

# Noble Energy

Weld County, CO (NAD 83)

Sec. 1-T6N-R63W (Crow Creek 1/AA01 PAD)

Crow Creek AA01-789

05-123-40166

Original Wellbore

Design: Actual Surveys

## Sperry Drilling Services

### Final Survey Report

19 January, 2015

Surface UWI : 05-123-40166

Well Coordinates: 1,434,938.91 N, 3,307,892.55 E (40° 31' 19.31" N, 104° 23' 32.93" W)

Ground Level: 4,796.00 usft

Local Coordinate Origin:

Centered on Well Crow Creek AA01-789

Viewing Datum:

KB=24 @ 4820.00usft (H&P 315)

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. 1-T6N-R63W (Crow Creek 1/AA01 PAD)  
Well: Crow Creek AA01-789  
Wellbore: Original Wellbore  
Design: Actual Surveys



Platted SHL: 290' FNL, 500' FWL  
Platted Lat/Long: 40.52203 N, 104.39248 W  
Location: Sec. 1-T6N-R63W

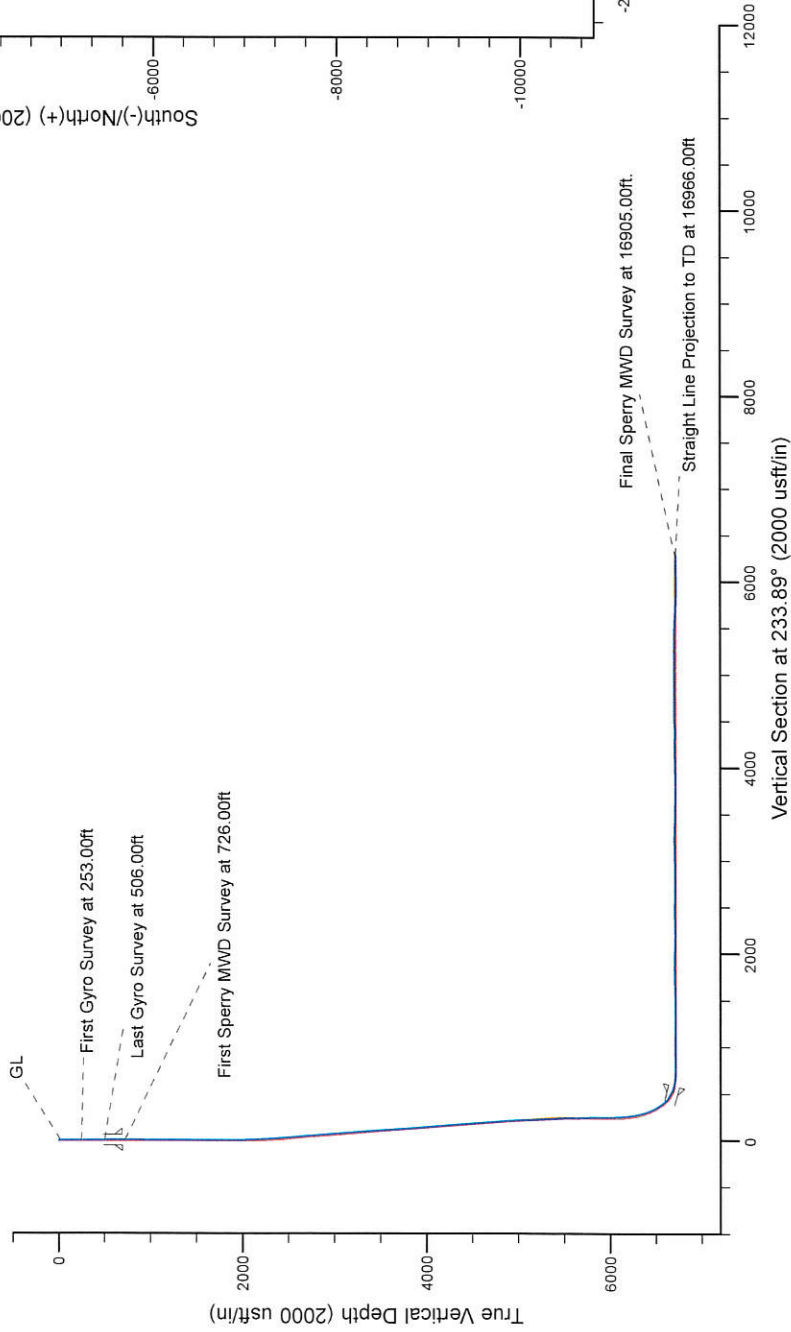
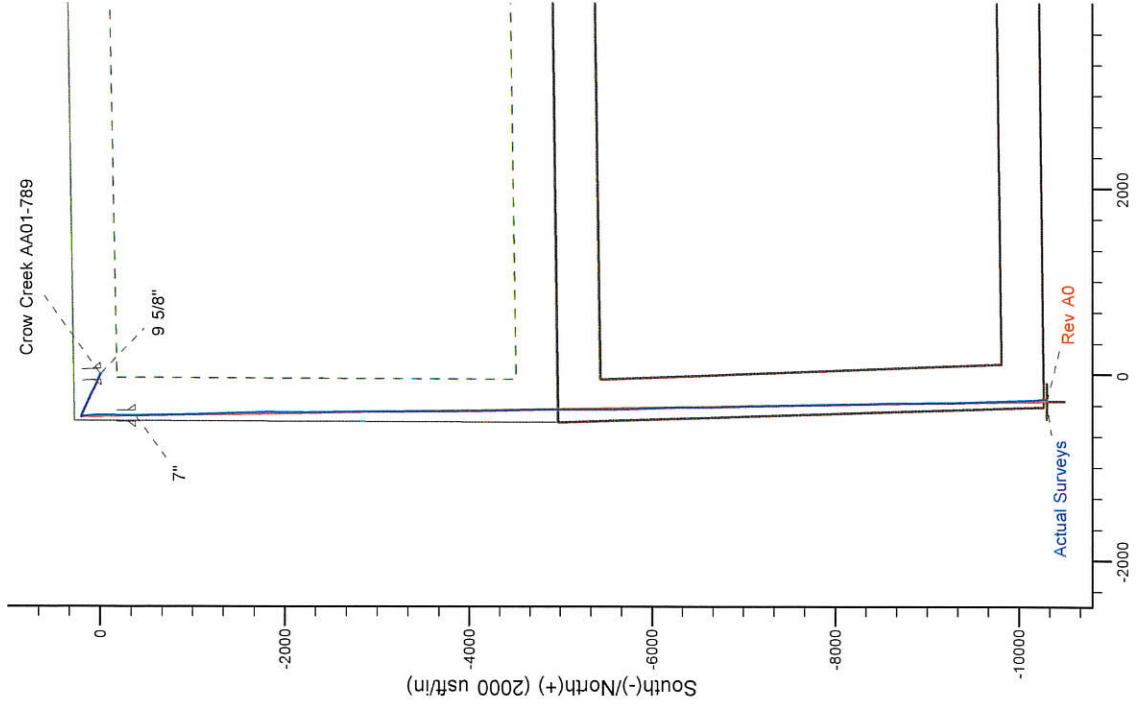
~7" Casing: 660' FNL, 63' FWL  
Lat/Long: 40.521010 N, 104.394114 W  
State Planes - CO Northern: 1,434,561.52 N, 3,307,443.07 E  
Location: Sec. 1-T6N-R63W

Platted BHL: 30' FNL, 60' FWL  
Lat/Long: 40.49376 N, 104.39398 W  
State Planes - CO Northern: 1,424,699.42 N, 3,307,619.98 E  
Location: Sec. 13-T6N-R63W

