



## **Directional**

# **NOBLE ENERGY INC WELD COUNTY CO**

**SEC.5-T5N-R67W**

**Thornton USX N05-09D Pad SEC.5-T5N-R67W**

**Thornton USX N05-23D**

**Wellbore #1**

**Noble Thornton USX N05-23D Plan #1 (1-30-12)**

## **Anticollision Report**

**01 February, 2012**



<b>Company:</b>	NOBLE ENERGY INC WELD COUNTY CO	<b>Local Co-ordinate Reference:</b>	Well Thornton USX N05-23D
<b>Project:</b>	SEC.5-T5N-R67W	<b>TVD Reference:</b>	WELL @ 4896.0ft (Original Well Elev)
<b>Reference Site:</b>	Thornton USX N05-09D Pad SEC.5-T5N-R67W	<b>MD Reference:</b>	WELL @ 4896.0ft (Original Well Elev)
<b>Site Error:</b>	0.0ft	<b>North Reference:</b>	True
<b>Reference Well:</b>	Thornton USX N05-23D	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Well Error:</b>	0.0ft	<b>Output errors are at</b>	2.00 sigma
<b>Reference Wellbore</b>	Wellbore #1	<b>Database:</b>	Landmark
<b>Reference Design:</b>	Noble Thornton USX N05-23D Plan #1 (1-30-12)	<b>Offset TVD Reference:</b>	Offset Datum

<b>Reference</b>	Noble Thornton USX N05-23D Plan		
<b>Filter type:</b>	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
<b>Interpolation Method:</b>	MD Interval 100.0ft	<b>Error Model:</b>	ISCWSA
<b>Depth Range:</b>	Unlimited	<b>Scan Method:</b>	Closest Approach 3D
<b>Results Limited by:</b>	Maximum center-center distance of 10,000.0ft	<b>Error Surface:</b>	Elliptical Conic
<b>Warning Levels Evaluated at:</b>	2.00 Sigma		

<b>Survey Tool Program</b>	<b>Date</b>	1/31/2012		
<b>From (ft)</b>	<b>To (ft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>
0.0	7,887.5	Noble Thornton USX N05-23D Plan #1 (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						
Thornton USX N05-09D Pad SEC.5-T5N-R67W						
Thornton USX N05-09D - Wellbore #1 - Noble Thornton I	934.2	934.2	22.6	18.6	5.678 CC	
Thornton USX N05-09D - Wellbore #1 - Noble Thornton I	1,000.0	999.8	22.8	18.5	5.339 ES	
Thornton USX N05-09D - Wellbore #1 - Noble Thornton I	1,100.0	1,099.3	24.8	20.1	5.253 SF	
Thornton USX N05-10D - Wellbore #1 - Noble Thornton I	734.0	734.0	22.3	19.2	7.244 CC	
Thornton USX N05-10D - Wellbore #1 - Noble Thornton I	800.0	799.8	22.5	19.2	6.685 ES	
Thornton USX N05-10D - Wellbore #1 - Noble Thornton I	900.0	899.2	24.7	20.9	6.485 SF	

Offset Design Thornton USX N05-09D Pad SEC.5-T5N-R67W - Thornton USX N05-09D - Wellbore #1 - Noble Thorntc													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
0.0	0.0	0.0	0.0	0.0	0.0	80.70	3.6	22.3	22.6					
100.0	100.0	100.0	100.0	0.1	0.1	80.70	3.6	22.3	22.6	22.3	0.22	100.418		
200.0	200.0	200.0	200.0	0.3	0.3	80.70	3.6	22.3	22.6	21.9	0.67	33.473		
300.0	300.0	300.0	300.0	0.6	0.6	80.70	3.6	22.3	22.6	21.4	1.12	20.084		
400.0	400.0	400.0	400.0	0.8	0.8	80.70	3.6	22.3	22.6	21.0	1.57	14.345		
500.0	500.0	500.0	500.0	1.0	1.0	80.70	3.6	22.3	22.6	20.5	2.02	11.158		
600.0	600.0	600.0	600.0	1.2	1.2	80.70	3.6	22.3	22.6	20.1	2.47	9.129		
700.0	700.0	700.0	700.0	1.5	1.5	80.70	3.6	22.3	22.6	19.6	2.92	7.724		
800.0	800.0	800.0	800.0	1.7	1.7	80.70	3.6	22.3	22.6	19.2	3.37	6.695		
900.0	900.0	900.0	900.0	1.9	1.9	80.70	3.6	22.3	22.6	18.7	3.82	5.907		
934.2	934.2	934.2	934.2	2.0	2.0	80.70	3.6	22.3	22.6	18.6	3.97	5.678 CC		
1,000.0	1,000.0	999.8	999.8	2.1	2.1	79.76	4.1	22.4	22.8	18.5	4.27	5.339 ES		
1,100.0	1,100.0	1,099.3	1,099.2	2.4	2.4	72.90	7.3	23.7	24.8	20.1	4.71	5.253 SF		
1,200.0	1,200.0	1,198.4	1,198.1	2.6	2.6	84.48	13.7	26.1	29.5	24.3	5.16	5.714		
1,300.0	1,299.9	1,297.2	1,296.3	2.8	2.8	78.96	23.3	29.8	37.0	31.4	5.61	6.596		
1,400.0	1,399.7	1,395.5	1,393.7	3.0	3.1	77.05	35.9	34.6	46.8	40.7	6.07	7.704		
1,500.0	1,499.1	1,493.4	1,490.1	3.3	3.3	77.14	51.6	40.6	58.6	52.0	6.55	8.938		
1,600.0	1,598.2	1,590.6	1,585.3	3.5	3.7	78.22	70.3	47.7	72.4	65.3	7.07	10.238		
1,700.0	1,696.6	1,687.2	1,679.1	3.8	4.0	79.74	91.8	55.9	88.2	80.6	7.64	11.551		
1,800.0	1,794.9	1,783.0	1,771.3	4.1	4.4	80.51	116.0	65.2	106.5	98.2	8.25	12.900		

