



## **Noble Energy Inc.**

Weld County, CO  
Sec. 12, T6N, R64W  
Shoemaker A12-23D

Wellbore #1

Survey: MWD Final

## **DDC Survey Report**

27 February, 2012



Company: Noble Energy Inc.  
 Project: Weld County, CO  
 Site: Sec. 12, T6N, R64W  
 Well: Shoemaker A12-23D  
 Wellbore: Wellbore #1  
 Design: Wellbore #1

Local Co-ordinate Reference: Well Shoemaker A12-23D  
 TVD Reference: WELL @ 4712.0usft (H&P #323)  
 MD Reference: WELL @ 4712.0usft (H&P #323)  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 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. 12, T6N, R64W				
Site Position:		Northing:	1,426,325.46 usft	Latitude:	40° 29' 57.408 N
From:	Lat/Long	Easting:	3,280,671.66 usft	Longitude:	104° 29' 26.664 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.65 °

Well	Shoemaker A12-23D					
Well Position	+N-S	0.0 usft	Northing:	1,426,325.45 usft	Latitude:	40° 29' 57.408 N
	+E-W	0.0 usft	Easting:	3,280,671.66 usft	Longitude:	104° 29' 26.664 W
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft	Ground Level:	4,688.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/27/2011	8.65	67.16	53,157

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	228.22	

Survey Program	Date 2/27/2012				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	866.0	GYRO (Wellbore #1)	Good_gyro	Good Gyro	
903.0	7,202.0	MWD (Wellbore #1)	MWD default	MWD - Standard	

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)	
866.0	0.00	0.00	866.0	0.0	0.0	0.0	0.00	0.00	0.00	
First Survey @ 866' MD / 866' TVD										
866.1	0.00	101.50	866.1	0.0	0.0	0.0	0.00	0.00	0.00	
903.0	0.50	101.50	903.0	0.0	0.2	-0.1	1.36	1.36	0.00	
964.0	0.60	247.80	964.0	-0.2	0.1	0.0	1.73	0.16	239.84	
1,058.0	1.90	258.60	1,058.0	-0.7	-1.9	1.9	1.40	1.38	11.49	
1,152.0	1.90	259.70	1,151.9	-1.3	-4.9	4.5	0.04	0.00	1.17	
1,247.0	1.70	249.70	1,246.9	-2.1	-7.8	7.2	0.39	-0.21	-10.53	
1,342.0	4.10	256.00	1,341.7	-3.4	-12.4	11.5	2.54	2.53	6.63	
1,436.0	6.40	247.20	1,435.3	-6.2	-20.5	19.4	2.59	2.45	-9.36	