**LEGEND**

Crow Creek AA01-789, Original Wellbore, Rev A0 V0

Actual Surveys



WELL DETAILS: Crow Creek AA01-789
Ground Level: 4796.00
KB=24 @ 4820.00usft (H&P 315)
Created By: Tatiana Gomez
Created On: 1/19/2015

## Design Report for Crow Creek AA01-789 - 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
253.00	1.00	175.75	252.99	-2.20	0.16	1.17	0.40
First Gyro Survey at 253.00ft							
506.00	0.30	142.35	505.97	-4.93	0.73	2.31	0.30
Last Gyro Survey at 506.00ft							
695.00	0.39	177.52	694.97	-5.97	1.06	2.66	0.12
9 5/8"							
726.00	0.42	181.39	725.97	-6.19	1.06	2.79	0.12
First Sperry MWD Survey at 726.00ft							
819.00	0.38	166.84	818.96	-6.83	1.13	3.12	0.12
912.00	0.46	167.24	911.96	-7.50	1.28	3.38	0.09
1,006.00	0.67	317.71	1,005.96	-7.46	0.99	3.59	1.16
1,098.00	0.63	333.24	1,097.95	-6.61	0.40	3.57	0.20
1,191.00	0.68	341.69	1,190.95	-5.63	0.00	3.32	0.12
1,283.00	0.83	333.33	1,282.94	-4.51	-0.47	3.04	0.20
1,376.00	0.77	342.57	1,375.93	-3.32	-0.96	2.73	0.15
1,468.00	0.97	352.50	1,467.92	-1.95	-1.25	2.16	0.27
1,560.00	0.83	349.12	1,559.91	-0.53	-1.48	1.50	0.16
1,653.00	0.90	334.82	1,652.90	0.80	-1.91	1.08	0.24
1,747.00	0.81	322.52	1,746.89	1.99	-2.63	0.95	0.22
1,841.00	0.75	332.91	1,840.88	3.07	-3.32	0.87	0.16
1,935.00	0.79	325.87	1,934.87	4.15	-3.96	0.75	0.11
2,028.00	3.66	295.68	2,027.79	5.97	-7.00	2.13	3.23
2,119.00	5.68	294.73	2,118.49	9.11	-13.70	5.70	2.22
2,212.00	5.58	290.78	2,211.04	12.64	-22.11	10.41	0.43
2,304.00	7.24	295.36	2,302.46	16.71	-31.53	15.62	1.89
2,397.00	6.86	296.90	2,394.76	21.73	-41.78	20.94	0.46
2,492.00	8.77	289.11	2,488.87	26.67	-53.69	27.65	2.29
2,587.00	8.51	289.48	2,582.79	31.39	-67.16	35.75	0.28
2,681.00	8.91	292.38	2,675.71	36.48	-80.44	43.49	0.63
2,776.00	8.60	290.66	2,769.60	41.78	-93.89	51.22	0.43
2,871.00	8.51	289.35	2,863.55	46.62	-107.17	59.10	0.23
2,966.00	8.95	295.94	2,957.45	52.18	-120.45	66.55	1.15
3,061.00	9.08	294.67	3,051.27	58.54	-133.91	73.67	0.25
3,156.00	9.19	299.36	3,145.07	65.39	-147.33	80.48	0.79
3,251.00	8.81	297.97	3,238.90	72.52	-160.37	86.81	0.46
3,346.00	8.10	296.49	3,332.87	78.92	-172.78	93.07	0.78
3,441.00	7.23	296.07	3,427.02	84.53	-184.14	98.93	0.92
3,536.00	8.45	299.12	3,521.13	90.56	-195.61	104.65	1.36
3,631.00	8.01	298.93	3,615.15	97.16	-207.50	110.37	0.46
3,726.00	9.55	296.42	3,709.03	103.86	-220.35	116.79	1.67
3,820.00	10.20	296.16	3,801.64	111.00	-234.81	124.26	0.69
3,915.00	10.45	296.76	3,895.10	118.59	-250.05	132.10	0.29
4,010.00	10.90	296.28	3,988.46	126.45	-265.80	140.19	0.48
4,105.00	10.34	294.98	4,081.83	134.02	-281.58	148.48	0.64
4,200.00	10.13	294.08	4,175.32	141.03	-296.93	156.75	0.28
4,295.00	9.22	292.63	4,268.97	147.37	-311.59	164.85	0.99
4,389.00	8.00	291.80	4,361.91	152.70	-324.61	172.23	1.30
4,483.00	7.48	288.54	4,455.05	157.07	-336.48	179.25	0.72
4,578.00	7.35	292.44	4,549.26	161.36	-347.96	186.00	0.55



