

SPERRY-SUN DRILLING SERVICES

CERTIFIED SURVEY WORK SHEET

OPERATOR:	Anadarko Petroleum Corp.
WELL:	NRC 30C-4HZ
FIELD:	DJ Basin
RIG:	H&P 308
LEGALS:	Sec. 9-T1N-R67W
COUNTY:	Weld
STATE:	Colorado
CAL. METHOD:	True N
MAG. DECL. APPLIED:	8.59
VERTICAL SEC. DIR. :	359.970

SSDS Job Number :	901165851
Start Date of Job :	3/15/2014
End Date of Job :	4/8/2014
Lead Directional Driller:	Jesse Kysar
	Brian Saunders
Other SSDS DD's :	
SSDS MWD Engineers :	Ryan White
	Patrick Lane

	Main Hole =====>		1st Side Track =====>		2nd Side Track =====>		3rd Side Track =====>		4th Side Track =====>	
ESS Survey		Tie On		Tie On		Tie On		Tie On		Tie On
First Survey Depth	25.00	Gyro								
Last Survey Depth	991.00									
KOP Depth/Sidetrack MD	7131.00	KOP		KOP-ST1		KOP-ST2		KOP-ST3		KOP-ST4
First Survey Depth	1105.00	MWD		MWD		MWD		MWD		MWD
Last Survey Depth	17367.00	MWD		MWD		MWD		MWD		MWD
Bit Extrapolation to TD	17420.00	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 : Patrick Lane

Print Name :

Sign Name :

Sign Name :

Sign Name :

Print Name : Jesse Kysar

Print Name : Ryan White

Print Name :

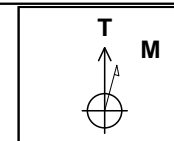
Sign Name :

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.

Project: Weld County, CO (NAD 83)
 Site: Sec. 9-T1N-R67W
 Well: NRC 30C-4HZ
 Wellbore: Plan A
 Design: Surveys



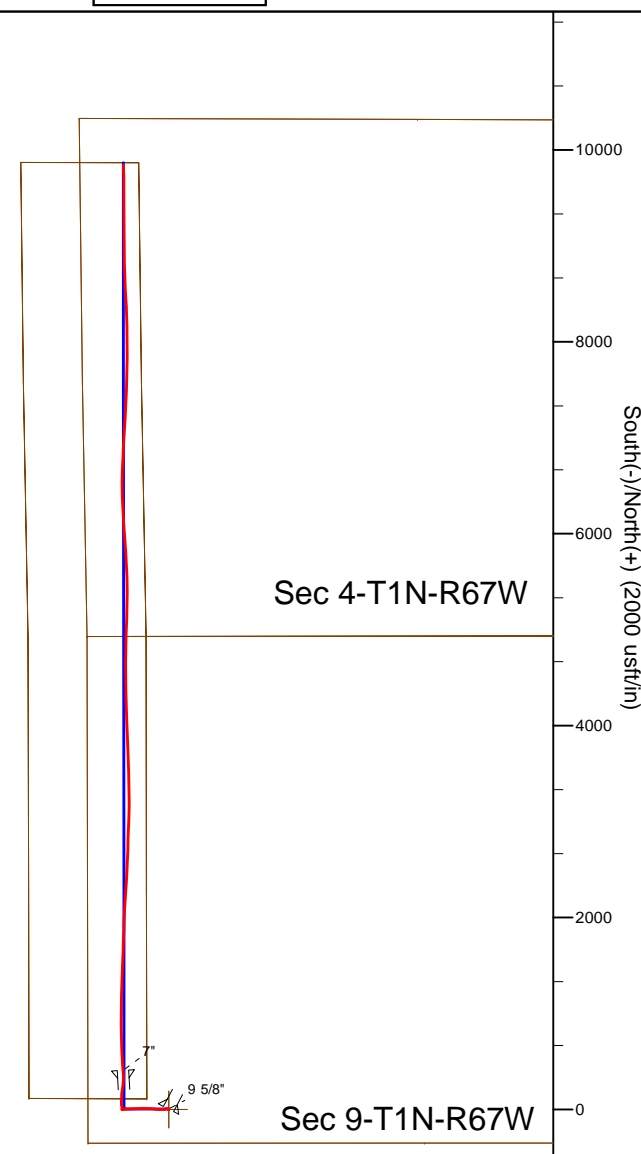
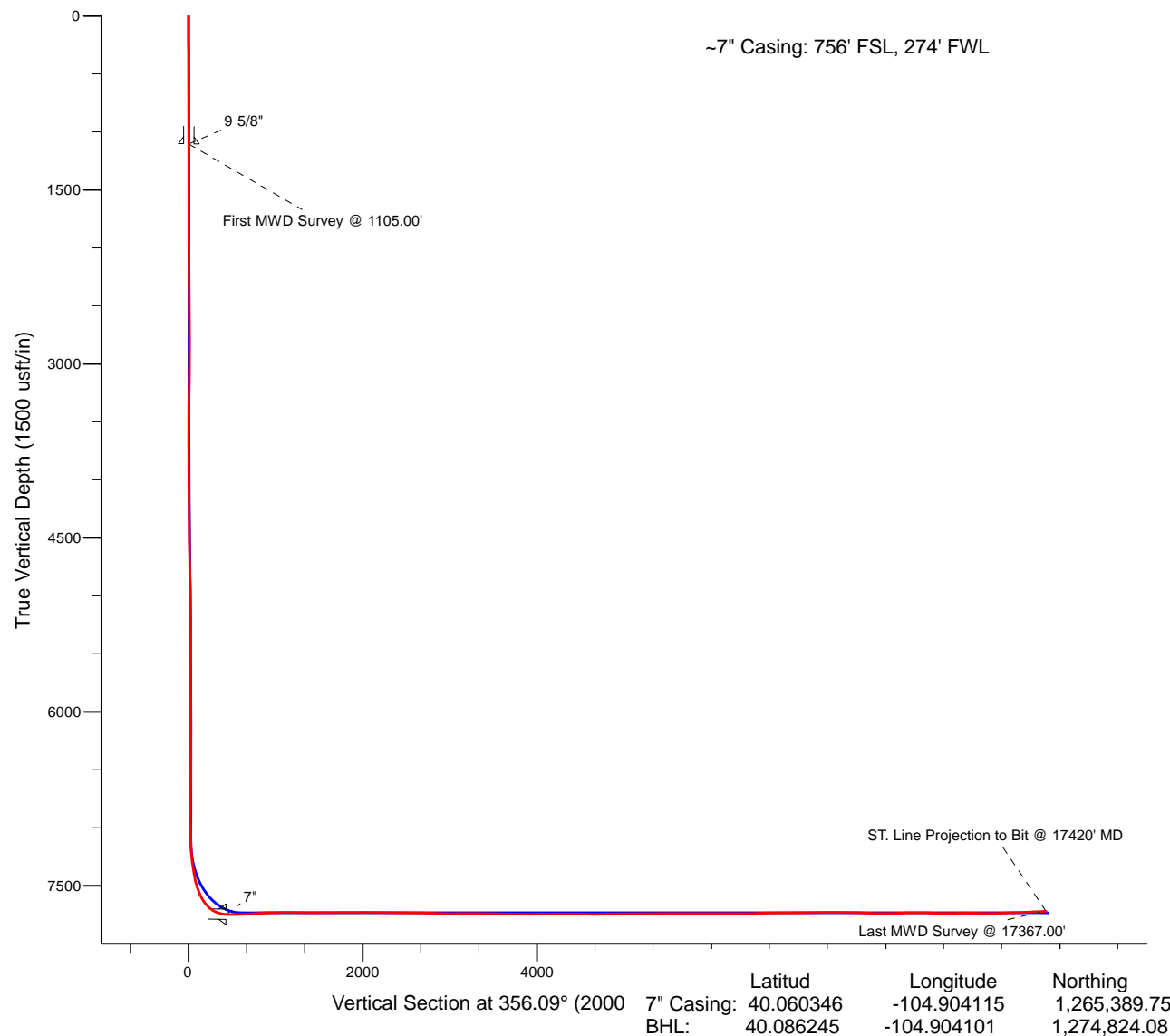
HALLIBURTON
 Sperry Drilling

