



## **Noble Energy Inc.**

Weld County, CO  
Sec 20, T9N, R59W, 6th PM  
Ptasnik LC20-75HN

Wellbore #1

Design: Wellbore #1 **FINAL**

## **DDC Survey Report**

15 April, 2013



<b>Company:</b>	Noble Energy Inc.	<b>Local Co-ordinate Reference:</b>	Well Ptasnik LC20-75HN
<b>Project:</b>	Weld County, CO	<b>TVD Reference:</b>	WELL @ 5008.0usft (H&P #326)
<b>Site:</b>	Sec 20, T9N, R59W, 6th PM	<b>MD Reference:</b>	WELL @ 5008.0usft (H&P #326)
<b>Well:</b>	Ptasnik LC20-75HN	<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

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

<b>Site</b>	Sec 20, T9N, R59W, 6th PM		
<b>Site Position:</b>		<b>Northing:</b>	1,516,584.28 usft
<b>From:</b>	Map	<b>Easting:</b>	3,415,248.48 usft
<b>Position Uncertainty:</b>	0.0 usft	<b>Slot Radius:</b>	13-3/16 "
		<b>Latitude:</b>	40° 44' 30.410 N
		<b>Longitude:</b>	104° 0' 5.080 W
		<b>Grid Convergence:</b>	0.97 °

<b>Well</b>	Ptasnik LC20-75HN		
<b>Well Position</b>	<b>+N-S</b>	0.0 usft	<b>Northing:</b>
	<b>+E-W</b>	0.0 usft	<b>Easting:</b>
<b>Position Uncertainty</b>	0.0 usft	<b>Wellhead Elevation:</b>	usft
		<b>Latitude:</b>	40° 44' 30.410 N
		<b>Longitude:</b>	104° 0' 5.080 W
		<b>Ground Level:</b>	4,978.0 usft

<b>Wellbore</b>	Wellbore #1				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	IGRF2010	8/28/2012	8.31	67.41	53,260

<b>Design</b>	Wellbore #1				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.0
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N-S (usft)</b>	<b>+E-W (usft)</b>	<b>Direction (°)</b>	
	0.0	0.0	0.0	179.45	

<b>Survey Program</b>	<b>Date</b>	4/15/2013			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
840.0	10,616.0	MWD (Wellbore #1)	MWD default	MWD - Standard	

<b>Survey</b>										
<b>Measured Depth (usft)</b>	<b>Inclination (°)</b>	<b>Azimuth (°)</b>	<b>Vertical Depth (usft)</b>	<b>+N-S (usft)</b>	<b>+E-W (usft)</b>	<b>Vertical Section (usft)</b>	<b>Dogleg Rate (°/100usft)</b>	<b>Build Rate (°/100usft)</b>	<b>Turn Rate (°/100usft)</b>	
756.0	0.00	0.00	756.0	0.0	0.0	0.0	0.00	0.00	0.00	
840.0	0.40	140.00	840.0	-0.2	0.2	0.2	0.48	0.48	0.00	
1,124.0	0.30	158.40	1,124.0	-1.7	1.1	1.7	0.05	-0.04	6.48	
1,409.0	0.10	151.50	1,409.0	-2.6	1.5	2.6	0.07	-0.07	-2.42	
1,688.0	0.20	84.70	1,688.0	-2.8	2.1	2.8	0.07	0.04	-23.94	
1,783.0	0.10	157.30	1,783.0	-2.8	2.3	2.8	0.21	-0.11	76.42	
1,877.0	4.00	341.30	1,876.9	0.2	1.3	-0.2	4.36	4.15	-187.23	
1,972.0	5.40	348.30	1,971.6	7.7	-0.7	-7.7	1.59	1.47	7.37	
2,065.0	8.10	357.90	2,063.9	18.6	-1.8	-18.6	3.14	2.90	10.32	
2,159.0	11.30	354.00	2,156.6	34.3	-3.0	-34.4	3.47	3.40	-4.15	