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



**Company:** NOBLE ENERGY INC WELD COUNTY CO  
**Project:** SEC.5-T5N-R67W  
**Reference Site:** Thornton USX N05-09D Pad  
 SEC.5-T5N-R67W  
**Site Error:** 0.0ft  
**Reference Well:** Thornton USX N05-23D  
**Well Error:** 0.0ft  
**Reference Wellbore** Wellbore #1  
**Reference Design:** Noble Thornton USX N05-23D Plan #1  
 (1-30-12)

**Local Co-ordinate Reference:** Well Thornton USX N05-23D  
**TVD Reference:** WELL @ 4896.0ft (Original Well Elev)  
**MD Reference:** WELL @ 4896.0ft (Original Well Elev)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Output errors are at** 2.00 sigma  
**Database:** Landmark  
**Offset TVD Reference:** Offset Datum

Offset Design Thornton USX N05-09D Pad SEC.5-T5N-R67W - Thornton USX N05-09D - Wellbore #1 - Noble Thornt														Offset Site Error:	0.0 ft
Survey Program: 0-MWD														Offset Well Error:	0.0 ft
Measured Depth (ft)	Vertical Depth (ft)	Measured Depth (ft)	Vertical Depth (ft)	Reference	Offset	Semi Major Axis	Highside Toolface (°)	Offset Wellbore Centre +N/-S (ft)	Offset Wellbore Centre +E/-W (ft)	Between Centres (ft)	Between Ellipses (ft)	Minimum Separation (ft)	Separation Factor	Warning	
1,900.0	1,893.2	1,878.2	1,862.0	4.4	4.9	80.14		142.9	75.5	127.2	118.3	8.90	14.295		
2,000.0	1,991.4	1,975.7	1,954.6	4.8	5.4	79.55		171.5	86.4	149.0	139.4	9.58	15.550		
2,100.0	2,089.7	2,073.3	2,047.3	5.1	5.9	79.11		200.2	97.4	170.8	160.5	10.28	16.609		
2,200.0	2,187.9	2,170.9	2,139.9	5.5	6.4	78.77		228.9	108.3	192.6	181.6	11.00	17.505		
2,300.0	2,286.2	2,268.5	2,232.6	5.8	7.0	78.50		257.5	119.3	214.4	202.6	11.73	18.269		
2,400.0	2,384.5	2,366.1	2,325.2	6.2	7.6	78.28		286.2	130.2	236.1	223.7	12.48	18.926		
2,500.0	2,482.7	2,463.7	2,417.8	6.6	8.1	78.09		314.9	141.2	257.9	244.7	13.23	19.494		
2,600.0	2,581.0	2,561.3	2,510.5	7.0	8.7	77.94		343.6	152.2	279.7	265.7	13.99	19.989		
2,700.0	2,679.3	2,658.9	2,603.1	7.3	9.3	77.81		372.2	163.1	301.5	286.8	14.76	20.424		
2,800.0	2,777.5	2,756.5	2,695.8	7.7	9.9	77.69		400.9	174.1	323.3	307.8	15.54	20.807		
2,900.0	2,875.8	2,854.1	2,788.4	8.1	10.4	77.59		429.6	185.0	345.1	328.8	16.32	21.148		
3,000.0	2,974.0	2,951.7	2,881.1	8.5	11.0	77.50		458.3	196.0	366.9	349.8	17.10	21.451		
3,100.0	3,072.3	3,049.3	2,973.7	8.9	11.6	77.42		486.9	206.9	388.7	370.8	17.89	21.724		
3,200.0	3,170.6	3,146.9	3,066.3	9.3	12.2	77.35		515.6	217.9	410.5	391.8	18.69	21.969		
3,300.0	3,268.8	3,244.5	3,159.0	9.7	12.8	77.29		544.3	228.9	432.3	412.8	19.48	22.192		
3,400.0	3,367.1	3,342.1	3,251.6	10.1	13.4	77.23		573.0	239.8	454.1	433.8	20.28	22.394		
3,500.0	3,465.3	3,439.6	3,344.3	10.5	14.0	77.18		601.6	250.8	475.9	454.8	21.08	22.578		
3,600.0	3,563.6	3,537.2	3,436.9	10.9	14.6	77.14		630.3	261.7	497.7	475.8	21.88	22.746		
3,700.0	3,661.9	3,634.8	3,529.5	11.3	15.2	77.09		659.0	272.7	519.5	496.8	22.69	22.901		
3,800.0	3,760.1	3,732.4	3,622.2	11.7	15.8	77.05		687.7	283.6	541.3	517.8	23.49	23.044		
3,900.0	3,858.4	3,830.0	3,714.8	12.1	16.4	77.02		716.3	294.6	563.1	538.8	24.30	23.176		
4,000.0	3,956.7	3,927.6	3,807.5	12.5	17.0	76.98		745.0	305.5	584.9	559.8	25.11	23.298		