## Design Report for Crow Creek AA01-789 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,672.00	7.01	294.46	4,642.52	166.03	-358.74	191.95	0.45
4,767.00	8.24	295.41	4,736.68	171.35	-370.17	198.04	1.30
4,861.00	8.69	301.18	4,829.66	177.92	-382.33	204.00	1.02
4,956.00	7.66	298.32	4,923.69	184.64	-394.04	209.50	1.17
5,051.00	8.78	296.40	5,017.71	190.86	-406.11	215.58	1.21
5,146.00	7.92	296.00	5,111.70	196.96	-418.49	221.99	0.91
5,240.00	6.49	293.67	5,204.96	201.93	-429.18	227.69	1.55
5,335.00	5.28	293.62	5,299.46	205.84	-438.10	232.59	1.27
5,430.00	4.29	295.67	5,394.12	209.13	-445.31	236.48	1.06
5,525.00	3.08	297.40	5,488.93	211.84	-450.77	239.30	1.28
5,620.00	1.42	280.90	5,583.85	213.24	-454.20	241.24	1.86
5,714.00	1.11	247.75	5,677.83	213.11	-456.18	242.91	0.83
5,809.00	1.04	240.63	5,772.81	212.34	-457.79	244.66	0.16
5,904.00	0.85	238.46	5,867.80	211.55	-459.14	246.22	0.20
5,999.00	0.73	240.23	5,962.79	210.88	-460.26	247.53	0.13
6,043.00	0.69	245.15	6,006.79	210.63	-460.75	248.07	0.17
6,189.00	9.14	168.34	6,152.15	198.88	-459.20	253.74	6.17
6,237.00	14.21	169.64	6,199.15	189.35	-457.37	257.88	10.58
6,284.00	18.16	172.18	6,244.27	176.41	-455.33	263.86	8.54
6,332.00	22.88	171.05	6,289.22	159.77	-452.86	271.67	9.87
6,379.00	27.60	170.65	6,331.72	139.99	-449.67	280.75	10.05
6,427.00	32.47	175.49	6,373.27	116.16	-446.85	292.52	11.32
6,473.00	35.16	178.05	6,411.48	90.61	-445.43	306.43	6.62
6,521.00	38.15	178.28	6,449.99	61.97	-444.51	322.57	6.24
6,568.00	42.51	177.76	6,485.81	31.58	-443.45	339.63	9.30
6,616.00	45.05	179.17	6,520.46	-1.62	-442.57	358.48	5.67
6,663.00	49.17	180.09	6,552.44	-36.05	-442.36	378.60	8.88
6,711.00	54.89	179.90	6,581.96	-73.87	-442.35	400.89	11.92
6,758.00	60.47	181.24	6,607.08	-113.57	-442.76	424.62	12.11
6,806.00	64.49	182.34	6,629.26	-156.11	-444.10	450.77	8.62
6,853.00	67.66	183.73	6,648.32	-199.00	-446.38	477.90	7.27
6,901.00	71.73	181.98	6,664.97	-243.95	-448.61	506.19	9.14
6,948.00	75.84	180.48	6,678.09	-289.06	-449.58	533.56	9.27
6,988.00	79.25	179.94	6,686.72	-328.11	-449.72	556.69	8.63
7,038.00	81.55	179.53	6,695.06	-377.41	-449.49	585.56	4.66
7"							
7,120.00	85.31	178.88	6,704.44	-458.85	-448.36	632.65	4.66
7,215.00	87.93	179.42	6,710.04	-553.66	-446.96	687.40	2.82
7,310.00	89.14	179.20	6,712.47	-648.62	-445.81	742.44	1.29
7,404.00	89.01	178.90	6,713.99	-742.60	-444.25	796.57	0.35
7,499.00	89.82	177.90	6,714.96	-837.55	-441.60	850.40	1.35
7,594.00	91.11	178.02	6,714.19	-932.49	-438.22	903.62	1.36
7,689.00	91.48	177.78	6,712.04	-1,027.40	-434.74	956.75	0.46
7,784.00	90.18	178.94	6,710.66	-1,122.35	-432.02	1,010.52	1.83
7,878.00	89.82	178.51	6,710.66	-1,216.32	-429.93	1,064.22	0.60
7,973.00	90.34	178.31	6,710.53	-1,311.29	-427.29	1,118.06	0.59
8,068.00	89.63	178.85	6,710.56	-1,406.26	-424.94	1,172.13	0.94
8,163.00	89.91	177.84	6,710.94	-1,501.21	-422.20	1,225.88	1.10
8,258.00	89.75	176.92	6,711.22	-1,596.11	-417.85	1,278.31	0.98
8,353.00	89.97	178.21	6,711.45	-1,691.03	-413.82	1,330.99	1.38
8,447.00	89.85	178.73	6,711.60	-1,784.99	-411.31	1,384.34	0.57