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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)
1,531.0	8.20	236.70	1,529.6	-12.0	-31.0	31.1	2.35	1.89	-11.05
1,625.0	9.40	233.20	1,622.5	-20.3	-42.8	45.4	1.40	1.28	-3.72
1,720.0	9.90	226.60	1,716.1	-30.5	-54.9	61.3	1.28	0.53	-6.95
1,814.0	11.60	229.10	1,808.5	-42.3	-68.0	78.8	1.87	1.81	2.66
1,909.0	13.80	225.80	1,901.1	-56.4	-83.3	99.7	2.44	2.32	-3.47
2,004.0	15.60	230.00	1,993.0	-72.5	-101.2	123.8	2.20	1.89	4.42
2,098.0	17.90	230.90	2,083.0	-89.8	-122.1	150.9	2.46	2.45	0.96
2,198.0	16.40	228.80	2,178.6	-108.8	-144.7	180.3	1.62	-1.50	-2.10
2,293.0	16.90	231.60	2,269.6	-126.2	-165.6	207.5	0.99	0.53	2.95
2,387.0	17.40	230.30	2,359.4	-143.6	-187.1	235.2	0.67	0.53	-1.38
2,482.0	17.60	225.90	2,450.0	-162.7	-208.3	263.8	1.41	0.21	-4.63
2,578.0	18.50	228.90	2,541.3	-182.8	-230.2	293.5	1.35	0.94	3.13
2,673.0	18.20	231.10	2,631.5	-202.0	-253.1	323.4	0.79	-0.32	2.32
2,768.0	17.30	229.50	2,722.0	-220.5	-275.4	352.3	1.08	-0.95	-1.68
2,863.0	18.30	229.10	2,812.4	-239.5	-297.4	381.4	1.06	1.05	-0.42
2,958.0	18.50	226.60	2,902.6	-259.6	-319.7	411.3	0.86	0.21	-2.63
3,053.0	18.00	227.00	2,992.8	-280.0	-341.4	441.1	0.54	-0.53	0.42
3,148.0	17.10	226.50	3,083.4	-299.6	-362.2	469.7	0.96	-0.95	-0.53
3,242.0	17.20	228.10	3,173.2	-318.4	-382.6	497.4	0.51	0.11	1.70
3,337.0	15.70	226.80	3,264.3	-336.6	-402.4	524.3	1.63	-1.58	-1.37
3,432.0	15.80	227.50	3,355.7	-354.1	-421.3	550.1	0.23	0.11	0.74
3,527.0	16.80	230.00	3,446.9	-371.7	-441.4	576.8	1.29	1.05	2.63
3,622.0	17.10	227.40	3,537.8	-389.9	-462.2	604.5	0.86	0.32	-2.74
3,717.0	19.40	226.30	3,628.0	-410.3	-483.9	634.2	2.45	2.42	-1.16
3,812.0	20.60	226.80	3,717.3	-432.6	-507.5	666.7	1.28	1.26	0.53
3,907.0	19.60	225.80	3,806.5	-455.2	-531.1	699.3	1.11	-1.05	-1.05
4,002.0	19.10	229.10	3,896.1	-476.5	-554.2	730.8	1.27	-0.53	3.47
4,097.0	15.50	227.00	3,986.8	-495.3	-575.3	759.0	3.85	-3.79	-2.21
4,192.0	16.60	228.20	4,078.1	-513.0	-594.7	785.3	1.21	1.16	1.26
4,287.0	15.40	226.80	4,169.4	-530.7	-614.0	811.4	1.33	-1.26	-1.47
4,382.0	14.90	226.80	4,261.1	-547.7	-632.1	836.3	0.53	-0.53	0.00
4,477.0	14.50	223.00	4,353.0	-564.8	-649.1	860.3	1.10	-0.42	-4.00
4,572.0	16.50	221.20	4,444.5	-583.6	-666.1	885.6	2.17	2.11	-1.89
4,667.0	15.90	226.30	4,535.8	-602.7	-684.4	911.9	1.62	-0.63	5.37
4,763.0	15.60	231.40	4,628.2	-619.9	-704.0	938.0	1.48	-0.31	5.31
4,858.0	13.40	230.00	4,720.1	-634.9	-722.4	961.7	2.34	-2.32	-1.47
4,953.0	10.30	229.30	4,813.1	-647.5	-737.3	981.2	3.27	-3.26	-0.74
5,048.0	7.80	230.00	4,906.9	-657.2	-748.7	996.2	2.63	-2.63	0.74
5,142.0	7.20	227.90	5,000.1	-665.3	-757.9	1,008.4	0.70	-0.64	-2.23
5,238.0	5.70	227.90	5,095.5	-672.5	-765.9	1,019.2	1.56	-1.56	0.00
5,333.0	4.00	226.50	5,190.2	-678.0	-771.8	1,027.3	1.79	-1.79	-1.47
5,428.0	2.80	226.60	5,285.0	-681.8	-775.9	1,032.9	1.26	-1.26	0.11
5,523.0	2.30	225.80	5,379.9	-684.8	-779.0	1,037.1	0.53	-0.53	-0.84

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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)	
5,618.0	1.90	222.10	5,474.8	-687.3	-781.4	1,040.6	0.44	-0.42	-3.89	
5,713.0	1.70	226.60	5,569.8	-689.4	-783.5	1,043.6	0.26	-0.21	4.74	
5,808.0	1.50	225.60	5,664.8	-691.2	-785.4	1,046.2	0.21	-0.21	-1.05	
5,903.0	1.40	240.50	5,759.7	-692.7	-787.3	1,048.6	0.41	-0.11	15.68	
5,997.0	0.90	214.50	5,853.7	-693.8	-788.7	1,050.4	0.76	-0.53	-27.66	
6,092.0	0.90	217.70	5,948.7	-695.0	-789.6	1,051.9	0.05	0.00	3.37	
6,187.0	0.80	208.00	6,043.7	-696.2	-790.3	1,053.2	0.18	-0.11	-10.21	
6,282.0	0.50	240.20	6,138.7	-697.0	-791.0	1,054.3	0.49	-0.32	33.89	
6,377.0	0.70	221.70	6,233.7	-697.7	-791.8	1,055.2	0.29	0.21	-19.47	
6,473.0	0.90	214.00	6,329.7	-698.7	-792.6	1,056.6	0.24	0.21	-8.02	
6,568.0	0.70	233.30	6,424.7	-699.7	-793.5	1,057.9	0.35	-0.21	20.32	
6,663.0	0.40	185.70	6,519.6	-700.4	-794.0	1,058.7	0.55	-0.32	-50.11	
6,758.0	0.70	135.90	6,614.6	-701.1	-793.6	1,058.9	0.57	0.32	-52.42	
6,853.0	0.70	167.90	6,709.6	-702.1	-793.1	1,059.2	0.41	0.00	33.68	
6,948.0	0.30	142.80	6,804.6	-702.9	-792.8	1,059.5	0.47	-0.42	-26.42	
7,043.0	0.50	144.40	6,899.6	-703.4	-792.4	1,059.5	0.21	0.21	1.68	
7,138.0	0.40	139.80	6,994.6	-704.0	-791.9	1,059.6	0.11	-0.11	-4.84	
7,148.0	0.30	157.20	7,004.6	-704.0	-791.9	1,059.6	1.45	-1.00	174.00	
TD @ 7202' MD / 7059' TVD										
7,202.0	0.30	157.20	7,058.6	-704.3	-791.8	1,059.7	0.00	0.00	0.00	

