

Noble Energy

Weld County, CO (NAD 83)

Sec. 4-T6N-R63W (NCLP AA04-04/05-B)

NCLP AA06-69-1BHNC

Plan A

Design: Actual Surveys

Sperry Drilling Services

Final Report

04 November, 2014

Well Coordinates: 1,434,362.70 N, 3,291,668.06 E (40° 31' 15.56" N, 104° 27' 03.10" W)

Ground Level: 4,712.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well NCLP AA06-69-1BHNC

RKB=30ft @ 4742.00usft (H&P 321)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Project: Weld County, CO (NAD 83)
 Site: Sec. 4-T6N-R63W (NCLP AA04-04/05-B)
 Well: NCLP AA06-69-1BHNC
 Wellbore: Plan A
 Design: Actual Surveys



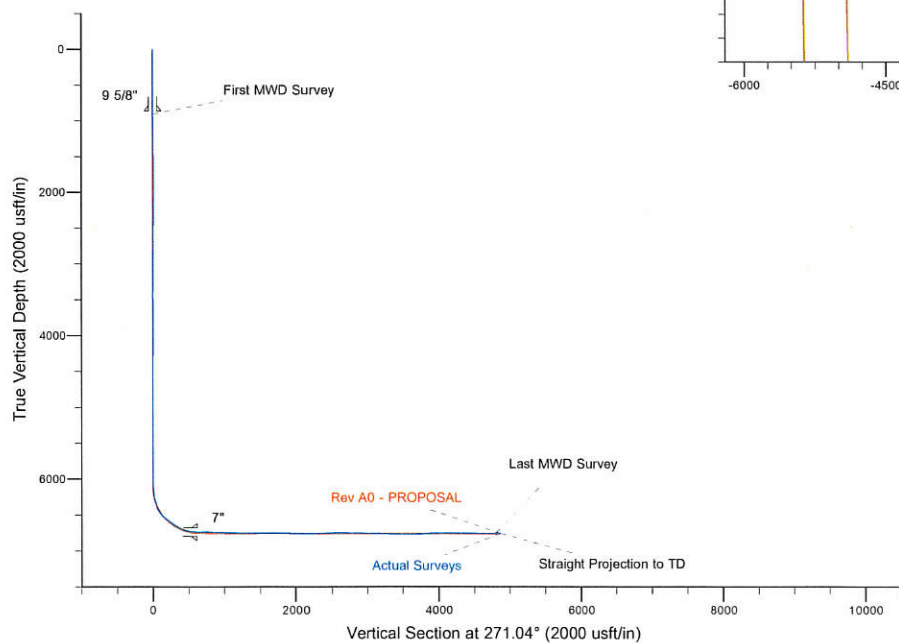
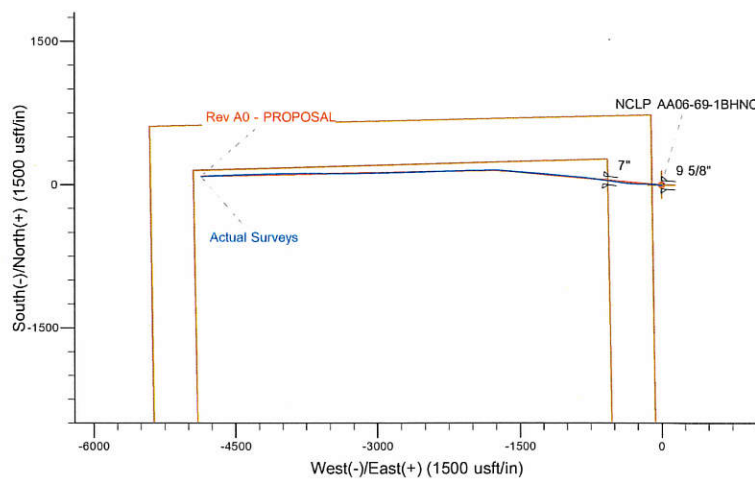
HALLIBURTON

