

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

Well Name: **Thistle Down PC F36-63HN**

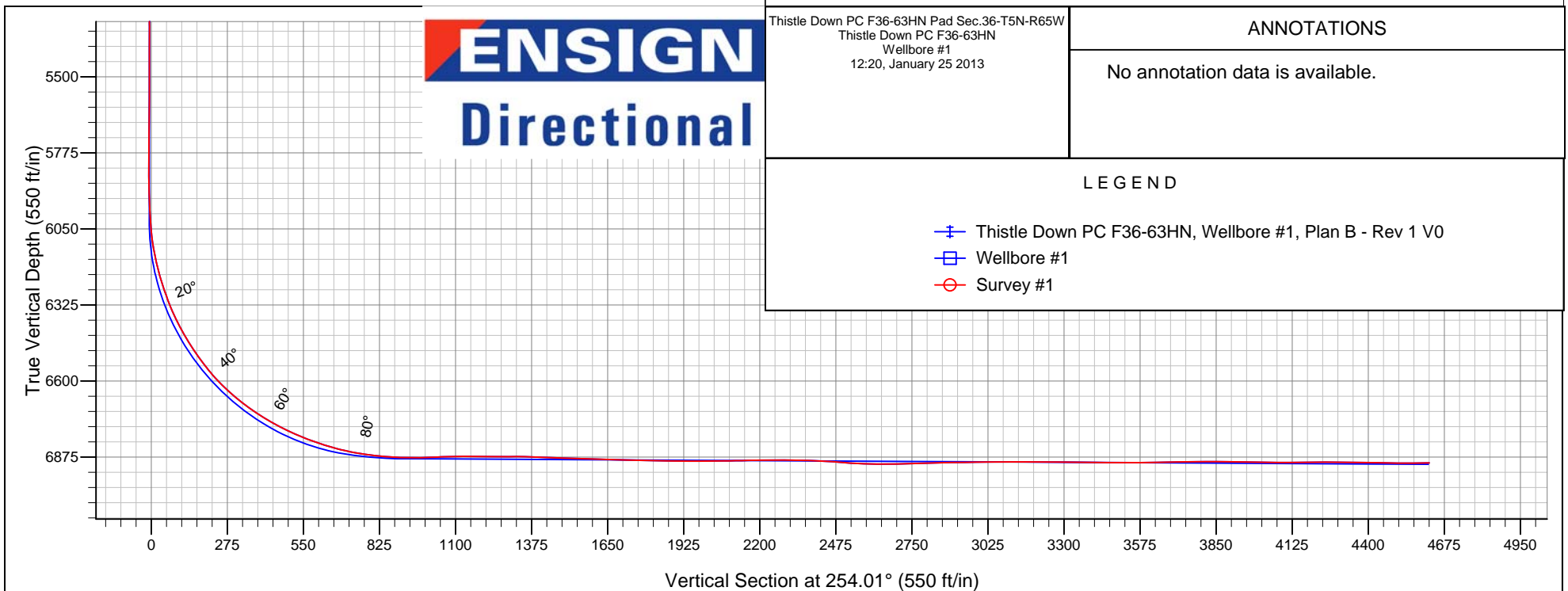
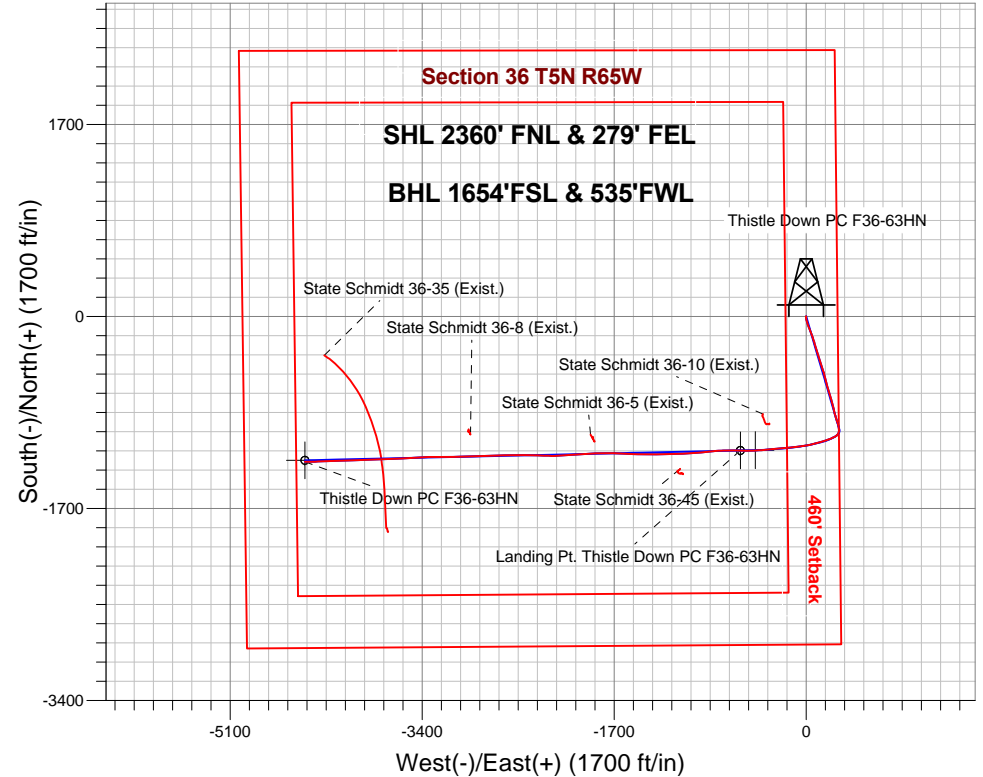
Surface Location: Thistle Down PC F36-63HN Pad Sec.36-T5N-R65W
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone
Ground Elevation: 4770.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	1373934.08	3249969.12	40.356380	-104.603040	

