



Noble Energy Inc.

Weld County, CO
Sec 12, T5N,R64W
SLW Ranch B13-69HN

Wellbore #1

Design: Wellbore #1 **FINAL**

DDC Survey Report

13 May, 2013



Company:	Noble Energy Inc.	Local Co-ordinate Reference:	Well SLW Ranch B13-69HN
Project:	Weld County, CO	TVD Reference:	WELL @ 4625.0usft (H&P #326)
Site:	Sec 12, T5N,R64W	MD Reference:	WELL @ 4625.0usft (H&P #326)
Well:	SLW Ranch B13-69HN	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 12, T5N,R64W			
Site Position:		Northing:	1,393,120.64 usft	Latitude:	40° 24' 29.772 N
From:	Lat/Long	Easting:	3,276,451.66 usft	Longitude:	104° 30' 26.100 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.64 °

Well	SLW Ranch B13-69HN					
Well Position	+N-S	0.0 usft	Northing:	1,393,098.78 usft	Latitude:	40° 24' 29.556 N
	+E-W	0.0 usft	Easting:	3,276,451.90 usft	Longitude:	104° 30' 26.100 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	4,595.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	3/27/2013	8.49	67.04	52,977

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	97.67	

Survey Program		Date	5/13/2013		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
270.0	10,833.0	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 @ 270' MD / 270' TVD									
270.0	0.40	270.00	270.0	0.0	0.0	0.0	0.00	0.00	0.00
620.0	0.40	340.80	620.0	1.2	-1.6	-1.8	0.13	0.00	20.23
738.0	0.40	31.20	738.0	1.9	-1.5	-1.8	0.29	0.00	42.71
833.0	0.50	18.90	833.0	2.6	-1.2	-1.6	0.15	0.11	-12.95
927.0	0.60	14.90	927.0	3.4	-1.0	-1.4	0.11	0.11	-4.26
1,022.0	0.70	8.30	1,022.0	4.5	-0.8	-1.4	0.13	0.11	-6.95
1,116.0	0.90	12.10	1,116.0	5.8	-0.5	-1.3	0.22	0.21	4.04
1,211.0	0.70	23.60	1,211.0	7.0	-0.1	-1.1	0.27	-0.21	12.11
1,309.0	0.70	19.70	1,309.0	8.2	0.3	-0.8	0.05	0.00	-3.98
1,403.0	0.60	20.80	1,402.9	9.2	0.7	-0.6	0.11	-0.11	1.17

