



Noble Energy Inc.

Weld County, CO

Sec 17, T9N, R58W, 6th PM

Timbro Federal LD17-76HN

Wellbore #1

Design: Wellbore #1 FINAL

DDC Survey Report

14 February, 2013



Company:	Noble Energy Inc.	Local Co-ordinate Reference:	Well Timbro Federal LD17-76HN
Project:	Weld County, CO	TVD Reference:	WELL @ 4898.0usft (H&P #326)
Site:	Sec 17, T9N, R58W, 6th PM	MD Reference:	WELL @ 4898.0usft (H&P #326)
Well:	Timbro Federal LD17-76HN	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 17, T9N, R58W, 6th PM			
Site Position:		Northing:	1,518,402.36 usft	Latitude:	40° 44' 42.980 N
From:	Map	Easting:	3,446,371.93 usft	Longitude:	103° 53' 20.380 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.04 °

Well	Timbro Federal LD17-76HN					
Well Position	+N-S	0.0 usft	Northing:	1,518,402.36 usft	Latitude:	40° 44' 42.980 N
	+E-W	0.0 usft	Easting:	3,446,371.93 usft	Longitude:	103° 53' 20.380 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,868.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/9/2013	8.20	67.41	53,235

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	352.75	

Survey Program		Date	2/14/2013		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
741.0	10,251.0	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)	
673.0	0.00	0.00	673.0	0.0	0.0	0.0	0.00	0.00	0.00	
741.0	0.20	9.60	741.0	0.1	0.0	0.1	0.29	0.29	0.00	
932.0	0.20	349.40	932.0	0.8	0.0	0.8	0.04	0.00	-10.58	
1,212.0	0.20	296.70	1,212.0	1.5	-0.5	1.5	0.06	0.00	-18.82	
1,492.0	0.30	320.60	1,492.0	2.3	-1.4	2.4	0.05	0.04	8.54	
1,585.0	3.30	239.40	1,584.9	1.1	-3.9	1.6	3.51	3.23	-87.31	
1,678.0	5.20	227.90	1,677.7	-3.1	-9.3	-1.9	2.23	2.04	-12.37	
1,771.0	6.40	215.80	1,770.2	-10.1	-15.5	-8.1	1.84	1.29	-13.01	
1,865.0	8.40	225.30	1,863.4	-19.2	-23.4	-16.1	2.49	2.13	10.11	
1,957.0	10.80	232.00	1,954.1	-29.2	-35.0	-24.6	2.87	2.61	7.28	