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<b>Site:</b>	Sec 20, T9N, R59W, 6th PM	<b>MD Reference:</b>	WELL @ 5008.0usft (H&P #326)
<b>Well:</b>	Ptasnik LC20-75HN	<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

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)
2,253.0	12.80	353.90	2,248.5	53.9	-5.1	-53.9	1.60	1.60	-0.11
2,345.0	14.90	349.90	2,337.8	75.6	-8.3	-75.7	2.51	2.28	-4.35
2,438.0	15.30	352.10	2,427.6	99.6	-12.0	-99.7	0.75	0.43	2.37
2,530.0	13.40	352.90	2,516.8	122.2	-15.0	-122.3	2.08	-2.07	0.87
2,624.0	15.70	348.00	2,607.7	145.4	-19.0	-145.6	2.77	2.45	-5.21
2,717.0	15.70	351.20	2,697.3	170.2	-23.6	-170.4	0.93	0.00	3.44
2,809.0	16.70	351.20	2,785.6	195.5	-27.5	-195.8	1.09	1.09	0.00
2,901.0	16.80	350.20	2,873.7	221.7	-31.8	-222.0	0.33	0.11	-1.09
2,996.0	16.80	350.50	2,964.7	248.8	-36.4	-249.1	0.09	0.00	0.32
3,091.0	16.40	349.50	3,055.7	275.5	-41.1	-275.9	0.52	-0.42	-1.05
3,185.0	15.00	349.20	3,146.2	300.5	-45.8	-300.9	1.49	-1.49	-0.32
3,280.0	12.80	347.50	3,238.4	322.8	-50.4	-323.3	2.36	-2.32	-1.79
3,375.0	9.40	351.80	3,331.6	340.8	-53.8	-341.3	3.68	-3.58	4.53
3,470.0	8.20	347.70	3,425.5	355.1	-56.3	-355.6	1.42	-1.26	-4.32
3,565.0	8.50	346.90	3,519.5	368.6	-59.3	-369.1	0.34	0.32	-0.84
3,660.0	7.80	348.10	3,613.5	381.7	-62.3	-382.3	0.76	-0.74	1.26
3,755.0	7.60	356.50	3,707.7	394.3	-64.0	-394.9	1.20	-0.21	8.84
3,850.0	7.80	356.80	3,801.8	407.0	-64.7	-407.6	0.21	0.21	0.32
3,945.0	8.20	357.80	3,895.9	420.2	-65.3	-420.8	0.45	0.42	1.05
4,040.0	7.40	355.40	3,990.0	433.1	-66.1	-433.7	0.91	-0.84	-2.53
4,135.0	6.40	358.10	4,084.3	444.5	-66.7	-445.1	1.11	-1.05	2.84
4,230.0	5.40	351.40	4,178.8	454.2	-67.6	-454.8	1.28	-1.05	-7.05
4,325.0	3.30	349.50	4,273.5	461.3	-68.8	-461.9	2.22	-2.21	-2.00
4,420.0	3.10	316.70	4,368.4	465.8	-71.0	-466.5	1.91	-0.21	-34.53
4,515.0	1.50	339.30	4,463.3	468.9	-73.2	-469.5	1.90	-1.68	23.79
4,610.0	0.80	124.20	4,558.3	469.7	-73.1	-470.3	2.32	-0.74	152.53
4,705.0	1.10	126.80	4,653.3	468.7	-71.8	-469.4	0.32	0.32	2.74
4,800.0	1.10	105.50	4,748.3	467.9	-70.2	-468.6	0.43	0.00	-22.42
4,895.0	1.20	65.40	4,843.3	468.1	-68.4	-468.8	0.84	0.11	-42.21
4,990.0	1.40	54.70	4,938.2	469.2	-66.6	-469.8	0.33	0.21	-11.26
5,085.0	1.10	66.30	5,033.2	470.2	-64.8	-470.8	0.41	-0.32	12.21
5,180.0	2.10	65.50	5,128.2	471.3	-62.4	-471.9	1.05	1.05	-0.84
5,275.0	1.80	116.30	5,223.1	471.4	-59.5	-471.9	1.78	-0.32	53.47
5,370.0	1.30	104.10	5,318.1	470.5	-57.1	-471.0	0.63	-0.53	-12.84
5,465.0	1.10	99.60	5,413.1	470.1	-55.1	-470.6	0.23	-0.21	-4.74
5,560.0	1.10	95.20	5,508.1	469.8	-53.3	-470.3	0.09	0.00	-4.63
5,655.0	6.90	152.40	5,602.8	464.7	-49.8	-465.1	6.71	6.11	60.21
5,700.0	11.10	162.60	5,647.2	458.1	-47.2	-458.6	9.95	9.33	22.67
5,750.0	16.70	168.70	5,695.8	446.5	-44.4	-446.9	11.56	11.20	12.20
5,795.0	20.70	170.20	5,738.4	432.3	-41.8	-432.7	8.95	8.89	3.33
5,845.0	23.90	174.50	5,784.6	413.5	-39.3	-413.9	7.18	6.40	8.60
5,890.0	26.90	177.00	5,825.3	394.3	-37.9	-394.6	7.08	6.67	5.56
5,940.0	31.80	179.80	5,868.9	369.8	-37.2	-370.1	10.17	9.80	5.60
5,985.0	35.00	182.10	5,906.4	345.0	-37.7	-345.4	7.65	7.11	5.11

