

Noble Energy

Weld County, CO (NAD 83)

Sec. 4-T6N-R63W (NCLP AA04-13-B PAD)

NCLP AA06-62-1HNA

901287551

Plan A

Design: Field Surveys

Sperry Drilling Services

Final Survey Report

02 July, 2014

Surface UWI : 901287551

Well Coordinates: 1,430,497.68 N, 3,291,713.79 E (40° 30' 37.37" N, 104° 27' 03.10" W)

Ground Level: 4,708.00 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 AA06-62-1HNA

RKB=24ft @ 4732.00usft (H&P 322)

N

Grid

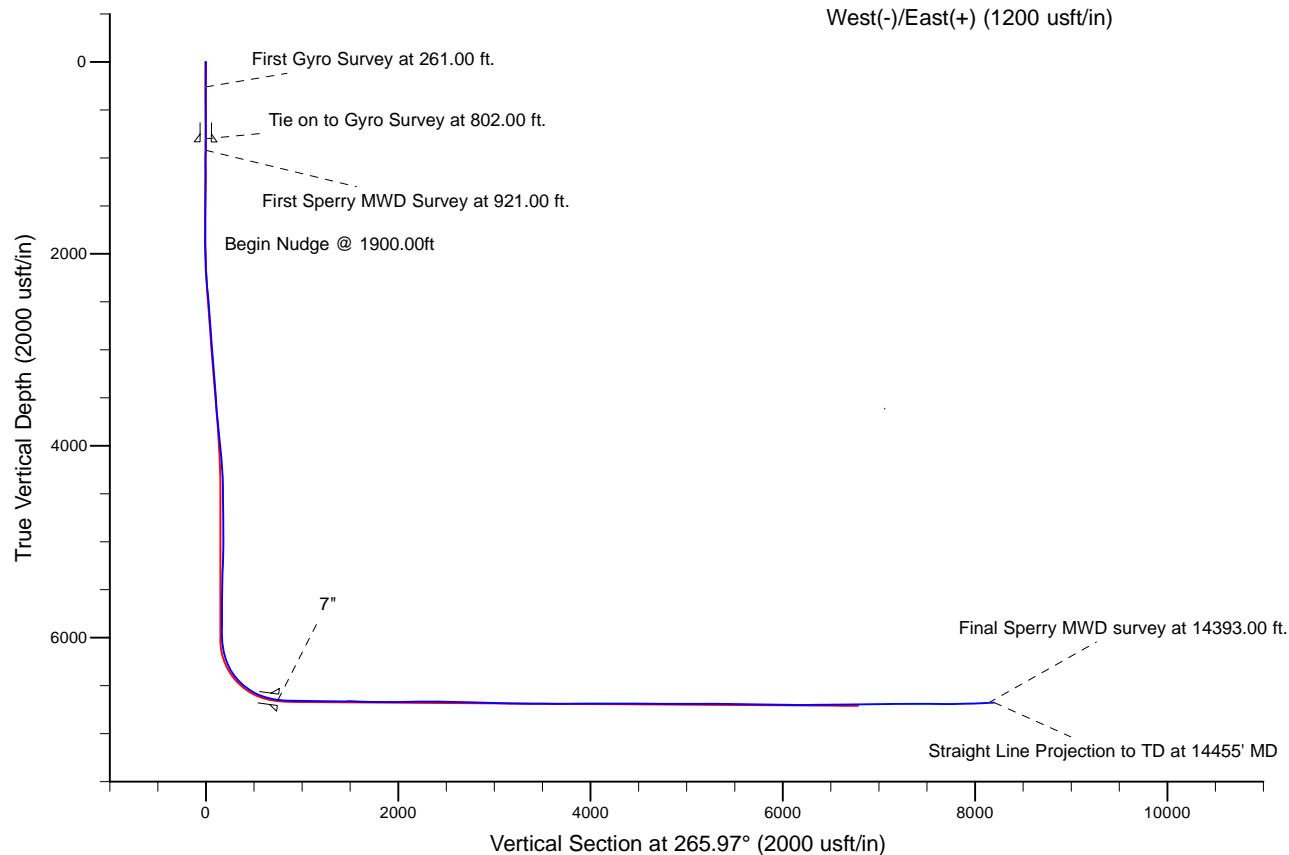
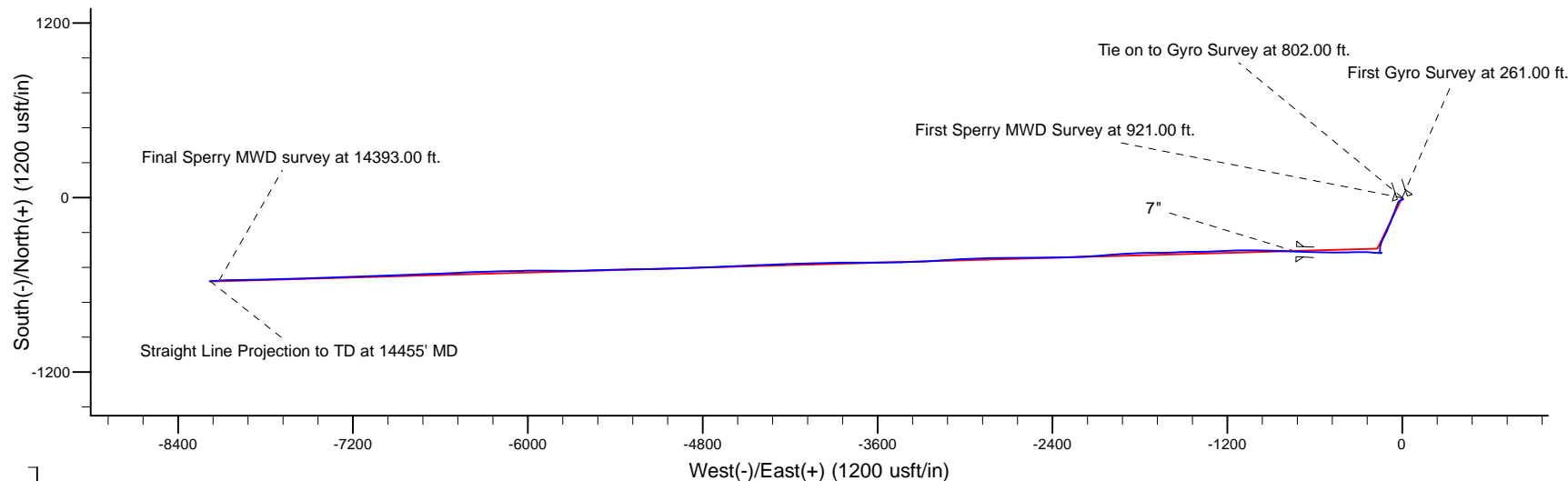
Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Project: Weld County, CO (NAD 83)
Site: Sec. 4-T6N-R63W (NCLP AA04-13-B PAD)
Well: NCLP AA06-62-1HNA
Wellbore: Plan A
Design: Field Surveys