4,100.0	4,054.9	4,025.2	3,900.1	12.9	17.6	76.95		773.7	316.5	606.7	580.8	25.92	23.411		
4,200.0	4,153.2	4,122.8	3,992.7	13.3	18.2	76.92		802.4	327.5	628.6	601.8	26.73	23.516		
4,300.0	4,251.4	4,220.4	4,085.4	13.7	18.8	76.89		831.0	338.4	650.4	622.8	27.54	23.615		
4,400.0	4,349.7	4,318.0	4,178.0	14.1	19.4	76.87		859.7	349.4	672.2	643.8	28.35	23.707		
4,500.0	4,448.0	4,415.6	4,270.7	14.5	20.0	76.84		888.4	360.3	694.0	664.8	29.17	23.793		
4,600.0	4,546.4	4,513.1	4,363.2	14.9	20.7	77.08		917.0	371.3	716.0	686.0	29.96	23.895		
4,700.0	4,645.4	4,610.4	4,455.6	15.2	21.3	77.17		945.6	382.2	738.8	708.2	30.65	24.107		
4,800.0	4,744.8	4,707.2	4,547.5	15.4	21.9	77.04		974.1	393.1	762.4	731.2	31.26	24.394		
4,900.0	4,844.6	4,803.6	4,638.9	15.6	22.5	76.71		1,002.4	403.9	786.9	755.1	31.78	24.758		
5,000.0	4,944.5	4,899.3	4,729.8	15.8	23.1	76.21		1,030.5	414.6	812.4	780.2	32.24	25.200		
5,100.0	5,044.5	4,994.3	4,820.0	15.9	23.6	53.96		1,058.4	425.3	838.9	806.3	32.59	25.743		
5,200.0	5,144.5	5,089.2	4,910.1	16.0	24.2	52.84		1,086.3	436.0	865.8	832.9	32.90	26.318		
5,300.0	5,244.5	5,184.7	5,000.7	16.2	24.8	51.79		1,114.3	446.7	893.0	859.8	33.21	26.887		
5,400.0	5,344.5	5,316.8	5,127.1	16.4	25.4	50.51		1,150.4	460.4	918.5	885.0	33.51	27.409		
5,500.0	5,444.5	5,452.5	5,258.5	16.5	26.0	49.49		1,181.7	472.4	940.2	906.4	33.82	27.798		
5,600.0	5,544.5	5,591.1	5,394.4	16.7	26.5	48.68		1,207.6	482.3	958.0	923.8	34.16	28.046		
5,700.0	5,644.5	5,732.3	5,533.8	16.8	26.9	48.09		1,227.7	490.0	971.5	937.0	34.50	28.162		
5,800.0	5,744.5	5,875.2	5,676.0	17.0	27.2	47.69		1,241.4	495.2	980.7	945.9	34.85	28.144		
5,900.0	5,844.5	6,019.2	5,819.8	17.1	27.4	47.49		1,248.6	498.0	985.5	950.3	35.20	28.000		
6,000.0	5,944.5	6,143.9	5,944.5	17.3	27.6	47.46		1,249.6	498.4	986.2	950.6	35.53	27.759		
6,100.0	6,044.5	6,243.9	6,044.5	17.5	27.7	47.46		1,249.6	498.4	986.2	950.3	35.84	27.518		
6,200.0	6,144.5	6,343.9	6,144.5	17.6	27.8	47.46		1,249.6	498.4	986.2	950.0	36.16	27.275		
6,300.0	6,244.5	6,443.9	6,244.5	17.8	27.9	47.46		1,249.6	498.4	986.2	949.7	36.48	27.035		
6,400.0	6,344.5	6,543.9	6,344.5	18.0	28.0	47.46		1,249.6	498.4	986.2	949.4	36.80	26.797		
6,500.0	6,444.5	6,643.9	6,444.5	18.1	28.1	47.46		1,249.6	498.4	986.2	949.0	37.13	26.561		
6,600.0	6,544.5	6,743.9	6,544.5	18.3	28.2	47.46		1,249.6	498.4	986.2	948.7	37.46	26.327		
6,700.0	6,644.5	6,843.9	6,644.5	18.5	28.3	47.46		1,249.6	498.4	986.2	948.4	37.79	26.096		
6,800.0	6,744.5	6,943.9	6,744.5	18.7	28.4	47.46		1,249.6	498.4	986.2	948.0	38.12	25.867		
6,900.0	6,844.5	7,043.9	6,844.5	18.8	28.5	47.46		1,249.6	498.4	986.2	947.7	38.46	25.640		

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

Company: NOBLE ENERGY INC WELD COUNTY CO  
Project: SEC.5-T5N-R67W  
Reference Site: Thornton USX N05-09D Pad  
SEC.5-T5N-R67W  
Site Error: 0.0ft  
Reference Well: Thornton USX N05-23D  
Well Error: 0.0ft  
Reference Wellbore: Wellbore #1  
Reference Design: Noble Thornton USX N05-23D Plan #1  
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Local Co-ordinate Reference: Well Thornton USX N05-23D  
TVD Reference: WELL @ 4896.0ft (Original Well Elev)  
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Offset TVD Reference: Offset Datum

