



## **Noble Energy Inc.**

Weld County, CO  
Sec 27, T3N, R67W 6TH pm  
NIX P28-69HN

Wellbore #1

Survey: MWD FINAL

## **DDC Survey Report**

03 October, 2012



<b>Company:</b>	Noble Energy Inc.	<b>Local Co-ordinate Reference:</b>	Well NIX P28-69HN
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 4818.0usft (H&P #323)
<b>Site:</b>	Sec 27, T3N, R67W 6TH pm	<b>MD Reference:</b>	WELL @ 4818.0usft (H&P #323)
<b>Well:</b>	NIX P28-69HN	<b>North Reference:</b>	Grid
<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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 27, T3N, R67W 6TH pm			
Site Position:		Northing:	1,317,266.30 usft	Latitude:	40° 12' 9.720 N
From:	Lat/Long	Easting:	3,169,543.67 usft	Longitude:	104° 53' 34.836 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.39 °

Well	NIX P28-69HN					
Well Position	+N-S	0.0 usft	Northing:	1,317,266.30 usft	Latitude:	40° 12' 9.720 N
	+E-W	0.0 usft	Easting:	3,169,543.67 usft	Longitude:	104° 53' 34.836 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,794.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/4/2012	8.75	66.83	52,885

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	84.77	

Survey Program		Date	10/3/2012		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
697.0	10,953.0	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 @ 665' MD / 665' TVD									
665.0	0.00	0.00	665.0	0.0	0.0	0.0	0.00	0.00	0.00
697.0	0.30	46.20	697.0	0.1	0.1	0.1	0.94	0.94	0.00
973.0	0.20	125.80	973.0	0.3	1.0	1.0	0.12	-0.04	28.84
1,249.0	0.30	252.20	1,249.0	-0.2	0.7	0.7	0.16	0.04	45.80
1,339.0	0.20	335.10	1,339.0	-0.2	0.4	0.4	0.38	-0.11	92.11
1,431.0	1.90	347.80	1,431.0	1.5	0.0	0.1	1.85	1.85	13.80
1,526.0	3.30	343.60	1,525.9	5.6	-1.1	-0.6	1.49	1.47	-4.42
1,621.0	5.60	338.30	1,620.6	12.6	-3.6	-2.4	2.46	2.42	-5.58
1,716.0	6.70	343.90	1,715.0	22.2	-6.8	-4.8	1.32	1.16	5.89
1,811.0	7.90	335.50	1,809.3	33.5	-11.1	-8.0	1.69	1.26	-8.84