Noble Energy

HALLIBURTON
Sperry Drilling



LEGEND

- NCLP AA06-63-1HNB, Plan A, Rev A0 - PROPOSAL V0
- Field Surveys

WELL DETAILS: NCLP AA06-62-1HNA

Ground Level: 4708.00
RKB=24ft @ 4732.00usft (H&P 322)

Created By: Tatiana Gomez
Created On: 13:58, July 02 2014

Design Report for NCLP AA06-62-1HNA - Field 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
261.00	0.20	32.98	261.00	0.38	0.25	0.09	0.08
First Gyro Survey at 261.00 ft.							
515.00	0.10	107.88	515.00	0.69	0.70	0.39	0.08
802.00	0.50	158.88	801.99	-0.56	1.39	1.50	0.15
Tie on to Gyro Survey at 802.00 ft.							
836.00	0.56	161.75	835.99	-0.85	1.49	1.71	0.18
9 5/8"							
921.00	0.70	166.88	920.99	-1.75	1.74	2.27	0.18
First Sperry MWD Survey at 921.00 ft.							
1,014.00	0.84	147.46	1,013.98	-2.88	2.24	3.15	0.32
1,107.00	0.88	159.05	1,106.97	-4.12	2.86	4.19	0.19
1,200.00	0.67	145.61	1,199.96	-5.24	3.42	5.13	0.30
1,386.00	0.70	161.24	1,385.95	-7.21	4.40	6.77	0.10
1,574.00	0.55	154.84	1,573.94	-9.11	5.15	8.18	0.09
1,763.00	0.60	151.66	1,762.93	-10.81	6.01	9.61	0.03
1,857.00	0.33	164.63	1,856.92	-11.50	6.32	10.15	0.31
2,047.00	0.25	222.35	2,046.92	-12.33	6.18	10.34	0.15
2,142.00	2.35	250.26	2,141.89	-13.15	4.21	8.81	2.24
2,237.00	4.42	260.21	2,236.72	-14.43	-1.23	4.24	2.26
2,332.00	6.36	247.01	2,331.30	-17.10	-9.69	-2.60	2.41
2,426.00	7.32	231.31	2,424.64	-22.88	-19.15	-9.23	2.23
2,521.00	7.91	207.90	2,518.82	-32.44	-26.94	-12.88	3.30
2,615.00	9.32	198.34	2,611.77	-45.39	-32.36	-13.08	2.13
2,710.00	9.36	201.42	2,705.51	-59.88	-37.60	-12.54	0.53
2,804.00	10.18	202.65	2,798.14	-74.66	-43.59	-12.58	0.90
2,899.00	11.02	200.71	2,891.52	-90.90	-50.04	-12.50	0.96
2,994.00	11.31	201.41	2,984.72	-108.07	-56.65	-12.22	0.34
3,088.00	10.79	201.32	3,076.98	-124.85	-63.21	-12.05	0.55
3,183.00	10.38	200.14	3,170.36	-141.17	-69.39	-11.69	0.49
3,278.00	9.27	198.35	3,263.97	-156.46	-74.75	-10.95	1.21
3,373.00	9.31	203.72	3,357.72	-170.76	-80.25	-10.72	0.91
3,468.00	10.21	206.11	3,451.35	-185.36	-87.04	-11.58	1.04
3,563.00	8.27	200.85	3,545.11	-199.31	-93.18	-12.07	2.23
3,658.00	9.92	200.36	3,638.92	-213.36	-98.46	-11.72	1.74
3,753.00	11.20	203.76	3,732.31	-229.48	-105.03	-11.79	1.50
3,847.00	11.80	207.23	3,824.42	-246.38	-113.10	-12.98	0.97
3,942.00	12.88	207.07	3,917.22	-264.45	-122.37	-14.83	1.14
4,037.00	11.39	205.31	4,010.10	-282.36	-131.20	-16.34	1.62
4,132.00	10.95	201.87	4,103.30	-299.21	-138.57	-16.89	0.84
4,227.00	10.04	199.37	4,196.71	-315.40	-144.67	-16.51	1.07
4,416.00	8.10	187.03	4,383.36	-344.16	-151.77	-12.36	1.45
4,511.00	6.72	176.13	4,477.56	-356.35	-152.21	-8.22	2.07
4,606.00	5.52	179.74	4,572.02	-366.46	-151.82	-4.08	1.33
4,700.00	3.92	192.22	4,665.70	-374.13	-152.48	-1.83	2.01
4,795.00	2.19	235.05	4,760.57	-378.34	-154.65	-2.28	2.90
4,890.00	0.37	175.38	4,855.55	-379.69	-156.12	-3.13	2.14
4,984.00	0.14	212.56	4,949.55	-380.09	-156.15	-3.02	0.29
5,079.00	1.89	105.33	5,044.53	-380.60	-154.70	-1.48	2.04
5,174.00	1.66	102.57	5,139.49	-381.31	-151.85	1.43	0.26

