



Noble Energy Inc.

Weld County, CO

Sec. 3-T8N-R59W

McClellan PC LG03-78HN

Wellbore #1

Survey: MWD

DDC Survey Report

20 December, 2011





Survey Certification Sheet

Noble Energy Inc.
Company

RM-11693
Job Number

12/20/11
Date

Sec 3-T8N-R59W
Lease

McClellan PC LG03-78HN
Well Name

Weld, Co
County & State

Surveyed from a depth of: 1166 feet to 10407 feet MD

Type of Survey: MWD

Directional Supervisor/Surveyor: Boyd Wolff

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.

Larry Wright
MWD General Manager

Company:	Noble Energy Inc.	Local Co-ordinate Reference:	Well McClellan PC LG03-78HN
Project:	Weld County, CO	TVD Reference:	WELL @ 4826.0usft (H&P #322)
Site:	Sec. 3-T8N-R59W	MD Reference:	WELL @ 4826.0usft (H&P #322)
Well:	McClellan PC LG03-78HN	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. 3-T8N-R59W				
Site Position:		Northing:	1,495,957.78 usft	Latitude:	40° 41' 5.064 N	
From:	Map	Easting:	3,424,495.76 usft	Longitude:	103° 58' 9.588 W	
Position Uncertainty:		0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.99 °

Well	McClellan PC LG03-78HN					
Well Position	+N-S	0.0 usft	Northing:	1,495,957.78 usft	Latitude:	40° 41' 5.064 N
	+E-W	0.0 usft	Easting:	3,424,495.76 usft	Longitude:	103° 58' 9.588 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,802.0 usft	

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/15/2011	8.40	67.40	53,319

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	0.21	

Survey Program		Date	12/20/2011		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
1,216.0	10,407.0	MWD (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)
Tie In @ 1166' MD / 1166' TVD									
1,166.0	0.00	0.00	1,166.0	0.0	0.0	0.0	0.00	0.00	0.00
1,216.0	0.40	127.30	1,216.0	-0.1	0.1	-0.1	0.80	0.80	0.00
1,500.0	0.30	134.70	1,500.0	-1.2	1.5	-1.2	0.04	-0.04	2.61
1,783.0	0.20	86.00	1,783.0	-1.7	2.5	-1.7	0.08	-0.04	-17.21
2,067.0	0.40	151.90	2,067.0	-2.6	3.4	-2.5	0.13	0.07	23.20
2,354.0	0.60	143.30	2,354.0	-4.6	4.8	-4.6	0.07	0.07	-3.00
2,639.0	0.40	139.20	2,639.0	-6.6	6.3	-6.6	0.07	-0.07	-1.44
2,924.0	0.40	101.80	2,924.0	-7.6	8.0	-7.5	0.09	0.00	-13.12
3,209.0	0.70	171.10	3,208.9	-9.5	9.2	-9.4	0.24	0.11	24.32
3,493.0	0.50	180.70	3,492.9	-12.4	9.5	-12.4	0.08	-0.07	3.38

