



Noble Energy Inc.

Weld County, CO

Sec 14, T6N, R64W 6th PM

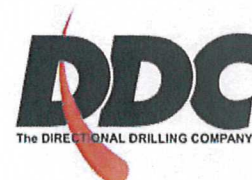
Rayglo A14-67-1HN

Wellbore #1

Survey: MWD Final

DDC Survey Report

02 May, 2012



Company:	Noble Energy Inc.	Local Co-ordinate Reference:	Well Rayglo A14-67-1HN
Project:	Weld County, CO	TVD Reference:	WELL @ 4766.0usft (H&P #323)
Site:	Sec 14, T6N, R64W 6th PM	MD Reference:	WELL @ 4766.0usft (H&P #323)
Well:	Rayglo A14-67-1HN	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 14, T6N, R64W 6th PM				
Site Position:		Northing:	1,422,457.54 usft	Latitude:	40° 29' 20.256 N
From:	Lat/Long	Easting:	3,271,010.58 usft	Longitude:	104° 31' 32.268 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.63 °

Well	Rayglo A14-67-1HN					
Well Position	+N/-S	0.0 usft	Northing:	1,422,457.53 usft	Latitude:	40° 29' 20.256 N
	+E/-W	0.0 usft	Easting:	3,271,010.58 usft	Longitude:	104° 31' 32.268 W
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft	Ground Level:	4,742.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/21/2012	8.64	67.14	53,123

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	89.19	

Survey Program	Date 5/2/2012			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
974.0	10,594.0	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)	
883.0	0.00	0.00	883.0	0.0	0.0	0.0	0.00	0.00	0.00	
Tie into Casing @ 883' MD / 883' TVD										
883.1	0.00	95.20	883.1	0.0	0.0	0.0	0.00	0.00	0.00	
974.0	0.80	95.20	974.0	-0.1	0.6	0.6	0.88	0.88	0.00	
1,250.0	1.00	103.80	1,250.0	-0.8	4.9	4.9	0.09	0.07	3.12	
1,532.0	1.40	98.50	1,531.9	-1.9	10.7	10.7	0.15	0.14	-1.88	
1,817.0	0.90	142.80	1,816.8	-4.2	15.5	15.4	0.34	-0.18	15.54	
2,103.0	1.30	203.10	2,102.8	-9.0	15.6	15.4	0.40	0.14	21.08	
2,387.0	0.90	265.70	2,386.8	-12.1	12.1	11.9	0.42	-0.14	22.04	
2,672.0	0.90	354.80	2,671.7	-10.0	9.6	9.5	0.44	0.00	31.26	
2,957.0	0.70	253.60	2,956.7	-8.3	7.8	7.7	0.44	-0.07	-35.51	