Sperry Drilling

Platted SHL: 735' FNL, 100' FWL
 Platted Lat/Long: 40.52099 N, 104.45086W
 Location: Sec. 4-T6N-R63W

~7" Casing: 666' FNL, 504' FEL
 Lat/Long: 40.521146 N, -104.453057 W
 State Planes - CO Northern: 1434412.50 N, 3291056.67 E
 Location: Sec. 5-T6N-R63W

Platted BHL: 535' FNL, 535' FWL
 Lat/Long: 40.52139 N, 104.46835 W
 State Planes - CO Northern: 1434451.38 N, 3286804.25 E
 Location: Sec. 5-T6N-R63W



LEGEND

- △— NCLP AA06-69-1BHNC, Plan A, Rev A0 - PROPOSAL V0
- Actual Surveys

WELL DETAILS: NCLP AA06-69-1BHNC

Ground Level: 4712.00
 RKB=30ft @ 4742.00usft (H&P 321)

Created By: Gordy Roth
 Created On: 11/04/2014

Design Report for NCLP AA06-69-1BHNC - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
905.00	0.25	273.54	905.00	0.12	-1.97	1.97	0.03
First MWD Survey							
996.00	0.54	258.63	995.99	0.05	-2.59	2.59	0.34
1,089.00	0.68	253.44	1,088.99	-0.19	-3.55	3.54	0.16
1,182.00	0.64	263.89	1,181.98	-0.41	-4.59	4.59	0.14
1,274.00	0.59	260.65	1,273.98	-0.54	-5.57	5.56	0.07
1,365.00	0.73	259.25	1,364.97	-0.72	-6.60	6.59	0.15
1,457.00	0.68	255.15	1,456.97	-0.97	-7.71	7.69	0.08
1,549.00	0.42	225.95	1,548.96	-1.35	-8.48	8.45	0.41
1,641.00	0.31	226.83	1,640.96	-1.75	-8.90	8.87	0.12
1,736.00	0.16	295.66	1,735.96	-1.87	-9.21	9.17	0.31
1,831.00	0.37	144.26	1,830.96	-2.06	-9.15	9.11	0.54
1,926.00	0.32	136.38	1,925.96	-2.50	-8.79	8.74	0.07
2,020.00	0.49	169.59	2,019.95	-3.09	-8.53	8.47	0.30
2,115.00	0.42	91.37	2,114.95	-3.50	-8.11	8.05	0.61
2,210.00	0.61	96.75	2,209.95	-3.56	-7.26	7.19	0.21
2,304.00	0.79	87.91	2,303.94	-3.60	-6.12	6.05	0.22
2,399.00	1.16	100.85	2,398.93	-3.76	-4.52	4.45	0.45
2,494.00	1.15	13.35	2,493.91	-3.01	-3.35	3.30	1.68
2,589.00	0.76	271.26	2,588.91	-2.07	-3.76	3.72	1.58
2,683.00	0.99	288.90	2,682.89	-1.79	-5.15	5.12	0.37
2,778.00	0.51	90.31	2,777.89	-1.53	-5.51	5.48	1.56
2,873.00	0.38	94.00	2,872.89	-1.55	-4.77	4.74	0.14
2,968.00	0.36	97.72	2,967.89	-1.61	-4.16	4.13	0.03
3,063.00	0.45	90.39	3,062.88	-1.66	-3.49	3.46	0.11
3,157.00	0.34	102.53	3,156.88	-1.72	-2.85	2.82	0.15
3,252.00	0.16	173.34	3,251.88	-1.91	-2.56	2.52	0.34
3,346.00	0.49	155.84	3,345.88	-2.41	-2.38	2.34	0.36
3,441.00	1.20	163.20	3,440.87	-3.73	-1.93	1.86	0.75
3,536.00	0.79	290.09	3,535.86	-4.46	-2.25	2.17	1.88
3,631.00	1.08	307.00	3,630.85	-3.70	-3.58	3.52	0.42
3,726.00	0.37	25.54	3,725.84	-2.88	-4.17	4.11	1.13
3,820.00	0.48	58.17	3,819.84	-2.40	-3.70	3.66	0.28
3,915.00	0.67	66.47	3,914.83	-1.97	-2.85	2.82	0.22
4,010.00	1.03	61.19	4,009.82	-1.33	-1.60	1.57	0.39
4,105.00	0.40	82.15	4,104.82	-0.88	-0.52	0.50	0.71
4,200.00	0.25	170.27	4,199.82	-1.04	-0.16	0.14	0.49
4,294.00	0.92	148.10	4,293.81	-1.88	0.28	-0.31	0.74
4,389.00	0.38	180.08	4,388.80	-2.84	0.68	-0.73	0.66
4,484.00	0.25	188.84	4,483.80	-3.36	0.65	-0.71	0.15
4,579.00	0.44	170.60	4,578.80	-3.93	0.68	-0.75	0.23
4,674.00	0.53	110.79	4,673.80	-4.44	1.15	-1.23	0.52
4,769.00	0.21	143.15	4,768.80	-4.74	1.66	-1.75	0.39
4,864.00	0.22	233.77	4,863.80	-4.98	1.62	-1.71	0.32
4,958.00	0.33	203.08	4,957.79	-5.34	1.37	-1.46	0.19
5,053.00	0.26	211.13	5,052.79	-5.78	1.15	-1.25	0.09
5,148.00	0.18	230.48	5,147.79	-6.05	0.92	-1.03	0.11
5,243.00	0.34	198.56	5,242.79	-6.42	0.72	-0.83	0.22
5,338.00	0.53	258.33	5,337.79	-6.77	0.20	-0.32	0.49

