

# SPERRY-SUN DRILLING SERVICES

## CERTIFIED SURVEY WORK SHEET

OPERATOR:	Anadarko Petroleum Corp.
ELL:	Adder 29N-14HZ
ELD:	DJ Basin
IG:	H&P 308
EGALS:	Sec. 23-T2N-R67W
COUNTY:	Weld
STATE:	Colorado
AL. METHOD:	True N
AG. DECL. APPLIED:	8.54
VERTICAL SEC. DIR. :	0.450

SSDS Job Number :	902040801
Start Date of Job :	2/6/2015
End Date of Job :	2/15/2015
Lead Directional Driller:	Jesse Kysar
	Brain Saunders
Other SSDS DD's :	Ryan Elliott
SSDS MWD Engineers :	Adam Sampson
	Aaron Maurice


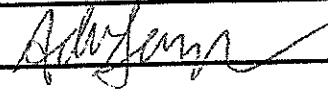

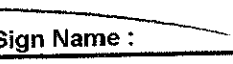

SS Survey  
First Survey Depth  
Last Survey Depth

OP Depth/Sidetrack MD

First Survey Depth  
Last Survey Depth  
It Extrapolation to TD

Main Hole =====>		1st Side Track =====>		2nd Side Track =====>		3rd Side Track =====>		4th Side Track =====>	
102	Tie On		Tie On		Tie On		Tie On		Tie On
-83	Gyro								
1220									
7632	KOP		KOP-ST1		KOP-ST2		KOP-ST3		KOP-ST4
1265	MWD		MWD		MWD		MWD		MWD
13436	MWD		MWD		MWD		MWD		MWD
13479	T.D.		T.D.		T.D.		T.D.		T.D.

The following Sperry Sun Drilling Services personnel listed below, do certify the above survey information to be accurate :

Print Name : Jesse Kysar	Print Name : Adam Sampson	Print Name :
Sign Name : 	Sign Name : 	Sign Name :
Print Name : Brain Saunders	Print Name : Aaron Maurice	Print Name : Ryan Elliott
Sign Name : 	Sign Name : 	Sign Name : 

Examples of  
Survey Types:

Tie On	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.

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 23-T2N-R67W

Adder 29C-14HZ

API: 05-123-40557 :: Job #: 902039853

Plan C

Design: Actual Surveys

## Sperry Drilling Services

### Final Report

09 March, 2015

Surface UWI : API: 05-123-40557 :: Job #: 902039853

Well Coordinates: 1,288,221.11 N, 3,179,028.46 E (40° 07' 22.03" N, 104° 51' 35.30" W)

Ground Level: 4,955.00 usft

Local Coordinate Origin:

Centered on Well Adder 29C-14HZ

Viewing Datum:

RKB = 25' @ 4980.00usft (H&P 308)

TVDs to System:

N

North Reference:

True

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

**HALLIBURTON**

Project: Weld County, CO (NAD 83)  
 Site: Sec. 23-T2N-R67W  
 Well: Adder 29C-14HZ  
 Wellbore: Plan C  
 Design: Actual Surveys



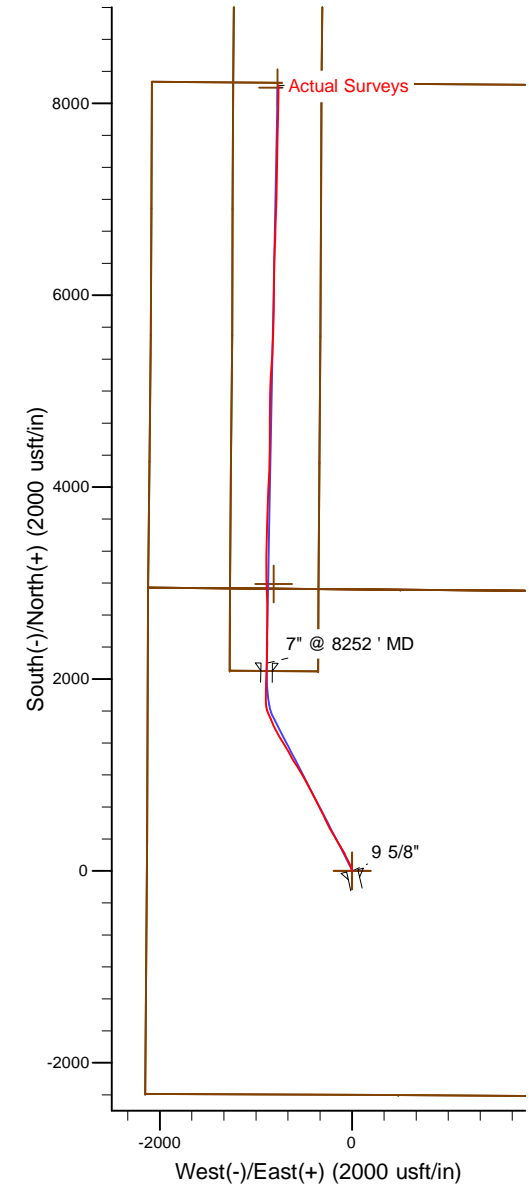
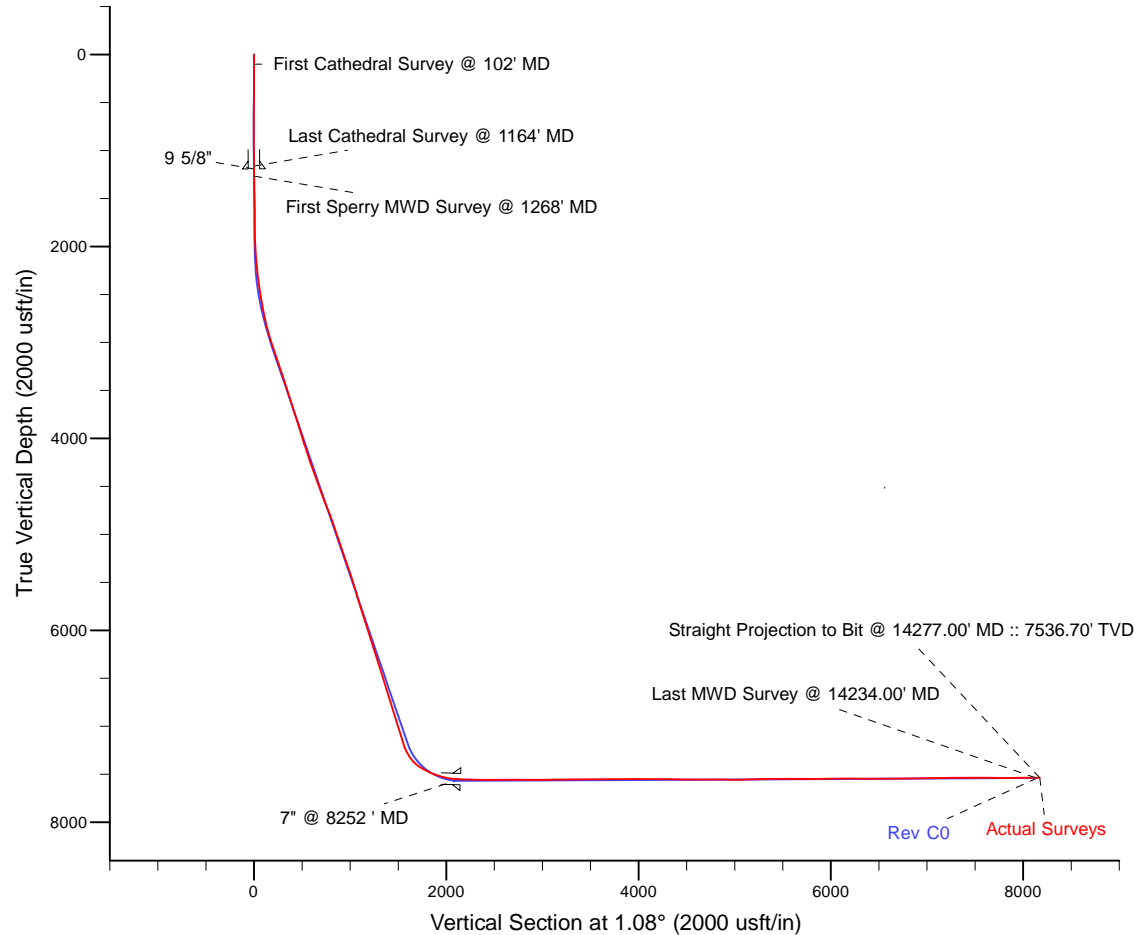
Platted SHL: 2333' FSL, 2134' FWL  
 Platted Lat/Long: 40.122786N, 104.859805W  
 Location: Sec. 23-T2N-R67W

