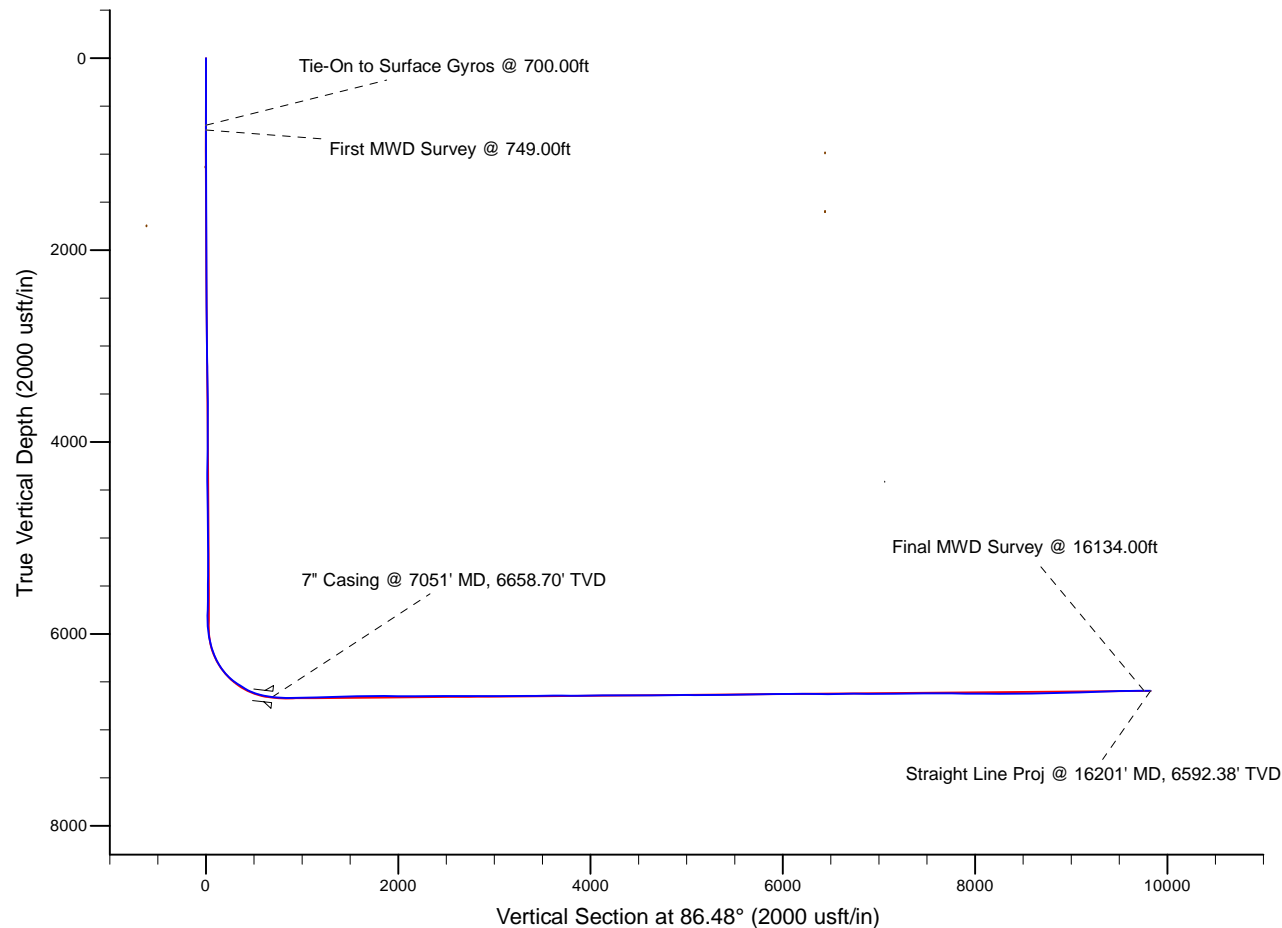
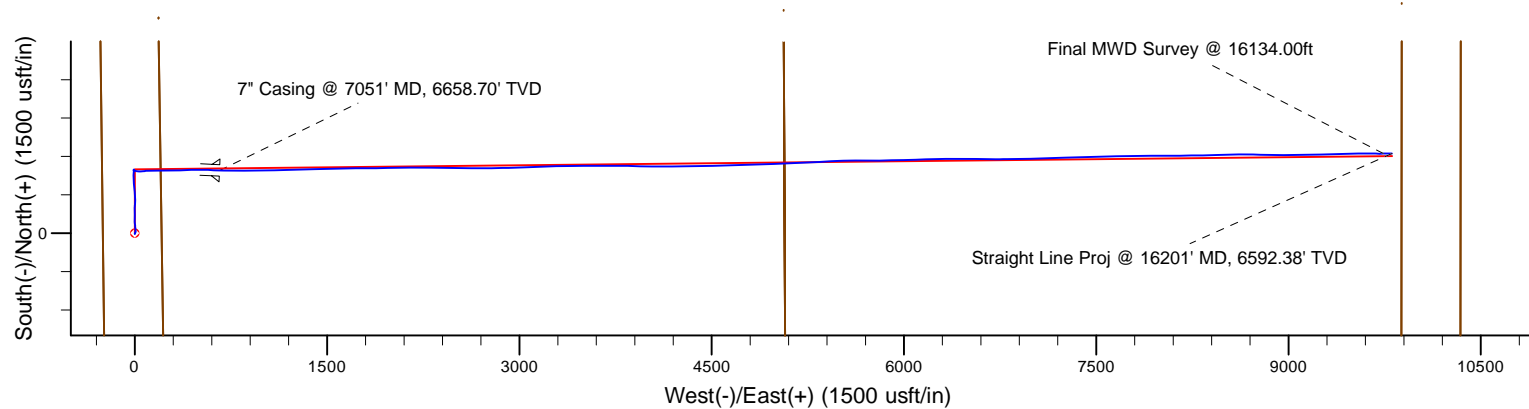