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Well:	Timbro Federal LD17-76HN	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)
2,051.0	12.10	228.50	2,046.3	-41.2	-49.3	-34.6	1.57	1.38	-3.72
2,145.0	14.50	219.70	2,137.7	-56.8	-64.2	-48.2	3.33	2.55	-9.36
2,238.0	14.10	220.20	2,227.9	-74.4	-78.9	-63.8	0.45	-0.43	0.54
2,333.0	12.20	220.20	2,320.4	-90.9	-92.9	-78.5	2.00	-2.00	0.00
2,428.0	14.30	222.10	2,412.8	-107.3	-107.2	-92.9	2.26	2.21	2.00
2,522.0	14.40	223.20	2,503.9	-124.4	-123.0	-107.9	0.31	0.11	1.17
2,617.0	16.40	222.70	2,595.5	-142.9	-140.2	-124.0	2.11	2.11	-0.53
2,712.0	16.30	222.10	2,686.6	-162.6	-158.2	-141.4	0.21	-0.11	-0.63
2,807.0	15.60	221.30	2,778.0	-182.1	-175.6	-158.5	0.77	-0.74	-0.84
2,902.0	14.90	221.80	2,869.6	-200.8	-192.2	-175.0	0.75	-0.74	0.53
2,997.0	13.40	219.90	2,961.8	-218.4	-207.4	-190.5	1.65	-1.58	-2.00
3,092.0	12.40	212.50	3,054.4	-235.4	-219.9	-205.8	2.03	-1.05	-7.79
3,187.0	11.70	223.00	3,147.3	-251.1	-232.0	-219.8	2.42	-0.74	11.05
3,282.0	14.70	224.10	3,239.8	-266.8	-246.9	-233.5	3.17	3.16	1.16
3,377.0	15.30	223.70	3,331.5	-284.5	-264.0	-248.9	0.64	0.63	-0.42
3,472.0	13.80	223.90	3,423.5	-301.7	-280.5	-263.9	1.58	-1.58	0.21
3,567.0	13.90	224.90	3,515.7	-318.0	-296.4	-278.0	0.27	0.11	1.05
3,663.0	14.20	225.30	3,608.8	-334.4	-312.9	-292.2	0.33	0.31	0.42
3,758.0	13.10	223.90	3,701.2	-350.4	-328.7	-306.1	1.21	-1.16	-1.47
3,853.0	11.20	223.70	3,794.0	-364.8	-342.5	-318.7	2.00	-2.00	-0.21
3,948.0	10.10	225.50	3,887.4	-377.3	-354.8	-329.5	1.21	-1.16	1.89
4,043.0	8.20	224.60	3,981.2	-388.0	-365.5	-338.7	2.01	-2.00	-0.95
4,138.0	7.40	220.70	4,075.3	-397.4	-374.3	-347.0	1.01	-0.84	-4.11
4,233.0	6.50	215.10	4,169.6	-406.5	-381.4	-355.1	1.18	-0.95	-5.89
4,328.0	4.80	188.90	4,264.1	-414.8	-385.1	-362.9	3.21	-1.79	-27.58
4,423.0	3.90	176.90	4,358.9	-422.0	-385.5	-369.9	1.34	-0.95	-12.63
4,518.0	3.80	191.00	4,453.7	-428.3	-385.9	-376.1	1.00	-0.11	14.84
4,613.0	1.90	220.00	4,548.5	-432.6	-387.5	-380.2	2.45	-2.00	30.53
4,708.0	1.20	246.20	4,643.5	-434.2	-389.5	-381.6	1.03	-0.74	27.58
4,803.0	1.20	257.60	4,738.5	-434.8	-391.4	-381.9	0.25	0.00	12.00
4,898.0	2.60	241.30	4,833.4	-436.0	-394.2	-382.8	1.57	1.47	-17.16
4,993.0	2.50	225.30	4,928.3	-438.5	-397.6	-384.8	0.75	-0.11	-16.84
5,088.0	1.80	235.10	5,023.3	-440.8	-400.3	-386.8	0.83	-0.74	10.32
5,179.0	1.60	252.70	5,114.2	-442.0	-402.7	-387.7	0.61	-0.22	19.34
5,274.0	2.10	286.80	5,209.2	-441.9	-405.6	-387.2	1.25	0.53	35.89
5,369.0	10.90	338.30	5,303.5	-433.1	-410.6	-377.8	10.24	9.26	54.21
5,464.0	21.50	343.40	5,394.6	-408.0	-418.9	-351.8	11.25	11.16	5.37
5,559.0	27.90	342.70	5,480.9	-370.0	-430.5	-312.7	6.74	6.74	-0.74
5,654.0	32.80	340.40	5,562.8	-324.5	-445.8	-265.7	5.30	5.16	-2.42
5,749.0	37.10	344.30	5,640.7	-272.7	-462.1	-212.2	5.10	4.53	4.11
5,844.0	44.70	354.90	5,712.5	-211.6	-472.9	-150.3	10.81	8.00	11.16
5,939.0	55.00	357.00	5,773.7	-139.3	-477.9	-77.9	10.97	10.84	2.21
6,034.0	62.40	358.50	5,823.0	-58.3	-481.1	2.9	7.91	7.79	1.58
6,129.0	71.90	8.40	5,860.0	28.9	-475.5	88.7	13.85	10.00	10.42