Precision #828 KB - 16' WELL @ 4786.0ft (Precision #828 KB - 16')

FINAL SURVEY

Projected Bottom Hole Location
11371' MD 6898' TVD 1284' S & 4438' W of SHL
90.4 degree Incl @ 269.7 degree AZM





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

Sec.36-T5N-R65W

Thistle Down PC F36-63HN Pad Sec.36-T5N-R65W

Thistle Down PC F36-63HN

Wellbore #1

Survey: Survey #1

Standard Survey Report

25 January, 2013

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
	604.0	0.00	0.00	604.0	0.0	0.0	0.0	0.00	0.00	0.00
	613.0	0.40	17.50	613.0	0.0	0.0	0.0	4.44	4.44	0.00
	702.0	0.60	37.70	702.0	0.7	0.4	-0.6	0.30	0.22	22.70
	792.0	0.50	12.00	792.0	1.5	0.8	-1.1	0.29	-0.11	-28.56
	882.0	0.70	6.40	882.0	2.4	0.9	-1.5	0.23	0.22	-6.22
	972.0	0.80	280.30	972.0	3.0	0.3	-1.2	1.14	0.11	-95.67
	1,062.0	2.70	197.80	1,061.9	1.1	-0.9	0.6	3.02	2.11	-91.67
	1,157.0	4.20	173.20	1,156.8	-4.5	-1.2	2.4	2.18	1.58	-25.89
	1,251.0	6.00	172.40	1,250.4	-12.7	-0.1	3.6	1.92	1.91	-0.85
	1,346.0	8.40	173.80	1,344.6	-24.6	1.3	5.5	2.53	2.53	1.47

