



Noble Energy Inc.

**Weld County, CO
Sec 6, T6N, R66W, 6th PM
Cecil Farms PC I06-67HN**

Wellbore #1

Design: Wellbore #1 FINAL

DDC Survey Report

18 March, 2014



Company:	Noble Energy Inc.	Local Co-ordinate Reference:	Well Cecil Farms PC I06-67HN
Project:	Weld County, CO	TVD Reference:	WELL @ 4900.0usft (H&P #326)
Site:	Sec 6, T6N, R66W, 6th PM	MD Reference:	WELL @ 4900.0usft (H&P #326)
Well:	Cecil Farms PC I06-67HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	Colorado Northern Zone		

Site		Sec 6, T6N, R66W, 6th PM							
Site Position:		Northing:	1,434,045.34	usft	Latitude:	40° 31' 22.188 N			
From:	Lat/Long	Easting:	3,190,715.59	usft	Longitude:	104° 48' 50.328 W			
Position Uncertainty:		0.0	usft	Slot Radius:	13-3/16	"	Grid Convergence:	0.44	°

Well		Cecil Farms PC I06-67HN				
Well Position	+N/-S	0.0 usft	Northing:	1,434,045.33 usft	Latitude:	40° 31' 22.188 N
	+E/-W	0.0 usft	Easting:	3,190,715.59 usft	Longitude:	104° 48' 50.328 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,870.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/5/2014	8.53	67.05	52,903

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	256.20	

Survey Program	Date	3/18/2014			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
268.0	1,008.0	SURFACE (Wellbore #1)	Flexi-Shot	VES Flexi-Shot Tool	
1,114.0	7,602.0	MWD SURVEY - VERT/BUILD (Wellbore	MWD default	MWD - Standard	
7,659.0	11,718.0	MWD SURVEY - LATERAL (Wellbore #1)	MWD default	MWD - Standard	

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
268.0	0.30	93.60	268.0	0.0	0.7	-0.7	0.11	0.11	0.00	
546.0	0.40	359.30	546.0	0.9	1.4	-1.6	0.19	0.04	-33.92	
844.0	0.50	286.20	844.0	2.3	0.2	-0.7	0.18	0.03	-24.53	
TIE IN @ 1008' MD / 1008' TVD End of Surface Hole / Begin INT Hole										
1,008.0	0.10	320.80	1,008.0	2.6	-0.6	0.0	0.26	-0.24	21.10	
1,114.0	0.70	251.20	1,114.0	2.5	-1.3	0.7	0.63	0.57	-65.66	
1,206.0	0.60	233.10	1,206.0	2.0	-2.2	1.7	0.25	-0.11	-19.67	
1,299.0	0.70	243.60	1,299.0	1.4	-3.1	2.7	0.17	0.11	11.29	

