

Noble Energy

Weld County, CO (NAD 83)

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

Shable K08-69HN

Job# 901456689 ::API 05-123-39558

Plan B

Design: Actual Surveys

Sperry Drilling Services

Final Survey Report

23 September, 2014

Surface UWI : Job# 901456689 ::API 05-123-39558

Well Coordinates: 1,364,705.12 N, 3,191,522.48 E (40° 19' 56.93" N, 104° 48' 46.84" W)

Ground Level: 4,715.00 usft

Local Coordinate Origin:

Centered on Well Shable K08-69HN

Viewing Datum:

RKB=30' @ 4745.00usft (H&P 321)

TVDs to System:

N

North Reference:

Grid

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

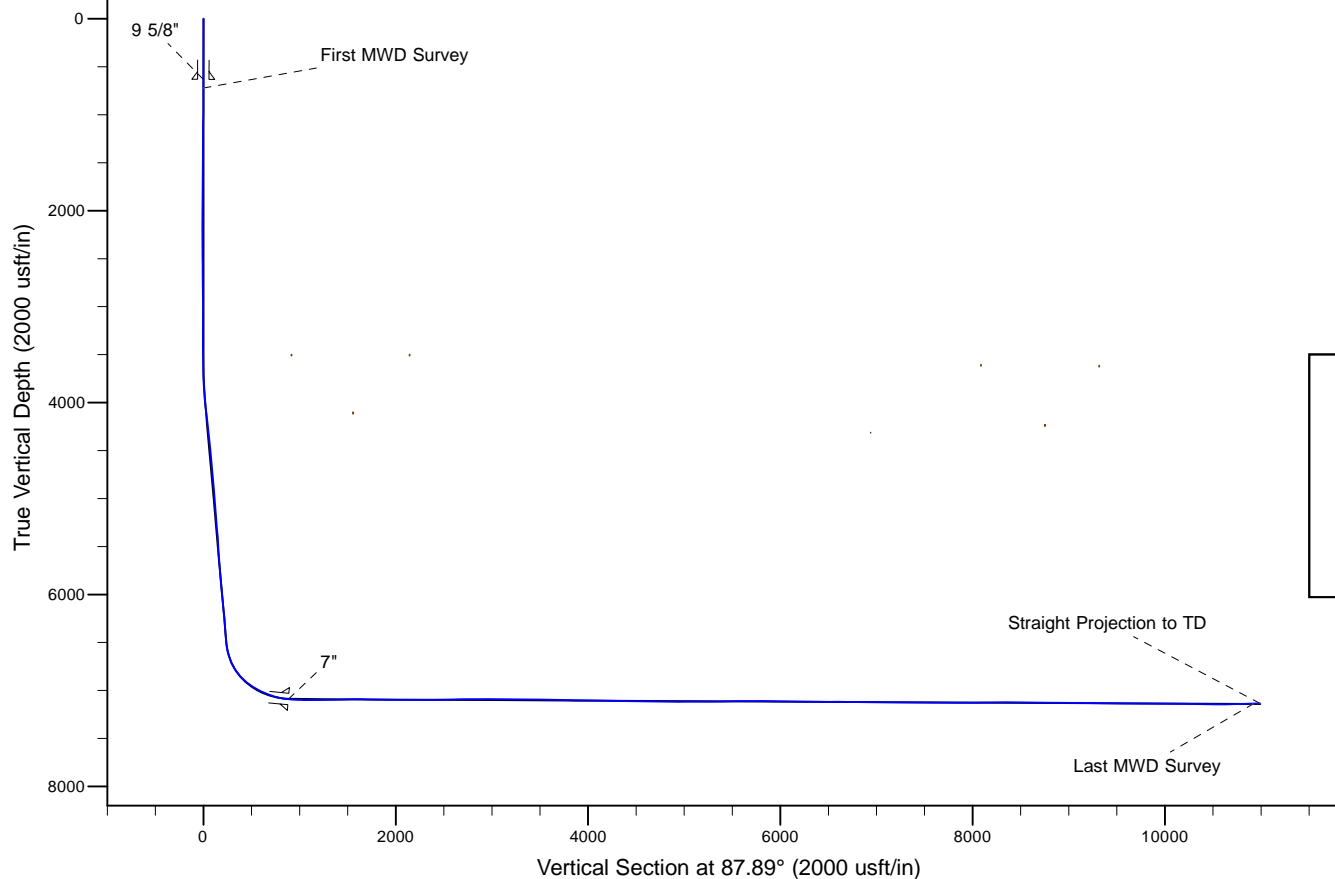
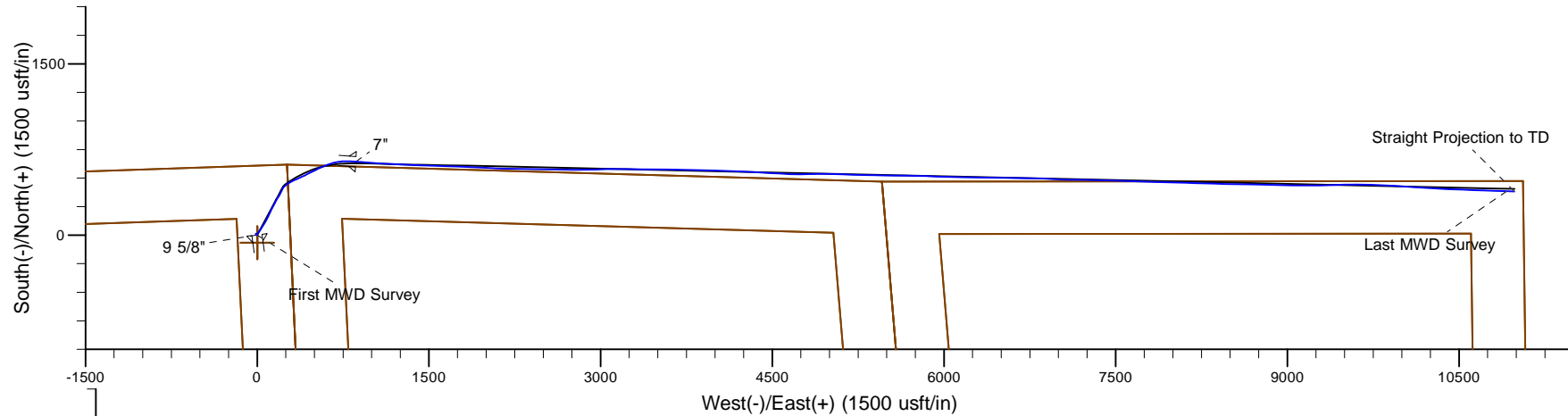
Version: 5000.1 Build: 70

HALLIBURTON

Project: Weld County, CO (NAD 83)
Site: Sec. 7-T4N-R66W (Shable K08-30-A PAD)
Well: Shable K08-69HN
Wellbore: Plan B
Design: Actual Surveys

Noble Energy

HALLIBURTON
Sperry Drilling



Platted SHL: 607 FNL, 290 FEL
Platted Lat/Long: 40.33248 N, 104.81301 W
Location: Sec. 7-T4N-R66W

~7" Casing: 60" FNL, 600' FWL
Lat/Long: 40.334229N 104.809902W
State Planes - CO Northern: 1365349.09N 3192383.94E
Location: Sec. 8-T4N-R66W

Platted BHL: 75' FNL, 75' FEL
Lat/Long: 40.33333 N, 104.7736 W
State Planes - CO Northern: 1365110.11 N, 3202506.61 E
Location: Sec. 9-T4N-R66W

LEGEND

- △ Shable K08-69HN, Plan B, Plan B0 Proposal V0
- Actual Surveys

WELL DETAILS: Shable K08-69HN

Ground Level: 4715.00
RKB=30' @ 4745.00usft (H&P 321)