## Design Report for Crow Creek AA01-789 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,542.00	90.28	181.27	6,711.49	-1,879.98	-411.31	1,440.33	2.71
8,637.00	89.97	180.68	6,711.28	-1,974.97	-412.93	1,497.62	0.70
8,732.00	90.89	180.33	6,710.57	-2,069.96	-413.76	1,554.29	1.04
8,827.00	90.37	180.02	6,709.53	-2,164.95	-414.05	1,610.51	0.64
8,922.00	90.74	179.63	6,708.61	-2,259.95	-413.76	1,666.27	0.57
9,017.00	91.05	179.51	6,707.12	-2,354.94	-413.05	1,721.67	0.35
9,112.00	91.39	179.04	6,705.10	-2,449.91	-411.85	1,776.68	0.61
9,207.00	89.48	179.29	6,704.38	-2,544.89	-410.46	1,831.54	2.03
9,301.00	90.15	179.01	6,704.68	-2,638.88	-409.07	1,885.81	0.77
9,396.00	90.09	178.58	6,704.48	-2,733.86	-407.07	1,940.18	0.46
9,491.00	88.06	178.16	6,706.02	-2,828.80	-404.37	1,993.96	2.18
9,586.00	87.97	179.44	6,709.31	-2,923.72	-402.38	2,048.30	1.35
9,681.00	88.86	179.04	6,711.94	-3,018.67	-401.12	2,103.25	1.03
9,776.00	90.99	180.63	6,712.06	-3,113.66	-400.85	2,159.01	2.80
9,871.00	91.02	180.59	6,710.39	-3,208.64	-401.86	2,215.81	0.05
9,966.00	90.34	180.38	6,709.27	-3,303.63	-402.66	2,272.45	0.75
10,061.00	90.40	180.19	6,708.65	-3,398.63	-403.14	2,328.82	0.21
10,156.00	90.80	180.24	6,707.66	-3,493.62	-403.49	2,385.10	0.42
10,250.00	91.26	180.32	6,705.97	-3,587.61	-403.95	2,440.86	0.50
10,345.00	89.51	179.30	6,705.33	-3,682.60	-403.64	2,496.60	2.13
10,439.00	89.45	179.24	6,706.18	-3,776.59	-402.44	2,551.02	0.09
10,531.00	89.54	179.19	6,706.99	-3,868.58	-401.18	2,604.22	0.11
10,624.00	89.63	179.18	6,707.67	-3,961.56	-399.86	2,657.96	0.10
10,716.00	89.85	179.43	6,708.08	-4,053.56	-398.74	2,711.28	0.36
10,810.00	89.57	179.33	6,708.56	-4,147.55	-397.72	2,765.86	0.32