LEGEND

- NRC 30C-4HZ, Plan A, Rev A1 V0
- Surveys

~BHL: 487' FNL, 342' FWL

~7" Casing: 756' FSL, 274' FWL



WELL DETAILS: NRC 30C-4HZ	
Ground Level:	5064.60
RKB=25' @ 5089.60usft	
Design: Surveys (NRC 30C-4HZ/Plan A)	
Created By: Pari Amanlou	Date: 4-17-2014

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 9-T1N-R67W

NRC 30C-4HZ

Job#901165851: API:05-123-38628

Plan A

Design: Surveys

Sperry Drilling Services

Standard Report

07 November, 2014

Surface UWI : Job#901165851: API:05-123-38628

Well Coordinates: 1,264,984.54 N, 3,167,149.12 E (40° 03' 33.22" N, 104° 54' 10.23" W)

Ground Level: 5,064.60 usft

Local Coordinate Origin:

Centered on Well NRC 30C-4HZ

Viewing Datum:

RKB=25' @ 5089.60usft

TVDs to System:

N

North Reference:

True

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

HALLIBURTON

Design Report for NRC 30C-4HZ - 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
NRC 30C-4HZ LD - NRC 13-9HZ Pad_Sec. Line - NRC 30C-4HZ SHL							
25.00	0.00	0.00	25.00	0.00	0.00	0.00	0.00
125.00	0.52	339.35	125.00	0.42	-0.16	0.43	0.52
225.00	0.52	350.01	224.99	1.30	-0.40	1.32	0.10
325.00	0.46	343.37	324.99	2.13	-0.59	2.16	0.08
425.00	0.53	337.09	424.99	2.94	-0.89	2.99	0.09
525.00	0.52	6.04	524.98	3.82	-1.02	3.88	0.26
625.00	0.58	333.68	624.98	4.72	-1.20	4.79	0.31
725.00	0.41	64.90	724.98	5.33	-1.10	5.39	0.72
825.00	0.39	181.45	824.97	5.14	-0.78	5.18	0.68
925.00	0.42	31.84	924.97	5.11	-0.60	5.14	0.78
991.00	0.35	27.60	990.97	5.49	-0.38	5.51	0.11
1,104.00	0.13	207.82	1,103.97	5.69	-0.27	5.69	0.42
9 5/8"							
1,105.00	0.13	207.81	1,104.97	5.69	-0.27	5.69	0.42
First MWD Survey @ 1105.00'							
1,197.00	0.19	26.11	1,196.97	5.73	-0.26	5.74	0.35
1,289.00	0.21	52.47	1,288.97	5.97	-0.06	5.96	0.10
1,382.00	0.29	167.25	1,381.97	5.85	0.13	5.82	0.46
1,475.00	0.43	217.97	1,474.97	5.34	-0.03	5.33	0.36
1,568.00	0.61	261.11	1,567.97	4.99	-0.73	5.03	0.45
1,660.00	0.64	249.19	1,659.96	4.73	-1.70	4.84	0.14
1,752.00	0.77	255.04	1,751.95	4.39	-2.78	4.57	0.16
1,845.00	0.45	273.24	1,844.95	4.25	-3.74	4.49	0.40
1,938.00	0.87	295.19	1,937.94	4.57	-4.75	4.88	0.52
2,031.00	1.20	273.00	2,030.93	4.92	-6.36	5.34	0.55
2,124.00	1.03	289.65	2,123.91	5.25	-8.12	5.79	0.39
2,217.00	0.88	288.87	2,216.90	5.77	-9.58	6.41	0.16
2,309.00	1.03	303.96	2,308.88	6.46	-10.94	7.19	0.32
2,402.00	1.68	326.52	2,401.86	8.06	-12.38	8.89	0.89
2,493.00	1.61	320.77	2,492.82	10.16	-13.93	11.09	0.20
2,586.00	0.98	279.66	2,585.80	11.31	-15.54	12.34	1.17
2,679.00	1.02	294.21	2,678.78	11.78	-17.08	12.92	0.28
2,772.00	1.11	280.88	2,771.77	12.29	-18.72	13.54	0.28
2,867.00	1.23	231.47	2,866.75	11.83	-20.42	13.19	1.04
2,961.00	1.50	218.65	2,960.72	10.24	-21.97	11.71	0.43
3,056.00	1.12	224.51	3,055.70	8.61	-23.40	10.18	0.42
3,150.00	1.77	224.42	3,149.67	6.91	-25.06	8.61	0.69
3,244.00	1.55	212.60	3,243.63	4.81	-26.76	6.62	0.43
3,338.00	1.20	214.62	3,337.60	2.93	-28.01	4.83	0.38
3,433.00	1.33	230.76	3,432.58	1.41	-29.43	3.41	0.40
3,527.00	1.44	249.85	3,526.55	0.31	-31.38	2.45	0.50
3,621.00	2.56	274.44	3,620.50	0.07	-34.58	2.43	1.48
3,715.00	2.80	270.98	3,714.39	0.27	-38.97	2.93	0.31
3,810.00	2.68	281.99	3,809.28	0.77	-43.46	3.73	0.57
3,904.00	2.86	268.72	3,903.18	1.17	-47.96	4.44	0.71
3,998.00	1.71	272.36	3,997.10	1.18	-51.70	4.70	1.23
4,093.00	3.27	284.79	4,092.01	1.93	-55.74	5.73	1.73
4,187.00	4.57	259.97	4,185.79	1.96	-62.02	6.19	2.24

Design Report for NRC 30C-4HZ - Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
4,281.00	6.14	262.91	4,279.38	0.69	-70.70	5.51	1.69
4,376.00	7.10	280.99	4,373.75	1.18	-81.50	6.74	2.40
4,470.00	7.53	276.25	4,466.99	2.96	-93.33	9.32	0.79
4,565.00	9.11	277.71	4,560.99	4.65	-106.97	11.93	1.68
4,659.00	9.47	272.98	4,653.76	6.05	-122.07	14.36	0.90
4,753.00	9.02	271.51	4,746.53	6.64	-137.16	15.98	0.54
4,848.00	10.80	280.23	4,840.12	8.42	-153.36	18.86	2.45
4,942.00	10.94	278.29	4,932.43	11.27	-170.85	22.90	0.42
5,036.00	11.04	271.37	5,024.71	12.77	-188.68	25.61	1.41
5,131.00	10.13	270.94	5,118.10	13.13	-206.13	27.16	0.96
5,225.00	8.85	260.58	5,210.81	12.08	-221.53	27.16	2.27
5,319.00	9.09	267.12	5,303.67	10.52	-236.08	26.60	1.11
5,414.00	10.85	265.72	5,397.23	9.48	-252.49	26.68	1.87
5,508.00	10.80	263.20	5,489.56	7.77	-270.06	26.18	0.51
5,603.00	11.14	266.79	5,582.82	6.21	-288.06	25.84	0.80
5,697.00	10.09	265.08	5,675.21	4.99	-305.33	25.81	1.17
5,791.00	9.96	266.38	5,767.78	3.77	-321.65	25.70	0.28
5,886.00	7.85	267.38	5,861.63	2.96	-336.33	25.89	2.23
5,980.00	6.31	271.23	5,954.91	2.77	-347.91	26.50	1.71
6,074.00	4.19	267.94	6,048.51	2.76	-356.50	27.07	2.28
6,169.00	2.50	264.72	6,143.34	2.45	-362.03	27.14	1.79
6,263.00	0.62	241.50	6,237.30	2.02	-364.52	26.87	2.07
6,358.00	0.33	172.52	6,332.30	1.50	-364.94	26.39	0.62
6,452.00	0.29	62.03	6,426.30	1.34	-364.69	26.21	0.54
6,547.00	0.07	43.21	6,521.30	1.50	-364.44	26.35	0.24
6,641.00	0.22	130.46	6,615.30	1.42	-364.27	26.26	0.24
6,735.00	0.32	123.65	6,709.30	1.16	-363.91	25.98	0.11
6,830.00	0.32	105.40	6,804.30	0.94	-363.43	25.73	0.11
6,924.00	0.25	86.89	6,898.30	0.88	-362.97	25.64	0.12
7,019.00	0.03	126.54	6,993.30	0.88	-362.75	25.62	0.24
7,113.00	0.33	354.76	7,087.29	1.13	-362.75	25.88	0.37
7,160.00	2.16	351.94	7,134.28	2.15	-362.89	26.89	3.89
7,207.00	4.36	355.30	7,181.20	4.80	-363.16	29.56	4.70
7,254.00	6.70	357.71	7,227.98	9.32	-363.42	34.09	5.00
7,302.00	9.47	357.33	7,275.50	16.07	-363.71	40.84	5.77
7,349.00	10.86	354.29	7,321.76	24.34	-364.33	49.13	3.17
7,396.00	11.55	352.40	7,367.86	33.41	-365.40	58.25	1.66
7,443.00	12.89	350.75	7,413.80	43.25	-366.86	68.17	2.95
7,491.00	17.80	355.61	7,460.08	55.85	-368.28	80.84	10.57
7,538.00	22.40	359.88	7,504.20	71.98	-368.85	96.97	10.27
7,585.00	27.34	2.57	7,546.83	91.73	-368.39	116.64	10.78
7,632.00	32.87	2.14	7,587.48	115.28	-367.43	140.07	11.77
7,680.00	39.75	2.09	7,626.13	143.66	-366.38	168.32	14.33
7,727.00	48.35	4.29	7,659.88	176.25	-364.51	200.71	18.58
7,774.00	56.17	5.63	7,688.63	213.25	-361.28	237.40	16.79
7,821.00	64.52	4.95	7,711.86	253.88	-357.53	277.68	17.81
7,868.00	74.28	5.33	7,728.38	297.65	-353.59	321.07	20.78
7,915.00	78.33	358.44	7,739.52	343.25	-352.11	366.47	16.64
7,932.00	80.65	355.98	7,742.62	359.94	-352.92	383.18	19.71
7,980.00	89.25	357.00	7,746.84	407.62	-355.85	430.94	18.04
7"							