Offset Design Thornton USX N05-09D Pad SEC.5-T5N-R67W - Thornton USX N05-09D - Wellbore #1 - Noble Thorntc													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance							
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning	
(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(°)	+N/-S (ft)	+E/-W (ft)	(ft)	(ft)	(ft)			
7,000.0	6,944.5	7,143.9	6,944.5	19.0	28.6	47.46	1,249.6	498.4	986.2	947.4	38.80	25.417		
7,100.0	7,044.5	7,243.9	7,044.5	19.2	28.7	47.46	1,249.6	498.4	986.2	947.0	39.14	25.195		
7,200.0	7,144.5	7,343.9	7,144.5	19.4	28.8	47.46	1,249.6	498.4	986.2	946.7	39.48	24.976		
7,300.0	7,244.5	7,443.9	7,244.5	19.5	29.0	47.46	1,249.6	498.4	986.2	946.3	39.83	24.759		
7,400.0	7,344.5	7,543.9	7,344.5	19.7	29.1	47.46	1,249.6	498.4	986.2	946.0	40.18	24.545		
7,500.0	7,444.5	7,643.9	7,444.5	19.9	29.2	47.46	1,249.6	498.4	986.2	945.6	40.53	24.334		
7,600.0	7,544.5	7,743.9	7,544.5	20.1	29.3	47.46	1,249.6	498.4	986.2	945.3	40.88	24.125		
7,700.0	7,644.5	7,843.9	7,644.5	20.3	29.4	47.46	1,249.6	498.4	986.2	944.9	41.23	23.918		
7,800.0	7,744.5	7,943.9	7,744.5	20.5	29.5	47.46	1,249.6	498.4	986.2	944.6	41.59	23.714		
7,887.5	7,832.0	8,031.4	7,832.0	20.6	29.7	47.46	1,249.6	498.4	986.2	944.3	41.90	23.537		



**Company:** NOBLE ENERGY INC WELD COUNTY CO  
**Project:** SEC.5-T5N-R67W  
**Reference Site:** Thornton USX N05-09D Pad  
SEC.5-T5N-R67W  
**Site Error:** 0.0ft  
**Reference Well:** Thornton USX N05-23D  
**Well Error:** 0.0ft  
**Reference Wellbore:** Wellbore #1  
**Reference Design:** Noble Thornton USX N05-23D Plan #1  
(1-30-12)

**Local Co-ordinate Reference:** Well Thornton USX N05-23D  
**TVD Reference:** WELL @ 4896.0ft (Original Well Elev)  
**MD Reference:** WELL @ 4896.0ft (Original Well Elev)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Output errors are at** 2.00 sigma  
**Database:** Landmark  
**Offset TVD Reference:** Offset Datum