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Thistle Down PC F36-63HN
Project:	Sec.36-T5N-R65W	TVD Reference:	WELL @ 4786.0ft (Precision #828 KB - 16')
Site:	Thistle Down PC F36-63HN Pad	MD Reference:	WELL @ 4786.0ft (Precision #828 KB - 16')
Well:	Thistle Down PC F36-63HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
1,441.0	9.50	167.30	1,438.5	-39.1	3.7	7.2	1.57	1.16	-6.84
1,536.0	10.20	160.20	1,532.1	-54.7	8.3	7.1	1.47	0.74	-7.47
1,631.0	11.10	158.10	1,625.5	-71.1	14.6	5.6	1.03	0.95	-2.21
1,726.0	12.90	157.40	1,718.4	-89.3	22.1	3.4	1.90	1.89	-0.74
1,821.0	12.90	157.60	1,811.0	-108.9	30.2	1.0	0.05	0.00	0.21
1,916.0	13.50	163.00	1,903.5	-129.4	37.5	-0.4	1.44	0.63	5.68
1,999.0	13.30	162.30	1,984.2	-147.7	43.2	-0.8	0.31	-0.24	-0.84
2,089.0	13.00	156.70	2,071.9	-166.9	50.3	-2.4	1.45	-0.33	-6.22
2,179.0	12.50	158.60	2,159.6	-185.2	57.9	-4.6	0.72	-0.56	2.11
2,269.0	13.40	164.10	2,247.3	-204.3	64.3	-5.5	1.69	1.00	6.11
2,358.0	12.50	164.10	2,334.1	-223.5	69.8	-5.5	1.01	-1.01	0.00
2,448.0	12.40	160.80	2,422.0	-242.0	75.6	-6.0	0.80	-0.11	-3.67
2,538.0	13.60	163.20	2,509.7	-261.3	81.9	-6.7	1.46	1.33	2.67
2,628.0	13.30	162.70	2,597.2	-281.3	88.0	-7.1	0.36	-0.33	-0.56
2,718.0	13.60	165.30	2,684.7	-301.4	93.8	-7.1	0.75	0.33	2.89
2,808.0	15.70	164.10	2,771.8	-323.3	99.8	-6.8	2.36	2.33	-1.33
2,897.0	14.90	162.90	2,857.6	-345.9	106.5	-7.0	0.97	-0.90	-1.35
2,988.0	14.90	161.60	2,945.6	-368.1	113.6	-7.7	0.37	0.00	-1.43
3,077.0	13.40	160.40	3,031.9	-388.7	120.7	-8.9	1.72	-1.69	-1.35
3,167.0	13.40	161.50	3,119.4	-408.4	127.5	-10.0	0.28	0.00	1.22
3,257.0	12.80	160.80	3,207.1	-427.7	134.1	-11.0	0.69	-0.67	-0.78
3,347.0	11.80	163.00	3,295.0	-446.0	140.0	-11.7	1.23	-1.11	2.44
3,437.0	9.80	164.80	3,383.4	-462.2	144.7	-11.8	2.25	-2.22	2.00
3,526.0	9.70	160.60	3,471.1	-476.5	149.2	-12.1	0.81	-0.11	-4.72
3,616.0	9.60	161.30	3,559.9	-490.8	154.1	-12.9	0.17	-0.11	0.78
3,706.0	10.10	167.30	3,648.5	-505.6	158.3	-12.8	1.27	0.56	6.67
3,796.0	12.40	166.70	3,736.8	-522.7	162.2	-11.9	2.56	2.56	-0.67
3,886.0	13.20	166.90	3,824.6	-542.1	166.8	-10.9	0.89	0.89	0.22
3,976.0	12.00	166.20	3,912.4	-561.2	171.3	-10.1	1.34	-1.33	-0.78
4,066.0	11.70	164.80	4,000.5	-579.1	176.0	-9.6	0.46	-0.33	-1.56
4,155.0	11.30	163.40	4,087.7	-596.2	180.8	-9.5	0.55	-0.45	-1.57
4,245.0	12.80	162.90	4,175.7	-614.2	186.3	-9.8	1.67	1.67	-0.56
4,335.0	12.50	161.50	4,263.5	-632.9	192.3	-10.4	0.48	-0.33	-1.56
4,425.0	11.70	162.90	4,351.5	-650.9	198.1	-11.0	0.95	-0.89	1.56
4,515.0	12.00	165.10	4,439.6	-668.6	203.1	-11.0	0.60	0.33	2.44
4,605.0	12.90	163.40	4,527.5	-687.3	208.4	-11.0	1.08	1.00	-1.89
4,695.0	11.50	163.60	4,615.4	-705.5	213.8	-11.1	1.56	-1.56	0.22
4,784.0	11.60	164.10	4,702.6	-722.7	218.8	-11.2	0.16	0.11	0.56
4,874.0	12.80	163.40	4,790.6	-740.9	224.1	-11.3	1.34	1.33	-0.78
4,964.0	12.50	162.70	4,878.4	-759.8	229.9	-11.6	0.37	-0.33	-0.78
5,054.0	13.40	169.40	4,966.1	-779.3	234.7	-10.8	1.94	1.00	7.44
5,144.0	12.30	168.00	5,053.9	-798.9	238.6	-9.2	1.27	-1.22	-1.56
5,234.0	11.30	168.10	5,142.0	-817.0	242.4	-7.9	1.11	-1.11	0.11
5,324.0	11.90	168.50	5,230.1	-834.7	246.1	-6.5	0.67	0.67	0.44
5,414.0	11.60	161.30	5,318.3	-852.3	250.8	-6.2	1.66	-0.33	-8.00
5,504.0	11.60	165.00	5,406.4	-869.7	256.1	-6.5	0.83	0.00	4.11
5,594.0	13.00	163.60	5,494.4	-888.1	261.3	-6.4	1.59	1.56	-1.56
5,683.0	13.10	163.60	5,581.1	-907.4	266.9	-6.6	0.11	0.11	0.00
5,773.0	12.50	159.30	5,668.8	-926.3	273.3	-7.4	1.25	-0.67	-4.78
5,863.0	12.90	161.10	5,756.6	-944.9	280.0	-8.7	0.63	0.44	2.00
5,953.0	12.90	167.10	5,844.4	-964.2	285.4	-8.7	1.49	0.00	6.67
6,043.0	13.00	171.30	5,932.1	-984.0	289.2	-6.9	1.05	0.11	4.67
6,133.0	13.20	177.60	6,019.7	-1,004.3	291.2	-3.2	1.60	0.22	7.00

