



Noble Energy Inc.

Weld County, CO

Sec 2, T9N, R58W

Gonsoulin State LD11-76HN FINAL

Wellbore #1

Design: Wellbore #1

DDC Survey Report

17 February, 2015



Company:	Noble Energy Inc.	Local Co-ordinate Reference:	Well Gonsoulin State LD11-76HN
Project:	Weld County, CO	TVD Reference:	well @ 4769.0usft (H&P #326)
Site:	Sec 2, T9N, R58W	MD Reference:	well @ 4769.0usft (H&P #326)
Well:	Gonsoulin State LD11-76HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

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 2, T9N, R58W					
Site Position:		Northing:	1,529,499.23	usft	Latitude:	40° 46' 29.928 N	
From:	Lat/Long	Easting:	3,461,069.43	usft	Longitude:	103° 50' 6.756 W	
Position Uncertainty:		0.0	usft	Slot Radius:	13-3/16 "	Grid Convergence:	1.08 °

Well		Gonsoulin State LD11-76HN				
Well Position	+N/-S	0.0 usft	Northing:	1,529,346.24 usft	Latitude:	40° 46' 28.416 N
	+E/-W	0.0 usft	Easting:	3,461,072.30 usft	Longitude:	103° 50' 6.756 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	4,739.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/22/2015	7.89	67.37	53,039

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	174.48	

Survey Program	Date	1/22/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
729.0	1,008.0	Surface (Wellbore #1)	Flexi-Shot	VES Flexi-Shot Tool	
1,302.0	5,888.0	MWD Survey - Vert/Build (Wellbore #1)	MWD default	MWD - Standard	
5,989.0	10,851.0	MWD Survey - Lateral (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 @ 1008' MD / 1008' TVD / END OF SUR HOLE / BEGIN INT HOLE										
1,008.0	0.50	293.22	1,008.0	-4.4	0.8	4.5	0.36	-0.04	48.17	
1,302.0	0.70	202.82	1,302.0	-5.6	-1.1	5.5	0.29	0.07	-30.75	
1,395.0	0.44	174.16	1,395.0	-6.5	-1.3	6.3	0.41	-0.28	-30.82	
1,489.0	0.79	153.07	1,489.0	-7.4	-0.9	7.3	0.44	0.37	-22.44	
1,582.0	3.25	139.53	1,581.9	-10.0	1.1	10.0	2.68	2.65	-14.56	
1,676.0	7.47	99.81	1,675.5	-13.1	8.8	13.8	5.73	4.49	-42.26	
1,768.0	9.67	77.66	1,766.5	-12.4	22.3	14.5	4.27	2.39	-24.08	
1,862.0	7.56	76.78	1,859.4	-9.3	36.0	12.7	2.25	-2.24	-0.94	

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Well:	Gonsoulin State LD11-76HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