10,903.00	89.35	178.69	6,709.44	-4,240.53	-396.12	2,819.36	0.73
10,996.00	89.23	177.45	6,710.59	-4,333.47	-392.98	2,871.61	1.34
11,087.00	90.09	177.71	6,711.13	-4,424.39	-389.14	2,922.09	0.99
11,180.00	90.77	178.96	6,710.43	-4,517.34	-386.44	2,974.70	1.53
11,272.00	91.14	178.32	6,708.90	-4,609.30	-384.26	3,027.14	0.80
11,365.00	90.71	179.01	6,707.40	-4,702.26	-382.09	3,080.18	0.87
11,458.00	91.08	178.97	6,705.94	-4,795.24	-380.45	3,133.65	0.40
11,551.00	90.15	179.60	6,704.95	-4,888.22	-379.29	3,187.52	1.21
11,646.00	90.49	179.43	6,704.42	-4,983.22	-378.49	3,242.86	0.40
11,740.00	90.03	180.30	6,703.99	-5,077.22	-378.27	3,298.08	1.05
11,832.00	89.01	180.78	6,704.76	-5,169.21	-379.13	3,353.00	1.23
11,924.00	88.98	180.77	6,706.37	-5,261.19	-380.38	3,408.22	0.03
12,016.00	88.67	180.47	6,708.26	-5,353.16	-381.37	3,463.23	0.47
12,108.00	89.32	179.31	6,709.87	-5,445.14	-381.19	3,517.31	1.45
12,201.00	88.98	179.12	6,711.25	-5,538.13	-379.92	3,571.08	0.42
12,294.00	88.80	178.93	6,713.05	-5,631.09	-378.34	3,624.60	0.28
12,385.00	88.52	179.24	6,715.18	-5,722.06	-376.89	3,677.04	0.46
12,478.00	90.31	177.06	6,716.13	-5,814.99	-373.88	3,729.39	3.03
12,572.00	90.71	176.65	6,715.30	-5,908.85	-368.73	3,780.54	0.61
12,665.00	91.79	177.74	6,713.27	-6,001.71	-364.18	3,831.60	1.65
12,759.00	90.28	179.19	6,711.57	-6,095.66	-361.66	3,884.94	2.23
12,854.00	90.34	178.59	6,711.05	-6,190.64	-359.82	3,939.43	0.63
12,949.00	89.97	178.01	6,710.80	-6,285.60	-357.00	3,993.12	0.72
13,044.00	91.48	179.46	6,709.60	-6,380.56	-354.90	4,047.40	2.20
13,139.00	91.57	179.48	6,707.07	-6,475.52	-354.03	4,102.66	0.10
13,234.00	91.85	180.21	6,704.23	-6,570.48	-353.77	4,158.42	0.82

