

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 11-T1N-R66W

Griswold 3C-11HZ

05-123-40982

Plan B

Design: Actual Surveys

## Sperry Drilling Services

### Final Report

02 March, 2015

Surface UWI : 05-123-40982

Well Coordinates: 1,265,630.70 N, 3,210,863.82 E (40° 03' 36.31" N, 104° 44' 47.96" W)

Ground Level: 5,143.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Site Sec. 11-T1N-R66W

RKB = 13' @ 5156.00usft (Ensign 145)

N

True

Dec-Deg - API - US Survey Feet - Custom


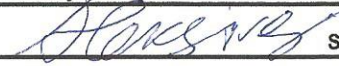
**HALLIBURTON**

# SPERRY-SUN DRILLING SERVICES

## CERTIFIED SURVEY WORK SHEET

OPERATOR:	Anadarko Petroleum Corp
WELL:	Griswold 3C-11HZ
FIELD:	Wattenberg
RIG:	Ensign 145
LEGALS:	Sec 11-T1N-R66W
COUNTY:	Weld
STATE:	Colorado
CAL. METHOD:	Minimum Curvature
MAG. DECL. APPLIED:	8.27
VERTICAL SEC. DIR. :	0.30

SSDS Job Number :	902110445
Start Date of Job :	20-Feb-15
End Date of Job :	1-Mar-15
Lead Directional Driller:	Ryan White
Other SSDS DD's :	Omar Dominguez
	Francisco Pauda
SSDS MWD Engineers :	Aleksey Treskov
	James Ramsay

	Main Hole =====>		1st Side Track =====>		2nd Side Track =====>		3rd Side Track =====>		4th Side Track =====>	
				Tie On		Tie On		Tie On		Tie On
Tie On Point	1728.00	Gyro								
First Survey	1834.00	MWD								
KOP Depth	7195.00	KOP		KOP-ST1		KOP-ST2		KOP-ST3		KOP-ST4
Last Survey Depth	13240.00	MWD								
				MWD		MWD		MWD		MWD
Bit Extrapolation to TD	13281.00	Projection				MWD		MWD		MWD
				T.D.		T.D.		T.D.		T.D.
The following personnel listed below, certify the above survey information to be accurate to the their knowledge. :										
Print Name : Ryan White			Print Name : Omar Dominguez				Print Name : Francisco Pauda			
Sign Name : 			Sign Name :				Sign Name :			
Print Name : Aleksey Treskov			Print Name : James Ramsay				Print Name :			
Sign Name : 			Sign Name :				Sign Name :			
TieOn	Tie On to Surface Casing (Assumed Vertical), Tie On to existing MWD Survey (prior drilled hole)									
MWD	Sperry Sun Drilling Services (SSDS) Measurement While Drilling (MWD) Survey's									
ESS	Sperry Sun Drilling Services (SSDS) Electronic Survey System (ESS) Survey's									
Gyro	Gyro Survey's ; Provided by third party vendor, or by Sperry Sun Drilling Services (SSDS)									
SS	Single Shot (SS) Survey's ; Provided by Sperry Sun Drilling Services (SSDS) or third party vendor.									

Examples of Survey Types:

Project: Weld County, CO (NAD 83)  
 Site: Sec. 11-T1N-R66W  
 Well: Griswold 3C-11HZ  
 Wellbore: Plan B  
 Design: Actual Surveys



**HALLIBURTON**  
 Sperry Drilling

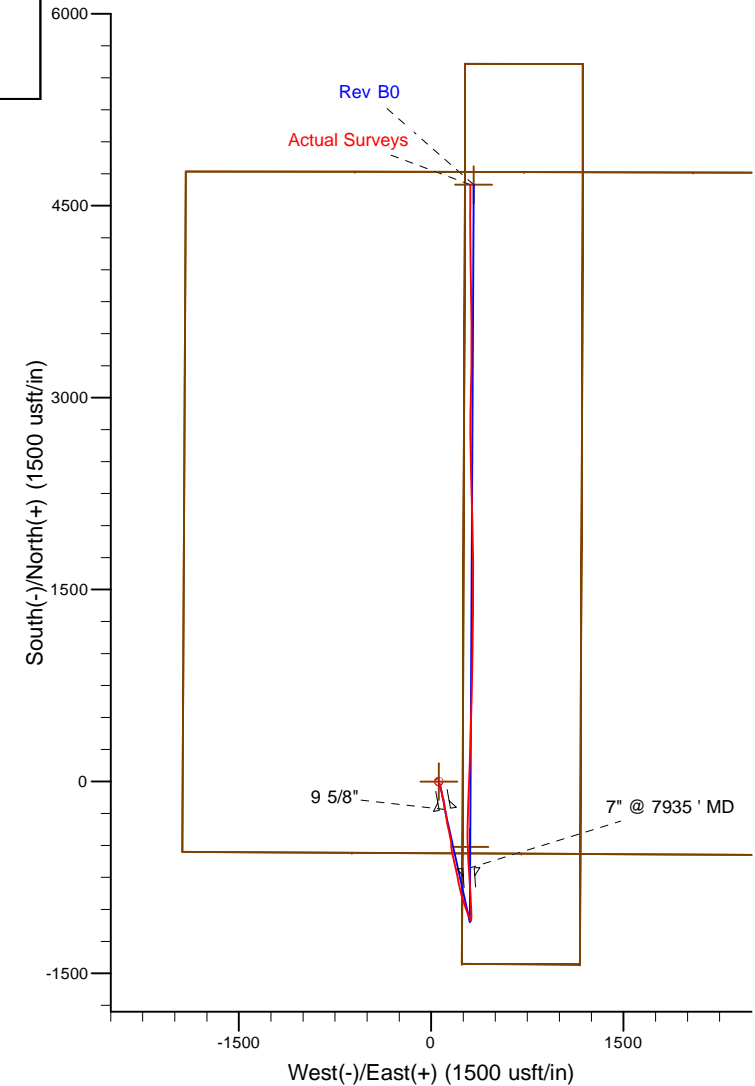
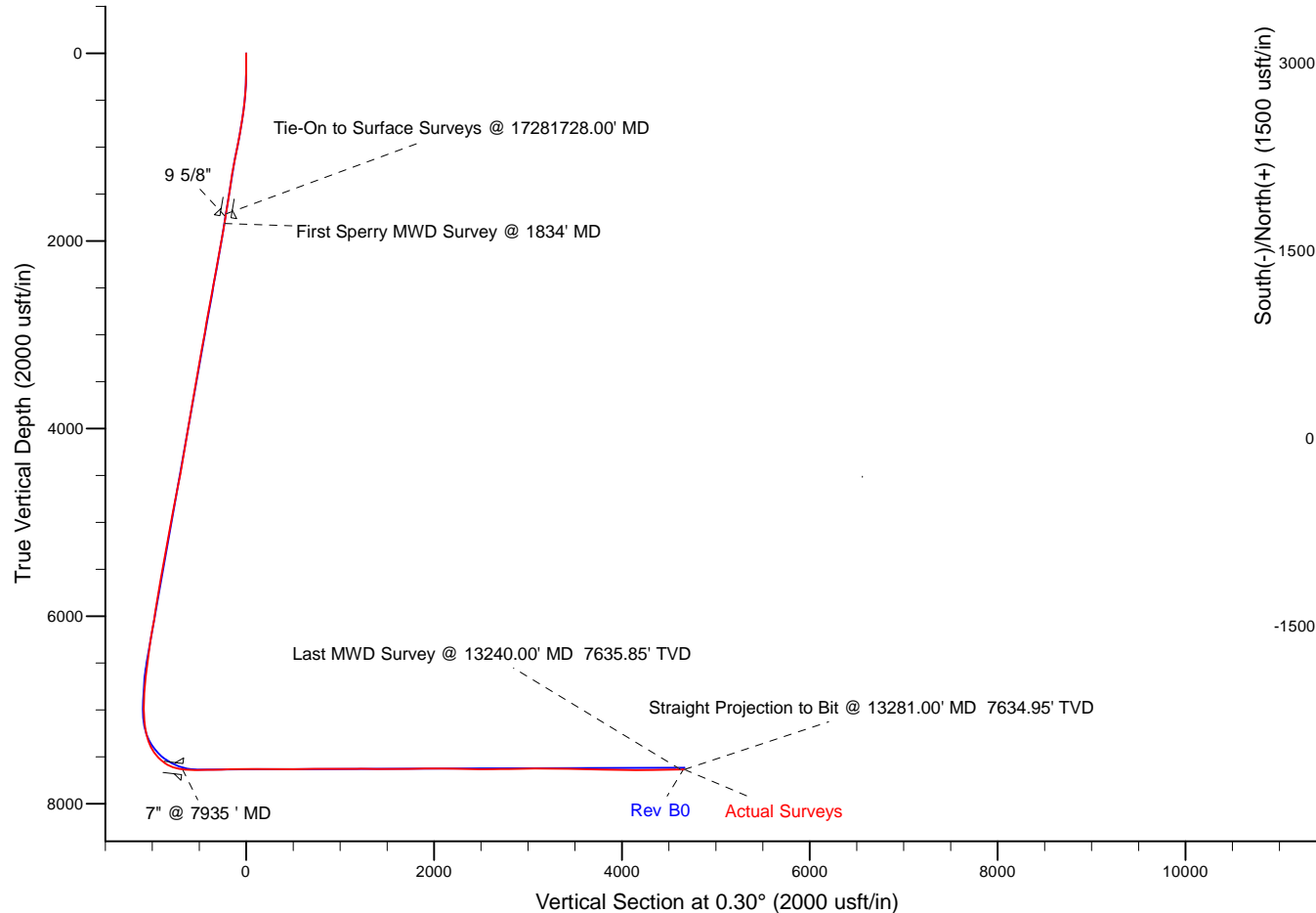
Platted SHL: 560' FSL, 1998' FWL  
 Platted Lat/Long: 40.060087 N, 104.746655 W  
 Location: Sec. 11-T1N-R66W