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)
1,954.0	11.78	91.19	1,950.1	-8.1	51.3	13.0	5.25	4.59	15.66
2,046.0	11.61	78.54	2,040.2	-6.5	69.8	13.2	2.79	-0.18	-13.75
2,139.0	10.82	78.54	2,131.4	-2.9	87.5	11.3	0.85	-0.85	0.00
CROSSED 460' HARDLINE @ 2175' MD / 2167' TVD									
2,174.7	10.89	78.81	2,166.5	-1.6	94.1	10.6	0.23	0.18	0.76
2,232.0	10.99	79.24	2,222.7	0.5	104.7	9.6	0.23	0.18	0.75
2,325.0	10.73	79.07	2,314.1	3.8	122.0	7.9	0.28	-0.28	-0.18
2,417.0	10.11	93.83	2,404.6	4.9	138.4	8.4	2.97	-0.67	16.04
2,509.0	10.64	91.19	2,495.1	4.2	155.0	10.8	0.77	0.58	-2.87
2,603.0	10.55	91.02	2,587.5	3.8	172.2	12.7	0.10	-0.10	-0.18
2,698.0	10.38	88.91	2,680.9	3.8	189.5	14.4	0.44	-0.18	-2.22
2,792.0	10.29	86.98	2,773.4	4.4	206.4	15.4	0.38	-0.10	-2.05
2,887.0	9.85	86.10	2,866.9	5.4	222.9	16.0	0.49	-0.46	-0.93
2,981.0	9.15	83.11	2,959.6	6.9	238.4	16.1	0.91	-0.74	-3.18
3,076.0	8.62	83.81	3,053.5	8.6	253.0	15.8	0.57	-0.56	0.74
3,171.0	8.09	81.88	3,147.5	10.3	266.6	15.4	0.63	-0.56	-2.03
3,265.0	8.09	82.58	3,240.5	12.1	279.8	14.9	0.10	0.00	0.74
3,360.0	8.27	85.04	3,334.6	13.5	293.2	14.7	0.41	0.19	2.59
3,455.0	8.27	84.52	3,428.6	14.8	306.8	14.8	0.08	0.00	-0.55
3,550.0	8.62	82.23	3,522.6	16.4	320.7	14.5	0.51	0.37	-2.41
3,645.0	6.07	61.84	3,616.8	19.7	332.1	12.3	3.80	-2.68	-21.46
3,739.0	5.98	67.46	3,710.3	23.9	341.0	9.0	0.63	-0.10	5.98
3,834.0	2.90	78.89	3,805.0	26.3	348.0	7.3	3.36	-3.24	12.03
3,928.0	3.34	85.39	3,898.8	27.0	353.0	7.1	0.60	0.47	6.91
4,022.0	3.34	84.16	3,992.7	27.5	358.5	7.1	0.08	0.00	-1.31
4,117.0	2.90	80.65	4,087.5	28.1	363.6	6.9	0.50	-0.46	-3.69
4,212.0	2.64	89.61	4,182.4	28.5	368.2	7.0	0.53	-0.27	9.43
4,307.0	2.02	107.72	4,277.3	28.0	372.0	7.8	1.01	-0.65	19.06
4,401.0	1.58	107.19	4,371.3	27.2	374.8	9.0	0.47	-0.47	-0.56
4,496.0	1.67	147.80	4,466.3	25.6	376.8	10.7	1.19	0.09	42.75
4,591.0	1.76	49.71	4,561.2	25.4	378.6	11.1	2.73	0.09	-103.25
4,685.0	1.06	54.63	4,655.2	26.8	380.4	9.9	0.76	-0.74	5.23
4,780.0	1.14	23.52	4,750.2	28.2	381.5	8.6	0.63	0.08	-32.75
4,874.0	0.97	6.29	4,844.2	29.8	382.0	7.0	0.38	-0.18	-18.33
4,969.0	7.03	166.25	4,939.0	25.0	383.4	12.0	8.37	6.38	168.38
5,063.0	12.49	193.15	5,031.6	9.5	382.5	27.3	7.42	5.81	28.62
CROSSED 46' HARDLINE @ 5079' MD / 5047' TVD									
5,078.5	12.85	194.61	5,046.7	6.2	381.7	30.5	3.10	2.31	9.40
5,157.0	14.77	200.88	5,123.0	-11.6	375.9	47.7	3.10	2.45	7.99
5,252.0	17.76	195.26	5,214.2	-36.9	367.8	72.1	3.55	3.15	-5.92
5,346.0	23.21	186.82	5,302.2	-69.2	361.8	103.6	6.58	5.80	-8.98
5,441.0	26.47	182.43	5,388.4	-108.9	358.7	142.9	3.94	3.43	-4.62
5,513.0	32.62	176.98	5,451.0	-144.4	359.0	178.2	9.31	8.54	-7.57

