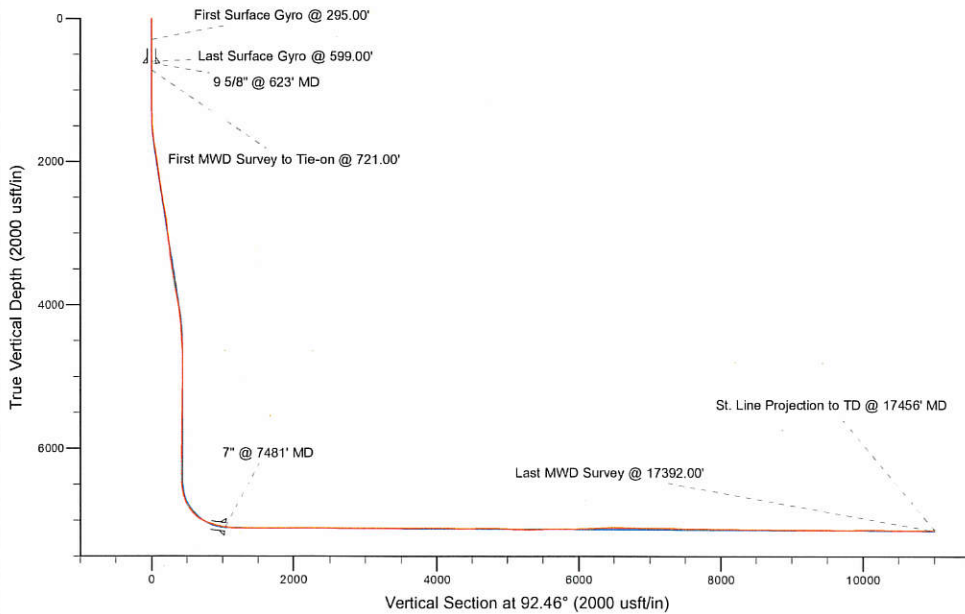
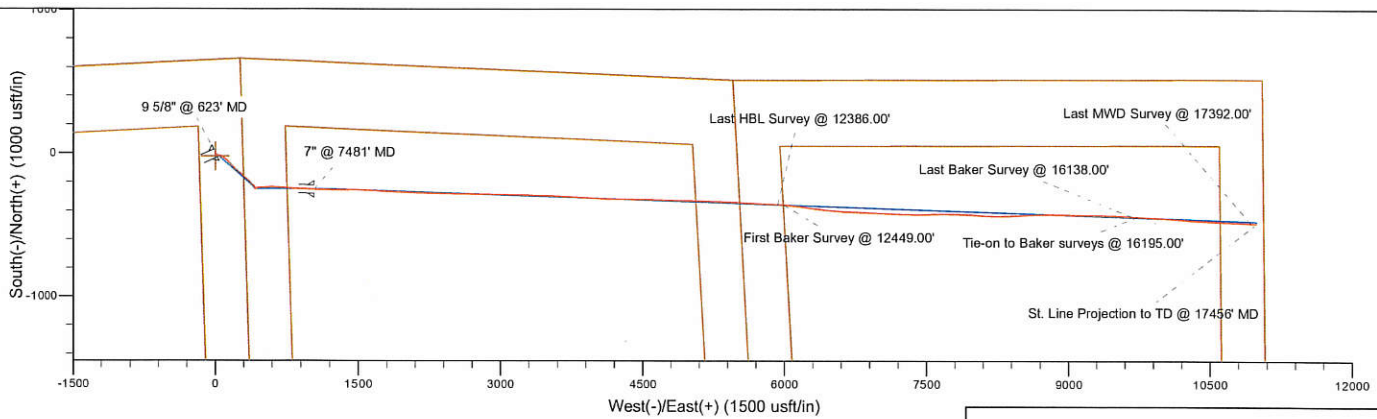


Project: Weld County, CO (NAD 83)  
 Site: Sec. 7-T4N-R66W (K08-30-A PAD)  
 Well: Shable K08-68-1HN  
 Wellbore: Plan B  
 Design: Field Surveys

# Noble Energy

**HALLIBURTON**  
 Drilling



## LEGEND

- Shable K08-68-1HN, Plan B, PlanB0- Proposal V0
- Field Surveys

Platted SHL: 674' FNL, 292' FEL  
 Platted Lat/Long: 40.332360 N, 104.813010 W  
 Location: Sec. 7-T4N-R66W