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Well:	Cecil Farms PC I06-67HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,393.0	0.80	243.30	1,393.0	0.9	-4.2	3.9	0.11	0.11	-0.32
1,485.0	0.90	237.80	1,485.0	0.2	-5.4	5.2	0.14	0.11	-5.98
1,578.0	0.90	252.10	1,577.9	-0.4	-6.7	6.6	0.24	0.00	15.38
1,672.0	0.30	272.10	1,671.9	-0.6	-7.7	7.6	0.67	-0.64	21.28
1,765.0	0.40	307.10	1,764.9	-0.4	-8.2	8.0	0.25	0.11	37.63
1,856.0	0.20	276.90	1,855.9	-0.2	-8.6	8.4	0.27	-0.22	-33.19
1,948.0	0.30	166.60	1,947.9	-0.4	-8.7	8.5	0.45	0.11	-119.89
2,041.0	0.50	200.20	2,040.9	-1.0	-8.8	8.8	0.32	0.22	36.13
2,133.0	0.30	183.20	2,132.9	-1.6	-8.9	9.0	0.25	-0.22	-18.48
2,226.0	0.30	193.00	2,225.9	-2.1	-9.0	9.2	0.06	0.00	10.54
2,319.0	0.70	187.70	2,318.9	-2.9	-9.1	9.5	0.43	0.43	-5.70
2,413.0	1.30	154.70	2,412.9	-4.5	-8.7	9.5	0.86	0.64	-35.11
2,506.0	1.90	176.10	2,505.9	-7.0	-8.2	9.6	0.90	0.65	23.01
2,600.0	4.40	167.20	2,599.7	-12.0	-7.3	9.9	2.70	2.66	-9.47
2,695.0	5.60	164.90	2,694.4	-20.1	-5.3	9.9	1.28	1.26	-2.42
2,789.0	7.60	167.40	2,787.7	-30.5	-2.7	9.9	2.15	2.13	2.66
2,883.0	10.60	173.30	2,880.5	-45.2	-0.3	11.1	3.34	3.19	6.28
2,978.0	8.40	172.60	2,974.2	-60.8	1.6	13.0	2.32	-2.32	-0.74
3,073.0	9.90	173.30	3,068.0	-75.8	3.4	14.7	1.58	1.58	0.74
3,168.0	11.30	171.70	3,161.4	-93.1	5.7	16.7	1.51	1.47	-1.68
3,262.0	10.90	172.30	3,253.6	-111.0	8.2	18.5	0.44	-0.43	0.64
3,357.0	9.50	162.90	3,347.1	-127.4	11.7	19.0	2.28	-1.47	-9.89
3,452.0	7.60	162.40	3,441.1	-140.9	16.0	18.1	2.00	-2.00	-0.53
3,546.0	8.40	156.40	3,534.2	-153.1	20.6	16.5	1.23	0.85	-6.38
3,641.0	9.50	158.60	3,628.0	-166.8	26.2	14.3	1.21	1.16	2.32
3,736.0	10.30	156.30	3,721.6	-181.8	32.5	11.8	0.94	0.84	-2.42
3,830.0	11.90	161.90	3,813.8	-198.7	38.9	9.6	2.05	1.70	5.96
3,925.0	13.40	163.30	3,906.5	-218.6	45.1	8.4	1.61	1.58	1.47
4,019.0	14.50	164.50	3,997.8	-240.4	51.4	7.5	1.21	1.17	1.28
4,114.0	14.50	165.20	4,089.7	-263.3	57.6	6.9	0.18	0.00	0.74
4,209.0	11.10	163.70	4,182.4	-283.6	63.2	6.3	3.60	-3.58	-1.58
4,303.0	9.90	159.40	4,274.8	-299.9	68.6	4.9	1.52	-1.28	-4.57
4,398.0	9.10	157.10	4,368.5	-314.4	74.4	2.8	0.93	-0.84	-2.42
4,492.0	8.90	160.30	4,461.3	-328.1	79.7	0.9	0.57	-0.21	3.40
4,587.0	9.40	162.30	4,555.1	-342.4	84.5	-0.4	0.62	0.53	2.11
4,682.0	9.40	167.20	4,648.8	-357.4	88.6	-0.8	0.84	0.00	5.16
4,777.0	8.70	160.70	4,742.7	-371.7	92.7	-1.4	1.30	-0.74	-6.84
4,871.0	8.40	166.50	4,835.6	-385.1	96.7	-2.0	0.97	-0.32	6.17
4,966.0	8.80	170.00	4,929.5	-399.0	99.6	-1.5	0.69	0.42	3.68
5,061.0	9.50	170.20	5,023.3	-413.9	102.1	-0.5	0.74	0.74	0.21
5,155.0	9.10	173.10	5,116.1	-428.9	104.4	1.0	0.66	-0.43	3.09
5,250.0	9.20	168.40	5,209.9	-443.8	106.8	2.2	0.79	0.11	-4.95
5,345.0	9.10	169.30	5,303.7	-458.6	109.7	2.9	0.18	-0.11	0.95