Project: Weld County, CO (NAD 83)
Site: Sec. 4-T6N-R63W (NCLP PC AA04 Pads)
Well: NCLP PC AA 04-67-1HN
Wellbore: Plan B
Design: Final Surveys

Noble Energy

HALLIBURTON
Sperry Drilling



Platted SHL: 2150' FNL, 250' FWL
Platted Lat/Long: 40.51710° N, 104.45032° W
Location: Sec. 4-T6N-R63W

7" Casing: ~1666.03' FNL, ~917.18' FWL
Lat/Long: 40° 31' 6.331 N, 104° 26' 52.516 W
State Planes - CO Northern: 1,433,438.15' N, 3,292,496.15' E
Location: Sec. 4-T6N-R63W

BHL: ~1630.80 FNL, ~535.90' FEL
Lat/Long: 40° 31' 6.553 N, 104° 24' 54.084 W
State Planes - CO Northern: 1,433,570.76' N, 3,301,641.58' E
Location: Sec. 3-T6N-R63W

LEGEND

—+— NCLP PC AA 04-67-1HN, Plan B, Ensign Directional - Plan B Rev 0 V0
—□— Final Surveys

WELL DETAILS: NCLP PC AA 04-67-1HN

Ground Level: 4710.00
RKB=16 @ 4726.00usft (PD828)

Created By: Fred Hartmann
Created On: 12/16/2013

Noble Energy

Weld County, CO (NAD 83)

Sec. 4-T6N-R63W (NCLP PC AA04 Pads)

NCLP PC AA 04-67-1HN

Design: Final Surveys

Sperry Drilling Services

Final Survey Report

16 December, 2013

Well Coordinates: 1,432,947.42 N, 3,291,834.95 E (40° 31' 01.56" N, 104° 27' 01.15" W)

Ground Level: 4,710.00 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 PC AA 04-67-1HN

RKB=16 @ 4726.00usft (PD828)