~7" Casing: 726' FWL, 891' FNL  
 Lat/Long: 40.331646 N, 104.809325 W  
 State Planes - CO Northern: 1,364,409.34 N, 3,192,552.19 E  
 Location: Sec. 8-T4N-R66W

~BHL: 75' FEL, 1004' FNL  
 Lat/Long: 40.330786 N, 104.773582 W  
 State Planes - CO Northern: 1,364,175.51 N, 3,202,519.23 E  
 Location: Sec. 9-T4N-R66W

WELL DETAILS: Shable K08-68-1HN

Ground Level: 4715.00  
 RKB @ 4745.00usft (H&P 321)

Created By: Pari Amanlou  
 Created On: August 06 2014

# Noble Energy

Weld County, CO (NAD 83)

Sec. 7-T4N-R66W (K08-30-A PAD)

Shable K08-68-1HN

Job#901457114 :: API: 05-123-39559

Plan B

Design: Field Surveys

## Sperry Drilling Services

### Final Survey Report

08 August, 2014

Well Coordinates: 1,364,661.40 N, 3,191,522.81 E (40° 19' 56.50" N, 104° 48' 46.84" W)

Ground Level: 4,715.00 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 Shable K08-68-1HN

RKB @ 4745.00usft (H&P 321)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

## Design Report for Shable K08-68-1HN - Field Surveys

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)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Sable K08-68-1HN_SHL</b>										
0.02	0.00	124.23	0.02	0.00	0.00	0.00	0.00	0.00	0.00	124.23
<b>Sable K08-67HN_Sec 7_460_SB</b>										
295.00	0.20	124.23	295.00	-0.29	0.43	0.44	0.07	0.07	0.00	124.23
<b>First Surface Gyro @ 295.00'</b>										
599.00	0.20	56.53	599.00	-0.30	1.31	1.32	0.07	0.00	-22.27	-123.85
<b>Last Surface Gyro @ 599.00'</b>										
623.00	0.13	65.09	623.00	-0.26	1.37	1.38	0.30	-0.28	35.67	163.96
<b>9 5/8" @ 623' MD</b>										
721.00	0.18	202.61	721.00	-0.35	1.41	1.42	0.30	0.05	140.33	155.40
<b>First MWD Survey to Tie-on @ 721.00'</b>										
813.00	0.34	214.58	813.00	-0.71	1.20	1.23	0.18	0.17	13.01	24.80
905.00	0.25	204.07	905.00	-1.12	0.96	1.01	0.11	-0.10	-11.42	-154.17
996.00	0.37	169.13	995.99	-1.59	0.94	1.01	0.24	0.13	-38.40	-75.88
1,089.00	0.51	169.39	1,088.99	-2.29	1.07	1.17	0.15	0.15	0.28	0.95
1,180.00	0.50	170.79	1,179.99	-3.08	1.21	1.34	0.02	-0.01	1.54	129.72
1,273.00	0.58	171.95	1,272.98	-3.95	1.34	1.51	0.09	0.09	1.25	8.36
1,365.00	2.31	143.33	1,364.95	-5.90	2.51	2.76	1.98	1.88	-31.11	-37.39
1,458.00	3.69	119.49	1,457.83	-8.87	6.24	6.61	1.97	1.48	-25.63	-54.44
1,550.00	4.96	105.49	1,549.56	-11.39	12.65	13.13	1.79	1.38	-15.22	-46.86
1,642.00	6.61	101.05	1,641.09	-13.47	21.68	22.24	1.86	1.79	-4.83	-17.39
1,737.00	8.30	98.08	1,735.29	-15.48	33.83	34.47	1.82	1.78	-3.13	-14.32
1,831.00	10.92	100.13	1,827.96	-18.00	49.32	50.05	2.81	2.79	2.18	8.45