~ 7" Casing: 776' FNL 1238' FWL  
 Lat/Long: 40.128731N, 104.862975W  
 State Planes - CO Northern: 1290380.40N, 3178126.56E  
 Location: Sec. 23-T2N-R67W

~ BHL: 32' FNL, 1316' FWL  
 Lat/Long: 40.145262N, 104.862540W  
 State Planes - CO Northern: 1296402.98N, 3178204.68E  
 Location: Sec. 14-T2N-R67W

# LEGEND

- ✕ Adder 29C-14HZ, Plan C, Rev C0 V0
- ▣ Actual Surveys



WELL DETAILS: Adder 29C-14HZ

Ground Level: 4955.00  
 RKB = 25' @ 4980.00usft (H&P 308)

Created By: Gordy Roth  
 Created On: 3/9/15

**Design Report for Adder 29C-14HZ - 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
102.00	1.00	317.40	101.99	0.66	-0.60	0.64	0.98
<b>First Cathedral Survey @ 102' MD</b>							
172.00	0.60	278.40	171.99	1.16	-1.38	1.13	0.93
248.00	0.40	315.20	247.99	1.40	-1.96	1.37	0.48
329.00	0.10	313.30	328.98	1.65	-2.21	1.61	0.37
409.00	0.60	161.00	408.98	1.31	-2.12	1.27	0.86
489.00	0.80	195.70	488.98	0.37	-2.14	0.33	0.57
569.00	0.80	168.50	568.97	-0.71	-2.18	-0.75	0.47
649.00	0.80	135.20	648.96	-1.66	-1.67	-1.69	0.57
729.00	0.70	133.20	728.96	-2.39	-0.92	-2.40	0.13
809.00	1.00	88.60	808.95	-2.70	0.13	-2.70	0.88
889.00	1.00	44.20	888.94	-2.19	1.31	-2.16	0.94
969.00	0.70	21.40	968.93	-1.23	1.98	-1.19	0.56
1,049.00	1.00	2.20	1,048.92	-0.08	2.18	-0.04	0.51
1,129.00	0.40	7.50	1,128.91	0.90	2.25	0.94	0.75
1,164.00	0.40	352.90	1,163.91	1.14	2.25	1.18	0.29
<b>Last Cathedral Survey @ 1164' MD</b>							
1,268.00	0.63	338.56	1,267.91	2.03	1.99	2.07	0.25
<b>First Sperry MWD Survey @ 1268' MD</b>							
1,359.00	0.85	332.71	1,358.90	3.10	1.50	3.13	0.25
1,451.00	0.76	335.21	1,450.89	4.26	0.93	4.28	0.10
1,545.00	0.87	316.12	1,544.88	5.34	0.18	5.34	0.31
1,639.00	0.94	317.48	1,638.87	6.42	-0.84	6.40	0.08
1,734.00	0.99	330.88	1,733.86	7.71	-1.77	7.68	0.24
1,828.00	0.77	324.66	1,827.85	8.94	-2.53	8.89	0.25
1,923.00	1.97	343.04	1,922.82	11.02	-3.37	10.95	1.33
2,017.00	3.17	337.09	2,016.72	14.96	-4.85	14.87	1.31
2,111.00	4.67	342.84	2,110.50	21.01	-7.00	20.88	1.65
2,205.00	5.49	353.32	2,204.13	29.13	-8.65	28.97	1.31
2,300.00	7.42	347.62	2,298.53	39.64	-10.49	39.43	2.14
2,394.00	8.05	337.33	2,391.67	51.64	-14.33	51.36	1.62
2,488.00	10.59	334.10	2,484.43	65.49	-20.64	65.09	2.76
2,583.00	11.21	333.03	2,577.71	81.57	-28.64	81.02	0.69
2,677.00	12.29	331.58	2,669.74	98.51	-37.55	97.79	1.19
2,772.00	13.62	330.71	2,762.32	117.16	-47.83	116.24	1.41
2,866.00	16.11	335.16	2,853.17	138.65	-58.73	137.52	2.91
2,960.00	18.80	336.56	2,942.83	164.39	-70.23	163.04	2.90
3,054.00	20.32	333.74	3,031.41	192.93	-83.48	191.32	1.90
3,148.00	22.73	329.33	3,118.85	223.19	-99.97	221.27	3.09
3,242.00	20.96	327.71	3,206.10	253.02	-118.22	250.75	1.99
3,337.00	22.50	329.61	3,294.35	283.07	-136.49	280.45	1.78
3,431.00	20.74	326.75	3,381.73	312.51	-154.72	309.54	2.18
3,525.00	21.45	327.65	3,469.43	340.95	-173.04	337.63	0.83
3,620.00	19.85	327.58	3,558.33	369.24	-190.98	365.57	1.68
3,714.00	21.06	333.21	3,646.41	397.79	-207.15	393.82	2.46
3,809.00	19.08	331.65	3,735.64	426.70	-222.22	422.43	2.16
3,903.00	20.70	334.58	3,824.03	455.22	-236.65	450.68	2.02
3,997.00	18.63	334.11	3,912.54	483.74	-250.34	478.94	2.21
4,092.00	18.65	334.93	4,002.56	511.15	-263.40	506.09	0.28