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<b>Wellbore:</b>	Wellbore #1	<b>Survey Calculation Method:</b>	Minimum Curvature
<b>Design:</b>	Wellbore #1	<b>Database:</b>	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)
1,906.0	8.90	342.90	1,903.3	46.4	-16.0	-11.7	1.55	1.05	7.79
2,001.0	10.90	350.30	1,996.8	62.3	-19.6	-13.9	2.49	2.11	7.79
2,096.0	12.30	347.30	2,089.9	81.0	-23.4	-15.9	1.60	1.47	-3.16
2,191.0	13.00	348.00	2,182.6	101.4	-27.8	-18.5	0.75	0.74	0.74
2,286.0	13.40	345.50	2,275.1	122.5	-32.8	-21.5	0.73	0.42	-2.63
2,381.0	13.10	346.00	2,367.5	143.6	-38.2	-24.9	0.34	-0.32	0.53
2,476.0	15.60	349.40	2,459.6	166.6	-43.1	-27.7	2.78	2.63	3.58
2,571.0	16.50	345.30	2,550.9	192.2	-48.9	-31.2	1.52	0.95	-4.32
2,666.0	16.40	347.10	2,642.0	218.3	-55.3	-35.2	0.55	-0.11	1.89
2,761.0	14.70	345.70	2,733.5	243.1	-61.3	-38.9	1.83	-1.79	-1.47
2,856.0	13.30	344.50	2,825.7	265.3	-67.2	-42.7	1.50	-1.47	-1.26
2,951.0	11.50	344.80	2,918.5	284.9	-72.6	-46.3	1.90	-1.89	0.32
3,046.0	9.10	345.50	3,011.9	301.4	-76.9	-49.2	2.53	-2.53	0.74
3,141.0	7.20	345.70	3,106.0	314.4	-80.3	-51.3	2.00	-2.00	0.21
3,236.0	5.60	347.30	3,200.4	324.7	-82.8	-52.8	1.69	-1.68	1.68
3,331.0	4.00	343.90	3,295.0	332.4	-84.7	-54.1	1.71	-1.68	-3.58
3,426.0	2.20	350.10	3,389.9	337.4	-86.0	-54.8	1.92	-1.89	6.53
3,521.0	1.20	23.10	3,484.8	340.1	-85.9	-54.5	1.43	-1.05	34.74
3,616.0	1.50	43.20	3,579.8	341.9	-84.6	-53.1	0.59	0.32	21.16
3,711.0	0.90	44.40	3,674.8	343.4	-83.3	-51.6	0.63	-0.63	1.26
3,806.0	0.80	46.50	3,769.8	344.3	-82.3	-50.5	0.11	-0.11	2.21
3,901.0	0.40	78.30	3,864.8	344.9	-81.5	-49.7	0.53	-0.42	33.47
3,996.0	0.80	46.00	3,959.8	345.4	-80.7	-48.8	0.54	0.42	-34.00
4,091.0	1.00	325.60	4,054.8	346.5	-80.6	-48.7	1.23	0.21	-84.63
4,186.0	0.80	308.80	4,149.8	347.6	-81.6	-49.6	0.35	-0.21	-17.68
4,281.0	2.10	319.30	4,244.7	349.4	-83.3	-51.1	1.39	1.37	11.05
4,376.0	1.90	306.00	4,339.7	351.6	-85.7	-53.3	0.53	-0.21	-14.00
4,471.0	1.80	255.50	4,434.6	352.2	-88.4	-55.9	1.66	-0.11	-53.16
4,566.0	1.90	240.70	4,529.6	351.0	-91.2	-58.8	0.51	0.11	-15.58
4,661.0	1.70	293.10	4,624.5	350.8	-93.9	-61.5	1.68	-0.21	55.16
4,756.0	2.50	314.20	4,719.5	352.8	-96.7	-64.1	1.16	0.84	22.21
4,851.0	2.50	304.40	4,814.4	355.4	-99.9	-67.1	0.45	0.00	-10.32
4,946.0	2.10	285.00	4,909.3	357.0	-103.3	-70.3	0.92	-0.42	-20.42
5,041.0	1.90	327.40	5,004.3	358.8	-105.8	-72.6	1.53	-0.21	44.63
5,135.0	2.00	314.90	5,098.2	361.3	-107.8	-74.4	0.46	0.11	-13.30
5,230.0	1.70	304.70	5,193.2	363.3	-110.1	-76.6	0.47	-0.32	-10.74
5,421.0	3.30	289.30	5,384.0	366.7	-117.6	-83.7	0.90	0.84	-8.06
5,484.0	4.20	294.00	5,446.8	368.2	-121.5	-87.4	1.51	1.43	7.46
5,516.0	3.40	297.70	5,478.8	369.2	-123.4	-89.2	2.61	-2.50	11.56
5,548.0	2.40	310.50	5,510.7	370.0	-124.7	-90.5	3.70	-3.13	40.00
5,611.0	1.10	357.50	5,573.7	371.5	-125.8	-91.4	2.91	-2.06	74.60
5,706.0	0.40	356.20	5,668.7	372.7	-125.8	-91.3	0.74	-0.74	-1.37
5,801.0	0.60	271.30	5,763.7	373.1	-126.3	-91.8	0.73	0.21	-89.37