~ 7" Casing: 124.5' FNL, 2230' FWL  
 Lat/Long: 40.058222N, 104.745823W  
 State Planes - CO Northern: 1264953.49N, 3211102.49E  
 Location: Sec. 14-T1N-R66W

~ BHL: 94.5' FNL, 2217' FWL  
 Lat/Long: 40.072891N, 104.745777W  
 State Planes - CO Northern: 1270296.91N, 3211069.94E  
 Location: Sec. 11-T1N-R66W

# LEGEND

- ✕ Griswold 3C-11HZ, Plan B, Rev B0 V0
- Actual Surveys



WELL DETAILS: Griswold 3C-11HZ

Ground Level: 5143.00  
 RKB = 13' @ 5156.00usft (Ensign 145)

Created By: Gordy Roth  
 Created On: 3/2/15

**Design Report for Griswold 3C-11HZ - 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	-0.03	59.90	0.00	0.00
13.00	0.00	0.00	13.00	-0.03	59.90	0.00	0.00
119.00	0.60	318.90	119.00	0.38	59.54	0.42	0.57
209.00	0.70	170.40	209.00	0.20	59.32	0.23	1.39
295.00	1.70	183.10	294.98	-1.59	59.34	-1.56	1.20
382.00	3.50	169.60	381.88	-5.50	59.75	-5.46	2.17
472.00	5.60	164.20	471.60	-12.42	61.44	-12.38	2.38
566.00	8.00	160.00	564.93	-22.98	64.93	-22.92	2.61
661.00	8.10	159.00	658.99	-35.44	69.59	-35.36	0.18
757.00	9.80	167.20	753.82	-49.73	73.82	-49.62	2.21
852.00	9.80	168.70	847.44	-65.54	77.20	-65.41	0.27
948.00	11.00	165.80	941.86	-82.43	81.04	-82.29	1.36
1,043.00	12.10	170.90	1,034.94	-101.05	84.84	-100.88	1.58
1,139.00	11.60	165.10	1,128.89	-120.31	88.91	-120.13	1.34
1,233.00	11.10	164.50	1,221.05	-138.17	93.76	-137.95	0.55
1,327.00	8.70	169.80	1,313.65	-153.88	97.44	-153.65	2.73
1,423.00	8.20	167.40	1,408.61	-167.71	100.22	-167.47	0.64
1,519.00	8.00	170.90	1,503.65	-180.99	102.77	-180.73	0.55
1,613.00	8.80	176.70	1,596.64	-194.63	104.22	-194.36	1.24
1,728.00	9.80	169.70	1,710.13	-213.04	106.47	-212.76	1.31
<b>Tie-On to Surface Surveys @ 17281728.00' MD</b>							
1,834.00	9.85	170.06	1,814.58	-230.85	109.65	-230.55	0.07
<b>First Sperry MWD Survey @ 1834' MD</b>							
1,927.00	9.99	170.69	1,906.19	-246.64	112.33	-246.33	0.19
2,017.00	9.67	171.09	1,994.87	-261.81	114.76	-261.49	0.36
2,107.00	11.45	171.98	2,083.34	-278.13	117.18	-277.79	1.99
2,197.00	11.02	170.73	2,171.62	-295.46	119.81	-295.11	0.55
2,287.00	10.62	169.17	2,260.02	-312.10	122.76	-311.73	0.55
2,377.00	10.10	168.23	2,348.55	-327.97	125.93	-327.59	0.61
2,467.00	9.45	168.55	2,437.24	-342.94	129.00	-342.54	0.72
2,557.00	10.82	168.22	2,525.83	-358.45	132.19	-358.03	1.52
2,647.00	10.28	166.80	2,614.31	-374.54	135.75	-374.10	0.67
2,737.00	9.59	167.08	2,702.96	-389.66	139.26	-389.21	0.77
2,827.00	11.38	169.38	2,791.46	-405.70	142.57	-405.23	2.04
2,917.00	10.63	167.83	2,879.80	-422.54	145.96	-422.05	0.90
3,007.00	9.81	167.73	2,968.37	-438.15	149.34	-437.64	0.91
3,097.00	10.91	173.03	3,056.91	-454.09	152.00	-453.57	1.62
3,187.00	10.34	173.56	3,145.36	-470.57	153.94	-470.04	0.64
3,277.00	9.59	172.98	3,234.00	-486.04	155.77	-485.50	0.84
3,367.00	10.81	175.06	3,322.58	-501.89	157.41	-501.34	1.42
3,457.00	9.95	175.26	3,411.11	-518.05	158.78	-517.49	0.96
3,547.00	9.28	177.32	3,499.84	-533.05	159.76	-532.48	0.84
3,637.00	9.87	171.31	3,588.59	-547.92	161.26	-547.35	1.29
3,727.00	10.84	167.36	3,677.12	-563.80	164.28	-563.22	1.34
3,817.00	9.74	166.38	3,765.68	-579.46	167.93	-578.85	1.24
3,907.00	8.70	164.54	3,854.51	-593.42	171.53	-592.79	1.20
3,997.00	9.59	166.11	3,943.37	-607.26	175.15	-606.61	1.03
4,088.00	10.61	169.46	4,032.96	-622.85	178.50	-622.19	1.29
4,178.00	9.61	169.98	4,121.56	-638.40	181.32	-637.72	1.12
4,268.00	9.61	164.35	4,210.30	-653.03	184.66	-652.33	1.04