**Design Report for Adder 29C-14HZ - Actual Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,186.00	20.28	334.05	4,091.18	539.41	-276.90	534.10	1.76
4,280.00	19.83	335.38	4,179.48	568.56	-290.67	562.98	0.68
4,375.00	22.61	331.22	4,268.04	599.22	-306.18	593.34	3.33
4,469.00	21.46	332.16	4,355.17	630.26	-322.91	624.06	1.28
4,564.00	22.97	333.54	4,443.12	662.23	-339.28	655.71	1.68
4,658.00	21.31	332.41	4,530.18	693.79	-355.37	686.97	1.82
4,752.00	24.57	334.37	4,616.74	726.55	-371.74	719.42	3.56
4,847.00	23.76	333.16	4,703.41	761.44	-388.92	753.97	1.00
4,941.00	23.16	332.77	4,789.64	794.77	-405.93	786.98	0.66
5,035.00	22.24	332.15	4,876.36	826.94	-422.70	818.82	1.01
5,130.00	20.92	332.57	4,964.70	857.89	-438.91	849.46	1.40
5,224.00	19.85	331.83	5,052.81	886.85	-454.18	878.14	1.17
5,318.00	23.28	330.55	5,140.22	917.11	-470.85	908.07	3.68
5,413.00	22.53	331.91	5,227.73	949.51	-488.65	940.13	0.97
5,507.00	21.48	332.06	5,314.88	980.60	-505.19	970.91	1.12
5,601.00	19.61	331.21	5,402.90	1,009.64	-520.85	999.64	2.01
5,696.00	20.63	327.29	5,492.10	1,037.69	-537.58	1,027.37	1.78
5,790.00	21.17	326.41	5,579.92	1,065.76	-555.92	1,055.10	0.66
5,885.00	19.03	325.64	5,669.13	1,092.84	-574.15	1,081.83	2.27
5,979.00	20.94	327.73	5,757.46	1,119.70	-591.77	1,108.35	2.17
6,073.00	19.38	326.90	5,845.70	1,146.97	-609.26	1,135.28	1.69
6,168.00	20.20	332.11	5,935.10	1,174.67	-625.54	1,162.67	2.05
6,262.00	20.63	334.25	6,023.19	1,203.93	-640.32	1,191.65	0.92
6,356.00	21.21	333.14	6,111.00	1,234.02	-655.20	1,221.45	0.75
6,450.00	19.25	328.54	6,199.20	1,262.41	-670.97	1,249.54	2.68
6,545.00	20.02	327.85	6,288.68	1,289.53	-687.80	1,276.34	0.85
6,639.00	21.47	328.16	6,376.58	1,317.77	-705.44	1,304.24	1.55
6,733.00	19.80	325.13	6,464.55	1,345.45	-723.62	1,331.57	2.11
6,828.00	20.40	327.41	6,553.76	1,372.60	-741.73	1,358.38	1.04
6,922.00	21.43	333.98	6,641.58	1,401.84	-758.09	1,387.31	2.72
7,016.00	19.68	331.05	6,729.59	1,431.13	-773.29	1,416.30	2.16
7,111.00	17.85	332.04	6,819.54	1,457.99	-787.86	1,442.88	1.96
7,205.00	18.59	335.37	6,908.83	1,484.34	-800.86	1,468.98	1.36
7,300.00	19.63	332.86	6,998.60	1,512.30	-814.45	1,496.68	1.39
7,394.00	19.85	335.66	7,087.07	1,540.89	-828.23	1,525.01	1.03
7,488.00	17.09	340.87	7,176.23	1,568.49	-839.34	1,552.39	3.42
7,535.00	23.50	337.59	7,220.29	1,583.70	-845.18	1,567.48	13.85
7,582.00	29.57	336.35	7,262.32	1,603.00	-853.41	1,586.63	12.97
7,629.00	33.10	334.47	7,302.46	1,625.21	-863.60	1,608.64	7.79
7,677.00	39.79	337.47	7,341.05	1,651.26	-875.15	1,634.47	14.42
7,724.00	46.24	344.50	7,375.42	1,681.55	-885.46	1,664.56	17.08
7,771.00	52.33	352.22	7,406.09	1,716.40	-892.53	1,699.27	17.95
7,818.00	57.73	356.17	7,433.02	1,754.70	-896.38	1,737.49	13.39
7,866.00	61.85	0.11	7,457.18	1,796.13	-897.69	1,778.90	11.13
7,913.00	65.45	0.79	7,478.04	1,838.24	-897.36	1,821.00	7.77
7,960.00	68.09	0.89	7,496.57	1,881.42	-896.73	1,864.19	5.62
8,007.00	71.47	1.65	7,512.81	1,925.51	-895.75	1,908.28	7.35
8,054.00	74.65	2.50	7,526.51	1,970.43	-894.12	1,953.23	6.98
8,101.00	77.91	3.03	7,537.65	2,016.03	-891.91	1,998.86	7.02
8,148.00	82.05	2.74	7,545.83	2,062.25	-889.58	2,045.11	8.83
8,211.00	86.76	1.52	7,551.97	2,124.89	-887.26	2,107.79	7.72

**Design Report for Adder 29C-14HZ - Actual Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,252.00	87.96	1.09	7,553.86	2,165.83	-886.32	2,148.74	3.11
8,347.00	88.55	0.51	7,556.75	2,260.78	-885.00	2,243.69	0.87
8,441.00	89.48	0.92	7,558.37	2,354.75	-883.83	2,337.68	1.08
8,535.00	90.19	1.16	7,558.64	2,448.74	-882.12	2,431.68	0.80
8,630.00	89.88	0.21	7,558.58	2,543.73	-880.98	2,526.67	1.05
8,724.00	90.09	359.87	7,558.60	2,637.73	-880.92	2,620.66	0.43
8,818.00	90.56	359.58	7,558.07	2,731.73	-881.37	2,714.63	0.59
8,913.00	89.60	358.35	7,557.94	2,826.71	-883.09	2,809.56	1.64
9,007.00	89.66	357.78	7,558.55	2,920.65	-886.26	2,903.43	0.61
9,101.00	90.31	358.57	7,558.57	3,014.60	-889.25	2,997.31	1.09
9,196.00	90.86	359.86	7,557.60	3,109.59	-890.55	3,092.25	1.48
9,291.00	90.40	359.25	7,556.56	3,204.58	-891.29	3,187.21	0.80
9,385.00	90.43	0.21	7,555.88	3,298.57	-891.73	3,281.18	1.02
9,480.00	90.77	2.14	7,554.88	3,393.54	-889.79	3,376.17	2.06
9,574.00	90.52	1.06	7,553.82	3,487.50	-887.16	3,470.16	1.18
9,668.00	89.44	1.49	7,553.85	3,581.47	-885.07	3,564.16	1.24
9,762.00	90.55	2.81	7,553.86	3,675.40	-881.54	3,658.14	1.83
9,856.00	90.56	2.13	7,552.95	3,769.31	-877.49	3,752.10	0.72
9,951.00	90.49	1.54	7,552.08	3,864.26	-874.45	3,847.09	0.63
10,045.00	90.74	1.83	7,551.07	3,958.21	-871.69	3,941.08	0.41
10,139.00	89.66	3.05	7,550.74	4,052.12	-867.69	4,035.05	1.73
10,233.00	89.44	2.51	7,551.48	4,146.01	-863.13	4,129.00	0.62
10,328.00	89.23	1.52	7,552.59	4,240.94	-859.79	4,223.98	1.07
10,422.00	89.38	1.26	7,553.73	4,334.91	-857.51	4,317.98	0.32
10,516.00	89.66	0.71	7,554.51	4,428.89	-855.89	4,411.97	0.66
10,611.00	89.63	0.34	7,555.10	4,523.89	-855.02	4,506.97	0.39
10,705.00	89.66	359.94	7,555.68	4,617.88	-854.79	4,600.95	0.43
10,799.00	90.34	0.38	7,555.68	4,711.88	-854.53	4,694.94	0.86
10,894.00	90.49	0.29	7,555.00	4,806.88	-853.97	4,789.93	0.18
10,988.00	89.20	0.68	7,555.25	4,900.87	-853.18	4,883.92	1.43
11,082.00	89.72	1.15	7,556.14	4,994.86	-851.68	4,977.92	0.75
11,176.00	89.82	2.67	7,556.51	5,088.80	-848.54	5,071.90	1.62
11,271.00	92.59	3.77	7,554.52	5,183.62	-843.21	5,166.80	3.14
11,365.00	91.02	3.72	7,551.56	5,277.37	-837.07	5,260.65	1.67
11,460.00	91.05	3.41	7,549.84	5,372.17	-831.17	5,355.55	0.33
11,554.00	90.40	2.67	7,548.65	5,466.03	-826.18	5,449.48	1.05
11,648.00	89.97	2.18	7,548.35	5,559.94	-822.21	5,543.46	0.69
11,742.00	90.15	2.01	7,548.25	5,653.88	-818.77	5,637.44	0.26
11,837.00	89.94	1.54	7,548.17	5,748.83	-815.83	5,732.43	0.54
11,931.00	89.48	0.90	7,548.65	5,842.81	-813.83	5,826.43	0.84
12,026.00	90.77	0.20	7,548.44	5,937.80	-812.91	5,921.43	1.54
12,120.00	90.86	0.23	7,547.11	6,031.79	-812.56	6,015.41	0.10
12,214.00	90.99	359.91	7,545.59	6,125.78	-812.45	6,109.38	0.37
12,309.00	88.77	0.76	7,545.79	6,220.77	-811.89	6,204.36	2.50
12,403.00	89.66	2.05	7,547.07	6,314.73	-809.59	6,298.35	1.67
12,497.00	90.34	2.34	7,547.07	6,408.66	-805.99	6,392.33	0.79
12,591.00	90.31	2.20	7,546.54	6,502.59	-802.26	6,486.31	0.15
12,686.00	90.03	1.75	7,546.26	6,597.53	-798.99	6,581.30	0.56
12,780.00	90.52	1.48	7,545.81	6,691.49	-796.34	6,675.29	0.60
12,874.00	89.88	1.09	7,545.48	6,785.47	-794.23	6,769.29	0.80
12,968.00	91.48	2.71	7,544.36	6,879.40	-791.12	6,863.27	2.42