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Well:	McClellan PC LG03-78HN	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)
3,779.0	0.60	184.40	3,778.9	-15.2	9.3	-15.1	0.04	0.03	1.29
4,063.0	1.20	129.00	4,062.9	-18.5	11.5	-18.5	0.35	0.21	-19.51
4,348.0	1.90	99.90	4,347.8	-21.2	18.5	-21.1	0.36	0.25	-10.21
4,633.0	1.80	87.90	4,632.6	-21.9	27.6	-21.8	0.14	-0.04	-4.21
4,917.0	1.50	110.40	4,916.5	-23.0	35.6	-22.9	0.25	-0.11	7.92
5,200.0	0.40	129.00	5,199.5	-24.9	39.8	-24.8	0.40	-0.39	6.57
5,270.0	0.30	93.90	5,269.5	-25.1	40.2	-24.9	0.33	-0.14	-50.14
5,301.0	0.40	29.20	5,300.5	-25.0	40.3	-24.8	1.24	0.32	-208.71
5,333.0	3.40	338.00	5,332.5	-24.0	40.0	-23.9	9.89	9.38	-160.00
5,364.0	6.30	338.90	5,363.3	-21.6	39.1	-21.4	9.36	9.35	2.90
5,396.0	9.10	345.60	5,395.1	-17.5	37.8	-17.3	9.17	8.75	20.94
5,428.0	12.50	349.30	5,426.5	-11.6	36.5	-11.5	10.84	10.63	11.56
5,460.0	15.30	353.70	5,457.5	-4.0	35.4	-3.9	9.35	8.75	13.75
5,491.0	16.60	0.00	5,487.4	4.5	35.0	4.6	6.98	4.19	20.32
5,523.0	19.50	1.30	5,517.8	14.4	35.1	14.5	9.15	9.06	4.06
5,555.0	22.40	358.30	5,547.7	25.8	35.0	26.0	9.66	9.06	-9.38
5,586.0	25.00	354.60	5,576.0	38.3	34.2	38.4	9.66	8.39	-11.94
5,618.0	27.80	353.30	5,604.7	52.4	32.7	52.5	8.93	8.75	-4.06
5,650.0	29.70	352.10	5,632.8	67.7	30.8	67.8	6.21	5.94	-3.75
5,681.0	31.60	351.80	5,659.4	83.3	28.6	83.4	6.15	6.13	-0.97
5,713.0	34.30	353.30	5,686.3	100.6	26.3	100.7	8.81	8.44	4.69
5,745.0	36.80	355.10	5,712.3	119.1	24.4	119.2	8.47	7.81	5.63
5,777.0	39.00	357.20	5,737.6	138.7	23.1	138.8	7.97	6.88	6.56
5,808.0	41.20	357.00	5,761.3	158.6	22.1	158.7	7.11	7.10	-0.65
5,840.0	43.80	355.80	5,784.9	180.2	20.8	180.3	8.51	8.13	-3.75
5,871.0	46.30	354.70	5,806.8	202.1	18.9	202.1	8.45	8.06	-3.55
5,903.0	49.20	355.30	5,828.3	225.7	16.9	225.7	9.17	9.06	1.88
5,935.0	51.60	356.00	5,848.7	250.2	15.0	250.3	7.69	7.50	2.19
5,967.0	53.70	357.70	5,868.1	275.6	13.6	275.7	7.80	6.56	5.31
5,998.0	56.20	358.80	5,885.9	301.0	12.8	301.0	8.57	8.06	3.55
6,030.0	58.80	359.10	5,903.1	328.0	12.4	328.0	8.16	8.13	0.94
Crossed Hard Line @ 6056' MD / 5916.3' TVD									
6,056.0	60.18	359.02	5,916.3	350.4	12.0	350.4	5.32	5.31	-0.31
6,062.0	60.50	359.00	5,919.2	355.6	11.9	355.6	5.32	5.31	-0.31
6,093.0	62.50	359.10	5,934.0	382.8	11.4	382.9	6.46	6.45	0.32
6,125.0	65.30	358.40	5,948.1	411.6	10.8	411.6	8.97	8.75	-2.19
6,157.0	68.00	359.00	5,960.8	440.9	10.2	441.0	8.61	8.44	1.88
6,188.0	69.90	359.30	5,971.9	469.9	9.7	469.9	6.20	6.13	0.97
6,220.0	71.90	0.40	5,982.4	500.1	9.6	500.1	7.04	6.25	3.44
6,252.0	74.90	0.90	5,991.5	530.7	10.0	530.8	9.49	9.38	1.56
6,284.0	77.30	1.10	5,999.2	561.8	10.5	561.8	7.52	7.50	0.63
6,315.0	78.90	0.40	6,005.6	592.1	10.9	592.2	5.61	5.16	-2.26
6,349.0	81.90	359.10	6,011.3	625.7	10.8	625.7	9.59	8.82	-3.82