Company: Noble Energy Inc.
Project: Weld County, CO
Site: Sec 14, T6N, R64W 6th PM
Well: Rayglo A14-67-1HN
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Rayglo A14-67-1HN
TVD Reference: WELL @ 4766.0usft (H&P #323)
MD Reference: WELL @ 4766.0usft (H&P #323)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
3,241.0	0.90	282.60	3,240.7	-8.3	3.9	3.8	0.16	0.07	10.21
3,527.0	2.80	314.40	3,526.5	-2.9	-3.3	-3.3	0.73	0.66	11.12
3,717.0	3.00	319.30	3,716.3	4.1	-9.8	-9.8	0.17	0.11	2.58
3,812.0	1.70	310.70	3,811.2	6.9	-12.5	-12.4	1.41	-1.37	-9.05
3,907.0	1.40	299.50	3,906.2	8.4	-14.6	-14.5	0.45	-0.32	-11.79
4,002.0	0.50	269.60	4,001.2	8.9	-16.0	-15.9	1.05	-0.95	-31.47
4,097.0	1.10	59.50	4,096.2	9.4	-15.6	-15.5	1.63	0.63	157.79
4,382.0	2.50	32.30	4,381.0	16.1	-10.0	-9.7	0.56	0.49	-9.54
4,478.0	2.00	34.40	4,476.9	19.2	-7.9	-7.6	0.53	-0.52	2.19
4,572.0	1.30	37.00	4,570.9	21.4	-6.3	-6.0	0.75	-0.74	2.77
4,668.0	0.70	103.40	4,666.9	22.1	-5.1	-4.8	1.25	-0.63	69.17
4,762.0	1.40	113.10	4,760.9	21.6	-3.5	-3.2	0.77	0.74	10.32
4,857.0	1.30	75.70	4,855.8	21.4	-1.4	-1.1	0.92	-0.11	-39.37
4,952.0	1.40	41.80	4,950.8	22.5	0.5	0.8	0.83	0.11	-35.68
5,047.0	1.70	66.90	5,045.8	23.9	2.5	2.9	0.77	0.32	26.42
5,142.0	1.10	125.60	5,140.8	23.9	4.6	4.9	1.55	-0.63	61.79
5,238.0	0.70	112.80	5,236.8	23.2	5.8	6.2	0.46	-0.42	-13.33
5,333.0	1.20	194.90	5,331.7	22.0	6.1	6.4	1.37	0.53	86.42
5,428.0	1.10	184.10	5,426.7	20.1	5.8	6.1	0.25	-0.11	-11.37
5,523.0	0.40	253.60	5,521.7	19.1	5.4	5.7	1.08	-0.74	73.16
5,618.0	0.70	258.10	5,616.7	18.9	4.5	4.8	0.32	0.32	4.74
5,713.0	0.30	227.00	5,711.7	18.6	3.8	4.1	0.49	-0.42	-32.74
5,808.0	0.40	271.00	5,806.7	18.5	3.3	3.5	0.29	0.11	46.32
5,914.0	0.50	262.90	5,912.7	18.4	2.4	2.7	0.11	0.09	-7.64
5,930.0	0.30	276.20	5,928.7	18.4	2.3	2.6	1.37	-1.25	83.13
5,975.0	0.40	112.20	5,973.7	18.3	2.4	2.6	1.54	0.22	-364.44
6,025.0	4.80	106.10	6,023.6	17.7	4.5	4.8	8.80	8.80	-12.20
6,070.0	7.40	106.40	6,068.4	16.4	9.1	9.4	5.78	5.78	0.67
6,120.0	10.20	94.00	6,117.8	15.1	16.6	16.8	6.73	5.60	-24.80
6,165.0	13.60	89.00	6,161.8	15.0	25.9	26.1	7.89	7.56	-11.11
6,216.0	17.00	83.90	6,211.0	15.9	39.3	39.5	7.16	6.67	-10.00
6,261.0	19.80	88.90	6,253.7	16.7	53.5	53.7	7.14	6.22	11.11
6,311.0	21.50	94.50	6,300.5	16.1	71.1	71.3	5.21	3.40	11.20
6,356.0	24.30	93.60	6,341.9	14.9	88.5	88.8	6.27	6.22	-2.00
6,406.0	28.00	89.70	6,386.8	14.3	110.6	110.8	8.16	7.40	-7.80
6,451.0	32.10	88.30	6,425.8	14.7	133.1	133.3	9.24	9.11	-3.11
6,501.0	36.30	90.60	6,467.1	15.0	161.2	161.4	8.79	8.40	4.60
6,546.0	38.90	92.40	6,502.8	14.2	188.6	188.8	6.27	5.78	4.00
6,596.0	42.60	96.40	6,540.6	11.7	221.1	221.3	9.05	7.40	8.00
6,641.0	47.50	97.10	6,572.4	8.0	252.8	252.8	10.94	10.89	1.56
6,691.0	54.10	95.40	6,604.0	3.8	291.3	291.3	13.46	13.20	-3.40
6,736.0	59.00	94.00	6,628.8	0.7	328.7	328.6	11.19	10.89	-3.11
6,786.0	64.20	93.60	6,652.6	-2.2	372.5	372.5	10.42	10.40	-0.80