Company:	Noble Energy Inc.	Local Co-ordinate Reference:	Well SLW Ranch B13-69HN
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Well:	SLW Ranch B13-69HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
1,497.0	0.40	196.00	1,496.9	9.3	0.8	-0.5	1.06	-0.21	186.38
1,591.0	2.20	182.60	1,590.9	7.2	0.6	-0.4	1.93	1.91	-14.26
1,683.0	4.60	181.60	1,682.7	1.7	0.4	0.2	2.61	2.61	-1.09
1,777.0	7.20	182.70	1,776.2	-7.9	0.0	1.1	2.77	2.77	1.17
1,870.0	8.60	181.20	1,868.4	-20.7	-0.4	2.4	1.52	1.51	-1.61
1,962.0	10.90	184.10	1,959.0	-36.3	-1.2	3.7	2.56	2.50	3.15
2,054.0	12.50	180.60	2,049.1	-54.9	-1.9	5.4	1.90	1.74	-3.80
2,146.0	13.90	182.10	2,138.7	-75.9	-2.4	7.7	1.57	1.52	1.63
2,239.0	15.10	184.00	2,228.7	-99.1	-3.7	9.6	1.39	1.29	2.04
2,331.0	13.70	181.90	2,317.8	-122.0	-4.9	11.5	1.62	-1.52	-2.28
2,423.0	15.20	183.00	2,406.9	-144.9	-5.9	13.5	1.66	1.63	1.20
2,517.0	16.80	181.20	2,497.3	-170.8	-6.8	16.1	1.78	1.70	-1.91
2,610.0	18.50	180.80	2,585.9	-199.0	-7.3	19.4	1.83	1.83	-0.43
2,703.0	20.10	179.90	2,673.7	-229.7	-7.4	23.3	1.75	1.72	-0.97
2,795.0	19.40	180.50	2,760.2	-260.8	-7.6	27.3	0.79	-0.76	0.65
2,888.0	17.90	180.70	2,848.4	-290.6	-7.9	31.0	1.61	-1.61	0.22
2,983.0	16.90	181.50	2,939.0	-319.0	-8.4	34.2	1.08	-1.05	0.84
3,078.0	13.90	181.10	3,030.6	-344.2	-9.0	37.0	3.16	-3.16	-0.42
3,172.0	14.40	180.40	3,121.7	-367.2	-9.3	39.8	0.56	0.53	-0.74
3,267.0	15.10	179.50	3,213.6	-391.3	-9.3	43.1	0.78	0.74	-0.95
3,362.0	15.40	186.00	3,305.3	-416.3	-10.5	45.2	1.83	0.32	6.84
3,457.0	15.80	190.50	3,396.8	-441.5	-14.1	44.9	1.34	0.42	4.74
3,552.0	15.40	189.50	3,488.3	-466.7	-18.6	43.9	0.51	-0.42	-1.05
3,647.0	16.80	187.30	3,579.5	-492.7	-22.4	43.6	1.61	1.47	-2.32
3,742.0	15.40	187.10	3,670.8	-518.9	-25.7	43.8	1.47	-1.47	-0.21
3,837.0	12.60	185.70	3,763.0	-541.7	-28.3	44.3	2.97	-2.95	-1.47
3,931.0	9.40	184.10	3,855.2	-559.6	-29.9	45.1	3.42	-3.40	-1.70
4,026.0	6.70	186.30	3,949.3	-572.8	-31.0	45.7	2.86	-2.84	2.32
4,121.0	3.80	191.30	4,043.9	-581.4	-32.3	45.6	3.09	-3.05	5.26
4,215.0	1.90	214.90	4,137.8	-585.8	-33.8	44.7	2.33	-2.02	25.11
4,310.0	1.30	307.70	4,232.7	-586.4	-35.5	43.1	2.48	-0.63	97.68
4,405.0	1.90	346.30	4,327.7	-584.2	-36.7	41.6	1.26	0.63	40.63
4,499.0	0.90	340.80	4,421.7	-582.0	-37.3	40.7	1.07	-1.06	-5.85
4,594.0	1.10	311.60	4,516.7	-580.7	-38.3	39.6	0.57	0.21	-30.74
4,689.0	1.20	310.90	4,611.7	-579.4	-39.7	38.0	0.11	0.11	-0.74
4,783.0	1.60	331.20	4,705.6	-577.6	-41.1	36.4	0.67	0.43	21.60
4,878.0	1.50	323.40	4,800.6	-575.5	-42.5	34.7	0.25	-0.11	-8.21
4,973.0	1.50	308.50	4,895.6	-573.7	-44.2	32.8	0.41	0.00	-15.68
5,068.0	2.60	309.20	4,990.5	-571.6	-46.8	29.9	1.16	1.16	0.74
5,162.0	2.00	311.50	5,084.4	-569.1	-49.7	26.7	0.65	-0.64	2.45
5,257.0	1.10	309.40	5,179.4	-567.4	-51.7	24.5	0.95	-0.95	-2.21
5,351.0	1.20	273.60	5,273.4	-566.8	-53.3	22.8	0.76	0.11	-38.09
5,446.0	0.60	316.40	5,368.4	-566.4	-54.7	21.4	0.91	-0.63	45.05

