



Noble Energy Inc.

Weld County, CO

Sec 18, T9N, R58W, 6th PM

Timbro Federal LD18-74HN

Wellbore #1

Design: Wellbore #1 FINAL

DDC Survey Report

01 March, 2013



Company:	Noble Energy Inc.	Local Co-ordinate Reference:	Well Timbro Federal LD18-74HN
Project:	Weld County, CO	TVD Reference:	WELL @ 4917.0usft (H&P #326)
Site:	Sec 18, T9N, R58W, 6th PM	MD Reference:	WELL @ 4917.0usft (H&P #326)
Well:	Timbro Federal LD18-74HN	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 18, T9N, R58W, 6th PM			
Site Position:		Northing:	1,518,037.01 usft	Latitude:	40° 44' 40.121 N
From:	Lat/Long	Easting:	3,442,172.18 usft	Longitude:	103° 54' 15.020 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.03 °

Well	Timbro Federal LD18-74HN					
Well Position	+N-S	0.0 usft	Northing:	1,518,037.00 usft	Latitude:	40° 44' 40.121 N
	+E-W	0.0 usft	Easting:	3,442,172.18 usft	Longitude:	103° 54' 15.020 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,887.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/9/2013	8.21	67.41	53,233

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	356.25	

Survey Program		Date	3/1/2013		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
935.0	10,271.0	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)	
899.0	0.00	0.00	899.0	0.0	0.0	0.0	0.00	0.00	0.00	
935.0	0.80	58.70	935.0	0.1	0.2	0.1	2.22	2.22	0.00	
1,215.0	0.50	43.50	1,215.0	2.0	2.7	1.8	0.12	-0.11	-5.43	
1,493.0	0.50	64.80	1,493.0	3.4	4.7	3.1	0.07	0.00	7.66	
1,772.0	0.60	65.90	1,772.0	4.5	7.1	4.1	0.04	0.04	0.39	
1,866.0	3.20	193.70	1,865.9	2.2	6.9	1.7	3.83	2.77	135.96	
1,960.0	4.30	188.40	1,959.7	-3.8	5.8	-4.2	1.23	1.17	-5.64	
2,055.0	6.20	206.10	2,054.3	-12.0	3.0	-12.1	2.61	2.00	18.63	
2,149.0	8.20	214.80	2,147.6	-22.0	-3.1	-21.8	2.42	2.13	9.26	
2,242.0	10.60	219.70	2,239.3	-34.1	-12.3	-33.2	2.72	2.58	5.27	