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Thistle Down PC F36-63HN
Project:	Sec.36-T5N-R65W	TVD Reference:	WELL @ 4786.0ft (Precision #828 KB - 16')
Site:	Thistle Down PC F36-63HN Pad	MD Reference:	WELL @ 4786.0ft (Precision #828 KB - 16')
Well:	Thistle Down PC F36-63HN	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)
6,178.0	14.00	188.20	6,063.5	-1,014.8	290.6	0.3	5.81	1.78	23.56
6,223.0	15.50	198.70	6,107.0	-1,025.9	287.9	5.9	6.80	3.33	23.33
6,268.0	16.20	209.10	6,150.3	-1,037.1	282.9	13.8	6.49	1.56	23.11
6,313.0	17.00	222.80	6,193.4	-1,047.4	275.4	23.9	8.86	1.78	30.44
6,358.0	17.50	235.30	6,236.4	-1,056.1	265.4	35.9	8.30	1.11	27.78
6,403.0	19.50	242.30	6,279.1	-1,063.4	253.2	49.7	6.63	4.44	15.56
6,448.0	21.90	244.40	6,321.2	-1,070.5	238.9	65.3	5.58	5.33	4.67
6,493.0	24.80	247.60	6,362.5	-1,077.7	222.6	83.0	7.03	6.44	7.11
6,537.0	28.00	249.20	6,401.9	-1,084.9	204.5	102.4	7.45	7.27	3.64
6,582.0	30.70	250.10	6,441.1	-1,092.6	183.8	124.4	6.08	6.00	2.00
6,627.0	33.00	251.80	6,479.4	-1,100.3	161.3	148.1	5.49	5.11	3.78
6,672.0	35.40	254.80	6,516.6	-1,107.6	137.1	173.4	6.52	5.33	6.67
6,717.0	38.60	255.10	6,552.5	-1,114.6	110.9	200.5	7.12	7.11	0.67
6,762.0	42.00	255.30	6,586.8	-1,122.0	82.8	229.6	7.56	7.56	0.44
6,807.0	45.80	255.70	6,619.2	-1,129.8	52.6	260.8	8.47	8.44	0.89
6,852.0	49.60	258.00	6,649.5	-1,137.4	20.2	294.0	9.25	8.44	5.11
6,897.0	52.00	261.30	6,678.0	-1,143.6	-14.1	328.7	7.79	5.33	7.33
6,942.0	54.60	264.60	6,704.9	-1,148.0	-49.9	364.3	8.24	5.78	7.33
6,987.0	58.70	263.20	6,729.6	-1,152.1	-87.3	401.3	9.47	9.11	-3.11
7,032.0	61.80	262.70	6,751.9	-1,156.9	-126.0	439.9	6.96	6.89	-1.11
7,077.0	63.90	264.10	6,772.5	-1,161.4	-165.8	479.4	5.43	4.67	3.11
7,121.0	66.20	264.30	6,791.0	-1,165.5	-205.5	518.7	5.24	5.23	0.45
7,166.0	68.90	265.00	6,808.2	-1,169.4	-246.9	559.5	6.17	6.00	1.56
7,211.0	71.40	265.50	6,823.5	-1,172.9	-289.1	601.1	5.65	5.56	1.11