N

Grid

API - US Survey Feet - Custom

HALLIBURTON

Design Report for NCLP PC AA 04-67-1HN - Final 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
320.00	0.20	134.73	320.00	-0.39	0.40	0.37	0.06
700.00	0.20	358.92	700.00	-0.20	0.86	0.84	0.10
Tie-On to Surface Gyros @ 700.00ft							
749.00	0.31	166.96	749.00	-0.24	0.88	0.87	1.04
First MWD Survey @ 749.00ft							
839.00	0.55	186.13	839.00	-0.91	0.89	0.84	0.31
929.00	0.43	198.86	928.99	-1.66	0.74	0.63	0.18
1,019.00	0.31	206.87	1,018.99	-2.19	0.52	0.38	0.14
1,095.00	0.27	169.10	1,094.99	-2.55	0.46	0.30	0.25
1,190.00	0.87	13.16	1,189.99	-2.07	0.67	0.54	1.18
1,285.00	0.12	161.34	1,284.98	-1.46	0.86	0.77	1.03
1,380.00	0.16	104.63	1,379.98	-1.59	1.02	0.92	0.14
1,475.00	0.28	119.58	1,474.98	-1.74	1.35	1.24	0.14
1,570.00	2.25	32.51	1,569.96	-0.28	2.56	2.53	2.37
1,665.00	2.67	9.82	1,664.87	3.47	3.94	4.14	1.11
1,760.00	4.33	14.87	1,759.69	9.12	5.23	5.78	1.78
1,855.00	5.81	357.58	1,854.32	17.39	5.95	7.01	2.22
1,950.00	7.01	357.03	1,948.73	27.99	5.45	7.15	1.26
2,016.00	7.66	354.33	2,014.19	36.39	4.80	7.03	1.11
2,106.00	8.45	356.45	2,103.30	48.95	3.80	6.80	0.94
2,196.00	7.84	351.87	2,192.39	61.63	2.52	6.30	0.99
2,286.00	8.77	352.53	2,281.45	74.51	0.76	5.33	1.04
2,376.00	9.20	352.93	2,370.34	88.45	-1.01	4.42	0.48
2,466.00	9.38	1.74	2,459.17	102.92	-1.68	4.64	1.59
2,555.00	8.66	356.69	2,547.07	116.86	-1.84	5.33	1.20
2,645.00	9.36	6.02	2,635.96	130.91	-1.47	6.57	1.80
2,735.00	8.69	4.04	2,724.85	144.97	-0.22	8.67	0.82
2,825.00	8.31	0.05	2,813.86	158.25	0.27	9.97	0.78
2,915.00	8.55	356.99	2,902.89	171.44	-0.08	10.44	0.57
3,005.00	8.01	358.02	2,991.95	184.39	-0.65	10.66	0.62
3,095.00	8.99	2.81	3,080.96	197.68	-0.52	11.61	1.34
3,184.00	8.38	3.51	3,168.94	211.10	0.22	13.17	0.70
3,274.00	6.49	8.04	3,258.18	222.68	1.33	14.99	2.20
3,364.00	6.33	2.93	3,347.62	232.67	2.30	16.56	0.66
3,454.00	7.30	0.34	3,436.98	243.34	2.58	17.51	1.13
3,544.00	8.58	4.05	3,526.11	255.76	3.09	18.78	1.53
3,634.00	10.31	357.39	3,614.89	270.50	3.20	19.79	2.27
3,723.00	10.68	356.85	3,702.40	286.69	2.38	19.97	0.43
3,813.00	11.21	358.14	3,790.77	303.76	1.64	20.27	0.65
3,903.00	11.55	354.74	3,879.00	321.48	0.53	20.25	0.84
3,993.00	11.09	352.86	3,967.25	339.04	-1.37	19.43	0.66
4,083.00	10.98	350.57	4,055.58	356.09	-3.85	18.00	0.50
4,173.00	8.90	350.89	4,144.23	371.42	-6.36	16.44	2.31
4,262.00	8.34	355.64	4,232.22	384.65	-7.94	15.67	1.02
4,352.00	8.24	354.86	4,321.28	397.58	-9.01	15.39	0.17
4,442.00	9.11	0.72	4,410.26	411.13	-9.50	15.74	1.38
4,532.00	8.63	358.21	4,499.18	425.00	-9.62	16.47	0.68
4,622.00	7.41	2.06	4,588.30	437.55	-9.62	17.24	1.48
4,712.00	8.06	2.09	4,677.48	449.66	-9.19	18.42	0.72