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Well:	Timbro Federal LD18-74HN	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)
2,337.0	12.80	218.40	2,332.3	-49.0	-24.4	-47.3	2.33	2.32	-1.37
2,430.0	12.20	219.30	2,423.1	-64.7	-37.0	-62.2	0.68	-0.65	0.97
2,525.0	11.60	218.30	2,516.1	-80.0	-49.3	-76.6	0.67	-0.63	-1.05
2,620.0	12.60	221.60	2,609.0	-95.2	-62.1	-91.0	1.28	1.05	3.47
2,715.0	12.90	222.50	2,701.6	-110.8	-76.2	-105.6	0.38	0.32	0.95
2,810.0	12.60	221.60	2,794.3	-126.4	-90.2	-120.2	0.38	-0.32	-0.95
2,905.0	12.30	222.30	2,887.1	-141.6	-103.9	-134.5	0.35	-0.32	0.74
3,000.0	11.60	221.60	2,980.0	-156.2	-117.1	-148.2	0.75	-0.74	-0.74
3,095.0	9.50	228.30	3,073.4	-168.6	-129.2	-159.8	2.56	-2.21	7.05
3,190.0	5.50	237.10	3,167.6	-176.3	-138.9	-166.8	4.37	-4.21	9.26
3,285.0	5.50	240.40	3,262.1	-181.0	-146.7	-171.0	0.33	0.00	3.47
3,380.0	4.70	233.70	3,356.8	-185.5	-153.8	-175.1	1.05	-0.84	-7.05
3,475.0	4.70	234.40	3,451.4	-190.1	-160.1	-179.2	0.06	0.00	0.74
3,569.0	4.70	236.40	3,545.1	-194.5	-166.4	-183.2	0.17	0.00	2.13
3,664.0	3.00	246.90	3,639.9	-197.6	-172.0	-185.9	1.93	-1.79	11.05
3,759.0	1.70	206.00	3,734.8	-199.9	-174.9	-188.0	2.15	-1.37	-43.05
3,854.0	1.70	207.60	3,829.8	-202.4	-176.1	-190.4	0.05	0.00	1.68
3,949.0	1.30	224.80	3,924.7	-204.4	-177.6	-192.3	0.63	-0.42	18.11
4,044.0	1.00	233.40	4,019.7	-205.6	-179.0	-193.5	0.36	-0.32	9.05
4,139.0	1.00	237.30	4,114.7	-206.6	-180.3	-194.3	0.07	0.00	4.11
4,234.0	1.20	245.50	4,209.7	-207.4	-182.0	-195.1	0.27	0.21	8.63
4,328.0	1.40	250.40	4,303.7	-208.2	-183.9	-195.8	0.24	0.21	5.21
4,423.0	0.80	219.00	4,398.7	-209.1	-185.4	-196.6	0.87	-0.63	-33.05
4,518.0	0.90	206.70	4,493.6	-210.3	-186.2	-197.7	0.22	0.11	-12.95
4,613.0	1.10	230.10	4,588.6	-211.6	-187.2	-198.9	0.47	0.21	24.63
4,708.0	0.90	247.10	4,683.6	-212.5	-188.6	-199.7	0.37	-0.21	17.89
4,803.0	0.90	241.80	4,778.6	-213.1	-190.0	-200.2	0.09	0.00	-5.58
5,088.0	1.10	67.40	5,063.6	-213.1	-189.4	-200.3	0.70	0.07	-61.19
5,119.0	1.00	63.10	5,094.6	-212.9	-188.9	-200.1	0.41	-0.32	-13.87
5,181.0	0.70	69.60	5,156.6	-212.5	-188.1	-199.7	0.51	-0.48	10.48
5,276.0	3.40	15.40	5,251.5	-209.6	-186.8	-196.9	3.20	2.84	-57.05
5,371.0	9.90	346.60	5,345.8	-198.9	-187.9	-186.2	7.48	6.84	-30.32
5,466.0	17.80	13.70	5,438.1	-176.8	-186.4	-164.2	10.55	8.32	28.53
5,561.0	26.40	12.30	5,526.0	-142.0	-178.4	-130.0	9.07	9.05	-1.47
5,656.0	33.90	4.70	5,608.2	-94.9	-171.7	-83.4	8.84	7.89	-8.00
5,751.0	39.00	356.60	5,684.6	-38.5	-171.3	-27.3	7.37	5.37	-8.53
5,846.0	49.80	359.60	5,752.4	27.8	-173.4	39.1	11.58	11.37	3.16
5,941.0	58.20	2.40	5,808.2	104.5	-171.9	115.6	9.16	8.84	2.95
6,036.0	64.40	1.40	5,853.8	187.8	-169.2	198.4	6.59	6.53	-1.05
6,130.0	69.60	358.50	5,890.5	274.3	-169.3	284.8	6.22	5.53	-3.09
6,175.0	73.10	359.30	5,904.9	316.9	-170.1	327.3	7.96	7.78	1.78
CROSSED HARD LINE @ 6206' MD / 5914' TVD									
6,206.1	73.85	0.05	5,913.7	346.7	-170.3	357.1	3.33	2.40	2.41
6,225.0	74.30	0.50	5,918.9	364.9	-170.2	375.2	3.33	2.40	2.39