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Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
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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)
5,541.0	1.20	24.20	5,463.3	-565.1	-54.6	21.3	1.18	0.63	71.37
5,636.0	0.90	34.60	5,558.3	-563.6	-53.8	21.9	0.37	-0.32	10.95
5,730.0	0.60	37.90	5,652.3	-562.6	-53.0	22.5	0.32	-0.32	3.51
5,787.0	0.60	27.40	5,709.3	-562.1	-52.7	22.8	0.19	0.00	-18.42
5,825.0	0.50	21.20	5,747.3	-561.8	-52.6	22.9	0.31	-0.26	-16.32
5,920.0	3.60	84.60	5,842.2	-561.1	-49.5	25.9	3.58	3.26	66.74
6,014.0	15.20	77.60	5,934.8	-558.2	-34.4	40.4	12.38	12.34	-7.45
6,109.0	25.20	80.20	6,023.9	-552.0	-2.3	71.4	10.57	10.53	2.74
6,204.0	29.80	91.80	6,108.2	-549.3	41.3	114.3	7.41	4.84	12.21
6,298.0	35.40	94.00	6,187.3	-552.0	91.9	164.7	6.09	5.96	2.34
6,393.0	48.20	94.60	6,258.0	-556.7	154.9	227.8	13.48	13.47	0.63
6,488.0	58.90	92.80	6,314.4	-561.6	231.0	303.9	11.37	11.26	-1.89
6,582.0	59.30	90.40	6,362.7	-563.8	311.6	384.1	2.23	0.43	-2.55
6,627.0	59.70	89.70	6,385.5	-563.9	350.4	422.5	1.61	0.89	-1.56
6,677.0	60.50	89.50	6,410.4	-563.6	393.8	465.5	1.64	1.60	-0.40
6,722.0	60.70	89.90	6,432.5	-563.4	433.0	504.3	0.89	0.44	0.89
6,772.0	62.30	91.30	6,456.4	-563.8	476.9	547.9	4.04	3.20	2.80
6,817.0	62.70	91.70	6,477.1	-564.9	516.8	587.6	1.19	0.89	0.89
6,867.0	65.10	89.70	6,499.1	-565.4	561.7	632.1	5.99	4.80	-4.00
6,962.0	77.80	86.80	6,529.3	-562.6	651.5	720.8	13.68	13.37	-3.05
6,987.0	81.60	87.10	6,533.8	-561.3	676.1	744.9	15.25	15.20	1.20
7,056.0	85.80	88.80	6,541.3	-558.8	744.6	812.5	6.56	6.09	2.46
7,119.0	85.80	88.30	6,546.0	-557.2	807.4	874.6	0.79	0.00	-0.79
7,214.0	89.80	91.00	6,549.6	-556.7	902.3	968.5	5.08	4.21	2.84
7,309.0	89.60	93.70	6,550.1	-560.6	997.2	1,063.1	2.85	-0.21	2.84
7,404.0	89.30	93.60	6,551.0	-566.6	1,092.0	1,157.9	0.33	-0.32	-0.11
7,498.0	89.00	93.60	6,552.4	-572.5	1,185.8	1,251.6	0.32	-0.32	0.00
7,593.0	89.80	92.40	6,553.4	-577.5	1,280.7	1,346.3	1.52	0.84	-1.26
7,688.0	90.60	90.50	6,553.1	-579.9	1,375.6	1,440.7	2.17	0.84	-2.00
7,782.0	90.60	90.00	6,552.1	-580.3	1,469.6	1,533.9	0.53	0.00	-0.53
7,877.0	90.40	89.70	6,551.3	-580.0	1,564.6	1,628.1	0.38	-0.21	-0.32
7,972.0	90.50	89.20	6,550.5	-579.1	1,659.6	1,722.1	0.54	0.11	-0.53
8,067.0	90.00	89.80	6,550.1	-578.3	1,754.6	1,816.1	0.82	-0.53	0.63
8,162.0	89.80	89.90	6,550.3	-578.0	1,849.6	1,910.2	0.24	-0.21	0.11
8,256.0	91.10	91.40	6,549.5	-579.1	1,943.6	2,003.5	2.11	1.38	1.60
8,352.0	90.60	91.70	6,548.1	-581.7	2,039.6	2,099.0	0.61	-0.52	0.31
8,446.0	90.40	91.90	6,547.3	-584.7	2,133.5	2,192.5	0.30	-0.21	0.21
8,541.0	90.30	91.90	6,546.7	-587.8	2,228.5	2,287.0	0.11	-0.11	0.00
8,636.0	90.20	92.20	6,546.3	-591.2	2,323.4	2,381.5	0.33	-0.11	0.32
8,731.0	90.00	92.20	6,546.1	-594.9	2,418.3	2,476.1	0.21	-0.21	0.00
8,825.0	89.80	92.60	6,546.3	-598.8	2,512.2	2,569.7	0.48	-0.21	0.43
8,920.0	88.10	91.80	6,548.0	-602.4	2,607.2	2,664.2	1.98	-1.79	-0.84
9,015.0	87.90	89.20	6,551.3	-603.3	2,702.1	2,758.4	2.74	-0.21	-2.74