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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)
6,174.0	74.70	9.80	5,872.9	71.4	-468.7	130.0	6.90	6.22	3.11
CROSSED HARD LINE @ 6191' MD / 5877' TVD									
6,190.5	75.56	9.27	5,877.1	87.2	-466.1	145.3	6.06	5.19	-3.22
6,224.0	77.30	8.20	5,885.0	119.3	-461.1	176.6	6.06	5.20	-3.19
6,269.0	80.10	5.20	5,893.8	163.2	-456.0	219.4	9.02	6.22	-6.67
6,319.0	80.80	3.30	5,902.1	212.3	-452.3	267.7	4.00	1.40	-3.80
6,351.0	81.30	2.20	5,907.1	243.9	-450.8	298.8	3.74	1.56	-3.44
6,414.0	84.40	1.90	5,914.9	306.4	-448.6	360.5	4.94	4.92	-0.48
6,476.0	86.60	2.00	5,919.8	368.1	-446.5	421.5	3.55	3.55	0.16
6,569.0	89.60	0.10	5,922.9	461.1	-444.8	513.5	3.82	3.23	-2.04
6,664.0	89.90	359.20	5,923.3	556.0	-445.4	607.8	1.00	0.32	-0.95
6,759.0	89.70	359.20	5,923.6	651.0	-446.7	702.2	0.21	-0.21	0.00
6,854.0	90.10	359.60	5,923.8	746.0	-447.7	796.6	0.60	0.42	0.42
6,949.0	90.60	359.20	5,923.2	841.0	-448.7	890.9	0.67	0.53	-0.42
7,043.0	90.90	358.70	5,922.0	935.0	-450.4	984.4	0.62	0.32	-0.53
7,138.0	91.30	358.70	5,920.2	1,030.0	-452.6	1,078.8	0.42	0.42	0.00
7,233.0	91.40	357.80	5,917.9	1,124.9	-455.5	1,173.4	0.95	0.11	-0.95
7,328.0	91.60	357.00	5,915.4	1,219.8	-459.8	1,268.0	0.87	0.21	-0.84
7,423.0	88.60	359.10	5,915.3	1,314.7	-463.0	1,362.6	3.85	-3.16	2.21
7,518.0	88.20	358.20	5,917.9	1,409.6	-465.2	1,457.1	1.04	-0.42	-0.95
7,612.0	87.60	357.80	5,921.4	1,503.5	-468.5	1,550.6	0.77	-0.64	-0.43
7,707.0	87.30	358.70	5,925.6	1,598.4	-471.4	1,645.1	1.00	-0.32	0.95
7,802.0	89.30	0.80	5,928.4	1,693.3	-471.8	1,739.3	3.05	2.11	2.21
7,897.0	89.60	0.50	5,929.3	1,788.3	-470.8	1,833.4	0.45	0.32	-0.32
7,992.0	91.70	0.10	5,928.2	1,883.3	-470.3	1,927.6	2.25	2.21	-0.42
8,087.0	92.60	359.60	5,924.7	1,978.2	-470.5	2,021.8	1.08	0.95	-0.53
8,181.0	91.00	0.80	5,921.7	2,072.2	-470.2	2,114.9	2.13	-1.70	1.28
8,276.0	90.70	0.10	5,920.3	2,167.1	-469.4	2,209.1	0.80	-0.32	-0.74
8,371.0	90.50	359.80	5,919.3	2,262.1	-469.5	2,303.3	0.38	-0.21	-0.32
8,466.0	90.10	359.80	5,918.8	2,357.1	-469.8	2,397.6	0.42	-0.42	0.00
8,561.0	90.60	359.20	5,918.2	2,452.1	-470.7	2,491.9	0.82	0.53	-0.63
8,656.0	90.70	358.70	5,917.2	2,547.1	-472.4	2,586.4	0.54	0.11	-0.53
8,751.0	91.30	358.40	5,915.5	2,642.1	-474.8	2,680.9	0.71	0.63	-0.32
8,846.0	88.70	357.80	5,915.5	2,737.0	-478.0	2,775.4	2.81	-2.74	-0.63
8,941.0	88.70	357.30	5,917.7	2,831.9	-482.0	2,870.1	0.53	0.00	-0.53
9,036.0	89.10	356.30	5,919.5	2,926.7	-487.3	2,964.8	1.13	0.42	-1.05
9,131.0	89.50	356.30	5,920.6	3,021.5	-493.5	3,059.6	0.42	0.42	0.00
9,226.0	90.00	355.70	5,921.1	3,116.3	-500.1	3,154.5	0.82	0.53	-0.63
9,321.0	90.60	354.90	5,920.6	3,211.0	-507.9	3,249.4	1.05	0.63	-0.84
9,416.0	89.70	355.70	5,920.3	3,305.6	-515.7	3,344.3	1.27	-0.95	0.84
9,511.0	90.10	357.10	5,920.5	3,400.5	-521.6	3,439.1	1.53	0.42	1.47
9,606.0	89.70	354.70	5,920.6	3,495.2	-528.4	3,533.9	2.56	-0.42	-2.53
9,701.0	91.80	355.70	5,919.4	3,589.9	-536.4	3,628.8	2.45	2.21	1.05