**Design Report for Griswold 3C-11HZ - Actual Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,358.00	10.23	163.76	4,298.95	-667.94	188.92	-667.22	0.70
4,448.00	11.25	165.88	4,387.37	-684.12	193.30	-683.38	1.22
4,538.00	10.37	165.78	4,475.78	-700.49	197.43	-699.73	0.98
4,628.00	12.13	168.97	4,564.04	-717.63	201.23	-716.84	2.07
4,718.00	11.15	173.53	4,652.19	-735.55	204.02	-734.76	1.49
4,808.00	9.90	172.67	4,740.68	-751.88	205.98	-751.07	1.40
4,898.00	11.59	169.65	4,829.10	-768.44	208.60	-767.62	1.98
4,988.00	10.50	169.61	4,917.43	-785.40	211.70	-784.56	1.21
5,079.00	11.28	163.72	5,006.79	-802.10	215.69	-801.24	1.49
5,169.00	10.50	165.36	5,095.17	-818.49	220.23	-817.60	0.93
5,259.00	9.93	167.99	5,183.74	-834.01	223.92	-833.11	0.82
5,349.00	10.62	163.25	5,272.30	-849.54	227.92	-848.62	1.21
5,439.00	9.85	166.78	5,360.87	-864.98	232.07	-864.03	1.10
5,529.00	11.53	166.49	5,449.30	-881.22	235.93	-880.25	1.87
5,619.00	11.07	164.70	5,537.56	-898.30	240.32	-897.31	0.64
5,799.00	9.77	162.27	5,714.59	-929.52	249.53	-928.48	0.76
5,889.00	8.97	160.83	5,803.39	-943.42	254.16	-942.36	0.93
5,979.00	10.20	164.04	5,892.13	-957.71	258.65	-956.62	1.49
6,069.00	9.11	161.06	5,980.85	-972.11	263.16	-971.00	1.33
6,159.00	10.84	156.06	6,069.49	-986.59	268.90	-985.44	2.15
6,249.00	10.82	160.68	6,157.89	-1,002.29	275.13	-1,001.12	0.96
6,339.00	9.92	161.07	6,246.42	-1,017.60	280.44	-1,016.40	1.00
6,429.00	8.51	157.99	6,335.26	-1,031.11	285.45	-1,029.88	1.66
6,519.00	8.52	161.03	6,424.26	-1,043.58	290.12	-1,042.33	0.50
6,609.00	7.62	158.54	6,513.37	-1,055.44	294.47	-1,054.17	1.07
6,699.00	6.70	156.83	6,602.67	-1,065.82	298.72	-1,064.52	1.05
6,789.00	5.87	155.83	6,692.13	-1,074.85	302.67	-1,073.53	0.93
6,879.00	4.65	165.81	6,781.75	-1,082.58	305.44	-1,081.25	1.69
6,969.00	2.33	150.58	6,871.58	-1,087.72	307.24	-1,086.37	2.75
7,059.00	1.23	103.43	6,961.54	-1,089.53	309.08	-1,088.18	1.94
7,149.00	1.18	54.20	7,051.52	-1,089.22	310.77	-1,087.85	1.12
7,239.00	5.81	359.30	7,141.34	-1,084.12	311.46	-1,082.75	5.80
7,329.00	12.09	10.87	7,230.21	-1,070.29	313.19	-1,068.92	7.22
7,421.00	18.03	1.01	7,319.02	-1,046.57	315.26	-1,045.18	7.01
7,448.00	21.03	358.86	7,344.47	-1,037.54	315.23	-1,036.16	11.42
7,511.00	27.76	356.21	7,401.81	-1,011.57	314.04	-1,010.19	10.82
7,556.00	33.04	354.83	7,440.61	-988.88	312.24	-987.51	11.83
7,601.00	37.88	356.80	7,477.25	-962.85	310.36	-961.49	11.05
7,646.00	44.15	356.99	7,511.19	-933.38	308.77	-932.03	13.94
7,691.00	49.87	357.93	7,541.86	-900.51	307.32	-899.17	12.80
7,736.00	55.68	357.43	7,569.07	-864.72	305.86	-863.39	12.94
7,780.00	62.25	356.67	7,591.75	-827.09	303.92	-825.77	15.00
7,825.00	69.82	354.71	7,610.01	-786.12	300.81	-784.82	17.29
7,870.00	77.23	355.96	7,622.77	-743.14	297.31	-741.86	16.68
7,906.00	80.69	355.81	7,629.66	-707.91	294.77	-706.63	9.62
7,992.00	87.26	357.53	7,638.68	-622.57	289.82	-621.33	7.89
8,082.00	89.78	358.53	7,641.01	-532.67	286.72	-531.44	3.01
8,172.00	90.55	359.05	7,640.75	-442.69	284.82	-441.47	1.03
8,262.00	90.65	0.48	7,639.80	-352.70	284.46	-351.48	1.59
8,352.00	92.50	1.81	7,637.33	-262.75	286.25	-261.53	2.53
8,442.00	92.25	1.21	7,633.60	-172.86	288.62	-171.63	0.72