Created By: Gordy Roth
Created On: 08/27/2014

Design Report for Shable K08-69HN - 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
723.00	0.22	352.50	723.00	1.38	-0.18	-0.13	0.03
First MWD Survey							
814.00	0.69	310.81	814.00	1.91	-0.62	-0.55	0.60
907.00	0.51	315.63	906.99	2.57	-1.33	-1.24	0.20
999.00	0.49	243.37	998.99	2.69	-1.97	-1.87	0.64
1,091.00	0.13	222.75	1,090.99	2.43	-2.39	-2.30	0.40
1,183.00	0.18	328.07	1,182.99	2.48	-2.54	-2.45	0.27
1,274.00	0.22	312.76	1,273.99	2.72	-2.74	-2.64	0.07
1,367.00	0.68	307.20	1,366.98	3.17	-3.31	-3.20	0.50
1,458.00	0.75	294.17	1,457.98	3.74	-4.29	-4.15	0.19
1,551.00	0.96	288.05	1,550.96	4.23	-5.58	-5.42	0.25
1,643.00	0.91	282.89	1,642.95	4.64	-7.03	-6.85	0.11
1,736.00	0.70	307.55	1,735.94	5.15	-8.20	-8.00	0.43
1,828.00	1.05	327.99	1,827.93	6.20	-9.09	-8.86	0.50
1,920.00	0.96	337.00	1,919.92	7.63	-9.84	-9.55	0.20
2,015.00	1.07	358.10	2,014.90	9.25	-10.18	-9.83	0.41
2,110.00	1.06	348.78	2,109.89	11.00	-10.38	-9.97	0.18
2,204.00	1.31	347.76	2,203.87	12.90	-10.78	-10.29	0.27
2,299.00	1.91	168.55	2,298.85	12.41	-10.69	-10.23	3.39
2,394.00	1.20	157.27	2,393.82	9.94	-9.99	-9.62	0.81
2,489.00	0.69	64.22	2,488.81	9.27	-9.09	-8.75	1.49
2,584.00	0.71	45.38	2,583.80	9.93	-8.16	-7.79	0.24
2,679.00	0.80	49.11	2,678.79	10.78	-7.24	-6.84	0.11
2,773.00	0.69	144.32	2,772.79	10.75	-6.41	-6.01	1.17
2,868.00	1.06	152.32	2,867.78	9.51	-5.67	-5.32	0.41
2,963.00	1.05	158.81	2,962.76	7.92	-4.95	-4.65	0.13
3,058.00	1.11	154.54	3,057.74	6.28	-4.24	-4.01	0.11
3,153.00	1.28	165.16	3,152.72	4.42	-3.57	-3.41	0.29
3,247.00	0.93	160.26	3,246.71	2.69	-3.05	-2.94	0.39
3,342.00	1.09	165.47	3,341.69	1.09	-2.56	-2.52	0.19
3,437.00	0.84	200.99	3,436.68	-0.44	-2.58	-2.60	0.67
3,531.00	0.44	266.05	3,530.67	-1.11	-3.19	-3.23	0.82
3,626.00	2.23	18.90	3,625.65	0.62	-2.95	-2.93	2.56
3,721.00	3.59	28.45	3,720.53	4.98	-0.94	-0.75	1.51
3,815.00	5.76	33.93	3,814.21	11.48	3.10	3.52	2.35
3,910.00	7.75	35.20	3,908.54	20.67	9.45	10.21	2.10
4,005.00	8.90	34.84	4,002.54	31.94	17.34	18.51	1.21
4,100.00	10.44	34.14	4,096.19	45.10	26.37	28.02	1.63
4,194.00	11.39	33.81	4,188.49	59.86	36.32	38.50	1.01
4,289.00	11.42	32.29	4,281.61	75.60	46.56	49.31	0.32
4,384.00	10.91	31.37	4,374.81	91.23	56.26	59.59	0.57
4,479.00	10.86	30.69	4,468.11	106.60	65.51	69.40	0.15
4,573.00	10.21	29.80	4,560.52	121.44	74.17	78.60	0.71
4,668.00	9.51	26.84	4,654.12	135.75	81.90	86.85	0.91
4,763.00	9.70	25.12	4,747.79	150.00	88.84	94.31	0.36
4,857.00	10.74	27.51	4,840.29	164.94	96.25	102.26	1.19
4,952.00	11.09	27.75	4,933.57	180.88	104.59	111.19	0.37
5,047.00	9.45	24.75	5,027.05	196.05	112.11	119.26	1.82
5,142.00	8.72	22.32	5,120.86	209.79	118.11	125.76	0.87

Design Report for Shable K08-69HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
5,236.00	9.22	25.02	5,213.71	223.21	124.00	132.14	0.70
5,331.00	9.87	30.14	5,307.39	237.15	131.31	139.96	1.12
5,426.00	8.94	28.43	5,401.12	250.68	138.91	148.05	1.02
5,521.00	8.22	28.83	5,495.05	263.12	145.70	155.30	0.76
5,616.00	8.22	25.20	5,589.08	275.21	151.87	161.91	0.55
5,710.00	7.64	25.72	5,682.18	286.92	157.44	167.91	0.62
5,805.00	8.04	25.32	5,776.29	298.62	163.02	173.92	0.42
5,900.00	8.87	34.05	5,870.26	310.69	169.97	181.30	1.61
5,995.00	9.54	30.73	5,964.04	323.53	178.09	189.89	0.90
6,089.00	10.08	33.71	6,056.66	337.07	186.64	198.93	0.79
6,184.00	10.53	30.00	6,150.13	351.50	195.59	208.41	0.84
6,279.00	11.45	27.22	6,243.39	367.41	204.24	217.64	1.12
6,374.00	10.60	22.82	6,336.64	383.84	211.95	225.94	1.26
6,493.00	9.01	23.86	6,453.89	402.46	219.96	234.64	1.34
6,564.00	10.15	31.51	6,523.91	412.87	225.48	240.54	2.40
6,612.00	15.49	42.27	6,570.70	421.23	232.01	247.37	12.14
6,658.00	19.82	49.04	6,614.53	430.89	242.03	257.75	10.40
6,706.00	23.40	52.69	6,659.15	442.01	255.76	271.88	7.96
6,753.00	26.16	57.72	6,701.82	453.20	271.95	288.47	7.38
6,801.00	29.54	61.29	6,744.26	464.54	291.28	308.20	7.85
6,848.00	34.24	63.62	6,784.15	475.99	313.30	330.63	10.34
6,896.00	39.62	65.67	6,822.51	488.31	339.37	357.13	11.50
6,942.00	45.45	66.58	6,856.39	500.87	367.80	386.00	12.74
6,990.00	49.91	64.39	6,888.70	515.62	400.07	418.79	9.88
7,037.00	53.18	62.70	6,917.93	532.02	433.01	452.31	7.51
7,085.00	56.74	63.55	6,945.49	549.78	468.06	488.00	7.56
7,132.00	61.18	64.50	6,969.71	567.40	504.25	524.82	9.60
7,180.00	64.73	64.92	6,991.54	585.66	542.90	564.11	7.44
7,227.00	66.32	66.19	7,011.01	603.36	581.84	603.68	4.18
7,275.00	66.54	70.06	7,030.21	619.75	622.66	645.07	7.40
7,322.00	69.45	75.49	7,047.83	632.62	664.26	687.12	12.37
7,370.00	73.66	80.96	7,063.02	641.88	708.82	731.98	13.92
7,417.00	76.79	87.35	7,075.02	646.49	754.00	777.30	14.73
7,482.00	82.28	92.70	7,086.83	646.43	817.86	841.13	11.70
7,560.00	86.36	94.46	7,094.55	641.58	895.31	918.34	5.69
7,623.00	87.26	94.59	7,098.05	636.62	958.02	980.82	1.44
7,718.00	89.78	93.51	7,100.51	629.92	1,052.74	1,075.23	2.89
7,813.00	90.12	93.33	7,100.59	624.25	1,147.57	1,169.79	0.40
7,908.00	90.92	93.40	7,099.73	618.67	1,242.40	1,264.35	0.85
8,003.00	91.11	92.08	7,098.04	614.13	1,337.27	1,358.99	1.40
8,097.00	91.76	91.71	7,095.69	611.02	1,431.19	1,452.73	0.80
8,192.00	90.71	90.98	7,093.64	608.80	1,526.14	1,547.54	1.35
8,287.00	89.91	91.81	7,093.13	606.48	1,621.11	1,642.36	1.21
8,381.00	88.92	92.44	7,094.09	603.00	1,715.04	1,736.09	1.25
8,476.00	88.95	92.55	7,095.85	598.86	1,809.93	1,830.77	0.12
8,571.00	89.35	93.02	7,097.26	594.25	1,904.81	1,925.41	0.65
8,665.00	89.57	92.78	7,098.15	589.49	1,998.69	2,019.05	0.35
8,760.00	89.29	92.46	7,099.09	585.15	2,093.58	2,113.72	0.45
8,854.00	90.31	91.13	7,099.42	582.21	2,187.53	2,207.50	1.78
8,949.00	90.34	90.71	7,098.88	580.68	2,282.52	2,302.36	0.44
9,044.00	90.68	91.43	7,098.04	578.91	2,377.50	2,397.21	0.84