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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)
6,035.0	37.20	182.10	5,946.8	315.6	-38.7	-315.9	4.40	4.40	0.00
6,080.0	39.70	181.20	5,982.1	287.6	-39.5	-288.0	5.69	5.56	-2.00
6,130.0	40.10	185.40	6,020.4	255.6	-41.4	-256.0	5.45	0.80	8.40
6,175.0	43.80	185.60	6,053.9	225.7	-44.3	-226.1	8.23	8.22	0.44
6,225.0	48.50	181.20	6,088.5	189.7	-46.4	-190.1	11.34	9.40	-8.80
6,270.0	50.00	180.00	6,117.9	155.6	-46.7	-156.1	3.90	3.33	-2.67
6,320.0	52.90	180.70	6,149.0	116.5	-47.0	-117.0	5.90	5.80	1.40
6,365.0	57.40	180.00	6,174.8	79.6	-47.2	-80.1	10.08	10.00	-1.56
6,415.0	63.00	179.00	6,199.6	36.2	-46.8	-36.7	11.33	11.20	-2.00
6,460.0	67.40	177.80	6,218.5	-4.6	-45.6	4.2	10.07	9.78	-2.67
6,511.0	70.80	177.40	6,236.7	-52.2	-43.6	51.8	6.71	6.67	-0.78
6,556.0	75.00	179.30	6,249.9	-95.2	-42.4	94.8	10.17	9.33	4.22
<b>CROSSED HARD LINE @ 6564' MD / 6252' TVD</b>									
6,564.4	75.91	179.47	6,252.0	-103.3	-42.3	102.9	11.00	10.81	2.08
6,605.0	80.30	180.30	6,260.4	-143.0	-42.3	142.6	11.00	10.82	2.03
6,628.0	84.20	180.60	6,263.5	-165.8	-42.4	165.4	17.01	16.96	1.30
6,742.0	92.40	180.60	6,266.8	-279.6	-43.6	279.2	7.19	7.19	0.00
6,837.0	92.90	180.70	6,262.5	-374.5	-44.7	374.1	0.54	0.53	0.11
6,932.0	92.20	180.00	6,258.2	-469.4	-45.3	469.0	1.04	-0.74	-0.74
7,027.0	91.80	177.80	6,254.9	-564.4	-43.5	563.9	2.35	-0.42	-2.32
7,122.0	91.70	176.80	6,252.0	-659.2	-39.0	658.8	1.06	-0.11	-1.05
7,217.0	89.40	176.10	6,251.1	-754.0	-33.1	753.7	2.53	-2.42	-0.74
7,312.0	90.20	175.60	6,251.4	-848.8	-26.2	848.5	0.99	0.84	-0.53
7,407.0	90.50	176.70	6,250.8	-943.5	-19.8	943.3	1.20	0.32	1.16
7,502.0	91.30	177.20	6,249.4	-1,038.4	-14.8	1,038.2	0.99	0.84	0.53
7,597.0	89.40	178.40	6,248.8	-1,133.3	-11.1	1,133.2	2.37	-2.00	1.26
7,691.0	90.50	177.30	6,248.9	-1,227.3	-7.6	1,227.1	1.65	1.17	-1.17
7,786.0	91.40	176.30	6,247.3	-1,322.1	-2.3	1,322.0	1.42	0.95	-1.05
7,881.0	90.00	177.30	6,246.1	-1,416.9	3.0	1,416.9	1.81	-1.47	1.05
7,976.0	90.30	177.00	6,245.9	-1,511.8	7.7	1,511.8	0.45	0.32	-0.32
8,071.0	91.40	177.00	6,244.5	-1,606.7	12.7	1,606.7	1.16	1.16	0.00
8,166.0	91.10	177.10	6,242.4	-1,701.5	17.6	1,701.6	0.33	-0.32	0.11
8,261.0	90.30	177.50	6,241.2	-1,796.4	22.0	1,796.5	0.94	-0.84	0.42
8,356.0	92.10	176.20	6,239.2	-1,891.2	27.3	1,891.4	2.34	1.89	-1.37
8,451.0	92.20	177.90	6,235.7	-1,986.0	32.1	1,986.3	1.79	0.11	1.79
8,546.0	91.90	179.00	6,232.3	-2,080.9	34.7	2,081.2	1.20	-0.32	1.16
8,641.0	90.30	180.20	6,230.5	-2,175.9	35.4	2,176.2	2.11	-1.68	1.26
8,736.0	91.30	179.10	6,229.1	-2,270.9	36.0	2,271.1	1.56	1.05	-1.16
8,831.0	90.60	180.10	6,227.6	-2,365.9	36.6	2,366.1	1.28	-0.74	1.05
8,927.0	88.00	180.60	6,228.7	-2,461.9	36.0	2,462.1	2.76	-2.71	0.52
9,021.0	88.90	180.10	6,231.3	-2,555.8	35.5	2,556.1	1.10	0.96	-0.53
9,116.0	90.60	180.20	6,231.7	-2,650.8	35.2	2,651.0	1.79	1.79	0.11
9,211.0	90.00	180.10	6,231.2	-2,745.8	35.0	2,746.0	0.64	-0.63	-0.11