**Design Report for Griswold 3C-11HZ - Actual Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,532.00	90.89	2.05	7,631.14	-82.94	291.18	-81.69	1.78
8,622.00	89.94	2.16	7,630.48	7.00	294.49	8.26	1.06
8,712.00	88.92	2.13	7,631.38	96.93	297.85	98.21	1.13
8,802.00	89.60	2.15	7,632.54	186.86	301.22	188.16	0.76
8,892.00	90.12	2.50	7,632.76	276.79	304.87	278.10	0.70
8,982.00	90.34	3.05	7,632.40	366.68	309.22	368.01	0.66
9,162.00	90.22	0.68	7,631.52	546.57	315.08	547.93	1.32
9,342.00	90.92	0.64	7,629.73	726.55	317.15	727.92	0.39
9,432.00	89.75	0.90	7,629.20	816.54	318.36	817.91	1.33
9,522.00	89.97	0.95	7,629.42	906.52	319.82	907.91	0.25
9,612.00	90.49	0.70	7,629.06	996.51	321.11	997.90	0.64
9,703.00	90.09	0.81	7,628.60	1,087.50	322.31	1,088.90	0.46
9,793.00	90.52	1.17	7,628.12	1,177.49	323.87	1,178.89	0.62
9,883.00	89.23	0.68	7,628.32	1,267.47	325.32	1,268.88	1.53
9,973.00	89.23	0.44	7,629.53	1,357.46	326.20	1,358.87	0.27
10,063.00	89.23	359.72	7,630.74	1,447.45	326.32	1,448.86	0.80
10,153.00	90.28	359.92	7,631.12	1,537.45	326.04	1,538.86	1.19
10,243.00	90.92	359.97	7,630.18	1,627.45	325.96	1,628.85	0.71
10,333.00	91.70	359.84	7,628.12	1,717.42	325.81	1,718.82	0.88
10,423.00	90.43	359.84	7,626.45	1,807.40	325.56	1,808.80	1.41
10,513.00	90.65	359.60	7,625.60	1,897.40	325.12	1,898.79	0.36
10,603.00	90.62	358.76	7,624.60	1,987.38	323.83	1,988.77	0.93
10,694.00	89.48	357.34	7,624.52	2,078.33	320.73	2,079.70	2.00
10,784.00	88.98	357.93	7,625.73	2,168.24	317.02	2,169.59	0.86
10,874.00	87.69	358.47	7,628.35	2,258.16	314.19	2,259.49	1.55
10,964.00	88.86	358.38	7,631.06	2,348.08	311.72	2,349.40	1.30
11,054.00	89.63	359.01	7,632.24	2,438.05	309.67	2,439.36	1.11
11,144.00	90.09	359.51	7,632.46	2,528.04	308.51	2,529.34	0.75
11,235.00	90.12	359.46	7,632.30	2,619.04	307.69	2,620.33	0.06
11,325.00	90.34	359.18	7,631.94	2,709.03	306.62	2,710.32	0.40
11,415.00	90.80	0.72	7,631.04	2,799.02	306.54	2,800.31	1.79
11,505.00	91.33	0.53	7,629.37	2,889.00	307.52	2,890.29	0.63
11,595.00	90.03	0.91	7,628.30	2,978.98	308.66	2,980.28	1.50
11,685.00	91.14	1.23	7,627.38	3,068.96	310.34	3,070.26	1.28
11,775.00	89.69	1.26	7,626.73	3,158.94	312.29	3,160.25	1.61
11,865.00	89.97	0.84	7,627.00	3,248.92	313.94	3,250.24	0.56
11,955.00	90.46	0.53	7,626.66	3,338.91	315.02	3,340.24	0.64
12,045.00	89.35	359.96	7,626.81	3,428.91	315.40	3,430.23	1.39
12,135.00	88.92	1.21	7,628.17	3,518.89	316.32	3,520.22	1.47
12,215.00	87.26	357.69	7,634.17	3,608.75	314.60	3,700.07	2.16
12,405.00	88.37	358.64	7,637.60	3,788.64	311.72	3,789.94	1.62
12,495.00	89.38	359.29	7,639.37	3,878.60	310.09	3,879.89	1.33
12,585.00	89.26	359.78	7,640.43	3,968.59	309.36	3,969.88	0.56
12,675.00	89.35	358.98	7,641.53	4,058.58	308.39	4,059.86	0.89
12,765.00	88.92	358.14	7,642.88	4,148.54	306.13	4,149.81	1.05
12,855.00	91.02	359.32	7,642.93	4,238.51	304.13	4,239.77	2.68
12,945.00	90.89	0.44	7,641.43	4,328.50	303.94	4,329.75	1.25
13,035.00	91.29	0.49	7,639.72	4,418.48	304.67	4,419.73	0.45
13,126.00	90.89	0.17	7,637.99	4,509.46	305.20	4,510.72	0.56
13,240.00	91.26	0.17	7,635.85	4,623.44	305.54	4,624.70	0.32

Last MWD Survey @ 13240.00' MD 7635.85' TVD

**Design Report for Griswold 3C-11HZ - Actual Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
13,281.00	91.26	0.17	7,634.95	4,664.43	305.66	4,665.69	0.00
Straight Projection to Bit @ 13281.00' MD 7634.95' TVD							

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,728.00	1,710.13	-213.04	106.47	Tie-On to Surface Surveys @ 17281728.00' MD
1,834.00	1,814.58	-230.85	109.65	First Sperry MWD Survey @ 1834' MD
13,240.00	7,635.85	4,623.44	305.54	Last MWD Survey @ 13240.00' MD 7635.85' TVD
13,281.00	7,634.95	4,664.43	305.66	Straight Projection to Bit @ 13281.00' MD 7634.95' TVD

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	0.30	Slot	-0.03	59.90	0.00

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
13.00	1,728.00	Cathedral MWD Surface Surveys	MWD
1,834.00	13,281.00	MWD Vertical/Curve Surveys	MWD+IFR1+SC

**Casing Details**

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,762.00	1,743.64	9 5/8"	9-5/8	13-1/2
7,935.00	7,633.80	7" @ 7935' MD	5-1/2	8-3/4