Design Report for Shable K08-69HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,138.00	91.23	91.36	7,096.47	576.62	2,471.46	2,491.02	0.59
9,233.00	91.63	90.48	7,094.10	575.09	2,566.41	2,585.86	1.02
9,328.00	90.49	91.24	7,092.34	573.67	2,661.38	2,680.71	1.44
9,423.00	89.38	90.20	7,092.45	572.47	2,756.37	2,775.59	1.60
9,517.00	89.51	89.38	7,093.36	572.82	2,850.37	2,869.54	0.88
9,612.00	91.36	88.36	7,092.64	574.69	2,945.34	2,964.52	2.22
9,707.00	90.96	87.82	7,090.72	577.86	3,040.27	3,059.49	0.71
9,801.00	88.34	90.47	7,091.29	579.26	3,134.24	3,153.45	3.96
9,896.00	89.17	90.55	7,093.35	578.41	3,229.21	3,248.33	0.88
9,991.00	89.63	90.61	7,094.35	577.45	3,324.20	3,343.22	0.49
10,086.00	88.58	90.76	7,095.83	576.32	3,419.18	3,438.10	1.12
10,180.00	89.01	90.01	7,097.81	575.69	3,513.16	3,531.98	0.92
10,275.00	89.82	90.52	7,098.78	575.25	3,608.15	3,626.90	1.01
10,370.00	88.18	91.89	7,100.44	573.25	3,703.11	3,721.72	2.25
10,464.00	89.48	91.41	7,102.36	570.54	3,797.05	3,815.49	1.47
10,559.00	88.80	91.24	7,103.78	568.35	3,892.01	3,910.31	0.74
10,654.00	89.85	91.07	7,104.90	566.43	3,986.99	4,005.15	1.12
10,754.00	89.51	92.49	7,105.46	563.33	4,086.93	4,104.91	1.46
10,849.00	88.09	92.61	7,107.45	559.10	4,181.82	4,199.58	1.50
10,944.00	89.26	93.06	7,109.65	554.40	4,276.67	4,294.20	1.32
11,039.00	90.22	92.76	7,110.08	549.58	4,371.55	4,388.83	1.06
11,134.00	88.77	93.07	7,110.92	544.75	4,466.42	4,483.46	1.56
11,228.00	88.98	93.79	7,112.76	539.13	4,560.23	4,577.00	0.80
11,320.00	88.71	93.21	7,114.62	533.51	4,652.04	4,668.54	0.70
11,413.00	88.24	88.59	7,117.09	532.05	4,744.97	4,761.35	4.99
11,504.00	89.14	87.75	7,119.17	534.96	4,835.90	4,852.33	1.35
11,596.00	90.46	89.96	7,119.49	536.79	4,927.87	4,944.30	2.80
11,687.00	91.67	92.19	7,117.80	535.09	5,018.83	5,035.14	2.79
11,779.00	90.03	92.14	7,116.44	531.61	5,110.75	5,126.87	1.78
11,870.00	89.38	91.28	7,116.91	528.90	5,201.71	5,217.67	1.18
11,962.00	90.77	91.54	7,116.79	526.63	5,293.68	5,309.49	1.54
12,055.00	90.59	91.37	7,115.68	524.27	5,386.64	5,402.30	0.27
12,147.00	90.46	90.41	7,114.84	522.84	5,478.63	5,494.17	1.05
12,238.00	90.71	90.10	7,113.91	522.44	5,569.62	5,585.09	0.44
12,330.00	90.37	91.69	7,113.04	521.00	5,661.60	5,676.96	1.77
12,422.00	90.31	90.86	7,112.50	518.95	5,753.58	5,768.79	0.90
12,514.00	89.78	92.18	7,112.42	516.51	5,845.54	5,860.61	1.55
12,607.00	90.25	91.91	7,112.40	513.20	5,938.48	5,953.36	0.58
12,699.00	88.71	91.54	7,113.24	510.43	6,030.44	6,045.15	1.72
12,792.00	88.71	91.90	7,115.33	507.64	6,123.37	6,137.92	0.39
12,884.00	88.24	90.31	7,117.78	505.86	6,215.32	6,229.74	1.80
12,975.00	87.81	90.18	7,120.91	505.47	6,306.26	6,320.60	0.49
13,070.00	90.00	90.50	7,122.73	504.91	6,401.24	6,415.49	2.33
13,165.00	92.10	92.04	7,120.99	502.80	6,496.19	6,510.30	2.74
13,260.00	89.66	91.46	7,119.53	499.90	6,591.13	6,605.07	2.64
13,354.00	88.89	89.46	7,120.72	499.15	6,685.11	6,698.96	2.28
13,449.00	89.88	92.13	7,121.74	497.83	6,780.09	6,793.82	3.00
13,544.00	90.12	92.34	7,121.74	494.13	6,875.01	6,888.55	0.34
13,639.00	88.92	92.94	7,122.53	489.75	6,969.91	6,983.22	1.41
13,733.00	89.04	91.39	7,124.21	486.20	7,063.82	7,076.94	1.65