**Design Report for Adder 29C-14HZ - Actual Surveys**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
13,063.00	91.14	2.07	7,542.19	6,974.29	-787.15	6,958.22	0.76
13,157.00	90.86	1.35	7,540.55	7,068.24	-784.35	7,052.20	0.82
13,251.00	90.92	1.25	7,539.09	7,162.20	-782.22	7,146.18	0.12
13,440.00	91.02	0.64	7,535.89	7,351.15	-779.10	7,335.16	0.33
13,534.00	89.11	0.47	7,535.79	7,445.14	-778.19	7,429.15	2.04
13,628.00	88.83	1.02	7,537.48	7,539.11	-776.97	7,523.13	0.66
13,723.00	88.70	0.78	7,539.52	7,634.08	-775.48	7,618.11	0.29
13,817.00	90.22	2.06	7,540.41	7,728.04	-773.15	7,712.10	2.11
13,911.00	90.09	1.31	7,540.15	7,822.00	-770.38	7,806.09	0.81
14,006.00	90.86	1.24	7,539.37	7,916.97	-768.27	7,901.09	0.81
14,100.00	90.83	0.54	7,537.98	8,010.95	-766.81	7,995.08	0.75
14,194.00	90.22	0.79	7,537.12	8,104.94	-765.72	8,089.07	0.70
14,234.00	90.31	0.66	7,536.93	8,144.94	-765.21	8,129.07	0.40
<b>Last MWD Survey @ 14234.00' MD</b>							
14,277.00	90.31	0.66	7,536.70	8,187.93	-764.72	8,172.07	0.00
<b>Straight Projection to Bit @ 14277.00' MD :: 7536.70' TVD</b>							

**Design Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
102.00	101.99	0.66	-0.60	First Cathedral Survey @ 102' MD
1,164.00	1,163.91	1.14	2.25	Last Cathedral Survey @ 1164' MD
1,268.00	1,267.91	2.03	1.99	First Sperry MWD Survey @ 1268' MD
14,234.00	7,536.93	8,144.94	-765.21	Last MWD Survey @ 14234.00' MD
14,277.00	7,536.70	8,187.93	-764.72	Straight Projection to Bit @ 14277.00' MD :: 7536.70' TVD

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	1.08	Slot	0.00	0.00	0.00

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
102.00	1,164.00	MWD Surface Surveys	MWD
1,287.00	8,252.00	MWD Vertical/Build Surveys	MWD+IFR1+SC
8,347.00	14,277.00	MWD Lateral Surveys	MWD+IFR1+SC

**Casing Details**

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,194.00	1,193.91	9 5/8"	9-5/8	13-3/4
8,252.00	7,553.86	7" @ 8252' MD	7	8-3/4

## Design Report for Adder 29C-14HZ - 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
Adder 29C-14HZ_SEC	0.00	0.00	0.00	0.00	0.00	1,288,221.11	3,179,028.46	40.122786	-104.859805
- actual wellpath hits target center									
- Polygon									
Point 1				0.00	2,952.49	-2,120.96	1,291,158.09	3,176,886.32	
Point 2				0.00	4,272.27	-2,106.50	1,292,477.89	3,176,891.25	
Point 3				0.00	5,591.76	-2,092.14	1,293,797.40	3,176,896.09	
Point 4				0.00	6,908.32	-2,086.24	1,295,113.91	3,176,892.48	
Point 5				0.00	8,224.91	-2,080.06	1,296,430.46	3,176,889.16	
Point 6				0.00	8,202.53	525.68	1,296,426.89	3,179,494.88	
Point 7				0.00	8,183.74	3,153.12	1,296,427.07	3,182,122.29	
Point 8				0.00	6,866.02	3,147.88	1,295,109.40	3,182,126.56	
Point 9				0.00	5,548.43	3,142.73	1,293,791.86	3,182,130.92	
Point 10				0.00	2,911.88	3,132.18	1,291,155.41	3,182,139.41	
Point 11				0.00	277.35	3,121.33	1,288,520.98	3,182,147.58	
Point 12				0.00	-1,036.08	3,115.53	1,287,207.59	3,182,151.26	
Point 13				0.00	-2,350.08	3,109.73	1,285,893.64	3,182,154.94	
Point 14				0.00	-2,335.53	480.63	1,285,889.21	3,179,525.91	
Point 15				0.00	-2,322.21	-2,150.23	1,285,883.53	3,176,895.13	
Point 16				0.00	315.83	-2,131.98	1,288,521.53	3,176,894.34	
Point 17				0.00	2,952.49	-2,120.96	1,291,158.09	3,176,886.32	
Point 18				0.00	2,930.37	502.19	1,291,154.91	3,179,509.46	
Point 19				0.00	2,911.88	3,132.18	1,291,155.41	3,182,139.41	
Adder 29C-14HZ_SHL	0.00	0.00	0.00	0.00	0.00	1,288,221.11	3,179,028.46	40.122786	-104.859805
- actual wellpath hits target center									
- Point									
Adder 29C-14HZ_BHL	0.00	0.00	7,540.00	8,162.86	-775.24	1,296,377.83	3,178,194.33	40.145193	-104.862578
- actual wellpath misses target center by 20.77usft at 14234.00usft MD (7536.93 TVD, 8144.94 N, -765.21 E)									
- Point									
Adder 29C-14HZ_H	0.00	0.00	7,570.00	2,991.61	-815.39	1,291,206.63	3,178,191.52	40.130998	-104.862721
- actual wellpath misses target center by 74.09usft at 9075.67usft MD (7558.67 TVD, 2989.28 N, -888.57 E)									
- Polygon									
Point 1			7,570.00	-46.31	-454.00	1,291,157.05	3,177,737.89		
Point 2			7,570.00	-904.20	-457.57	1,290,299.19	3,177,740.51		
Point 3			7,570.00	-911.51	462.45	1,290,298.52	3,178,660.52		
Point 4			7,570.00	-54.06	466.01	1,291,155.94	3,178,657.89		
Point 5			7,570.00	1,265.75	476.27	1,292,475.74	3,178,658.62		
Point 6			7,570.00	2,585.71	486.52	1,293,795.68	3,178,659.34		
Point 7			7,570.00	3,901.96	492.36	1,295,111.89	3,178,655.68		
Point 8			7,570.00	5,218.16	498.20	1,296,428.04	3,178,652.02		
Point 9			7,570.00	6,076.77	506.14	1,297,286.65	3,178,653.76		
Point 10			7,570.00	6,083.62	-413.87	1,297,286.86	3,177,733.76		
Point 11			7,570.00	5,226.07	-421.80	1,296,429.31	3,177,732.02		
Point 12			7,570.00	3,909.65	-427.19	1,295,112.94	3,177,736.14		
Point 13			7,570.00	2,593.24	-432.57	1,293,796.58	3,177,740.26		
Point 14			7,570.00	1,273.51	-443.38	1,292,476.86	3,177,738.98		
Point 15			7,570.00	-46.31	-454.00	1,291,157.05	3,177,737.89		

