

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 24-T3N-R66W

Miller 4N-24HZ

Plan A Rev 0

Plan: Plan A Rev 0 Permit

## Sperry Drilling Services

## Proposal Report

21 January, 2013

Well Coordinates: 1,318,352.95 N, 3,214,126.42 E (40° 12' 17.05" N, 104° 44' 00.14" W)

Ground Level: 5,016.00 ft

Local Coordinate Origin:

Centered on Well Miller 4N-24HZ

Viewing Datum:

RKB=16 @ 5032.00ft (Drilling Rig)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 431

**HALLIBURTON**

Project: Weld County, CO (NAD 83)  
Site: Sec. 24-T3N-R66W  
Well: Miller 4N-24HZ  
Wellbore: Plan A Rev 0  
Design: Plan A Rev 0 Permit

# Anadarko Petroleum Corp.

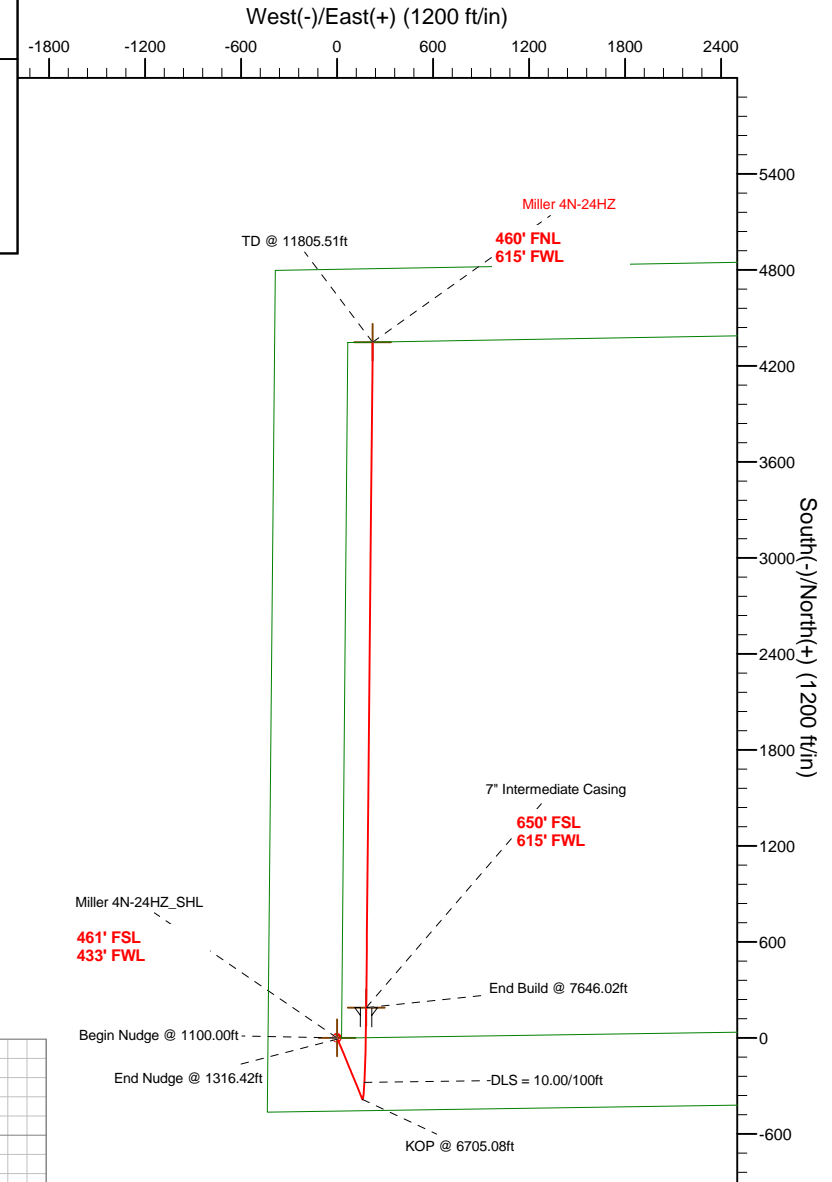
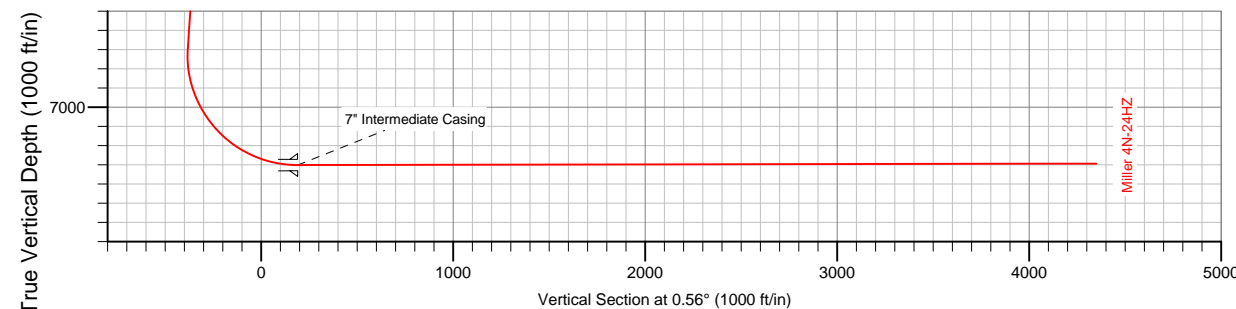
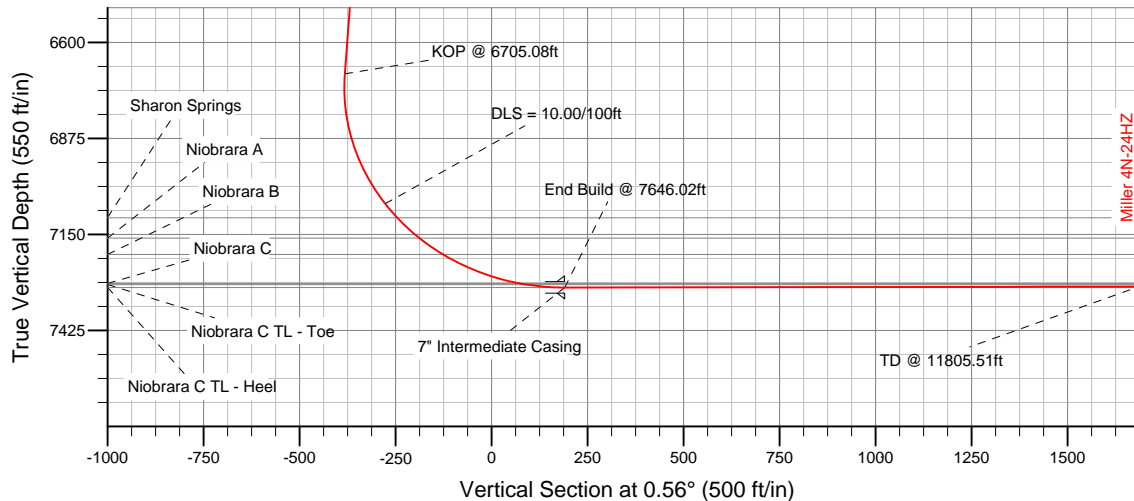
**HALLIBURTON**  
Sperry Drilling

## SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1100.00	0.00	0.00	1100.00	0.00	0.00	0.00	0.00	0.00	
3	1316.42	4.33	157.57	1316.21	-7.55	3.12	2.00	157.57	-7.52	
4	6705.08	4.33	157.57	6689.50	-383.47	158.31	0.00	0.00	-381.91	
5	7646.02	90.11	0.56	7302.00	189.00	182.00	10.00	-156.95	190.77	Miller 4N-24HZ_CP
6	11805.51	90.11	0.56	7294.00	4348.28	222.30	0.00	0.00	4350.25	Miller 4N-24HZ_BHL

## WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Miller 4N-24HZ_SHL	0.00	0.00	0.00	40.204735	-104.733371	Point
Miller 4N-24HZ_BHL	7294.00	4348.28	222.30	40.216671	-104.732575	Point
Miller 4N-24HZ_CP	7302.00	189.00	182.00	40.205254	-104.732719	Point



## WELL DETAILS: Miller 4N-24HZ

Ground Level:	5016.00
RKB=16 @ 5032.00ft (Drilling Rig)	
Plan: Plan A Rev 0 Permit (Miller 4N-24HZ/Plan A Rev 0)	
Created By: Fred Hartmann	Date: 01/21/2013
Reviewed: _____	Date: _____