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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)	
9,306.0	89.70	180.20	6,231.4	-2,840.8	34.7	2,841.0	0.33	-0.32	0.11	
9,401.0	91.50	179.40	6,230.4	-2,935.8	35.0	2,936.0	2.07	1.89	-0.84	
9,496.0	91.20	179.30	6,228.2	-3,030.8	36.1	3,031.0	0.33	-0.32	-0.11	
9,591.0	90.00	180.00	6,227.2	-3,125.8	36.7	3,126.0	1.46	-1.26	0.74	
9,686.0	91.00	180.00	6,226.4	-3,220.8	36.7	3,221.0	1.05	1.05	0.00	
9,781.0	92.00	179.50	6,223.9	-3,315.7	37.1	3,315.9	1.18	1.05	-0.53	
9,876.0	93.10	179.30	6,219.7	-3,410.6	38.1	3,410.8	1.18	1.16	-0.21	
9,971.0	93.20	179.50	6,214.4	-3,505.5	39.1	3,505.7	0.24	0.11	0.21	
10,066.0	89.70	181.10	6,212.0	-3,600.4	38.6	3,600.6	4.05	-3.68	1.68	
10,161.0	88.30	180.40	6,213.7	-3,695.4	37.4	3,695.6	1.65	-1.47	-0.74	
10,256.0	89.30	180.10	6,215.7	-3,790.4	36.9	3,790.6	1.10	1.05	-0.32	
10,351.0	91.80	178.80	6,214.8	-3,885.4	37.9	3,885.6	2.97	2.63	-1.37	
10,446.0	91.50	179.10	6,212.0	-3,980.3	39.6	3,980.5	0.45	-0.32	0.32	
10,541.0	93.10	177.80	6,208.2	-4,075.2	42.2	4,075.4	2.17	1.68	-1.37	
10,572.0	93.60	177.50	6,206.4	-4,106.1	43.4	4,106.3	1.88	1.61	-0.97	
TD @ 10616' MD / 6204' TVD										
10,616.0	93.60	177.50	6,203.7	-4,150.0	45.3	4,150.2	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
6,564.4	6,252.0	-103.3	-42.3	CROSSED HARD LINE @ 6564' MD / 6252' TVD	
10,616.0	6,203.7	-4,150.0	45.3	TD @ 10616' MD / 6204' TVD	