Design Report for Shable K08-69HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
13,828.00	88.80	90.81	7,126.00	484.38	7,158.79	7,171.77	0.66
13,923.00	89.63	90.90	7,127.30	482.96	7,253.77	7,266.64	0.88
14,018.00	91.23	91.05	7,126.59	481.34	7,348.75	7,361.49	1.69
14,113.00	90.49	90.82	7,125.16	479.79	7,443.72	7,456.35	0.82
14,207.00	89.08	92.39	7,125.51	477.16	7,537.68	7,550.14	2.24
14,303.00	89.04	92.57	7,127.09	473.01	7,633.58	7,645.82	0.19
14,397.00	89.51	92.00	7,128.28	469.26	7,727.50	7,739.54	0.79
14,492.00	90.40	91.39	7,128.35	466.45	7,822.45	7,834.33	1.14
14,587.00	89.32	91.75	7,128.58	463.85	7,917.41	7,929.13	1.20
14,682.00	90.09	91.27	7,129.07	461.34	8,012.38	8,023.94	0.96
14,776.00	91.63	91.78	7,127.66	458.84	8,106.33	8,117.73	1.73
14,871.00	90.68	91.66	7,125.75	455.99	8,201.27	8,212.50	1.01
14,936.00	90.19	91.51	7,125.25	454.19	8,266.24	8,277.36	0.79
15,031.00	90.25	91.78	7,124.89	451.47	8,361.20	8,372.16	0.29
15,126.00	89.23	91.50	7,125.32	448.75	8,456.16	8,466.95	1.11
15,221.00	90.25	90.44	7,125.75	447.14	8,551.14	8,561.81	1.55
15,316.00	88.43	91.53	7,126.85	445.51	8,646.12	8,656.66	2.23
15,410.00	88.98	91.09	7,128.97	443.36	8,740.07	8,750.47	0.75
15,505.00	89.54	91.73	7,130.20	441.02	8,835.03	8,845.28	0.90
15,600.00	90.89	92.22	7,129.84	437.75	8,929.97	8,940.04	1.51
15,695.00	88.83	90.83	7,130.07	435.22	9,024.93	9,034.84	2.62
15,790.00	89.57	90.05	7,131.40	434.49	9,119.92	9,129.73	1.13
15,885.00	89.32	89.23	7,132.32	435.09	9,214.91	9,224.68	0.90
15,980.00	89.60	89.19	7,133.22	436.40	9,309.90	9,319.65	0.30
16,075.00	88.89	88.03	7,134.47	438.70	9,404.86	9,414.64	1.43
16,170.00	89.41	88.35	7,135.88	441.70	9,499.80	9,509.62	0.64
16,264.00	89.14	89.58	7,137.07	443.40	9,593.77	9,603.60	1.34
16,359.00	89.72	90.69	7,138.01	443.18	9,688.77	9,698.52	1.32
16,454.00	89.63	93.40	7,138.55	439.79	9,783.70	9,793.26	2.85
16,542.00	90.68	93.32	7,138.31	434.63	9,871.54	9,880.86	1.20
16,636.00	90.18	93.41	7,137.61	429.11	9,965.38	9,974.42	0.54
16,731.00	89.17	93.60	7,138.15	423.30	10,060.20	10,068.96	1.08
16,826.00	88.15	93.41	7,140.37	417.50	10,154.99	10,163.48	1.09
16,921.00	88.83	93.33	7,142.87	411.91	10,249.80	10,258.01	0.72
17,016.00	89.41	92.75	7,144.33	406.88	10,344.65	10,352.62	0.86
17,110.00	90.34	92.80	7,144.53	402.33	10,438.54	10,446.27	0.99
17,205.00	89.91	92.13	7,144.33	398.24	10,533.45	10,540.97	0.84
17,300.00	90.09	92.13	7,144.33	394.71	10,628.38	10,635.71	0.19
17,395.00	91.51	92.17	7,143.00	391.15	10,723.31	10,730.44	1.50
17,490.00	91.63	91.87	7,140.40	387.80	10,818.21	10,825.15	0.34
17,590.00	91.91	91.60	7,137.31	384.77	10,918.12	10,924.88	0.39
Last MWD Survey							
17,656.00	91.91	91.60	7,135.11	382.93	10,984.05	10,990.71	0.00
Straight Projection to TD							

Design Report for Shable K08-69HN - Actual Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
723.00	723.00	1.38	-0.18	First MWD Survey
17,590.00	7,137.31	384.77	10,918.12	Last MWD Survey
17,656.00	7,135.11	382.93	10,984.05	Straight Projection to TD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Sable K08-69HN BHL_Rev 1	87.89	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
723.00	7,482.00	Intermediate Surveys	MWD+IFR1+MS_WY
7,560.00	17,656.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
634.00	634.00	9 5/8"	9-5/8	13-3/4
7,526.00	7,091.86	7"	7	8-3/4

Design Report for Shable K08-69HN - 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
Sable K08-67HN_Sec	0.00	0.00	0.00	-65.57	0.51	1,364,639.56	3,191,522.98	40.332300	-104.813010
- actual wellpath misses target center by 65.57usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	517.95	-4,679.53	1,365,157.49	3,186,843.65	
Point 2				0.00	-4,807.90	-4,619.76	1,359,831.86	3,186,903.42	
Point 3				0.00	-4,735.83	507.97	1,359,903.93	3,192,030.93	
Point 4				0.00	683.29	259.57	1,365,322.82	3,191,782.54	
Sable K08-67HN_Sec	0.00	0.00	0.00	-65.57	0.51	1,364,639.56	3,191,522.98	40.332300	-104.813010
- actual wellpath misses target center by 65.57usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	73.24	-4,214.49	1,364,712.80	3,187,308.67	
Point 2				0.00	-4,341.44	-4,164.95	1,360,298.30	3,187,358.21	
Point 3				0.00	-4,282.53	26.69	1,360,357.21	3,191,549.67	
Point 4				0.00	208.33	-179.16	1,364,847.88	3,191,343.83	
Sable K08-69HN SHL	0.00	0.00	0.00	0.01	0.00	1,364,705.14	3,191,522.48	40.332480	-104.813010
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
Sable K08-67HN_Sec	0.00	0.00	0.00	-65.57	0.51	1,364,639.56	3,191,522.98	40.332300	-104.813010
- actual wellpath misses target center by 65.57usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	209.30	741.80	1,364,848.85	3,192,264.75	
Point 2				0.00	-4,283.55	947.74	1,360,356.19	3,192,470.68	
Point 3				0.00	-4,362.78	5,404.03	1,360,276.97	3,196,926.79	
Point 4				0.00	86.64	5,033.33	1,364,726.20	3,196,556.10	
Sable K08-67HN_Sec	0.00	0.00	0.00	-65.57	0.51	1,364,639.56	3,191,522.98	40.332300	-104.813010
- actual wellpath misses target center by 65.57usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	75.16	5,957.51	1,364,714.72	3,197,480.24	
Point 2				0.00	-4,368.02	6,327.70	1,360,271.73	3,197,850.42	
Point 3				0.00	-4,329.94	10,659.00	1,360,309.80	3,202,181.53	
Point 4				0.00	79.47	10,604.39	1,364,719.03	3,202,126.93	
Sable K08-67HN_Sec	0.00	0.00	0.00	-65.57	0.51	1,364,639.56	3,191,522.98	40.332300	-104.813010
- actual wellpath misses target center by 65.57usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	683.29	259.57	1,365,322.82	3,191,782.54	
Point 2				0.00	-4,735.83	507.97	1,359,903.93	3,192,030.93	
Point 3				0.00	-4,831.76	5,904.73	1,359,808.00	3,197,427.46	
Point 4				0.00	534.72	5,457.61	1,365,174.26	3,196,980.36	
Sable K08-67HN_Sec	0.00	0.00	0.00	-65.57	0.51	1,364,639.56	3,191,522.98	40.332300	-104.813010
- actual wellpath misses target center by 65.57usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	534.72	5,457.61	1,365,174.26	3,196,980.36	
Point 2				0.00	-4,831.76	5,904.73	1,359,808.00	3,197,427.46	
Point 3				0.00	-4,785.89	11,124.70	1,359,853.87	3,202,647.21	
Point 4				0.00	539.91	11,058.74	1,365,179.45	3,202,581.26	
Sable K08-69HN BHL	0.00	0.00	7,143.00	397.23	10,984.60	1,365,102.33	3,202,506.61	40.333330	-104.773600
- actual wellpath misses target center by 16.34usft at 17655.88usft MD (7135.11 TVD, 382.93 N, 10983.94 E)									
- Point									
Sable K08-69HN BHL	0.00	0.00	7,143.00	405.00	10,984.60	1,365,110.11	3,202,506.61	40.333351	-104.773600
- actual wellpath misses target center by 23.45usft at 17655.67usft MD (7135.12 TVD, 382.94 N, 10983.72 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.53 °/100usft	Maximum Dogleg over Survey:	14.73 °/100usft at 7,417.00 usft
Net Tortosity applicable to Plans:	0.96 °/100usft	Directional Difficulty Index:	6.878

Design Report for Shable K08-69HN - Actual Surveys

Audit Info

North Reference Sheet for Sec. 7-T4N-R66W (Shable K08-30-A PAD) - Shable
K08-69HN - 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=30' @ 4745.00usft (H&P 321). Northing and Easting are relative to Shable K08-69HN