Design Report for NRC 30C-4HZ - Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
8,019.00	88.67	357.20	7,747.55	446.56	-357.82	469.93	1.57
8,113.00	91.39	357.95	7,747.50	540.47	-361.80	563.89	3.00
8,208.00	91.70	357.77	7,744.94	635.37	-365.34	658.81	0.38
8,303.00	92.59	358.47	7,741.38	730.25	-368.46	753.68	1.19
8,397.00	92.10	359.09	7,737.54	824.15	-370.46	847.50	0.84
8,492.00	91.23	0.33	7,734.78	919.10	-370.94	942.26	1.59
8,586.00	91.60	0.12	7,732.46	1,013.07	-370.57	1,035.99	0.45
8,680.00	90.80	0.97	7,730.49	1,107.05	-369.67	1,129.68	1.24
8,775.00	89.45	1.60	7,730.28	1,202.02	-367.54	1,224.29	1.57
8,869.00	88.86	1.62	7,731.67	1,295.97	-364.90	1,317.84	0.63
8,963.00	89.54	1.55	7,732.98	1,389.93	-362.30	1,411.40	0.73
9,058.00	90.00	1.36	7,733.36	1,484.90	-359.89	1,505.99	0.52
9,152.00	91.11	1.22	7,732.45	1,578.87	-357.77	1,599.59	1.19
9,247.00	90.62	1.73	7,731.01	1,673.82	-355.33	1,694.16	0.74
9,337.00	89.66	1.51	7,730.80	1,763.79	-352.78	1,783.74	1.09
9,431.00	89.82	1.40	7,731.22	1,857.75	-350.40	1,877.33	0.21
9,523.00	90.80	1.15	7,730.72	1,949.73	-348.35	1,968.95	1.10
9,615.00	89.20	2.50	7,730.72	2,041.68	-345.42	2,060.48	2.28
9,707.00	90.40	2.46	7,731.04	2,133.59	-341.44	2,151.91	1.31
9,800.00	89.01	2.58	7,731.52	2,226.50	-337.35	2,244.32	1.50
9,894.00	89.51	2.63	7,732.74	2,320.39	-333.08	2,337.71	0.53
9,986.00	90.37	3.18	7,732.83	2,412.27	-328.42	2,429.05	1.11
10,078.00	89.75	2.10	7,732.74	2,504.17	-324.18	2,520.45	1.35
10,170.00	88.43	1.52	7,734.20	2,596.11	-321.27	2,611.98	1.57
10,263.00	89.41	1.29	7,735.95	2,689.07	-318.99	2,704.56	1.08
10,356.00	88.15	1.31	7,737.93	2,782.02	-316.88	2,797.15	1.36
10,449.00	88.30	0.78	7,740.81	2,874.96	-315.19	2,889.76	0.59
10,543.00	90.43	1.71	7,741.85	2,968.92	-313.15	2,983.37	2.47
10,634.00	90.80	1.71	7,740.88	3,059.88	-310.43	3,073.93	0.41
10,727.00	90.25	0.69	7,740.03	3,152.85	-308.48	3,166.55	1.25
10,818.00	89.63	359.11	7,740.12	3,243.85	-308.64	3,257.35	1.87
10,912.00	89.14	359.07	7,741.13	3,337.83	-310.14	3,351.21	0.52
11,004.00	89.81	359.17	7,741.97	3,429.82	-311.55	3,443.08	0.74
11,098.00	89.63	359.38	7,742.43	3,523.81	-312.74	3,536.93	0.29
11,191.00	88.52	358.65	7,743.93	3,616.78	-314.34	3,629.80	1.43
11,283.00	88.77	358.31	7,746.11	3,708.72	-316.78	3,721.69	0.46
11,376.00	89.82	358.33	7,747.25	3,801.67	-319.50	3,814.61	1.13
11,469.00	90.55	358.50	7,746.95	3,894.64	-322.07	3,907.53	0.81
11,561.00	90.65	358.35	7,745.99	3,986.60	-324.60	3,999.45	0.20
11,652.00	91.39	358.75	7,744.37	4,077.55	-326.91	4,090.35	0.92
11,743.00	90.00	358.27	7,743.27	4,168.51	-329.27	4,181.26	1.62
11,836.00	88.71	358.78	7,744.31	4,261.47	-331.67	4,274.17	1.49
11,926.00	89.69	358.93	7,745.57	4,351.45	-333.46	4,364.06	1.10
12,021.00	90.71	358.81	7,745.24	4,446.42	-335.34	4,458.94	1.08
12,115.00	89.14	0.12	7,745.36	4,540.42	-336.21	4,552.77	2.18
12,210.00	89.85	0.07	7,746.20	4,635.41	-336.06	4,647.54	0.75
12,304.00	91.20	0.49	7,745.34	4,729.40	-335.60	4,741.28	1.50
12,398.00	90.52	1.72	7,743.93	4,823.37	-333.79	4,834.91	1.50
12,493.00	89.97	1.53	7,743.52	4,918.33	-331.09	4,929.46	0.61
12,587.00	90.31	1.05	7,743.29	5,012.31	-328.98	5,023.08	0.63
12,681.00	91.11	0.94	7,742.12	5,106.29	-327.34	5,116.72	0.86