7,256.0	74.00	265.20	6,836.9	-1,176.3	-331.9	643.2	5.81	5.78	-0.67
7,301.0	76.60	265.30	6,848.3	-1,179.9	-375.3	685.9	5.78	5.78	0.22
7,346.0	79.80	266.40	6,857.5	-1,183.1	-419.2	729.0	7.50	7.11	2.44
7,388.0	80.80	267.80	6,864.6	-1,185.2	-460.5	769.3	4.06	2.38	3.33
7,436.0	85.00	268.50	6,870.5	-1,186.8	-508.1	815.5	8.87	8.75	1.46
7,478.0	85.30	270.60	6,874.0	-1,187.1	-550.0	855.8	5.03	0.71	5.00
7,568.0	90.30	271.70	6,877.5	-1,185.3	-639.9	941.7	5.69	5.56	1.22
7,658.0	92.50	267.80	6,875.3	-1,185.7	-729.8	1,028.3	4.97	2.44	-4.33
7,748.0	90.80	265.30	6,872.7	-1,191.1	-819.6	1,116.1	3.36	-1.89	-2.78
7,838.0	88.80	263.90	6,873.0	-1,199.6	-909.2	1,204.5	2.71	-2.22	-1.56
7,928.0	90.50	265.30	6,873.6	-1,208.0	-998.8	1,293.0	2.45	1.89	1.56
8,018.0	88.30	267.10	6,874.5	-1,214.0	-1,088.6	1,380.9	3.16	-2.44	2.00
8,108.0	87.60	269.20	6,877.7	-1,216.9	-1,178.5	1,468.2	2.46	-0.78	2.33
8,197.0	88.10	270.10	6,881.1	-1,217.4	-1,267.4	1,553.8	1.16	0.56	1.01
8,287.0	88.40	269.40	6,883.8	-1,217.8	-1,357.4	1,640.4	0.85	0.33	-0.78
8,377.0	88.90	270.30	6,885.9	-1,218.1	-1,447.3	1,726.9	1.14	0.56	1.00
8,467.0	89.10	271.80	6,887.5	-1,216.4	-1,537.3	1,813.0	1.68	0.22	1.67
8,557.0	89.00	272.40	6,889.0	-1,213.1	-1,627.2	1,898.5	0.68	-0.11	0.67
8,647.0	90.30	271.00	6,889.6	-1,210.4	-1,717.2	1,984.2	2.12	1.44	-1.56
8,737.0	90.50	270.30	6,888.9	-1,209.4	-1,807.2	2,070.5	0.81	0.22	-0.78
8,827.0	91.60	266.90	6,887.3	-1,211.6	-1,897.1	2,157.5	3.97	1.22	-3.78
8,917.0	90.10	265.50	6,885.9	-1,217.6	-1,986.9	2,245.5	2.28	-1.67	-1.56
9,007.0	89.40	265.70	6,886.3	-1,224.5	-2,076.6	2,333.7	0.81	-0.78	0.22
9,097.0	86.60	266.40	6,889.5	-1,230.7	-2,166.4	2,421.6	3.21	-3.11	0.78
9,186.0	85.80	270.80	6,895.4	-1,232.9	-2,255.1	2,507.5	5.01	-0.90	4.94
9,276.0	88.50	272.90	6,899.9	-1,230.0	-2,344.9	2,593.1	3.80	3.00	2.33
9,366.0	90.90	271.50	6,900.3	-1,226.5	-2,434.9	2,678.6	3.09	2.67	-1.56
9,456.0	91.80	269.40	6,898.2	-1,225.8	-2,524.8	2,764.9	2.54	1.00	-2.33