**Plan Report for Miller 4N-24HZ - Plan A Rev 0 Permit**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Begin Nudge @ 1100.00ft</b>										
1,200.00	2.00	157.57	1,199.98	-1.61	0.67	-1.61	2.00	2.00	0.00	157.57
1,300.00	4.00	157.57	1,299.84	-6.45	2.66	-6.42	2.00	2.00	0.00	0.00
1,316.42	4.33	157.57	1,316.21	-7.55	3.12	-7.52	2.00	2.00	0.00	0.00
<b>End Nudge @ 1316.42ft</b>										
1,400.00	4.33	157.57	1,399.56	-13.38	5.53	-13.33	0.00	0.00	0.00	0.00
1,500.00	4.33	157.57	1,499.27	-20.36	8.41	-20.28	0.00	0.00	0.00	0.00
1,600.00	4.33	157.57	1,598.99	-27.34	11.29	-27.22	0.00	0.00	0.00	0.00
1,700.00	4.33	157.57	1,698.70	-34.31	14.17	-34.17	0.00	0.00	0.00	0.00
1,800.00	4.33	157.57	1,798.41	-41.29	17.05	-41.12	0.00	0.00	0.00	0.00
1,900.00	4.33	157.57	1,898.13	-48.26	19.93	-48.07	0.00	0.00	0.00	0.00
2,000.00	4.33	157.57	1,997.84	-55.24	22.81	-55.01	0.00	0.00	0.00	0.00
2,100.00	4.33	157.57	2,097.56	-62.22	25.69	-61.96	0.00	0.00	0.00	0.00
2,200.00	4.33	157.57	2,197.27	-69.19	28.57	-68.91	0.00	0.00	0.00	0.00
2,300.00	4.33	157.57	2,296.99	-76.17	31.45	-75.86	0.00	0.00	0.00	0.00
2,400.00	4.33	157.57	2,396.70	-83.14	34.33	-82.80	0.00	0.00	0.00	0.00
2,500.00	4.33	157.57	2,496.42	-90.12	37.21	-89.75	0.00	0.00	0.00	0.00
2,600.00	4.33	157.57	2,596.13	-97.10	40.09	-96.70	0.00	0.00	0.00	0.00
2,700.00	4.33	157.57	2,695.85	-104.07	42.97	-103.65	0.00	0.00	0.00	0.00
2,800.00	4.33	157.57	2,795.56	-111.05	45.85	-110.60	0.00	0.00	0.00	0.00
2,900.00	4.33	157.57	2,895.28	-118.03	48.73	-117.54	0.00	0.00	0.00	0.00
3,000.00	4.33	157.57	2,994.99	-125.00	51.61	-124.49	0.00	0.00	0.00	0.00
3,100.00	4.33	157.57	3,094.71	-131.98	54.49	-131.44	0.00	0.00	0.00	0.00
3,200.00	4.33	157.57	3,194.42	-138.95	57.37	-138.39	0.00	0.00	0.00	0.00
3,300.00	4.33	157.57	3,294.14	-145.93	60.25	-145.33	0.00	0.00	0.00	0.00
3,400.00	4.33	157.57	3,393.85	-152.91	63.13	-152.28	0.00	0.00	0.00	0.00
3,500.00	4.33	157.57	3,493.57	-159.88	66.01	-159.23	0.00	0.00	0.00	0.00
3,600.00	4.33	157.57	3,593.28	-166.86	68.89	-166.18	0.00	0.00	0.00	0.00
3,700.00	4.33	157.57	3,693.00	-173.83	71.77	-173.12	0.00	0.00	0.00	0.00
3,800.00	4.33	157.57	3,792.71	-180.81	74.65	-180.07	0.00	0.00	0.00	0.00
3,900.00	4.33	157.57	3,892.43	-187.79	77.53	-187.02	0.00	0.00	0.00	0.00
4,000.00	4.33	157.57	3,992.14	-194.76	80.41	-193.97	0.00	0.00	0.00	0.00
4,100.00	4.33	157.57	4,091.86	-201.74	83.29	-200.91	0.00	0.00	0.00	0.00
4,200.00	4.33	157.57	4,191.57	-208.71	86.17	-207.86	0.00	0.00	0.00	0.00
4,300.00	4.33	157.57	4,291.28	-215.69	89.05	-214.81	0.00	0.00	0.00	0.00
4,400.00	4.33	157.57	4,391.00	-222.67	91.93	-221.76	0.00	0.00	0.00	0.00
4,493.27	4.33	157.57	4,484.00	-229.17	94.61	-228.24	0.00	0.00	0.00	0.00
<b>Sussex</b>										
4,500.00	4.33	157.57	4,490.71	-229.64	94.81	-228.71	0.00	0.00	0.00	0.00
4,600.00	4.33	157.57	4,590.43	-236.62	97.69	-235.65	0.00	0.00	0.00	0.00
4,700.00	4.33	157.57	4,690.14	-243.60	100.57	-242.60	0.00	0.00	0.00	0.00
4,800.00	4.33	157.57	4,789.86	-250.57	103.45	-249.55	0.00	0.00	0.00	0.00
4,900.00	4.33	157.57	4,889.57	-257.55	106.33	-256.50	0.00	0.00	0.00	0.00
5,000.00	4.33	157.57	4,989.29	-264.52	109.21	-263.44	0.00	0.00	0.00	0.00
5,100.00	4.33	157.57	5,089.00	-271.50	112.09	-270.39	0.00	0.00	0.00	0.00
5,200.00	4.33	157.57	5,188.72	-278.48	114.97	-277.34	0.00	0.00	0.00	0.00

