1	5,489.4		23.3	27.9	-135.15	-157.2	-1,289.0	1,839.1	1,799.7	39.39	46.693	
6,000.0	5,860.2	5,668.1	5,699.2		23.4	28.4	-132.20	-161.4	-1,318.7	1,851.0	1,811.0	39.96	46.321	
6,100.0	5,960.2	6,083.4	5,914.0		23.5	28.8	-131.95	-163.4	-1,333.2	1,856.6	1,816.2	40.44	45.914	
6,200.0	6,060.2	6,229.7	6,060.2		23.6	28.9	-131.93	-163.6	-1,334.4	1,857.1	1,816.3	40.76	45.558	
6,300.0	6,160.2	6,329.7	6,160.2		23.7	29.0	-131.93	-163.6	-1,334.4	1,857.1	1,816.1	41.04	45.256	
6,400.0	6,260.2	6,429.7	6,260.2		23.8	29.1	-131.93	-163.6	-1,334.4	1,857.1	1,815.8	41.31	44.955	
6,500.0	6,360.2	6,529.7	6,360.2		24.0	29.2	-131.93	-163.6	-1,334.4	1,857.1	1,815.5	41.59	44.655	
6,600.0	6,460.2	6,629.7	6,460.2		24.1	29.3	-131.93	-163.6	-1,334.4	1,857.1	1,815.2	41.87	44.355	
6,700.0	6,560.2	6,729.7	6,560.2		24.2	29.4	-131.93	-163.6	-1,334.4	1,857.1	1,815.0	42.15	44.056	
6,800.0	6,660.2	6,829.7	6,660.2		24.3	29.5	-131.93	-163.6	-1,334.4	1,857.1	1,814.7	42.44	43.759	
6,900.0	6,760.2	6,929.7	6,760.2		24.5	29.6	-131.93	-163.6	-1,334.4	1,857.1	1,814.4	42.73	43.462	
7,000.0	6,860.2	7,029.7	6,860.2		24.6	29.8	-131.93	-163.6	-1,334.4	1,857.1	1,814.1	43.02	43.167	
7,100.0	6,960.2	7,129.7	6,960.2		24.7	29.9	-131.93	-163.6	-1,334.4	1,857.1	1,813.8	43.32	42.873	
7,200.0	7,060.2	7,229.7	7,060.2		24.9	30.0	-131.93	-163.6	-1,334.4	1,857.1	1,813.5	43.61	42.581	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	NOBLE ENERGY INC WELD COUNTY CO	Local Co-ordinate Reference:	Well Thistle Down B31-18D
Project:	SEC.31-T5N-R64W	TVD Reference:	WELL @ 4801.0ft (Original Well Elev)
Reference Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM den0-adp01 Server Data
Reference Design:	Plan #1 (07-23-09)	Offset TVD Reference:	Offset Datum

Offset Design													Thistle Down B31-22D Pad Sec.31-T5N-R64W - Thistle Down B31-20D - Wellbore #1 - Plan #1 (07-23-09)		Offset Site Error:		0.0 ft	
Survey Program: 0-MWD															Offset Well Error:		0.0 ft	
Reference		Offset		Semi Major Axis			Distance							Warning				
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor						
7,300.0	7,160.2	7,329.7	7,160.2	25.0	30.1	-131.93	-163.6	-1,334.4	1,857.1	1,813.2	43.89	42.311						
7,330.8	7,191.0	7,360.5	7,191.0	25.0	30.1	-131.93	-163.6	-1,334.4	1,857.1	1,813.1	43.96	42.243						