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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)
6,419.0	83.80	358.60	6,020.0	695.1	9.4	695.1	2.81	2.71	-0.71
6,482.0	85.40	359.10	6,025.9	757.8	8.1	757.8	2.66	2.54	0.79
6,514.0	85.80	359.10	6,028.4	789.7	7.6	789.7	1.25	1.25	0.00
6,577.0	88.10	359.00	6,031.7	852.6	6.6	852.6	3.65	3.65	-0.16
6,609.0	88.60	359.10	6,032.7	884.6	6.1	884.6	1.59	1.56	0.31
6,641.0	90.00	359.00	6,033.1	916.6	5.5	916.6	4.39	4.38	-0.31
6,672.0	91.00	359.50	6,032.8	947.6	5.1	947.6	3.61	3.23	1.61
6,704.0	91.20	359.80	6,032.2	979.6	4.9	979.6	1.13	0.63	0.94
6,767.0	92.00	359.70	6,030.4	1,042.5	4.6	1,042.5	1.28	1.27	-0.16
6,799.0	92.70	359.70	6,029.1	1,074.5	4.5	1,074.5	2.19	2.19	0.00
6,830.0	91.40	0.50	6,028.0	1,105.5	4.5	1,105.5	4.92	-4.19	2.58
6,862.0	91.30	1.10	6,027.2	1,137.5	5.0	1,137.5	1.90	-0.31	1.88
6,894.0	91.20	1.30	6,026.5	1,169.5	5.7	1,169.5	0.70	-0.31	0.63
6,957.0	88.90	0.70	6,026.5	1,232.4	6.8	1,232.5	3.77	-3.65	-0.95
6,989.0	89.30	0.50	6,027.0	1,264.4	7.1	1,264.5	1.40	1.25	-0.63
7,020.0	90.00	0.50	6,027.2	1,295.4	7.4	1,295.5	2.26	2.26	0.00
7,084.0	89.90	0.40	6,027.2	1,359.4	7.9	1,359.5	0.22	-0.16	-0.16
7,147.0	90.70	0.00	6,026.9	1,422.4	8.1	1,422.5	1.42	1.27	-0.63
7,179.0	90.30	0.00	6,026.6	1,454.4	8.1	1,454.5	1.25	-1.25	0.00
7,210.0	88.70	0.00	6,026.9	1,485.4	8.1	1,485.4	5.16	-5.16	0.00
7,274.0	89.40	359.70	6,027.9	1,549.4	7.9	1,549.4	1.19	1.09	-0.47
7,369.0	90.10	359.50	6,028.4	1,644.4	7.3	1,644.4	0.77	0.74	-0.21
7,464.0	90.50	359.80	6,027.9	1,739.4	6.7	1,739.4	0.53	0.42	0.32
7,559.0	89.00	0.00	6,028.3	1,834.4	6.5	1,834.4	1.59	-1.58	0.21
7,623.0	90.40	0.40	6,028.6	1,898.4	6.7	1,898.4	2.28	2.19	0.63
7,654.0	91.10	0.20	6,028.2	1,929.4	6.9	1,929.4	2.35	2.26	-0.65
7,749.0	89.10	0.50	6,028.0	2,024.4	7.5	2,024.4	2.13	-2.11	0.32
7,844.0	90.30	0.40	6,028.5	2,119.4	8.2	2,119.4	1.27	1.26	-0.11
7,939.0	90.10	0.00	6,028.2	2,214.4	8.5	2,214.4	0.47	-0.21	-0.42
8,003.0	91.10	359.70	6,027.5	2,278.4	8.4	2,278.4	1.63	1.56	-0.47
8,034.0	91.10	359.80	6,026.9	2,309.4	8.2	2,309.4	0.32	0.00	0.32
8,098.0	91.40	359.50	6,025.5	2,373.4	7.9	2,373.4	0.66	0.47	-0.47
8,129.0	91.60	359.50	6,024.7	2,404.3	7.6	2,404.4	0.65	0.65	0.00
8,224.0	91.40	359.30	6,022.3	2,499.3	6.6	2,499.3	0.30	-0.21	-0.21
8,320.0	91.00	0.00	6,020.2	2,595.3	6.0	2,595.3	0.84	-0.42	0.73
8,383.0	90.00	0.90	6,019.7	2,658.3	6.5	2,658.3	2.14	-1.59	1.43
8,415.0	89.70	0.50	6,019.8	2,690.3	6.9	2,690.3	1.56	-0.94	-1.25
8,478.0	89.10	0.50	6,020.4	2,753.3	7.4	2,753.3	0.95	-0.95	0.00
8,510.0	89.10	0.70	6,020.9	2,785.3	7.8	2,785.3	0.62	0.00	0.63
8,605.0	89.50	0.00	6,022.1	2,880.3	8.4	2,880.3	0.85	0.42	-0.74
8,700.0	89.50	359.70	6,022.9	2,975.3	8.1	2,975.3	0.32	0.00	-0.32
8,795.0	90.30	0.00	6,023.1	3,070.3	7.9	3,070.3	0.90	0.84	0.32
8,890.0	90.00	359.70	6,022.8	3,165.3	7.6	3,165.3	0.45	-0.32	-0.32