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Well:	Timbro Federal LD17-76HN	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)	
9,796.0	92.50	359.10	5,915.8	3,684.7	-540.7	3,723.5	3.65	0.74	3.58	
9,891.0	90.70	0.50	5,913.2	3,779.6	-541.0	3,817.7	2.40	-1.89	1.47	
9,986.0	89.90	359.10	5,912.7	3,874.6	-541.3	3,912.0	1.70	-0.84	-1.47	
10,081.0	90.50	357.00	5,912.4	3,969.6	-544.6	4,006.6	2.30	0.63	-2.21	
10,176.0	91.40	356.10	5,910.8	4,064.4	-550.3	4,101.3	1.34	0.95	-0.95	
10,207.0	91.50	355.50	5,910.0	4,095.3	-552.5	4,132.3	1.96	0.32	-1.94	
TD @ 10251' MD / 5909' TVD										
10,251.0	91.50	355.50	5,908.8	4,139.1	-556.0	4,176.2	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
6,190.5	5,877.1	87.2	-466.1	CROSSED HARD LINE @ 6191' MD / 5877' TVD	
10,251.0	5,908.8	4,139.1	-556.0	TD @ 10251' MD / 5909' TVD	

Checked By: _____ Approved By: _____ Date: _____



Survey Certification Sheet

Noble Energy
Company

RM-13100
Job Number

2/14/12
Date

Sec17, T9N, R58W, 6thPM
Lease

Timbro Federal LD17-76HN
Well Name

Weld, CO
County & State

Surveyed from a depth of: 673 feet to 10251 feet MD

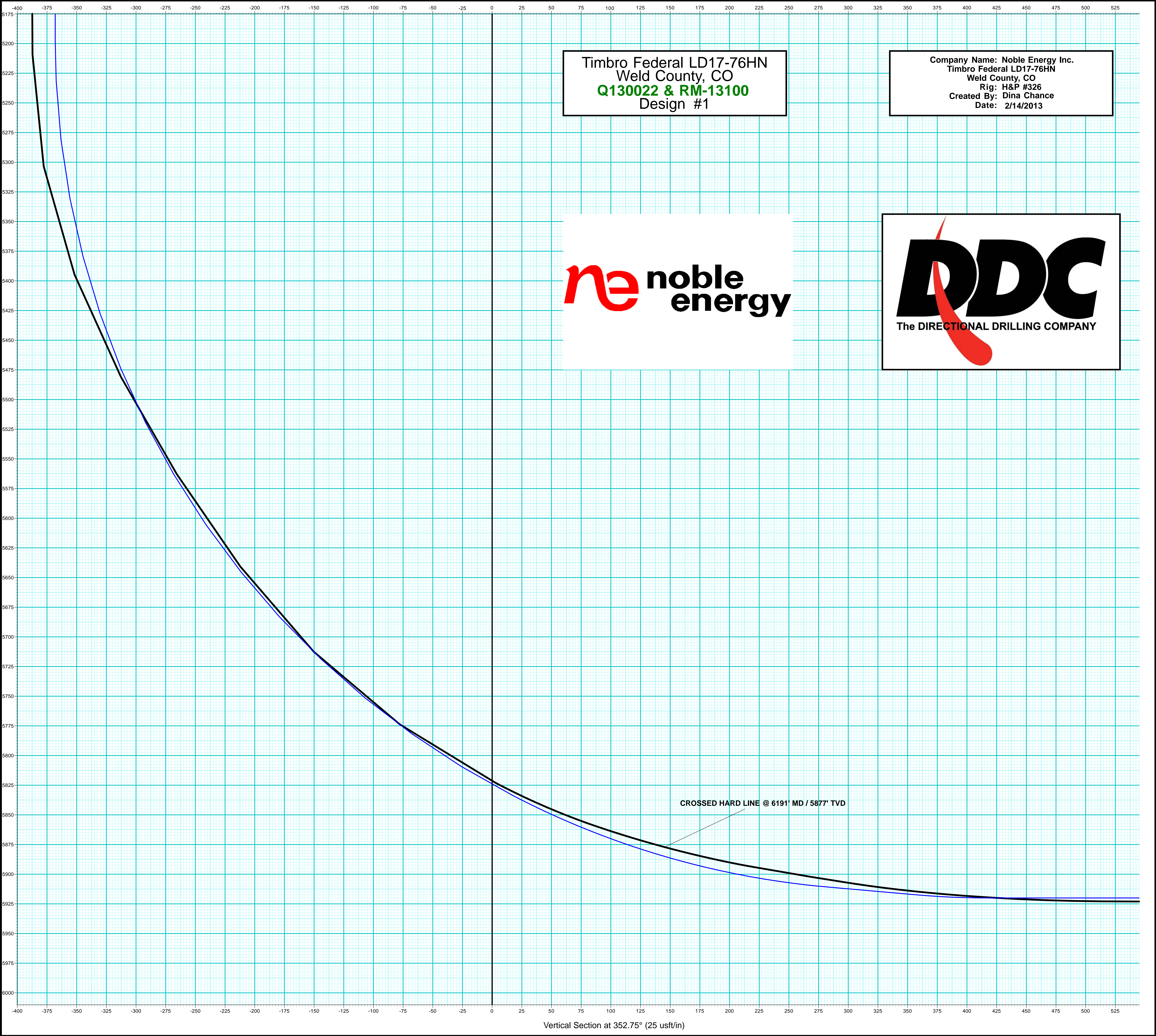
Type of Survey: MWD

Directional Supervisor/Surveyor: Chris 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.