## Design Report for Crow Creek AA01-789 - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
13,329.00	88.98	180.29	6,703.54	-6,665.47	-354.18	4,214.74	3.02
13,424.00	89.54	179.42	6,704.77	-6,760.46	-353.94	4,270.53	1.09
13,519.00	88.89	178.08	6,706.07	-6,855.42	-351.87	4,324.83	1.57
13,614.00	89.32	176.57	6,707.56	-6,950.30	-347.44	4,377.18	1.65
13,709.00	90.89	178.84	6,707.38	-7,045.22	-343.63	4,430.05	2.91
13,804.00	91.32	178.79	6,705.55	-7,140.18	-341.67	4,484.43	0.46
13,899.00	90.43	179.21	6,704.10	-7,235.15	-340.01	4,539.07	1.04
13,994.00	90.93	179.14	6,702.97	-7,330.14	-338.64	4,593.94	0.53
14,088.00	89.41	179.01	6,702.69	-7,424.12	-337.13	4,648.11	1.62
14,183.00	89.11	178.69	6,703.92	-7,519.09	-335.22	4,702.55	0.46
14,278.00	89.72	179.00	6,704.89	-7,614.07	-333.30	4,756.98	0.72
14,373.00	89.57	178.55	6,705.48	-7,709.05	-331.27	4,811.32	0.50
14,468.00	90.15	179.00	6,705.71	-7,804.02	-329.24	4,865.66	0.77
14,563.00	90.99	178.97	6,704.77	-7,899.00	-327.56	4,920.28	0.88
14,658.00	89.35	179.14	6,704.48	-7,993.99	-325.99	4,975.00	1.74
14,753.00	89.66	179.07	6,705.31	-8,088.97	-324.51	5,029.78	0.33
14,848.00	90.06	178.90	6,705.54	-8,183.95	-322.83	5,084.41	0.46
14,943.00	91.14	179.03	6,704.54	-8,278.93	-321.11	5,139.00	1.15
15,037.00	90.00	178.96	6,703.61	-8,372.91	-319.46	5,193.06	1.22
15,132.00	90.34	177.65	6,703.33	-8,467.87	-316.65	5,246.76	1.42
15,227.00	90.09	178.35	6,702.97	-8,562.81	-313.34	5,300.04	0.78
15,322.00	89.91	178.82	6,702.97	-8,657.78	-310.99	5,354.12	0.53
15,417.00	90.49	180.93	6,702.64	-8,752.77	-310.78	5,409.94	2.30
15,511.00	88.12	180.21	6,703.78	-8,846.75	-311.72	5,466.09	2.64
<b>Wells Ranch AA12-65-1HN_Sec. 12 Lines</b>							
15,518.87	88.15	180.19	6,704.03	-8,854.62	-311.75	5,470.74	0.44
<b>Wells Ranch AA12-65-1HN_Sec. 12 460' Setbacks</b>							
15,606.00	88.46	179.96	6,706.61	-8,941.71	-311.86	5,522.17	0.44
15,701.00	88.71	179.83	6,708.96	-9,036.68	-311.69	5,578.00	0.30
15,796.00	89.29	179.71	6,710.62	-9,131.67	-311.30	5,633.68	0.62
15,891.00	88.55	178.50	6,712.41	-9,226.64	-309.82	5,688.45	1.49
15,986.00	88.58	177.89	6,714.79	-9,321.56	-306.83	5,741.99	0.64
16,081.00	88.80	178.48	6,716.96	-9,416.49	-303.82	5,795.51	0.66
16,176.00	89.38	178.35	6,718.47	-9,511.44	-301.19	5,849.35	0.63
16,271.00	89.82	178.30	6,719.13	-9,606.39	-298.42	5,903.07	0.47
16,366.00	90.25	178.17	6,719.07	-9,701.35	-295.49	5,956.67	0.47
16,460.00	90.89	178.20	6,718.14	-9,795.30	-292.51	6,009.64	0.68
16,555.00	90.86	177.98	6,716.69	-9,890.23	-289.35	6,063.04	0.23
16,650.00	90.46	177.56	6,715.59	-9,985.15	-285.65	6,116.00	0.61
16,745.00	89.94	176.99	6,715.26	-10,080.04	-281.14	6,168.28	0.81
16,840.00	90.15	176.96	6,715.19	-10,174.91	-276.12	6,220.14	0.22
16,905.00	90.22	176.79	6,714.98	-10,239.81	-272.58	6,255.54	0.28
<b>Final Sperry MWD Survey at 16905.00ft.</b>							
16,966.00	90.22	176.79	6,714.74	-10,300.72	-269.16	6,288.67	0.00
<b>Straight Line Projection to TD at 16966.00ft - Crow Creek AA01-789_BHL</b>							