Design Report for NCLP AA06-62-1HNA - Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,363.00	1.70	94.11	5,328.40	-382.11	-146.38	6.80	0.13
5,552.00	1.17	40.56	5,517.35	-380.84	-142.33	10.09	0.73
5,647.00	0.34	41.81	5,612.34	-379.90	-141.51	10.49	0.87
5,742.00	0.28	38.35	5,707.34	-379.50	-141.18	10.66	0.07
5,837.00	0.16	6.21	5,802.34	-379.19	-141.02	10.69	0.18
5,927.00	0.19	351.58	5,892.34	-378.92	-141.03	10.58	0.06
6,022.00	0.56	292.10	5,987.34	-378.59	-141.48	10.03	0.52
6,069.00	3.40	262.27	6,034.31	-378.69	-143.08	8.59	6.23
6,116.00	8.17	267.43	6,081.05	-379.02	-147.80	4.34	10.20
6,163.00	11.23	266.78	6,127.38	-379.43	-155.71	-2.85	6.51
6,211.00	14.86	265.59	6,174.13	-380.17	-166.51	-12.60	7.58
6,258.00	18.12	271.38	6,219.19	-380.46	-179.83	-24.85	7.76
6,305.00	21.85	278.53	6,263.36	-378.98	-195.80	-40.21	9.47
6,352.00	26.33	275.55	6,306.26	-376.67	-214.83	-58.73	9.87
6,400.00	31.35	270.26	6,348.30	-375.59	-237.93	-80.57	11.72
6,447.00	35.80	270.50	6,387.45	-375.41	-263.92	-104.74	9.47
6,495.00	40.27	269.80	6,425.25	-375.34	-293.48	-132.19	9.36
6,542.00	44.39	269.92	6,459.98	-375.42	-325.13	-161.52	8.77
6,590.00	49.44	269.79	6,492.76	-375.51	-360.17	-194.00	10.52
6,637.00	53.62	269.00	6,521.99	-375.91	-396.96	-227.98	8.99
6,685.00	56.43	269.12	6,549.51	-376.55	-436.28	-264.22	5.86
6,732.00	61.51	269.70	6,573.73	-376.96	-476.54	-301.42	10.86
6,780.00	66.92	270.58	6,594.60	-376.85	-519.74	-341.55	11.39
6,827.00	70.78	271.51	6,611.55	-376.04	-563.56	-382.50	8.42
6,875.00	74.62	271.47	6,625.82	-374.85	-609.36	-425.44	8.00
6,922.00	77.67	271.69	6,637.08	-373.59	-654.97	-468.22	6.51
6,946.00	79.65	271.42	6,641.80	-372.95	-678.50	-490.28	8.32
6,994.00	82.62	272.29	6,649.19	-371.42	-725.89	-534.82	6.44
7"							
7,043.00	85.65	273.16	6,654.20	-369.10	-774.57	-580.85	6.44
7,137.00	88.74	271.96	6,658.80	-364.91	-868.35	-669.42	3.53
7,232.00	89.94	270.24	6,659.90	-363.09	-963.33	-758.21	2.21
7,326.00	88.37	269.52	6,661.28	-363.28	-1,057.31	-845.33	1.84
7,422.00	90.34	268.86	6,662.36	-364.64	-1,153.29	-933.87	2.16
7,516.00	89.17	267.54	6,662.76	-367.59	-1,247.24	-1,019.93	1.88
7,611.00	88.92	268.22	6,664.35	-371.11	-1,342.16	-1,106.68	0.76
7,706.00	91.39	269.85	6,664.09	-372.71	-1,437.14	-1,194.20	3.12
7,801.00	87.29	267.61	6,665.19	-374.81	-1,532.08	-1,281.50	4.92
7,896.00	87.56	268.46	6,669.45	-378.07	-1,626.93	-1,368.28	0.94
7,991.00	90.22	269.38	6,671.29	-379.85	-1,721.88	-1,455.70	2.96
8,086.00	88.61	267.38	6,672.26	-382.54	-1,816.83	-1,542.79	2.70
8,180.00	90.99	267.23	6,672.59	-386.96	-1,910.72	-1,628.25	2.54
8,273.00	91.23	265.93	6,670.79	-392.51	-2,003.54	-1,712.28	1.42
8,366.00	90.86	265.56	6,669.09	-399.41	-2,096.26	-1,795.74	0.56
8,459.00	91.02	266.48	6,667.57	-405.86	-2,189.03	-1,879.39	1.00
8,552.00	89.32	267.85	6,667.29	-410.46	-2,281.91	-1,963.84	2.35
8,645.00	90.22	269.56	6,667.67	-412.56	-2,374.88	-2,049.31	2.08
8,738.00	88.49	270.28	6,668.71	-412.69	-2,467.87	-2,135.53	2.01
8,831.00	88.61	269.57	6,671.07	-412.81	-2,560.84	-2,221.74	0.77
8,924.00	88.70	269.35	6,673.25	-413.69	-2,653.81	-2,307.66	0.26
9,017.00	89.20	270.09	6,674.95	-414.14	-2,746.79	-2,393.76	0.96