1,926.00	9.26	105.31	1,921.49	-21.60	65.55	66.42	1.99	-1.75	5.45	153.87
2,021.00	9.02	111.26	2,015.29	-26.32	79.86	80.92	1.03	-0.25	6.26	107.17
2,116.00	9.38	119.24	2,109.07	-32.81	93.56	94.88	1.39	0.38	8.40	78.21
2,211.00	9.40	116.82	2,202.79	-40.09	107.24	108.86	0.42	0.02	-2.55	-88.29
2,305.00	9.14	122.74	2,295.57	-47.59	120.37	122.30	1.05	-0.28	6.30	108.16
2,401.00	10.15	126.66	2,390.21	-56.76	133.57	135.89	1.25	1.05	4.08	34.98
2,495.00	10.22	123.21	2,482.73	-66.28	147.19	149.90	0.65	0.07	-3.67	-85.15
2,590.00	12.15	122.69	2,575.92	-76.29	162.66	165.79	2.03	2.03	-0.55	-3.25
2,685.00	13.00	122.27	2,668.64	-87.40	180.10	183.70	0.90	0.89	-0.44	-6.35
2,780.00	11.14	125.23	2,761.54	-98.40	196.64	200.69	2.06	-1.96	3.12	163.04
2,875.00	8.07	125.91	2,855.20	-107.60	209.54	213.97	3.23	-3.23	0.72	178.22
2,969.00	6.59	126.76	2,948.43	-114.70	219.20	223.93	1.58	-1.57	0.90	176.23
3,064.00	6.78	114.89	3,042.78	-120.33	228.66	233.62	1.47	0.20	-12.49	-88.09
3,159.00	6.47	114.31	3,137.15	-124.89	238.62	243.77	0.33	-0.33	-0.61	-168.11
3,253.00	8.48	110.05	3,230.35	-129.45	249.96	255.30	2.22	2.14	-4.53	-17.53
3,348.00	10.04	120.03	3,324.11	-135.99	263.71	269.32	2.35	1.64	10.51	50.83
3,443.00	9.50	129.68	3,417.74	-145.14	276.92	282.90	1.81	-0.57	10.16	112.97
3,538.00	9.18	125.73	3,511.48	-154.57	289.10	295.48	0.75	-0.34	-4.16	-118.47
3,633.00	9.01	123.19	3,605.29	-163.07	301.48	308.21	0.46	-0.18	-2.67	-114.20
3,727.00	10.54	116.79	3,697.92	-170.98	315.31	322.38	1.99	1.63	-6.81	-38.56
3,822.00	12.55	113.14	3,791.00	-178.95	332.56	339.95	2.25	2.12	-3.84	-21.77
3,917.00	13.27	118.15	3,883.60	-188.15	351.67	359.44	1.40	0.76	5.27	59.71
4,011.00	12.76	125.29	3,975.19	-199.24	369.66	377.88	1.79	-0.54	7.60	111.05
4,106.00	9.30	128.63	4,068.42	-210.09	384.22	392.90	3.70	-3.64	3.52	171.17
4,201.00	6.89	131.78	4,162.47	-218.68	394.47	403.51	2.58	-2.54	3.32	171.13
4,295.00	6.51	127.69	4,255.83	-225.70	402.89	412.22	0.65	-0.40	-4.35	-130.55
4,390.00	5.36	121.54	4,350.32	-231.31	410.93	420.50	1.38	-1.21	-6.47	-154.09
4,485.00	5.24	123.57	4,444.91	-236.03	418.33	428.09	0.23	-0.13	2.14	123.63
4,580.00	3.92	124.83	4,539.61	-240.29	424.61	434.55	1.39	-1.39	1.33	176.27
4,674.00	2.09	141.41	4,633.47	-243.46	428.32	438.39	2.14	-1.95	17.64	162.72
4,769.00	0.75	172.90	4,728.44	-245.43	429.47	439.63	1.58	-1.41	33.15	164.88
4,864.00	0.28	149.93	4,823.44	-246.25	429.67	439.86	0.53	-0.49	-24.18	-167.48
4,958.00	1.01	239.15	4,917.43	-246.87	429.07	439.29	1.11	0.78	94.91	104.77
5,053.00	0.83	239.21	5,012.42	-247.66	427.76	438.02	0.19	-0.19	0.06	179.72