Checked By: _____	Approved By: _____	Date: _____
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## Survey Certification Sheet

Noble Energy Inc  
Company

RM-12664  
Job Number

4/18/13  
Date

Sec20,T9N,R59W,6<sup>th</sup>PM  
Lease

Ptasnik LC20-75HN  
Well Name

Weld, CO  
County & State

API: 05-123-33311

Surveyed from a depth of: 756 feet to 10616 feet MD

Type of Survey: MWD

Directional Supervisor/Surveyor: Dan Brown

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.

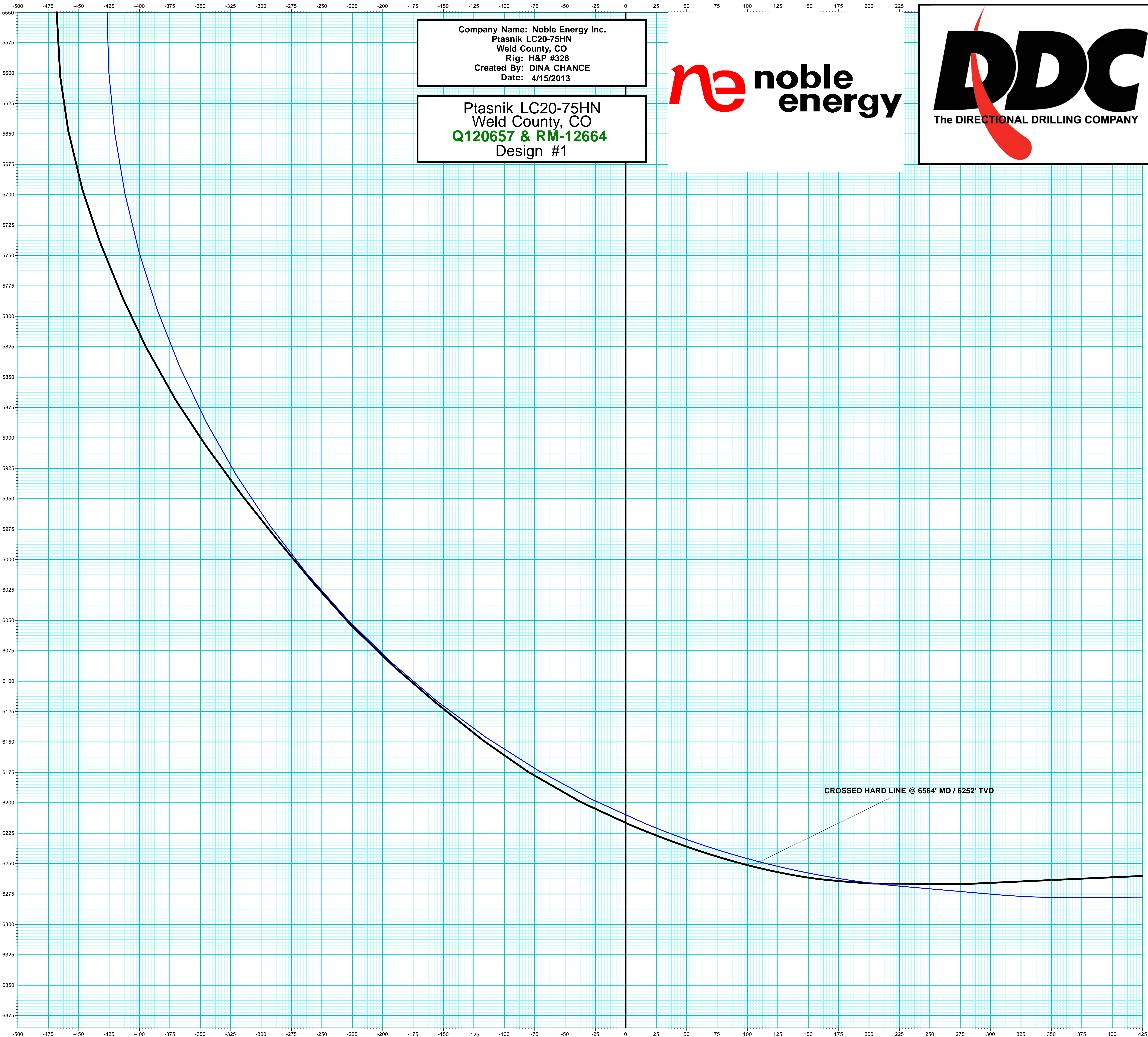
Digitally signed by Larry Wright  
DN: cn=Larry Wright, o=The  
Directional Drilling Company,  
ou=GM of Guidance Services,  
email=larryw@directionaldrillers.c  
om, c=US  
Date: 2013.04.22 10:42:37 -05'00'