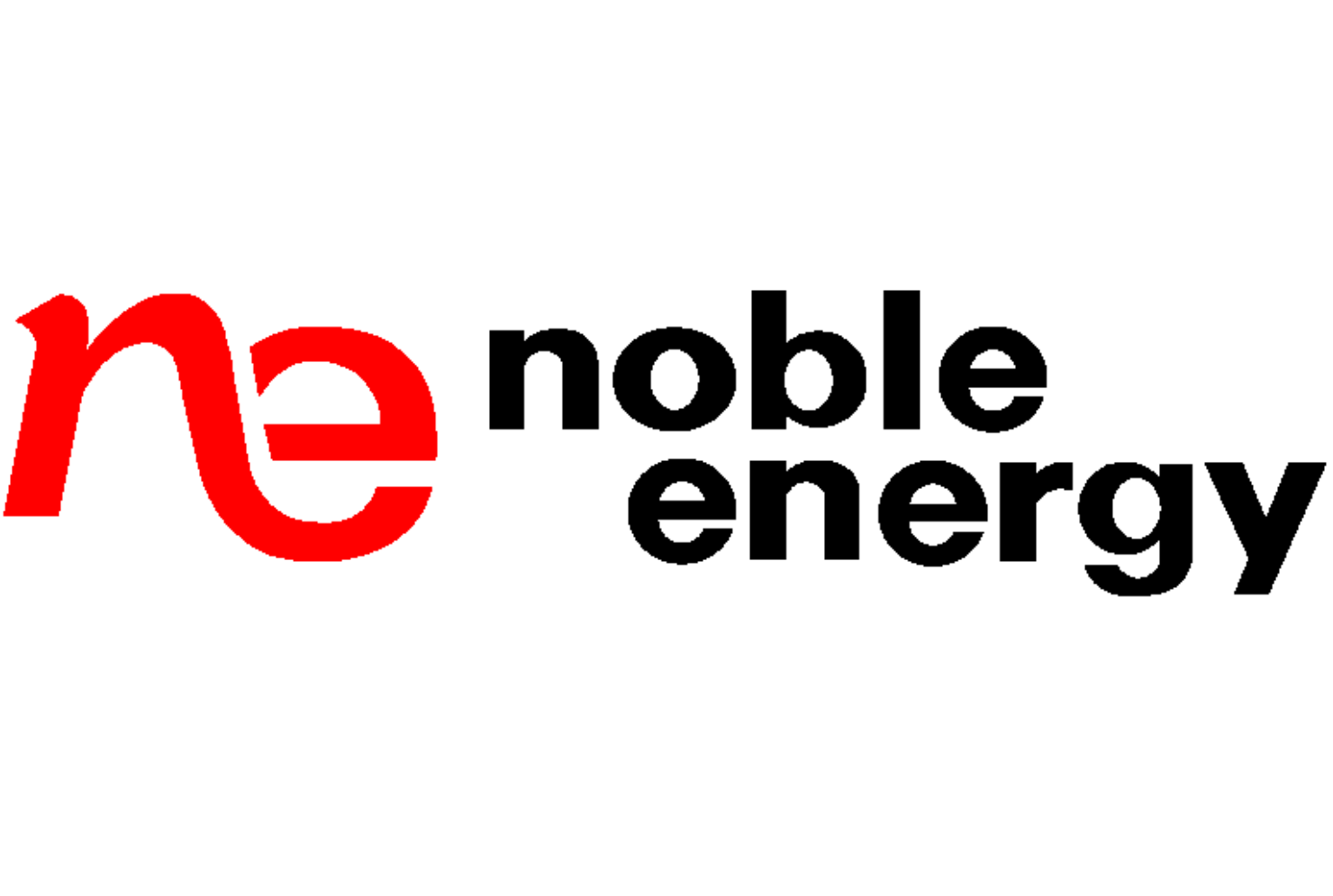
Digitally signed by Larry Wright
DN: cn=Larry Wright, o=The Directional Drilling Company, ou=GM of Guidance Services, email=larryw@directionaldrillers.com, c=US
Date: 2013.02.15 10:39:19 -06'00'

Larry Wright
MWD General Manager



Timbro Federal LD17-76HN
Weld County, CO
Q130022 & RM-13100
Design #1

Company Name: Noble Energy Inc.
Timbro Federal LD17-76HN
Weld County, CO
Rig: H&P #326
Created By: Dina Chance
Date: 2/14/2013



Vertical Section at 352.75° (25 usft/in)

Company Name: Noble Energy Inc.
Timbro Federal LD17-76HN
Weld County, CO
Rig: H&P #326
Created By: Dina Chance
Date: 2/14/2013

Timbro Federal LD17-76HN
Weld County, CO
Q130022 & RM-13100
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: 7.16°