Design Report for NCLP AA06-62-1HNA - Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,110.00	88.83	268.00	6,676.55	-415.69	-2,839.76	-2,479.43	2.28
9,203.00	88.09	268.01	6,679.05	-418.93	-2,932.67	-2,564.42	0.80
9,296.00	87.35	267.13	6,682.75	-422.87	-3,025.51	-2,649.08	1.24
9,389.00	87.69	265.94	6,686.78	-428.48	-3,118.25	-2,733.03	1.33
9,482.00	90.40	267.18	6,688.33	-434.06	-3,211.06	-2,817.05	3.20
9,575.00	90.46	266.59	6,687.63	-439.12	-3,303.92	-2,901.31	0.64
9,668.00	89.11	268.03	6,687.98	-443.48	-3,396.81	-2,985.86	2.12
9,761.00	89.01	269.45	6,689.50	-445.53	-3,489.77	-3,071.35	1.53
9,853.00	88.77	269.20	6,691.28	-446.61	-3,581.75	-3,156.27	0.38
9,946.00	92.16	270.35	6,690.53	-446.97	-3,674.73	-3,242.40	3.85
10,039.00	91.20	270.67	6,687.80	-446.15	-3,767.69	-3,328.95	1.09
10,134.00	90.03	268.84	6,686.78	-446.55	-3,862.67	-3,416.92	2.29
10,229.00	90.37	268.11	6,686.45	-449.08	-3,957.64	-3,504.08	0.85
10,324.00	88.80	268.47	6,687.14	-451.92	-4,052.59	-3,591.11	1.70
10,418.00	89.45	268.42	6,688.58	-454.47	-4,146.54	-3,677.33	0.69
10,513.00	90.37	267.83	6,688.72	-457.57	-4,241.49	-3,764.25	1.15
10,608.00	90.49	267.50	6,688.01	-461.44	-4,336.41	-3,850.87	0.37
10,703.00	90.31	267.58	6,687.35	-465.52	-4,431.32	-3,937.40	0.21
10,798.00	90.12	268.33	6,686.99	-468.91	-4,526.26	-4,024.21	0.81
10,892.00	88.61	267.68	6,688.03	-472.18	-4,620.19	-4,110.14	1.75
10,988.00	88.92	266.66	6,690.10	-476.92	-4,716.05	-4,197.30	1.11
11,083.00	90.12	268.24	6,690.90	-481.15	-4,810.95	-4,283.77	2.09
11,177.00	89.63	268.12	6,691.10	-484.13	-4,904.90	-4,369.82	0.54
11,272.00	89.51	267.94	6,691.82	-487.40	-4,999.84	-4,456.68	0.23
11,368.00	88.92	268.96	6,693.13	-490.00	-5,095.80	-4,544.73	1.23
11,462.00	90.86	269.16	6,693.31	-491.54	-5,189.78	-4,631.35	2.07
11,557.00	90.89	268.94	6,691.86	-493.11	-5,284.76	-4,718.87	0.23
11,652.00	90.03	268.68	6,691.10	-495.09	-5,379.73	-4,806.25	0.95
11,747.00	89.51	268.95	6,691.48	-497.05	-5,474.71	-4,893.63	0.62
11,842.00	89.32	268.21	6,692.45	-499.41	-5,569.67	-4,980.86	0.80
11,936.00	88.61	268.28	6,694.15	-502.28	-5,663.61	-5,066.94	0.76
12,031.00	89.01	270.37	6,696.12	-503.40	-5,758.58	-5,154.62	2.24
12,126.00	88.83	270.82	6,697.91	-502.42	-5,853.56	-5,243.11	0.51
12,221.00	88.43	269.76	6,700.18	-501.94	-5,948.53	-5,331.39	1.19
12,316.00	88.67	268.62	6,702.59	-503.28	-6,043.49	-5,418.99	1.23
12,411.00	89.85	269.02	6,703.81	-505.23	-6,138.46	-5,506.37	1.31
12,506.00	91.36	268.32	6,702.81	-507.44	-6,233.42	-5,593.65	1.75
12,601.00	90.28	268.09	6,701.45	-510.41	-6,328.37	-5,680.62	1.16
12,696.00	91.26	267.17	6,700.17	-514.34	-6,423.27	-5,767.21	1.41
12,791.00	90.31	267.42	6,698.87	-518.82	-6,518.16	-5,853.56	1.03
12,886.00	89.72	268.36	6,698.85	-522.32	-6,613.09	-5,940.33	1.17
12,981.00	91.94	267.45	6,697.47	-525.79	-6,708.01	-6,027.10	2.53
13,075.00	91.54	268.05	6,694.62	-529.48	-6,801.90	-6,112.82	0.77
13,171.00	90.34	268.60	6,693.04	-532.29	-6,897.84	-6,200.78	1.38
13,265.00	90.18	267.39	6,692.62	-535.58	-6,991.78	-6,286.71	1.30
13,360.00	90.55	267.57	6,692.01	-539.75	-7,086.69	-6,373.20	0.43
13,455.00	90.49	267.32	6,691.15	-543.99	-7,181.59	-6,459.66	0.27
13,549.00	89.97	267.96	6,690.77	-547.86	-7,275.51	-6,545.35	0.88
13,644.00	89.85	268.12	6,690.92	-551.11	-7,370.45	-6,632.22	0.21
13,739.00	89.60	268.62	6,691.38	-553.81	-7,465.41	-6,719.31	0.59
13,834.00	89.32	268.58	6,692.27	-556.13	-7,560.38	-6,806.55	0.30