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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)
6,831.0	69.90	92.20	6,670.1	-4.3	413.9	413.8	12.99	12.67	-3.11
6,881.0	76.10	90.80	6,684.7	-5.5	461.7	461.5	12.69	12.40	-2.80
6,926.0	79.20	89.60	6,694.4	-5.7	505.6	505.5	7.36	6.89	-2.67
6,976.0	81.90	88.20	6,702.6	-4.7	554.9	554.8	6.07	5.40	-2.80
7,007.0	82.30	87.80	6,706.8	-3.7	585.6	585.5	1.82	1.29	-1.29
7,039.0	82.00	88.20	6,711.2	-2.6	617.3	617.2	1.55	-0.94	1.25
7,071.0	82.10	87.80	6,715.6	-1.5	649.0	648.9	1.28	0.31	-1.25
7,112.0	81.60	87.80	6,721.4	0.1	689.5	689.5	1.22	-1.22	0.00
7,176.0	81.20	89.00	6,731.0	1.9	752.8	752.7	1.96	-0.63	1.88
7,207.0	82.70	91.30	6,735.3	1.8	783.5	783.4	8.80	4.84	7.42
7,239.0	84.10	91.30	6,739.0	1.1	815.3	815.2	4.38	4.38	0.00
7,271.0	85.70	90.80	6,741.9	0.5	847.1	847.0	5.24	5.00	-1.56
7,302.0	87.80	90.60	6,743.6	0.1	878.1	878.0	6.80	6.77	-0.65
7,331.0	90.00	91.30	6,744.2	-0.4	907.1	907.0	7.96	7.59	2.41
7,363.0	91.70	91.30	6,743.7	-1.1	939.0	938.9	5.31	5.31	0.00
7,394.0	91.50	91.00	6,742.8	-1.7	970.0	969.9	1.16	-0.65	-0.97
7,458.0	91.50	90.80	6,741.2	-2.7	1,034.0	1,033.8	0.31	0.00	-0.31
7,553.0	89.90	89.20	6,740.0	-2.7	1,129.0	1,128.8	2.38	-1.68	-1.68
7,648.0	89.60	89.00	6,740.4	-1.2	1,224.0	1,223.8	0.38	-0.32	-0.21
7,742.0	90.40	89.60	6,740.4	-0.1	1,318.0	1,317.8	1.06	0.85	0.64
7,837.0	90.00	89.40	6,740.1	0.7	1,413.0	1,412.8	0.47	-0.42	-0.21
7,932.0	90.00	87.30	6,740.1	3.5	1,507.9	1,507.8	2.21	0.00	-2.21
8,027.0	90.00	89.20	6,740.1	6.4	1,602.9	1,602.8	2.00	0.00	2.00
8,122.0	89.30	88.70	6,740.7	8.1	1,697.8	1,697.8	0.91	-0.74	-0.53
8,217.0	90.00	89.60	6,741.2	9.5	1,792.8	1,792.8	1.20	0.74	0.95
8,312.0	89.80	87.80	6,741.4	11.7	1,887.8	1,887.8	1.91	-0.21	-1.89
8,407.0	90.00	87.80	6,741.6	15.3	1,982.7	1,982.7	0.21	0.21	0.00
8,502.0	89.60	88.00	6,741.9	18.8	2,077.7	2,077.7	0.47	-0.42	0.21
8,597.0	89.60	88.50	6,742.6	21.7	2,172.6	2,172.7	0.53	0.00	0.53
8,692.0	90.40	89.70	6,742.6	23.2	2,267.6	2,267.7	1.52	0.84	1.26
8,787.0	90.90	91.80	6,741.5	22.0	2,362.6	2,362.7	2.27	0.53	2.21
8,882.0	90.40	89.70	6,740.4	20.7	2,457.6	2,457.6	2.27	-0.53	-2.21
8,977.0	90.90	86.60	6,739.3	23.8	2,552.5	2,552.6	3.31	0.53	-3.26
9,072.0	91.20	85.90	6,737.6	30.0	2,647.3	2,647.4	0.80	0.32	-0.74
9,167.0	90.40	85.20	6,736.3	37.4	2,742.0	2,742.2	1.12	-0.84	-0.74
9,262.0	90.00	87.80	6,735.9	43.2	2,836.8	2,837.1	2.77	-0.42	2.74
9,356.0	90.70	88.00	6,735.4	46.6	2,930.7	2,931.1	0.77	0.74	0.21
9,452.0	90.00	89.40	6,734.8	48.8	3,026.7	3,027.1	1.63	-0.73	1.46
9,547.0	88.60	89.00	6,735.9	50.1	3,121.7	3,122.1	1.53	-1.47	-0.42
9,642.0	88.70	89.40	6,738.2	51.4	3,216.6	3,217.0	0.43	0.11	0.42
9,737.0	88.60	89.20	6,740.4	52.6	3,311.6	3,312.0	0.24	-0.11	-0.21
9,832.0	89.60	89.90	6,741.9	53.3	3,406.6	3,407.0	1.28	1.05	0.74
9,927.0	91.80	90.30	6,740.8	53.2	3,501.6	3,502.0	2.35	2.32	0.42