**Directional Difficulty Index**

Average Dogleg over Survey:	1.70 °/100usft	Maximum Dogleg over Survey:	17.95 °/100usft at 7,771.00 usft
Net Tortousity applicable to Plans:	1.00 °/100usft	Directional Difficulty Index:	6.588

**Audit Info**



North Reference Sheet for Sec. 23-T2N-R67W - Adder 29C-14HZ - Plan C

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

Vertical Depths are relative to RKB = 25' @ 4980.00usft (H&P 308). Northing and Easting are relative to Adder 29C-14HZ

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: 0.99995933

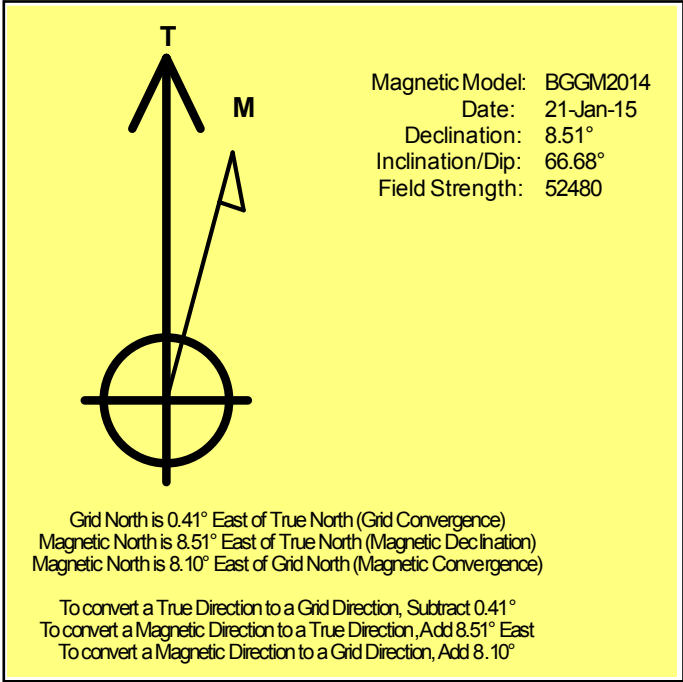
Grid Coordinates of Well: 1,288,221.11 usft N, 3,179,028.46 usft E

Geographical Coordinates of Well: 40° 07' 22.03" N, 104° 51' 35.30" W

Grid Convergence at Surface is: 0.41°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,277.00usft the Bottom Hole Displacement is 8,223.57usft in the Direction of 354.66° ( True).

Magnetic Convergence at surface is: -8.10° (21 January 2015, , BGGM2014)



# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 23-T2N-R67W

Adder 29C-14HZ

API: 05-123-40557 :: Job #: 902039853

Plan C

Design: Actual Surveys

## Sperry Drilling Services

### Geodetic Report

09 March, 2015

Well Coordinates: 1,288,221.11 N, 3,179,028.46 E (40° 07' 22.03" N, 104° 51' 35.30" W)

Ground Level: 4,955.00 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 Adder 29C-14HZ

RKB = 25' @ 4980.00usft (H&P 308)