Design Report for NCLP PC AA 04-67-1HN - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,802.00	5.88	358.17	4,766.81	460.57	-9.10	19.17	2.48
4,891.00	6.17	7.72	4,855.32	469.87	-8.61	20.23	1.17
4,980.00	5.83	4.99	4,943.83	479.11	-7.57	21.84	0.50
5,070.00	4.45	0.59	5,033.47	487.16	-7.14	22.76	1.59
5,161.00	3.02	347.58	5,124.27	493.03	-7.62	22.64	1.82
5,251.00	1.26	16.08	5,214.21	496.30	-7.85	22.61	2.23
5,341.00	0.41	187.67	5,304.20	496.93	-7.62	22.88	1.85
5,431.00	1.26	190.95	5,394.19	495.64	-7.85	22.57	0.95
5,520.00	0.52	297.10	5,483.19	494.86	-8.40	21.98	1.68
5,610.00	0.51	231.18	5,573.18	494.79	-9.07	21.30	0.62
5,700.00	0.51	237.08	5,663.18	494.33	-9.72	20.62	0.06
5,790.00	0.53	231.11	5,753.18	493.85	-10.38	19.93	0.06
5,835.00	0.55	217.58	5,798.17	493.54	-10.68	19.62	0.29
5,880.00	0.59	194.57	5,843.17	493.15	-10.87	19.41	0.51
5,925.00	1.43	155.08	5,888.16	492.42	-10.69	19.54	2.32
5,970.00	3.90	116.65	5,933.11	491.22	-9.08	21.07	6.48
6,015.00	7.66	105.23	5,977.88	489.74	-4.82	25.23	8.70
6,060.00	10.13	101.87	6,022.34	488.14	1.95	31.89	5.61
6,105.00	11.94	104.72	6,066.50	486.15	10.32	40.13	4.20
6,150.00	14.38	98.72	6,110.32	484.12	20.35	50.01	6.21
6,195.00	17.27	92.61	6,153.61	482.96	32.55	62.12	7.40
6,240.00	20.75	85.55	6,196.16	483.28	47.18	76.74	9.26
6,285.00	23.85	82.77	6,237.79	485.04	64.16	93.79	7.28
6,330.00	27.39	84.39	6,278.36	487.20	83.49	113.22	8.02
6,374.00	30.47	87.60	6,316.86	488.66	104.71	134.49	7.84
6,419.00	33.69	89.50	6,354.99	489.24	128.60	158.37	7.50
6,464.00	38.09	90.89	6,391.44	489.14	154.97	184.69	9.94
6,509.00	43.34	90.25	6,425.53	488.85	184.31	213.96	11.70
6,554.00	47.96	89.76	6,456.98	488.86	216.48	246.07	10.30
6,599.00	52.39	89.03	6,485.79	489.23	251.03	280.57	9.92
6,644.00	54.94	87.83	6,512.46	490.23	287.27	316.80	6.06
6,689.00	56.71	87.27	6,537.73	491.82	324.46	354.02	4.07
6,734.00	58.44	88.22	6,561.86	493.31	362.41	391.99	4.24
6,779.00	61.92	88.97	6,584.23	494.27	401.44	431.00	7.87
6,824.00	65.94	89.09	6,604.01	494.95	441.84	471.37	8.94
6,869.00	71.23	89.61	6,620.43	495.42	483.72	513.20	11.80
6,914.00	75.42	90.32	6,633.34	495.44	526.82	556.22	9.43
6,959.00	77.28	91.49	6,643.96	494.75	570.54	599.81	4.84
7,004.00	81.15	93.08	6,652.38	492.99	614.70	643.78	9.27
7,051.00	83.40	92.43	6,658.70	490.75	661.21	690.07	4.98
7" Casing @ 7051' MD, 6658.70' TVD							
7,105.00	85.99	91.69	6,663.69	488.82	714.94	743.58	4.98
7,195.00	87.53	89.63	6,668.78	487.78	804.79	833.19	2.85
7,285.00	90.15	89.43	6,670.60	488.52	894.76	923.04	2.92
7,375.00	91.82	88.75	6,669.05	489.95	984.73	1,012.93	2.00
7,465.00	92.81	88.12	6,665.41	492.40	1,074.62	1,102.80	1.30
7,554.00	92.93	88.81	6,660.96	494.79	1,163.47	1,191.64	0.79
7,644.00	92.34	88.18	6,656.82	497.15	1,253.35	1,281.49	0.96
7,734.00	91.45	88.24	6,653.84	499.96	1,343.25	1,371.39	0.99
7,824.00	90.56	89.50	6,652.27	501.73	1,433.22	1,461.30	1.71
7,914.00	91.42	88.23	6,650.71	503.51	1,523.19	1,551.21	1.70