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Survey

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5,895.0	1.10	255.00	5,857.7	372.9	-127.7	-93.2	0.59	0.53	-17.34
5,990.0	1.00	279.40	5,952.7	372.8	-129.4	-94.9	0.48	-0.11	25.68
6,085.0	1.40	252.30	6,047.6	372.5	-131.3	-96.8	0.72	0.42	-28.53
6,180.0	2.50	266.10	6,142.6	372.0	-134.5	-100.0	1.25	1.16	14.53
6,233.0	2.60	285.60	6,195.5	372.3	-136.8	-102.3	1.64	0.19	36.79
6,299.0	2.80	292.30	6,261.5	373.3	-139.7	-105.1	0.57	0.30	10.15
6,344.0	2.10	340.40	6,306.4	374.5	-141.0	-106.3	4.66	-1.56	106.89
6,394.0	6.60	71.80	6,356.3	376.3	-138.6	-103.7	13.95	9.00	182.80
6,439.0	10.50	86.40	6,400.8	377.3	-132.1	-97.1	9.85	8.67	32.44
6,489.0	15.70	90.30	6,449.5	377.6	-120.7	-85.8	10.54	10.40	7.80
6,534.0	21.40	84.70	6,492.1	378.3	-106.5	-71.5	13.26	12.67	-12.44
6,584.0	23.80	82.20	6,538.3	380.5	-87.4	-52.3	5.17	4.80	-5.00
6,629.0	25.20	83.20	6,579.2	382.9	-68.9	-33.7	3.24	3.11	2.22
6,679.0	27.40	79.90	6,624.1	386.2	-47.0	-11.6	5.28	4.40	-6.60
6,724.0	32.30	85.20	6,663.1	389.0	-24.8	10.8	12.36	10.89	11.78
6,774.0	35.80	95.00	6,704.5	388.8	3.1	38.6	13.00	7.00	19.60
6,819.0	39.90	95.40	6,740.1	386.3	30.6	65.7	9.13	9.11	0.89
6,869.0	46.50	95.00	6,776.5	383.2	64.7	99.4	13.21	13.20	-0.80
6,914.0	49.20	93.60	6,806.7	380.7	98.0	132.3	6.43	6.00	-3.11
6,964.0	53.40	92.70	6,837.9	378.6	136.9	170.9	8.52	8.40	-1.80
7,009.0	56.50	92.40	6,863.8	377.0	173.7	207.4	6.91	6.89	-0.67
7,059.0	60.30	89.80	6,890.0	376.2	216.3	249.7	8.80	7.60	-5.20
7,104.0	62.00	88.90	6,911.7	376.6	255.7	289.0	4.16	3.78	-2.00
7,154.0	63.50	91.30	6,934.6	376.5	300.1	333.2	5.22	3.00	4.80
7,199.0	68.80	93.40	6,952.8	374.8	341.2	374.0	12.53	11.78	4.67
7,249.0	76.00	93.10	6,967.9	372.1	388.8	421.1	14.41	14.40	-0.60
7,294.0	78.20	91.90	6,977.9	370.2	432.6	464.6	5.54	4.89	-2.67
7,324.0	78.90	91.00	6,983.9	369.5	462.0	493.8	3.75	2.33	-3.00
7,344.0	79.00	90.40	6,987.7	369.2	481.6	513.3	2.99	0.50	-3.00
7,381.0	79.10	90.40	6,994.7	369.0	518.0	549.4	0.27	0.27	0.00
7,468.0	85.60	89.00	7,006.3	369.4	604.1	635.3	7.64	7.47	-1.61
7,563.0	85.70	88.90	7,013.5	371.2	698.8	729.8	0.15	0.11	-0.11
7,658.0	85.20	89.20	7,021.1	372.7	793.5	824.2	0.61	-0.53	0.32
7,722.0	86.20	88.90	7,025.9	373.8	857.3	887.8	1.63	1.56	-0.47
7,753.0	87.30	88.00	7,027.6	374.6	888.3	918.7	4.58	3.55	-2.90
7,817.0	89.70	88.70	7,029.3	376.5	952.2	982.6	3.91	3.75	1.09
7,849.0	90.80	88.30	7,029.2	377.3	984.2	1,014.5	3.66	3.44	-1.25
7,944.0	91.40	87.10	7,027.3	381.1	1,079.1	1,109.4	1.41	0.63	-1.26
8,007.0	91.30	88.50	7,025.8	383.5	1,142.0	1,172.3	2.23	-0.16	2.22
8,039.0	91.20	89.00	7,025.1	384.2	1,174.0	1,204.2	1.59	-0.31	1.56
8,134.0	90.90	92.00	7,023.4	383.4	1,269.0	1,298.7	3.17	-0.32	3.16
8,229.0	90.40	91.30	7,022.3	380.7	1,364.0	1,393.0	0.91	-0.53	-0.74
8,324.0	89.70	93.10	7,022.2	377.0	1,458.9	1,487.2	2.03	-0.74	1.89