Offset Design Thornton USX N05-09D Pad SEC.5-T5N-R67W - Thornton USX N05-10D - Wellbore #1 - Noble Thorntc														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			
0.0	0.0	0.0	0.0	0.0	0.0	-90.00	0.0	-22.3	22.3						
100.0	100.0	100.0	100.0	0.1	0.1	-90.00	0.0	-22.3	22.3	22.0	0.22	99.099			
200.0	200.0	200.0	200.0	0.3	0.3	-90.00	0.0	-22.3	22.3	21.6	0.67	33.033			
300.0	300.0	300.0	300.0	0.6	0.6	-90.00	0.0	-22.3	22.3	21.2	1.12	19.820			
400.0	400.0	400.0	400.0	0.8	0.8	-90.00	0.0	-22.3	22.3	20.7	1.57	14.157			
500.0	500.0	500.0	500.0	1.0	1.0	-90.00	0.0	-22.3	22.3	20.3	2.02	11.011			
600.0	600.0	600.0	600.0	1.2	1.2	-90.00	0.0	-22.3	22.3	19.8	2.47	9.009			
700.0	700.0	700.0	700.0	1.5	1.5	-90.00	0.0	-22.3	22.3	19.4	2.92	7.623			
734.0	734.0	734.0	734.0	1.5	1.5	-90.00	0.0	-22.3	22.3	19.2	3.07	7.244 CC			
800.0	800.0	799.8	799.8	1.7	1.7	-89.10	0.4	-22.5	22.5	19.2	3.37	6.685 ES			
900.0	900.0	899.2	899.1	1.9	1.9	-82.63	3.2	-24.5	24.7	20.9	3.81	6.485 SF			
1,000.0	1,000.0	998.3	997.9	2.1	2.1	-72.87	8.8	-28.5	29.9	25.6	4.26	7.006			
1,100.0	1,100.0	1,096.7	1,095.9	2.4	2.4	-63.54	17.1	-34.4	38.6	33.9	4.72	8.189			
1,200.0	1,200.0	1,194.5	1,192.7	2.6	2.6	-35.13	28.1	-42.1	50.8	45.7	5.17	9.837			
1,300.0	1,299.9	1,291.7	1,288.4	2.8	2.9	-31.29	41.7	-51.8	64.1	58.5	5.61	11.420			
1,400.0	1,399.7	1,388.4	1,383.1	3.0	3.3	-29.33	57.8	-63.2	77.8	71.7	6.06	12.828			
1,500.0	1,499.1	1,484.7	1,476.6	3.3	3.6	-28.42	76.5	-76.4	91.7	85.2	6.52	14.065			
1,600.0	1,598.2	1,580.5	1,568.9	3.5	4.1	-28.15	97.6	-91.3	105.8	98.8	6.99	15.140			
1,700.0	1,696.6	1,675.8	1,659.8	3.8	4.6	-28.31	121.1	-107.9	120.1	112.6	7.48	16.057			
1,800.0	1,794.9	1,770.4	1,748.9	4.1	5.1	-28.41	146.8	-126.1	136.5	128.5	8.01	17.037			
1,900.0	1,893.2	1,867.5	1,839.7	4.4	5.7	-28.28	175.0	-146.1	155.1	146.5	8.57	18.108			
2,000.0	1,991.4	1,965.7	1,931.5	4.8	6.4	-28.16	203.6	-166.3	173.8	164.7	9.13	19.034			
2,100.0	2,089.7	2,064.0	2,023.3	5.1	7.0	-28.07	232.1	-186.5	192.6	182.8	9.71	19.832			
2,200.0	2,187.9	2,162.2	2,115.1	5.5	7.7	-27.99	260.7	-206.7	211.3	201.0	10.30	20.521			
2,300.0	2,286.2	2,260.4	2,206.8	5.8	8.4	-27.92	289.3	-226.9	230.0	219.1	10.89	21.122			
2,400.0	2,384.5	2,358.7	2,298.6	6.2	9.1	-27.87	317.9	-247.2	248.7	237.2	11.49	21.648			
2,500.0	2,482.7	2,456.9	2,390.4	6.6	9.7	-27.82	346.5	-267.4	267.4	255.4	12.10	22.111			
2,600.0	2,581.0	2,555.1	2,482.2	7.0	10.4	-27.78	375.1	-287.6	286.2	273.5	12.71	22.523			
2,700.0	2,679.3	2,653.3	2,573.9	7.3	11.1	-27.74	403.6	-307.8	304.9	291.6	13.32	22.889			
2,800.0	2,777.5	2,751.6	2,665.7	7.7	11.8	-27.71	432.2	-328.0	323.6	309.7	13.92	23.217			
2,900.0	2,875.8	2,849.8	2,757.5	8.1	12.5	-27.68	460.8	-348.3	342.3	327.8	14.56	23.513			
3,000.0	2,974.0	2,948.0	2,849.3	8.5	13.2	-27.66	489.4	-368.5	361.1	345.9	15.18	23.780			
3,100.0	3,072.3	3,046.3	2,941.1	8.9	13.9	-27.63	518.0	-388.7	379.8	364.0	15.81	24.022			
3,200.0	3,170.6	3,144.5	3,032.8	9.3	14.6	-27.61	546.6	-408.9	398.5	382.1	16.44	24.243			
3,300.0	3,268.8	3,242.7	3,124.6	9.7	15.4	-27.59	575.2	-429.2	417.2	400.2	17.07	24.445			
3,400.0	3,367.1	3,341.0	3,216.4	10.1	16.1	-27.58	603.7	-449.4	436.0	418.3	17.70	24.630			
3,500.0	3,465.3	3,439.2	3,308.2	10.5	16.8	-27.56	632.3	-469.6	454.7	436.3	18.33	24.801			
3,600.0	3,563.6	3,537.4	3,400.0	10.9	17.5	-27.55	660.9	-489.8	473.4	454.4	18.97	24.958			
3,700.0	3,661.9	3,635.7	3,491.7	11.3	18.2	-27.53	689.5	-510.0	492.1	472.5	19.60	25.103			
3,800.0	3,760.1	3,733.9	3,583.5	11.7	18.9	-27.52	718.1	-530.3	510.9	490.6	20.24	25.238			
3,900.0	3,858.4	3,832.1	3,675.3	12.1	19.6	-27.51	746.7	-550.5	529.6	508.7	20.88	25.364			
4,000.0	3,956.7	3,930.4	3,767.1	12.5	20.3	-27.50	775.2	-570.7	548.3	526.8	21.52	25.481			
4,100.0	4,054.9	4,028.6	3,858.9	12.9	21.0	-27.49	803.8	-590.9	567.0	544.9	22.16	25.590			
4,200.0	4,153.2	4,126.8	3,950.6	13.3	21.8	-27.48	832.4	-611.1	585.7	562.9	22.80	25.693			
4,300.0	4,251.4	4,225.0	4,042.4	13.7	22.5	-27.47	861.0	-631.4	604.5	581.0	23.44	25.788			
4,400.0	4,349.7	4,323.3	4,134.2	14.1	23.2	-27.46	889.6	-651.6	623.2	599.1	24.08	25.879			
4,500.0	4,448.0	4,421.5	4,226.0	14.5	23.9	-27.45	918.2	-671.8	641.9	617.2	24.72	25.963			
4,600.0	4,546.4	4,519.5	4,317.6	14.9	24.6	-27.55	946.7	-692.0	661.6	636.3	25.32	26.126			
4,700.0	4,645.4	4,616.9	4,408.6	15.2	25.3	-27.58	975.0	-712.0	684.2	658.4	25.84	26.485			
4,800.0	4,744.8	4,713.5	4,498.8	15.4	26.0	-27.52	1,003.1	-731.9	709.9	683.6	26.29	27.004			
4,900.0	4,844.6	4,809.2	4,588.2	15.6	26.7	-27.38	1,031.0	-751.6	738.6	711.9	26.69	27.677			