Design Report for NCLP AA06-62-1HNA - Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
13,929.00	89.41	268.80	6,693.33	-558.30	-7,655.35	-6,893.85	0.25
14,023.00	91.14	268.45	6,692.87	-560.56	-7,749.31	-6,980.19	1.88
14,150.00	91.82	268.64	6,689.59	-563.78	-7,876.23	-7,096.73	0.56
14,244.00	90.80	268.99	6,687.45	-565.73	-7,970.18	-7,183.17	1.15
14,393.00	93.64	267.65	6,681.67	-570.09	-8,118.99	-7,319.59	2.11
Final Sperry MWD survey at 14393.00 ft.							
14,455.00	93.64	267.65	6,677.74	-572.63	-8,180.81	-7,376.00	0.00
Straight Line Projection to TD at 14455' MD							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
261.00	261.00	0.38	0.25	First Gyro Survey at 261.00 ft.
802.00	801.99	-0.56	1.39	Tie on to Gyro Survey at 802.00 ft.
921.00	920.99	-1.75	1.74	First Sperry MWD Survey at 921.00 ft.
14,393.00	6,681.67	-570.09	-8,118.99	Final Sperry MWD survey at 14393.00 ft.
14,455.00	6,677.74	-572.63	-8,180.81	Straight Line Projection to TD at 14455' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	111.91	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
261.00	802.00	Surface Gyros	Flexi-Shot
921.00	6,946.00	MWD Surveys - Intermediate	MWD+IFR1+MS_WY
7,043.00	14,393.00	MWD Surveys - Production	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
836.00	835.99	9 5/8"	9-5/8	13-3/4
6,994.00	6,649.19	7"	7	8-3/4