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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)
8,419.0	89.30	93.30	7,023.1	371.7	1,553.7	1,581.1	0.47	-0.42	0.21
8,514.0	89.40	92.90	7,024.2	366.6	1,648.6	1,675.1	0.43	0.11	-0.42
8,609.0	89.60	93.10	7,025.0	361.6	1,743.5	1,769.2	0.30	0.21	0.21
8,704.0	90.20	92.90	7,025.1	356.7	1,838.3	1,863.2	0.67	0.63	-0.21
8,799.0	88.70	92.00	7,026.1	352.6	1,933.2	1,957.3	1.84	-1.58	-0.95
8,894.0	88.40	89.90	7,028.5	351.0	2,028.2	2,051.7	2.23	-0.32	-2.21
8,989.0	87.40	89.80	7,031.9	351.3	2,123.1	2,146.3	1.06	-1.05	-0.11
9,053.0	87.60	89.60	7,034.7	351.6	2,187.0	2,210.0	0.44	0.31	-0.31
9,084.0	89.10	88.90	7,035.6	352.0	2,218.0	2,240.9	5.34	4.84	-2.26
9,179.0	90.20	88.20	7,036.2	354.4	2,313.0	2,335.7	1.37	1.16	-0.74
9,274.0	90.00	88.50	7,036.0	357.1	2,408.0	2,430.5	0.38	-0.21	0.32
9,370.0	90.00	88.00	7,036.0	360.1	2,503.9	2,526.3	0.52	0.00	-0.52
9,465.0	90.50	87.10	7,035.6	364.1	2,598.8	2,621.2	1.08	0.53	-0.95
9,560.0	90.50	90.10	7,034.8	366.5	2,693.8	2,716.0	3.16	0.00	3.16
9,655.0	87.90	89.40	7,036.1	366.9	2,788.8	2,810.6	2.83	-2.74	-0.74
9,750.0	86.60	90.30	7,040.7	367.1	2,883.6	2,905.1	1.66	-1.37	0.95
9,845.0	88.50	90.30	7,044.7	366.6	2,978.6	2,999.6	2.00	2.00	0.00
9,940.0	89.40	90.10	7,046.5	366.3	3,073.5	3,094.1	0.97	0.95	-0.21
9,974.0	91.00	91.00	7,046.4	366.0	3,107.5	3,128.0	5.40	4.71	2.65
10,035.0	91.40	89.40	7,045.1	365.8	3,168.5	3,188.7	2.70	0.66	-2.62
10,130.0	91.70	88.50	7,042.5	367.5	3,263.5	3,283.4	1.00	0.32	-0.95
10,225.0	91.40	89.80	7,039.9	368.9	3,358.4	3,378.1	1.40	-0.32	1.37
10,257.0	90.50	90.10	7,039.4	368.9	3,390.4	3,409.9	2.96	-2.81	0.94
10,320.0	90.00	89.40	7,039.1	369.2	3,453.4	3,472.7	1.37	-0.79	-1.11
10,415.0	88.30	91.70	7,040.6	368.3	3,548.4	3,567.2	3.01	-1.79	2.42
10,510.0	89.50	90.80	7,042.4	366.2	3,643.3	3,661.6	1.58	1.26	-0.95
10,605.0	88.40	92.90	7,044.1	363.2	3,738.3	3,755.8	2.50	-1.16	2.21
10,700.0	88.30	91.50	7,046.9	359.5	3,833.2	3,850.0	1.48	-0.11	-1.47
10,795.0	88.50	90.80	7,049.5	357.6	3,928.1	3,944.4	0.77	0.21	-0.74
10,890.0	88.30	90.80	7,052.2	356.3	4,023.1	4,038.8	0.21	-0.21	0.00
<b>TD @ 10953' MD / 7054' TVD</b>									
10,953.0	88.30	90.80	7,054.0	355.4	4,086.0	4,101.4	0.00	0.00	0.00

#### Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
665.0	665.0	0.0	0.0	TIE IN @ 665' MD / 665' TVD
10,953.0	7,054.0	355.4	4,086.0	TD @ 10953' MD / 7054' TVD

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



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## Survey Certification Sheet

Noble Energy  
Company

RM-12709  
Job Number

10/03/2012  
Date

Sec 27,T3N,R67W,6thPM  
Lease

Nix P28-69HN  
Well Name

Weld,CO  
County & State

Surveyed from a depth of: 665 feet to 10953 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.

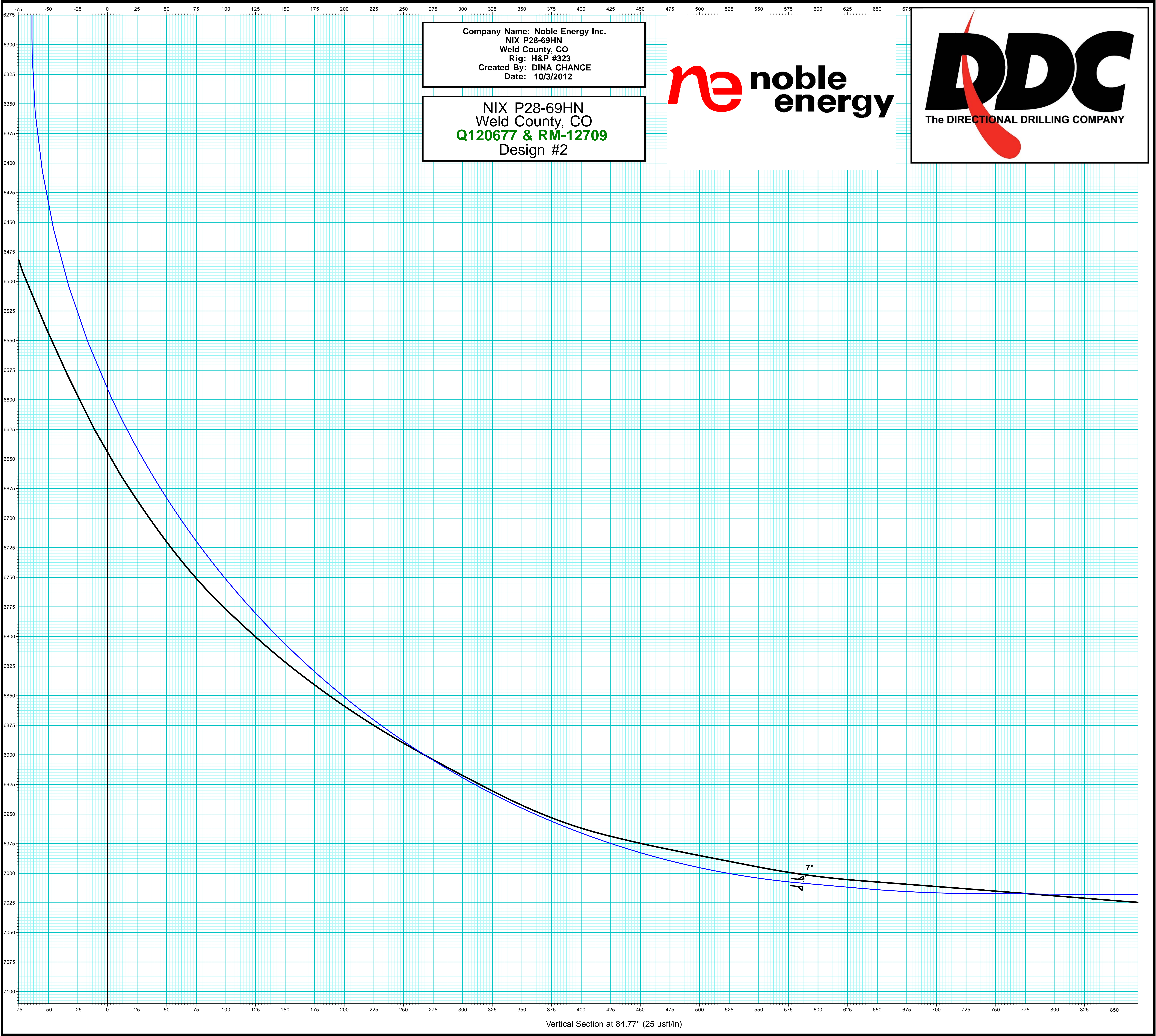
Digitally signed by Larry Wright  
DN: cn=Larry Wright, o=The  
Directional Drilling Company,  
ou=GM of Guidance Services,  
email=larryw@directionaldrillers.  
com, c=US  
Date: 2012.10.04 14:16:21 -05'00'

