

SPERRY-SUN DRILLING SERVICES

CERTIFIED SURVEY WORK SHEET

OPERATOR:	Anadarko Petroleum Corp.
WELL:	NRC 2C-4HZ
FIELD:	DJ Basin
RIG:	H&P 308
LEGALS:	Sec. 9-T1N-R67W
COUNTY:	Weld
STATE:	Colorado
CAL. METHOD:	Min Curv / True North
MAG. DECL. APPLIED:	8.57
VERTICAL SEC. DIR. :	359.00

SSDS Job Number :	901205069
Start Date of Job :	4/14/2014
End Date of Job :	5/3/2014
Lead Directional Driller:	Jesse Kysar
	Brian Saunders
Other SSDS DD's :	
SSDS MWD Engineers :	Jonathan Parrish
	Patrick Lane
	Ryan White


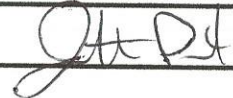
ESS Survey
First Survey Depth
Last Survey Depth

KOP Depth/Sidetrack MD

First Survey Depth
Last Survey Depth
Bit Extrapolation to TD

Main Hole =====>		1st Side Track =====>		2nd Side Track =====>		3rd Side Track =====>		4th Side Track =====>	
	Tie On		Tie On		Tie On		Tie On		Tie On
25.00	Gyro								
1010.00									
7082.00	KOP		KOP-ST1		KOP-ST2		KOP-ST3		KOP-ST4
1111.00	MWD		MWD		MWD		MWD		MWD
17232.00	MWD		MWD		MWD		MWD		MWD
17279.00	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 :

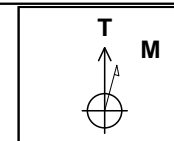
Print Name : Brian Saunders	Print Name : Jonathan Parrish	Print Name :
Sign Name : 	Sign Name : 	Sign Name :
Print Name :	Print Name :	Print Name :
Sign Name :	Sign Name :	Sign Name :

Examples of
Survey Types:

TieOn
MWD
ESS
Gyro
SS

Tie On to Surface Casing (Assumed Vertical), Tie On to existing MWD Survey (prior drilled hole)
Sperry Sun Drilling Services (SSDS) Measurement While Drilling (MWD) Survey's
Sperry Sun Drilling Services (SSDS) Electronic Survey System (ESS) Survey's
Gyro Survey's ; Provided by third party vendor, or by Sperry Sun Drilling Services (SSDS)
Single Shot (SS) Survey's ; Provided by Sperry Sun Drilling Services (SSDS) or third party vendor.

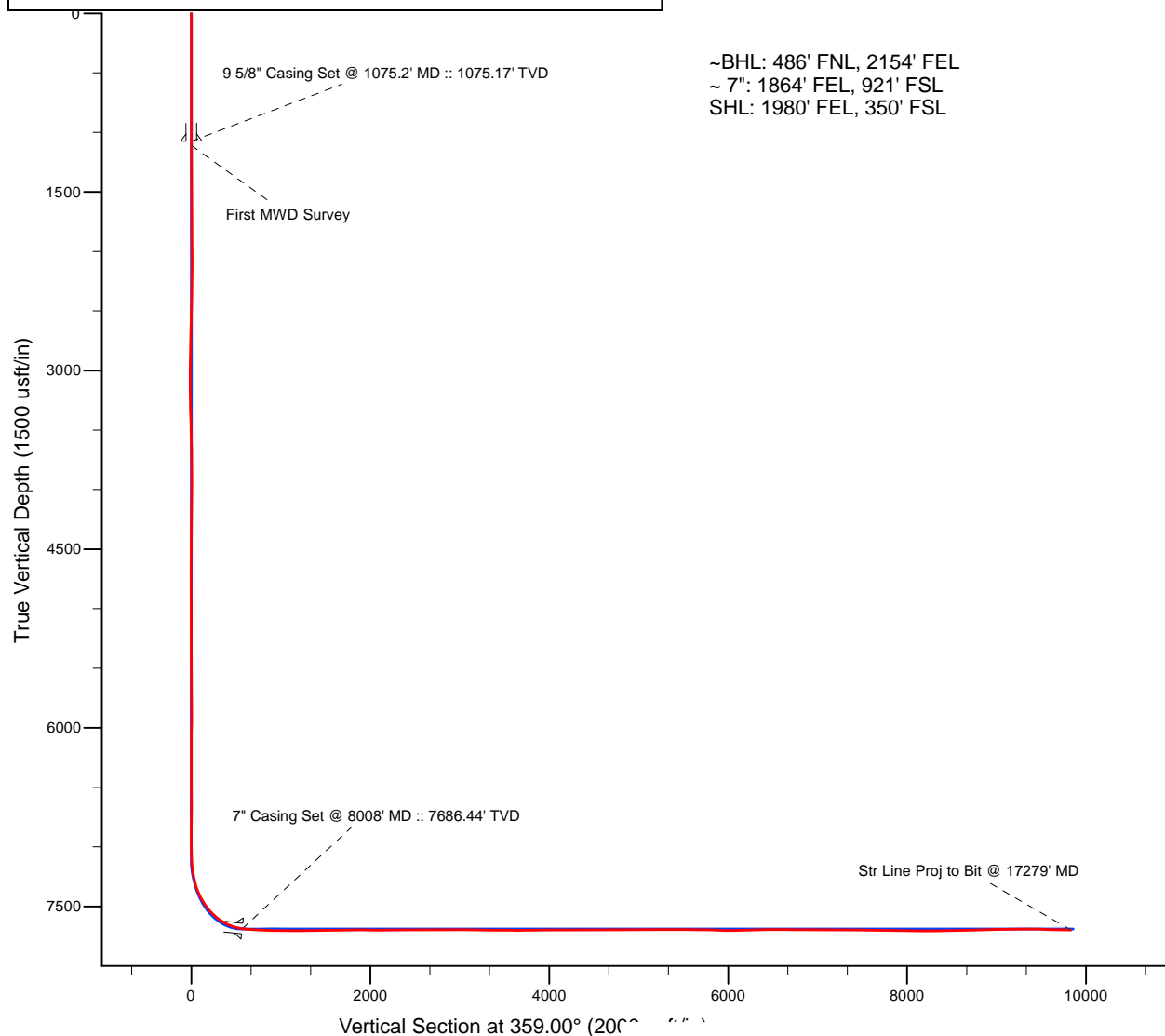
Project: Weld County, CO (NAD 83)
 Site: Sec. 9-T1N-R67W
 Well: NRC 2C-4HZ
 Wellbore: Plan A
 Design: Actual Surveys



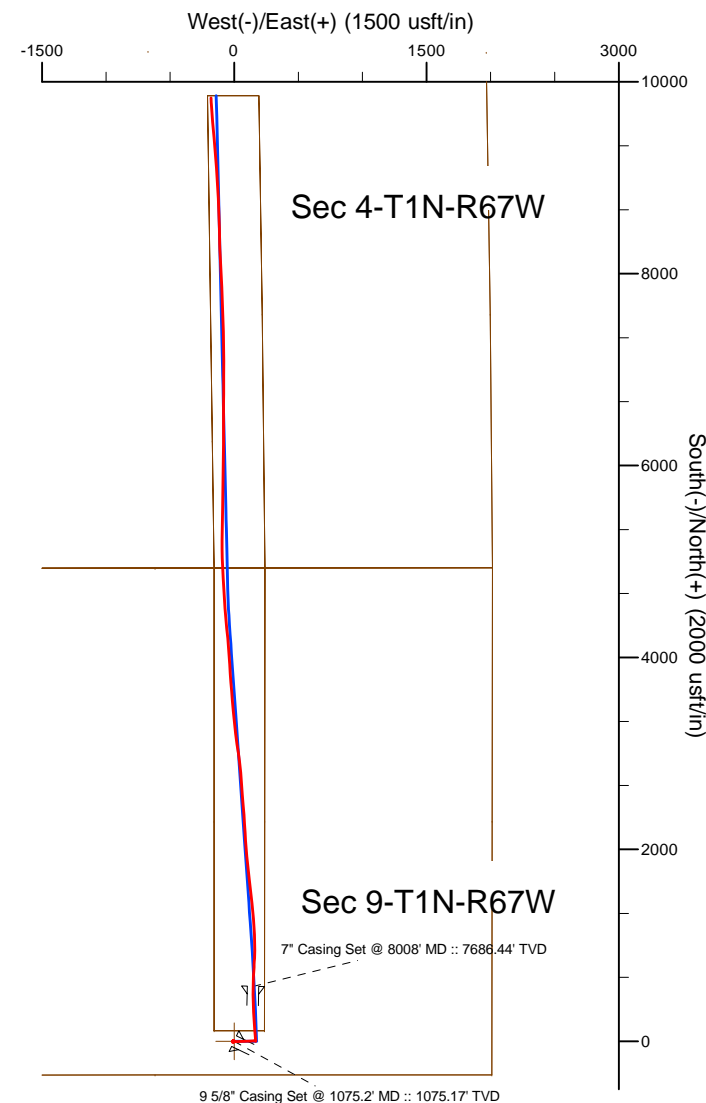
HALLIBURTON
 Sperry Drilling

LEGEND

- + NRC 2C-4HZ, Plan A, Rev A1 V0
- + Actual Surveys



~BHL: 486' FNL, 2154' FEL
 ~ 7": 1864' FEL, 921' FSL
 SHL: 1980' FEL, 350' FSL



	Latitude	Longitude	Northing	Easting
7" Casing:	40.060799	-104.892972	1,265,576.08	3,169,908.28
BHL:	40.086215	-104.894148	1,274,831.79	3,169,515.93