Design Report for NRC 30C-4HZ - Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
12,776.00	89.54	0.71	7,741.59	5,201.27	-325.98	5,211.39	1.67
12,870.00	90.25	0.71	7,741.76	5,295.26	-324.81	5,305.09	0.76
12,964.00	90.99	0.00	7,740.74	5,389.26	-324.23	5,398.82	1.09
13,059.00	89.45	359.34	7,740.38	5,484.25	-324.78	5,493.63	1.76
13,153.00	89.45	358.67	7,741.28	5,578.23	-326.41	5,587.50	0.71
13,247.00	89.97	357.94	7,741.75	5,672.19	-329.19	5,681.43	0.95
13,342.00	90.43	357.69	7,741.42	5,767.12	-332.81	5,776.39	0.55
13,436.00	90.83	356.56	7,740.39	5,860.99	-337.52	5,870.36	1.28
13,531.00	91.39	357.38	7,738.55	5,955.84	-342.54	5,965.33	1.05
13,625.00	88.52	356.96	7,738.62	6,049.72	-347.19	6,059.31	3.09
13,720.00	89.01	357.17	7,740.67	6,144.57	-352.05	6,154.27	0.56
13,814.00	90.37	357.05	7,741.18	6,238.45	-356.79	6,248.25	1.45
13,908.00	89.88	358.03	7,740.97	6,332.36	-360.82	6,342.22	1.17
14,003.00	90.99	359.03	7,740.25	6,427.32	-363.26	6,437.13	1.57
14,097.00	91.17	0.61	7,738.48	6,521.30	-363.55	6,530.91	1.69
14,192.00	91.14	1.68	7,736.57	6,616.26	-361.66	6,625.52	1.13
14,286.00	89.51	1.42	7,736.03	6,710.22	-359.11	6,719.09	1.76
14,380.00	91.23	1.72	7,735.43	6,804.18	-356.54	6,812.65	1.86
14,475.00	89.82	2.36	7,734.56	6,899.11	-353.16	6,907.13	1.63
14,569.00	90.86	1.95	7,734.00	6,993.04	-349.62	7,000.61	1.19
14,663.00	91.73	2.37	7,731.87	7,086.95	-346.08	7,094.05	1.03
14,758.00	90.06	2.74	7,730.39	7,181.84	-341.85	7,188.43	1.80
14,852.00	90.83	2.03	7,729.66	7,275.76	-337.93	7,281.86	1.11
14,947.00	89.14	2.54	7,729.68	7,370.68	-334.15	7,376.30	1.86
15,041.00	89.78	2.30	7,730.57	7,464.59	-330.18	7,469.73	0.73
15,135.00	90.00	1.87	7,730.75	7,558.53	-326.76	7,563.21	0.51
15,229.00	88.06	0.55	7,732.34	7,652.49	-324.77	7,656.82	2.50
15,324.00	88.37	0.23	7,735.30	7,747.44	-324.13	7,751.50	0.47
15,418.00	89.01	359.93	7,737.45	7,841.41	-324.00	7,845.25	0.75
15,512.00	89.51	359.39	7,738.66	7,935.40	-324.55	7,939.06	0.78
15,607.00	90.12	359.54	7,738.97	8,030.40	-325.44	8,033.89	0.66
15,701.00	91.02	359.15	7,738.04	8,124.38	-326.52	8,127.73	1.04
15,796.00	91.66	359.28	7,735.81	8,219.35	-327.82	8,222.57	0.69
15,890.00	91.26	359.48	7,733.42	8,313.31	-328.83	8,316.38	0.48
15,985.00	88.52	357.88	7,733.60	8,408.28	-331.02	8,411.27	3.34
16,079.00	88.71	357.26	7,735.87	8,502.16	-335.01	8,505.21	0.69
16,174.00	89.54	356.98	7,737.32	8,597.03	-339.78	8,600.19	0.92
16,268.00	89.60	358.54	7,738.03	8,690.95	-343.45	8,694.14	1.66
16,363.00	90.68	359.38	7,737.80	8,785.94	-345.18	8,789.02	1.44
16,457.00	91.20	358.82	7,736.26	8,879.91	-346.65	8,882.87	0.81
16,552.00	88.86	0.23	7,736.21	8,974.90	-347.44	8,977.69	2.88
16,646.00	88.83	359.87	7,738.10	9,068.88	-347.36	9,071.45	0.38
16,741.00	89.78	359.44	7,739.25	9,163.87	-347.93	9,166.26	1.10
16,835.00	91.17	359.99	7,738.47	9,257.86	-348.40	9,260.06	1.59
16,929.00	91.91	359.77	7,735.95	9,351.83	-348.59	9,353.82	0.82
17,024.00	90.74	359.69	7,733.75	9,446.80	-349.04	9,448.61	1.23
17,118.00	91.11	359.60	7,732.23	9,540.78	-349.62	9,542.41	0.41
17,213.00	92.44	359.63	7,729.29	9,635.73	-350.26	9,637.18	1.40
17,307.00	92.84	359.62	7,724.96	9,729.63	-350.88	9,730.91	0.43
17,367.00	92.77	359.46	7,722.02	9,789.56	-351.36	9,790.73	0.29

Last MWD Survey @ 17367.00'

Design Report for NRC 30C-4HZ - Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
17,420.00	92.77	359.46	7,719.46	9,842.49	-351.86	9,843.57	0.00
ST. Line Projection to Bit @ 17420' MD - NRC 30C-4HZ BHL							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,105.00	1,104.97	5.69	-0.27	First MWD Survey @ 1105.00'
17,367.00	7,722.02	9,789.56	-351.36	Last MWD Survey @ 17367.00'
17,420.00	7,719.46	9,842.49	-351.86	ST. Line Projection to Bit @ 17420' MD

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	356.09	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
25.00	991.00	Surface Gyros	NS-GYRO-MS
1,105.00	7,980.00	MWD Surveys- Intermediate	MWD+IFR1+SC
8,019.00	17,367.00	MWD Surveys-Lateral	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,104.00	1,103.97	9 5/8"	9-5/8	13-1/2
7,980.00	7,746.84	7"	7	8-3/4

Design Report for NRC 30C-4HZ - 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 30C-4HZ LD	0.00	0.00	0.00	0.02	0.00	1,264,984.56	3,167,149.12	40.059227	-104.902843
- actual wellpath misses target center by 0.02usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	114.17	-1,090.22	1,265,091.38	3,166,058.20	
Point 2				0.00	2,294.04	-1,093.29	1,267,271.10	3,166,040.45	
Point 3				0.00	4,933.79	-1,097.04	1,269,910.66	3,166,018.93	
Point 4				0.00	7,585.11	-1,132.66	1,272,561.58	3,165,965.46	
Point 5				0.00	9,870.96	-1,153.99	1,274,847.15	3,165,928.73	
Point 6				0.00	9,867.26	-233.88	1,274,849.65	3,166,848.81	
Point 7				0.00	7,580.76	-212.52	1,272,563.43	3,166,885.57	
Point 8				0.00	4,929.76	-176.89	1,269,912.83	3,166,939.05	
Point 9				0.00	2,290.01	-173.25	1,267,273.26	3,166,960.46	
Point 10				0.00	110.08	-170.18	1,265,093.49	3,166,978.21	
Point 11				0.00	114.17	-1,090.22	1,265,091.38	3,166,058.20	
NRC 13-9HZ Pad_Sec	0.00	0.00	0.00	0.02	0.00	1,264,984.56	3,167,149.12	40.059227	-104.902843
- actual wellpath misses target center by 0.02usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Polygon									
Point 1				0.00	10,329.15	-698.23	1,275,308.38	3,166,381.38	
Point 2				0.00	7,581.05	-672.58	1,272,560.62	3,166,425.53	
Point 3				0.00	4,929.01	-636.91	1,269,908.98	3,166,479.06	
Point 4				0.00	4,933.30	1,997.48	1,269,931.01	3,169,113.26	
Point 5				0.00	4,937.55	4,629.98	1,269,952.99	3,171,745.58	
Point 6				0.00	4,933.30	1,997.48	1,269,931.01	3,169,113.26	
Point 7				0.00	4,929.01	-636.91	1,269,908.98	3,166,479.06	
Point 8				0.00	2,289.57	-633.27	1,267,269.73	3,166,500.47	
Point 9				0.00	-350.08	-629.55	1,264,630.26	3,166,521.97	
Point 10				0.00	-349.24	1,997.80	1,264,648.79	3,169,149.16	
Point 11				0.00	-348.39	4,625.17	1,264,667.33	3,171,776.36	
Point 12				0.00	2,294.58	4,627.58	1,267,310.16	3,171,760.97	
Point 13				0.00	4,937.55	4,629.98	1,269,952.99	3,171,745.58	
Point 14				0.00	7,577.90	4,612.90	1,272,593.06	3,171,710.72	
Point 15				0.00	10,308.11	4,581.57	1,275,322.90	3,171,661.00	
Point 16				0.00	10,318.54	1,941.91	1,275,315.55	3,169,021.43	
Point 17				0.00	10,329.15	-698.23	1,275,308.38	3,166,381.38	
NRC 30C-4HZ SHL	0.00	0.00	0.00	0.02	0.00	1,264,984.56	3,167,149.12	40.059227	-104.902843
- actual wellpath misses target center by 0.02usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
NRC 30C-4HZ BHL	0.00	0.00	7,734.00	9,867.92	-353.96	1,274,849.48	3,166,728.74	40.086315	-104.904108
- actual wellpath misses target center by 29.36usft at 17420.00usft MD (7719.46 TVD, 9842.49 N, -351.86 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.48 °/100usft	Maximum Dogleg over Survey:	20.78 °/100usft at 7,868.00 usft
Net Tortousity applicable to Plans:	0.61 °/100usft	Directional Difficulty Index:	6.774