## Design Report for Shable K08-68-1HN - Field Surveys

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)	Toolface Azimuth (°)
5,148.00	1.16	253.86	5,107.41	-248.28	426.25	436.53	0.44	0.35	15.42	45.10
5,243.00	1.50	255.84	5,202.38	-248.85	424.12	434.43	0.36	0.36	2.08	8.69
5,337.00	1.18	318.57	5,296.36	-248.42	422.28	432.58	1.51	-0.34	66.73	132.44
5,432.00	0.91	320.10	5,391.34	-247.11	421.15	431.39	0.29	-0.28	1.61	174.86
5,527.00	1.13	327.64	5,486.33	-245.74	420.17	430.35	0.27	0.23	7.94	35.19
5,622.00	0.50	69.83	5,581.32	-244.81	420.05	430.19	1.40	-0.66	107.57	158.42
5,717.00	0.30	68.04	5,676.32	-244.57	420.67	430.80	0.21	-0.21	-1.88	-177.32
5,811.00	0.66	208.70	5,770.32	-244.95	420.64	430.79	0.97	0.38	149.64	152.69
5,906.00	1.01	230.70	5,865.31	-245.96	419.73	429.92	0.49	0.37	23.16	53.84
6,001.00	0.25	284.69	5,960.30	-246.44	418.88	429.09	0.93	-0.80	56.83	166.81
6,095.00	0.44	229.95	6,054.30	-246.62	418.41	428.63	0.38	0.20	-58.23	-89.36
6,190.00	0.11	18.75	6,149.30	-246.77	418.16	428.38	0.57	-0.35	156.63	173.91
6,285.00	0.61	249.68	6,244.30	-246.86	417.71	427.94	0.72	0.53	-135.86	-136.24
6,380.00	0.68	253.38	6,339.29	-247.20	416.70	426.94	0.09	0.07	3.89	32.61
6,474.00	0.89	273.24	6,433.28	-247.31	415.44	425.69	0.36	0.22	21.13	62.55
6,569.00	6.35	77.64	6,528.11	-246.15	419.84	430.03	7.59	5.75	173.05	166.29
6,664.00	14.72	78.99	6,621.43	-242.71	436.85	446.88	8.81	8.81	1.42	2.36
6,758.00	20.49	85.32	6,711.00	-239.08	464.99	474.84	6.46	6.14	6.73	21.40
6,853.00	29.94	89.11	6,796.85	-237.35	505.36	515.10	10.09	9.95	3.99	11.43
6,948.00	39.05	88.20	6,875.07	-236.04	559.09	568.72	9.60	9.59	-0.96	-3.62
7,042.00	49.24	90.75	6,942.44	-235.58	624.46	634.01	11.00	10.84	2.71	10.82
7,137.00	62.82	93.88	6,995.40	-238.92	702.98	712.60	14.55	14.29	3.29	11.73
7,232.00	68.52	93.11	7,034.53	-244.19	789.34	799.11	6.05	6.00	-0.81	-7.18
7,280.00	70.73	92.29	7,051.24	-246.30	834.29	844.11	4.87	4.60	-1.71	-19.32
7,327.00	72.86	91.27	7,065.92	-247.69	878.91	888.75	4.98	4.53	-2.17	-24.62
7,375.00	76.89	91.64	7,078.44	-248.87	925.22	935.07	8.43	8.40	0.77	5.11
7,437.00	80.06	92.00	7,090.83	-250.80	985.93	995.81	5.14	5.11	0.58	6.39
7,481.00	82.79	91.34	7,097.39	-252.06	1,029.42	1,039.31	6.39	6.22	-1.49	-13.41
7" @ 7481' MD										
7,511.00	84.66	90.90	7,100.66	-252.65	1,059.23	1,069.12	6.39	6.22	-1.48	-13.31
7,561.00	85.21	90.65	7,105.08	-253.32	1,109.03	1,118.90	1.21	1.10	-0.50	-24.37
7,653.00	87.38	90.36	7,111.02	-254.13	1,200.83	1,210.65	2.38	2.36	-0.32	-7.61
7,744.00	89.75	90.18	7,113.30	-254.56	1,291.79	1,301.55	2.61	2.60	-0.20	-4.34
7,840.00	90.40	89.63	7,113.18	-254.40	1,387.79	1,397.45	0.89	0.68	-0.57	-40.24
7,935.00	90.96	91.07	7,112.05	-254.98	1,482.78	1,492.37	1.63	0.59	1.52	68.74
8,029.00	89.78	92.23	7,111.44	-257.69	1,576.74	1,586.36	1.76	-1.26	1.23	135.49
8,124.00	90.34	92.36	7,111.34	-261.49	1,671.66	1,681.36	0.61	0.59	0.14	13.07
8,219.00	90.86	91.73	7,110.35	-264.88	1,766.59	1,776.35	0.86	0.55	-0.66	-50.46
8,314.00	91.54	91.72	7,108.36	-267.74	1,861.53	1,871.32	0.72	0.72	-0.01	-0.84
8,408.00	89.88	91.57	7,107.19	-270.44	1,955.48	1,965.30	1.77	-1.77	-0.16	-174.84
8,503.00	88.74	91.77	7,108.34	-273.21	2,050.43	2,060.28	1.22	-1.20	0.21	170.05
8,598.00	88.77	91.27	7,110.40	-275.72	2,145.37	2,155.25	0.53	0.03	-0.53	-86.57
8,693.00	89.72	91.23	7,111.65	-277.80	2,240.34	2,250.22	1.00	1.00	-0.04	-2.41
8,788.00	90.03	90.58	7,111.86	-279.30	2,335.33	2,345.18	0.76	0.33	-0.68	-64.50
8,882.00	90.96	90.82	7,111.05	-280.45	2,429.32	2,439.13	1.02	0.99	0.26	14.47
8,977.00	89.41	91.06	7,110.74	-282.00	2,524.30	2,534.09	1.65	-1.63	0.25	171.20
9,071.00	89.94	90.63	7,111.27	-283.39	2,618.29	2,628.05	0.73	0.56	-0.46	-39.05
9,166.00	90.74	90.79	7,110.71	-284.57	2,713.28	2,723.01	0.86	0.84	0.17	11.31
9,261.00	88.89	90.54	7,111.02	-285.67	2,808.27	2,817.96	1.97	-1.95	-0.26	-172.30
9,356.00	89.54	90.15	7,112.32	-286.24	2,903.26	2,912.88	0.80	0.68	-0.41	-30.96
9,451.00	88.83	90.58	7,113.67	-286.85	2,998.25	3,007.81	0.87	-0.75	0.45	148.80
9,545.00	89.57	90.44	7,114.98	-287.68	3,092.23	3,101.74	0.80	0.79	-0.15	-10.71
9,640.00	89.72	91.59	7,115.57	-289.37	3,187.21	3,196.71	1.22	0.16	1.21	82.57
9,734.00	91.14	91.44	7,114.87	-291.85	3,281.18	3,290.69	1.52	1.51	-0.16	-6.03
9,829.00	91.26	91.58	7,112.88	-294.35	3,376.12	3,385.66	0.19	0.13	0.15	49.39
9,924.00	91.14	91.18	7,110.89	-296.64	3,471.07	3,480.62	0.44	-0.13	-0.42	-106.70
10,019.00	90.80	91.50	7,109.28	-298.86	3,566.03	3,575.59	0.49	-0.36	0.34	136.74
10,114.00	89.69	91.91	7,108.87	-301.69	3,660.99	3,670.58	1.25	-1.17	0.43	159.73
10,208.00	90.31	91.95	7,108.87	-304.86	3,754.93	3,764.57	0.66	0.66	0.04	3.69