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Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,439.0	10.10	167.40	5,396.4	-474.0	112.9	3.4	1.12	1.06	-2.02
5,534.0	7.80	169.10	5,490.2	-488.5	115.9	3.9	2.44	-2.42	1.79
5,628.0	8.20	166.30	5,583.3	-501.2	118.7	4.3	0.59	0.43	-2.98
5,723.0	7.70	161.90	5,677.4	-513.9	122.3	3.8	0.83	-0.53	-4.63
5,818.0	7.40	163.30	5,771.6	-525.8	126.0	3.0	0.37	-0.32	1.47
5,912.0	7.80	168.10	5,864.7	-537.8	129.1	2.9	0.80	0.43	5.11
6,007.0	9.80	167.40	5,958.6	-552.0	132.2	3.3	2.11	2.11	-0.74
6,101.0	9.70	168.90	6,051.2	-567.6	135.5	3.8	0.29	-0.11	1.60
6,195.0	9.50	170.30	6,143.9	-583.0	138.3	4.8	0.33	-0.21	1.49
6,289.0	12.10	173.00	6,236.3	-600.4	140.8	6.5	2.82	2.77	2.87
6,384.0	12.90	170.50	6,329.0	-620.8	143.8	8.5	1.02	0.84	-2.63
6,478.0	14.80	170.20	6,420.3	-643.0	147.5	10.1	2.02	2.02	-0.32
6,572.0	24.00	176.10	6,508.8	-673.9	150.9	14.2	9.99	9.79	6.28
6,610.0	25.30	179.80	6,543.4	-689.8	151.4	17.5	5.31	3.42	9.74
6,667.0	26.20	178.60	6,594.7	-714.5	151.8	23.0	1.82	1.58	-2.11
6,761.0	33.60	192.70	6,676.3	-760.8	146.6	39.1	10.81	7.87	15.00
6,854.0	36.00	208.30	6,752.8	-810.0	127.9	69.0	9.89	2.58	16.77
6,948.0	37.80	220.80	6,828.0	-856.2	95.9	111.1	8.20	1.91	13.30
7,043.0	43.30	233.10	6,900.3	-897.9	50.8	164.9	10.19	5.79	12.95
7,137.0	48.60	245.60	6,965.8	-931.9	-7.3	229.4	11.08	5.64	13.30
7,231.0	58.00	260.50	7,022.1	-953.2	-79.1	304.2	16.13	10.00	15.85
CROSSED HARDLINE @ 7279' MD / 7047' TVD									
7,279.2	59.52	264.98	7,047.1	-958.4	-120.0	345.1	8.55	3.15	9.29
7,325.0	61.10	269.10	7,069.8	-960.4	-159.7	384.2	8.55	3.45	9.00
7,419.0	71.30	266.10	7,107.7	-964.1	-245.5	468.4	11.24	10.85	-3.19
7,513.0	78.10	261.60	7,132.5	-973.9	-335.6	558.2	8.58	7.23	-4.79
7,602.0	82.30	262.50	7,147.6	-986.0	-422.4	645.4	4.82	4.72	1.01
7" CASING @ 7659' MD / 7154' TVD End of INT Hole / Begin Lateral									
7,659.0	84.80	262.50	7,154.0	-993.4	-478.6	701.7	4.39	4.39	0.00
7,753.0	86.70	262.60	7,161.0	-1,005.6	-571.5	794.9	2.02	2.02	0.11
7,847.0	89.30	262.60	7,164.3	-1,017.7	-664.7	888.2	2.77	2.77	0.00
7,941.0	90.20	265.80	7,164.7	-1,027.2	-758.2	981.3	3.54	0.96	3.40
8,035.0	89.30	266.50	7,165.1	-1,033.5	-851.9	1,073.9	1.21	-0.96	0.74
8,128.0	89.40	268.80	7,166.2	-1,037.3	-944.9	1,165.0	2.48	0.11	2.47
8,222.0	89.30	268.60	7,167.2	-1,039.4	-1,038.8	1,256.8	0.24	-0.11	-0.21
8,315.0	89.10	269.10	7,168.5	-1,041.3	-1,131.8	1,347.5	0.58	-0.22	0.54
8,409.0	88.30	269.10	7,170.7	-1,042.8	-1,225.8	1,439.1	0.85	-0.85	0.00
8,502.0	91.00	268.30	7,171.2	-1,044.9	-1,318.7	1,529.9	3.03	2.90	-0.86
8,596.0	90.70	268.80	7,169.8	-1,047.2	-1,412.7	1,621.7	0.62	-0.32	0.53
8,691.0	89.00	268.80	7,170.1	-1,049.2	-1,507.7	1,714.4	1.79	-1.79	0.00
8,787.0	88.10	269.50	7,172.5	-1,050.7	-1,603.6	1,807.9	1.19	-0.94	0.73
8,881.0	89.40	269.10	7,174.6	-1,051.8	-1,697.6	1,899.5	1.45	1.38	-0.43
8,976.0	88.70	269.60	7,176.1	-1,052.9	-1,792.6	1,992.0	0.91	-0.74	0.53
9,070.0	90.70	269.00	7,176.6	-1,054.0	-1,886.5	2,083.5	2.22	2.13	-0.64