WELL DETAILS: NRC 2C-4HZ	
Ground Level:	5030.80
RKB= 25' @ 5055.80usft	
Design: Actual Surveys (NRC 2C-4HZ/Plan A)	
Created By: Pari Amanlou	Date: 5-8-14

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 9-T1N-R67W

NRC 2C-4HZ

Job# 901205069:: API: 05-123-38995

Plan A

Design: Actual Surveys

Sperry Drilling Services

Standard Report

22 August, 2014

Surface UWI : Job# 901205069:: API: 05-123-38995

Well Coordinates: 1,265,003.02 N, 3,169,764.26 E (40° 03' 33.22" N, 104° 53' 36.60" W)

Ground Level: 5,030.80 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well NRC 2C-4HZ

RKB= 25' @ 5055.80usft

N

True

API - US Survey Feet - Custom

HALLIBURTON

Design Report for NRC 2C-4HZ - 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
25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
125.00	0.48	80.20	125.00	0.07	0.41	0.06	0.48
225.00	0.44	301.46	225.00	0.34	0.50	0.33	0.86
325.00	0.60	135.04	325.00	0.17	0.54	0.16	1.03
425.00	0.63	26.44	424.99	0.29	1.16	0.27	1.00
525.00	0.38	284.13	524.99	0.87	1.08	0.85	0.80
625.00	0.36	156.01	624.99	0.66	0.88	0.65	0.67
725.00	0.62	65.24	724.99	0.60	1.50	0.58	0.72
825.00	0.53	320.84	824.98	1.19	1.70	1.16	0.91
925.00	0.61	274.93	924.98	1.59	0.88	1.58	0.45
1,010.00	0.52	215.70	1,009.98	1.32	0.20	1.31	0.66
Tie-On to Surface Gyro @ 1010.00 FT							
1,075.20	0.25	295.66	1,075.17	1.14	-0.10	1.14	0.82
9 5/8" Casing Set @ 1075.2' MD :: 1075.17' TVD							
1,111.00	0.44	335.38	1,110.97	1.30	-0.22	1.30	0.82
First MWD Survey							
1,206.00	0.51	320.95	1,205.97	1.96	-0.64	1.97	0.15
1,301.00	0.37	318.22	1,300.97	2.51	-1.11	2.53	0.15
1,388.00	0.31	310.20	1,387.97	2.88	-1.48	2.90	0.09
1,482.00	0.54	289.46	1,481.96	3.19	-2.09	3.22	0.29
1,586.00	0.59	296.02	1,585.96	3.59	-3.04	3.64	0.08
1,685.00	0.60	315.77	1,684.95	4.18	-3.86	4.25	0.21
1,771.00	0.76	295.86	1,770.95	4.75	-4.68	4.83	0.33
1,864.00	0.92	306.03	1,863.94	5.46	-5.84	5.56	0.23
1,955.00	1.06	296.58	1,954.92	6.27	-7.18	6.39	0.24
2,048.00	0.41	98.97	2,047.92	6.60	-7.63	6.73	1.57
2,142.00	0.46	129.19	2,141.92	6.31	-7.00	6.43	0.25
2,233.00	0.31	12.34	2,232.92	6.32	-6.67	6.43	0.73
2,325.00	0.47	310.39	2,324.91	6.81	-6.90	6.93	0.46
2,417.00	2.06	189.10	2,416.90	5.42	-7.45	5.55	2.54
2,510.00	3.20	186.31	2,509.80	1.19	-8.00	1.33	1.23
2,603.00	3.22	184.08	2,602.65	-4.00	-8.47	-3.85	0.14
2,695.00	1.31	140.01	2,694.58	-7.38	-7.98	-7.24	2.67
2,787.00	1.09	163.67	2,786.56	-9.03	-7.06	-8.90	0.58
2,879.00	0.74	216.39	2,878.55	-10.35	-7.16	-10.22	0.95
2,971.00	0.87	244.41	2,970.54	-11.13	-8.14	-10.98	0.45
3,063.00	0.65	226.97	3,062.53	-11.78	-9.16	-11.62	0.34
3,155.00	0.72	234.39	3,154.53	-12.48	-10.01	-12.30	0.12
3,246.00	1.21	353.42	3,245.52	-11.85	-10.58	-11.67	1.85
3,339.00	2.00	2.27	3,338.48	-9.26	-10.63	-9.07	0.89
3,431.00	2.11	349.33	3,430.42	-5.99	-10.88	-5.80	0.52
3,523.00	2.15	351.95	3,522.36	-2.62	-11.44	-2.42	0.11
3,615.00	1.35	343.54	3,614.32	0.13	-11.98	0.34	0.91
3,706.00	1.48	336.27	3,705.29	2.24	-12.76	2.46	0.24
3,798.00	1.62	76.63	3,797.27	3.62	-11.97	3.83	2.59
3,890.00	1.67	86.28	3,889.23	4.01	-9.37	4.18	0.31
3,982.00	1.51	93.07	3,981.20	4.03	-6.82	4.15	0.27
4,073.00	1.24	115.71	4,072.17	3.54	-4.74	3.63	0.66
4,165.00	1.42	111.12	4,164.14	2.70	-2.78	2.75	0.23