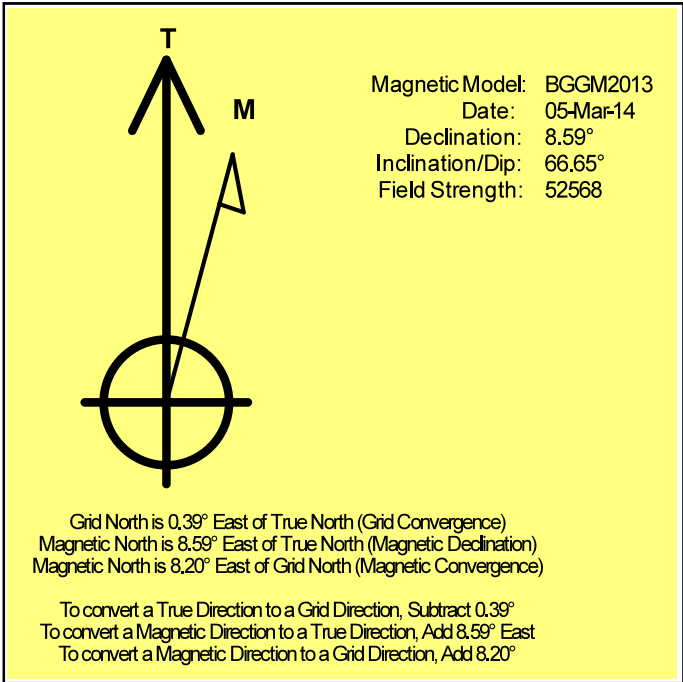
Audit Info

North Reference Sheet for Sec. 9-T1N-R67W - NRC 30C-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' @ 5089.60usft. Northing and Easting are relative to NRC 30C-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: 1,264,984.54 usft N, 3,167,149.12 usft E
 Geographical Coordinates of Well: 40° 03' 33.22" N, 104° 54' 10.23" W
 Grid Convergence at Surface is: 0.39°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,420.00usft
 the Bottom Hole Displacement is 9,848.78usft in the Direction of 357.95° (True).
 Magnetic Convergence at surface is: -8.20° (5 March 2014, , BGGM2013)



Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 9-T1N-R67W

NRC 30C-4HZ

Job#901165851: API:05-123-38628

Plan A

Design: Surveys

Sperry Drilling Services

Geodetic Report

07 November, 2014

Well Coordinates: 1,264,984.54 N, 3,167,149.12 E (40° 03' 33.22" N, 104° 54' 10.23" W)

Ground Level: 5,064.60 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 30C-4HZ

RKB=25' @ 5089.60usft

N

True

Dec-Deg - API - US Survey Feet - Custom

HALLIBURTON

Design Report for NRC 30C-4HZ - 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	40.059227	-104.902843	1,264,984.54	3,167,149.12
25.00	0.00	0.00	25.00	0.00	0.00	40.059227	-104.902843	1,264,984.54	3,167,149.12
125.00	0.52	339.35	125.00	0.42	-0.16	40.059228	-104.902844	1,264,984.96	3,167,148.96
225.00	0.52	350.01	224.99	1.30	-0.40	40.059231	-104.902845	1,264,985.83	3,167,148.72
325.00	0.46	343.37	324.99	2.13	-0.59	40.059233	-104.902845	1,264,986.66	3,167,148.52
425.00	0.53	337.09	424.99	2.94	-0.89	40.059235	-104.902846	1,264,987.47	3,167,148.22
525.00	0.52	6.04	524.98	3.82	-1.02	40.059238	-104.902847	1,264,988.35	3,167,148.08
625.00	0.58	333.68	624.98	4.72	-1.20	40.059240	-104.902848	1,264,989.25	3,167,147.90
725.00	0.41	64.90	724.98	5.33	-1.10	40.059242	-104.902847	1,264,989.86	3,167,147.99
825.00	0.39	181.45	824.97	5.14	-0.78	40.059241	-104.902846	1,264,989.67	3,167,148.31
925.00	0.42	31.84	924.97	5.11	-0.60	40.059241	-104.902845	1,264,989.65	3,167,148.49
991.00	0.35	27.60	990.97	5.49	-0.38	40.059242	-104.902845	1,264,990.03	3,167,148.71
1,104.00	0.13	207.82	1,103.97	5.69	-0.27	40.059243	-104.902844	1,264,990.23	3,167,148.81
1,105.00	0.13	207.81	1,104.97	5.69	-0.27	40.059243	-104.902844	1,264,990.23	3,167,148.81
1,197.00	0.19	26.11	1,196.97	5.73	-0.26	40.059243	-104.902844	1,264,990.27	3,167,148.83
1,289.00	0.21	52.47	1,288.97	5.97	-0.06	40.059243	-104.902843	1,264,990.51	3,167,149.03
1,382.00	0.29	167.25	1,381.97	5.85	0.13	40.059243	-104.902843	1,264,990.39	3,167,149.22
1,475.00	0.43	217.97	1,474.97	5.34	-0.03	40.059242	-104.902843	1,264,989.88	3,167,149.06
1,568.00	0.61	261.11	1,567.97	4.99	-0.73	40.059241	-104.902846	1,264,989.53	3,167,148.36
1,660.00	0.64	249.19	1,659.96	4.73	-1.70	40.059240	-104.902849	1,264,989.26	3,167,147.39
1,752.00	0.77	255.04	1,751.95	4.39	-2.78	40.059239	-104.902853	1,264,988.91	3,167,146.32
1,845.00	0.45	273.24	1,844.95	4.25	-3.74	40.059239	-104.902857	1,264,988.76	3,167,145.35
1,938.00	0.87	295.19	1,937.94	4.57	-4.75	40.059240	-104.902860	1,264,989.08	3,167,144.35
2,031.00	1.20	273.00	2,030.93	4.92	-6.36	40.059241	-104.902866	1,264,989.42	3,167,142.73
2,124.00	1.03	289.65	2,123.91	5.25	-8.12	40.059241	-104.902872	1,264,989.74	3,167,140.97
2,217.00	0.88	288.87	2,216.90	5.77	-9.58	40.059243	-104.902877	1,264,990.24	3,167,139.50
2,309.00	1.03	303.96	2,308.88	6.46	-10.94	40.059245	-104.902882	1,264,990.92	3,167,138.14
2,402.00	1.68	326.52	2,401.86	8.06	-12.38	40.059249	-104.902887	1,264,992.52	3,167,136.69
2,493.00	1.61	320.77	2,492.82	10.16	-13.93	40.059255	-104.902893	1,264,994.61	3,167,135.13
2,586.00	0.98	279.66	2,585.80	11.31	-15.54	40.059258	-104.902899	1,264,995.74	3,167,133.51
2,679.00	1.02	294.21	2,678.78	11.78	-17.08	40.059259	-104.902904	1,264,996.21	3,167,131.97
2,772.00	1.11	280.88	2,771.77	12.29	-18.72	40.059261	-104.902910	1,264,996.70	3,167,130.33
2,867.00	1.23	231.47	2,866.75	11.83	-20.42	40.059260	-104.902916	1,264,996.23	3,167,128.63
2,961.00	1.50	218.65	2,960.72	10.24	-21.97	40.059255	-104.902922	1,264,994.63	3,167,127.08
3,056.00	1.12	224.51	3,055.70	8.61	-23.40	40.059251	-104.902927	1,264,992.99	3,167,125.67
3,150.00	1.77	224.42	3,149.67	6.91	-25.06	40.059246	-104.902933	1,264,991.29	3,167,124.02
3,244.00	1.55	212.60	3,243.63	4.81	-26.76	40.059240	-104.902939	1,264,989.17	3,167,122.33
3,338.00	1.20	214.62	3,337.60	2.93	-28.01	40.059235	-104.902943	1,264,987.28	3,167,121.10
3,433.00	1.33	230.76	3,432.58	1.41	-29.43	40.059231	-104.902948	1,264,985.75	3,167,119.69
3,527.00	1.44	249.85	3,526.55	0.31	-31.38	40.059228	-104.902955	1,264,984.64	3,167,117.74
3,621.00	2.56	274.44	3,620.50	0.07	-34.58	40.059227	-104.902967	1,264,984.38	3,167,114.54
3,715.00	2.80	270.98	3,714.39	0.27	-38.97	40.059228	-104.902982	1,264,984.55	3,167,110.15