Magnetic Field

Strength: 53235.0snT

Dip Angle: 67.41°

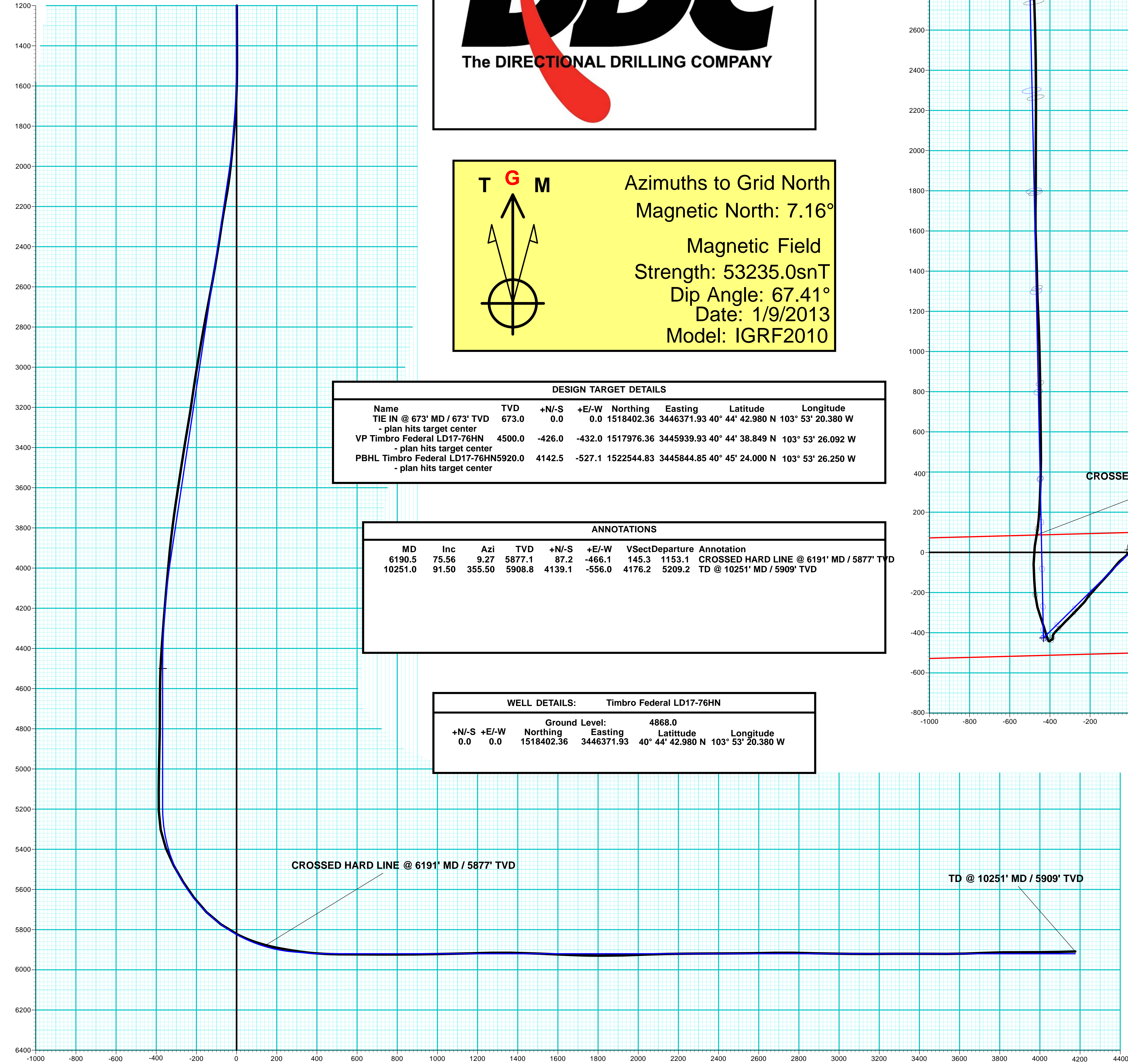
Date: 1/9/2013

Model: IGRF2010

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
TIE IN @ 673' MD / 673' TVD	673.0	0.0	0.0	1518402.36	3446371.93	40° 44' 42.980 N	103° 53' 20.380 W
- plan hits target center							
VP Timbro Federal LD17-76HN	4500.0	-426.0	-432.0	1517976.36	3445939.93	40° 44' 38.849 N	103° 53' 26.092 W
- plan hits target center							
PBHL Timbro Federal LD17-76HN5920.0	4142.5	-527.1	-522.544.83	3445844.85	40° 45' 24.000 N	103° 53' 26.250 W	
- plan hits target center							

ANNOTATIONS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Vsect	Departure	Annotation	
6190.5	75.56	9.27	5877.1	87.2	-466.1	145.3	1153.1	CROSSED HARD LINE @ 6191' MD / 5877' TVD	
10251.0	91.50	355.50	5908.8	4139.1	-556.0	4176.2	5209.2	TD @ 10251' MD / 5909' TVD	

WELL DETAILS:		Timbro Federal LD17-76HN					
		Ground Level:		4868.0			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude		
0.0	0.0	1518402.36	3446371.93	40° 44' 42.980 N	103° 53' 20.380 W		



Vertical Section at 352.75° (200 usft/in)