Design Report for NRC 2C-4HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,257.00	1.01	125.36	4,256.12	1.82	-1.05	1.84	0.55
4,352.00	1.09	138.41	4,351.11	0.66	0.23	0.66	0.26
4,446.00	1.02	141.46	4,445.09	-0.66	1.34	-0.69	0.10
4,541.00	0.75	143.99	4,540.08	-1.83	2.24	-1.87	0.29
4,635.00	2.70	92.32	4,634.04	-2.41	4.81	-2.50	2.46
4,729.00	3.94	88.28	4,727.88	-2.41	10.25	-2.59	1.34
4,824.00	6.55	84.72	4,822.47	-1.81	18.91	-2.14	2.77
4,918.00	8.09	86.76	4,915.70	-0.94	30.85	-1.48	1.66
5,012.00	9.29	88.47	5,008.62	-0.37	45.04	-1.15	1.31
5,107.00	10.13	86.85	5,102.26	0.30	61.05	-0.77	0.93
5,202.00	9.95	89.95	5,195.81	0.76	77.60	-0.59	0.60
5,296.00	9.44	88.18	5,288.46	1.02	93.43	-0.62	0.63
5,390.00	8.19	86.21	5,381.35	1.70	107.81	-0.18	1.37
5,485.00	7.24	87.92	5,475.49	2.37	120.55	0.26	1.03
5,579.00	6.18	84.20	5,568.85	3.09	131.50	0.80	1.22
5,674.00	4.91	84.40	5,663.40	4.01	140.63	1.55	1.34
5,768.00	4.31	85.63	5,757.10	4.67	148.16	2.08	0.65
5,862.00	3.41	90.61	5,850.88	4.91	154.48	2.21	1.02
5,957.00	2.81	88.94	5,945.74	4.92	159.63	2.13	0.64
6,051.00	1.70	95.50	6,039.67	4.83	163.32	1.98	1.21
6,146.00	1.29	95.25	6,134.64	4.60	165.79	1.70	0.43
6,240.00	0.75	113.61	6,228.62	4.25	167.41	1.33	0.66
6,335.00	0.25	49.98	6,323.62	4.14	168.13	1.20	0.71
6,429.00	0.31	311.87	6,417.62	4.44	168.10	1.51	0.45
6,523.00	0.31	293.96	6,511.61	4.71	167.68	1.79	0.10
6,618.00	0.31	240.48	6,606.61	4.69	167.22	1.77	0.29
6,712.00	0.15	158.73	6,700.61	4.45	167.05	1.53	0.35
6,807.00	0.43	161.64	6,795.61	4.00	167.20	1.08	0.30
6,901.00	0.25	202.53	6,889.61	3.47	167.24	0.55	0.31
6,996.00	0.44	215.58	6,984.61	2.98	166.94	0.07	0.22
7,090.00	1.82	299.45	7,078.59	3.42	165.43	0.54	1.94
7,137.00	6.32	353.67	7,125.47	6.36	164.50	3.49	11.61
7,185.00	10.13	3.53	7,172.97	13.21	164.47	10.33	8.44
7,232.00	11.77	3.89	7,219.11	22.12	165.05	19.23	3.49
7,279.00	14.75	359.38	7,264.86	32.88	165.31	29.99	6.71
7,326.00	19.82	1.46	7,309.72	46.84	165.45	43.95	10.87
7,374.00	25.79	355.78	7,353.95	65.41	164.88	62.52	13.24
7,421.00	32.06	357.14	7,395.07	88.09	163.51	85.22	13.41
7,468.00	35.65	355.42	7,434.10	114.21	161.79	111.37	7.91
7,515.00	39.63	355.29	7,471.31	142.81	159.47	140.00	8.47
7,563.00	44.90	356.19	7,506.82	174.99	157.08	172.22	11.05
7,610.00	50.27	356.49	7,538.51	209.61	154.87	206.87	11.44
7,657.00	53.81	356.89	7,567.41	246.60	152.73	243.89	7.56
7,704.00	58.53	359.22	7,593.57	285.60	151.43	282.92	10.85
7,752.00	62.57	358.76	7,617.17	327.38	150.69	324.70	8.46
7,799.00	66.99	358.67	7,637.19	369.88	149.74	367.21	9.41
7,847.00	72.16	358.72	7,653.94	414.84	148.71	412.18	10.77
7,894.00	74.58	358.72	7,667.38	459.86	147.71	457.21	5.15
7,941.00	79.64	359.60	7,677.87	505.65	147.04	503.01	10.92
7,966.00	82.86	0.93	7,681.67	530.36	147.16	527.71	13.91
8,008.00	84.11	1.24	7,686.44	572.08	147.94	569.41	3.05

Design Report for NRC 2C-4HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
7" Casing Set @ 8008' MD :: 7686.44' TVD							
8,112.00	87.19	1.99	7,694.33	675.72	150.87	672.99	3.05
8,207.00	87.29	2.62	7,698.90	770.54	154.68	767.72	0.67
8,301.00	88.80	0.98	7,702.11	864.43	157.63	861.55	2.37
8,396.00	89.63	0.53	7,703.41	959.41	158.88	956.49	0.99
8,490.00	90.22	359.62	7,703.53	1,053.41	159.01	1,050.47	1.15
8,585.00	90.34	358.03	7,703.07	1,148.39	157.06	1,145.47	1.68
8,679.00	89.72	356.31	7,703.02	1,242.27	152.42	1,239.42	1.95
8,774.00	89.88	355.86	7,703.35	1,337.04	145.93	1,334.29	0.50
8,869.00	90.83	355.86	7,702.76	1,431.79	139.07	1,429.15	1.00
8,963.00	90.59	355.38	7,701.60	1,525.51	131.89	1,522.98	0.57
9,057.00	90.77	355.12	7,700.48	1,619.18	124.11	1,616.77	0.34
9,152.00	90.43	354.40	7,699.49	1,713.78	115.44	1,711.50	0.84
9,246.00	91.11	355.60	7,698.22	1,807.41	107.24	1,805.26	1.47
9,339.00	89.35	356.06	7,697.85	1,900.16	100.48	1,898.12	1.96
9,431.00	89.26	356.10	7,698.97	1,991.94	94.19	1,989.99	0.11
9,524.00	89.69	357.42	7,699.82	2,084.78	88.94	2,082.91	1.49
9,615.00	90.37	357.05	7,699.77	2,175.68	84.55	2,173.87	0.85
9,708.00	90.62	357.28	7,698.97	2,268.56	79.95	2,266.82	0.37
9,801.00	90.46	357.20	7,698.09	2,361.45	75.47	2,359.77	0.19
9,893.00	90.15	356.45	7,697.60	2,453.30	70.37	2,451.70	0.88
9,985.00	90.40	356.70	7,697.16	2,545.14	64.88	2,543.62	0.38
10,077.00	90.65	356.72	7,696.32	2,636.98	59.60	2,635.54	0.27
10,170.00	90.89	356.65	7,695.07	2,729.82	54.22	2,728.46	0.27
10,263.00	90.86	356.19	7,693.65	2,822.63	48.41	2,821.35	0.50
10,355.00	89.04	354.56	7,693.73	2,914.32	41.00	2,913.16	2.66
10,447.00	88.15	353.79	7,695.98	3,005.82	31.66	3,004.80	1.28
10,539.00	89.66	353.91	7,697.74	3,097.27	21.81	3,096.41	1.65
10,631.00	89.05	355.16	7,698.78	3,188.84	13.05	3,188.13	1.51
10,723.00	89.41	354.84	7,700.01	3,280.48	5.03	3,279.89	0.52
10,815.00	90.03	356.35	7,700.46	3,372.21	-2.04	3,371.73	1.77
10,906.00	89.94	356.53	7,700.49	3,463.03	-7.69	3,462.64	0.22
10,999.00	89.72	356.15	7,700.76	3,555.84	-13.62	3,555.54	0.47
11,093.00	89.91	356.06	7,701.07	3,649.62	-20.01	3,649.42	0.22
11,184.00	90.46	356.36	7,700.77	3,740.42	-26.02	3,740.31	0.69
11,276.00	90.62	357.32	7,699.91	3,832.28	-31.09	3,832.24	1.06
11,368.00	90.55	357.34	7,698.97	3,924.17	-35.38	3,924.19	0.08
11,460.00	90.71	357.39	7,697.96	4,016.07	-39.61	4,016.15	0.18
11,552.00	90.19	356.51	7,697.23	4,107.93	-44.50	4,108.09	1.11
11,643.00	89.72	356.14	7,697.30	4,198.75	-50.34	4,198.99	0.66
11,735.00	89.38	355.55	7,698.03	4,290.50	-57.00	4,290.84	0.74
11,827.00	89.14	355.40	7,699.21	4,382.21	-64.26	4,382.66	0.31
11,918.00	90.68	357.07	7,699.36	4,473.01	-70.23	4,473.55	2.50
12,010.00	91.60	358.26	7,697.53	4,564.91	-73.98	4,565.50	1.63
12,105.00	90.86	357.11	7,695.49	4,659.81	-77.82	4,660.45	1.44
12,199.00	89.17	357.19	7,695.46	4,753.69	-82.49	4,754.40	1.80
12,294.00	90.62	357.10	7,695.64	4,848.57	-87.22	4,849.35	1.53
12,388.00	89.57	358.42	7,695.48	4,942.49	-90.90	4,943.32	1.79
12,483.00	90.40	358.85	7,695.51	5,037.46	-93.16	5,038.32	0.98
12,578.00	90.77	359.23	7,694.54	5,132.44	-94.75	5,133.32	0.56
12,672.00	90.43	0.68	7,693.55	5,226.44	-94.83	5,227.30	1.58