N

True

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

## Design Report for Adder 29C-14HZ - 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	40.122786	-104.859805	1,288,221.11	3,179,028.46
102.00	1.00	317.40	101.99	0.66	-0.60	40.122788	-104.859807	1,288,221.76	3,179,027.85
172.00	0.60	278.40	171.99	1.16	-1.38	40.122789	-104.859810	1,288,222.26	3,179,027.07
248.00	0.40	315.20	247.99	1.40	-1.96	40.122790	-104.859812	1,288,222.50	3,179,026.49
329.00	0.10	313.30	328.98	1.65	-2.21	40.122791	-104.859813	1,288,222.75	3,179,026.23
409.00	0.60	161.00	408.98	1.31	-2.12	40.122790	-104.859813	1,288,222.40	3,179,026.32
489.00	0.80	195.70	488.98	0.37	-2.14	40.122787	-104.859813	1,288,221.47	3,179,026.31
569.00	0.80	168.50	568.97	-0.71	-2.18	40.122784	-104.859813	1,288,220.38	3,179,026.28
649.00	0.80	135.20	648.96	-1.66	-1.67	40.122782	-104.859811	1,288,219.44	3,179,026.79
729.00	0.70	133.20	728.96	-2.39	-0.92	40.122780	-104.859809	1,288,218.71	3,179,027.55
809.00	1.00	88.60	808.95	-2.70	0.13	40.122779	-104.859805	1,288,218.41	3,179,028.61
889.00	1.00	44.20	888.94	-2.19	1.31	40.122780	-104.859801	1,288,218.93	3,179,029.79
969.00	0.70	21.40	968.93	-1.23	1.98	40.122783	-104.859798	1,288,219.89	3,179,030.44
1,049.00	1.00	2.20	1,048.92	-0.08	2.18	40.122786	-104.859797	1,288,221.05	3,179,030.64
1,129.00	0.40	7.50	1,128.91	0.90	2.25	40.122789	-104.859797	1,288,222.02	3,179,030.70
1,164.00	0.40	352.90	1,163.91	1.14	2.25	40.122789	-104.859797	1,288,222.26	3,179,030.70
1,359.00	0.85	332.71	1,358.90	3.10	1.50	40.122795	-104.859800	1,288,224.22	3,179,029.93
1,451.00	0.76	335.21	1,450.89	4.26	0.93	40.122798	-104.859802	1,288,225.37	3,179,029.36
1,545.00	0.87	316.12	1,544.88	5.34	0.18	40.122801	-104.859805	1,288,226.45	3,179,028.59
1,639.00	0.94	317.48	1,638.87	6.42	-0.84	40.122804	-104.859808	1,288,227.52	3,179,027.57
1,734.00	0.99	330.88	1,733.86	7.71	-1.77	40.122807	-104.859812	1,288,228.81	3,179,026.64
1,828.00	0.77	324.66	1,827.85	8.94	-2.53	40.122811	-104.859814	1,288,230.03	3,179,025.87
1,923.00	1.97	343.04	1,922.82	11.02	-3.37	40.122816	-104.859817	1,288,232.10	3,179,025.01
2,017.00	3.17	337.09	2,016.72	14.96	-4.85	40.122827	-104.859823	1,288,236.03	3,179,023.49
2,111.00	4.67	342.84	2,110.50	21.01	-7.00	40.122844	-104.859830	1,288,242.07	3,179,021.31
2,205.00	5.49	353.32	2,204.13	29.13	-8.65	40.122866	-104.859836	1,288,250.18	3,179,019.60
2,300.00	7.42	347.62	2,298.53	39.64	-10.49	40.122895	-104.859843	1,288,260.67	3,179,017.68
2,394.00	8.05	337.33	2,391.67	51.64	-14.33	40.122928	-104.859857	1,288,272.64	3,179,013.75
2,488.00	10.59	334.10	2,484.43	65.49	-20.64	40.122966	-104.859879	1,288,286.44	3,179,007.34
2,583.00	11.21	333.03	2,577.71	81.57	-28.64	40.123010	-104.859908	1,288,302.47	3,178,999.23
2,677.00	12.29	331.58	2,669.74	98.51	-37.55	40.123056	-104.859940	1,288,319.34	3,178,990.20
2,772.00	13.62	330.71	2,762.32	117.16	-47.83	40.123108	-104.859976	1,288,337.92	3,178,979.78
2,866.00	16.11	335.16	2,853.17	138.65	-58.73	40.123167	-104.860015	1,288,359.33	3,178,968.73
2,960.00	18.80	336.56	2,942.83	164.39	-70.23	40.123237	-104.860056	1,288,384.98	3,178,957.04
3,054.00	20.32	333.74	3,031.41	192.93	-83.48	40.123316	-104.860104	1,288,413.42	3,178,943.59
3,148.00	22.73	329.33	3,118.85	223.19	-99.97	40.123399	-104.860163	1,288,443.56	3,178,926.88
3,242.00	20.96	327.71	3,206.10	253.02	-118.22	40.123481	-104.860228	1,288,473.26	3,178,908.42
3,337.00	22.50	329.61	3,294.35	283.07	-136.49	40.123563	-104.860293	1,288,503.18	3,178,889.93
3,431.00	20.74	326.75	3,381.73	312.51	-154.72	40.123644	-104.860358	1,288,532.48	3,178,871.49
3,525.00	21.45	327.65	3,469.43	340.95	-173.04	40.123722	-104.860424	1,288,560.78	3,178,852.97
3,620.00	19.85	327.58	3,558.33	369.24	-190.98	40.123800	-104.860488	1,288,588.94	3,178,834.82
3,714.00	21.06	333.21	3,646.41	397.79	-207.15	40.123878	-104.860546	1,288,617.38	3,178,818.45

## Design Report for Adder 29C-14HZ - 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)
3,809.00	19.08	331.65	3,735.64	426.70	-222.22	40.123957	-104.860600	1,288,646.17	3,178,803.17
3,903.00	20.70	334.58	3,824.03	455.22	-236.65	40.124036	-104.860651	1,288,674.59	3,178,788.54
3,997.00	18.63	334.11	3,912.54	483.74	-250.34	40.124114	-104.860700	1,288,703.01	3,178,774.64
4,092.00	18.65	334.93	4,002.56	511.15	-263.40	40.124189	-104.860747	1,288,730.32	3,178,761.38
4,186.00	20.28	334.05	4,091.18	539.41	-276.90	40.124267	-104.860795	1,288,758.49	3,178,747.68
4,280.00	19.83	335.38	4,179.48	568.56	-290.67	40.124347	-104.860845	1,288,787.53	3,178,733.70
4,375.00	22.61	331.22	4,268.04	599.22	-306.18	40.124431	-104.860900	1,288,818.08	3,178,717.97
4,469.00	21.46	332.16	4,355.17	630.26	-322.91	40.124516	-104.860960	1,288,849.00	3,178,701.02
4,564.00	22.97	333.54	4,443.12	662.23	-339.28	40.124604	-104.861018	1,288,880.84	3,178,684.41
4,658.00	21.31	332.41	4,530.18	693.79	-355.37	40.124691	-104.861076	1,288,912.28	3,178,668.10
4,752.00	24.57	334.37	4,616.74	726.55	-371.74	40.124780	-104.861135	1,288,944.93	3,178,651.50
4,847.00	23.76	333.16	4,703.41	761.44	-388.92	40.124876	-104.861196	1,288,979.69	3,178,634.06
4,941.00	23.16	332.77	4,789.64	794.77	-405.93	40.124968	-104.861257	1,289,012.90	3,178,616.82
5,035.00	22.24	332.15	4,876.36	826.94	-422.70	40.125056	-104.861317	1,289,044.94	3,178,599.82
5,130.00	20.92	332.57	4,964.70	857.89	-438.91	40.125141	-104.861375	1,289,075.77	3,178,583.38
5,224.00	19.85	331.83	5,052.81	886.85	-454.18	40.125220	-104.861429	1,289,104.62	3,178,567.91
5,318.00	23.28	330.55	5,140.22	917.11	-470.85	40.125304	-104.861489	1,289,134.76	3,178,551.02
5,413.00	22.53	331.91	5,227.73	949.51	-488.65	40.125392	-104.861553	1,289,167.03	3,178,532.99
5,507.00	21.48	332.06	5,314.88	980.60	-505.19	40.125478	-104.861612	1,289,198.00	3,178,516.22
5,601.00	19.61	331.21	5,402.90	1,009.64	-520.85	40.125558	-104.861668	1,289,226.92	3,178,500.35
5,696.00	20.63	327.29	5,492.10	1,037.69	-537.58	40.125635	-104.861728	1,289,254.85	3,178,483.42
5,790.00	21.17	326.41	5,579.92	1,065.76	-555.92	40.125712	-104.861793	1,289,282.79	3,178,464.88
5,885.00	19.03	325.64	5,669.13	1,092.84	-574.15	40.125786	-104.861858	1,289,309.73	3,178,446.45
5,979.00	20.94	327.73	5,757.46	1,119.70	-591.77	40.125860	-104.861921	1,289,336.46	3,178,428.64
6,073.00	19.38	326.90	5,845.70	1,146.97	-609.26	40.125935	-104.861984	1,289,363.60	3,178,410.96
6,168.00	20.20	332.11	5,935.10	1,174.67	-625.54	40.126011	-104.862042	1,289,391.19	3,178,394.48
6,262.00	20.63	334.25	6,023.19	1,203.93	-640.32	40.126091	-104.862095	1,289,420.34	3,178,379.48
6,356.00	21.21	333.14	6,111.00	1,234.02	-655.20	40.126173	-104.862148	1,289,450.31	3,178,364.39
6,450.00	19.25	328.54	6,199.20	1,262.41	-670.97	40.126251	-104.862205	1,289,478.59	3,178,348.41
6,545.00	20.02	327.85	6,288.68	1,289.53	-687.80	40.126326	-104.862265	1,289,505.59	3,178,331.39
6,639.00	21.47	328.16	6,376.58	1,317.77	-705.44	40.126403	-104.862328	1,289,533.70	3,178,313.55
6,733.00	19.80	325.13	6,464.55	1,345.45	-723.62	40.126479	-104.862393	1,289,561.25	3,178,295.17
6,828.00	20.40	327.41	6,553.76	1,372.60	-741.73	40.126554	-104.862458	1,289,588.27	3,178,276.86
6,922.00	21.43	333.98	6,641.58	1,401.84	-758.09	40.126634	-104.862516	1,289,617.39	3,178,260.29
7,016.00	19.68	331.05	6,729.59	1,431.13	-773.29	40.126715	-104.862571	1,289,646.56	3,178,244.88
7,111.00	17.85	332.04	6,819.54	1,457.99	-787.86	40.126788	-104.862623	1,289,673.31	3,178,230.12
7,205.00	18.59	335.37	6,908.83	1,484.34	-800.86	40.126861	-104.862669	1,289,699.56	3,178,216.93
7,300.00	19.63	332.86	6,998.60	1,512.30	-814.45	40.126937	-104.862718	1,289,727.43	3,178,203.14
7,394.00	19.85	335.66	7,087.07	1,540.89	-828.23	40.127016	-104.862767	1,289,755.92	3,178,189.15
7,488.00	17.09	340.87	7,176.23	1,568.49	-839.34	40.127092	-104.862807	1,289,783.44	3,178,177.85
7,535.00	23.50	337.59	7,220.29	1,583.70	-845.18	40.127133	-104.862828	1,289,798.60	3,178,171.90
7,582.00	29.57	336.35	7,262.32	1,603.00	-853.41	40.127186	-104.862857	1,289,817.84	3,178,163.53