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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)
5,607.0	46.17	175.04	5,523.5	-203.7	363.3	237.7	14.47	14.41	-2.06
5,702.0	62.43	174.52	5,578.7	-280.3	370.3	314.6	17.12	17.12	-0.55
5,796.0	78.88	180.49	5,609.8	-368.6	374.0	402.8	18.49	17.50	6.35
CROSSED LEASELINE @ 5882' MD / 5619' TVD									
5,882.3	88.36	181.32	5,619.4	-454.2	372.6	487.9	11.03	10.99	0.96
5,888.0	88.99	181.37	5,619.5	-459.9	372.5	493.6	11.03	10.99	0.94
7" CASING PIONT @ 5935' MD / 5620' TVD / END OF INT HOLE / BEGIN LATERAL									
5,935.0	89.56	181.21	5,620.1	-506.9	371.4	540.3	1.27	1.22	-0.35
5,989.0	90.22	181.02	5,620.2	-560.9	370.4	593.9	1.27	1.22	-0.35
6,082.0	92.24	180.49	5,618.2	-653.9	369.1	686.3	2.25	2.17	-0.57
6,176.0	91.36	180.32	5,615.3	-747.8	368.5	779.8	0.95	-0.94	-0.18
6,269.0	90.66	180.32	5,613.6	-840.8	368.0	872.3	0.75	-0.75	0.00
CROSSED 460' HARDLINE @ 6343' MD / 5612' TVD									
6,342.7	92.26	179.62	5,611.7	-914.5	368.0	945.6	2.37	2.17	-0.95
6,362.0	92.68	179.44	5,610.9	-933.8	368.1	964.8	2.37	2.17	-0.95
6,455.0	92.95	178.56	5,606.3	-1,026.6	369.8	1,057.4	0.99	0.29	-0.95
6,549.0	91.19	176.80	5,602.9	-1,120.5	373.6	1,151.2	2.65	-1.87	-1.87
6,641.0	92.15	176.27	5,600.3	-1,212.3	379.1	1,243.1	1.19	1.04	-0.58
6,733.0	90.22	176.62	5,598.4	-1,304.1	384.8	1,335.0	2.13	-2.10	0.38
6,825.0	89.87	176.45	5,598.3	-1,395.9	390.4	1,427.0	0.42	-0.38	-0.18
6,918.0	89.60	175.57	5,598.7	-1,488.7	396.9	1,519.9	0.99	-0.29	-0.95
7,012.0	89.43	175.04	5,599.5	-1,582.4	404.6	1,613.9	0.59	-0.18	-0.56
7,104.0	92.59	179.09	5,597.9	-1,674.2	409.3	1,705.8	5.58	3.43	4.40
7,196.0	89.60	179.96	5,596.1	-1,766.2	410.0	1,797.4	3.38	-3.25	0.95
7,291.0	89.43	179.96	5,596.9	-1,861.2	410.1	1,892.0	0.18	-0.18	0.00
7,385.0	87.85	178.56	5,599.2	-1,955.1	411.3	1,985.6	2.25	-1.68	-1.49
7,480.0	86.44	177.86	5,603.9	-2,050.0	414.3	2,080.3	1.66	-1.48	-0.74
7,574.0	90.40	177.68	5,606.5	-2,143.8	417.9	2,174.1	4.22	4.21	-0.19
7,669.0	89.87	176.98	5,606.3	-2,238.7	422.4	2,269.0	0.92	-0.56	-0.74
7,763.0	88.11	176.45	5,607.9	-2,332.5	427.7	2,362.9	1.96	-1.87	-0.56
7,858.0	91.01	177.33	5,608.7	-2,427.4	432.9	2,457.8	3.19	3.05	0.93
7,953.0	89.43	176.27	5,608.3	-2,522.2	438.2	2,552.7	2.00	-1.66	-1.12
8,047.0	93.91	179.79	5,605.6	-2,616.1	441.4	2,646.4	6.06	4.77	3.74
8,142.0	94.00	179.61	5,599.0	-2,710.9	441.9	2,740.8	0.21	0.09	-0.19
8,236.0	91.01	182.07	5,594.9	-2,804.8	440.5	2,834.1	4.12	-3.18	2.62
8,331.0	90.40	181.55	5,593.7	-2,899.7	437.5	2,928.3	0.84	-0.64	-0.55
8,425.0	90.40	180.32	5,593.1	-2,993.7	436.0	3,021.7	1.31	0.00	-1.31
8,519.0	89.34	178.38	5,593.3	-3,087.7	437.1	3,115.4	2.35	-1.13	-2.06
8,614.0	88.20	177.50	5,595.3	-3,182.6	440.5	3,210.2	1.52	-1.20	-0.93
8,709.0	86.97	177.15	5,599.3	-3,277.4	444.9	3,305.0	1.35	-1.29	-0.37
8,803.0	90.40	175.75	5,601.5	-3,371.2	450.7	3,398.9	3.94	3.65	-1.49
8,897.0	90.66	175.39	5,600.6	-3,464.9	458.0	3,492.9	0.47	0.28	-0.38
8,992.0	90.66	174.34	5,599.5	-3,559.5	466.5	3,587.9	1.11	0.00	-1.11
9,087.0	90.92	173.99	5,598.2	-3,654.0	476.2	3,682.9	0.46	0.27	-0.37