Design Report for NRC 2C-4HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
12,767.00	89.60	0.80	7,693.53	5,321.43	-93.60	5,322.25	0.88
12,862.00	90.18	0.80	7,693.71	5,416.42	-92.27	5,417.20	0.61
12,957.00	89.23	0.80	7,694.20	5,511.41	-90.95	5,512.15	1.00
13,052.00	89.38	0.61	7,695.35	5,606.39	-89.78	5,607.10	0.25
13,146.00	89.97	0.42	7,695.88	5,700.39	-88.93	5,701.07	0.66
13,241.00	88.03	0.99	7,697.54	5,795.36	-87.76	5,796.01	2.13
13,336.00	88.46	0.51	7,700.45	5,890.31	-86.52	5,890.92	0.68
13,431.00	90.25	0.97	7,701.52	5,985.29	-85.29	5,985.87	1.95
13,526.00	90.06	0.18	7,701.26	6,080.28	-84.34	6,080.83	0.86
13,621.00	91.17	0.20	7,700.24	6,175.27	-84.03	6,175.80	1.17
13,715.00	91.39	359.98	7,698.14	6,269.25	-83.88	6,269.76	0.33
13,810.00	91.60	0.10	7,695.67	6,364.22	-83.81	6,364.71	0.25
13,905.00	90.06	0.14	7,694.29	6,459.21	-83.61	6,459.68	1.62
13,999.00	90.59	0.16	7,693.76	6,553.20	-83.37	6,553.66	0.56
14,094.00	89.14	0.56	7,693.98	6,648.20	-82.77	6,648.63	1.58
14,188.00	89.23	0.23	7,695.32	6,742.19	-82.12	6,742.59	0.36
14,283.00	89.45	0.21	7,696.41	6,837.18	-81.76	6,837.57	0.23
14,378.00	89.94	0.23	7,696.92	6,932.18	-81.39	6,932.54	0.52
14,473.00	89.72	359.95	7,697.20	7,027.18	-81.24	7,027.52	0.37
14,568.00	90.15	0.29	7,697.31	7,122.18	-81.04	7,122.51	0.58
14,663.00	89.41	358.94	7,697.67	7,217.17	-81.68	7,217.50	1.62
14,758.00	90.09	358.85	7,698.09	7,312.15	-83.52	7,312.50	0.72
14,852.00	90.49	359.28	7,697.61	7,406.14	-85.05	7,406.49	0.62
14,947.00	88.71	358.65	7,698.27	7,501.11	-86.76	7,501.49	1.99
15,042.00	88.67	358.39	7,700.45	7,596.06	-89.22	7,596.46	0.28
15,137.00	89.29	358.38	7,702.14	7,691.01	-91.89	7,691.44	0.65
15,231.00	89.72	358.08	7,702.95	7,784.96	-94.80	7,785.43	0.56
15,326.00	90.62	358.42	7,702.67	7,879.91	-97.70	7,880.42	1.01
15,421.00	88.58	357.75	7,703.33	7,974.85	-100.87	7,975.40	2.26
15,516.00	89.14	357.85	7,705.22	8,069.76	-104.52	8,070.36	0.60
15,611.00	89.26	357.84	7,706.55	8,164.68	-108.09	8,165.33	0.13
15,705.00	90.12	357.96	7,707.06	8,258.62	-111.54	8,259.31	0.92
15,800.00	91.26	358.99	7,705.91	8,353.58	-114.06	8,354.29	1.62
15,894.00	91.23	358.99	7,703.87	8,447.54	-115.72	8,448.27	0.03
15,989.00	91.54	359.04	7,701.57	8,542.50	-117.35	8,543.24	0.33
16,083.00	90.96	358.60	7,699.52	8,636.45	-119.29	8,637.22	0.77
16,178.00	90.80	357.98	7,698.06	8,731.40	-122.12	8,732.20	0.67
16,272.00	90.62	357.47	7,696.90	8,825.32	-125.85	8,826.17	0.58
16,367.00	91.14	357.89	7,695.44	8,920.23	-129.70	8,921.13	0.70
16,461.00	90.92	357.56	7,693.75	9,014.14	-133.43	9,015.09	0.42
16,556.00	90.83	356.90	7,692.30	9,109.02	-138.02	9,110.04	0.70
16,650.00	90.65	356.60	7,691.08	9,202.86	-143.35	9,203.96	0.37
16,744.00	90.68	355.89	7,689.99	9,296.65	-149.51	9,297.84	0.76
16,838.00	89.60	355.73	7,689.76	9,390.40	-156.37	9,391.69	1.16
16,932.00	88.52	356.47	7,691.31	9,484.16	-162.77	9,485.56	1.39
17,027.00	88.58	357.06	7,693.71	9,578.98	-168.12	9,580.46	0.62
17,121.00	89.08	357.24	7,695.63	9,672.84	-172.80	9,674.39	0.57
17,215.00	89.04	356.83	7,697.17	9,766.71	-177.66	9,768.32	0.44
17,232.00	89.08	356.92	7,697.45	9,783.68	-178.59	9,785.31	0.58
17,279.00	89.08	356.92	7,698.21	9,830.60	-181.11	9,832.27	0.00

Str Line Proj to Bit @ 17279' MD ::

Design Report for NRC 2C-4HZ - Actual Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
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Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,010.00	1,009.98	1.32	0.20	Tie-On to Surface Gyro @ 1010.00 FT
1,111.00	1,110.97	1.30	-0.22	First MWD Survey
17,279.00	7,698.21	9,830.60	-181.11	Str Line Proj to Bit @ 17279' MD ::

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	359.00	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
25.00	1,010.00	Surface Gyro Surveys	NS-GYRO-MS
1,111.00	8,112.00	MWD Surveys-Intermediate	MWD+IFR1+SC
8,207.00	17,232.00	MWD Lateral Surveys	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,075.20		9 5/8" Casing Set @ 1075.2' MD :: 1075.17' TVD	9-5/8	13-1/2
8,008.00		7" Casing Set @ 8008' MD :: 7686.44' TVD	7	8-3/4

Design Report for NRC 2C-4HZ - 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
NRC 2C-4HZ SHL	0.00	0.00	0.00	0.01	0.00	1,265,003.03	3,169,764.26	40° 3' 33.224 N	104° 53' 36.600 W
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
NRC 2C-4HZ_LB	0.00	0.00	0.00	0.01	0.00	1,265,003.03	3,169,764.26	40° 3' 33.224 N	104° 53' 36.600 W
- actual wellpath misses target center by 0.01usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	110.09	-157.50	1,265,112.03	3,169,606.02	
Point 2				0.00	2,291.67	-157.40	1,267,293.48	3,169,591.20	
Point 3				0.00	4,933.20	-157.28	1,269,934.85	3,169,573.25	
Point 4				0.00	6,255.76	-169.97	1,271,257.24	3,169,551.52	
Point 5				0.00	9,855.84	-207.28	1,274,856.85	3,169,489.59	
Point 6				0.00	9,854.23	192.56	1,274,857.97	3,169,889.41	
Point 7				0.00	7,578.04	217.80	1,272,582.09	3,169,930.22	
Point 8				0.00	4,933.80	238.93	1,269,938.16	3,169,969.43	
Point 9				0.00	2,292.01	237.53	1,267,296.52	3,169,986.10	
Point 10				0.00	110.17	236.38	1,265,114.81	3,169,999.87	
Point 11				0.00	110.09	-157.50	1,265,112.03	3,169,606.02	
NRC 13-9HZ Pad_Sec	0.00	0.00	-33.80	-0.57	-2,615.30	1,264,984.56	3,167,149.12	40° 3' 33.217 N	104° 54' 10.235 W
- actual wellpath misses target center by 2615.52usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				-33.80	10,329.15	-698.23	1,275,308.30	3,166,380.29	
Point 2				-33.80	7,581.05	-672.58	1,272,560.55	3,166,424.74	
Point 3				-33.80	4,929.01	-636.91	1,269,908.91	3,166,478.54	
Point 4				-33.80	4,933.30	1,997.48	1,269,931.22	3,169,112.74	
Point 5				-33.80	4,937.55	4,629.98	1,269,953.47	3,171,745.05	
Point 6				-33.80	4,933.30	1,997.48	1,269,931.22	3,169,112.74	
Point 7				-33.80	4,929.01	-636.91	1,269,908.91	3,166,478.54	
Point 8				-33.80	2,289.57	-633.27	1,267,269.66	3,166,500.23	
Point 9				-33.80	-350.08	-629.55	1,264,630.19	3,166,522.01	
Point 10				-33.80	-349.24	1,997.80	1,264,649.00	3,169,149.19	
Point 11				-33.80	-348.39	4,625.17	1,264,667.82	3,171,776.40	
Point 12				-33.80	2,294.58	4,627.58	1,267,310.65	3,171,760.73	
Point 13				-33.80	4,937.55	4,629.98	1,269,953.47	3,171,745.05	
Point 14				-33.80	7,577.90	4,612.90	1,272,593.54	3,171,709.92	
Point 15				-33.80	10,308.11	4,581.57	1,275,323.37	3,171,659.91	
Point 16				-33.80	10,318.54	1,941.91	1,275,315.75	3,169,020.34	
Point 17				-33.80	10,329.15	-698.23	1,275,308.30	3,166,380.29	
NRC 2C-4HZ Lateral T	0.00	0.00	7,690.00	750.01	150.00	1,265,754.01	3,169,909.12	40° 3' 40.636 N	104° 53' 34.671 W
- actual wellpath misses target center by 8.76usft at 8185.90usft MD (7697.90 TVD, 749.48 N, 153.74 E)									
- Point									
NRC 2C-4HZ Lateral T	0.00	0.00	7,690.00	4,500.01	-45.00	1,269,502.45	3,169,688.49	40° 4' 17.694 N	104° 53' 37.179 W
- actual wellpath misses target center by 27.99usft at 11944.13usft MD (7698.99 TVD, 4499.11 N, -71.49 E)									
- Point									
NRC 2C-4HZ BHL_Re	0.00	0.00	7,690.00	9,855.17	-140.00	1,274,856.63	3,169,556.87	40° 5' 10.615 N	104° 53' 38.401 W
- actual wellpath misses target center by 48.59usft at 17279.00usft MD (7698.21 TVD, 9830.60 N, -181.11 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.31 °/100usft	Maximum Dogleg over Survey:	13.91 °/100usft at 7,966.00 usft
Net Tortosity applicable to Plans:	0.61 °/100usft	Directional Difficulty Index:	6.709