## Design Report for Shable K08-68-1HN - Field Surveys

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)	Toolface Azimuth (°)
10,303.00	89.75	91.94	7,108.82	-308.08	3,849.88	3,859.57	0.59	-0.59	-0.01	-178.98
10,397.00	89.23	92.20	7,109.66	-311.48	3,943.81	3,953.56	0.62	-0.55	0.28	153.44
10,492.00	89.29	91.88	7,110.89	-314.86	4,038.75	4,048.55	0.34	0.06	-0.34	-79.38
10,587.00	88.12	91.53	7,113.03	-317.68	4,133.68	4,143.52	1.29	-1.23	-0.37	-163.35
10,681.00	88.49	91.10	7,115.81	-319.84	4,227.61	4,237.46	0.60	0.39	-0.46	-49.28
10,776.00	89.51	88.98	7,117.47	-319.90	4,322.59	4,332.35	2.48	1.07	-2.23	-64.32
10,871.00	91.51	90.65	7,116.63	-319.60	4,417.58	4,427.24	2.74	2.11	1.76	39.86
10,966.00	89.57	91.57	7,115.73	-321.44	4,512.55	4,522.20	2.26	-2.04	0.97	154.62
11,060.00	90.93	90.69	7,115.32	-323.29	4,606.53	4,616.17	1.72	1.45	-0.94	-32.90
11,155.00	90.56	90.60	7,114.08	-324.36	4,701.51	4,711.11	0.40	-0.39	-0.09	-166.33
11,249.00	89.72	91.49	7,113.86	-326.08	4,795.50	4,805.08	1.30	-0.89	0.95	133.34
11,344.00	86.98	90.86	7,116.59	-328.02	4,890.43	4,900.01	2.96	-2.88	-0.66	-167.06
11,438.00	87.66	90.94	7,120.99	-329.50	4,984.31	4,993.87	0.73	0.72	0.09	6.70
11,533.00	87.90	90.28	7,124.67	-330.51	5,079.24	5,088.75	0.74	0.25	-0.69	-70.02
11,628.00	88.86	91.91	7,127.35	-332.32	5,174.18	5,183.68	1.99	1.01	1.72	59.52
11,723.00	89.75	91.69	7,128.50	-335.31	5,269.12	5,278.67	0.97	0.94	-0.23	-13.89
11,818.00	90.71	90.49	7,128.12	-337.11	5,364.10	5,373.63	1.62	1.01	-1.26	-51.34
11,913.00	90.74	92.37	7,126.92	-339.48	5,459.06	5,468.61	1.98	0.03	1.98	89.07
12,007.00	91.51	91.79	7,125.07	-342.90	5,552.98	5,562.59	1.03	0.82	-0.62	-36.98
12,102.00	90.46	92.49	7,123.44	-346.44	5,647.89	5,657.57	1.33	-1.11	0.74	146.31
12,196.00	89.66	91.98	7,123.34	-350.11	5,741.82	5,751.57	1.01	-0.85	-0.54	-147.48
12,291.00	90.31	91.61	7,123.37	-353.08	5,836.78	5,846.56	0.79	0.68	-0.39	-29.65
12,386.00	89.60	90.81	7,123.44	-355.09	5,931.75	5,941.54	1.13	-0.75	-0.84	-131.59
<b>Last HBL Survey @ 12386.00'</b>										
12,449.00	90.00	92.87	7,123.66	-357.11	5,994.72	6,004.53	3.33	0.63	3.27	79.02
<b>First Baker Survey @ 12449.00'</b>										
12,541.00	92.96	93.78	7,121.29	-362.45	6,086.52	6,096.48	3.37	3.22	0.99	17.07
12,634.00	95.87	96.01	7,114.13	-370.35	6,178.89	6,189.10	3.94	3.13	2.40	37.30
12,726.00	92.53	95.58	7,107.39	-379.62	6,270.16	6,280.69	3.66	-3.63	-0.47	-172.67
12,818.00	91.63	94.85	7,104.05	-387.97	6,361.72	6,372.52	1.26	-0.98	-0.79	-140.96