**Design Report for Griswold 3C-11HZ - 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
GRISWOLD 3C-11HZ_	0.00	0.00	0.00	-0.02	59.90	1,265,630.72	3,210,863.82	40.060087	-104.746655
- actual wellpath misses target center by 0.02usft at 0.00usft MD (0.00 TVD, -0.03 N, 59.90 E)									
- Polygon									
Point 1			0.00	-550.07	-2,000.65	1,265,063.70	3,208,867.99		
Point 2			0.00	2,109.06	-1,988.13	1,267,722.74	3,208,857.92		
Point 3			0.00	4,768.33	-1,974.84	1,270,381.92	3,208,848.63		
Point 4			0.00	4,765.80	-655.45	1,270,390.60	3,210,167.94		
Point 5			0.00	4,763.38	663.99	1,270,399.39	3,211,487.30		
Point 6			0.00	4,760.75	1,983.37	1,270,407.96	3,212,806.61		
Point 7			0.00	4,758.41	3,302.97	1,270,416.83	3,214,126.13		
Point 8			0.00	2,091.24	3,296.06	1,267,749.80	3,214,141.87		
Point 9			0.00	-576.13	3,289.12	1,265,082.56	3,214,157.59		
Point 10			0.00	-563.47	643.91	1,265,072.76	3,211,512.47		
Point 11			0.00	-556.66	-678.32	1,265,068.34	3,210,190.28		
GRISWOLD 3C-11HZ_	0.00	0.00	7,616.00	4,664.01	331.64	1,270,296.71	3,211,095.92	40.072890	-104.745684
- actual wellpath misses target center by 32.16usft at 13281.00usft MD (7634.95 TVD, 4664.43 N, 305.66 E)									
- Point									
GRISWOLD 3C-11HZ_	0.00	0.00	7,636.00	-511.46	303.44	1,265,121.38	3,211,111.68	40.058683	-104.745785
- actual wellpath misses target center by 17.95usft at 8102.86usft MD (7641.05 TVD, -511.81 N, 286.21 E)									
- Polygon									
Point 1			7,636.00	5,275.68	-39.56	1,270,396.33	3,211,027.32		
Point 2			7,636.00	6,120.61	-39.51	1,271,241.20	3,211,020.19		
Point 3			7,636.00	6,119.92	880.53	1,271,248.33	3,211,940.17		
Point 4			7,636.00	5,273.91	880.47	1,270,402.38	3,211,947.29		
Point 5			7,636.00	3,941.97	875.43	1,269,070.49	3,211,953.56		
Point 6			7,636.00	2,609.99	870.39	1,267,738.57	3,211,959.84		
Point 7			7,636.00	1,277.88	865.39	1,266,406.51	3,211,966.15		
Point 8			7,636.00	-54.23	860.40	1,265,074.46	3,211,972.47		
Point 9			7,636.00	-918.30	856.65	1,264,210.42	3,211,976.06		
Point 10			7,636.00	-914.79	-63.37	1,264,206.12	3,211,056.08		
Point 11			7,636.00	-49.66	-59.62	1,265,071.22	3,211,052.48		
Point 12			7,636.00	1,281.69	-54.63	1,266,402.51	3,211,046.17		
Point 13			7,636.00	2,613.12	-49.64	1,267,733.89	3,211,039.85		
Point 14			7,636.00	3,944.39	-44.60	1,269,065.10	3,211,033.58		

**Directional Difficulty Index**

Average Dogleg over Survey:	1.74 °/100usft	Maximum Dogleg over Survey:	17.29 °/100usft at 7,825.00 usft
Net Tortousity applicable to Plans:	0.80 °/100usft	Directional Difficulty Index:	6.441

**Audit Info**



North Reference Sheet for Sec. 11-T1N-R66W - Griswold 3C-11HZ - Plan B

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

Vertical Depths are relative to RKB = 13' @ 5156.00usft (Ensign 145). Northing and Easting are relative to Sec. 11-T1N-R66W

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: 0.99996235

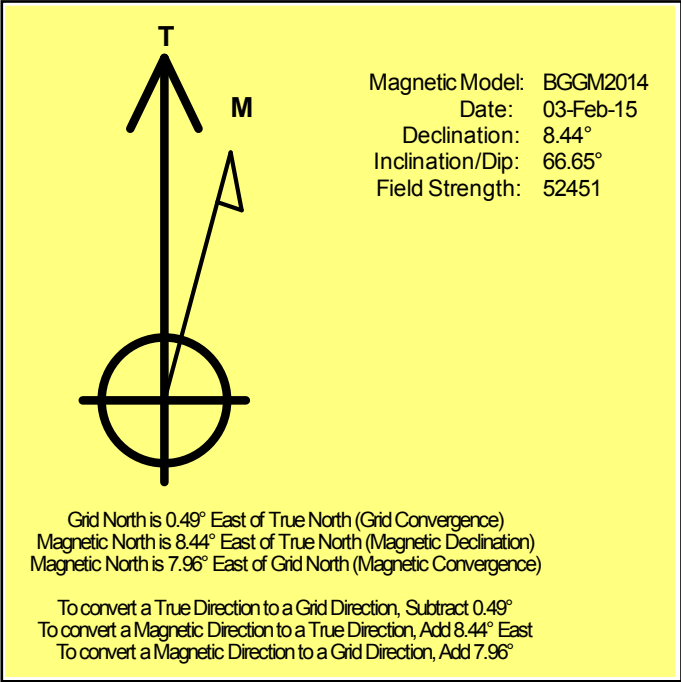
Grid Coordinates of Well: 1,265,630.70 usft N, 3,210,863.82 usft E

Geographical Coordinates of Well: 40° 03' 36.31" N, 104° 44' 47.96" W

Grid Convergence at Surface is: 0.49°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,281.00usft  
the Bottom Hole Displacement is 4,670.93usft in the Direction of 3.02° (True).

Magnetic Convergence at surface is: -7.96° ( 3 February 2015, , BGGM2014)



# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 11-T1N-R66W

Griswold 3C-11HZ

05-123-40982

Plan B

Design: Actual Surveys

## Sperry Drilling Services

### Geodetic Report

03 March, 2015

Well Coordinates: 1,265,630.70 N, 3,210,863.82 E (40° 03' 36.31" N, 104° 44' 47.96" W)

Ground Level: 5,143.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well Griswold 3C-11HZ

RKB = 13' @ 5156.00usft (Ensign 145)