## Design Report for Adder 29C-14HZ - 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)
7,629.00	33.10	334.47	7,302.46	1,625.21	-863.60	40.127247	-104.862893	1,289,839.98	3,178,153.18
7,677.00	39.79	337.47	7,341.05	1,651.26	-875.15	40.127319	-104.862935	1,289,865.94	3,178,141.45
7,724.00	46.24	344.50	7,375.42	1,681.55	-885.46	40.127402	-104.862972	1,289,896.16	3,178,130.91
7,771.00	52.33	352.22	7,406.09	1,716.40	-892.53	40.127498	-104.862997	1,289,930.95	3,178,123.59
7,818.00	57.73	356.17	7,433.02	1,754.70	-896.38	40.127603	-104.863011	1,289,969.22	3,178,119.47
7,866.00	61.85	0.11	7,457.18	1,796.13	-897.69	40.127716	-104.863015	1,290,010.64	3,178,117.85
7,913.00	65.45	0.79	7,478.04	1,838.24	-897.36	40.127832	-104.863014	1,290,052.75	3,178,117.88
7,960.00	68.09	0.89	7,496.57	1,881.42	-896.73	40.127951	-104.863012	1,290,095.93	3,178,118.21
8,007.00	71.47	1.65	7,512.81	1,925.51	-895.75	40.128072	-104.863008	1,290,140.02	3,178,118.87
8,054.00	74.65	2.50	7,526.51	1,970.43	-894.12	40.128195	-104.863003	1,290,184.96	3,178,120.17
8,101.00	77.91	3.03	7,537.65	2,016.03	-891.91	40.128320	-104.862995	1,290,230.57	3,178,122.05
8,148.00	82.05	2.74	7,545.83	2,062.25	-889.58	40.128447	-104.862986	1,290,276.80	3,178,124.04
8,211.00	86.76	1.52	7,551.97	2,124.89	-887.26	40.128619	-104.862978	1,290,339.45	3,178,125.92
8,252.00	87.96	1.09	7,553.86	2,165.83	-886.32	40.128731	-104.862975	1,290,380.40	3,178,126.56
8,347.00	88.55	0.51	7,556.75	2,260.78	-885.00	40.128992	-104.862970	1,290,475.35	3,178,127.20
8,441.00	89.48	0.92	7,558.37	2,354.75	-883.83	40.129250	-104.862966	1,290,569.33	3,178,127.69
8,535.00	90.19	1.16	7,558.64	2,448.74	-882.12	40.129508	-104.862960	1,290,663.32	3,178,128.72
8,630.00	89.88	0.21	7,558.58	2,543.73	-880.98	40.129769	-104.862956	1,290,758.31	3,178,129.17
8,724.00	90.09	359.87	7,558.60	2,637.73	-880.92	40.130027	-104.862956	1,290,852.30	3,178,128.55
8,818.00	90.56	359.58	7,558.07	2,731.73	-881.37	40.130285	-104.862957	1,290,946.29	3,178,127.42
8,913.00	89.60	358.35	7,557.94	2,826.71	-883.09	40.130545	-104.862963	1,291,041.25	3,178,125.02
9,007.00	89.66	357.78	7,558.55	2,920.65	-886.26	40.130803	-104.862975	1,291,135.17	3,178,121.17
9,101.00	90.31	358.57	7,558.57	3,014.60	-889.25	40.131061	-104.862985	1,291,229.09	3,178,117.50
9,196.00	90.86	359.86	7,557.60	3,109.59	-890.55	40.131322	-104.862990	1,291,324.06	3,178,115.51
9,291.00	90.40	359.25	7,556.56	3,204.58	-891.29	40.131583	-104.862993	1,291,419.04	3,178,114.09
9,385.00	90.43	0.21	7,555.88	3,298.57	-891.73	40.131841	-104.862994	1,291,513.02	3,178,112.97
9,480.00	90.77	2.14	7,554.88	3,393.54	-889.79	40.132101	-104.862987	1,291,608.00	3,178,114.23
9,574.00	90.52	1.06	7,553.82	3,487.50	-887.16	40.132359	-104.862978	1,291,701.97	3,178,116.18
9,668.00	89.44	1.49	7,553.85	3,581.47	-885.07	40.132617	-104.862971	1,291,795.95	3,178,117.59
9,762.00	90.55	2.81	7,553.86	3,675.40	-881.54	40.132875	-104.862958	1,291,889.90	3,178,120.44
9,856.00	90.56	2.13	7,552.95	3,769.31	-877.49	40.133133	-104.862943	1,291,983.83	3,178,123.81
9,951.00	90.49	1.54	7,552.08	3,864.26	-874.45	40.133394	-104.862933	1,292,078.80	3,178,126.17
10,045.00	90.74	1.83	7,551.07	3,958.21	-871.69	40.133651	-104.862923	1,292,172.76	3,178,128.25
10,139.00	89.66	3.05	7,550.74	4,052.12	-867.69	40.133909	-104.862908	1,292,266.70	3,178,131.57
10,233.00	89.44	2.51	7,551.48	4,146.01	-863.13	40.134167	-104.862892	1,292,360.61	3,178,135.45
10,328.00	89.23	1.52	7,552.59	4,240.94	-859.79	40.134428	-104.862880	1,292,455.56	3,178,138.11
10,422.00	89.38	1.26	7,553.73	4,334.91	-857.51	40.134685	-104.862872	1,292,549.54	3,178,139.71
10,516.00	89.66	0.71	7,554.51	4,428.89	-855.89	40.134943	-104.862866	1,292,643.53	3,178,140.65
10,611.00	89.63	0.34	7,555.10	4,523.89	-855.02	40.135204	-104.862863	1,292,738.52	3,178,140.83
10,705.00	89.66	359.94	7,555.68	4,617.88	-854.79	40.135462	-104.862862	1,292,832.51	3,178,140.38
10,799.00	90.34	0.38	7,555.68	4,711.88	-854.53	40.135720	-104.862861	1,292,926.51	3,178,139.97
10,894.00	90.49	0.29	7,555.00	4,806.88	-853.97	40.135981	-104.862859	1,293,021.50	3,178,139.84