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

Company: NOBLE ENERGY INC WELD COUNTY CO  
Project: SEC.5-T5N-R67W  
Reference Site: Thornton USX N05-09D Pad  
SEC.5-T5N-R67W  
Site Error: 0.0ft  
Reference Well: Thornton USX N05-23D  
Well Error: 0.0ft  
Reference Wellbore: Wellbore #1  
Reference Design: Noble Thornton USX N05-23D Plan #1  
(1-30-12)

Local Co-ordinate Reference: Well Thornton USX N05-23D  
TVD Reference: WELL @ 4896.0ft (Original Well Elev)  
MD Reference: WELL @ 4896.0ft (Original Well Elev)  
North Reference: True  
Survey Calculation Method: Minimum Curvature  
Output errors are at: 2.00 sigma  
Database: Landmark  
Offset TVD Reference: Offset Datum

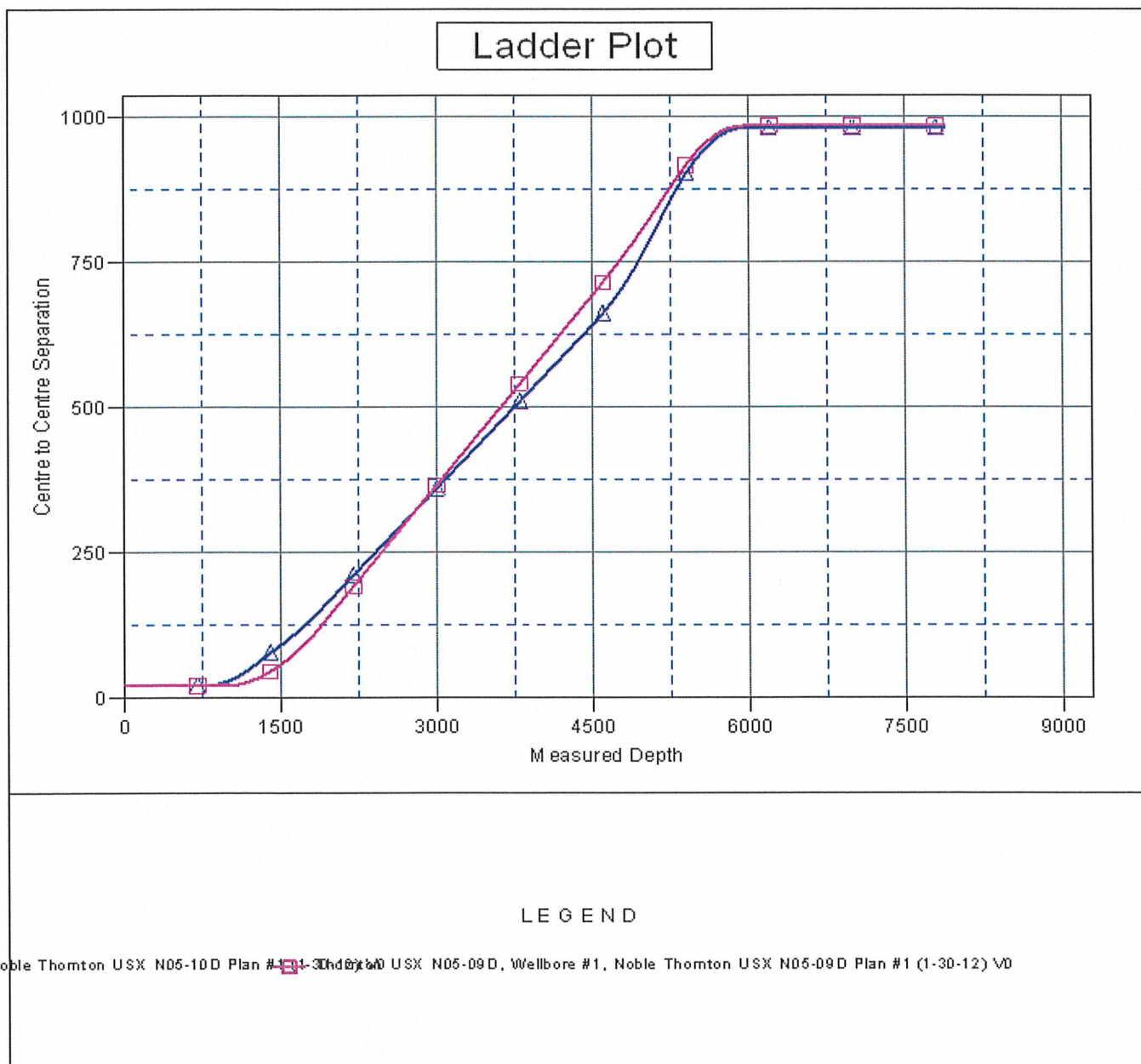
Offset Design Thornton USX N05-09D Pad SEC.5-T5N-R67W - Thornton USX N05-10D - Wellbore #1 - Noble Thornc													Offset Site Error:	0.0 ft
Survey Program: 0-MWD													Offset Well Error:	0.0 ft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (ft)	Vertical Depth (ft)	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		
5,000.0	4,944.5	4,903.8	4,676.6	15.8	27.4	-27.18	1,058.5	-771.1	770.2	743.2	27.03	28.501		
5,100.0	5,044.5	4,997.4	4,764.1	15.9	28.1	-48.18	1,085.8	-790.4	804.6	777.3	27.36	29.412		
5,200.0	5,144.5	5,090.9	4,851.4	16.0	28.8	-47.64	1,112.9	-809.6	839.5	811.7	27.76	30.247		
5,300.0	5,244.5	5,211.6	4,964.7	16.2	29.5	-47.02	1,147.0	-833.7	873.4	845.2	28.20	30.968		
5,400.0	5,344.5	5,348.6	5,095.2	16.4	30.2	-46.46	1,180.9	-857.7	903.3	874.6	28.66	31.512		
5,500.0	5,444.5	5,489.5	5,231.4	16.5	30.8	-46.02	1,210.5	-878.6	928.6	899.4	29.13	31.872		
5,600.0	5,544.5	5,633.9	5,372.5	16.7	31.4	-45.67	1,235.1	-896.0	949.1	919.5	29.60	32.065		
5,700.0	5,644.5	5,781.0	5,517.7	16.8	31.8	-45.42	1,254.2	-909.5	964.8	934.7	30.06	32.095		
5,800.0	5,744.5	5,930.2	5,666.0	17.0	32.1	-45.25	1,267.3	-918.8	975.4	944.9	30.50	31.977		
5,900.0	5,844.5	6,080.6	5,816.3	17.1	32.3	-45.17	1,274.1	-923.6	980.8	949.9	30.93	31.715		
6,000.0	5,944.5	6,208.9	5,944.5	17.3	32.5	-45.16	1,275.1	-924.3	981.6	950.3	31.31	31.354		