N

True

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

## Design Report for Griswold 3C-11HZ - 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	40.060087	-104.746655	1,265,630.70	3,210,863.82
13.00	0.00	0.00	13.00	0.00	0.00	40.060087	-104.746655	1,265,630.70	3,210,863.82
119.00	0.60	318.90	119.00	0.42	-0.36	40.060088	-104.746657	1,265,631.12	3,210,863.45
209.00	0.70	170.40	209.00	0.23	-0.58	40.060088	-104.746657	1,265,630.93	3,210,863.23
295.00	1.70	183.10	294.98	-1.56	-0.56	40.060083	-104.746657	1,265,629.14	3,210,863.27
382.00	3.50	169.60	381.88	-5.46	-0.15	40.060072	-104.746656	1,265,625.24	3,210,863.71
472.00	5.60	164.20	471.60	-12.39	1.54	40.060053	-104.746650	1,265,618.33	3,210,865.46
566.00	8.00	160.00	564.93	-22.95	5.02	40.060024	-104.746637	1,265,607.79	3,210,869.04
661.00	8.10	159.00	658.99	-35.41	9.68	40.059990	-104.746621	1,265,595.37	3,210,873.80
757.00	9.80	167.20	753.82	-49.69	13.92	40.059951	-104.746606	1,265,581.13	3,210,878.16
852.00	9.80	168.70	847.44	-65.51	17.29	40.059907	-104.746593	1,265,565.35	3,210,881.67
948.00	11.00	165.80	941.86	-82.40	21.14	40.059861	-104.746580	1,265,548.49	3,210,885.66
1,043.00	12.10	170.90	1,034.94	-101.02	24.94	40.059810	-104.746566	1,265,529.90	3,210,889.61
1,139.00	11.60	165.10	1,128.89	-120.28	29.01	40.059757	-104.746552	1,265,510.68	3,210,893.85
1,233.00	11.10	164.50	1,221.05	-138.13	33.86	40.059708	-104.746534	1,265,492.87	3,210,898.85
1,327.00	8.70	169.80	1,313.65	-153.85	37.54	40.059665	-104.746521	1,265,477.18	3,210,902.66
1,423.00	8.20	167.40	1,408.61	-167.68	40.32	40.059627	-104.746511	1,265,463.38	3,210,905.56
1,519.00	8.00	170.90	1,503.65	-180.96	42.87	40.059590	-104.746502	1,265,450.12	3,210,908.22
1,613.00	8.80	176.70	1,596.64	-194.59	44.32	40.059553	-104.746497	1,265,436.50	3,210,909.78
1,728.00	9.80	169.70	1,710.13	-213.01	46.57	40.059502	-104.746489	1,265,418.11	3,210,912.20
1,834.00	9.85	170.06	1,814.58	-230.81	49.75	40.059453	-104.746478	1,265,400.33	3,210,915.53
1,927.00	9.99	170.69	1,906.19	-246.61	52.43	40.059410	-104.746468	1,265,384.56	3,210,918.34
2,017.00	9.67	171.09	1,994.87	-261.78	54.86	40.059368	-104.746459	1,265,369.41	3,210,920.90
2,107.00	11.45	171.98	2,083.34	-278.09	57.28	40.059324	-104.746451	1,265,353.11	3,210,923.46
2,197.00	11.02	170.73	2,171.62	-295.43	59.91	40.059276	-104.746441	1,265,335.80	3,210,926.23
2,287.00	10.62	169.17	2,260.02	-312.06	62.86	40.059230	-104.746431	1,265,319.19	3,210,929.32
2,377.00	10.10	168.23	2,348.55	-327.94	66.02	40.059187	-104.746419	1,265,303.35	3,210,932.62
2,467.00	9.45	168.55	2,437.24	-342.90	69.10	40.059146	-104.746408	1,265,288.41	3,210,935.83
2,557.00	10.82	168.22	2,525.83	-358.41	72.29	40.059103	-104.746397	1,265,272.93	3,210,939.15
2,647.00	10.28	166.80	2,614.31	-374.50	75.85	40.059059	-104.746384	1,265,256.87	3,210,942.84
2,737.00	9.59	167.08	2,702.96	-389.63	79.36	40.059017	-104.746372	1,265,241.78	3,210,946.48
2,827.00	11.38	169.38	2,791.46	-405.66	82.67	40.058973	-104.746360	1,265,225.77	3,210,949.93
2,917.00	10.63	167.83	2,879.80	-422.51	86.06	40.058927	-104.746348	1,265,208.96	3,210,953.46
3,007.00	9.81	167.73	2,968.37	-438.11	89.44	40.058884	-104.746336	1,265,193.38	3,210,956.97
3,097.00	10.91	173.03	3,056.91	-454.06	92.10	40.058841	-104.746326	1,265,177.46	3,210,959.77
3,187.00	10.34	173.56	3,145.36	-470.54	94.04	40.058795	-104.746319	1,265,160.99	3,210,961.85
3,277.00	9.59	172.98	3,234.00	-486.01	95.86	40.058753	-104.746313	1,265,145.54	3,210,963.80
3,367.00	10.81	175.06	3,322.58	-501.86	97.51	40.058709	-104.746307	1,265,129.71	3,210,965.58
3,457.00	9.95	175.26	3,411.11	-518.01	98.88	40.058665	-104.746302	1,265,113.56	3,210,967.09
3,547.00	9.28	177.32	3,499.84	-533.01	99.86	40.058624	-104.746299	1,265,098.58	3,210,968.20
3,637.00	9.87	171.31	3,588.59	-547.89	101.36	40.058583	-104.746293	1,265,083.72	3,210,969.83
3,727.00	10.84	167.36	3,677.12	-563.77	104.38	40.058539	-104.746282	1,265,067.86	3,210,972.98

## Design Report for Griswold 3C-11HZ - 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)
3,817.00	9.74	166.38	3,765.68	-579.43	108.02	40.058496	-104.746269	1,265,052.23	3,210,976.76
3,907.00	8.70	164.54	3,854.51	-593.39	111.63	40.058458	-104.746256	1,265,038.31	3,210,980.48
3,997.00	9.59	166.11	3,943.37	-607.23	115.25	40.058420	-104.746244	1,265,024.50	3,210,984.21
4,088.00	10.61	169.46	4,032.96	-622.82	118.60	40.058377	-104.746232	1,265,008.93	3,210,987.70
4,178.00	9.61	169.98	4,121.56	-638.36	121.42	40.058335	-104.746222	1,264,993.41	3,210,990.65
4,268.00	9.61	164.35	4,210.30	-653.00	124.75	40.058294	-104.746210	1,264,978.81	3,210,994.11
4,358.00	10.23	163.76	4,298.95	-667.90	129.02	40.058254	-104.746194	1,264,963.94	3,210,998.50
4,448.00	11.25	165.88	4,387.37	-684.09	133.39	40.058209	-104.746179	1,264,947.79	3,211,003.01
4,538.00	10.37	165.78	4,475.78	-700.46	137.52	40.058164	-104.746164	1,264,931.46	3,211,007.28
4,628.00	12.13	168.97	4,564.04	-717.59	141.32	40.058117	-104.746150	1,264,914.36	3,211,011.23
4,718.00	11.15	173.53	4,652.19	-735.52	144.11	40.058068	-104.746140	1,264,896.46	3,211,014.17
4,808.00	9.90	172.67	4,740.68	-751.84	146.08	40.058023	-104.746133	1,264,880.16	3,211,016.28
4,898.00	11.59	169.65	4,829.10	-768.41	148.69	40.057978	-104.746124	1,264,863.61	3,211,019.03
4,988.00	10.50	169.61	4,917.43	-785.37	151.80	40.057931	-104.746113	1,264,846.68	3,211,022.27
5,079.00	11.28	163.72	5,006.79	-802.07	155.79	40.057885	-104.746099	1,264,830.01	3,211,026.41
5,169.00	10.50	165.36	5,095.17	-818.45	160.33	40.057840	-104.746083	1,264,813.67	3,211,031.09
5,259.00	9.93	167.99	5,183.74	-833.98	164.01	40.057798	-104.746069	1,264,798.18	3,211,034.91
5,349.00	10.62	163.25	5,272.30	-849.51	168.02	40.057755	-104.746055	1,264,782.68	3,211,039.04
5,439.00	9.85	166.78	5,360.87	-864.95	172.17	40.057713	-104.746040	1,264,767.28	3,211,043.32
5,529.00	11.53	166.49	5,449.30	-881.19	176.03	40.057668	-104.746026	1,264,751.07	3,211,047.32
5,619.00	11.07	164.70	5,537.56	-898.27	180.41	40.057621	-104.746011	1,264,734.03	3,211,051.85
5,799.00	9.77	162.27	5,714.59	-929.48	189.62	40.057535	-104.745978	1,264,702.90	3,211,061.32
5,889.00	8.97	160.83	5,803.39	-943.39	194.25	40.057497	-104.745961	1,264,689.04	3,211,066.07
5,979.00	10.20	164.04	5,892.13	-957.67	198.75	40.057458	-104.745945	1,264,674.79	3,211,070.69
6,069.00	9.11	161.06	5,980.85	-972.08	203.25	40.057419	-104.745929	1,264,660.42	3,211,075.31
6,159.00	10.84	156.06	6,069.49	-986.55	209.00	40.057379	-104.745909	1,264,646.00	3,211,081.18
6,249.00	10.82	160.68	6,157.89	-1,002.26	215.23	40.057336	-104.745886	1,264,630.34	3,211,087.55
6,339.00	9.92	161.07	6,246.42	-1,017.56	220.54	40.057294	-104.745867	1,264,615.09	3,211,092.99
6,429.00	8.51	157.99	6,335.26	-1,031.07	225.55	40.057257	-104.745850	1,264,601.62	3,211,098.11
6,519.00	8.52	161.03	6,424.26	-1,043.55	230.21	40.057222	-104.745833	1,264,589.18	3,211,102.88
6,609.00	7.62	158.54	6,513.37	-1,055.41	234.56	40.057190	-104.745817	1,264,577.36	3,211,107.33
6,699.00	6.70	156.83	6,602.67	-1,065.79	238.81	40.057161	-104.745802	1,264,567.02	3,211,111.67
6,789.00	5.87	155.83	6,692.13	-1,074.81	242.76	40.057137	-104.745788	1,264,558.03	3,211,115.69
6,879.00	4.65	165.81	6,781.75	-1,082.55	245.54	40.057115	-104.745778	1,264,550.32	3,211,118.54
6,969.00	2.33	150.58	6,871.58	-1,087.68	247.34	40.057101	-104.745772	1,264,545.20	3,211,120.37
7,059.00	1.23	103.43	6,961.54	-1,089.50	249.17	40.057096	-104.745765	1,264,543.40	3,211,122.23
7,149.00	1.18	54.20	7,051.52	-1,089.18	250.86	40.057097	-104.745759	1,264,543.73	3,211,123.92
7,239.00	5.81	359.30	7,141.34	-1,084.08	251.56	40.057111	-104.745757	1,264,548.84	3,211,124.57
7,329.00	12.09	10.87	7,230.21	-1,070.26	253.28	40.057149	-104.745750	1,264,562.68	3,211,126.18
7,421.00	18.03	1.01	7,319.02	-1,046.53	255.35	40.057214	-104.745743	1,264,586.41	3,211,128.04
7,448.00	21.03	358.86	7,344.47	-1,037.51	255.33	40.057239	-104.745743	1,264,595.44	3,211,127.94
7,511.00	27.76	356.21	7,401.81	-1,011.54	254.14	40.057310	-104.745747	1,264,621.40	3,211,126.53