Design Report for NCLP PC AA 04-67-1HN - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,004.00	89.88	88.77	6,649.69	505.87	1,613.15	1,641.14	1.81
8,094.00	89.75	90.16	6,649.98	506.71	1,703.14	1,731.02	1.55
8,184.00	89.17	89.42	6,650.83	507.04	1,793.13	1,820.86	1.04
8,274.00	90.59	88.68	6,651.02	508.53	1,883.12	1,910.77	1.78
8,363.00	89.94	88.86	6,650.61	510.44	1,972.10	1,999.70	0.76
8,453.00	90.00	88.71	6,650.65	512.35	2,062.08	2,089.62	0.18
8,543.00	90.31	89.71	6,650.41	513.59	2,152.07	2,179.52	1.16
8,633.00	90.49	91.43	6,649.78	512.70	2,242.06	2,269.29	1.92
8,723.00	90.28	90.47	6,649.18	511.20	2,332.04	2,359.01	1.09
8,813.00	90.12	90.24	6,648.86	510.65	2,422.04	2,448.80	0.31
8,903.00	89.78	90.58	6,648.94	510.00	2,512.04	2,538.59	0.53
8,993.00	90.46	90.31	6,648.75	509.30	2,602.03	2,628.38	0.81
9,083.00	89.17	90.11	6,649.04	508.97	2,692.03	2,718.18	1.45
9,172.00	91.11	89.66	6,648.83	509.15	2,781.02	2,807.02	2.24
9,262.00	89.66	89.27	6,648.22	509.99	2,871.02	2,896.89	1.67
9,352.00	89.29	87.99	6,649.05	512.14	2,960.98	2,986.83	1.48
9,442.00	90.25	87.11	6,649.41	515.99	3,050.90	3,076.81	1.45
9,531.00	90.74	88.02	6,648.64	519.77	3,139.81	3,165.79	1.16
9,621.00	90.74	88.09	6,647.48	522.83	3,229.76	3,255.75	0.08
9,711.00	90.34	89.17	6,646.63	524.98	3,319.72	3,345.68	1.28
9,801.00	90.18	89.58	6,646.22	525.96	3,409.72	3,435.56	0.49
9,891.00	91.08	89.49	6,645.23	526.69	3,499.71	3,525.43	1.00
9,981.00	91.02	89.68	6,643.58	527.34	3,589.69	3,615.28	0.22
10,071.00	89.11	90.27	6,643.48	527.38	3,679.69	3,705.11	2.22
10,161.00	89.66	90.10	6,644.44	527.09	3,769.68	3,794.91	0.64
10,236.00	90.71	91.27	6,644.20	526.19	3,844.67	3,869.71	2.10
10,329.00	91.42	92.10	6,642.47	523.46	3,937.61	3,962.31	1.17
10,423.00	90.77	90.21	6,640.68	521.57	4,031.57	4,055.98	2.13
10,517.00	88.55	89.59	6,641.23	521.73	4,125.56	4,149.80	2.45
10,610.00	89.63	89.65	6,642.71	522.35	4,218.55	4,242.65	1.16
10,703.00	90.18	89.53	6,642.87	523.01	4,311.55	4,335.51	0.61
10,795.00	90.92	88.94	6,641.98	524.24	4,403.53	4,427.40	1.03
10,889.00	89.41	88.05	6,641.71	526.71	4,497.50	4,521.34	1.86
10,984.00	90.34	87.70	6,641.92	530.23	4,592.43	4,616.31	1.05
11,077.00	90.77	88.39	6,641.02	533.40	4,685.37	4,709.27	0.87
11,169.00	91.23	89.63	6,639.41	534.99	4,777.34	4,801.16	1.44
11,264.00	90.37	88.00	6,638.09	536.96	4,872.31	4,896.07	1.94
11,356.00	89.94	87.64	6,637.84	540.46	4,964.24	4,988.05	0.61
11,450.00	89.63	86.98	6,638.19	544.87	5,058.14	5,082.03	0.78
11,543.00	91.82	87.61	6,637.01	549.26	5,151.02	5,175.01	2.45
11,636.00	90.25	88.23	6,635.33	552.63	5,243.94	5,267.96	1.81
11,729.00	89.57	86.34	6,635.48	557.04	5,336.83	5,360.95	2.16
11,824.00	90.62	87.15	6,635.32	562.43	5,431.67	5,455.95	1.40
11,918.00	89.97	87.54	6,634.84	566.79	5,525.57	5,549.93	0.81
12,013.00	91.51	89.81	6,633.61	568.98	5,620.53	5,644.85	2.89
12,107.00	91.45	90.02	6,631.18	569.12	5,714.50	5,738.65	0.23
12,201.00	91.08	90.28	6,629.11	568.88	5,808.47	5,832.43	0.48
12,296.00	91.20	88.76	6,627.22	569.67	5,903.45	5,927.28	1.60
12,390.00	90.62	88.60	6,625.72	571.84	5,997.41	6,021.20	0.64
12,484.00	89.94	87.99	6,625.27	574.63	6,091.37	6,115.15	0.97
12,578.00	89.17	88.31	6,626.00	577.67	6,185.31	6,209.10	0.89