Company:	NOBLE ENERGY INC WELD COUNTY CO	Local Co-ordinate Reference:	Well Thistle Down B31-18D
Project:	SEC.31-T5N-R64W	TVD Reference:	WELL @ 4801.0ft (Original Well Elev)
Reference Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM den0-adp01 Server Data
Reference Design:	Plan #1 (07-23-09)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)		Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)						
0.0	0.0	0.0	0.0	0.0	0.0	81.74	3.6	25.1	25.3					
100.0	100.0	100.0	100.0	0.1	0.1	81.74	3.6	25.1	25.3	25.1	0.22	112.768		
200.0	200.0	200.0	200.0	0.3	0.3	81.74	3.6	25.1	25.3	24.7	0.67	37.589		
300.0	300.0	300.0	300.0	0.6	0.6	81.74	3.6	25.1	25.3	24.2	1.12	22.554		
400.0	400.0	400.0	400.0	0.8	0.8	81.74	3.6	25.1	25.3	23.8	1.57	16.110		
500.0	500.0	500.0	500.0	1.0	1.0	81.74	3.6	25.1	25.3	23.3	2.02	12.530		
600.0	600.0	600.0	600.0	1.2	1.2	81.74	3.6	25.1	25.3	22.9	2.47	10.252		
700.0	700.0	700.0	700.0	1.5	1.5	81.74	3.6	25.1	25.3	22.4	2.92	8.674		
800.0	800.0	800.0	800.0	1.7	1.7	81.74	3.6	25.1	25.3	22.0	3.37	7.518 CC, ES		
900.0	900.0	899.1	899.1	1.9	1.9	82.62	3.5	26.8	27.0	23.2	3.80	7.104 SF		
1,000.0	1,000.0	998.0	997.8	2.1	2.1	84.73	2.9	31.9	32.1	27.9	4.23	7.587		
1,100.0	1,100.0	1,096.4	1,095.9	2.4	2.3	87.06	2.1	40.3	40.6	35.9	4.66	8.704		
1,200.0	1,200.0	1,194.1	1,192.9	2.6	2.6	89.04	0.9	52.0	52.5	47.4	5.10	10.293		
1,300.0	1,300.0	1,290.8	1,288.5	2.8	2.8	89.20	-0.7	66.8	67.8	62.2	5.54	12.232		
1,400.0	1,399.8	1,386.3	1,382.2	3.0	3.1	93.05	-2.5	84.6	86.6	80.6	5.98	14.472		
1,500.0	1,499.5	1,480.2	1,473.8	3.3	3.5	97.00	-4.6	105.0	109.3	102.9	6.44	16.990		
1,600.0	1,598.7	1,572.2	1,562.9	3.5	3.9	100.58	-7.0	128.0	136.2	129.3	6.91	19.730		
1,700.0	1,697.5	1,662.1	1,649.1	3.8	4.3	103.65	-9.5	153.1	167.4	160.0	7.40	22.609		
1,800.0	1,795.6	1,755.5	1,738.3	4.1	4.8	106.52	-12.4	180.7	201.4	193.4	7.94	25.361		
1,900.0	1,893.1	1,848.1	1,826.8	4.4	5.3	109.16	-15.2	208.0	237.0	228.4	8.52	27.815		
2,000.0	1,989.6	1,939.9	1,914.5	4.8	5.8	111.67	-18.0	235.0	274.3	265.1	9.14	29.994		
2,100.0	2,085.9	2,031.4	2,001.8	5.2	6.4	114.37	-20.7	262.0	312.7	302.9	9.83	31.822		
2,200.0	2,182.1	2,122.8	2,089.1	5.6	6.9	116.48	-23.5	288.9	351.6	341.1	10.54	33.367		
2,300.0	2,278.3	2,214.2	2,176.4	6.1	7.5	118.18	-26.3	315.9	390.9	379.6	11.27	34.677		