12,913.00	89.69	93.23	7,102.96	-394.66	6,456.47	6,467.47	2.66	-2.04	-1.71	-140.13
13,008.00	89.16	93.33	7,103.91	-400.10	6,551.31	6,562.45	0.57	-0.56	0.11	169.32
13,103.00	89.07	92.91	7,105.38	-405.27	6,646.15	6,657.43	0.45	-0.09	-0.44	-102.10
13,198.00	89.01	91.14	7,106.97	-408.63	6,741.08	6,752.41	1.86	-0.06	-1.86	-91.96
13,293.00	89.56	91.67	7,108.15	-410.95	6,836.04	6,847.39	0.80	0.58	0.56	43.94
13,388.00	90.03	91.54	7,108.49	-413.61	6,931.00	6,942.38	0.51	0.49	-0.14	-15.46
13,483.00	89.56	91.43	7,108.83	-416.08	7,025.97	7,037.36	0.51	-0.49	-0.12	-166.83
13,578.00	88.95	91.51	7,110.07	-418.51	7,120.93	7,132.34	0.65	-0.64	0.08	172.53
13,672.00	88.98	91.99	7,111.77	-421.38	7,214.87	7,226.32	0.51	0.03	0.51	86.43
13,767.00	89.01	90.80	7,113.43	-423.70	7,309.83	7,321.29	1.25	0.03	-1.25	-88.57
13,862.00	89.07	89.86	7,115.03	-424.24	7,404.81	7,416.21	0.99	0.06	-0.99	-86.36
13,955.00	89.32	89.00	7,116.33	-423.32	7,497.80	7,509.06	0.96	0.27	-0.92	-73.80
14,050.00	89.79	88.99	7,117.07	-421.65	7,592.78	7,603.89	0.49	0.49	-0.01	-1.22
14,145.00	89.17	89.84	7,117.93	-420.68	7,687.77	7,698.75	1.11	-0.65	0.89	126.11
14,240.00	89.39	90.71	7,119.13	-421.14	7,782.76	7,793.67	0.94	0.23	0.92	75.81
14,334.00	89.34	91.82	7,120.17	-423.21	7,876.73	7,887.64	1.18	-0.05	1.18	92.59
14,429.00	89.13	92.68	7,121.44	-426.94	7,971.65	7,982.63	0.93	-0.22	0.91	103.73
14,524.00	89.78	92.61	7,122.34	-431.33	8,066.54	8,077.63	0.69	0.68	-0.07	-6.15
14,619.00	89.69	91.86	7,122.78	-435.03	8,161.47	8,172.62	0.80	-0.09	-0.79	-96.84
14,714.00	88.58	89.92	7,124.21	-436.51	8,256.44	8,267.57	2.35	-1.17	-2.04	-119.79
14,808.00	88.49	88.83	7,126.62	-435.48	8,350.40	8,361.40	1.16	-0.10	-1.16	-94.74
14,903.00	88.55	88.10	7,129.07	-432.94	8,445.33	8,456.14	0.77	0.06	-0.77	-85.31
14,998.00	89.04	88.09	7,131.07	-429.78	8,540.26	8,550.84	0.52	0.52	-0.01	-1.17
15,093.00	90.00	87.91	7,131.86	-426.46	8,635.20	8,645.55	1.03	1.01	-0.19	-10.62
15,188.00	90.82	89.02	7,131.18	-423.92	8,730.16	8,740.31	1.45	0.86	1.17	53.54
15,282.00	88.98	90.91	7,131.35	-423.86	8,824.15	8,834.21	2.81	-1.96	2.01	134.23
15,378.00	89.47	90.91	7,132.65	-425.39	8,920.13	8,930.17	0.51	0.51	0.00	0.00
15,472.00	88.95	90.72	7,133.94	-426.72	9,014.11	9,024.12	0.59	-0.55	-0.20	-159.93
15,567.00	89.78	90.37	7,135.00	-427.63	9,109.10	9,119.06	0.95	0.87	-0.37	-22.87
15,662.00	90.06	90.77	7,135.13	-428.57	9,204.09	9,214.01	0.51	0.29	0.42	55.01