Audit Info

North Reference Sheet for Sec. 9-T1N-R67W - NRC 2C-4HZ - Plan A

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' @ 5055.80usft. Northing and Easting are relative to NRC 2C-4HZ

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° 30' 0.000 W°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:40° 47' 0.000 N°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996240

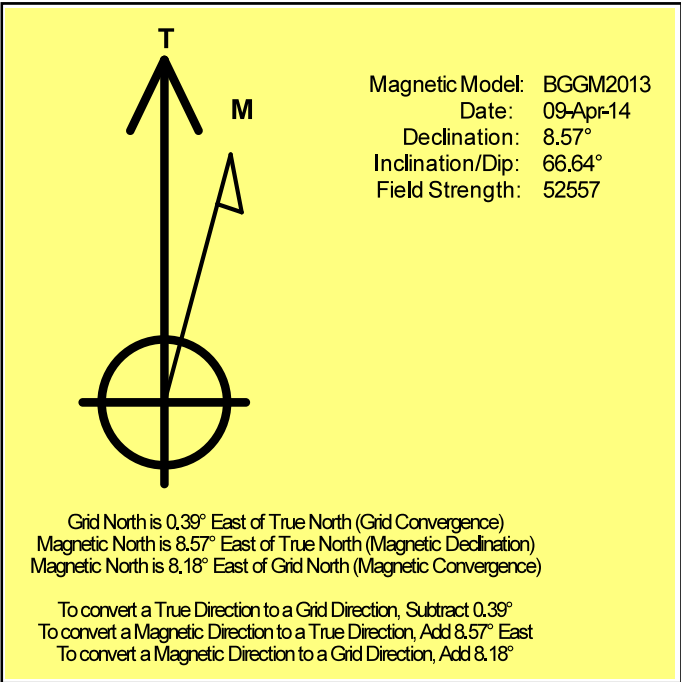
Grid Coordinates of Well: 1,265,003.02 usft N, 3,169,764.26 usft E

Geographical Coordinates of Well: 40° 03' 33.22" N, 104° 53' 36.60" W

Grid Convergence at Surface is: 0.39°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,279.00usft
 the Bottom Hole Displacement is 9,832.27usft in the Direction of 358.94° (True).

Magnetic Convergence at surface is: -8.18° (9 April 2014, , BGGM2013)



Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 9-T1N-R67W

NRC 2C-4HZ

Job# 901205069:: API: 05-123-38995

Plan A

Design: Actual Surveys

Sperry Drilling Services

Geodetic Report

25 August, 2014

Well Coordinates: 1,265,003.02 N, 3,169,764.26 E (40° 03' 33.22" N, 104° 53' 36.60" W)

Ground Level: 5,030.80 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well NRC 2C-4HZ

RKB= 25' @ 5055.80usft

N

True

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for NRC 2C-4HZ - 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	40.059229	-104.893500	1,265,003.02	3,169,764.26
25.00	0.00	0.00	25.00	0.00	0.00	40.059229	-104.893500	1,265,003.02	3,169,764.26
125.00	0.48	80.20	125.00	0.07	0.41	40.059229	-104.893499	1,265,003.09	3,169,764.67
225.00	0.44	301.46	225.00	0.34	0.50	40.059230	-104.893498	1,265,003.37	3,169,764.76
325.00	0.60	135.04	325.00	0.17	0.54	40.059230	-104.893498	1,265,003.20	3,169,764.80
425.00	0.63	26.44	424.99	0.29	1.16	40.059230	-104.893496	1,265,003.32	3,169,765.41
525.00	0.38	284.13	524.99	0.87	1.08	40.059231	-104.893496	1,265,003.89	3,169,765.33
625.00	0.36	156.01	624.99	0.66	0.88	40.059231	-104.893497	1,265,003.69	3,169,765.14
725.00	0.62	65.24	724.99	0.60	1.50	40.059231	-104.893495	1,265,003.63	3,169,765.76
825.00	0.53	320.84	824.98	1.19	1.70	40.059232	-104.893494	1,265,004.22	3,169,765.96
925.00	0.61	274.93	924.98	1.59	0.88	40.059233	-104.893497	1,265,004.62	3,169,765.13
1,010.00	0.52	215.70	1,009.98	1.32	0.20	40.059233	-104.893500	1,265,004.34	3,169,764.46
1,075.20	0.25	295.66	1,075.17	1.14	-0.10	40.059232	-104.893501	1,265,004.16	3,169,764.16
1,111.00	0.44	335.38	1,110.97	1.30	-0.22	40.059233	-104.893501	1,265,004.31	3,169,764.03
1,206.00	0.51	320.95	1,205.97	1.96	-0.64	40.059234	-104.893503	1,265,004.97	3,169,763.60
1,301.00	0.37	318.22	1,300.97	2.51	-1.11	40.059236	-104.893504	1,265,005.53	3,169,763.13
1,388.00	0.31	310.20	1,387.97	2.88	-1.48	40.059237	-104.893506	1,265,005.88	3,169,762.76
1,482.00	0.54	289.46	1,481.96	3.19	-2.09	40.059238	-104.893508	1,265,006.19	3,169,762.15
1,586.00	0.59	296.02	1,585.96	3.59	-3.04	40.059239	-104.893511	1,265,006.58	3,169,761.20
1,685.00	0.60	315.77	1,684.95	4.18	-3.86	40.059241	-104.893514	1,265,007.17	3,169,760.38
1,771.00	0.76	295.86	1,770.95	4.75	-4.68	40.059242	-104.893517	1,265,007.74	3,169,759.55
1,864.00	0.92	306.03	1,863.94	5.46	-5.84	40.059244	-104.893521	1,265,008.44	3,169,758.38
1,955.00	1.06	296.58	1,954.92	6.27	-7.18	40.059246	-104.893526	1,265,009.24	3,169,757.03
2,048.00	0.41	98.97	2,047.92	6.60	-7.63	40.059247	-104.893528	1,265,009.57	3,169,756.59
2,142.00	0.46	129.19	2,141.92	6.31	-7.00	40.059246	-104.893525	1,265,009.28	3,169,757.22
2,233.00	0.31	12.34	2,232.92	6.32	-6.67	40.059246	-104.893524	1,265,009.29	3,169,757.55
2,325.00	0.47	310.39	2,324.91	6.81	-6.90	40.059248	-104.893525	1,265,009.78	3,169,757.32
2,417.00	2.06	189.10	2,416.90	5.42	-7.45	40.059244	-104.893527	1,265,008.39	3,169,756.78
2,510.00	3.20	186.31	2,509.80	1.19	-8.00	40.059232	-104.893529	1,265,004.15	3,169,756.26
2,603.00	3.22	184.08	2,602.65	-4.00	-8.47	40.059218	-104.893531	1,264,998.96	3,169,755.82
2,695.00	1.31	140.01	2,694.58	-7.38	-7.98	40.059209	-104.893529	1,264,995.58	3,169,756.33
2,787.00	1.09	163.67	2,786.56	-9.03	-7.06	40.059204	-104.893525	1,264,993.94	3,169,757.27
2,879.00	0.74	216.39	2,878.55	-10.35	-7.16	40.059201	-104.893526	1,264,992.63	3,169,757.17
2,971.00	0.87	244.41	2,970.54	-11.13	-8.14	40.059199	-104.893529	1,264,991.84	3,169,756.19
3,063.00	0.65	226.97	3,062.53	-11.78	-9.16	40.059197	-104.893533	1,264,991.17	3,169,755.19
3,155.00	0.72	234.39	3,154.53	-12.48	-10.01	40.059195	-104.893536	1,264,990.48	3,169,754.34
3,246.00	1.21	353.42	3,245.52	-11.85	-10.58	40.059197	-104.893538	1,264,991.09	3,169,753.76
3,339.00	2.00	2.27	3,338.48	-9.26	-10.63	40.059204	-104.893538	1,264,993.69	3,169,753.69
3,431.00	2.11	349.33	3,430.42	-5.99	-10.88	40.059213	-104.893539	1,264,996.96	3,169,753.42
3,523.00	2.15	351.95	3,522.36	-2.62	-11.44	40.059222	-104.893541	1,265,000.33	3,169,752.84
3,615.00	1.35	343.54	3,614.32	0.13	-11.98	40.059229	-104.893543	1,265,003.07	3,169,752.28
3,706.00	1.48	336.27	3,705.29	2.24	-12.76	40.059235	-104.893546	1,265,005.17	3,169,751.49