6,100.0	6,044.5	6,308.9	6,044.5	17.5	32.5	-45.16	1,275.1	-924.3	981.6	950.0	31.66	31.001		
6,200.0	6,144.5	6,408.9	6,144.5	17.6	32.6	-45.16	1,275.1	-924.3	981.6	949.6	32.02	30.654		
6,300.0	6,244.5	6,508.9	6,244.5	17.8	32.7	-45.16	1,275.1	-924.3	981.6	949.2	32.38	30.313		
6,400.0	6,344.5	6,608.9	6,344.5	18.0	32.8	-45.16	1,275.1	-924.3	981.6	948.9	32.75	29.977		
6,500.0	6,444.5	6,708.9	6,444.5	18.1	32.9	-45.16	1,275.1	-924.3	981.6	948.5	33.11	29.646		
6,600.0	6,544.5	6,808.9	6,544.5	18.3	33.0	-45.16	1,275.1	-924.3	981.6	948.2	33.48	29.321		
6,700.0	6,644.5	6,908.9	6,644.5	18.5	33.1	-45.16	1,275.1	-924.3	981.6	947.8	33.85	29.002		
6,800.0	6,744.5	7,008.9	6,744.5	18.7	33.2	-45.16	1,275.1	-924.3	981.6	947.4	34.22	28.688		
6,900.0	6,844.5	7,108.9	6,844.5	18.8	33.3	-45.16	1,275.1	-924.3	981.6	947.0	34.59	28.379		
7,000.0	6,944.5	7,208.9	6,944.5	19.0	33.4	-45.16	1,275.1	-924.3	981.6	946.7	34.96	28.075		
7,100.0	7,044.5	7,308.9	7,044.5	19.2	33.5	-45.16	1,275.1	-924.3	981.6	946.3	35.34	27.777		
7,200.0	7,144.5	7,408.9	7,144.5	19.4	33.6	-45.16	1,275.1	-924.3	981.6	945.9	35.72	27.483		
7,300.0	7,244.5	7,508.9	7,244.5	19.5	33.7	-45.16	1,275.1	-924.3	981.6	945.5	36.10	27.195		
7,400.0	7,344.5	7,608.9	7,344.5	19.7	33.8	-45.16	1,275.1	-924.3	981.6	945.2	36.48	26.911		
7,500.0	7,444.5	7,708.9	7,444.5	19.9	33.9	-45.16	1,275.1	-924.3	981.6	944.8	36.86	26.632		
7,600.0	7,544.5	7,808.9	7,544.5	20.1	34.0	-45.16	1,275.1	-924.3	981.6	944.4	37.24	26.358		
7,700.0	7,644.5	7,908.9	7,644.5	20.3	34.1	-45.16	1,275.1	-924.3	981.6	944.0	37.63	26.089		
7,800.0	7,744.5	8,008.9	7,744.5	20.5	34.2	-45.16	1,275.1	-924.3	981.6	943.6	38.01	25.824		
7,887.5	7,832.0	8,096.4	7,832.0	20.6	34.3	-45.16	1,275.1	-924.3	981.6	943.3	38.35	25.595		



**Company:** NOBLE ENERGY INC WELD COUNTY CO  
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SEC.5-T5N-R67W  
**Site Error:** 0.0ft  
**Reference Well:** Thornton USX N05-23D  
**Well Error:** 0.0ft  
**Reference Wellbore:** Wellbore #1  
**Reference Design:** Noble Thornton USX N05-23D Plan #1  
(1-30-12)