Larry Wright  
MWD General Manager



Company Name: Noble Energy Inc.  
NIX P28-69HN  
Weld County, CO  
Rig: H&P #323  
Created By: DINA CHANCE  
Date: 10/3/2012

NIX P28-69HN  
Weld County, CO  
**Q120677 & RM-12709**  
Design #2





Company Name: Noble Energy Inc.  
NIX P28-69HN  
Weld County, CO  
Rig: H&P #323  
Created By: DINA CHANCE  
Date: 10/3/2012

NIX P28-69HN  
Weld County, CO  
Q120677 & RM-12709  
Design #2

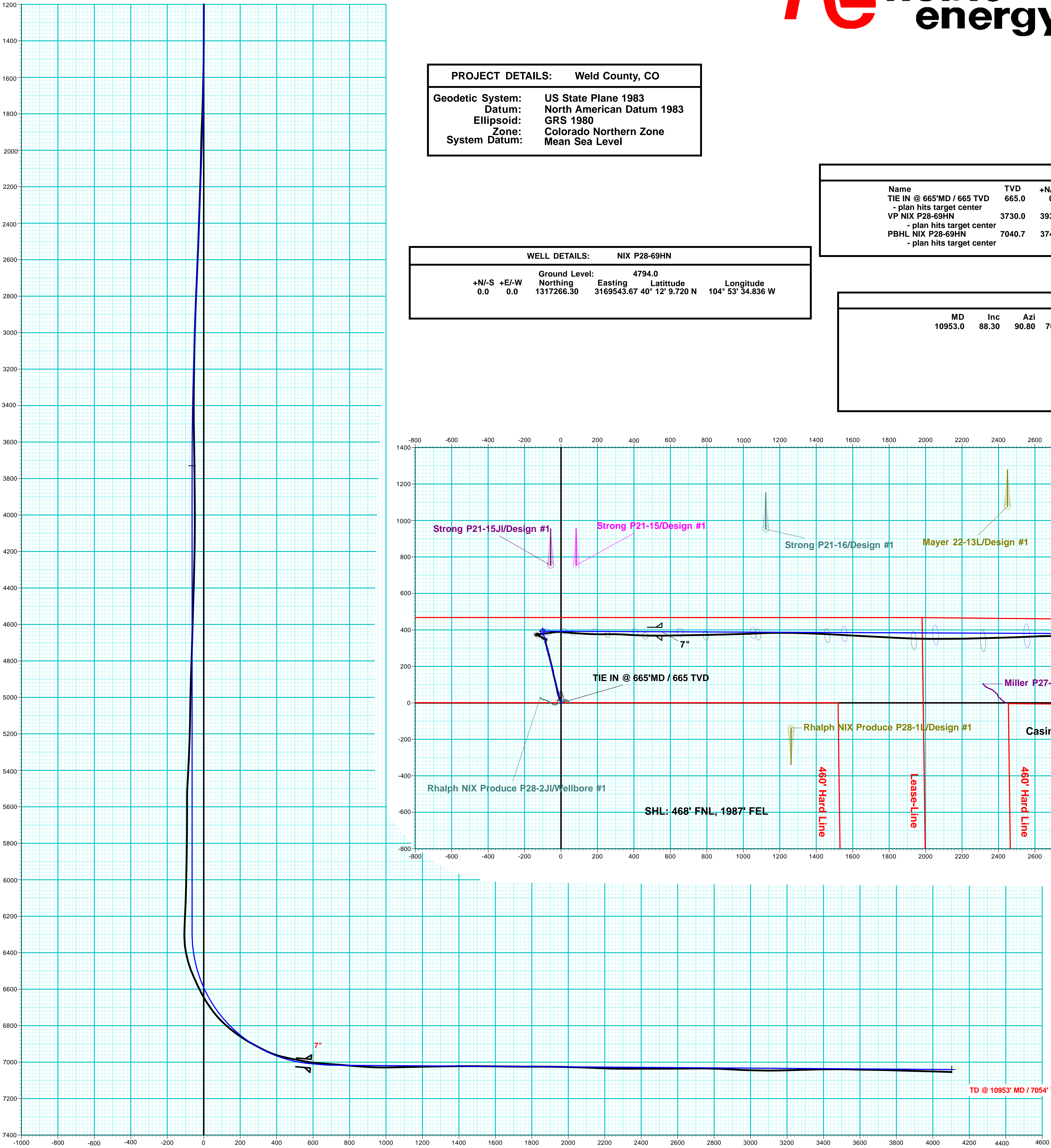
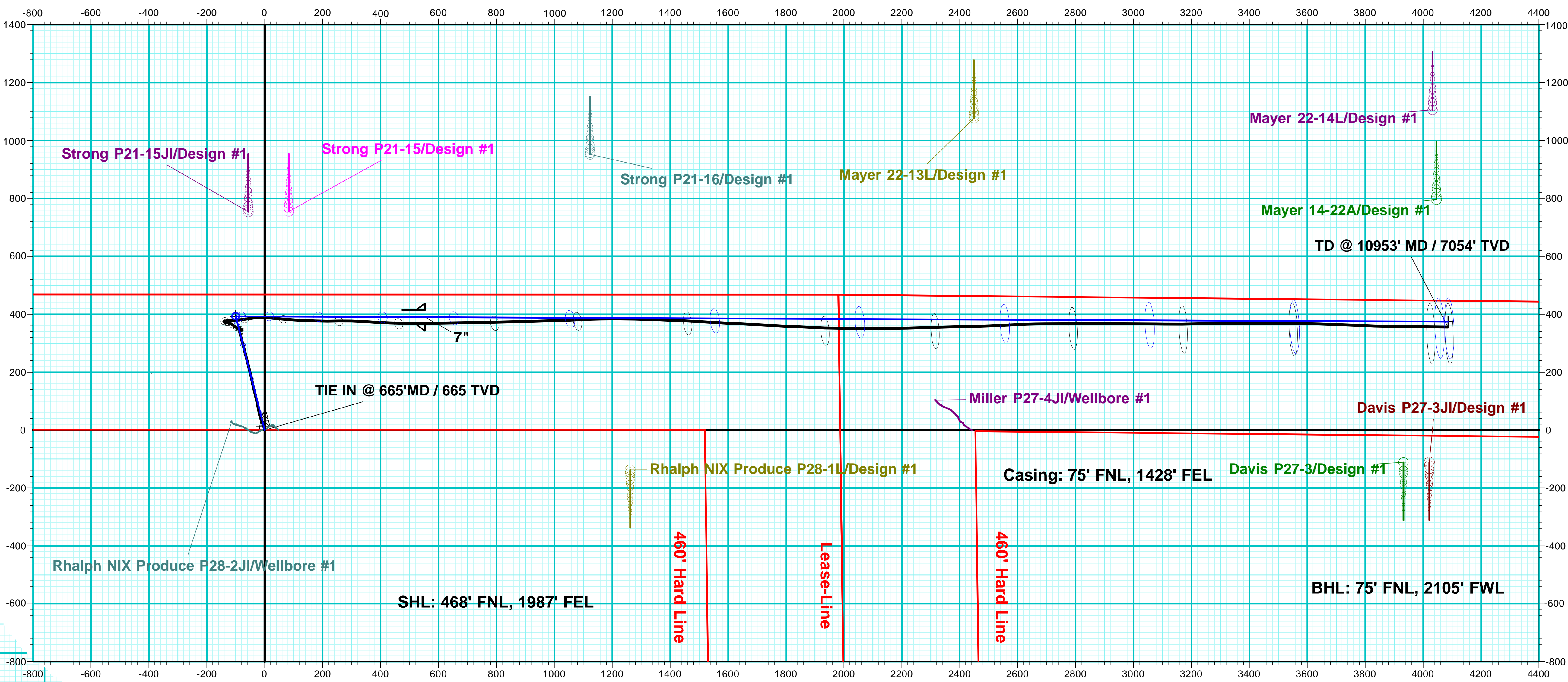