Design Report for NCLP PC AA 04-67-1HN - Final Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
12,673.00	89.44	88.80	6,627.15	580.06	6,280.28	6,304.03	0.59
12,749.00	89.38	89.21	6,627.93	581.38	6,356.26	6,379.96	0.55
12,839.00	90.22	90.39	6,628.24	581.70	6,446.26	6,469.80	1.61
12,929.00	91.30	91.40	6,627.05	580.29	6,536.24	6,559.52	1.64
13,019.00	90.37	90.38	6,625.74	578.89	6,626.21	6,649.25	1.53
13,109.00	91.91	90.20	6,623.95	578.44	6,716.19	6,739.03	1.72
13,199.00	89.66	88.84	6,622.72	579.19	6,806.17	6,828.88	2.92
13,288.00	88.74	88.89	6,623.96	580.95	6,895.15	6,917.80	1.04
13,378.00	89.35	88.76	6,625.46	582.80	6,985.11	7,007.71	0.69
13,468.00	90.31	87.88	6,625.73	585.44	7,075.07	7,097.66	1.45
13,558.00	90.93	88.03	6,624.75	588.65	7,165.01	7,187.63	0.71
13,648.00	90.25	88.60	6,623.82	591.30	7,254.97	7,277.57	0.99
13,738.00	91.82	89.61	6,622.20	592.70	7,344.94	7,367.46	2.07
13,827.00	90.65	86.99	6,620.28	595.34	7,433.87	7,456.39	3.22
13,917.00	90.15	88.77	6,619.65	598.67	7,523.80	7,546.35	2.05
14,007.00	88.98	88.10	6,620.34	601.13	7,613.76	7,636.30	1.50
14,097.00	89.35	89.39	6,621.65	603.10	7,703.73	7,726.22	1.49
14,187.00	90.09	89.25	6,622.09	604.17	7,793.72	7,816.10	0.84
14,277.00	90.00	89.74	6,622.02	604.96	7,883.72	7,905.98	0.55
14,366.00	89.48	89.65	6,622.42	605.43	7,972.71	7,994.84	0.59
14,456.00	89.44	89.42	6,623.27	606.17	8,062.71	8,084.71	0.26
14,546.00	90.12	90.07	6,623.61	606.57	8,152.70	8,174.56	1.05
14,636.00	90.96	89.33	6,622.77	607.04	8,242.70	8,264.41	1.24
14,726.00	89.69	88.99	6,622.26	608.36	8,332.68	8,354.31	1.46
14,816.00	89.94	88.13	6,622.55	610.62	8,422.65	8,444.25	1.00
14,906.00	89.85	88.03	6,622.71	613.63	8,512.60	8,534.21	0.15
14,996.00	90.62	89.88	6,622.34	615.27	8,602.58	8,624.12	2.23
15,085.00	91.70	90.54	6,620.54	614.95	8,691.56	8,712.92	1.42
15,175.00	92.19	91.31	6,617.49	613.50	8,781.50	8,802.59	1.01
15,265.00	91.88	90.99	6,614.29	611.69	8,871.42	8,892.24	0.49
15,355.00	90.12	89.43	6,612.72	611.36	8,961.40	8,982.03	2.61
15,445.00	91.14	89.16	6,611.73	612.47	9,051.39	9,071.91	1.17
15,535.00	91.85	89.52	6,609.38	613.51	9,141.35	9,161.77	0.88
15,625.00	92.87	88.72	6,605.67	614.89	9,231.26	9,251.60	1.44
15,715.00	92.41	88.37	6,601.53	617.17	9,321.14	9,341.44	0.64
15,805.00	91.57	88.48	6,598.40	619.64	9,411.05	9,431.34	0.94
15,894.00	91.79	88.87	6,595.79	621.70	9,499.99	9,520.23	0.50
15,984.00	90.37	90.03	6,594.10	622.56	9,589.96	9,610.09	2.04
16,074.00	90.77	90.59	6,593.20	622.08	9,679.96	9,699.89	0.76
16,134.00	90.25	89.06	6,592.67	622.26	9,739.95	9,759.78	2.69
Final MWD Survey @ 16134.00ft							
16,201.00	90.25	89.06	6,592.38	623.36	9,806.94	9,826.71	0.00
Straight Line Proj @ 16201' MD, 6592.38' TVD							