Larry Wright  
MWD General Manager



Company Name: Noble Energy Inc.  
Ptasnik LC20-75HN  
Weld County, CO  
Rig: H&P #326  
Created By: DINA CHANCE  
Date: 4/15/2013

Ptasnik LC20-75HN  
Weld County, CO  
**Q120657 & RM-12664**  
Design #1



Vertical Section at 179.45° (25 usft/in)

Company Name: Noble Energy Inc.  
Ptasnik LC20-75HN  
Weld County, CO  
Rig: H&P #326  
Created By: DINA CHANCE  
Date: 4/15/2013

Ptasnik LC20-75HN  
Weld County, CO  
**Q120657 & RM-12664**  
Design #1

PROJECT DETAILS:	Weld County, CO
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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:		Ptasnik LC20-75HN			
		Ground Level:	4978.0		
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	1516584.28	3415248.48	40° 44' 30.410 N	104° 0' 5.080 W

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
TIE IN @ 756' MD / 756' TVD	756.0	0.0	0.0	1516584.28	3415248.48	40° 44' 30.410 N	104° 0' 5.080 W
- plan hits target center							
VP Ptasnik LC20-75HN	4000.0	426.0	-55.0	1517010.28	3415193.48	40° 44' 34.628 N	104° 0' 5.701 W
- plan hits target center							
PBHL Ptasnik LC20-75HN	6248.0	-4153.3	40.2	1512431.00	3415288.64	40° 43' 49.370 N	104° 0' 5.470 W

ANNOTATIONS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSec	Departure	Annotation	
6564.4	75.91	179.47	6252.0	-103.3	-42.3	102.9	1083.7	CROSSED HARD LINE @ 6564' MD / 6252' TVD	
10616.0	93.60	177.50	6203.7	-4150.0	45.3	4150.2	5132.6	TD @ 10616' MD / 6204' TVD	