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Project:	Weld County, CO	TVD Reference:	WELL @ 4625.0usft (H&P #326)
Site:	Sec 12, T5N,R64W	MD Reference:	WELL @ 4625.0usft (H&P #326)
Well:	SLW Ranch B13-69HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
9,110.0	89.30	89.00	6,553.7	-601.8	2,797.0	2,852.3	1.49	1.47	-0.21
9,205.0	89.10	89.40	6,555.0	-600.5	2,892.0	2,946.3	0.47	-0.21	0.42
9,300.0	90.70	89.20	6,555.2	-599.3	2,987.0	3,040.3	1.70	1.68	-0.21
9,395.0	90.50	89.40	6,554.2	-598.1	3,082.0	3,134.3	0.30	-0.21	0.21
9,490.0	92.80	89.40	6,551.4	-597.1	3,176.9	3,228.2	2.42	2.42	0.00
9,585.0	94.10	89.30	6,545.7	-596.1	3,271.8	3,322.1	1.37	1.37	-0.11
9,680.0	94.70	89.30	6,538.4	-594.9	3,366.5	3,415.8	0.63	0.63	0.00
9,775.0	90.60	90.90	6,534.0	-595.1	3,461.4	3,509.8	4.63	-4.32	1.68
9,870.0	89.80	92.30	6,533.7	-597.7	3,556.3	3,604.3	1.70	-0.84	1.47
9,965.0	89.80	92.40	6,534.0	-601.6	3,651.2	3,698.9	0.11	0.00	0.11
10,060.0	90.10	91.80	6,534.1	-605.1	3,746.2	3,793.4	0.71	0.32	-0.63
10,154.0	90.50	93.00	6,533.6	-609.0	3,840.1	3,887.0	1.35	0.43	1.28
10,249.0	88.00	91.60	6,534.9	-612.8	3,935.0	3,981.6	3.02	-2.63	-1.47
10,344.0	86.10	87.20	6,539.8	-611.9	4,029.8	4,075.4	5.04	-2.00	-4.63
10,439.0	87.40	88.90	6,545.1	-608.6	4,124.6	4,168.9	2.25	1.37	1.79
10,533.0	89.50	89.00	6,547.7	-606.9	4,218.6	4,261.8	2.24	2.23	0.11
10,628.0	88.80	88.80	6,549.1	-605.1	4,313.5	4,355.7	0.77	-0.74	-0.21
10,723.0	90.40	88.40	6,549.8	-602.8	4,408.5	4,449.5	1.74	1.68	-0.42
10,772.0	89.30	87.50	6,549.9	-601.0	4,457.5	4,497.8	2.90	-2.24	-1.84
TD @ 10833' MD / 6551' TVD									
10,833.0	89.30	87.50	6,550.6	-598.4	4,518.4	4,557.8	0.00	0.00	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
270.0	270.0	0.0	0.0	TIE IN @ 270' MD / 270' TVD
10,833.0	6,550.6	-598.4	4,518.4	TD @ 10833' MD / 6551' TVD