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
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Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,165.0	90.50	269.50	7,175.6	-1,055.3	-1,981.5	2,176.1	0.57	-0.21	0.53
9,260.0	90.20	270.20	7,175.1	-1,055.5	-2,076.5	2,268.4	0.80	-0.32	0.74
9,354.0	90.40	270.20	7,174.6	-1,055.2	-2,170.5	2,359.6	0.21	0.21	0.00
9,449.0	90.40	270.90	7,173.9	-1,054.3	-2,265.5	2,451.6	0.74	0.00	0.74
9,544.0	90.20	270.90	7,173.4	-1,052.8	-2,360.5	2,543.5	0.21	-0.21	0.00
9,639.0	88.50	266.70	7,174.5	-1,054.8	-2,455.5	2,636.2	4.77	-1.79	-4.42
9,733.0	87.80	266.80	7,177.5	-1,060.1	-2,549.3	2,728.5	0.75	-0.74	0.11
9,828.0	90.30	265.30	7,179.1	-1,066.7	-2,644.0	2,822.1	3.07	2.63	-1.58
9,922.0	90.80	265.10	7,178.2	-1,074.5	-2,737.7	2,915.0	0.57	0.53	-0.21
10,017.0	91.20	264.90	7,176.5	-1,082.8	-2,832.3	3,008.8	0.47	0.42	-0.21
10,112.0	91.80	264.90	7,174.0	-1,091.2	-2,926.9	3,102.7	0.63	0.63	0.00
10,207.0	89.30	266.80	7,173.1	-1,098.1	-3,021.6	3,196.3	3.31	-2.63	2.00
10,301.0	90.80	268.60	7,173.1	-1,101.9	-3,115.5	3,288.4	2.49	1.60	1.91
10,396.0	91.20	269.00	7,171.4	-1,103.9	-3,210.5	3,381.1	0.60	0.42	0.42
10,490.0	91.00	269.10	7,169.6	-1,105.4	-3,304.5	3,472.8	0.24	-0.21	0.11
10,585.0	90.10	269.00	7,168.7	-1,107.0	-3,399.5	3,565.4	0.95	-0.95	-0.11
10,679.0	90.70	269.50	7,168.0	-1,108.2	-3,493.4	3,657.0	0.83	0.64	0.53
10,774.0	88.80	269.50	7,168.4	-1,109.1	-3,588.4	3,749.4	2.00	-2.00	0.00
10,868.0	88.60	269.80	7,170.6	-1,109.6	-3,682.4	3,840.8	0.38	-0.21	0.32
10,963.0	87.80	269.80	7,173.6	-1,110.0	-3,777.4	3,933.1	0.84	-0.84	0.00
11,058.0	90.70	269.00	7,174.8	-1,111.0	-3,872.3	4,025.6	3.17	3.05	-0.84
11,152.0	90.90	269.30	7,173.5	-1,112.4	-3,966.3	4,117.2	0.38	0.21	0.32
11,247.0	90.90	269.00	7,172.0	-1,113.8	-4,061.3	4,209.7	0.32	0.00	-0.32
11,342.0	90.00	267.50	7,171.2	-1,116.7	-4,156.2	4,302.6	1.84	-0.95	-1.58
11,436.0	90.00	266.00	7,171.2	-1,122.0	-4,250.1	4,395.0	1.60	0.00	-1.60
11,531.0	90.00	265.80	7,171.2	-1,128.8	-4,344.8	4,488.7	0.21	0.00	-0.21
11,625.0	90.00	266.10	7,171.2	-1,135.4	-4,438.6	4,581.3	0.32	0.00	0.32
11,654.0	90.00	265.60	7,171.2	-1,137.5	-4,467.5	4,609.9	1.72	0.00	-1.72
TD @ 11718' MD / 7171' TVD									
11,718.0	90.00	265.60	7,171.2	-1,142.4	-4,531.4	4,673.1	0.00	0.00	0.00