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
866.1	866.1	0.0	0.0	First Survey @ 866' MD / 866' TVD
7,202.0	7,058.6	-704.3	-791.8	TD @ 7202' MD / 7059' TVD

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



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## Survey Certification Sheet

Noble Energy  
Company

RM-12111  
Job Number

2/27/12  
Date

Sec 12, T6N, R64W  
Lease

Shoemaker A #12-23D  
Well Name

Weld, CO  
County & State

Surveyed from a depth of: 866 feet to 7202 feet MD

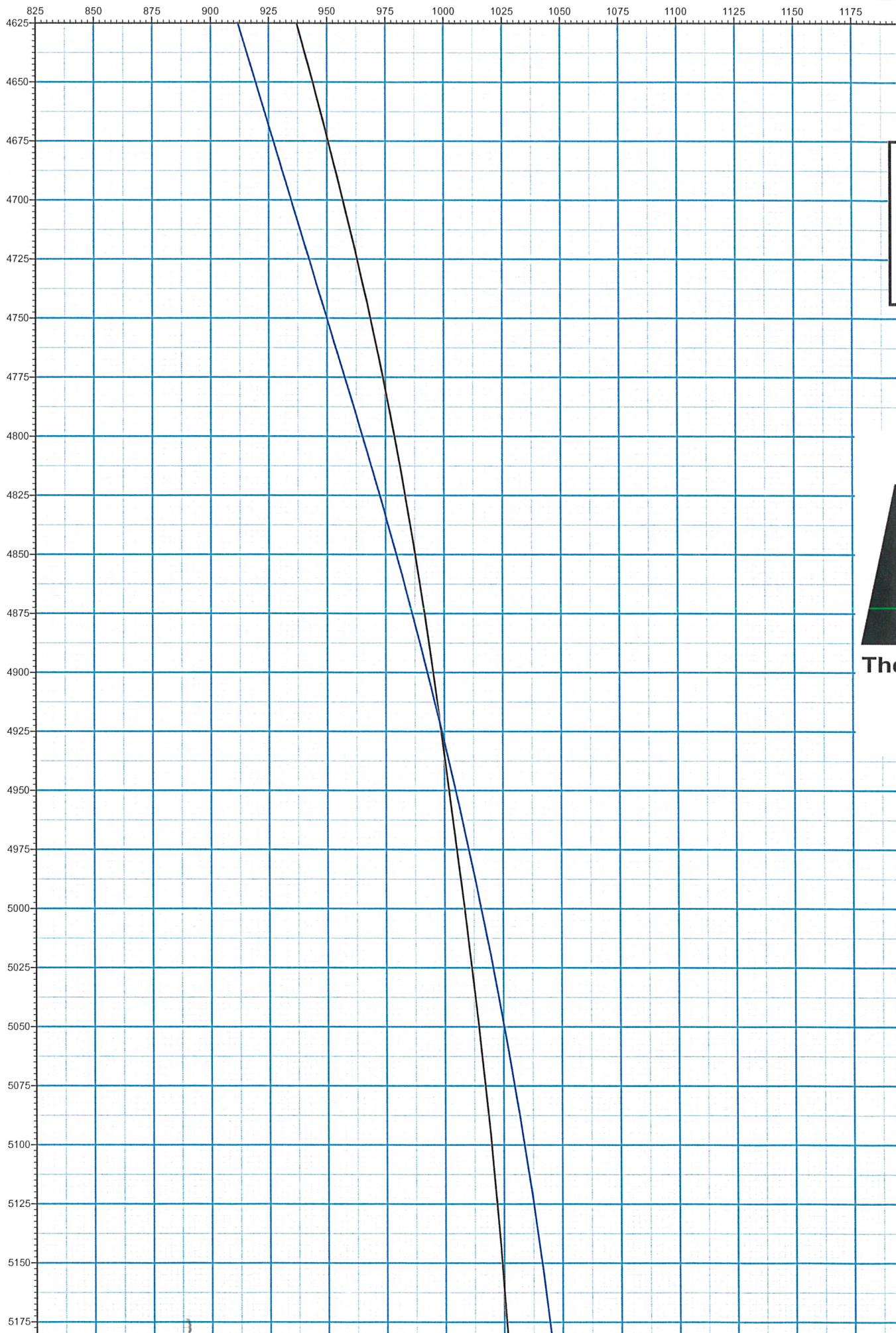
Type of Survey: MWD

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.c  
om, c=US  
Date: 2012.02.28 14:22:05 -06'00'

Larry Wright  
MWD General Manager



Company Name: Noble Energy Inc.  
Shoemaker A12-23D  
Weld County, CO  
Rig: H&P #323  
Created By: Dina Chance  
Date: 2/27/2012



Shoemaker A12-23D  
Weld County, CO  
**Q120122 & RM-12111**

**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