Design Report for NCLP AA06-69-1BHNC - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,433.00	0.54	264.64	5,432.78	-6.90	-0.68	0.55	0.06
5,527.00	0.07	333.08	5,526.78	-6.89	-1.15	1.02	0.55
5,622.00	0.22	41.31	5,621.78	-6.71	-1.05	0.93	0.22
5,717.00	0.17	343.58	5,716.78	-6.43	-0.97	0.85	0.20
5,811.00	0.19	17.53	5,810.78	-6.15	-0.96	0.85	0.11
5,906.00	0.25	344.46	5,905.78	-5.80	-0.97	0.87	0.15
6,001.00	0.39	11.44	6,000.78	-5.28	-0.96	0.87	0.21
6,064.00	0.50	358.95	6,063.78	-4.80	-0.93	0.84	0.23
6,096.00	0.44	2.43	6,095.78	-4.54	-0.92	0.84	0.21
6,191.00	6.44	266.72	6,190.58	-4.48	-6.23	6.15	6.84
6,285.00	13.77	280.04	6,283.07	-2.83	-22.54	22.48	8.13
6,380.00	19.78	277.91	6,373.98	1.36	-49.62	49.63	6.36
6,475.00	32.55	274.04	6,459.08	5.39	-91.21	91.29	13.55
6,569.00	46.89	270.43	6,531.20	7.44	-151.06	151.17	15.45
6,664.00	53.34	271.01	6,592.09	8.37	-223.91	224.03	6.81
6,759.00	57.99	273.67	6,645.66	11.63	-302.26	302.42	5.41
6,854.00	63.54	276.57	6,692.05	19.08	-384.78	385.06	6.42
6,948.00	76.10	278.90	6,724.42	31.00	-472.01	472.50	13.56
7,043.00	85.90	276.95	6,739.26	43.90	-564.83	565.54	10.51
7,124.00	91.54	277.87	6,741.07	54.34	-645.10	645.99	7.05
7,176.00	91.48	277.72	6,739.70	61.39	-696.60	697.61	0.31
7,270.00	87.66	275.95	6,740.40	72.57	-789.91	791.10	4.48
7,365.00	87.16	275.47	6,744.70	82.01	-884.34	885.69	0.73
7,460.00	86.54	275.27	6,749.92	90.89	-978.78	980.28	0.69
7,555.00	88.86	274.95	6,753.73	99.35	-1,073.32	1,074.96	2.47
7,650.00	90.12	274.47	6,754.58	107.15	-1,168.00	1,169.76	1.42
7,744.00	89.66	274.09	6,754.76	114.16	-1,261.73	1,263.60	0.63
7,839.00	89.51	274.26	6,755.44	121.08	-1,356.48	1,358.46	0.24
7,934.00	89.48	274.19	6,756.28	128.08	-1,451.22	1,453.31	0.08
8,029.00	89.94	277.00	6,756.76	137.34	-1,545.75	1,548.00	3.00
8,124.00	90.55	274.77	6,756.36	147.08	-1,640.25	1,642.65	2.43
8,219.00	89.08	271.57	6,756.66	152.33	-1,735.08	1,737.57	3.71
8,314.00	88.55	268.68	6,758.63	152.54	-1,830.05	1,832.53	3.09
8,408.00	88.89	268.75	6,760.73	150.43	-1,924.01	1,926.43	0.37
8,503.00	89.48	268.85	6,762.08	148.44	-2,018.98	2,021.35	0.63
8,598.00	89.60	268.77	6,762.84	146.47	-2,113.95	2,116.27	0.15
8,692.00	90.06	268.27	6,763.12	144.04	-2,207.92	2,210.18	0.72
8,787.00	91.02	268.48	6,762.23	141.35	-2,302.88	2,305.07	1.03
8,881.00	92.93	267.98	6,758.99	138.44	-2,396.77	2,398.90	2.10
8,976.00	91.26	267.99	6,755.51	135.11	-2,491.65	2,493.69	1.76
9,071.00	90.77	268.87	6,753.83	132.50	-2,586.59	2,588.58	1.06
9,166.00	89.08	268.42	6,753.96	130.26	-2,681.56	2,683.49	1.84
9,260.00	89.91	268.41	6,754.78	127.66	-2,775.52	2,777.39	0.88
9,355.00	88.09	267.35	6,756.44	124.14	-2,870.44	2,872.22	2.22
9,450.00	88.58	267.78	6,759.20	120.11	-2,965.31	2,967.01	0.69
9,545.00	89.32	269.57	6,760.94	117.91	-3,060.27	3,061.91	2.04
9,640.00	89.20	269.27	6,762.17	116.95	-3,155.25	3,156.86	0.34
9,735.00	89.23	269.16	6,763.47	115.65	-3,250.23	3,251.80	0.12
9,830.00	88.71	270.24	6,765.18	115.15	-3,345.22	3,346.76	1.26
9,924.00	89.82	270.11	6,766.38	115.44	-3,439.21	3,440.74	1.19
10,019.00	90.15	270.67	6,766.41	116.09	-3,534.20	3,535.73	0.68