Company: Noble Energy Inc.
Project: Weld County, CO
Site: Sec 14, T6N, R64W 6th PM
Well: Rayglo A14-67-1HN
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Rayglo A14-67-1HN
TVD Reference: WELL @ 4766.0usft (H&P #323)
MD Reference: WELL @ 4766.0usft (H&P #323)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
10,022.0	92.20	89.20	6,737.4	53.6	3,596.5	3,596.9	1.23	0.42	-1.16
10,117.0	91.80	89.00	6,734.1	55.1	3,691.4	3,691.9	0.47	-0.42	-0.21
10,212.0	91.20	88.70	6,731.6	57.0	3,786.4	3,786.8	0.71	-0.63	-0.32
10,307.0	91.00	88.20	6,729.8	59.6	3,881.3	3,881.8	0.57	-0.21	-0.53
10,402.0	91.20	88.30	6,728.0	62.5	3,976.3	3,976.8	0.24	0.21	0.11
10,497.0	90.70	87.10	6,726.4	66.3	4,071.2	4,071.7	1.37	-0.53	-1.26
10,541.0	89.70	86.60	6,726.3	68.7	4,115.1	4,115.7	2.54	-2.27	-1.14
TD @ 10594' MD / 6727' TVD									
10,594.0	89.70	86.60	6,726.5	71.8	4,168.0	4,168.6	0.00	0.00	0.00

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
883.1	883.1	0.0	0.0	Tie into Casing @ 883' MD / 883' TVD
10,594.0	6,726.5	71.8	4,168.0	TD @ 10594' MD / 6727' TVD

Checked By: _____ Approved By: _____ Date: _____



Survey Certification Sheet

Noble Energy
Company

RM-12285
Job Number

5/2/12
Date

Sec 14, T6N, R64W, 6th PM
Lease

Rayglo A14-67-1HN
Well Name

Weld, CO
County & State

Surveyed from a depth of:

883 feet to 10594 feet MD

Type of Survey:

MWD

Directional Supervisor/Surveyor:

Boyd Wolff

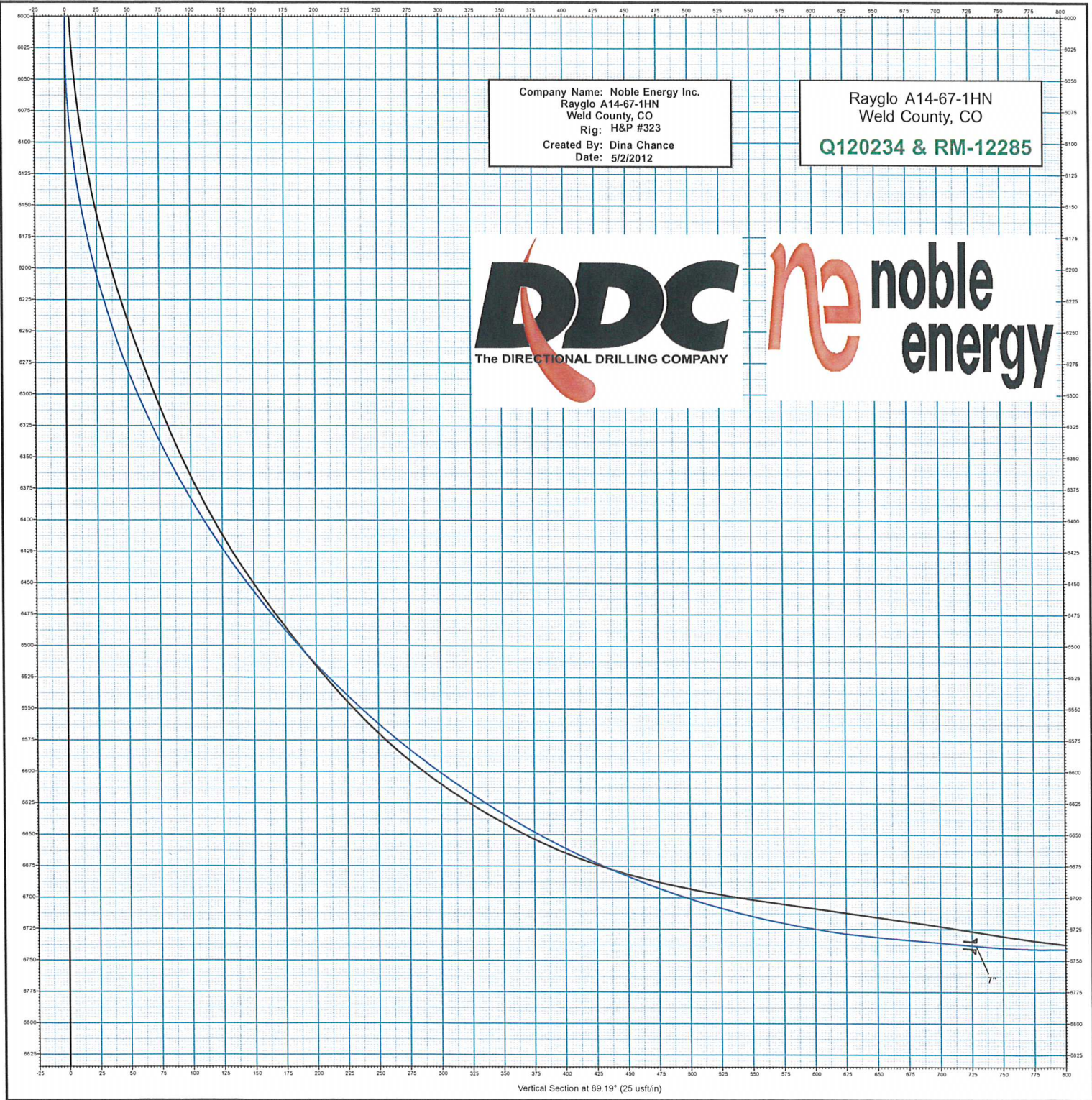
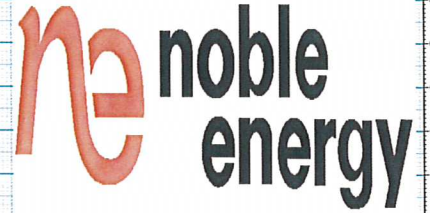
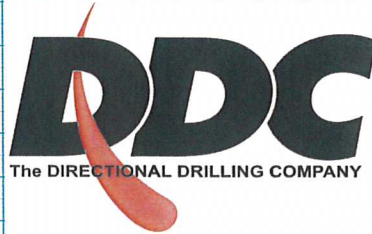
The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by **The Directional Drilling Company (DDC)**. This report represents a true and correct Directional survey of this well based on the original data obtained at the well site. Wellbore 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: 2012.05.07 14:14:03 -05'00'