Design Report for NRC 30C-4HZ - 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)
3,810.00	2.68	281.99	3,809.28	0.77	-43.46	40.059229	-104.902999	1,264,985.02	3,167,105.66
3,904.00	2.86	268.72	3,903.18	1.17	-47.96	40.059230	-104.903015	1,264,985.39	3,167,101.16
3,998.00	1.71	272.36	3,997.10	1.18	-51.70	40.059230	-104.903028	1,264,985.37	3,167,097.42
4,093.00	3.27	284.79	4,092.01	1.93	-55.74	40.059232	-104.903042	1,264,986.10	3,167,093.38
4,187.00	4.57	259.97	4,185.79	1.96	-62.02	40.059232	-104.903065	1,264,986.09	3,167,087.10
4,281.00	6.14	262.91	4,279.38	0.69	-70.70	40.059229	-104.903096	1,264,984.76	3,167,078.43
4,376.00	7.10	280.99	4,373.75	1.18	-81.50	40.059230	-104.903134	1,264,985.17	3,167,067.62
4,470.00	7.53	276.25	4,466.99	2.96	-93.33	40.059235	-104.903177	1,264,986.87	3,167,055.78
4,565.00	9.11	277.71	4,560.99	4.65	-106.97	40.059240	-104.903225	1,264,988.47	3,167,042.13
4,659.00	9.47	272.98	4,653.76	6.05	-122.07	40.059244	-104.903279	1,264,989.77	3,167,027.02
4,753.00	9.02	271.51	4,746.53	6.64	-137.16	40.059245	-104.903333	1,264,990.26	3,167,011.93
4,848.00	10.80	280.23	4,840.12	8.42	-153.36	40.059250	-104.903391	1,264,991.93	3,166,995.72
4,942.00	10.94	278.29	4,932.43	11.27	-170.85	40.059258	-104.903454	1,264,994.66	3,166,978.20
5,036.00	11.04	271.37	5,024.71	12.77	-188.68	40.059262	-104.903517	1,264,996.04	3,166,960.37
5,131.00	10.13	270.94	5,118.10	13.13	-206.13	40.059263	-104.903580	1,264,996.28	3,166,942.92
5,225.00	8.85	260.58	5,210.81	12.08	-221.53	40.059260	-104.903635	1,264,995.13	3,166,927.53
5,319.00	9.09	267.12	5,303.67	10.52	-236.08	40.059256	-104.903687	1,264,993.47	3,166,912.99
5,414.00	10.85	265.72	5,397.23	9.48	-252.49	40.059253	-104.903745	1,264,992.32	3,166,896.59
5,508.00	10.80	263.20	5,489.56	7.77	-270.06	40.059248	-104.903808	1,264,990.50	3,166,879.03
5,603.00	11.14	266.79	5,582.82	6.21	-288.06	40.059244	-104.903872	1,264,988.81	3,166,861.04
5,697.00	10.09	265.08	5,675.21	4.99	-305.33	40.059241	-104.903934	1,264,987.48	3,166,843.78
5,791.00	9.96	266.38	5,767.78	3.77	-321.65	40.059237	-104.903992	1,264,986.15	3,166,827.47
5,886.00	7.85	267.38	5,861.63	2.96	-336.33	40.059235	-104.904045	1,264,985.23	3,166,812.80
5,980.00	6.31	271.23	5,954.91	2.77	-347.91	40.059235	-104.904086	1,264,984.97	3,166,801.22
6,074.00	4.19	267.94	6,048.51	2.76	-356.50	40.059235	-104.904117	1,264,984.90	3,166,792.62
6,169.00	2.50	264.72	6,143.34	2.45	-362.03	40.059234	-104.904137	1,264,984.55	3,166,787.10
6,263.00	0.62	241.50	6,237.30	2.02	-364.52	40.059233	-104.904146	1,264,984.10	3,166,784.61
6,358.00	0.33	172.52	6,332.30	1.50	-364.94	40.059231	-104.904147	1,264,983.58	3,166,784.20
6,452.00	0.29	62.03	6,426.30	1.34	-364.69	40.059231	-104.904146	1,264,983.43	3,166,784.44
6,547.00	0.07	43.21	6,521.30	1.50	-364.44	40.059231	-104.904145	1,264,983.58	3,166,784.69
6,641.00	0.22	130.46	6,615.30	1.42	-364.27	40.059231	-104.904145	1,264,983.51	3,166,784.87
6,735.00	0.32	123.65	6,709.30	1.16	-363.91	40.059230	-104.904143	1,264,983.25	3,166,785.23
6,830.00	0.32	105.40	6,804.30	0.94	-363.43	40.059230	-104.904142	1,264,983.04	3,166,785.71
6,924.00	0.25	86.89	6,898.30	0.88	-362.97	40.059229	-104.904140	1,264,982.98	3,166,786.17
7,019.00	0.03	126.54	6,993.30	0.88	-362.75	40.059229	-104.904139	1,264,982.98	3,166,786.39
7,113.00	0.33	354.76	7,087.29	1.13	-362.75	40.059230	-104.904139	1,264,983.23	3,166,786.39
7,160.00	2.16	351.94	7,134.28	2.15	-362.89	40.059233	-104.904140	1,264,984.24	3,166,786.24
7,207.00	4.36	355.30	7,181.20	4.80	-363.16	40.059240	-104.904141	1,264,986.90	3,166,785.95
7,254.00	6.70	357.71	7,227.98	9.32	-363.42	40.059253	-104.904142	1,264,991.42	3,166,785.67
7,302.00	9.47	357.33	7,275.50	16.07	-363.71	40.059271	-104.904143	1,264,998.16	3,166,785.33
7,349.00	10.86	354.29	7,321.76	24.34	-364.33	40.059294	-104.904145	1,265,006.42	3,166,784.65
7,396.00	11.55	352.40	7,367.86	33.41	-365.40	40.059319	-104.904149	1,265,015.49	3,166,783.53