Design Report for NCLP AA06-69-1BHNC - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
10,113.00	89.38	271.16	6,766.80	117.59	-3,628.19	3,629.73	0.97
10,208.00	93.20	270.56	6,764.66	119.01	-3,723.14	3,724.69	4.07
10,303.00	91.73	269.46	6,760.57	119.03	-3,818.05	3,819.58	1.93
10,398.00	91.48	268.79	6,757.91	117.58	-3,913.00	3,914.49	0.75
10,493.00	90.83	268.95	6,756.00	115.71	-4,007.96	4,009.40	0.70
10,588.00	89.57	268.31	6,755.66	113.44	-4,102.93	4,104.31	1.49
10,682.00	89.66	267.94	6,756.30	110.36	-4,196.88	4,198.19	0.41
10,777.00	89.60	268.02	6,756.91	107.01	-4,291.81	4,293.05	0.11
10,872.00	90.15	269.49	6,757.12	104.95	-4,386.79	4,387.97	1.65
10,967.00	88.83	267.27	6,757.96	102.26	-4,481.74	4,482.86	2.72
11,062.00	89.66	267.57	6,759.21	97.99	-4,576.63	4,577.66	0.93
11,157.00	90.59	267.58	6,759.01	93.97	-4,671.55	4,672.48	0.98
11,251.00	90.46	267.21	6,758.14	89.69	-4,765.45	4,766.29	0.42
11,284.00	90.86	267.65	6,757.76	88.22	-4,798.41	4,799.22	1.80
Last MWD Survey							
11,349.00	90.86	267.65	6,756.79	85.55	-4,863.35	4,864.10	0.00
Straight Projection to TD - St. Line Projection to Bit @ 11349' MD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
905.00	905.00	0.12	-1.97	First MWD Survey
11,284.00	6,757.76	88.22	-4,798.41	Last MWD Survey
11,349.00	6,756.79	85.55	-4,863.35	Straight Projection to TD
11,349.00	6,756.79	85.55	-4,863.35	St. Line Projection to Bit @ 11349' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	NCLP AA06-69-1BHNC_BHL	271.04	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
905.00	7,043.00	MWD Surveys-Intermediate	MWD+IFR1+MS_WY
7,124.00	11,349.00	MWD Surveys-Production	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
864.00	864.00	9 5/8"	9-5/8	13-3/4
7,090.00	6,741.28	7"	7	8-3/4