## Design Report for Adder 29C-14HZ - 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)
10,988.00	89.20	0.68	7,555.25	4,900.87	-853.18	40.136239	-104.862857	1,293,115.49	3,178,139.95
11,082.00	89.72	1.15	7,556.14	4,994.86	-851.68	40.136497	-104.862851	1,293,209.48	3,178,140.78
11,176.00	89.82	2.67	7,556.51	5,088.80	-848.54	40.136755	-104.862840	1,293,303.44	3,178,143.23
11,271.00	92.59	3.77	7,554.52	5,183.62	-843.21	40.137015	-104.862821	1,293,398.29	3,178,147.88
11,365.00	91.02	3.72	7,551.56	5,277.37	-837.07	40.137273	-104.862799	1,293,492.08	3,178,153.34
11,460.00	91.05	3.41	7,549.84	5,372.17	-831.17	40.137533	-104.862778	1,293,586.92	3,178,158.56
11,554.00	90.40	2.67	7,548.65	5,466.03	-826.18	40.137790	-104.862760	1,293,680.81	3,178,162.87
11,648.00	89.97	2.18	7,548.35	5,559.94	-822.21	40.138048	-104.862746	1,293,774.74	3,178,166.17
11,742.00	90.15	2.01	7,548.25	5,653.88	-818.77	40.138306	-104.862734	1,293,868.70	3,178,168.92
11,837.00	89.94	1.54	7,548.17	5,748.83	-815.83	40.138567	-104.862723	1,293,963.67	3,178,171.18
11,931.00	89.48	0.90	7,548.65	5,842.81	-813.83	40.138825	-104.862716	1,294,057.65	3,178,172.50
12,026.00	90.77	0.20	7,548.44	5,937.80	-812.91	40.139085	-104.862713	1,294,152.65	3,178,172.73
12,120.00	90.86	0.23	7,547.11	6,031.79	-812.56	40.139343	-104.862711	1,294,246.63	3,178,172.40
12,214.00	90.99	359.91	7,545.59	6,125.78	-812.45	40.139601	-104.862711	1,294,340.61	3,178,171.84
12,309.00	88.77	0.76	7,545.79	6,220.77	-811.89	40.139862	-104.862709	1,294,435.60	3,178,171.71
12,403.00	89.66	2.05	7,547.07	6,314.73	-809.59	40.140120	-104.862701	1,294,529.57	3,178,173.34
12,497.00	90.34	2.34	7,547.07	6,408.66	-805.99	40.140378	-104.862688	1,294,623.52	3,178,176.26
12,591.00	90.31	2.20	7,546.54	6,502.59	-802.26	40.140636	-104.862675	1,294,717.47	3,178,179.30
12,686.00	90.03	1.75	7,546.26	6,597.53	-798.99	40.140896	-104.862663	1,294,812.43	3,178,181.89
12,780.00	90.52	1.48	7,545.81	6,691.49	-796.34	40.141154	-104.862654	1,294,906.40	3,178,183.86
12,874.00	89.88	1.09	7,545.48	6,785.47	-794.23	40.141412	-104.862646	1,295,000.39	3,178,185.29
12,968.00	91.48	2.71	7,544.36	6,879.40	-791.12	40.141670	-104.862635	1,295,094.34	3,178,187.73
13,063.00	91.14	2.07	7,542.19	6,974.29	-787.15	40.141931	-104.862621	1,295,189.25	3,178,191.00
13,157.00	90.86	1.35	7,540.55	7,068.24	-784.35	40.142189	-104.862611	1,295,283.21	3,178,193.13
13,251.00	90.92	1.25	7,539.09	7,162.20	-782.22	40.142446	-104.862603	1,295,377.18	3,178,194.58
13,440.00	91.02	0.64	7,535.89	7,351.15	-779.10	40.142965	-104.862592	1,295,566.14	3,178,196.34
13,534.00	89.11	0.47	7,535.79	7,445.14	-778.19	40.143223	-104.862589	1,295,660.13	3,178,196.57
13,628.00	88.83	1.02	7,537.48	7,539.11	-776.97	40.143481	-104.862584	1,295,754.11	3,178,197.11
13,723.00	88.70	0.78	7,539.52	7,634.08	-775.48	40.143742	-104.862579	1,295,849.08	3,178,197.92
13,817.00	90.22	2.06	7,540.41	7,728.04	-773.15	40.144000	-104.862571	1,295,943.05	3,178,199.57
13,911.00	90.09	1.31	7,540.15	7,822.00	-770.38	40.144258	-104.862561	1,296,037.03	3,178,201.65
14,006.00	90.86	1.24	7,539.37	7,916.97	-768.27	40.144518	-104.862553	1,296,132.01	3,178,203.08
14,100.00	90.83	0.54	7,537.98	8,010.95	-766.81	40.144776	-104.862548	1,296,225.99	3,178,203.86
14,194.00	90.22	0.79	7,537.12	8,104.94	-765.72	40.145034	-104.862544	1,296,319.98	3,178,204.28
14,234.00	90.31	0.66	7,536.93	8,144.94	-765.21	40.145144	-104.862542	1,296,359.98	3,178,204.49
14,277.00	90.31	0.66	7,536.70	8,187.93	-764.72	40.145262	-104.862541	1,296,402.98	3,178,204.68

## Design Report for Adder 29C-14HZ - Actual Surveys

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
14,234.00	7,536.93	8,144.94	-765.21	Last MWD Survey @ 14234.00' MD :: 7536.94' TVD
14,277.00	7,536.70	8,187.93	-764.72	Straight Projection to Bit @ 14277.00' MD :: 7536.70' TVD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
User	No Target (Freehand)	1.08	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
102.00	1,164.00	MWD Surface Surveys	MWD
1,287.00	8,252.00	MWD Vertical/Build Surveys	MWD+IFR1+SC
8,347.00	14,277.00	MWD Lateral Surveys	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,194.00	1,193.91	9 5/8"	9-5/8	13-3/4
8,252.00	7,553.86	7" @ 8252 ' MD	7	8-3/4

Design Targets

Shape	Target Name	TVD (')	Northing (')	Easting (')	+N/-S	+E/-W	Created	Updated
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**Design Report for Adder 29C-14HZ - Actual Surveys**

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**Directional Difficulty Index**

Average Dogleg over Survey: 1.70 °/100usft

Maximum Dogleg over Survey: 17.95 °/100usft at 7,771.00  
usft

Net Tortosity applicable to Plans: 1.00 °/100usft

Directional Difficulty Index: 6.588

**Audit Info**



**North Reference Sheet for Sec. 23-T2N-R67W - Adder 29C-14HZ - Plan C**

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

Vertical Depths are relative to RKB = 25' @ 4980.00usft (H&P 308). Northing and Easting are relative to Adder 29C-14HZ

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: 0.99995933

Grid Coordinates of Well: 1,288,221.11 usft N, 3,179,028.46 usft E

Geographical Coordinates of Well: 40° 07' 22.03" N, 104° 51' 35.30" W

Grid Convergence at Surface is: 0.41°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,277.00usft

the Bottom Hole Displacement is 8,223.57usft in the Direction of 354.66° ( True).

Magnetic Convergence at surface is: -8.10° (21 January 2015, , BGGM2014)