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: 0.99995786

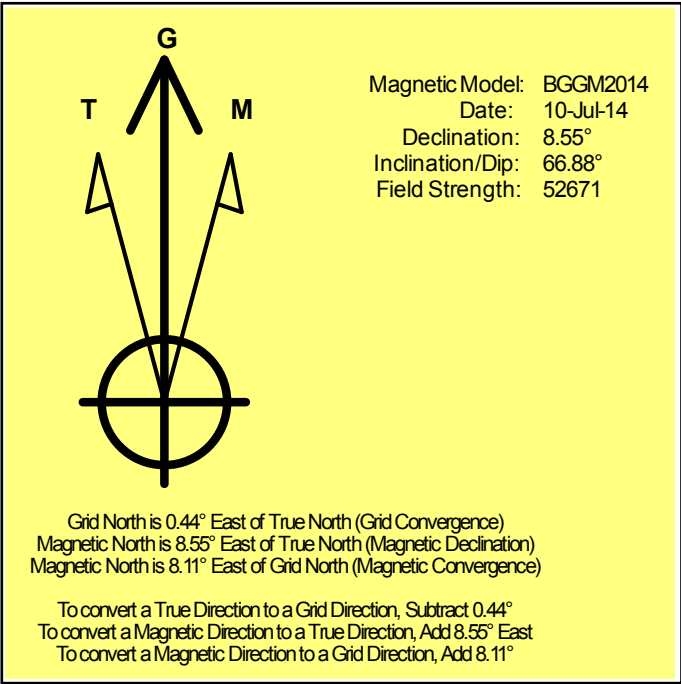
Grid Coordinates of Well: 1,364,705.12 usft N, 3,191,522.48 usft E

Geographical Coordinates of Well: 40° 19' 56.93" N, 104° 48' 46.84" W

Grid Convergence at Surface is: 0.44°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,656.00usft
the Bottom Hole Displacement is 10,990.73usft in the Direction of 88.00° (Grid).

Magnetic Convergence at surface is: -8.11° (10 July 2014, , BGGM2014)



Noble Energy

Weld County, CO (NAD 83)

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

Shable K08-69HN

Job# 901456689 ::API 05-123-39558

Plan B

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

23 September, 2014

Well Coordinates: 1,364,705.12 N, 3,191,522.48 E (40° 19' 56.93" 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 K08-69HN

RKB=30' @ 4745.00usft (H&P 321)

N

Grid

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for Shable K08-69HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	40.332480	-104.813010	1,364,705.12	3,191,522.48
723.00	0.22	352.50	723.00	1.38	-0.18	40.332484	-104.813011	1,364,706.50	3,191,522.29
814.00	0.69	310.81	814.00	1.91	-0.62	40.332485	-104.813012	1,364,707.03	3,191,521.86
907.00	0.51	315.63	906.99	2.57	-1.33	40.332487	-104.813015	1,364,707.69	3,191,521.14
999.00	0.49	243.37	998.99	2.69	-1.97	40.332487	-104.813017	1,364,707.81	3,191,520.51
1,091.00	0.13	222.75	1,090.99	2.43	-2.39	40.332487	-104.813019	1,364,707.56	3,191,520.08
1,183.00	0.18	328.07	1,182.99	2.48	-2.54	40.332487	-104.813019	1,364,707.60	3,191,519.94
1,274.00	0.22	312.76	1,273.99	2.72	-2.74	40.332488	-104.813020	1,364,707.84	3,191,519.73
1,367.00	0.68	307.20	1,366.98	3.17	-3.31	40.332489	-104.813022	1,364,708.30	3,191,519.16
1,458.00	0.75	294.17	1,457.98	3.74	-4.29	40.332490	-104.813026	1,364,708.87	3,191,518.19
1,551.00	0.96	288.05	1,550.96	4.23	-5.58	40.332492	-104.813030	1,364,709.36	3,191,516.89
1,643.00	0.91	282.89	1,642.95	4.64	-7.03	40.332493	-104.813035	1,364,709.76	3,191,515.45
1,736.00	0.70	307.55	1,735.94	5.15	-8.20	40.332494	-104.813040	1,364,710.27	3,191,514.28
1,828.00	1.05	327.99	1,827.93	6.20	-9.09	40.332497	-104.813043	1,364,711.33	3,191,513.38
1,920.00	0.96	337.00	1,919.92	7.63	-9.84	40.332501	-104.813045	1,364,712.75	3,191,512.64
2,015.00	1.07	358.10	2,014.90	9.25	-10.18	40.332506	-104.813047	1,364,714.37	3,191,512.30
2,110.00	1.06	348.78	2,109.89	11.00	-10.38	40.332510	-104.813047	1,364,716.12	3,191,512.10
2,204.00	1.31	347.76	2,203.87	12.90	-10.78	40.332516	-104.813049	1,364,718.02	3,191,511.70
2,299.00	1.91	168.55	2,298.85	12.41	-10.69	40.332514	-104.813048	1,364,717.53	3,191,511.78
2,394.00	1.20	157.27	2,393.82	9.94	-9.99	40.332508	-104.813046	1,364,715.06	3,191,512.48
2,489.00	0.69	64.22	2,488.81	9.27	-9.09	40.332506	-104.813043	1,364,714.39	3,191,513.38
2,584.00	0.71	45.38	2,583.80	9.93	-8.16	40.332507	-104.813039	1,364,715.06	3,191,514.32
2,679.00	0.80	49.11	2,678.79	10.78	-7.24	40.332510	-104.813036	1,364,715.90	3,191,515.24
2,773.00	0.69	144.32	2,772.79	10.75	-6.41	40.332510	-104.813033	1,364,715.87	3,191,516.06
2,868.00	1.06	152.32	2,867.78	9.51	-5.67	40.332506	-104.813030	1,364,714.63	3,191,516.80
2,963.00	1.05	158.81	2,962.76	7.92	-4.95	40.332502	-104.813028	1,364,713.04	3,191,517.53
3,058.00	1.11	154.54	3,057.74	6.28	-4.24	40.332497	-104.813025	1,364,711.40	3,191,518.24
3,153.00	1.28	165.16	3,152.72	4.42	-3.57	40.332492	-104.813023	1,364,709.54	3,191,518.90
3,247.00	0.93	160.26	3,246.71	2.69	-3.05	40.332487	-104.813021	1,364,707.81	3,191,519.43
3,342.00	1.09	165.47	3,341.69	1.09	-2.56	40.332483	-104.813019	1,364,706.21	3,191,519.92
3,437.00	0.84	200.99	3,436.68	-0.44	-2.58	40.332479	-104.813020	1,364,704.68	3,191,519.89
3,531.00	0.44	266.05	3,530.67	-1.11	-3.19	40.332477	-104.813022	1,364,704.02	3,191,519.29
3,626.00	2.23	18.90	3,625.65	0.62	-2.95	40.332482	-104.813021	1,364,705.74	3,191,519.52
3,721.00	3.59	28.45	3,720.53	4.98	-0.94	40.332494	-104.813013	1,364,710.10	3,191,521.54
3,815.00	5.76	33.93	3,814.21	11.48	3.10	40.332512	-104.812999	1,364,716.61	3,191,525.57
3,910.00	7.75	35.20	3,908.54	20.67	9.45	40.332537	-104.812976	1,364,725.80	3,191,531.93
4,005.00	8.90	34.84	4,002.54	31.94	17.34	40.332567	-104.812947	1,364,737.06	3,191,539.82
4,100.00	10.44	34.14	4,096.19	45.10	26.37	40.332603	-104.812914	1,364,750.22	3,191,548.85
4,194.00	11.39	33.81	4,188.49	59.86	36.32	40.332644	-104.812878	1,364,764.98	3,191,558.79
4,289.00	11.42	32.29	4,281.61	75.60	46.56	40.332687	-104.812841	1,364,780.72	3,191,569.03
4,384.00	10.91	31.37	4,374.81	91.23	56.26	40.332729	-104.812806	1,364,796.35	3,191,578.74
4,479.00	10.86	30.69	4,468.11	106.60	65.51	40.332771	-104.812772	1,364,811.72	3,191,587.99