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Thistle Down PC F36-63HN
Project:	Sec.36-T5N-R65W	TVD Reference:	WELL @ 4786.0ft (Precision #828 KB - 16')
Site:	Thistle Down PC F36-63HN Pad	MD Reference:	WELL @ 4786.0ft (Precision #828 KB - 16')
Well:	Thistle Down PC F36-63HN	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)	
9,546.0	91.10	269.40	6,895.9	-1,226.7	-2,614.8	2,851.6	0.78	-0.78	0.00	
9,636.0	91.10	268.20	6,894.2	-1,228.6	-2,704.8	2,938.6	1.33	0.00	-1.33	
9,726.0	90.10	267.80	6,893.3	-1,231.8	-2,794.7	3,025.9	1.20	-1.11	-0.44	
9,816.0	90.70	268.20	6,892.6	-1,234.9	-2,884.6	3,113.2	0.80	0.67	0.44	
9,906.0	89.40	268.00	6,892.6	-1,237.9	-2,974.6	3,200.5	1.46	-1.44	-0.22	
9,995.0	89.40	269.00	6,893.5	-1,240.2	-3,063.5	3,286.7	1.12	0.00	1.12	
10,085.0	89.60	269.60	6,894.3	-1,241.3	-3,153.5	3,373.5	0.70	0.22	0.67	
10,175.0	89.50	269.90	6,895.0	-1,241.7	-3,243.5	3,460.1	0.35	-0.11	0.33	
10,265.0	90.20	269.00	6,895.2	-1,242.6	-3,333.5	3,546.9	1.27	0.78	-1.00	
10,355.0	91.20	267.10	6,894.1	-1,245.6	-3,423.5	3,634.2	2.39	1.11	-2.11	
10,445.0	90.90	265.20	6,892.5	-1,251.7	-3,513.2	3,722.1	2.14	-0.33	-2.11	
10,535.0	90.40	267.30	6,891.4	-1,257.6	-3,603.0	3,810.1	2.40	-0.56	2.33	
10,624.0	89.10	267.10	6,891.8	-1,261.9	-3,691.9	3,896.7	1.48	-1.46	-0.22	
10,714.0	88.90	267.80	6,893.4	-1,265.9	-3,781.8	3,984.2	0.81	-0.22	0.78	
10,804.0	89.50	269.40	6,894.7	-1,268.1	-3,871.8	4,071.3	1.90	0.67	1.78	
10,894.0	90.80	268.70	6,894.4	-1,269.6	-3,961.8	4,158.2	1.64	1.44	-0.78	
10,984.0	89.90	267.30	6,893.9	-1,272.7	-4,051.7	4,245.6	1.85	-1.00	-1.56	
11,074.0	89.60	268.00	6,894.3	-1,276.4	-4,141.6	4,333.0	0.85	-0.33	0.78	
11,164.0	89.00	267.80	6,895.4	-1,279.7	-4,231.6	4,420.4	0.70	-0.67	-0.22	
11,253.0	89.20	268.20	6,896.8	-1,282.8	-4,320.5	4,506.7	0.50	0.22	0.45	
11,312.0	90.40	269.70	6,897.0	-1,283.9	-4,379.5	4,563.7	3.26	2.03	2.54	
11,371.0	90.40	269.70	6,896.6	-1,284.2	-4,438.5	4,620.5	0.00	0.00	0.00	

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										
End of Build	0.00	0.00	6,871.5	-1,181.8	-449.6	1,372,752.33	3,249,519.54	40.353149	-104.604696	
- survey misses target center by 9.1ft at 7378.2ft MD (6863.0 TVD, -1184.8 N, -450.9 E)										
- Point										
Landing Pt. Thistle Dc	0.00	0.00	6,880.8	-1,184.8	-582.9	1,372,749.33	3,249,386.25	40.353144	-104.605174	
- survey misses target center by 4.9ft at 7511.2ft MD (6876.2 TVD, -1186.6 N, -583.1 E)										
- Circle (radius 35.0)										
Thistle Down PC F36-	0.00	0.00	6,901.2	-1,272.3	-4,438.4	1,372,661.86	3,245,530.87	40.353010	-104.619010	
- survey misses target center by 12.8ft at 11370.9ft MD (6896.6 TVD, -1284.2 N, -4438.3 E)										
- Circle (radius 35.0)										

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")	
7,532.7	7"		7	7-1/2	

Checked By: _____ Approved By: _____ Date: _____