Checked By: _____ Approved By: _____ Date: _____



Survey Certification Sheet

Noble Energy Inc
Company

RM-13328
Job Number

5/24/13
Date

Sec12,T5N,R64W
Lease

SLW Ranch B13-69HN
Well Name

Weld, CO
County & State

API: 05-123-36496

Surveyed from a depth of: 270 feet to 10833 feet MD

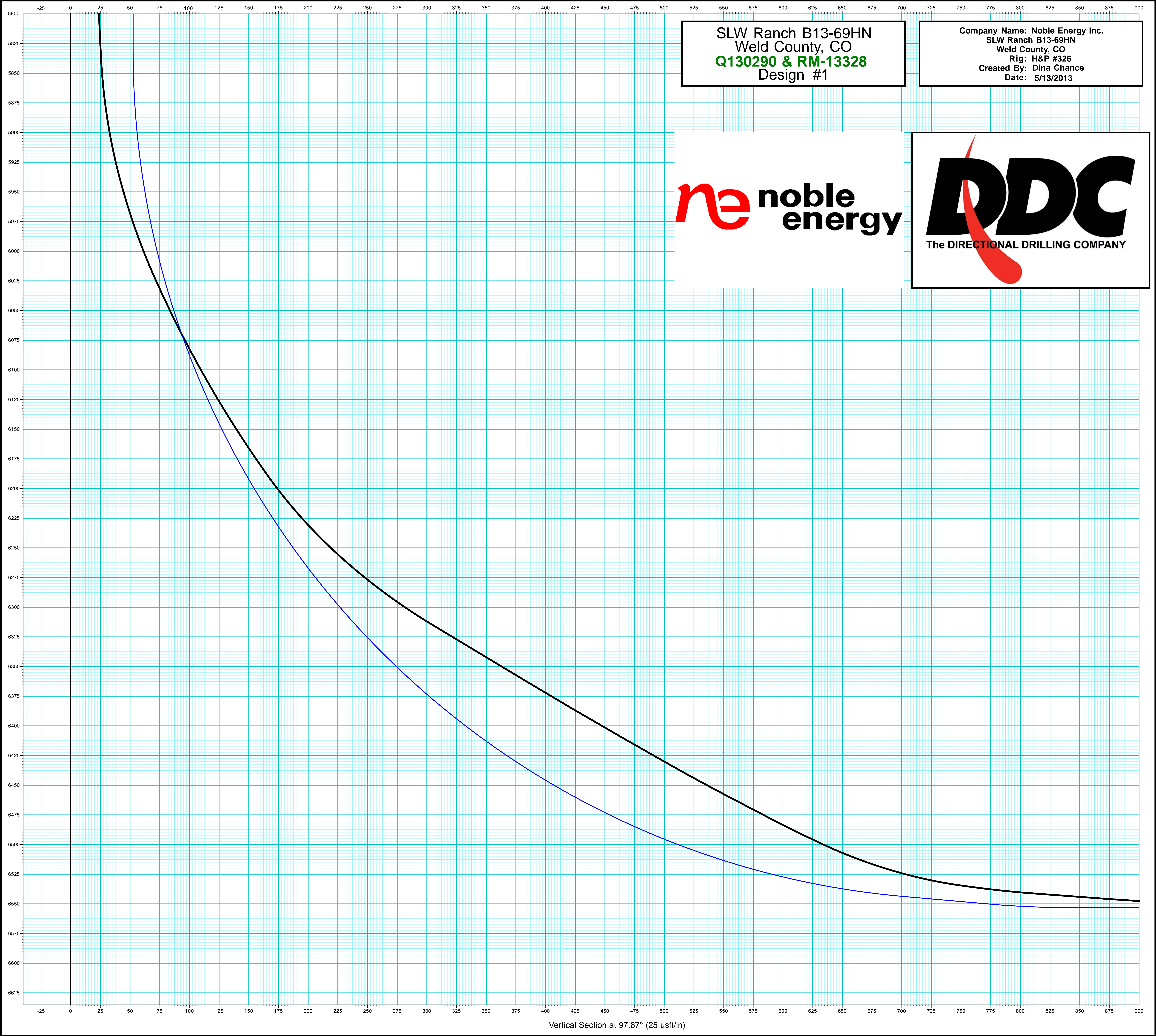
Type of Survey: MWD

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.

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: 2013.05.28 16:43:49 -05'00'

Larry Wright
MWD General Manager



SLW Ranch B13-69HN
Weld County, CO
Q130290 & RM-13328
Design #1

Company Name: Noble Energy Inc.
SLW Ranch B13-69HN
Weld County, CO
Rig: H&P #326
Created By: Dina Chance
Date: 5/13/2013



Vertical Section at 97.67° (25 usft/in)

Company Name: Noble Energy Inc.
SLW Ranch B13-69HN
Weld County, CO
Rig: H&P #326
Created By: Dina Chance
Date: 5/13/2013

SLW Ranch B13-69HN
Weld County, CO
Q130290 & RM-13328
Design #1

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



ANNOTATIONS								
MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation
270.0	0.40	270.00	270.0	0.0	0.0	0.0	0.0	TIE IN @ 270' MD / 270' TVD
10833.0	89.30	87.50	6550.6	-598.4	4518.4	4557.8	5220.8	TD @ 10833' MD / 6551' TVD

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL SLW Ranch B13-69HN - plan hits target center	6540.0	-608.4	4518.7	1392490.37	3280970.60	40° 24' 23.040 N	104° 29' 27.778 W

WELL DETAILS: SLW Ranch B13-69HN							
+N/-S	+E/-W	Ground Level:	4595.0		Longitude		
0.0	0.0	Northing	Easting	Latitude			
		1393098.77	3276451.90	40° 24' 29.556 N	104° 30' 26.100 W		