## Plan Report for Miller 4N-24HZ - Plan A Rev 0 Permit

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
5,300.00	4.33	157.57	5,288.43	-285.45	117.85	-284.29	0.00	0.00	0.00	0.00
5,400.00	4.33	157.57	5,388.15	-292.43	120.73	-291.23	0.00	0.00	0.00	0.00
5,500.00	4.33	157.57	5,487.86	-299.40	123.61	-298.18	0.00	0.00	0.00	0.00
5,600.00	4.33	157.57	5,587.58	-306.38	126.49	-305.13	0.00	0.00	0.00	0.00
5,700.00	4.33	157.57	5,687.29	-313.36	129.37	-312.08	0.00	0.00	0.00	0.00
5,800.00	4.33	157.57	5,787.01	-320.33	132.25	-319.02	0.00	0.00	0.00	0.00
5,900.00	4.33	157.57	5,886.72	-327.31	135.13	-325.97	0.00	0.00	0.00	0.00
6,000.00	4.33	157.57	5,986.44	-334.28	138.01	-332.92	0.00	0.00	0.00	0.00
6,100.00	4.33	157.57	6,086.15	-341.26	140.89	-339.87	0.00	0.00	0.00	0.00
6,200.00	4.33	157.57	6,185.87	-348.24	143.77	-346.82	0.00	0.00	0.00	0.00
6,300.00	4.33	157.57	6,285.58	-355.21	146.65	-353.76	0.00	0.00	0.00	0.00
6,400.00	4.33	157.57	6,385.30	-362.19	149.53	-360.71	0.00	0.00	0.00	0.00
6,500.00	4.33	157.57	6,485.01	-369.17	152.41	-367.66	0.00	0.00	0.00	0.00
6,600.00	4.33	157.57	6,584.72	-376.14	155.29	-374.61	0.00	0.00	0.00	0.00
6,700.00	4.33	157.57	6,684.44	-383.12	158.17	-381.55	0.00	0.00	0.00	0.00
6,705.08	4.33	157.57	6,689.51	-383.47	158.31	-381.91	0.00	0.00	0.00	0.00
<b>KOP @ 6705.08ft</b>										
6,800.00	5.76	17.60	6,784.27	-382.24	161.13	-380.65	10.00	1.51	-147.46	-156.95
6,900.00	15.60	6.64	6,882.42	-364.05	164.20	-362.43	10.00	9.84	-10.96	-17.12
7,000.00	25.56	4.10	6,975.92	-329.09	167.31	-327.44	10.00	9.96	-2.53	-6.31
7,100.00	35.54	2.93	7,061.93	-278.42	170.35	-276.74	10.00	9.98	-1.17	-3.93
<b>DLS = 10.00/100ft</b>										
7,150.92	40.63	2.53	7,102.00	-247.05	171.84	-245.36	10.00	9.99	-0.78	-2.91
<b>Sharon Springs</b>										
7,200.00	45.53	2.22	7,137.83	-213.57	173.22	-211.87	10.00	9.99	-0.64	-2.60
7,232.60	48.79	2.04	7,160.00	-189.68	174.11	-187.97	10.00	9.99	-0.55	-2.37
<b>Niobrara A</b>										
7,300.00	55.53	1.72	7,201.32	-136.52	175.85	-134.79	10.00	9.99	-0.48	-2.25
7,310.16	56.54	1.68	7,207.00	-128.09	176.10	-126.37	10.00	9.99	-0.43	-2.05
<b>Niobrara B</b>										
7,400.00	65.52	1.33	7,250.47	-49.60	178.15	-47.86	10.00	9.99	-0.39	-2.03
7,500.00	75.51	1.00	7,283.78	44.53	180.05	46.29	10.00	10.00	-0.33	-1.86
7,527.42	78.26	0.91	7,290.00	71.23	180.50	72.99	10.00	10.00	-0.31	-1.75
<b>Niobrara C</b>										