Design Report for NRC 30C-4HZ - 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)
7,443.00	12.89	350.75	7,413.80	43.25	-366.86	40.059346	-104.904154	1,265,025.31	3,166,782.00
7,491.00	17.80	355.61	7,460.08	55.85	-368.28	40.059380	-104.904159	1,265,037.91	3,166,780.49
7,538.00	22.40	359.88	7,504.20	71.98	-368.85	40.059425	-104.904161	1,265,054.03	3,166,779.81
7,585.00	27.34	2.57	7,546.83	91.73	-368.39	40.059479	-104.904159	1,265,073.79	3,166,780.14
7,632.00	32.87	2.14	7,587.48	115.28	-367.43	40.059543	-104.904156	1,265,097.34	3,166,780.94
7,680.00	39.75	2.09	7,626.13	143.66	-366.38	40.059621	-104.904152	1,265,125.73	3,166,781.80
7,727.00	48.35	4.29	7,659.88	176.25	-364.51	40.059711	-104.904145	1,265,158.33	3,166,783.45
7,774.00	56.17	5.63	7,688.63	213.25	-361.28	40.059812	-104.904134	1,265,195.35	3,166,786.43
7,821.00	64.52	4.95	7,711.86	253.88	-357.53	40.059924	-104.904121	1,265,236.00	3,166,789.91
7,868.00	74.28	5.33	7,728.38	297.65	-353.59	40.060044	-104.904106	1,265,279.79	3,166,793.56
7,915.00	78.33	358.44	7,739.52	343.25	-352.11	40.060169	-104.904101	1,265,325.40	3,166,794.73
7,932.00	80.65	355.98	7,742.62	359.94	-352.92	40.060215	-104.904104	1,265,342.08	3,166,793.80
7,980.00	89.25	357.00	7,746.84	407.62	-355.85	40.060346	-104.904115	1,265,389.74	3,166,790.56
8,019.00	88.67	357.20	7,747.55	446.56	-357.82	40.060453	-104.904122	1,265,428.67	3,166,788.32
8,113.00	91.39	357.95	7,747.50	540.47	-361.80	40.060711	-104.904136	1,265,522.54	3,166,783.71
8,208.00	91.70	357.77	7,744.94	635.37	-365.34	40.060971	-104.904148	1,265,617.41	3,166,779.53
8,303.00	92.59	358.47	7,741.38	730.25	-368.46	40.061232	-104.904160	1,265,712.27	3,166,775.77
8,397.00	92.10	359.09	7,737.54	824.15	-370.46	40.061489	-104.904167	1,265,806.15	3,166,773.14
8,492.00	91.23	0.33	7,734.78	919.10	-370.94	40.061750	-104.904168	1,265,901.09	3,166,772.02
8,586.00	91.60	0.12	7,732.46	1,013.07	-370.57	40.062008	-104.904167	1,265,995.06	3,166,771.76
8,680.00	90.80	0.97	7,730.49	1,107.05	-369.67	40.062266	-104.904164	1,266,089.03	3,166,772.02
8,775.00	89.45	1.60	7,730.28	1,202.02	-367.54	40.062527	-104.904156	1,266,184.02	3,166,773.51
8,869.00	88.86	1.62	7,731.67	1,295.97	-364.90	40.062785	-104.904147	1,266,277.98	3,166,775.52
8,963.00	89.54	1.55	7,732.98	1,389.93	-362.30	40.063042	-104.904138	1,266,371.95	3,166,777.48
9,058.00	90.00	1.36	7,733.36	1,484.90	-359.89	40.063303	-104.904129	1,266,466.92	3,166,779.26
9,152.00	91.11	1.22	7,732.45	1,578.87	-357.77	40.063561	-104.904121	1,266,560.90	3,166,780.74
9,247.00	90.62	1.73	7,731.01	1,673.82	-355.33	40.063822	-104.904113	1,266,655.87	3,166,782.55
9,337.00	89.66	1.51	7,730.80	1,763.79	-352.78	40.064069	-104.904104	1,266,745.85	3,166,784.48
9,431.00	89.82	1.40	7,731.22	1,857.75	-350.40	40.064327	-104.904095	1,266,839.82	3,166,786.24
9,523.00	90.80	1.15	7,730.72	1,949.73	-348.35	40.064579	-104.904088	1,266,931.81	3,166,787.67
9,615.00	89.20	2.50	7,730.72	2,041.68	-345.42	40.064832	-104.904077	1,267,023.77	3,166,789.98
9,707.00	90.40	2.46	7,731.04	2,133.59	-341.44	40.065084	-104.904063	1,267,115.70	3,166,793.34
9,800.00	89.01	2.58	7,731.52	2,226.50	-337.35	40.065339	-104.904049	1,267,208.63	3,166,796.80
9,894.00	89.51	2.63	7,732.74	2,320.39	-333.08	40.065597	-104.904033	1,267,302.55	3,166,800.44
9,986.00	90.37	3.18	7,732.83	2,412.27	-328.42	40.065849	-104.904017	1,267,394.46	3,166,804.48
10,078.00	89.75	2.10	7,732.74	2,504.17	-324.18	40.066101	-104.904001	1,267,486.38	3,166,808.10
10,170.00	88.43	1.52	7,734.20	2,596.11	-321.27	40.066354	-104.903991	1,267,578.33	3,166,810.39
10,263.00	89.41	1.29	7,735.95	2,689.07	-318.99	40.066609	-104.903983	1,267,671.30	3,166,812.04
10,356.00	88.15	1.31	7,737.93	2,782.02	-316.88	40.066864	-104.903975	1,267,764.26	3,166,813.53
10,449.00	88.30	0.78	7,740.81	2,874.96	-315.19	40.067119	-104.903969	1,267,857.20	3,166,814.59
10,543.00	90.43	1.71	7,741.85	2,968.92	-313.15	40.067377	-104.903962	1,267,951.18	3,166,816.00
10,634.00	90.80	1.71	7,740.88	3,059.88	-310.43	40.067627	-104.903952	1,268,042.14	3,166,818.11

Design Report for NRC 30C-4HZ - 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)
10,727.00	90.25	0.69	7,740.03	3,152.85	-308.48	40.067882	-104.903945	1,268,135.13	3,166,819.43
10,818.00	89.63	359.11	7,740.12	3,243.85	-308.64	40.068132	-104.903946	1,268,226.12	3,166,818.66
10,912.00	89.14	359.07	7,741.13	3,337.83	-310.14	40.068390	-104.903951	1,268,320.08	3,166,816.53
11,004.00	89.81	359.17	7,741.97	3,429.82	-311.55	40.068642	-104.903956	1,268,412.05	3,166,814.50
11,098.00	89.63	359.38	7,742.43	3,523.81	-312.74	40.068900	-104.903961	1,268,506.03	3,166,812.68
11,191.00	88.52	358.65	7,743.93	3,616.78	-314.34	40.069155	-104.903966	1,268,598.99	3,166,810.45
11,283.00	88.77	358.31	7,746.11	3,708.72	-316.78	40.069408	-104.903975	1,268,690.91	3,166,807.39
11,376.00	89.82	358.33	7,747.25	3,801.67	-319.50	40.069663	-104.903985	1,268,783.83	3,166,804.04
11,469.00	90.55	358.50	7,746.95	3,894.64	-322.07	40.069918	-104.903994	1,268,876.77	3,166,800.84
11,561.00	90.65	358.35	7,745.99	3,986.60	-324.60	40.070171	-104.904003	1,268,968.71	3,166,797.70
11,652.00	91.39	358.75	7,744.37	4,077.55	-326.91	40.070420	-104.904011	1,269,059.65	3,166,794.78
11,743.00	90.00	358.27	7,743.27	4,168.51	-329.27	40.070670	-104.904020	1,269,150.58	3,166,791.80
11,836.00	88.71	358.78	7,744.31	4,261.47	-331.67	40.070925	-104.904028	1,269,243.52	3,166,788.78
11,926.00	89.69	358.93	7,745.57	4,351.45	-333.46	40.071172	-104.904035	1,269,333.48	3,166,786.38
12,021.00	90.71	358.81	7,745.24	4,446.42	-335.34	40.071433	-104.904041	1,269,428.44	3,166,783.87
12,115.00	89.14	0.12	7,745.36	4,540.42	-336.21	40.071691	-104.904045	1,269,522.42	3,166,782.36
12,210.00	89.85	0.07	7,746.20	4,635.41	-336.06	40.071952	-104.904044	1,269,617.41	3,166,781.87
12,304.00	91.20	0.49	7,745.34	4,729.40	-335.60	40.072210	-104.904042	1,269,711.40	3,166,781.70
12,398.00	90.52	1.72	7,743.93	4,823.37	-333.79	40.072468	-104.904036	1,269,805.38	3,166,782.88
12,493.00	89.97	1.53	7,743.52	4,918.33	-331.09	40.072728	-104.904026	1,269,900.35	3,166,784.93
12,587.00	90.31	1.05	7,743.29	5,012.31	-328.98	40.072986	-104.904019	1,269,994.33	3,166,786.42
12,681.00	91.11	0.94	7,742.12	5,106.29	-327.34	40.073244	-104.904013	1,270,088.32	3,166,787.42
12,776.00	89.54	0.71	7,741.59	5,201.27	-325.98	40.073505	-104.904008	1,270,183.31	3,166,788.14
12,870.00	90.25	0.71	7,741.76	5,295.26	-324.81	40.073763	-104.904004	1,270,277.30	3,166,788.68
12,964.00	90.99	0.00	7,740.74	5,389.26	-324.23	40.074021	-104.904002	1,270,371.29	3,166,788.63
13,059.00	89.45	359.34	7,740.38	5,484.25	-324.78	40.074282	-104.904004	1,270,466.27	3,166,787.44
13,153.00	89.45	358.67	7,741.28	5,578.23	-326.41	40.074540	-104.904010	1,270,560.24	3,166,785.17
13,247.00	89.97	357.94	7,741.75	5,672.19	-329.19	40.074798	-104.904020	1,270,654.17	3,166,781.76
13,342.00	90.43	357.69	7,741.42	5,767.12	-332.81	40.075058	-104.904032	1,270,749.07	3,166,777.50
13,436.00	90.83	356.56	7,740.39	5,860.99	-337.52	40.075316	-104.904049	1,270,842.91	3,166,772.15
13,531.00	91.39	357.38	7,738.55	5,955.84	-342.54	40.075576	-104.904067	1,270,937.72	3,166,766.49
13,625.00	88.52	356.96	7,738.62	6,049.72	-347.19	40.075834	-104.904084	1,271,031.55	3,166,761.22
13,720.00	89.01	357.17	7,740.67	6,144.57	-352.05	40.076094	-104.904101	1,271,126.37	3,166,755.72
13,814.00	90.37	357.05	7,741.18	6,238.45	-356.79	40.076352	-104.904118	1,271,220.21	3,166,750.35
13,908.00	89.88	358.03	7,740.97	6,332.36	-360.82	40.076610	-104.904133	1,271,314.09	3,166,745.68
14,003.00	90.99	359.03	7,740.25	6,427.32	-363.26	40.076870	-104.904141	1,271,409.03	3,166,742.61
14,097.00	91.17	0.61	7,738.48	6,521.30	-363.55	40.077128	-104.904142	1,271,503.00	3,166,741.68
14,192.00	91.14	1.68	7,736.57	6,616.26	-361.66	40.077389	-104.904136	1,271,597.97	3,166,742.94
14,286.00	89.51	1.42	7,736.03	6,710.22	-359.11	40.077647	-104.904127	1,271,691.94	3,166,744.85
14,380.00	91.23	1.72	7,735.43	6,804.18	-356.54	40.077905	-104.904117	1,271,785.91	3,166,746.79
14,475.00	89.82	2.36	7,734.56	6,899.11	-353.16	40.078166	-104.904105	1,271,880.86	3,166,749.53
14,569.00	90.86	1.95	7,734.00	6,993.04	-349.62	40.078423	-104.904093	1,271,974.81	3,166,752.43