2,400.0	2,374.5	2,305.6	2,263.7	6.6	8.0	119.57	-29.1	342.8	430.4	418.4	12.02	35.795		
2,500.0	2,470.7	2,397.0	2,351.1	7.0	8.6	120.72	-31.8	369.8	470.1	457.3	12.79	36.755		
2,600.0	2,566.9	2,488.4	2,438.4	7.5	9.1	121.70	-34.6	396.7	509.9	496.3	13.57	37.585		
2,700.0	2,663.1	2,579.8	2,525.7	8.0	9.7	122.54	-37.4	423.6	549.8	535.4	14.35	38.309		
2,800.0	2,759.3	2,671.2	2,613.0	8.6	10.2	123.26	-40.2	450.6	589.8	574.6	15.14	38.943		
2,900.0	2,855.5	2,762.7	2,700.3	9.1	10.8	123.89	-42.9	477.5	629.9	613.9	15.94	39.503		
3,000.0	2,951.7	2,854.1	2,787.6	9.6	11.4	124.45	-45.7	504.5	670.0	653.2	16.75	40.000		
3,100.0	3,047.9	2,945.5	2,874.9	10.1	11.9	124.94	-48.5	531.4	710.2	692.6	17.56	40.443		
3,200.0	3,144.1	3,036.9	2,962.2	10.6	12.5	125.38	-51.3	558.4	750.4	732.0	18.37	40.841		
3,300.0	3,240.3	3,128.3	3,049.5	11.2	13.1	125.78	-54.0	585.3	790.6	771.4	19.19	41.199		
3,400.0	3,336.6	3,219.7	3,136.8	11.7	13.6	126.14	-56.8	612.3	830.9	810.9	20.01	41.523		
3,500.0	3,432.8	3,311.1	3,224.1	12.2	14.2	126.46	-59.6	639.2	871.2	850.4	20.83	41.817		
3,600.0	3,529.0	3,402.5	3,311.4	12.8	14.8	126.76	-62.4	666.1	911.5	889.9	21.66	42.086		
3,700.0	3,625.2	3,494.0	3,398.7	13.3	15.4	127.03	-65.1	693.1	951.9	929.4	22.49	42.331		
3,800.0	3,721.4	3,585.4	3,486.1	13.8	15.9	127.28	-67.9	720.0	992.2	968.9	23.32	42.556		
3,900.0	3,817.6	3,676.8	3,573.4	14.4	16.5	127.51	-70.7	747.0	1,032.6	1,008.4	24.15	42.764		
4,000.0	3,913.8	3,768.2	3,660.7	14.9	17.1	127.72	-73.5	773.9	1,073.0	1,048.0	24.98	42.956		
4,100.0	4,010.0	3,859.6	3,748.0	15.4	17.6	127.92	-76.2	800.9	1,113.4	1,087.6	25.81	43.133		
4,200.0	4,106.2	3,951.0	3,835.3	16.0	18.2	128.10	-79.0	827.8	1,153.8	1,127.1	26.65	43.298		
4,300.0	4,202.4	4,042.4	3,922.6	16.5	18.8	128.27	-81.8	854.7	1,194.2	1,166.7	27.48	43.451		
4,400.0	4,298.6	4,133.8	4,009.9	17.1	19.4	128.43	-84.6	881.7	1,234.6	1,206.3	28.32	43.594		
4,500.0	4,394.8	4,225.3	4,097.2	17.6	19.9	128.58	-87.3	908.6	1,275.1	1,245.9	29.16	43.728		
4,600.0	4,491.1	4,316.7	4,184.5	18.2	20.5	128.72	-90.1	935.6	1,315.5	1,285.5	30.00	43.853		
4,700.0	4,587.3	4,408.1	4,271.8	18.7	21.1	128.86	-92.9	962.5	1,355.9	1,325.1	30.84	43.970		
4,800.0	4,683.5	4,499.5	4,359.1	19.2	21.7	128.98	-95.7	989.5	1,396.4	1,364.7	31.68	44.080		