PROJECT DETAILS:	Weld County, CO
Geodetic System:	US State Plane 1983
Datum:	North American Datum 1983
Ellipsoid:	GRS 1980
Zone:	Colorado Northern Zone
System Datum:	Mean Sea Level

WELL DETAILS:	NIX P28-69HN
Ground Level:	4794.0
+N/-S	0.0
+E/-W	0.0
Northing	1317266.30
Easting	3169543.67
Latitude	40° 12' 9.720 N
Longitude	104° 53' 34.836 W

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
TIE IN @ 665'MD / 665 TVD	665.0	0.0	0.0	1317266.30	3169543.67	40° 12' 9.720 N	104° 53' 34.836 W
- plan hits target center							
VP NIX P28-69HN	3730.0	393.0	-100.0	1317659.30	3169443.67	40° 12' 13.610 N	104° 53' 36.090 W
- plan hits target center							
PBHL NIX P28-69HN	7040.7	374.4	4086.7	1317640.69	3173630.40	40° 12' 13.140 N	104° 52' 42.132 W
- plan hits target center							

ANNOTATIONS							
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSecDeparture	Annotation
10953.0	88.30	90.80	7054.0	355.4	4086.0	4101.4	4668.5 TD @ 10953' MD / 7054' TVD



Vertical Section at 84.77° (200 usft/in)

T

G

M

True North: -0.39°

Azimuths to Grid North

Magnetic North: 8.36°

Magnetic Field

Strength: 52885.2snT

Dip Angle: 66.83°

Date: 9/4/2012

Model: IGRF2010