**Local Co-ordinate Reference:** Well Thornton USX N05-23D  
**TVD Reference:** WELL @ 4896.0ft (Original Well Elev)  
**MD Reference:** WELL @ 4896.0ft (Original Well Elev)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Output errors are at:** 2.00 sigma  
**Database:** Landmark  
**Offset TVD Reference:** Offset Datum

Reference Depths are relative to WELL @ 4896.0ft (Original Well Elev) Coordinates are relative to: Thornton USX N05-23D  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000 °  
Coordinate System is US State Plane 1983, Colorado Northern Zone  
Grid Convergence at Surface is: 0.38°

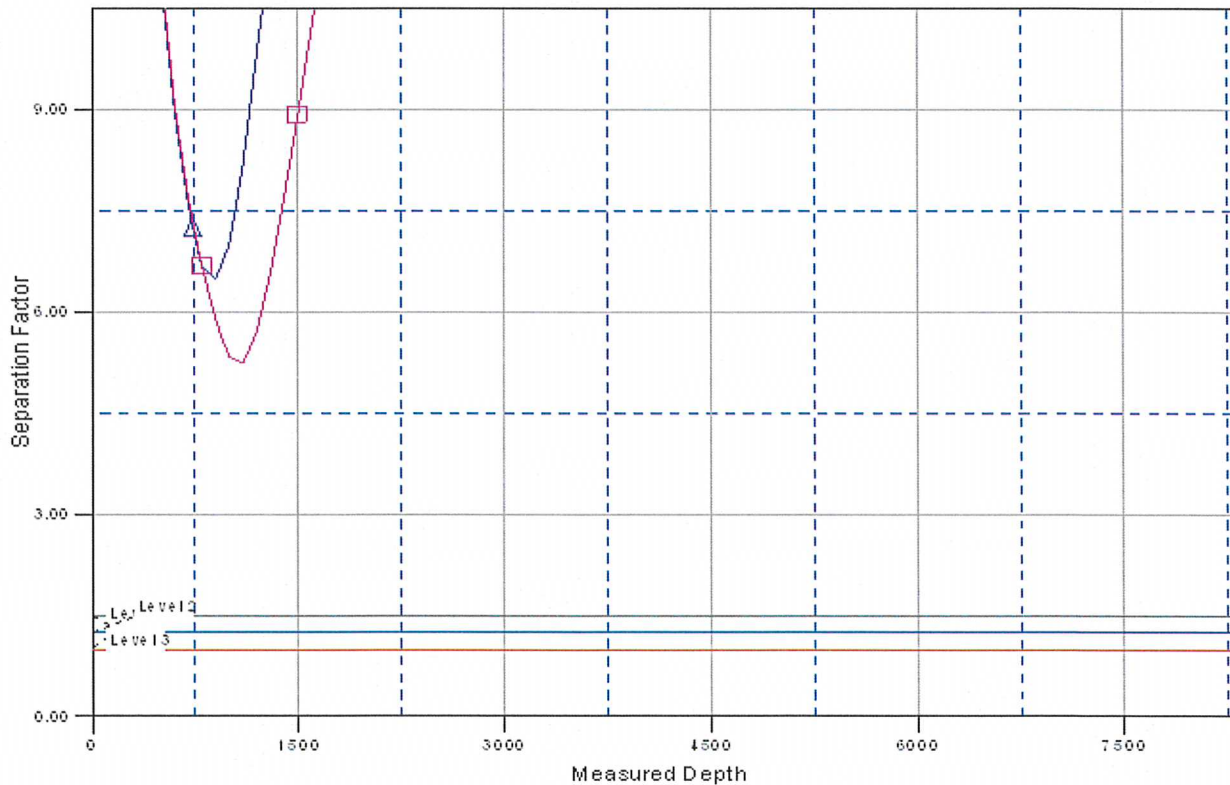


Company: NOBLE ENERGY INC WELD COUNTY CO  
Project: SEC.5-T5N-R67W  
Reference Site: Thornton USX N05-09D Pad  
SEC.5-T5N-R67W  
Site Error: 0.0ft  
Reference Well: Thornton USX N05-23D  
Well Error: 0.0ft  
Reference Wellbore: Wellbore #1  
Reference Design: Noble Thornton USX N05-23D Plan #1  
(1-30-12)

Local Co-ordinate Reference: Well Thornton USX N05-23D  
TVD Reference: WELL @ 4896.0ft (Original Well Elev)  
MD Reference: WELL @ 4896.0ft (Original Well Elev)  
North Reference: True  
Survey Calculation Method: Minimum Curvature  
Output errors are at: 2.00 sigma  
Database: Landmark  
Offset TVD Reference: Offset Datum

Reference Depths are relative to WELL @ 4896.0ft (Original Well Elev) Coordinates are relative to: Thornton USX N05-23D  
Offset Depths are relative to Offset Datum  
Central Meridian is -105.500000 °  
Coordinate System is US State Plane 1983, Colorado Northern Zone  
Grid Convergence at Surface is: 0.38°

## Separation Factor Plot



### LEGEND

Noble Thornton USX N05-10D Plan #1 (1-30-12) \00000 USX N05-09D, Wellbore #1, Noble Thornton USX N05-09D Plan #1 (1-30-12) \00