## Design Report for Shable K08-68-1HN - Field Surveys

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)	Toolface Azimuth (°)
15,757.00	90.12	90.72	7,134.98	-429.81	9,299.09	9,308.97	0.08	0.06	-0.05	-39.81
15,851.00	90.00	90.81	7,134.88	-431.06	9,393.08	9,402.93	0.16	-0.13	0.10	143.13
15,946.00	89.56	91.01	7,135.25	-432.57	9,488.06	9,497.89	0.51	-0.46	0.21	155.56
16,041.00	89.56	92.85	7,135.98	-435.77	9,583.00	9,592.88	1.94	0.00	1.94	90.01
16,138.00	89.66	91.26	7,136.64	-439.25	9,679.94	9,689.87	1.64	0.10	-1.64	-86.41
<b>Last Baker Survey @ 16138.00'</b>										
16,195.00	89.41	92.16	7,137.10	-440.95	9,736.91	9,746.86	1.64	-0.44	1.58	105.53
<b>Tie-on to Baker surveys @ 16195.00'</b>										
16,290.00	90.49	92.36	7,137.18	-444.70	9,831.83	9,841.86	1.16	1.14	0.21	10.49
16,385.00	91.67	91.74	7,135.39	-448.09	9,926.75	9,936.84	1.40	1.24	-0.65	-27.71
16,480.00	90.80	92.63	7,133.34	-451.72	10,021.66	10,031.81	1.31	-0.92	0.94	134.35
16,574.00	89.91	93.04	7,132.76	-456.36	10,115.54	10,125.81	1.04	-0.95	0.44	155.26
16,669.00	89.17	93.34	7,133.52	-461.65	10,210.39	10,220.80	0.84	-0.78	0.32	157.93
16,764.00	88.61	92.18	7,135.36	-466.22	10,305.26	10,315.78	1.36	-0.59	-1.22	-115.78
16,859.00	88.77	92.19	7,137.54	-469.85	10,400.17	10,410.75	0.17	0.17	0.01	3.58
16,954.00	89.17	91.85	7,139.24	-473.19	10,495.09	10,505.73	0.55	0.42	-0.36	-40.36
17,048.00	89.54	91.17	7,140.30	-475.67	10,589.05	10,599.71	0.82	0.39	-0.72	-61.45
17,143.00	90.31	91.84	7,140.43	-478.17	10,684.02	10,694.70	1.07	0.81	0.71	41.03
17,238.00	90.89	91.87	7,139.43	-481.24	10,778.96	10,789.69	0.61	0.61	0.03	2.96
17,333.00	90.74	91.13	7,138.08	-483.73	10,873.92	10,884.66	0.79	-0.16	-0.78	-101.45
17,392.00	91.08	90.98	7,137.14	-484.81	10,932.90	10,943.64	0.63	0.58	-0.25	-23.80
<b>Last MWD Survey @ 17392.00'</b>										
17,456.00	91.08	90.98	7,135.94	-485.91	10,996.88	11,007.61	0.00	0.00	0.00	0.00
<b>St. Line Projection to TD @ 17456' MD - Sable K08-68-1HN_BHL</b>										