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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)
8,985.0	89.10	358.30	6,023.6	3,260.2	5.9	3,260.2	1.75	-0.95	-1.47
9,080.0	90.20	357.60	6,024.2	3,355.2	2.6	3,355.2	1.37	1.16	-0.74
9,143.0	89.80	358.80	6,024.2	3,418.1	0.6	3,418.1	2.01	-0.63	1.90
9,175.0	90.00	358.80	6,024.2	3,450.1	-0.1	3,450.1	0.63	0.63	0.00
9,270.0	90.50	359.00	6,023.8	3,545.1	-1.9	3,545.1	0.57	0.53	0.21
9,333.0	90.40	358.40	6,023.3	3,608.1	-3.4	3,608.1	0.97	-0.16	-0.95
9,428.0	91.70	359.50	6,021.6	3,703.1	-5.1	3,703.0	1.79	1.37	1.16
9,460.0	92.00	359.10	6,020.5	3,735.0	-5.5	3,735.0	1.56	0.94	-1.25
9,523.0	91.90	0.50	6,018.4	3,798.0	-5.7	3,798.0	2.23	-0.16	2.22
9,618.0	91.40	1.10	6,015.7	3,892.9	-4.4	3,892.9	0.82	-0.53	0.63
9,681.0	91.20	0.90	6,014.2	3,955.9	-3.3	3,955.9	0.45	-0.32	-0.32
9,776.0	90.20	2.30	6,013.1	4,050.9	-0.6	4,050.8	1.81	-1.05	1.47
9,840.0	89.70	2.30	6,013.1	4,114.8	1.9	4,114.8	0.78	-0.78	0.00
9,871.0	90.10	2.10	6,013.2	4,145.8	3.1	4,145.8	1.44	1.29	-0.65
9,935.0	89.50	1.60	6,013.4	4,209.8	5.2	4,209.8	1.22	-0.94	-0.78
9,966.0	89.40	1.40	6,013.7	4,240.8	6.0	4,240.7	0.72	-0.32	-0.65
9,998.0	89.70	1.30	6,014.0	4,272.7	6.8	4,272.7	0.99	0.94	-0.31
10,029.0	90.00	1.10	6,014.0	4,303.7	7.4	4,303.7	1.16	0.97	-0.65
10,061.0	90.00	1.10	6,014.0	4,335.7	8.0	4,335.7	0.00	0.00	0.00
10,093.0	90.00	1.30	6,014.0	4,367.7	8.7	4,367.7	0.63	0.00	0.63
10,124.0	89.50	1.40	6,014.2	4,398.7	9.4	4,398.7	1.64	-1.61	0.32
10,188.0	89.30	1.10	6,014.8	4,462.7	10.8	4,462.7	0.56	-0.31	-0.47
10,220.0	89.70	1.40	6,015.1	4,494.7	11.5	4,494.7	1.56	1.25	0.94
10,315.0	90.60	2.00	6,014.9	4,589.6	14.3	4,589.7	1.14	0.95	0.63
10,360.0	90.80	1.60	6,014.3	4,634.6	15.8	4,634.6	0.99	0.44	-0.89
TD @ 10407' MD / 6013.7' TVD									
10,407.0	90.80	1.60	6,013.7	4,681.6	17.1	4,681.6	0.00	0.00	0.00

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,166.0	1,166.0	0.0	0.0	Tie In @ 1166' MD / 1166' TVD
6,056.0	5,916.3	350.4	12.0	Crossed Hard Line @ 6056' MD / 5916.3' TVD
10,407.0	6,013.7	4,681.6	17.1	TD @ 10407' MD / 6013.7' TVD