Design Report for NCLP AA06-69-1BHNC - Actual Surveys

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
NCLP AA06-69-1BHNC - actual wellpath hits target center	0.00	0.00	0.00	0.00	0.00	1,434,362.71	3,291,668.06	40.520990	-104.450860
- Polygon									
Point 1				0.00	150.69	-4,943.85	1,434,513.39	3,286,724.37	
Point 2				0.00	-4,226.05	-4,876.78	1,430,136.79	3,286,791.44	
Point 3				0.00	-4,083.89	-506.37	1,430,278.95	3,291,161.71	
Point 4				0.00	271.04	-568.76	1,434,633.74	3,291,099.32	
Point 5				0.00	150.69	-4,943.85	1,434,513.39	3,286,724.37	
NCLP AA06-69-1BHNC - actual wellpath hits target center	0.00	0.00	0.00	0.00	0.00	1,434,362.71	3,291,668.06	40.520990	-104.450860
- Point									
NCLP AA06-69-1BHNC - actual wellpath hits target center	0.00	0.00	0.00	0.00	0.00	1,434,362.71	3,291,668.06	40.520990	-104.450860
- Polygon									
Point 1				0.00	610.70	-5,403.87	1,434,973.39	3,286,264.37	
Point 2				0.00	-4,686.07	-5,336.79	1,429,676.79	3,286,331.44	
Point 3				0.00	-4,543.90	-46.35	1,429,818.95	3,291,621.71	
Point 4				0.00	731.05	-108.75	1,435,093.74	3,291,559.32	
Point 5				0.00	610.70	-5,403.87	1,434,973.39	3,286,264.37	
NCLP AA06-69-1BHNC - actual wellpath misses target center by 4.53usft at 11349.00usft MD (6756.79 TVD, 85.55 N, -4863.35 E)	0.00	0.00	6,760.00	88.68	-4,863.97	1,434,451.38	3,286,804.25	40.521390	-104.468350
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.52 °/100usft	Maximum Dogleg over Survey:	15.45 °/100usft at 6,569.00 usft
Net Tortousity applicable to Plans:	0.67 °/100usft	Directional Difficulty Index:	6.153

Audit Info

North Reference Sheet for Sec. 4-T6N-R63W (NCLP AA04-04/05-B) - NCLP AA06-69-1BHNC - Plan A

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to Grid North Reference.

Vertical Depths are relative to RKB=30ft @ 4742.00usft (H&P 321). Northing and Easting are relative to NCLP AA06-69-1BHNC

Coordinate System is US State Plane 1983, Colorado Northern Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996794

Grid Coordinates of Well: 1,434,362.70 usft N, 3,291,668.06 usft E

Geographical Coordinates of Well: 40° 31' 15.56" N, 104° 27' 03.10" W

Grid Convergence at Surface is: 0.68°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,349.00usft
the Bottom Hole Displacement is 4,864.10usft in the Direction of 271.01° (Grid).

Magnetic Convergence at surface is: -7.67° (14 June 2014, , BGGM2013)