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,008.0	1,008.0	2.6	-0.6	TIE IN @ 1008' MD / 1008' TVD End of Surface Hole / Begin INT Hole
7,279.2	7,047.1	-958.4	-120.0	CROSSED HARDLINE @ 7279' MD / 7047' TVD
7,659.0	7,154.0	-993.4	-478.6	7" CASING @ 7659' MD / 7154' TVD End of INT Hole / Begin Lateral
11,718.0	7,171.2	-1,142.4	-4,531.4	TD @ 11718' MD / 7171' TVD

Checked By: _____ Approved By: _____ Date: _____



Survey Certification Sheet

Noble Energy Inc
Company

RM-140208
Job Number

3/19/14
Date

Sec6,T6N,R66W, 6th PM
Lease

Cecil Farms PC I06-67HN
Well Name

Weld, CO
County & State

API: 05-123-38118

Surveyed from a depth of: 1008 feet MD to 11718 feet MD

Type of Survey: MWD

Directional Supervisor/Surveyor: Bob Kubistek

The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by **The Directional Drilling Company (DDC)**. This report represents a true and correct Directional survey of this well based on the original data obtained at the well site. Wellbore Coordinates are calculated using minimum curvature.

Digitally signed by Larry Wright
DN: cn=Larry Wright, o=The
Directional Drilling Company,
ou=GM of Guidance Services,
email=larryw@directionaldrillers.c
om, c=US
Date: 2014.03.21 11:13:05 -05'00'

Larry Wright
MWD General Manager

Company Name: Noble Energy Inc.
Cecil Farms PC I06-67HN
Weld County, CO
Rig: H&P #326
Created By: James Dawson
Date: 3/18/2014