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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)
6,270.0	75.10	358.90	5,930.8	408.3	-170.4	418.6	3.86	1.78	-3.56
6,320.0	81.40	355.90	5,941.0	457.2	-172.7	467.5	13.90	12.60	-6.00
6,385.0	86.30	355.70	5,947.9	521.6	-177.4	532.1	7.54	7.54	-0.31
6,480.0	85.90	353.80	5,954.4	616.0	-186.1	626.8	2.04	-0.42	-2.00
6,573.0	87.70	356.10	5,959.6	708.4	-194.2	719.6	3.14	1.94	2.47
6,668.0	89.90	359.10	5,961.6	803.3	-198.2	814.6	3.92	2.32	3.16
6,763.0	89.80	358.00	5,961.8	898.3	-200.6	909.5	1.16	-0.11	-1.16
6,858.0	89.50	357.80	5,962.4	993.2	-204.1	1,004.5	0.38	-0.32	-0.21
6,953.0	89.50	356.30	5,963.2	1,088.1	-209.0	1,099.4	1.58	0.00	-1.58
7,048.0	91.00	358.70	5,962.8	1,183.0	-213.1	1,194.4	2.98	1.58	2.53
7,143.0	91.40	359.30	5,960.8	1,278.0	-214.8	1,289.3	0.76	0.42	0.63
7,238.0	89.20	357.80	5,960.3	1,372.9	-217.2	1,384.2	2.80	-2.32	-1.58
7,333.0	89.40	358.00	5,961.5	1,467.8	-220.7	1,479.1	0.30	0.21	0.21
7,428.0	89.80	356.60	5,962.2	1,562.7	-225.1	1,574.1	1.53	0.42	-1.47
7,523.0	89.80	354.30	5,962.5	1,657.4	-232.7	1,669.1	2.42	0.00	-2.42
7,618.0	89.80	356.30	5,962.8	1,752.1	-240.5	1,764.1	2.11	0.00	2.11
7,713.0	89.80	354.90	5,963.1	1,846.8	-247.7	1,859.1	1.47	0.00	-1.47
7,808.0	90.00	357.30	5,963.3	1,941.6	-254.2	1,954.1	2.54	0.21	2.53
7,903.0	88.70	0.50	5,964.4	2,036.6	-256.0	2,048.9	3.64	-1.37	3.37
7,998.0	89.60	0.00	5,965.8	2,131.5	-255.6	2,143.7	1.08	0.95	-0.53
8,093.0	89.30	0.00	5,966.7	2,226.5	-255.6	2,238.5	0.32	-0.32	0.00
8,188.0	90.20	359.60	5,967.1	2,321.5	-255.9	2,333.3	1.04	0.95	-0.42
8,283.0	89.90	359.40	5,967.0	2,416.5	-256.8	2,428.2	0.38	-0.32	-0.21
8,378.0	89.70	359.60	5,967.4	2,511.5	-257.6	2,523.0	0.30	-0.21	0.21
8,473.0	89.90	358.50	5,967.7	2,606.5	-259.2	2,617.9	1.18	0.21	-1.16
8,567.0	89.90	357.00	5,967.9	2,700.4	-262.9	2,711.9	1.60	0.00	-1.60
8,662.0	90.70	359.30	5,967.4	2,795.4	-265.9	2,806.8	2.56	0.84	2.42
8,757.0	89.80	359.60	5,967.0	2,890.4	-266.8	2,901.6	1.00	-0.95	0.32
8,852.0	89.80	357.50	5,967.3	2,985.3	-269.3	2,996.6	2.21	0.00	-2.21
8,947.0	88.90	1.20	5,968.4	3,080.3	-270.3	3,091.4	4.01	-0.95	3.89
9,042.0	89.80	0.30	5,969.4	3,175.3	-269.1	3,186.1	1.34	0.95	-0.95
9,137.0	89.20	358.70	5,970.3	3,270.3	-269.9	3,280.9	1.80	-0.63	-1.68
9,232.0	89.50	358.90	5,971.4	3,365.3	-271.9	3,375.8	0.38	0.32	0.21
9,327.0	89.50	358.90	5,972.2	3,460.2	-273.7	3,470.7	0.00	0.00	0.00
9,422.0	89.10	358.50	5,973.3	3,555.2	-275.9	3,565.6	0.60	-0.42	-0.42
9,517.0	89.40	356.30	5,974.6	3,650.1	-280.2	3,660.6	2.34	0.32	-2.32
9,612.0	89.40	354.50	5,975.6	3,744.8	-287.8	3,755.6	1.89	0.00	-1.89
9,707.0	90.00	357.30	5,976.1	3,839.5	-294.6	3,850.6	3.01	0.63	2.95
9,802.0	91.40	2.90	5,974.9	3,934.5	-294.4	3,945.3	6.08	1.47	5.89
9,896.0	91.70	2.20	5,972.4	4,028.3	-290.3	4,038.7	0.81	0.32	-0.74
9,991.0	90.40	2.40	5,970.6	4,123.3	-286.4	4,133.2	1.38	-1.37	0.21
10,086.0	90.20	1.50	5,970.1	4,218.2	-283.2	4,227.7	0.97	-0.21	-0.95
10,181.0	90.90	2.60	5,969.2	4,313.1	-279.8	4,322.2	1.37	0.74	1.16