Larry Wright
MWD General Manager

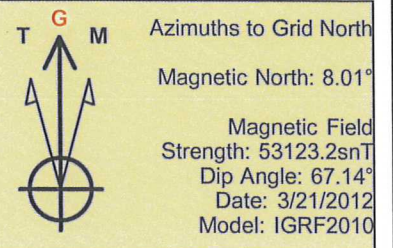
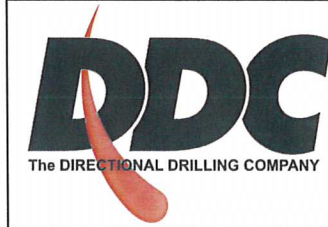
Company Name: Noble Energy Inc.
Rayglo A14-67-1HN
Weld County, CO
Rig: H&P #323
Created By: Dina Chance
Date: 5/2/2012

Rayglo A14-67-1HN
Weld County, CO
Q120234 & RM-12285



Vertical Section at 89.19° (25 usf/in)

Company Name: Noble Energy Inc.
 Rayglo A14-67-1HN
 Weld County, CO
 Rig: H&P #323
 Created By: Dina Chance
 Date: 5/2/2012



Rayglo A14-67-1HN
 Weld County, CO
 Q120234 & RM-12285

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: Rayglo A14-67-1HN

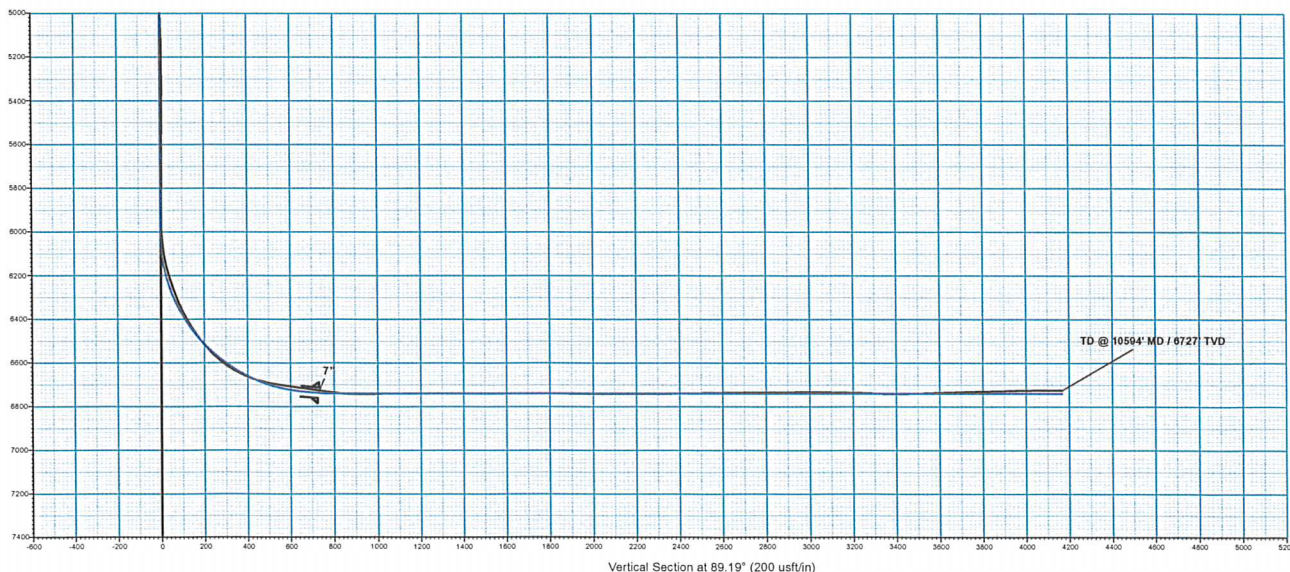
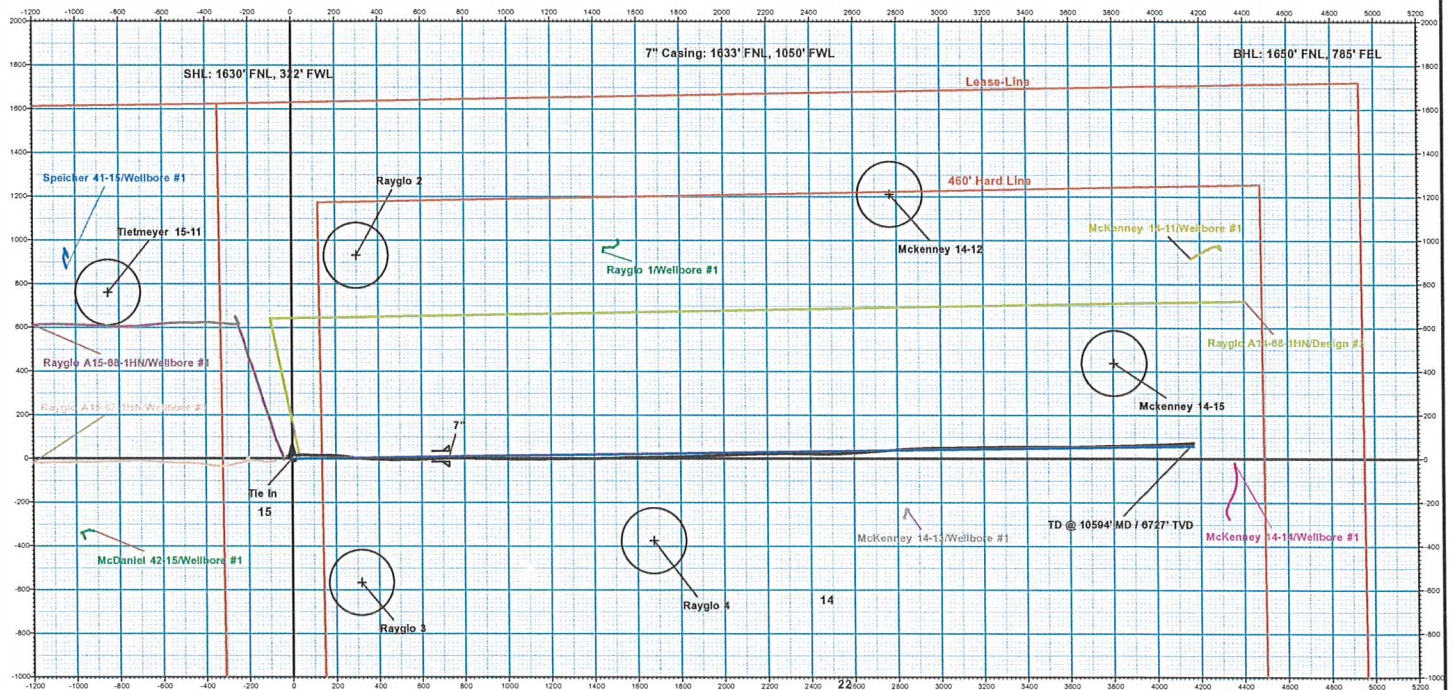
+N-S	+E-W	Ground Level:	4742.0
0.0	0.0	North	East
1422457.53	3271010.58	Latitude	Longitude
		40° 29' 20.256 N	104° 31' 32.268 W

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	North	East	Latitude	Longitude
Tie In	883.0	0.0	0.0	1422457.53	3271010.58	40° 29' 20.256 N	104° 31' 32.268 W
- plan hits target center							
PBHL Rayglo A14-67-1HN Design #3	6741.0	58.9	4166.9	1422516.42	3275177.48	40° 29' 20.382 N	104° 30' 38.331 W
- plan hits target center							

ANNOTATIONS

MD	Inc	Azi	TVD	+N-S	+E-W	V-Sect	Departure	Annotation
10594.0	89.70	86.60	6726.5	71.8	4168.0	4168.0	4275.1	TD @ 10594' MD / 6727' TVD



Vertical Section at 89.19° (200 usft/in)