Design Report for NCLP PC AA 04-67-1HN - Final Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
700.00	700.00	-0.20	0.86	Tie-On to Surface Gyros @ 700.00ft
749.00	749.00	-0.24	0.88	First MWD Survey @ 749.00ft
16,134.00	6,592.67	622.26	9,739.95	Final MWD Survey @ 16134.00ft
16,201.00	6,592.38	623.36	9,806.94	Straight Line Proj @ 16201' MD, 6592.38' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	86.48	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
320.00	700.00	Surface Gyros	Flexi-Shot
749.00	7,004.00	MWD Surveys - Vert/Build	MWD+IFR1+MS_WY
7,105.00	16,134.00	MWD Surveys - Lateral	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
7,051.00	6,658.70	7" Casing @ 7051' MD, 6658.70' TVD	7	8-3/4

Wellbore Targets

Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	()	()	()	()	()	()	()		
- Shape									

Directional Difficulty Index

Average Dogleg over Survey:	1.62 °/100usft	Maximum Dogleg over Survey:	11.80 °/100usft at 6,869.00 usft
Net Tortousity applicable to Plans:	0.96 °/100usft	Directional Difficulty Index:	6.820

Audit Info

North Reference Sheet for Sec. 4-T6N-R63W (NCLP PC AA04 Pads) - NCLP PC AA
04-67-1HN

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

Vertical Depths are relative to RKB=16 @ 4726.00usft (PD828). Northing and Easting are relative to NCLP PC AA 04-67-1HN

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° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:40° 47' 0.000 N°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996763

Grid Coordinates of Well: 1,432,947.42 usft N, 3,291,834.95 usft E

Geographical Coordinates of Well: 40° 31' 01.56" N, 104° 27' 01.15" W

Grid Convergence at Surface is: 0.68°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,201.00usft
the Bottom Hole Displacement is 9,826.73usft in the Direction of 86.36° (Grid).

Magnetic Convergence at surface is: -7.73° (29 November 2013, , BGGM2013)