Design Report for NRC 2C-4HZ - 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)
3,798.00	1.62	76.63	3,797.27	3.62	-11.97	40.059239	-104.893543	1,265,006.56	3,169,752.26
3,890.00	1.67	86.28	3,889.23	4.01	-9.37	40.059240	-104.893534	1,265,006.97	3,169,754.86
3,982.00	1.51	93.07	3,981.20	4.03	-6.82	40.059240	-104.893525	1,265,007.01	3,169,757.41
4,073.00	1.24	115.71	4,072.17	3.54	-4.74	40.059239	-104.893517	1,265,006.53	3,169,759.50
4,165.00	1.42	111.12	4,164.14	2.70	-2.78	40.059236	-104.893510	1,265,005.70	3,169,761.47
4,257.00	1.01	125.36	4,256.12	1.82	-1.05	40.059234	-104.893504	1,265,004.83	3,169,763.20
4,352.00	1.09	138.41	4,351.11	0.66	0.23	40.059231	-104.893499	1,265,003.68	3,169,764.49
4,446.00	1.02	141.46	4,445.09	-0.66	1.34	40.059227	-104.893495	1,265,002.37	3,169,765.61
4,541.00	0.75	143.99	4,540.08	-1.83	2.24	40.059224	-104.893492	1,265,001.21	3,169,766.51
4,635.00	2.70	92.32	4,634.04	-2.41	4.81	40.059222	-104.893483	1,265,000.64	3,169,769.09
4,729.00	3.94	88.28	4,727.88	-2.41	10.25	40.059222	-104.893464	1,265,000.68	3,169,774.53
4,824.00	6.55	84.72	4,822.47	-1.81	18.91	40.059224	-104.893433	1,265,001.34	3,169,783.18
4,918.00	8.09	86.76	4,915.70	-0.94	30.85	40.059226	-104.893390	1,265,002.29	3,169,795.12
5,012.00	9.29	88.47	5,008.62	-0.37	45.04	40.059228	-104.893339	1,265,002.96	3,169,809.30
5,107.00	10.13	86.85	5,102.26	0.30	61.05	40.059230	-104.893282	1,265,003.73	3,169,825.31
5,202.00	9.95	89.95	5,195.81	0.76	77.60	40.059231	-104.893223	1,265,004.31	3,169,841.85
5,296.00	9.44	88.18	5,288.46	1.02	93.43	40.059232	-104.893167	1,265,004.67	3,169,857.67
5,390.00	8.19	86.21	5,381.35	1.70	107.81	40.059234	-104.893115	1,265,005.46	3,169,872.05
5,485.00	7.24	87.92	5,475.49	2.37	120.55	40.059236	-104.893070	1,265,006.21	3,169,884.78
5,579.00	6.18	84.20	5,568.85	3.09	131.50	40.059238	-104.893030	1,265,007.01	3,169,895.73
5,674.00	4.91	84.40	5,663.40	4.01	140.63	40.059240	-104.892998	1,265,007.99	3,169,904.86
5,768.00	4.31	85.63	5,757.10	4.67	148.16	40.059242	-104.892971	1,265,008.70	3,169,912.38
5,862.00	3.41	90.61	5,850.88	4.91	154.48	40.059243	-104.892948	1,265,008.98	3,169,918.69
5,957.00	2.81	88.94	5,945.74	4.92	159.63	40.059243	-104.892930	1,265,009.03	3,169,923.85
6,051.00	1.70	95.50	6,039.67	4.83	163.32	40.059242	-104.892917	1,265,008.97	3,169,927.54
6,146.00	1.29	95.25	6,134.64	4.60	165.79	40.059242	-104.892908	1,265,008.75	3,169,930.01
6,240.00	0.75	113.61	6,228.62	4.25	167.41	40.059241	-104.892902	1,265,008.42	3,169,931.63
6,335.00	0.25	49.98	6,323.62	4.14	168.13	40.059240	-104.892900	1,265,008.31	3,169,932.36
6,429.00	0.31	311.87	6,417.62	4.44	168.10	40.059241	-104.892900	1,265,008.61	3,169,932.32
6,523.00	0.31	293.96	6,511.61	4.71	167.68	40.059242	-104.892901	1,265,008.88	3,169,931.90
6,618.00	0.31	240.48	6,606.61	4.69	167.22	40.059242	-104.892903	1,265,008.85	3,169,931.44
6,712.00	0.15	158.73	6,700.61	4.45	167.05	40.059241	-104.892904	1,265,008.61	3,169,931.27
6,807.00	0.43	161.64	6,795.61	4.00	167.20	40.059240	-104.892903	1,265,008.16	3,169,931.43
6,901.00	0.25	202.53	6,889.61	3.47	167.24	40.059239	-104.892903	1,265,007.63	3,169,931.46
6,996.00	0.44	215.58	6,984.61	2.98	166.94	40.059237	-104.892904	1,265,007.14	3,169,931.17
7,090.00	1.82	299.45	7,078.59	3.42	165.43	40.059238	-104.892909	1,265,007.57	3,169,929.66
7,137.00	6.32	353.67	7,125.47	6.36	164.50	40.059247	-104.892913	1,265,010.51	3,169,928.71
7,185.00	10.13	3.53	7,172.97	13.21	164.47	40.059265	-104.892913	1,265,017.35	3,169,928.63
7,232.00	11.77	3.89	7,219.11	22.12	165.05	40.059290	-104.892911	1,265,026.26	3,169,929.15
7,279.00	14.75	359.38	7,264.86	32.88	165.31	40.059319	-104.892910	1,265,037.03	3,169,929.33
7,326.00	19.82	1.46	7,309.72	46.84	165.45	40.059358	-104.892909	1,265,050.99	3,169,929.38
7,374.00	25.79	355.78	7,353.95	65.41	164.88	40.059409	-104.892911	1,265,069.55	3,169,928.69