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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)	
10,224.0	91.20	3.30	5,968.4	4,356.1	-277.6	4,364.9	1.77	0.70	1.63	
TD @ 10271' MD / 5968' TVD										
10,271.0	91.20	3.30	5,967.5	4,403.0	-274.9	4,411.5	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
6,206.1	5,913.7	346.7	-170.3	CROSSED HARD LINE @ 6206' MD / 5914' TVD	
10,271.0	5,967.5	4,403.0	-274.9	TD @ 10271' MD / 5968' TVD	

Checked By: _____ Approved By: _____ Date: _____



Survey Certification Sheet

Noble Energy
Company

RM-13139
Job Number

3/1/13
Date

Sec18,T9N,R58W,6thPM
Lease

Timbro Federal LD18-74HN
Well Name

Weld, CO
County & State

API: 05-123-36263

Surveyed from a depth of: 899 feet to 10271 feet MD

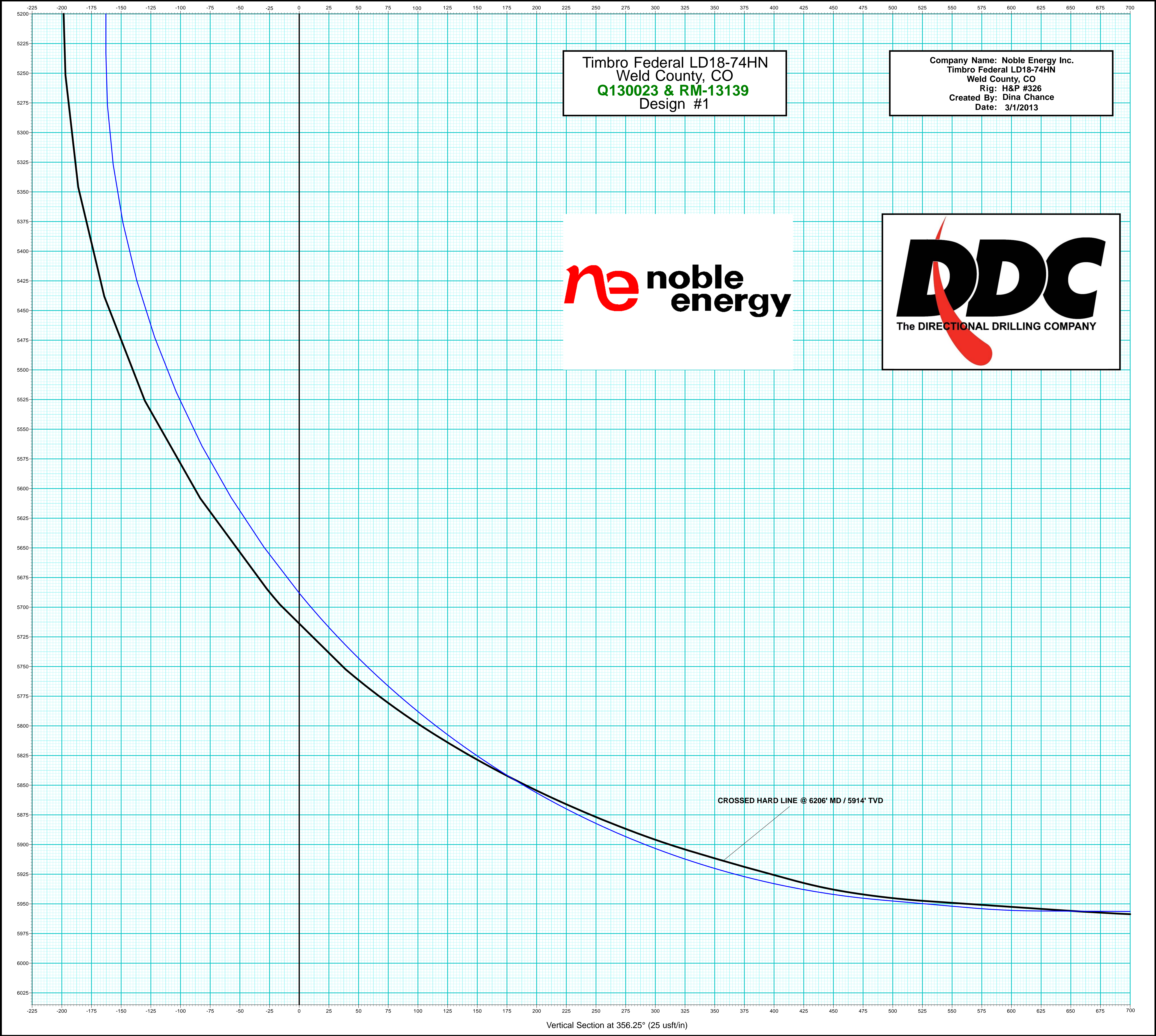
Type of Survey: MWD

Directional Supervisor/Surveyor: Justin Abbott

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: 2013.04.22 11:55:07 -05'00'

Larry Wright
MWD General Manager



Timbro Federal LD18-74HN
Weld County, CO
Q130023 & RM-13139
Design #1

Company Name: Noble Energy Inc.
Timbro Federal LD18-74HN
Weld County, CO
Rig: H&P #326
Created By: Dina Chance
Date: 3/1/2013



Vertical Section at 356.25° (25 usft/in)

Company Name: Noble Energy Inc.
Timbro Federal LD18-74HN
Weld County, CO
Rig: H&P #326
Created By: Dina Chance
Date: 3/1/2013