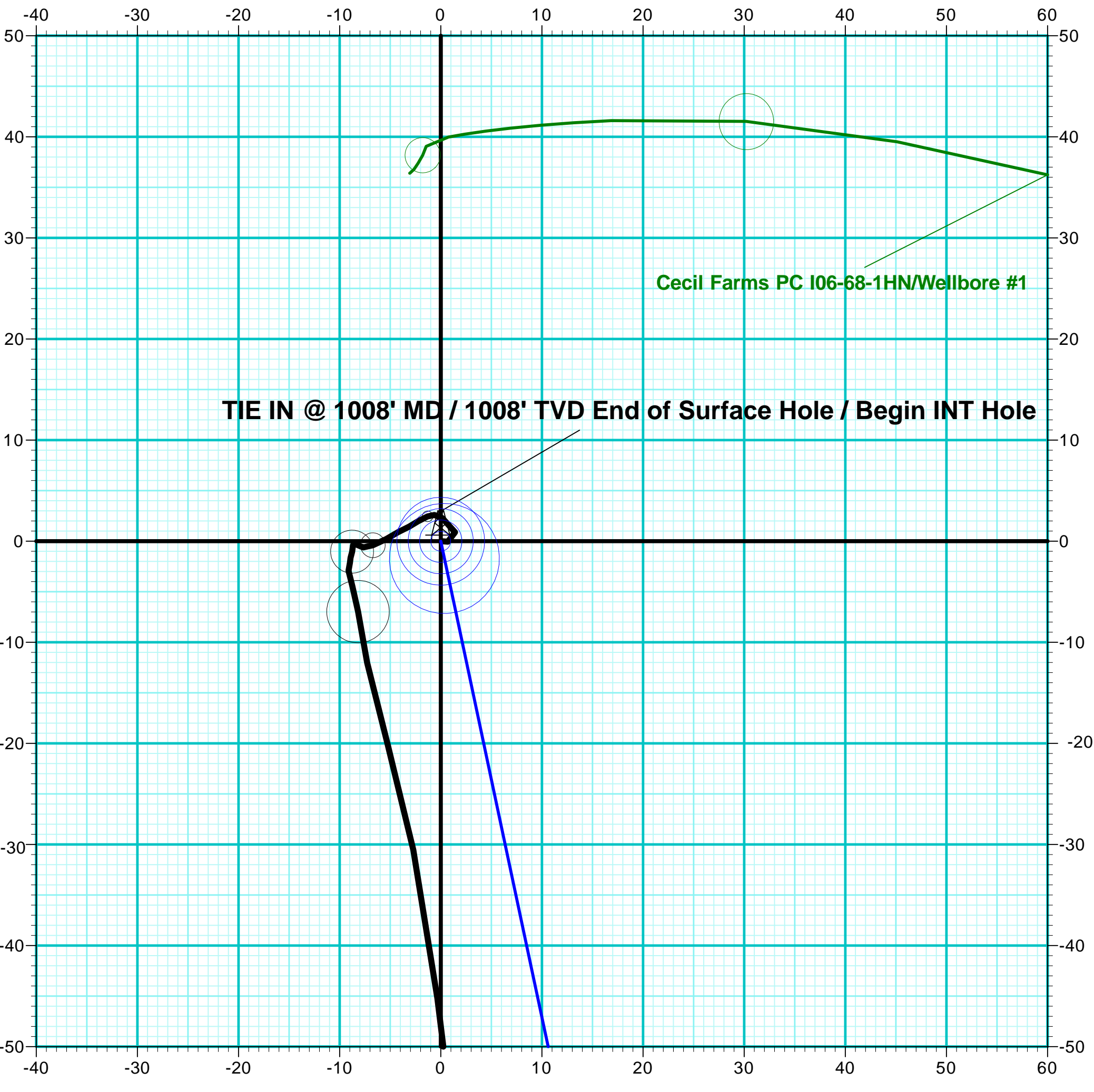
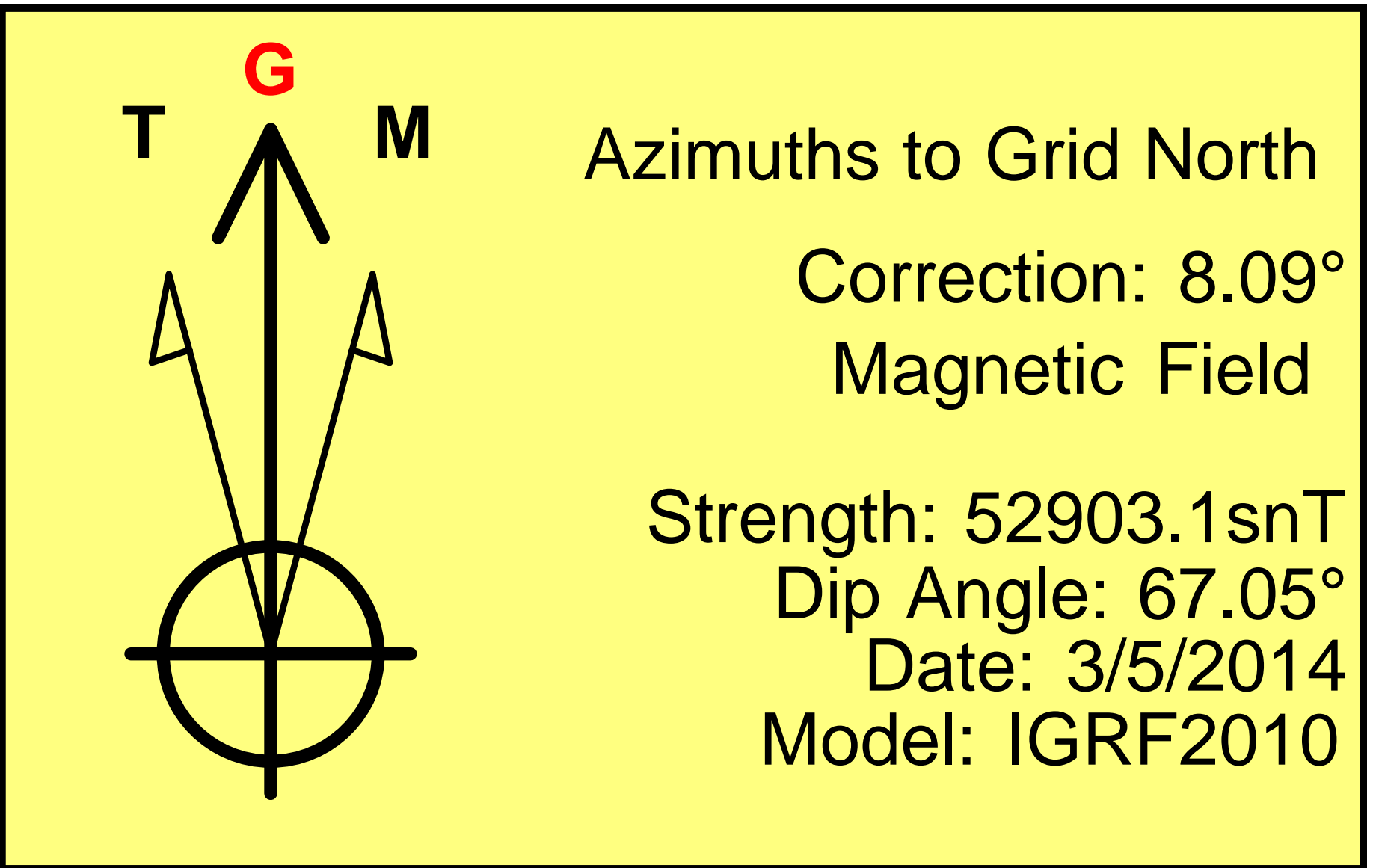