Design Report for NRC 2C-4HZ - 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)
7,421.00	32.06	357.14	7,395.07	88.09	163.51	40.059471	-104.892916	1,265,092.22	3,169,927.16
7,468.00	35.65	355.42	7,434.10	114.21	161.79	40.059543	-104.892922	1,265,118.32	3,169,925.26
7,515.00	39.63	355.29	7,471.31	142.81	159.47	40.059621	-104.892931	1,265,146.91	3,169,922.74
7,563.00	44.90	356.19	7,506.82	174.99	157.08	40.059709	-104.892939	1,265,179.07	3,169,920.14
7,610.00	50.27	356.49	7,538.51	209.61	154.87	40.059804	-104.892947	1,265,213.67	3,169,917.69
7,657.00	53.81	356.89	7,567.41	246.60	152.73	40.059906	-104.892955	1,265,250.65	3,169,915.30
7,704.00	58.53	359.22	7,593.57	285.60	151.43	40.060013	-104.892959	1,265,289.64	3,169,913.73
7,752.00	62.57	358.76	7,617.17	327.38	150.69	40.060128	-104.892962	1,265,331.41	3,169,912.70
7,799.00	66.99	358.67	7,637.19	369.88	149.74	40.060244	-104.892965	1,265,373.90	3,169,911.46
7,847.00	72.16	358.72	7,653.94	414.84	148.71	40.060368	-104.892969	1,265,418.85	3,169,910.13
7,894.00	74.58	358.72	7,667.38	459.86	147.71	40.060491	-104.892973	1,265,463.86	3,169,908.82
7,941.00	79.64	359.60	7,677.87	505.65	147.04	40.060617	-104.892975	1,265,509.65	3,169,907.83
7,966.00	82.86	0.93	7,681.67	530.36	147.16	40.060685	-104.892975	1,265,534.35	3,169,907.78
8,008.00	84.11	1.24	7,686.44	572.08	147.94	40.060799	-104.892972	1,265,576.07	3,169,908.28
8,112.00	87.19	1.99	7,694.33	675.72	150.87	40.061084	-104.892961	1,265,679.73	3,169,910.50
8,207.00	87.29	2.62	7,698.90	770.54	154.68	40.061344	-104.892948	1,265,774.57	3,169,913.66
8,301.00	88.80	0.98	7,702.11	864.43	157.63	40.061602	-104.892937	1,265,868.47	3,169,915.97
8,396.00	89.63	0.53	7,703.41	959.41	158.88	40.061863	-104.892933	1,265,963.46	3,169,916.57
8,490.00	90.22	359.62	7,703.53	1,053.41	159.01	40.062121	-104.892932	1,266,057.45	3,169,916.05
8,585.00	90.34	358.03	7,703.07	1,148.39	157.06	40.062381	-104.892939	1,266,152.41	3,169,913.46
8,679.00	89.72	356.31	7,703.02	1,242.27	152.42	40.062639	-104.892956	1,266,246.25	3,169,908.17
8,774.00	89.88	355.86	7,703.35	1,337.04	145.93	40.062899	-104.892979	1,266,340.98	3,169,901.04
8,869.00	90.83	355.86	7,702.76	1,431.79	139.07	40.063159	-104.893003	1,266,435.68	3,169,893.53
8,963.00	90.59	355.38	7,701.60	1,525.51	131.89	40.063417	-104.893029	1,266,529.34	3,169,885.71
9,057.00	90.77	355.12	7,700.48	1,619.18	124.11	40.063674	-104.893057	1,266,622.95	3,169,877.29
9,152.00	90.43	354.40	7,699.49	1,713.78	115.44	40.063933	-104.893088	1,266,717.48	3,169,867.97
9,246.00	91.11	355.60	7,698.22	1,807.41	107.24	40.064191	-104.893117	1,266,811.05	3,169,859.14
9,339.00	89.35	356.06	7,697.85	1,900.16	100.48	40.064445	-104.893141	1,266,903.75	3,169,851.74
9,431.00	89.26	356.10	7,698.97	1,991.94	94.19	40.064697	-104.893164	1,266,995.48	3,169,844.82
9,524.00	89.69	357.42	7,699.82	2,084.78	88.94	40.064952	-104.893183	1,267,088.28	3,169,838.93
9,615.00	90.37	357.05	7,699.77	2,175.68	84.55	40.065201	-104.893198	1,267,179.14	3,169,833.92
9,708.00	90.62	357.28	7,698.97	2,268.56	79.95	40.065456	-104.893215	1,267,271.99	3,169,828.69
9,801.00	90.46	357.20	7,698.09	2,361.45	75.47	40.065711	-104.893231	1,267,364.84	3,169,823.58
9,893.00	90.15	356.45	7,697.60	2,453.30	70.37	40.065964	-104.893249	1,267,456.65	3,169,817.85
9,985.00	90.40	356.70	7,697.16	2,545.14	64.88	40.066216	-104.893268	1,267,548.45	3,169,811.73
10,077.00	90.65	356.72	7,696.32	2,636.98	59.60	40.066468	-104.893287	1,267,640.25	3,169,805.82
10,170.00	90.89	356.65	7,695.07	2,729.82	54.22	40.066723	-104.893307	1,267,733.04	3,169,799.81
10,263.00	90.86	356.19	7,693.65	2,822.63	48.41	40.066977	-104.893327	1,267,825.80	3,169,793.37
10,355.00	89.04	354.56	7,693.73	2,914.32	41.00	40.067229	-104.893354	1,267,917.44	3,169,785.32
10,447.00	88.15	353.79	7,695.98	3,005.82	31.66	40.067480	-104.893387	1,268,008.87	3,169,775.36
10,539.00	89.66	353.91	7,697.74	3,097.27	21.81	40.067731	-104.893422	1,268,100.25	3,169,764.89
10,631.00	89.05	355.16	7,698.78	3,188.84	13.05	40.067983	-104.893454	1,268,191.75	3,169,755.50

Design Report for NRC 2C-4HZ - 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)
10,723.00	89.41	354.84	7,700.01	3,280.48	5.03	40.068234	-104.893482	1,268,283.33	3,169,746.85
10,815.00	90.03	356.35	7,700.46	3,372.21	-2.04	40.068486	-104.893508	1,268,375.00	3,169,739.16
10,906.00	89.94	356.53	7,700.49	3,463.03	-7.69	40.068735	-104.893528	1,268,465.79	3,169,732.89
10,999.00	89.72	356.15	7,700.76	3,555.84	-13.62	40.068990	-104.893549	1,268,558.55	3,169,726.32
11,093.00	89.91	356.06	7,701.07	3,649.62	-20.01	40.069247	-104.893572	1,268,652.28	3,169,719.29
11,184.00	90.46	356.36	7,700.77	3,740.42	-26.02	40.069497	-104.893593	1,268,743.03	3,169,712.66
11,276.00	90.62	357.32	7,699.91	3,832.28	-31.09	40.069749	-104.893611	1,268,834.85	3,169,706.96
11,368.00	90.55	357.34	7,698.97	3,924.17	-35.38	40.070001	-104.893627	1,268,926.71	3,169,702.05
11,460.00	90.71	357.39	7,697.96	4,016.07	-39.61	40.070253	-104.893642	1,269,018.57	3,169,697.19
11,552.00	90.19	356.51	7,697.23	4,107.93	-44.50	40.070506	-104.893659	1,269,110.40	3,169,691.66
11,643.00	89.72	356.14	7,697.30	4,198.75	-50.34	40.070755	-104.893680	1,269,201.17	3,169,685.21
11,735.00	89.38	355.55	7,698.03	4,290.50	-57.00	40.071007	-104.893704	1,269,292.87	3,169,677.92
11,827.00	89.14	355.40	7,699.21	4,382.21	-64.26	40.071258	-104.893730	1,269,384.52	3,169,670.03
11,918.00	90.68	357.07	7,699.36	4,473.01	-70.23	40.071508	-104.893751	1,269,475.27	3,169,663.44
12,010.00	91.60	358.26	7,697.53	4,564.91	-73.98	40.071760	-104.893765	1,269,567.14	3,169,659.06
12,105.00	90.86	357.11	7,695.49	4,659.81	-77.82	40.072021	-104.893778	1,269,662.01	3,169,654.58
12,199.00	89.17	357.19	7,695.46	4,753.69	-82.49	40.072278	-104.893795	1,269,755.85	3,169,649.26
12,294.00	90.62	357.10	7,695.64	4,848.57	-87.22	40.072539	-104.893812	1,269,850.69	3,169,643.88
12,388.00	89.57	358.42	7,695.48	4,942.49	-90.90	40.072796	-104.893825	1,269,944.59	3,169,639.57
12,483.00	90.40	358.85	7,695.51	5,037.46	-93.16	40.073057	-104.893833	1,270,039.54	3,169,636.65
12,578.00	90.77	359.23	7,694.54	5,132.44	-94.75	40.073318	-104.893839	1,270,134.50	3,169,634.41
12,672.00	90.43	0.68	7,693.55	5,226.44	-94.83	40.073576	-104.893839	1,270,228.49	3,169,633.70
12,767.00	89.60	0.80	7,693.53	5,321.43	-93.60	40.073837	-104.893835	1,270,323.48	3,169,634.27
12,862.00	90.18	0.80	7,693.71	5,416.42	-92.27	40.074097	-104.893830	1,270,418.48	3,169,634.95
12,957.00	89.23	0.80	7,694.20	5,511.41	-90.95	40.074358	-104.893825	1,270,513.47	3,169,635.63
13,052.00	89.38	0.61	7,695.35	5,606.39	-89.78	40.074619	-104.893821	1,270,608.45	3,169,636.14
13,146.00	89.97	0.42	7,695.88	5,700.39	-88.93	40.074877	-104.893818	1,270,702.45	3,169,636.35
13,241.00	88.03	0.99	7,697.54	5,795.36	-87.76	40.075138	-104.893814	1,270,797.42	3,169,636.87
13,336.00	88.46	0.51	7,700.45	5,890.31	-86.52	40.075398	-104.893809	1,270,892.37	3,169,637.46
13,431.00	90.25	0.97	7,701.52	5,985.29	-85.29	40.075659	-104.893805	1,270,987.36	3,169,638.04
13,526.00	90.06	0.18	7,701.26	6,080.28	-84.34	40.075920	-104.893802	1,271,082.35	3,169,638.34
13,621.00	91.17	0.20	7,700.24	6,175.27	-84.03	40.076181	-104.893801	1,271,177.34	3,169,638.01
13,715.00	91.39	359.98	7,698.14	6,269.25	-83.88	40.076439	-104.893800	1,271,271.31	3,169,637.51
13,810.00	91.60	0.10	7,695.67	6,364.22	-83.81	40.076699	-104.893800	1,271,366.28	3,169,636.93
13,905.00	90.06	0.14	7,694.29	6,459.21	-83.61	40.076960	-104.893799	1,271,461.26	3,169,636.48
13,999.00	90.59	0.16	7,693.76	6,553.20	-83.37	40.077218	-104.893798	1,271,555.25	3,169,636.08
14,094.00	89.14	0.56	7,693.98	6,648.20	-82.77	40.077479	-104.893796	1,271,650.25	3,169,636.03
14,188.00	89.23	0.23	7,695.32	6,742.19	-82.12	40.077737	-104.893794	1,271,744.23	3,169,636.03
14,283.00	89.45	0.21	7,696.41	6,837.18	-81.76	40.077998	-104.893792	1,271,839.22	3,169,635.75
14,378.00	89.94	0.23	7,696.92	6,932.18	-81.39	40.078258	-104.893791	1,271,934.22	3,169,635.46
14,473.00	89.72	359.95	7,697.20	7,027.18	-81.24	40.078519	-104.893791	1,272,029.21	3,169,634.96
14,568.00	90.15	0.29	7,697.31	7,122.18	-81.04	40.078780	-104.893790	1,272,124.21	3,169,634.51