Timbro Federal LD18-74HN
Weld County, CO
Q130023 & RM-13139
Design #1

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



TGM

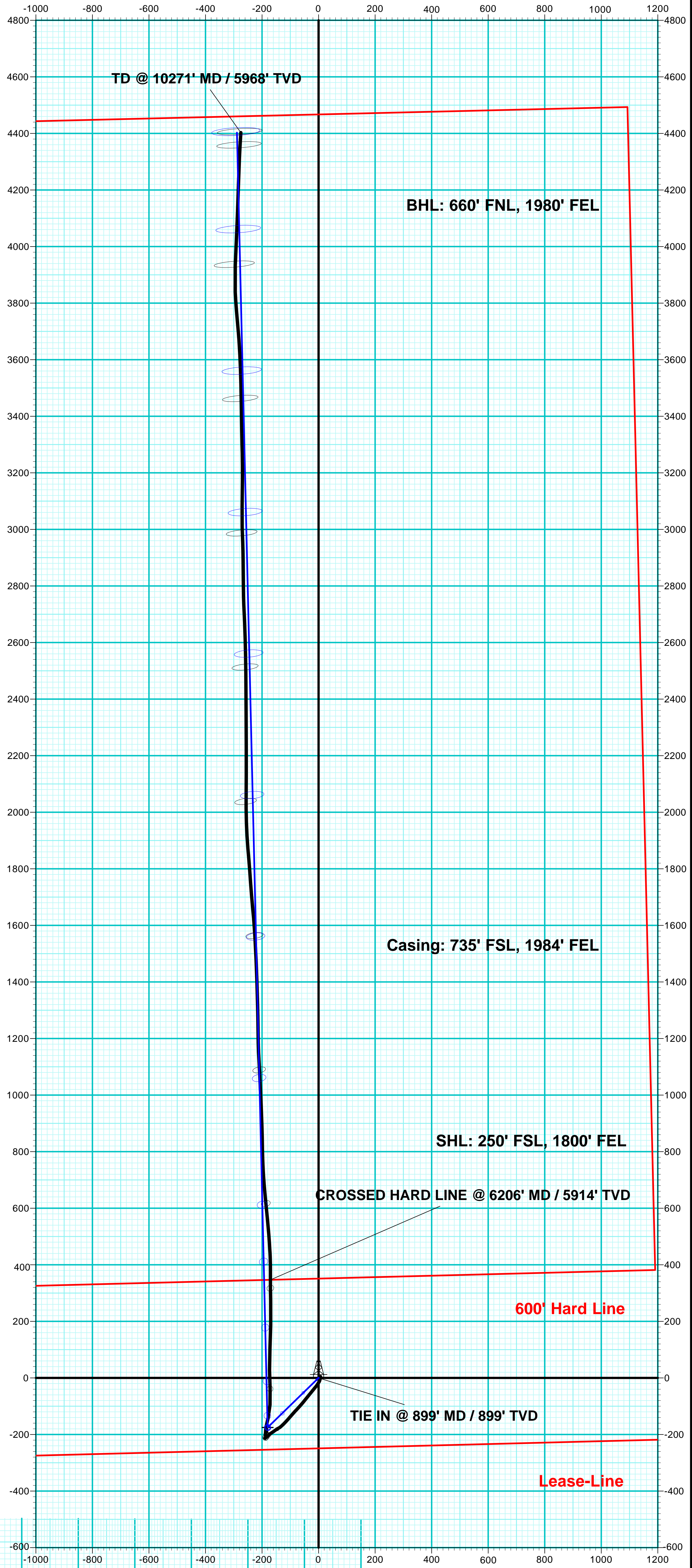
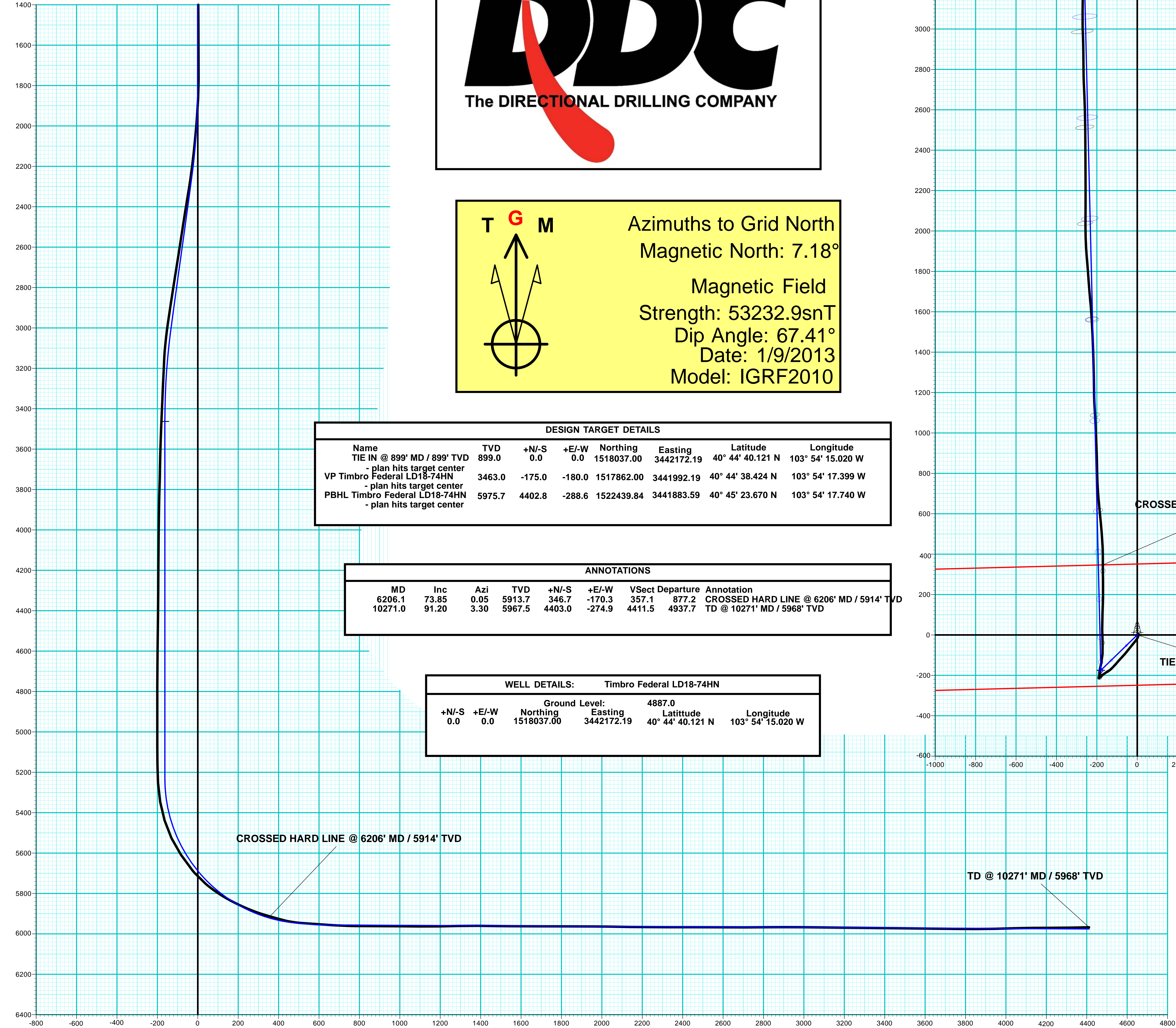
Azimuths to Grid North
Magnetic North: 7.18°