Design Report for NRC 30C-4HZ - 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	91.73	2.37	7,731.87	7,086.95	-346.08	40.078681	-104.904080	1,272,068.74	3,166,755.34
14,758.00	90.06	2.74	7,730.39	7,181.84	-341.85	40.078942	-104.904065	1,272,163.65	3,166,758.94
14,852.00	90.83	2.03	7,729.66	7,275.76	-337.93	40.079199	-104.904051	1,272,257.58	3,166,762.22
14,947.00	89.14	2.54	7,729.68	7,370.68	-334.15	40.079460	-104.904037	1,272,352.53	3,166,765.36
15,041.00	89.78	2.30	7,730.57	7,464.59	-330.18	40.079718	-104.904023	1,272,446.46	3,166,768.70
15,135.00	90.00	1.87	7,730.75	7,558.53	-326.76	40.079976	-104.904011	1,272,540.41	3,166,771.49
15,229.00	88.06	0.55	7,732.34	7,652.49	-324.77	40.080234	-104.904004	1,272,634.38	3,166,772.84
15,324.00	88.37	0.23	7,735.30	7,747.44	-324.13	40.080494	-104.904002	1,272,729.33	3,166,772.85
15,418.00	89.01	359.93	7,737.45	7,841.41	-324.00	40.080752	-104.904001	1,272,823.30	3,166,772.34
15,512.00	89.51	359.39	7,738.66	7,935.40	-324.55	40.081010	-104.904003	1,272,917.28	3,166,771.15
15,607.00	90.12	359.54	7,738.97	8,030.40	-325.44	40.081271	-104.904006	1,273,012.26	3,166,769.63
15,701.00	91.02	359.15	7,738.04	8,124.38	-326.52	40.081529	-104.904010	1,273,106.24	3,166,767.92
15,796.00	91.66	359.28	7,735.81	8,219.35	-327.82	40.081790	-104.904015	1,273,201.19	3,166,765.98
15,890.00	91.26	359.48	7,733.42	8,313.31	-328.83	40.082048	-104.904018	1,273,295.14	3,166,764.33
15,985.00	88.52	357.88	7,733.60	8,408.28	-331.02	40.082308	-104.904026	1,273,390.08	3,166,761.50
16,079.00	88.71	357.26	7,735.87	8,502.16	-335.01	40.082566	-104.904040	1,273,483.94	3,166,756.89
16,174.00	89.54	356.98	7,737.32	8,597.03	-339.78	40.082826	-104.904058	1,273,578.77	3,166,751.47
16,268.00	89.60	358.54	7,738.03	8,690.95	-343.45	40.083084	-104.904071	1,273,672.66	3,166,747.17
16,363.00	90.68	359.38	7,737.80	8,785.94	-345.18	40.083345	-104.904077	1,273,767.62	3,166,744.80
16,457.00	91.20	358.82	7,736.26	8,879.91	-346.65	40.083603	-104.904082	1,273,861.58	3,166,742.70
16,552.00	88.86	0.23	7,736.21	8,974.90	-347.44	40.083864	-104.904085	1,273,956.56	3,166,741.27
16,646.00	88.83	359.87	7,738.10	9,068.88	-347.36	40.084122	-104.904085	1,274,050.53	3,166,740.72
16,741.00	89.78	359.44	7,739.25	9,163.87	-347.93	40.084382	-104.904087	1,274,145.52	3,166,739.51
16,835.00	91.17	359.99	7,738.47	9,257.86	-348.40	40.084640	-104.904088	1,274,239.50	3,166,738.41
16,929.00	91.91	359.77	7,735.95	9,351.83	-348.59	40.084898	-104.904089	1,274,333.46	3,166,737.58
17,024.00	90.74	359.69	7,733.75	9,446.80	-349.04	40.085159	-104.904091	1,274,428.42	3,166,736.49
17,118.00	91.11	359.60	7,732.23	9,540.78	-349.62	40.085417	-104.904093	1,274,522.40	3,166,735.27
17,213.00	92.44	359.63	7,729.29	9,635.73	-350.26	40.085678	-104.904095	1,274,617.34	3,166,734.00
17,307.00	92.84	359.62	7,724.96	9,729.63	-350.88	40.085935	-104.904097	1,274,711.23	3,166,732.75
17,367.00	92.77	359.46	7,722.02	9,789.56	-351.36	40.086100	-104.904099	1,274,771.14	3,166,731.87
17,420.00	92.77	359.46	7,719.46	9,842.49	-351.86	40.086245	-104.904101	1,274,824.07	3,166,731.01

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,105.00	1,104.97	5.69	-0.27	First MWD Survey @ 1105.00'
17,367.00	7,722.02	9,789.56	-351.36	Last MWD Survey @ 17367.00'
17,420.00	7,719.46	9,842.49	-351.86	ST. Line Projection to Bit @ 17420' MD

Design Report for NRC 30C-4HZ - 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)	356.09	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
25.00	991.00	Surface Gyros	NS-GYRO-MS
1,105.00	7,980.00	MWD Surveys- Intermediate	MWD+IFR1+SC
8,019.00	17,367.00	MWD Surveys-Lateral	MWD+IFR1+SC

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
1,104.00	1,103.97	9 5/8"	9-5/8	13-1/2
7,980.00	7,746.84	7"	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 30C-4HZ LD	0.00	1,264,984.56	3,167,149.12	0.02	0.00	2/26/2014	2/26/2014
Polygon	NRC 13-9HZ Pad_Sec. Lir	0.00	1,264,984.56	3,167,149.12	0.02	0.00	3/2/2014	3/2/2014

Directional Difficulty Index

Average Dogleg over Survey:	1.48 °/100usft	Maximum Dogleg over Survey:	20.78 °/100usft at 7,868.00 usft
Net Tortousity applicable to Plans:	0.61 °/100usft	Directional Difficulty Index:	6.774

Design Report for NRC 30C-4HZ - Surveys

Audit Info

North Reference Sheet for Sec. 9-T1N-R67W - NRC 30C-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' @ 5089.60usft. Northing and Easting are relative to NRC 30C-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: 1,264,984.54 usft N, 3,167,149.12 usft E

Geographical Coordinates of Well: 40° 03' 33.22" N, 104° 54' 10.23" W

Grid Convergence at Surface is: 0.39°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,420.00usft

the Bottom Hole Displacement is 9,848.78usft in the Direction of 357.95° (True).

Magnetic Convergence at surface is: -8.20° (5 March 2014, , BGGM2013)