## Design Report for Crow Creek AA01-789 - Actual Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
253.00	252.99	-2.20	0.16	First Gyro Survey at 253.00ft
506.00	505.97	-4.93	0.73	Last Gyro Survey at 506.00ft
726.00	725.97	-6.19	1.06	First Sperry MWD Survey at 726.00ft
16,905.00	6,714.98	-10,239.81	-272.58	Final Sperry MWD Survey at 16905.00ft.
16,966.00	6,714.74	-10,300.72	-269.16	Straight Line Projection to TD at 16966.00ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	233.89	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
253.00	506.00	Surface Surveys	Flexi-Shot
726.00	6,988.00	Intermediate Surveys	MWD+IFR1+MS_WY
7,120.00	16,966.00	Production Surveys	MWD+IFR1+MS_WY

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
695.00	694.97	9 5/8"	9-5/8	13-3/4
7,038.00	6,695.06	7"	7	8-3/4

Wellbore Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Wells Ranch AA12-65-	0.00	0.00	-62.00	-9,064.05	4,702.56	1,425,875.15	3,312,594.96	40.496990	-104.375980
- actual wellpath misses target center by 8424.13usft at 15511.00usft MD (6703.78 TVD, -8846.75 N, -311.72 E)									
- Polygon									
Point 1			-62.00	-689.00	-259.00	1,425,186.17	3,312,335.97		
Point 2			-62.00	-748.00	-4,593.00	1,425,127.18	3,308,002.11		
Point 3			-62.00	3,628.00	-4,759.00	1,429,503.04	3,307,836.11		
Point 4			-62.00	3,701.00	-193.00	1,429,576.03	3,312,401.97		
Point 5			-62.00	-689.00	-259.00	1,425,186.17	3,312,335.97		
Wells Ranch AA12-65-	0.00	0.00	-62.00	-9,064.05	4,702.56	1,425,875.15	3,312,594.96	40.496990	-104.375980
- actual wellpath misses target center by 8424.13usft at 15511.00usft MD (6703.78 TVD, -8846.75 N, -311.72 E)									
- Polygon									
Point 1			-62.00	-1,149.00	201.00	1,424,726.19	3,312,795.95		
Point 2			-62.00	-1,208.00	-5,053.00	1,424,667.19	3,307,542.12		
Point 3			-62.00	4,088.00	-5,219.00	1,429,963.02	3,307,376.13		
Point 4			-62.00	4,161.00	267.00	1,430,036.02	3,312,861.95		
Point 5			-62.00	-1,149.00	201.00	1,424,726.19	3,312,795.95		
Crow Creek AA01-789	0.00	0.00	6,710.00	-10,303.65	-288.54	1,424,635.59	3,307,604.02	40.493760	-104.393980
- actual wellpath misses target center by 20.16usft at 16966.00usft MD (6714.74 TVD, -10300.72 N, -269.16 E)									
- Point									

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**Design Report for Crow Creek AA01-789 - Actual Surveys**

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**Directional Difficulty Index**

Average Dogleg over Survey:	1.34 °/100usft	Maximum Dogleg over Survey:	12.11 °/100usft at 6,758.00 usft
Net Tortosity applicable to Plans:	0.70 °/100usft	Directional Difficulty Index:	6.801

**Audit Info**



## North Reference Sheet for Sec. 1-T6N-R63W (Crow Creek 1/AA01 PAD) - Crow Creek AA01-789 - Original Wellbore

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

Vertical Depths are relative to KB=24 @ 4820.00usft (H&P 315). Northing and Easting are relative to Crow Creek AA01-789

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: 0.99996803

Grid Coordinates of Well: 1,434,938.91 usft N, 3,307,892.55 usft E

Geographical Coordinates of Well: 40° 31' 19.31" N, 104° 23' 32.93" W

Grid Convergence at Surface is: 0.72°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,966.00usft

the Bottom Hole Displacement is 10,304.23usft in the Direction of 181.50° (Grid).

Magnetic Convergence at surface is: -7.59° ( 9 November 2014, , BGGM2014)