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
295.00	295.00	-0.29	0.43	First Surface Gyro @ 295.00'
599.00	599.00	-0.30	1.31	Last Surface Gyro @ 599.00'
721.00	721.00	-0.35	1.41	First MWD Survey to Tie-on @ 721.00'
12,386.00	7,123.44	-355.09	5,931.75	Last HBL Survey @ 12386.00'
12,449.00	7,123.66	-357.11	5,994.72	First Baker Survey @ 12449.00'
16,138.00	7,136.64	-439.25	9,679.94	Last Baker Survey @ 16138.00'
16,195.00	7,137.10	-440.95	9,736.91	Tie-on to Baker surveys @ 16195.00'
17,392.00	7,137.14	-484.81	10,932.90	Last MWD Survey @ 17392.00'
17,456.00	7,135.94	-485.91	10,996.88	St. Line Projection to TD @ 17456' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Sable K08-68-1HN_BHL	92.46	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
295.00	599.00	Surface Surveys	Flexi-Shot
721.00	7,437.00	MWD Surveys - Intermediate	MWD+IFR1+MS_WY
7,511.00	12,386.00	MWD Surveys- Production	MWD+IFR1+MS_WY
12,449.00	16,138.00	MWD Surveys (Baker) Production	MWD+IFR1+MS_WY
16,195.00	17,392.00	MWD Surveys- Production	MWD+IFR1+MS_WY

## Design Report for Shable K08-68-1HN - Field Surveys

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
623.00	623.00	9 5/8" @ 623' MD	9-5/8	13-3/4
7,481.00	7,097.39	7" @ 7481' MD	7	8-3/4

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Sable K08-67HN_Sec 8_SL	0.00	-21.84	0.17	Polygon
Sable K08-67HN_Sec 7_460_SB	0.00	-21.84	0.17	Polygon
Sable K08-67HN_Sec 8_460_SB	0.00	-21.84	0.17	Polygon
Sable K08-67HN_Sec 9_460_SB	0.00	-21.84	0.17	Polygon
Sable K08-67HN_Sec 7_SL	0.00	-21.84	0.17	Polygon
Sable K08-67HN_Sec 9_SL	0.00	-21.84	0.17	Polygon
Sable K08-68-1HN_SHL	-5.00	0.02	0.00	Point
Sable K08-68-1HN_BHL	7,142.86	-473.38	10,997.33	Point

Directional Difficulty Index

Average Dogleg over Survey:	1.56 °/100usft	Maximum Dogleg over Survey:	14.55 °/100usft at 7,137.00 usft
Net Tortousity applicable to Plans:	0.93 °/100usft	Directional Difficulty Index:	6.870

Audit Info

## North Reference Sheet for Sec. 7-T4N-R66W (K08-30-A PAD) - Shable K08-68-1HN - Plan B

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

Vertical Depths are relative to RKB @ 4745.00usft (H&P 321). Northing and Easting are relative to Shable K08-68-1HN

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 -105.50°, Longitude Origin:0.000000°, Latitude Origin:40.783333°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99995786

Grid Coordinates of Well: 1,364,661.40 usft N, 3,191,522.81 usft E

Geographical Coordinates of Well: 40° 19' 56.50" N, 104° 48' 46.84" W

Grid Convergence at Surface is: 0.44°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,456.00usft  
the Bottom Hole Displacement is 11,007.61usft in the Direction of 92.53° (Grid).

Magnetic Convergence at surface is: -8.11° (21 July 2014, , BGGM2014)