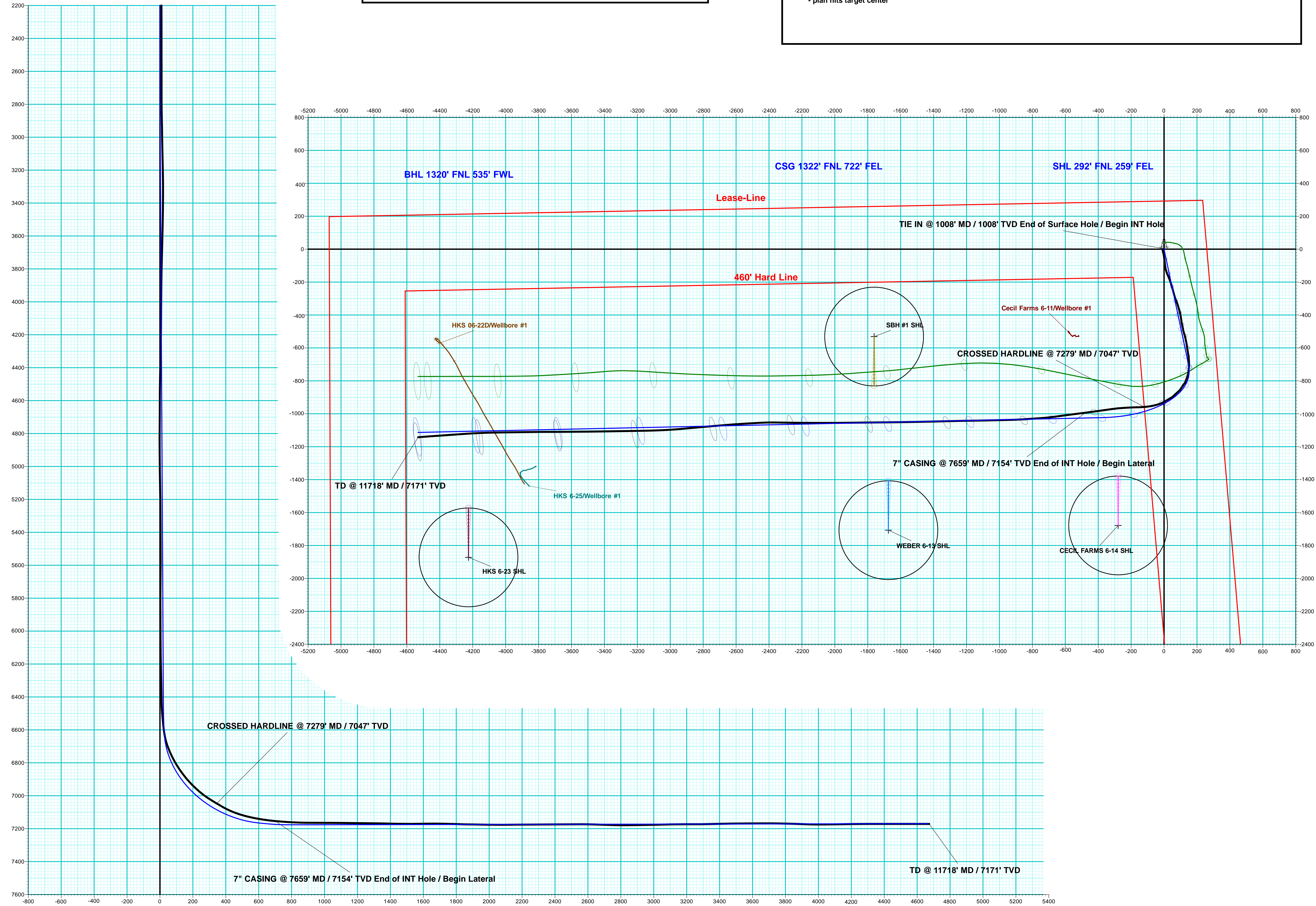
Cecil Farms PC I06-67HN
Weld County, CO
Q140106 & RM-140208
Design #2