4,900.0	4,779.7	4,590.9	4,446.4	19.8	22.2	129.10	-98.4	1,016.4	1,436.8	1,404.3	32.52	44.184		
5,000.0	4,875.9	4,682.3	4,533.7	20.3	22.8	129.21	-101.2	1,043.3	1,477.3	1,443.9	33.36	44.282		

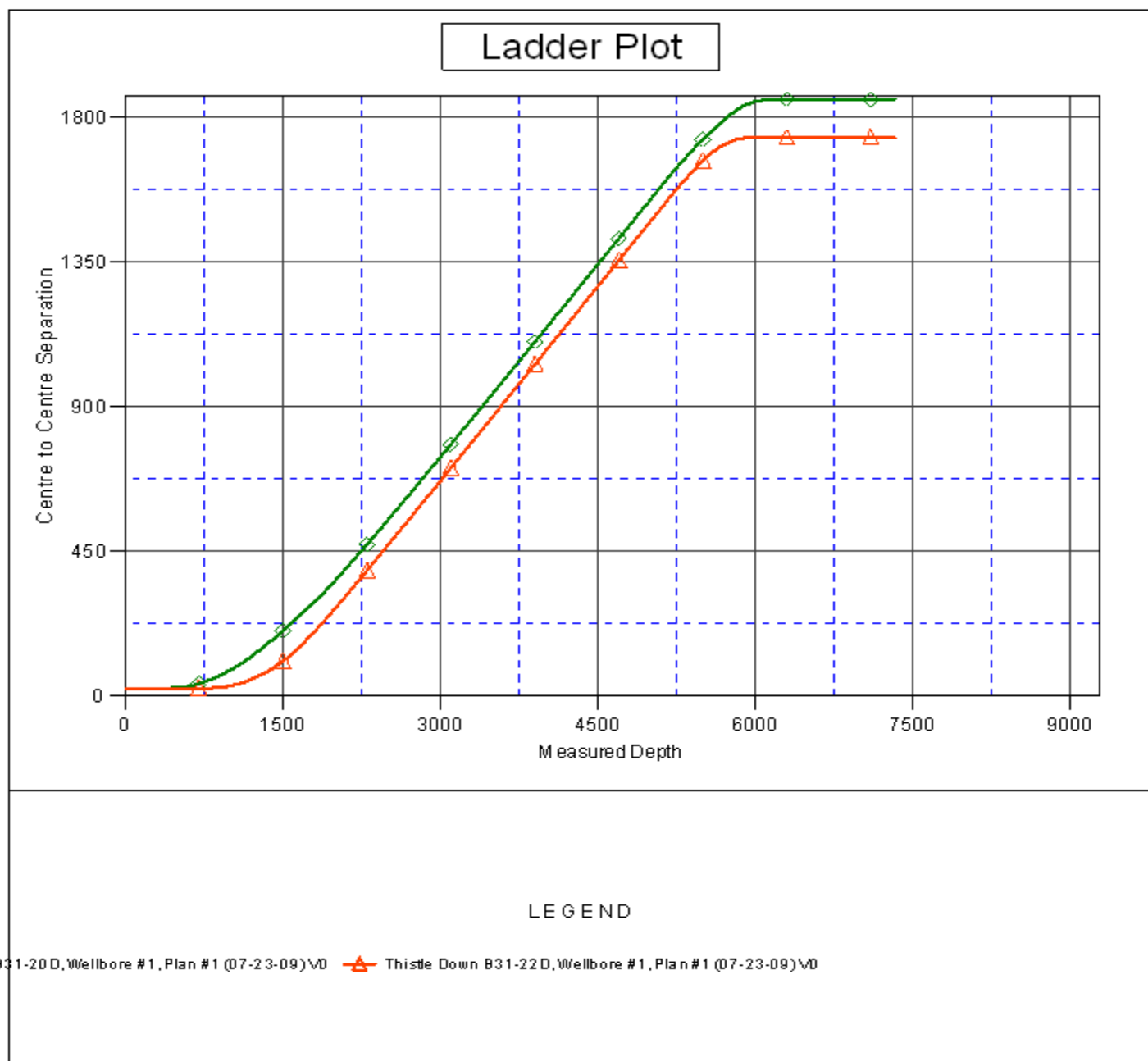
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	NOBLE ENERGY INC WELD COUNTY CO	Local Co-ordinate Reference:	Well Thistle Down B31-18D
Project:	SEC.31-T5N-R64W	TVD Reference:	WELL @ 4801.0ft (Original Well Elev)
Reference Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM den0-adp01 Server Data
Reference Design:	Plan #1 (07-23-09)	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference (ft)	Offset (ft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	+E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor		
5,100.0	4,972.1	4,773.7	4,621.1	20.9	23.4	129.31	-104.0	1,070.3	1,517.8	1,483.6	34.20	44.374		
5,200.0	5,068.4	4,865.3	4,708.5	21.4	24.0	129.75	-106.8	1,097.3	1,558.0	1,522.8	35.12	44.366		
5,300.0	5,165.5	4,957.6	4,796.7	21.8	24.6	130.37	-109.6	1,124.5	1,596.3	1,560.3	36.02	44.321		
5,400.0	5,263.4	5,050.7	4,885.6	22.1	25.1	130.85	-112.4	1,151.9	1,632.6	1,595.8	36.88	44.270		
5,500.0	5,362.0	5,165.7	4,995.5	22.4	25.8	131.15	-115.8	1,185.5	1,666.6	1,628.9	37.76	44.139		
5,600.0	5,461.0	5,342.9	5,167.0	22.7	26.6	131.25	-120.4	1,229.7	1,695.2	1,656.5	38.69	43.817		
5,700.0	5,560.5	5,526.3	5,347.0	22.9	27.2	131.31	-123.9	1,264.3	1,716.7	1,677.2	39.48	43.487		
5,800.0	5,660.3	5,714.2	5,533.5	23.1	27.7	131.35	-126.4	1,287.8	1,730.9	1,690.8	40.12	43.145		
5,900.0	5,760.2	5,905.0	5,723.8	23.3	28.0	131.37	-127.5	1,299.1	1,737.7	1,697.1	40.61	42.795		
6,000.0	5,860.2	6,041.4	5,860.2	23.4	28.1	133.88	-127.6	1,300.1	1,738.3	1,697.4	40.91	42.496		
6,100.0	5,960.2	6,141.4	5,960.2	23.5	28.2	133.88	-127.6	1,300.1	1,738.3	1,697.1	41.17	42.225		
6,200.0	6,060.2	6,241.4	6,060.2	23.6	28.3	133.88	-127.6	1,300.1	1,738.3	1,696.9	41.43	41.955		
6,300.0	6,160.2	6,341.4	6,160.2	23.7	28.4	133.88	-127.6	1,300.1	1,738.3	1,696.6	41.70	41.685		
6,400.0	6,260.2	6,441.4	6,260.2	23.8	28.5	133.88	-127.6	1,300.1	1,738.3	1,696.3	41.97	41.416		
6,500.0	6,360.2	6,541.4	6,360.2	24.0	28.6	133.88	-127.6	1,300.1	1,738.3	1,696.1	42.25	41.147		
6,600.0	6,460.2	6,641.4	6,460.2	24.1	28.7	133.88	-127.6	1,300.1	1,738.3	1,695.8	42.52	40.878		