Design Report for Shable K08-69HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
4,573.00	10.21	29.80	4,560.52	121.44	74.17	40.332812	-104.812741	1,364,826.56	3,191,596.64
4,668.00	9.51	26.84	4,654.12	135.75	81.90	40.332851	-104.812713	1,364,840.87	3,191,604.37
4,763.00	9.70	25.12	4,747.79	150.00	88.84	40.332890	-104.812687	1,364,855.12	3,191,611.31
4,857.00	10.74	27.51	4,840.29	164.94	96.25	40.332931	-104.812660	1,364,870.06	3,191,618.72
4,952.00	11.09	27.75	4,933.57	180.88	104.59	40.332974	-104.812630	1,364,885.99	3,191,627.06
5,047.00	9.45	24.75	5,027.05	196.05	112.11	40.333016	-104.812603	1,364,901.16	3,191,634.58
5,142.00	8.72	22.32	5,120.86	209.79	118.11	40.333053	-104.812581	1,364,914.91	3,191,640.58
5,236.00	9.22	25.02	5,213.71	223.21	124.00	40.333090	-104.812559	1,364,928.32	3,191,646.47
5,331.00	9.87	30.14	5,307.39	237.15	131.31	40.333128	-104.812533	1,364,942.26	3,191,653.78
5,426.00	8.94	28.43	5,401.12	250.68	138.91	40.333165	-104.812505	1,364,955.79	3,191,661.38
5,521.00	8.22	28.83	5,495.05	263.12	145.70	40.333199	-104.812480	1,364,968.23	3,191,668.17
5,616.00	8.22	25.20	5,589.08	275.21	151.87	40.333232	-104.812458	1,364,980.33	3,191,674.34
5,710.00	7.64	25.72	5,682.18	286.92	157.44	40.333264	-104.812438	1,364,992.04	3,191,679.91
5,805.00	8.04	25.32	5,776.29	298.62	163.02	40.333296	-104.812417	1,365,003.73	3,191,685.49
5,900.00	8.87	34.05	5,870.26	310.69	169.97	40.333329	-104.812392	1,365,015.80	3,191,692.43
5,995.00	9.54	30.73	5,964.04	323.53	178.09	40.333364	-104.812363	1,365,028.64	3,191,700.56
6,089.00	10.08	33.71	6,056.66	337.07	186.64	40.333401	-104.812331	1,365,042.18	3,191,709.10
6,184.00	10.53	30.00	6,150.13	351.50	195.59	40.333441	-104.812299	1,365,056.61	3,191,718.06
6,279.00	11.45	27.22	6,243.39	367.41	204.24	40.333484	-104.812267	1,365,072.51	3,191,726.71
6,374.00	10.60	22.82	6,336.64	383.84	211.95	40.333529	-104.812239	1,365,088.95	3,191,734.41
6,493.00	9.01	23.86	6,453.89	402.46	219.96	40.333580	-104.812210	1,365,107.56	3,191,742.43
6,564.00	10.15	31.51	6,523.91	412.87	225.48	40.333609	-104.812190	1,365,117.98	3,191,747.95
6,612.00	15.49	42.27	6,570.70	421.23	232.01	40.333631	-104.812166	1,365,126.34	3,191,754.47
6,658.00	19.82	49.04	6,614.53	430.89	242.03	40.333658	-104.812130	1,365,136.00	3,191,764.50
6,706.00	23.40	52.69	6,659.15	442.01	255.76	40.333688	-104.812081	1,365,147.12	3,191,778.23
6,753.00	26.16	57.72	6,701.82	453.20	271.95	40.333718	-104.812022	1,365,158.31	3,191,794.42
6,801.00	29.54	61.29	6,744.26	464.54	291.28	40.333749	-104.811953	1,365,169.65	3,191,813.75
6,848.00	34.24	63.62	6,784.15	475.99	313.30	40.333780	-104.811873	1,365,181.09	3,191,835.77
6,896.00	39.62	65.67	6,822.51	488.31	339.37	40.333813	-104.811779	1,365,193.41	3,191,861.83
6,942.00	45.45	66.58	6,856.39	500.87	367.80	40.333847	-104.811677	1,365,205.98	3,191,890.26
6,990.00	49.91	64.39	6,888.70	515.62	400.07	40.333887	-104.811561	1,365,220.72	3,191,922.52
7,037.00	53.18	62.70	6,917.93	532.02	433.01	40.333931	-104.811442	1,365,237.12	3,191,955.46
7,085.00	56.74	63.55	6,945.49	549.78	468.06	40.333979	-104.811316	1,365,254.88	3,191,990.51
7,132.00	61.18	64.50	6,969.71	567.40	504.25	40.334027	-104.811186	1,365,272.50	3,192,026.71
7,180.00	64.73	64.92	6,991.54	585.66	542.90	40.334076	-104.811047	1,365,290.76	3,192,065.35
7,227.00	66.32	66.19	7,011.01	603.36	581.84	40.334124	-104.810907	1,365,308.46	3,192,104.29
7,275.00	66.54	70.06	7,030.21	619.75	622.66	40.334168	-104.810760	1,365,324.84	3,192,145.11
7,322.00	69.45	75.49	7,047.83	632.62	664.26	40.334202	-104.810610	1,365,337.72	3,192,186.71
7,370.00	73.66	80.96	7,063.02	641.88	708.82	40.334227	-104.810450	1,365,346.98	3,192,231.26
7,417.00	76.79	87.35	7,075.02	646.49	754.00	40.334239	-104.810288	1,365,351.59	3,192,276.44
7,482.00	82.28	92.70	7,086.83	646.43	817.86	40.334237	-104.810059	1,365,351.53	3,192,340.31
7,560.00	86.36	94.46	7,094.55	641.58	895.31	40.334222	-104.809781	1,365,346.68	3,192,417.75