Design Report for NCLP AA06-62-1HNA - Field 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 AA06-62-1HNA_	0.00	0.00	0.00	0.00	0.00	1,430,497.69	3,291,713.79	40.510380	-104.450860
- actual wellpath hits target center									
- Polygon									
Point 1				0.00	4,365.63	-10,594.73	1,434,863.17	3,281,119.41	
Point 2				0.00	-982.26	-10,536.53	1,429,515.46	3,281,177.61	
Point 3				0.00	-820.92	-5,382.53	1,429,676.79	3,286,331.44	
Point 4				0.00	4,475.85	-5,449.60	1,434,973.39	3,286,264.37	
Point 5				0.00	-820.92	-5,382.53	1,429,676.79	3,286,331.44	
Point 6				0.00	-678.76	-92.09	1,429,818.95	3,291,621.71	
Point 7				0.00	4,596.20	-154.48	1,435,093.74	3,291,559.32	
Point 8				0.00	4,475.85	-5,449.60	1,434,973.39	3,286,264.37	
Point 9				0.00	4,365.63	-10,594.73	1,434,863.17	3,281,119.41	
NCLP AA06-62-1HNA_	0.00	0.00	0.00	0.00	0.00	1,430,497.69	3,291,713.79	40.510380	-104.450860
- actual wellpath hits target center									
- Polygon									
Point 1				0.00	3,905.61	-10,134.72	1,434,403.17	3,281,579.41	
Point 2				0.00	-522.24	-10,076.52	1,429,975.46	3,281,637.61	
Point 3				0.00	-360.91	-5,382.53	1,430,136.79	3,286,331.44	
Point 4				0.00	-218.74	-552.10	1,430,278.95	3,291,161.71	
Point 5				0.00	4,136.19	-614.49	1,434,633.74	3,291,099.32	
Point 6				0.00	4,015.83	-5,449.60	1,434,513.39	3,286,264.37	
Point 7				0.00	3,905.61	-10,134.72	1,434,403.17	3,281,579.41	
NCLP AA06-62-1HNA_	0.00	0.00	0.00	0.00	0.00	1,430,497.69	3,291,713.79	40.510380	-104.450860
- actual wellpath hits target center									
- Point									
NCLP AA06-62-1HNA_	0.00	0.00	6,717.27	-576.39	-8,182.96	1,429,921.32	3,283,531.11	40.509060	-104.480310
- actual wellpath misses target center by 39.77usft at 14454.78usft MD (6677.75 TVD, -572.62 N, -8180.60 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.68 °/100usft	Maximum Dogleg over Survey:	11.72 °/100usft at 6,400.00 usft
Net Tortousity applicable to Plans:	0.92 °/100usft	Directional Difficulty Index:	6.647

Audit Info

North Reference Sheet for Sec. 4-T6N-R63W (NCLP AA04-13-B PAD) - NCLP AA06-62-1HNA - 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=24ft @ 4732.00usft (H&P 322). Northing and Easting are relative to NCLP AA06-62-1HNA

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: 0.99996709

Grid Coordinates of Well: 1,430,497.68 usft N, 3,291,713.79 usft E

Geographical Coordinates of Well: 40° 30' 37.37" N, 104° 27' 03.10" W

Grid Convergence at Surface is: 0.68°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,455.00usft
the Bottom Hole Displacement is 8,200.83usft in the Direction of 266.00° (Grid).

Magnetic Convergence at surface is: -7.66° (17 June 2014, , BGGM2013)