Magnetic Field
Strength: 53232.9snT
Dip Angle: 67.41°
Date: 1/9/2013
Model: IGRF2010

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
TIE IN @ 899' MD / 899' TVD - plan hits target center	899.0	0.0	0.0	1518037.00	3442172.19	40° 44' 40.121 N	103° 54' 15.020 W
VP Timbro Federal LD18-74HN - plan hits target center	3463.0	-175.0	-180.0	1517862.00	3441992.19	40° 44' 38.424 N	103° 54' 17.399 W
PBHL Timbro Federal LD18-74HN - plan hits target center	5975.7	4402.8	-288.6	1522439.84	3441883.59	40° 45' 23.670 N	103° 54' 17.740 W

ANNOTATIONS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation	
6206.1	73.85	0.05	5913.7	346.7	-170.3	357.1	877.2	CROSSED HARD LINE @ 6206' MD / 5914' TVD	
10271.0	91.20	3.30	5967.5	4403.0	-274.9	4411.5	4937.7	TD @ 10271' MD / 5968' TVD	

WELL DETAILS: Timbro Federal LD18-74HN					
Ground Level:			4887.0		
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1518037.00	3442172.19	40° 44' 40.121 N	103° 54' 15.020 W



Vertical Section at 356.25° (200 usft/in)