ANNOTATIONS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation	
1008.0	0.10	320.80	1008.0	2.6	-0.6	0.0	5.6	TIE IN @ 1008' MD / 1008' TVD End of Surface Hole / Begin INT Hole	
7279.2	59.52	264.98	7047.1	-958.4	-120.0	345.1	1153.2	CROSSED HARDLINE @ 7279' MD / 7047' TVD	
7659.0	84.80	262.50	7154.0	-993.4	-478.6	701.7	1513.5	7" CASING @ 7659' MD / 7154' TVD End of INT Hole / Begin Lateral	
11718.0	90.00	265.60	7171.2	-1142.4	-4531.4	4673.1	5571.7	TD @ 11718' MD / 7171' TVD	

PROJECT DETAILS:		Weld County, CO
Geodetic System:	US State Plane 1983	
Datum:	North American Datum 1983	
Ellipsoid:	GRS 1980	
Zone:	Colorado Northern Zone	
System Datum:	Mean Sea Level	

WELL DETAILS:		Cecil Farms PC I06-67HN
Ground Level:		4870.0
+N/-S	+E/-W	Northing Easting Latitude Longitude
0.0	0.0	1434045.33 3190715.59 40° 31' 22.188 N 104° 48' 50.328 W

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
CECIL FARMS 6-14 SHL	0.0	-1678.0	-279.0	1432367.32	3190436.64	40° 31' 5.628 N	104° 48' 54.108 W
HKS 6-23 SHL	0.0	-1872.1	-4225.5	1432173.21	3186490.05	40° 31' 4.008 N	104° 49' 45.228 W
SBH #1 SHL	0.0	-530.9	-1761.3	1433514.44	3188954.27	40° 31' 17.076 N	104° 49' 13.188 W
WEBER 6-13 SHL	0.0	-1707.0	-1674.5	1432338.36	3189041.14	40° 31' 5.448 N	104° 49' 12.180 W
PBHL Cecil Farms PC I06-67HN D#2 - plan hits target center	7169.9	-1113.0	-4531.6	1432932.32	3186184.04	40° 31' 11.532 N	104° 49' 49.116 W



Vertical Section at 256.20° (200 usf/in)