Checked By: _____ Approved By: _____ Date: _____

Company Name: Noble Energy Inc.
McClellan PC LG03-78HN
Weld County, CO
Rig: H&P #323
Created By: Dina Chance
Date: 12/20/2011

McClellan PC LG03-78HN
Weld County, CO
Q110803 & RM-11693



T

G

M

Azimuths to Grid North

Correction: 7.41°

Magnetic Field

Strength: 53318.9snT

Dip Angle: 67.40°

Date: 11/15/2011

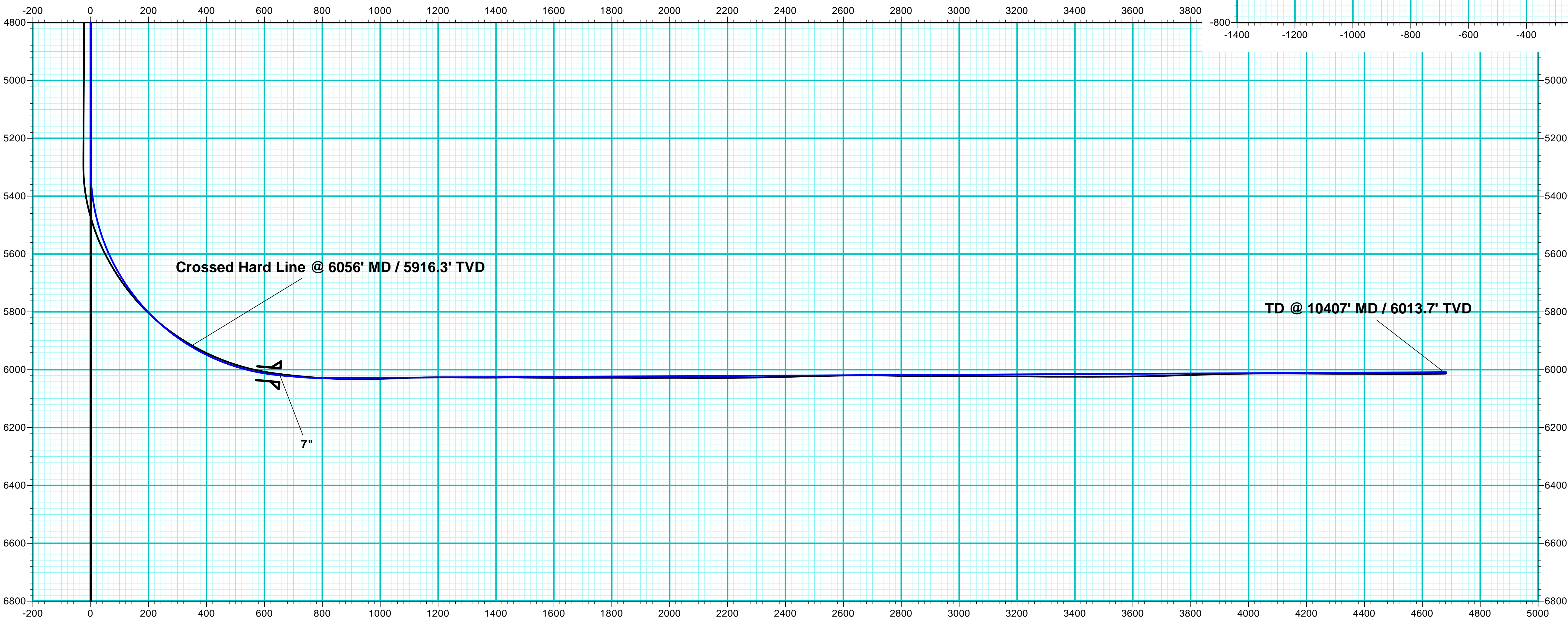
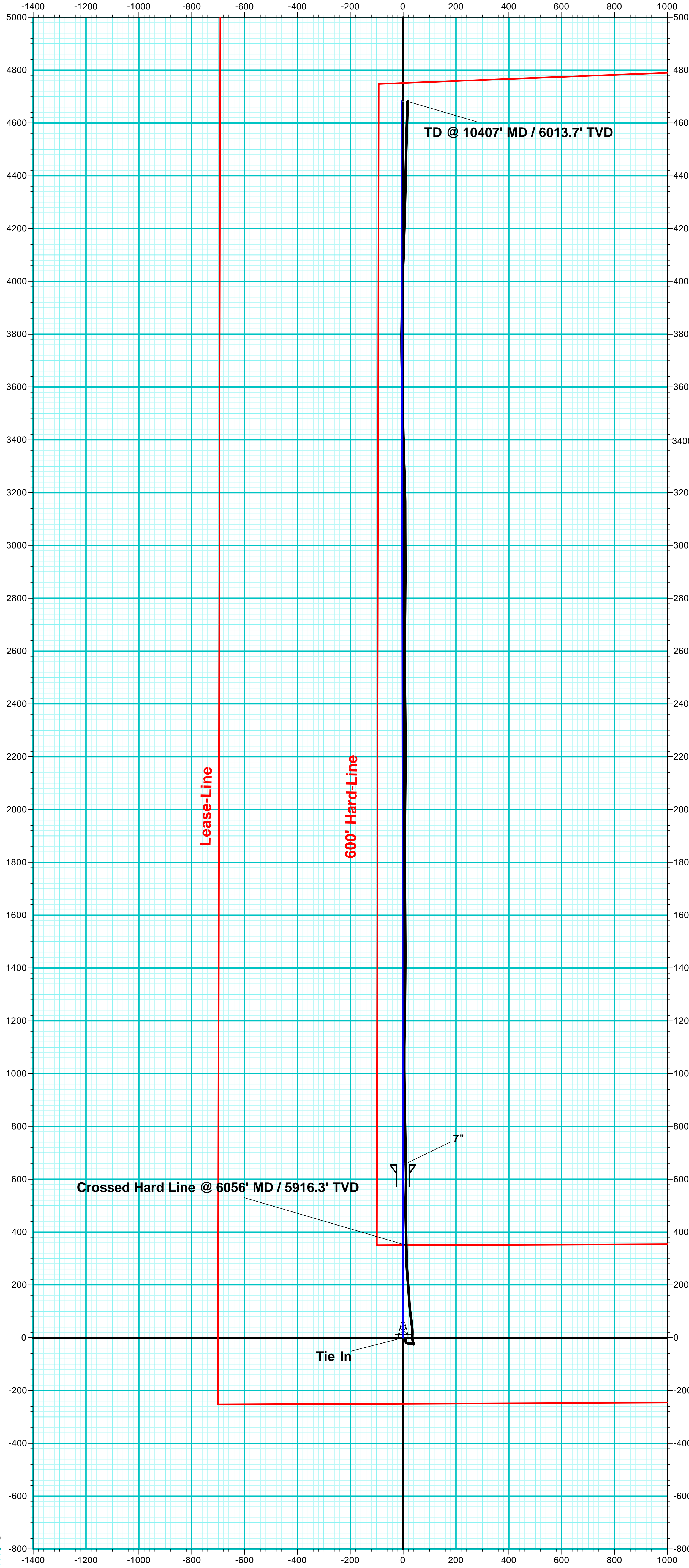
Model: IGRF2010

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:		McClellan PC LG03-78HN				
		Ground Level:	4802.0			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.0	0.0	1495957.78	3424495.76	40° 41' 5.064 N	103° 58' 9.588 W	

ANNOTATIONS								
MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation
6056.0	60.18	359.02	5916.3	350.4	12.0	350.4	432.1	Crossed Hard Line @ 6056' MD / 5916.3' TVD
10407.0	90.80	1.60	6013.7	4681.6	17.1	4681.6	4763.9	TD @ 10407' MD / 6013.7' TVD

DESIGN TARGET DETAILS								
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
Tie In	1166.0	0.0	0.0	1495957.78	3424495.76	40° 41' 5.064 N	103° 58' 9.588 W	
- plan hits target center								
PBHL McClellan PC LG03-78HN	6008.5	4682.2	-5.7	1500640.02	3424490.04	40° 41' 51.325 N	103° 58' 8.613 W	
- plan hits target center								



Vertical Section at 359.93° (200 usft/in)