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

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)	
9,181.0	90.92	178.56	5,596.7	-3,747.8	482.3	3,776.8	4.86	0.00	4.86	
9,276.0	91.28	178.56	5,594.9	-3,842.7	484.6	3,871.5	0.38	0.38	0.00	
9,370.0	90.84	178.03	5,593.1	-3,936.7	487.4	3,965.3	0.73	-0.47	-0.56	
9,464.0	89.52	178.91	5,592.8	-4,030.6	490.0	4,059.1	1.69	-1.40	0.94	
9,559.0	90.13	178.73	5,593.1	-4,125.6	491.9	4,153.8	0.67	0.64	-0.19	
9,653.0	90.22	178.21	5,592.8	-4,219.6	494.4	4,247.6	0.56	0.10	-0.55	
9,748.0	89.60	177.33	5,593.0	-4,314.5	498.1	4,342.4	1.13	-0.65	-0.93	
9,842.0	89.96	179.61	5,593.3	-4,408.5	500.6	4,436.2	2.46	0.38	2.43	
9,936.0	90.13	179.09	5,593.3	-4,502.5	501.7	4,529.8	0.58	0.18	-0.55	
10,031.0	88.64	178.91	5,594.3	-4,597.4	503.4	4,624.5	1.58	-1.57	-0.19	
10,125.0	87.67	176.45	5,597.3	-4,691.3	507.2	4,718.3	2.81	-1.03	-2.62	
10,220.0	89.43	178.21	5,599.7	-4,786.2	511.6	4,813.2	2.62	1.85	1.85	
10,314.0	90.48	177.86	5,599.8	-4,880.1	514.8	4,907.0	1.18	1.12	-0.37	
10,409.0	91.45	177.33	5,598.2	-4,975.0	518.8	5,001.8	1.16	1.02	-0.56	
10,504.0	90.57	178.21	5,596.5	-5,069.9	522.5	5,096.7	1.31	-0.93	0.93	
10,598.0	88.99	180.14	5,596.9	-5,163.9	523.8	5,190.3	2.65	-1.68	2.05	
10,693.0	88.99	180.14	5,598.6	-5,258.9	523.6	5,284.9	0.00	0.00	0.00	
CROSSED 460' HARDLINE @ 10718' MD / 5599' TVD										
10,717.5	89.10	180.19	5,599.0	-5,283.4	523.5	5,309.2	0.51	0.47	0.19	
10,787.0	89.43	180.32	5,599.9	-5,352.9	523.2	5,378.4	0.51	0.47	0.19	
10,805.0	89.78	180.14	5,600.0	-5,370.9	523.2	5,396.3	2.19	1.94	-1.00	
TD @ 10851' MD / 5600' TVD										
10,851.0	89.78	180.14	5,600.2	-5,416.9	523.0	5,442.1	0.00	0.00	0.00	