Design Report for NRC 2C-4HZ - 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)
14,663.00	89.41	358.94	7,697.67	7,217.17	-81.68	40.079041	-104.893792	1,272,219.19	3,169,633.22
14,758.00	90.09	358.85	7,698.09	7,312.15	-83.52	40.079301	-104.893799	1,272,314.15	3,169,630.74
14,852.00	90.49	359.28	7,697.61	7,406.14	-85.05	40.079559	-104.893804	1,272,408.12	3,169,628.56
14,947.00	88.71	358.65	7,698.27	7,501.11	-86.76	40.079820	-104.893810	1,272,503.08	3,169,626.20
15,042.00	88.67	358.39	7,700.45	7,596.06	-89.22	40.080081	-104.893819	1,272,598.00	3,169,623.10
15,137.00	89.29	358.38	7,702.14	7,691.01	-91.89	40.080341	-104.893829	1,272,692.93	3,169,619.77
15,231.00	89.72	358.08	7,702.95	7,784.96	-94.80	40.080599	-104.893839	1,272,786.85	3,169,616.23
15,326.00	90.62	358.42	7,702.67	7,879.91	-97.70	40.080860	-104.893849	1,272,881.78	3,169,612.67
15,421.00	88.58	357.75	7,703.33	7,974.85	-100.87	40.081121	-104.893861	1,272,976.69	3,169,608.85
15,516.00	89.14	357.85	7,705.22	8,069.76	-104.52	40.081381	-104.893874	1,273,071.57	3,169,604.56
15,611.00	89.26	357.84	7,706.55	8,164.68	-108.09	40.081642	-104.893887	1,273,166.47	3,169,600.34
15,705.00	90.12	357.96	7,707.06	8,258.62	-111.54	40.081899	-104.893899	1,273,260.37	3,169,596.25
15,800.00	91.26	358.99	7,705.91	8,353.58	-114.06	40.082160	-104.893908	1,273,355.30	3,169,593.07
15,894.00	91.23	358.99	7,703.87	8,447.54	-115.72	40.082418	-104.893914	1,273,449.25	3,169,590.77
15,989.00	91.54	359.04	7,701.57	8,542.50	-117.35	40.082679	-104.893920	1,273,544.19	3,169,588.49
16,083.00	90.96	358.60	7,699.52	8,636.45	-119.29	40.082937	-104.893927	1,273,638.13	3,169,585.91
16,178.00	90.80	357.98	7,698.06	8,731.40	-122.12	40.083197	-104.893937	1,273,733.05	3,169,582.43
16,272.00	90.62	357.47	7,696.90	8,825.32	-125.85	40.083455	-104.893950	1,273,826.94	3,169,578.06
16,367.00	91.14	357.89	7,695.44	8,920.23	-129.70	40.083716	-104.893964	1,273,921.82	3,169,573.56
16,461.00	90.92	357.56	7,693.75	9,014.14	-133.43	40.083973	-104.893977	1,274,015.70	3,169,569.19
16,556.00	90.83	356.90	7,692.30	9,109.02	-138.02	40.084234	-104.893994	1,274,110.54	3,169,563.95
16,650.00	90.65	356.60	7,691.08	9,202.86	-143.35	40.084491	-104.894013	1,274,204.33	3,169,557.98
16,744.00	90.68	355.89	7,689.99	9,296.65	-149.51	40.084749	-104.894035	1,274,298.08	3,169,551.18
16,838.00	89.60	355.73	7,689.76	9,390.40	-156.37	40.085006	-104.894059	1,274,391.77	3,169,543.67
16,932.00	88.52	356.47	7,691.31	9,484.16	-162.77	40.085264	-104.894082	1,274,485.49	3,169,536.64
17,027.00	88.58	357.06	7,693.71	9,578.98	-168.12	40.085524	-104.894101	1,274,580.27	3,169,530.63
17,121.00	89.08	357.24	7,695.63	9,672.84	-172.80	40.085782	-104.894118	1,274,674.09	3,169,525.32
17,215.00	89.04	356.83	7,697.17	9,766.71	-177.66	40.086039	-104.894135	1,274,767.91	3,169,519.82
17,232.00	89.08	356.92	7,697.45	9,783.68	-178.59	40.086086	-104.894139	1,274,784.88	3,169,518.77
17,279.00	89.08	356.92	7,698.21	9,830.60	-181.11	40.086215	-104.894148	1,274,831.79	3,169,515.93

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,010.00	1,009.98	1.32	0.20	Tie-On to Surface Gyro @ 1010.00 FT
1,111.00	1,110.97	1.30	-0.22	First MWD Survey
17,279.00	7,698.21	9,830.60	-181.11	Str Line Proj to Bit @ 17279' MD ::

Design Report for NRC 2C-4HZ - 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)	359.00	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
25.00	1,010.00	Surface Gyro Surveys	NS-GYRO-MS
1,111.00	8,112.00	MWD Surveys-Intermediate	MWD+IFR1+SC
8,207.00	17,232.00	MWD Lateral Surveys	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,075.20	1,075.17	9 5/8" Casing Set @ 1075.2' MD :: 1075.17' TVD	9-5/8	13-1/2
8,008.00	7,686.44	7" Casing Set @ 8008' MD :: 7686.44' TVD	7	8-3/4

Design Targets

Shape	Target Name	TVD (usft)	Northing (usft)	Easting (usft)	+N/-S usft	+E/-W usft	Created	Updated
Polygon	NRC 2C-4HZ_LB	0.00	1,265,003.03	3,169,764.26	0.01	0.00	3/26/2014	3/26/2014
Polygon	NRC 13-9HZ Pad_Sec. Lir	-33.80	1,264,984.56	3,167,149.12	-0.57	-2,615.30	3/2/2014	3/2/2014

Directional Difficulty Index

Average Dogleg over Survey:	1.31 °/100usft	Maximum Dogleg over Survey:	13.91 °/100usft at 7,966.00 usft
Net Tortousity applicable to Plans:	0.61 °/100usft	Directional Difficulty Index:	6.709

Design Report for NRC 2C-4HZ - Actual Surveys

Audit Info

North Reference Sheet for Sec. 9-T1N-R67W - NRC 2C-4HZ - Plan A

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' @ 5055.80usft. Northing and Easting are relative to NRC 2C-4HZ

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: 0.99996240

Grid Coordinates of Well: 1,265,003.02 usft N, 3,169,764.26 usft E

Geographical Coordinates of Well: 40° 03' 33.22" N, 104° 53' 36.60" W

Grid Convergence at Surface is: 0.39°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,279.00usft

the Bottom Hole Displacement is 9,832.27usft in the Direction of 358.94° (True).

Magnetic Convergence at surface is: -8.18° (9 April 2014, , BGGM2013)