6,700.0	6,560.2	6,741.4	6,560.2	24.2	28.8	133.88	-127.6	1,300.1	1,738.3	1,695.5	42.80	40.610		
6,800.0	6,660.2	6,841.4	6,660.2	24.3	28.9	133.88	-127.6	1,300.1	1,738.3	1,695.2	43.09	40.344		
6,900.0	6,760.2	6,941.4	6,760.2	24.5	29.0	133.88	-127.6	1,300.1	1,738.3	1,694.9	43.37	40.077		
7,000.0	6,860.2	7,041.4	6,860.2	24.6	29.2	133.88	-127.6	1,300.1	1,738.3	1,694.7	43.66	39.812		
7,100.0	6,960.2	7,141.4	6,960.2	24.7	29.3	133.88	-127.6	1,300.1	1,738.3	1,694.4	43.95	39.548		
7,200.0	7,060.2	7,241.4	7,060.2	24.9	29.4	133.88	-127.6	1,300.1	1,738.3	1,694.1	44.25	39.286		
7,300.0	7,160.2	7,341.4	7,160.2	25.0	29.5	133.88	-127.6	1,300.1	1,738.3	1,693.8	44.54	39.024		
7,310.8	7,171.0	7,352.1	7,171.0	25.0	29.5	133.88	-127.6	1,300.1	1,738.3	1,693.7	44.58	38.996		
7,330.8	7,191.0	7,357.1	7,176.0	25.0	29.5	133.88	-127.6	1,300.1	1,738.4	1,693.8	44.61	38.964		

Company:	NOBLE ENERGY INC WELD COUNTY CO	Local Co-ordinate Reference:	Well Thistle Down B31-18D
Project:	SEC.31-T5N-R64W	TVD Reference:	WELL @ 4801.0ft (Original Well Elev)
Reference Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM den0-adp01 Server Data
Reference Design:	Plan #1 (07-23-09)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4801.0ft (Original Well Elev) Coordinates are relative to: Thistle Down B31-18D
Offset Depths are relative to Offset Datum
Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is 105° 30' 0.000 W °
Grid Convergence at Surface is: 0.59°



Company:	NOBLE ENERGY INC WELD COUNTY CO	Local Co-ordinate Reference:	Well Thistle Down B31-18D
Project:	SEC.31-T5N-R64W	TVD Reference:	WELL @ 4801.0ft (Original Well Elev)
Reference Site:	Thistle Down B31-22D Pad Sec.31-T5N-R64W	MD Reference:	WELL @ 4801.0ft (Original Well Elev)
Site Error:	0.0ft	North Reference:	True
Reference Well:	Thistle Down B31-18D	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0ft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM den0-adp01 Server Data
Reference Design:	Plan #1 (07-23-09)	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 4801.0ft (Original Well Elev) Coordinates are relative to: Thistle Down B31-18D
Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1983, Colorado Northern Zone
Central Meridian is 105° 30' 0.000 W ° Grid Convergence at Surface is: 0.59°