Design Report for Shable K08-69HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
7,623.00	87.26	94.59	7,098.05	636.62	958.02	40.334207	-104.809556	1,365,341.72	3,192,480.45
7,718.00	89.78	93.51	7,100.51	629.92	1,052.74	40.334187	-104.809217	1,365,335.01	3,192,575.17
7,813.00	90.12	93.33	7,100.59	624.25	1,147.57	40.334169	-104.808877	1,365,329.35	3,192,670.00
7,908.00	90.92	93.40	7,099.73	618.67	1,242.40	40.334152	-104.808537	1,365,323.77	3,192,764.82
8,003.00	91.11	92.08	7,098.04	614.13	1,337.27	40.334137	-104.808197	1,365,319.23	3,192,859.69
8,097.00	91.76	91.71	7,095.69	611.02	1,431.19	40.334127	-104.807860	1,365,316.12	3,192,953.61
8,192.00	90.71	90.98	7,093.64	608.80	1,526.14	40.334119	-104.807519	1,365,313.89	3,193,048.55
8,287.00	89.91	91.81	7,093.13	606.48	1,621.11	40.334110	-104.807179	1,365,311.58	3,193,143.52
8,381.00	88.92	92.44	7,094.09	603.00	1,715.04	40.334099	-104.806842	1,365,308.10	3,193,237.44
8,476.00	88.95	92.55	7,095.85	598.86	1,809.93	40.334085	-104.806502	1,365,303.96	3,193,332.33
8,571.00	89.35	93.02	7,097.26	594.25	1,904.81	40.334070	-104.806162	1,365,299.35	3,193,427.21
8,665.00	89.57	92.78	7,098.15	589.49	1,998.69	40.334055	-104.805825	1,365,294.59	3,193,521.08
8,760.00	89.29	92.46	7,099.09	585.15	2,093.58	40.334041	-104.805485	1,365,290.25	3,193,615.97
8,854.00	90.31	91.13	7,099.42	582.21	2,187.53	40.334031	-104.805148	1,365,287.30	3,193,709.92
8,949.00	90.34	90.71	7,098.88	580.68	2,282.52	40.334025	-104.804807	1,365,285.78	3,193,804.90
9,044.00	90.68	91.43	7,098.04	578.91	2,377.50	40.334018	-104.804467	1,365,284.01	3,193,899.87
9,138.00	91.23	91.36	7,096.47	576.62	2,471.46	40.334010	-104.804130	1,365,281.72	3,193,993.83
9,233.00	91.63	90.48	7,094.10	575.09	2,566.41	40.334004	-104.803789	1,365,280.19	3,194,088.78
9,328.00	90.49	91.24	7,092.34	573.67	2,661.38	40.333998	-104.803449	1,365,278.77	3,194,183.75
9,423.00	89.38	90.20	7,092.45	572.47	2,756.37	40.333992	-104.803108	1,365,277.57	3,194,278.73
9,517.00	89.51	89.38	7,093.36	572.82	2,850.37	40.333991	-104.802771	1,365,277.92	3,194,372.72
9,612.00	91.36	88.36	7,092.64	574.69	2,945.34	40.333994	-104.802430	1,365,279.79	3,194,467.69
9,707.00	90.96	87.82	7,090.72	577.86	3,040.27	40.334001	-104.802089	1,365,282.96	3,194,562.62
9,801.00	88.34	90.47	7,091.29	579.26	3,134.24	40.334003	-104.801752	1,365,284.36	3,194,656.58
9,896.00	89.17	90.55	7,093.35	578.41	3,229.21	40.333998	-104.801412	1,365,283.51	3,194,751.55
9,991.00	89.63	90.61	7,094.35	577.45	3,324.20	40.333994	-104.801071	1,365,282.55	3,194,846.54
10,086.00	88.58	90.76	7,095.83	576.32	3,419.18	40.333989	-104.800730	1,365,281.42	3,194,941.51
10,180.00	89.01	90.01	7,097.81	575.69	3,513.16	40.333985	-104.800393	1,365,280.79	3,195,035.49
10,275.00	89.82	90.52	7,098.78	575.25	3,608.15	40.333982	-104.800053	1,365,280.35	3,195,130.47
10,370.00	88.18	91.89	7,100.44	573.25	3,703.11	40.333974	-104.799712	1,365,278.35	3,195,225.43
10,464.00	89.48	91.41	7,102.36	570.54	3,797.05	40.333965	-104.799375	1,365,275.64	3,195,319.37
10,559.00	88.80	91.24	7,103.78	568.35	3,892.01	40.333956	-104.799035	1,365,273.45	3,195,414.32
10,654.00	89.85	91.07	7,104.90	566.43	3,986.99	40.333949	-104.798694	1,365,271.53	3,195,509.29
10,754.00	89.51	92.49	7,105.46	563.33	4,086.93	40.333938	-104.798336	1,365,268.43	3,195,609.24
10,849.00	88.09	92.61	7,107.45	559.10	4,181.82	40.333925	-104.797995	1,365,264.20	3,195,704.12
10,944.00	89.26	93.06	7,109.65	554.40	4,276.67	40.333910	-104.797655	1,365,259.50	3,195,798.97
11,039.00	90.22	92.76	7,110.08	549.58	4,371.55	40.333895	-104.797315	1,365,254.68	3,195,893.84
11,134.00	88.77	93.07	7,110.92	544.75	4,466.42	40.333879	-104.796975	1,365,249.85	3,195,988.71
11,228.00	88.98	93.79	7,112.76	539.13	4,560.23	40.333862	-104.796639	1,365,244.23	3,196,082.51
11,320.00	88.71	93.21	7,114.62	533.51	4,652.04	40.333844	-104.796310	1,365,238.61	3,196,174.32
11,413.00	88.24	88.59	7,117.09	532.05	4,744.97	40.333838	-104.795976	1,365,237.15	3,196,267.25
11,504.00	89.14	87.75	7,119.17	534.96	4,835.90	40.333844	-104.795650	1,365,240.06	3,196,358.17

Design Report for Shable K08-69HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
11,596.00	90.46	89.96	7,119.49	536.79	4,927.87	40.333847	-104.795320	1,365,241.90	3,196,450.14
11,687.00	91.67	92.19	7,117.80	535.09	5,018.83	40.333841	-104.794994	1,365,240.19	3,196,541.10
11,779.00	90.03	92.14	7,116.44	531.61	5,110.75	40.333829	-104.794664	1,365,236.71	3,196,633.01
11,870.00	89.38	91.28	7,116.91	528.90	5,201.71	40.333820	-104.794338	1,365,234.00	3,196,723.97
11,962.00	90.77	91.54	7,116.79	526.63	5,293.68	40.333811	-104.794008	1,365,231.74	3,196,815.93
12,055.00	90.59	91.37	7,115.68	524.27	5,386.64	40.333803	-104.793675	1,365,229.37	3,196,908.89
12,147.00	90.46	90.41	7,114.84	522.84	5,478.63	40.333797	-104.793345	1,365,227.95	3,197,000.87
12,238.00	90.71	90.10	7,113.91	522.44	5,569.62	40.333794	-104.793019	1,365,227.54	3,197,091.86
12,330.00	90.37	91.69	7,113.04	521.00	5,661.60	40.333788	-104.792689	1,365,226.10	3,197,183.84
12,422.00	90.31	90.86	7,112.50	518.95	5,753.58	40.333780	-104.792359	1,365,224.06	3,197,275.81
12,514.00	89.78	92.18	7,112.42	516.51	5,845.54	40.333772	-104.792029	1,365,221.62	3,197,367.77
12,607.00	90.25	91.91	7,112.40	513.20	5,938.48	40.333760	-104.791696	1,365,218.30	3,197,460.71
12,699.00	88.71	91.54	7,113.24	510.43	6,030.44	40.333751	-104.791366	1,365,215.53	3,197,552.66
12,792.00	88.71	91.90	7,115.33	507.64	6,123.37	40.333741	-104.791033	1,365,212.74	3,197,645.59
12,884.00	88.24	90.31	7,117.78	505.86	6,215.32	40.333734	-104.790703	1,365,210.96	3,197,737.53
12,975.00	87.81	90.18	7,120.91	505.47	6,306.26	40.333731	-104.790377	1,365,210.58	3,197,828.47
13,070.00	90.00	90.50	7,122.73	504.91	6,401.24	40.333728	-104.790036	1,365,210.01	3,197,923.44
13,165.00	92.10	92.04	7,120.99	502.80	6,496.19	40.333720	-104.789696	1,365,207.91	3,198,018.39
13,260.00	89.66	91.46	7,119.53	499.90	6,591.13	40.333710	-104.789356	1,365,205.01	3,198,113.32
13,354.00	88.89	89.46	7,120.72	499.15	6,685.11	40.333706	-104.789018	1,365,204.25	3,198,207.30
13,449.00	89.88	92.13	7,121.74	497.83	6,780.09	40.333700	-104.788678	1,365,202.93	3,198,302.28
13,544.00	90.12	92.34	7,121.74	494.13	6,875.01	40.333688	-104.788337	1,365,199.23	3,198,397.20
13,639.00	88.92	92.94	7,122.53	489.75	6,969.91	40.333673	-104.787997	1,365,194.85	3,198,492.09
13,733.00	89.04	91.39	7,124.21	486.20	7,063.82	40.333662	-104.787661	1,365,191.30	3,198,586.00
13,828.00	88.80	90.81	7,126.00	484.38	7,158.79	40.333655	-104.787320	1,365,189.48	3,198,680.96
13,923.00	89.63	90.90	7,127.30	482.96	7,253.77	40.333649	-104.786979	1,365,188.06	3,198,775.94
14,018.00	91.23	91.05	7,126.59	481.34	7,348.75	40.333642	-104.786639	1,365,186.45	3,198,870.91
14,113.00	90.49	90.82	7,125.16	479.79	7,443.72	40.333636	-104.786298	1,365,184.90	3,198,965.89
14,207.00	89.08	92.39	7,125.51	477.16	7,537.68	40.333626	-104.785961	1,365,182.26	3,199,059.84
14,303.00	89.04	92.57	7,127.09	473.01	7,633.58	40.333613	-104.785617	1,365,178.11	3,199,155.73
14,397.00	89.51	92.00	7,128.28	469.26	7,727.50	40.333600	-104.785281	1,365,174.36	3,199,249.64
14,492.00	90.40	91.39	7,128.35	466.45	7,822.45	40.333591	-104.784940	1,365,171.55	3,199,344.60
14,587.00	89.32	91.75	7,128.58	463.85	7,917.41	40.333581	-104.784600	1,365,168.95	3,199,439.56
14,682.00	90.09	91.27	7,129.07	461.34	8,012.38	40.333572	-104.784259	1,365,166.45	3,199,534.52
14,776.00	91.63	91.78	7,127.66	458.84	8,106.33	40.333563	-104.783922	1,365,163.95	3,199,628.47
14,871.00	90.68	91.66	7,125.75	455.99	8,201.27	40.333554	-104.783582	1,365,161.10	3,199,723.40
14,936.00	90.19	91.51	7,125.25	454.19	8,266.24	40.333547	-104.783349	1,365,159.30	3,199,788.37
15,031.00	90.25	91.78	7,124.89	451.47	8,361.20	40.333538	-104.783008	1,365,156.57	3,199,883.33
15,126.00	89.23	91.50	7,125.32	448.75	8,456.16	40.333528	-104.782668	1,365,153.85	3,199,978.28
15,221.00	90.25	90.44	7,125.75	447.14	8,551.14	40.333521	-104.782327	1,365,152.24	3,200,073.26
15,316.00	88.43	91.53	7,126.85	445.51	8,646.12	40.333515	-104.781986	1,365,150.61	3,200,168.23
15,410.00	88.98	91.09	7,128.97	443.36	8,740.07	40.333507	-104.781649	1,365,148.46	3,200,262.18