## Design Report for Griswold 3C-11HZ - 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)
7,556.00	33.04	354.83	7,440.61	-988.85	252.34	40.057373	-104.745754	1,264,644.07	3,211,124.54
7,601.00	37.88	356.80	7,477.25	-962.82	250.46	40.057444	-104.745761	1,264,670.08	3,211,122.44
7,646.00	44.15	356.99	7,511.19	-933.35	248.86	40.057525	-104.745766	1,264,699.54	3,211,120.59
7,691.00	49.87	357.93	7,541.86	-900.48	247.42	40.057615	-104.745771	1,264,732.39	3,211,118.87
7,736.00	55.68	357.43	7,569.07	-864.69	245.96	40.057713	-104.745777	1,264,768.17	3,211,117.11
7,780.00	62.25	356.67	7,591.75	-827.06	244.01	40.057817	-104.745784	1,264,805.78	3,211,114.84
7,825.00	69.82	354.71	7,610.01	-786.09	240.91	40.057929	-104.745795	1,264,846.72	3,211,111.38
7,870.00	77.23	355.96	7,622.77	-743.11	237.41	40.058047	-104.745807	1,264,889.66	3,211,107.52
7,906.00	80.69	355.81	7,629.66	-707.87	234.87	40.058144	-104.745816	1,264,924.88	3,211,104.69
7,992.00	87.26	357.53	7,638.68	-622.54	229.91	40.058378	-104.745834	1,265,010.16	3,211,099.00
8,082.00	89.78	358.53	7,641.01	-532.63	226.82	40.058625	-104.745845	1,265,100.03	3,211,095.15
8,172.00	90.55	359.05	7,640.75	-442.65	224.92	40.058872	-104.745852	1,265,189.99	3,211,092.48
8,262.00	90.65	0.48	7,639.80	-352.66	224.55	40.059119	-104.745853	1,265,279.97	3,211,091.35
8,352.00	92.50	1.81	7,637.33	-262.72	226.35	40.059366	-104.745847	1,265,369.92	3,211,092.38
8,442.00	92.25	1.21	7,633.60	-172.83	228.72	40.059613	-104.745838	1,265,459.83	3,211,093.99
8,532.00	90.89	2.05	7,631.14	-82.90	231.28	40.059859	-104.745829	1,265,549.77	3,211,095.78
8,622.00	89.94	2.16	7,630.48	7.03	234.58	40.060106	-104.745817	1,265,639.73	3,211,098.33
8,712.00	88.92	2.13	7,631.38	96.97	237.95	40.060353	-104.745805	1,265,729.68	3,211,100.93
8,802.00	89.60	2.15	7,632.54	186.89	241.31	40.060600	-104.745793	1,265,819.63	3,211,103.53
8,892.00	90.12	2.50	7,632.76	276.82	244.96	40.060847	-104.745780	1,265,909.58	3,211,106.41
8,982.00	90.34	3.05	7,632.40	366.71	249.32	40.061094	-104.745765	1,265,999.50	3,211,110.01
9,162.00	90.22	0.68	7,631.52	546.60	255.18	40.061587	-104.745744	1,266,179.43	3,211,114.33
9,342.00	90.92	0.64	7,629.73	726.58	257.25	40.062082	-104.745736	1,266,359.41	3,211,114.88
9,432.00	89.75	0.90	7,629.20	816.57	258.46	40.062329	-104.745732	1,266,449.41	3,211,115.32
9,522.00	89.97	0.95	7,629.42	906.56	259.91	40.062576	-104.745727	1,266,539.40	3,211,116.01
9,612.00	90.49	0.70	7,629.06	996.55	261.21	40.062823	-104.745722	1,266,629.39	3,211,116.54
9,703.00	90.09	0.81	7,628.60	1,087.54	262.41	40.063072	-104.745718	1,266,720.39	3,211,116.97
9,793.00	90.52	1.17	7,628.12	1,177.52	263.96	40.063319	-104.745712	1,266,810.38	3,211,117.76
9,883.00	89.23	0.68	7,628.32	1,267.51	265.42	40.063566	-104.745707	1,266,900.37	3,211,118.45
9,973.00	89.23	0.44	7,629.53	1,357.50	266.30	40.063813	-104.745704	1,266,990.36	3,211,118.56
10,063.00	89.23	359.72	7,630.74	1,447.49	266.42	40.064060	-104.745703	1,267,080.34	3,211,117.92
10,153.00	90.28	359.92	7,631.12	1,537.48	266.14	40.064307	-104.745704	1,267,170.33	3,211,116.88
10,243.00	90.92	359.97	7,630.18	1,627.48	266.05	40.064555	-104.745705	1,267,260.32	3,211,116.03
10,333.00	91.70	359.84	7,628.12	1,717.45	265.90	40.064802	-104.745705	1,267,350.29	3,211,115.11
10,423.00	90.43	359.84	7,626.45	1,807.44	265.65	40.065049	-104.745706	1,267,440.26	3,211,114.10
10,513.00	90.65	359.60	7,625.60	1,897.43	265.21	40.065296	-104.745708	1,267,530.25	3,211,112.89
10,603.00	90.62	358.76	7,624.60	1,987.42	263.93	40.065543	-104.745712	1,267,620.21	3,211,110.84
10,694.00	89.48	357.34	7,624.52	2,078.36	260.83	40.065792	-104.745723	1,267,711.12	3,211,106.97
10,784.00	88.98	357.93	7,625.73	2,168.27	257.12	40.066039	-104.745737	1,267,801.00	3,211,102.49
10,874.00	87.69	358.47	7,628.35	2,258.19	254.29	40.066286	-104.745747	1,267,890.88	3,211,098.90
10,964.00	88.86	358.38	7,631.06	2,348.11	251.82	40.066533	-104.745756	1,267,980.78	3,211,095.67
11,054.00	89.63	359.01	7,632.24	2,438.08	249.77	40.066780	-104.745763	1,268,070.72	3,211,092.86