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
5,078.5	5,046.7	6.2	381.7	CROSSED 46' HARDLINE @ 5079' MD / 5047' TVD	
5,882.3	5,619.4	-454.2	372.6	CROSSED LEASELINE @ 5882' MD / 5619' TVD	
5,935.0	5,620.1	-506.9	371.4	7" CASING PIONT @ 5935' MD / 5620' TVD / END OF INT HOLE / BEGIN LAT	
6,342.7	5,611.7	-914.5	368.0	CROSSED 460' HARDLINE @ 6343' MD / 5612' TVD	
10,717.5	5,599.0	-5,283.4	523.5	CROSSED 460' HARDLINE @ 10718' MD / 5599' TVD	
10,851.0	5,600.2	-5,416.9	523.0	TD @ 10851' MD / 5600' TVD	

Checked By: _____ Approved By: _____ Date: _____



Survey Certification Sheet

Noble Energy Inc
Company

RM-150045
Job Number

2/17/15
Date

Sec2,T9N,R58W,6TH PM
Lease

Gonsoulin
State LD11-76HN
Well Name

Weld, CO
County & State

API: 05-123-39836

Surveyed from a depth of: 1008'to5888' MD (DDC Certified Survey Data
5888'to10851' MD (DDC Certified Survey Data

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.

Bryon Reed
MWD General Manager

Bryon Reed

Digitally signed by Bryon Reed
DN: cn=Bryon Reed, o=DDC, ou,
email=Bryon.reed@directionaldrill
ers.com, c=US
Date: 2015.02.17 14:20:05 -06'00'

Company Name: Noble Energy Inc.
Gonsoulin State LD11-76HN
Weld County, CO
Rig: H&P #326
Created By: Jerry Arsenault
Date: 1/22/2014



Gonsoulin State LD11-76HN
Weld County, CO
Q150035 & RM-150045
Design #1



T

G

M

Azimuths to Grid North

Magnetic North: 6.82°

Magnetic Field

Strength: 53039.5snT

Dip Angle: 67.37°

Date: 1/22/2015

Model: IGRF2010

DESIGN TARGET DETAILS							
Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude
PBHL Gonsoulin State LD11-76HN - plan hits target center	5576.5	-5416.1	522.9	1523930.17	3461595.16	40° 45' 34.812 N	103° 50' 1.284 W

ANNOTATIONS									
MD	Inc	Azi	TVD	+N-S	+E-W	V	Sect	Departure	Annotation
1008.0	0.50	293.22	1008.0	-4.4	0.8	4.5	6.5		TIE IN @ 1008' MD / 1008' TVD / END OF SUR HOLE / BEGIN INT HOLE
2174.7	10.89	78.81	2166.5	-1.6	94.1	10.6	110.3		CROSSED 460' HARDLINE @ 2175' MD / 2167' TVD
5078.5	12.85	194.61	5046.7	6.2	381.7	30.5	432.4		CROSSED 46' HARDLINE @ 5079' MD / 5047' TVD
5882.3	88.36	181.32	5619.4	-454.2	372.6	487.9	896.3		CROSSED LEASELINE @ 5882' MD / 5619' TVD
5935.0	89.56	181.21	5620.1	-506.9	371.4	540.3	948.9		7" CASING PIONT @ 5935' MD / 5620' TVD / END OF INT HOLE / BEGIN LATERAL
6342.7	92.26	179.62	5611.7	-914.5	368.0	945.6	1356.5		CROSSED 460' HARDLINE @ 6343' MD / 5612' TVD
10717.5	89.10	180.19	5599.0	-5283.4	523.5	5309.2	5730.0		CROSSED 460' HARDLINE @ 10718' MD / 5599' TVD
10851.0	89.78	180.14	5600.2	-5416.9	523.0	5442.1	5863.5		TD @ 10851' MD / 5600' TVD

WELL DETAILS: Gonsoulin State LD11-76HN							
Ground Level:				4739.0			
+N-S	+E-W	Northing	Easting	Latitude	Longitude		
0.0	0.0	1529346.23	3461072.30	40° 46' 28.416 N	103° 50' 6.756 W		