Design Report for Shable K08-69HN - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Geographic Coordinates		UTM Coordinates	
				+N/-S (usft)	+E/-W (usft)	Latitude (usft)	Longitude (usft)	Northing (usft)	Easting (usft)
15,505.00	89.54	91.73	7,130.20	441.02	8,835.03	40.333498	-104.781309	1,365,146.13	3,200,357.13
15,600.00	90.89	92.22	7,129.84	437.75	8,929.97	40.333487	-104.780968	1,365,142.85	3,200,452.07
15,695.00	88.83	90.83	7,130.07	435.22	9,024.93	40.333478	-104.780628	1,365,140.32	3,200,547.03
15,790.00	89.57	90.05	7,131.40	434.49	9,119.92	40.333474	-104.780287	1,365,139.60	3,200,642.01
15,885.00	89.32	89.23	7,132.32	435.09	9,214.91	40.333474	-104.779947	1,365,140.19	3,200,737.00
15,980.00	89.60	89.19	7,133.22	436.40	9,309.90	40.333475	-104.779606	1,365,141.50	3,200,831.98
16,075.00	88.89	88.03	7,134.47	438.70	9,404.86	40.333479	-104.779265	1,365,143.81	3,200,926.94
16,170.00	89.41	88.35	7,135.88	441.70	9,499.80	40.333485	-104.778925	1,365,146.81	3,201,021.87
16,264.00	89.14	89.58	7,137.07	443.40	9,593.77	40.333488	-104.778587	1,365,148.50	3,201,115.85
16,359.00	89.72	90.69	7,138.01	443.18	9,688.77	40.333485	-104.778247	1,365,148.28	3,201,210.84
16,454.00	89.63	93.40	7,138.55	439.79	9,783.70	40.333474	-104.777906	1,365,144.89	3,201,305.76
16,542.00	90.68	93.32	7,138.31	434.63	9,871.54	40.333458	-104.777591	1,365,139.73	3,201,393.60
16,636.00	90.18	93.41	7,137.61	429.11	9,965.38	40.333440	-104.777255	1,365,134.22	3,201,487.43
16,731.00	89.17	93.60	7,138.15	423.30	10,060.20	40.333422	-104.776915	1,365,128.41	3,201,582.25
16,826.00	88.15	93.41	7,140.37	417.50	10,154.99	40.333404	-104.776575	1,365,122.60	3,201,677.04
16,921.00	88.83	93.33	7,142.87	411.91	10,249.80	40.333387	-104.776235	1,365,117.02	3,201,771.84
17,016.00	89.41	92.75	7,144.33	406.88	10,344.65	40.333371	-104.775895	1,365,111.98	3,201,866.69
17,110.00	90.34	92.80	7,144.53	402.33	10,438.54	40.333356	-104.775559	1,365,107.43	3,201,960.57
17,205.00	89.91	92.13	7,144.33	398.24	10,533.45	40.333343	-104.775218	1,365,103.35	3,202,055.48
17,300.00	90.09	92.13	7,144.33	394.71	10,628.38	40.333331	-104.774878	1,365,099.82	3,202,150.41
17,395.00	91.51	92.17	7,143.00	391.15	10,723.31	40.333319	-104.774538	1,365,096.25	3,202,245.33
17,490.00	91.63	91.87	7,140.40	387.80	10,818.21	40.333308	-104.774197	1,365,092.91	3,202,340.23
17,590.00	91.91	91.60	7,137.31	384.77	10,918.12	40.333297	-104.773839	1,365,089.88	3,202,440.13
17,656.00	91.91	91.60	7,135.11	382.93	10,984.05	40.333291	-104.773603	1,365,088.04	3,202,506.07

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
723.00	723.00	1.38	-0.18	First MWD Survey
17,590.00	7,137.31	384.77	10,918.12	Last MWD Survey
17,656.00	7,135.11	382.93	10,984.05	Straight Projection to TD

Design Report for Shable K08-69HN - Actual Surveys

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
Target	Sable K08-69HN BHL_Rev 1	87.89	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
723.00	7,482.00	Intermediate Surveys	MWD+IFR1+MS_WY
7,560.00	17,656.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
634.00	634.00	9 5/8"	9-5/8	13-3/4
7,526.00	7,091.86	7"	7	8-3/4

Design Targets

Shape	Target Name	TVD (°)	Northing (°)	Easting (°)	+N/-S	+E/-W	Created	Updated
-------	-------------	------------	-----------------	----------------	-------	-------	---------	---------

Directional Difficulty Index

Average Dogleg over Survey:	1.53 °/100usft	Maximum Dogleg over Survey:	14.73 °/100usft at 7,417.00 usft
Net Tortosity applicable to Plans:	0.96 °/100usft	Directional Difficulty Index:	6.878

Audit Info

North Reference Sheet for Sec. 7-T4N-R66W (Shable K08-30-A PAD) - Shable K08-69HN - 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=30' @ 4745.00usft (H&P 321). Northing and Easting are relative to Shable K08-69HN

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: 0.99995786

Grid Coordinates of Well: 1,364,705.12 usft N, 3,191,522.48 usft E

Geographical Coordinates of Well: 40° 19' 56.93" N, 104° 48' 46.84" W

Grid Convergence at Surface is: 0.44°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,656.00usft

the Bottom Hole Displacement is 10,990.73usft in the Direction of 88.00° (Grid).

Magnetic Convergence at surface is: -8.11° (10 July 2014, , BGGM2014)