## Design Report for Griswold 3C-11HZ - 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)
11,144.00	90.09	359.51	7,632.46	2,528.07	248.61	40.067027	-104.745767	1,268,160.70	3,211,090.93
11,235.00	90.12	359.46	7,632.30	2,619.07	247.79	40.067277	-104.745770	1,268,251.68	3,211,089.34
11,325.00	90.34	359.18	7,631.94	2,709.06	246.72	40.067524	-104.745774	1,268,341.66	3,211,087.50
11,415.00	90.80	0.72	7,631.04	2,799.05	246.64	40.067771	-104.745774	1,268,431.64	3,211,086.66
11,505.00	91.33	0.53	7,629.37	2,889.03	247.62	40.068018	-104.745771	1,268,521.62	3,211,086.88
11,595.00	90.03	0.91	7,628.30	2,979.02	248.75	40.068265	-104.745766	1,268,611.61	3,211,087.25
11,685.00	91.14	1.23	7,627.38	3,069.00	250.43	40.068512	-104.745760	1,268,701.60	3,211,088.16
11,775.00	89.69	1.26	7,626.73	3,158.97	252.39	40.068759	-104.745753	1,268,791.58	3,211,089.35
11,865.00	89.97	0.84	7,627.00	3,248.95	254.04	40.069006	-104.745748	1,268,881.57	3,211,090.24
11,955.00	90.46	0.53	7,626.66	3,338.95	255.11	40.069253	-104.745744	1,268,971.57	3,211,090.55
12,045.00	89.35	359.96	7,626.81	3,428.94	255.50	40.069500	-104.745742	1,269,061.56	3,211,090.17
12,135.00	88.92	1.21	7,628.17	3,518.93	256.42	40.069747	-104.745739	1,269,151.55	3,211,090.32
12,315.00	87.26	357.69	7,634.17	3,698.78	254.69	40.070240	-104.745745	1,269,331.38	3,211,087.07
12,405.00	88.37	358.64	7,637.60	3,788.67	251.81	40.070487	-104.745756	1,269,421.23	3,211,083.43
12,495.00	89.38	359.29	7,639.37	3,878.64	250.19	40.070734	-104.745761	1,269,511.18	3,211,081.04
12,585.00	89.26	359.78	7,640.43	3,968.63	249.46	40.070981	-104.745764	1,269,601.15	3,211,079.54
12,675.00	89.35	358.98	7,641.53	4,058.61	248.48	40.071228	-104.745767	1,269,691.13	3,211,077.81
12,765.00	88.92	358.14	7,642.88	4,148.57	246.22	40.071475	-104.745775	1,269,781.06	3,211,074.78
12,855.00	91.02	359.32	7,642.93	4,238.55	244.23	40.071722	-104.745783	1,269,871.01	3,211,072.02
12,945.00	90.89	0.44	7,641.43	4,328.53	244.04	40.071969	-104.745783	1,269,960.99	3,211,071.07
13,035.00	91.29	0.49	7,639.72	4,418.51	244.77	40.072216	-104.745781	1,270,050.97	3,211,071.03
13,126.00	90.89	0.17	7,637.99	4,509.49	245.29	40.072466	-104.745779	1,270,141.95	3,211,070.79
13,240.00	91.26	0.17	7,635.85	4,623.47	245.63	40.072779	-104.745778	1,270,255.92	3,211,070.16
13,281.00	91.26	0.17	7,634.95	4,664.46	245.75	40.072891	-104.745777	1,270,296.91	3,211,069.93

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,728.00	1,710.13	-213.01	46.57	Tie-On to Surface Surveys @ 17281728.00' MD
1,834.00	1,814.58	-230.81	49.75	First Sperry MWD Survey @ 1834' MD
13,240.00	7,635.85	4,623.47	245.63	Last MWD Survey @ 13240.00' MD 7635.85' TVD
13,281.00	7,634.95	4,664.46	245.75	Straight Projection to Bit @ 13281.00' MD 7634.95' TVD

## Design Report for Griswold 3C-11HZ - Actual Surveys

### Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	0.30	Slot	0.00	0.00	0.00

### Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
13.00	1,728.00	Cathedral MWD Surface Surveys	MWD
1,834.00	13,281.00	MWD Vertical/Curve Surveys	MWD+IFR1+SC

### Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,762.00	1,743.64	9 5/8"	9-5/8	13-1/2
7,935.00	7,633.80	7" @ 7935' MD	5-1/2	8-3/4

### Design Targets

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

Average Dogleg over Survey:	1.74 °/100usft	Maximum Dogleg over Survey:	17.29 °/100usft at 7,825.00 usft
Net Tortosity applicable to Plans:	0.80 °/100usft	Directional Difficulty Index:	6.441

### Audit Info



**North Reference Sheet for Sec. 11-T1N-R66W - Griswold 3C-11HZ - Plan B**

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

Vertical Depths are relative to RKB = 13' @ 5156.00usft (Ensign 145). Northing and Easting are relative to Griswold 3C- 11HZ

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: 0.99996235

Grid Coordinates of Well: 1,265,630.70 usft N, 3,210,863.82 usft E

Geographical Coordinates of Well: 40° 03' 36.31" N, 104° 44' 47.96" W

Grid Convergence at Surface is: 0.49°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,281.00usft

the Bottom Hole Displacement is 4,670.93usft in the Direction of 3.02° ( True).

Magnetic Convergence at surface is: -7.96° ( 3 February 2015, , BGGM2014)