7,600.00	85.51	0.69	7,300.24	143.03	181.50	144.80	10.00	10.00	-0.30	-1.73
7,643.81	89.89	0.56	7,302.00	186.79	181.98	188.56	10.00	10.00	-0.30	-1.70
<b>Niobrara C TL - Heel</b>										
7,646.02	90.11	0.56	7,302.00	189.00	182.00	190.77	10.00	9.99	-0.30	-1.69
<b>End Build @ 7646.02ft - 7" Intermediate Casing - Miller 4N-24HZ_CP</b>										
7,700.00	90.11	0.56	7,301.90	242.98	182.52	244.75	0.00	0.00	0.00	-1.69
7,800.00	90.11	0.56	7,301.70	342.97	183.49	344.75	0.00	0.00	0.00	0.00
7,900.00	90.11	0.56	7,301.51	442.97	184.46	444.75	0.00	0.00	0.00	0.00
8,000.00	90.11	0.56	7,301.32	542.96	185.43	544.75	0.00	0.00	0.00	0.00
8,100.00	90.11	0.56	7,301.13	642.96	186.40	644.75	0.00	0.00	0.00	0.00
8,200.00	90.11	0.56	7,300.93	742.95	187.37	744.75	0.00	0.00	0.00	0.00
8,300.00	90.11	0.56	7,300.74	842.95	188.34	844.75	0.00	0.00	0.00	0.00
8,400.00	90.11	0.56	7,300.55	942.94	189.31	944.75	0.00	0.00	0.00	0.00
8,500.00	90.11	0.56	7,300.36	1,042.94	190.27	1,044.75	0.00	0.00	0.00	0.00
8,600.00	90.11	0.56	7,300.17	1,142.93	191.24	1,144.75	0.00	0.00	0.00	0.00
8,700.00	90.11	0.56	7,299.97	1,242.93	192.21	1,244.75	0.00	0.00	0.00	0.00
8,800.00	90.11	0.56	7,299.78	1,342.92	193.18	1,344.75	0.00	0.00	0.00	0.00
8,900.00	90.11	0.56	7,299.59	1,442.92	194.15	1,444.75	0.00	0.00	0.00	0.00
9,000.00	90.11	0.56	7,299.40	1,542.91	195.12	1,544.75	0.00	0.00	0.00	0.00
9,100.00	90.11	0.56	7,299.20	1,642.91	196.09	1,644.75	0.00	0.00	0.00	0.00
9,200.00	90.11	0.56	7,299.01	1,742.90	197.06	1,744.75	0.00	0.00	0.00	0.00
9,300.00	90.11	0.56	7,298.82	1,842.90	198.03	1,844.75	0.00	0.00	0.00	0.00
9,400.00	90.11	0.56	7,298.63	1,942.89	199.00	1,944.75	0.00	0.00	0.00	0.00
9,500.00	90.11	0.56	7,298.43	2,042.89	199.96	2,044.75	0.00	0.00	0.00	0.00
9,600.00	90.11	0.56	7,298.24	2,142.88	200.93	2,144.75	0.00	0.00	0.00	0.00

**Plan Report for Miller 4N-24HZ - Plan A Rev 0 Permit**

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	Toolface Azimuth (°)
9,700.00	90.11	0.56	7,298.05	2,242.88	201.90	2,244.75	0.00	0.00	0.00	0.00
9,800.00	90.11	0.56	7,297.86	2,342.87	202.87	2,344.75	0.00	0.00	0.00	0.00
9,900.00	90.11	0.56	7,297.66	2,442.87	203.84	2,444.75	0.00	0.00	0.00	0.00
10,000.00	90.11	0.56	7,297.47	2,542.86	204.81	2,544.75	0.00	0.00	0.00	0.00
10,100.00	90.11	0.56	7,297.28	2,642.86	205.78	2,644.74	0.00	0.00	0.00	0.00
10,200.00	90.11	0.56	7,297.09	2,742.86	206.75	2,744.74	0.00	0.00	0.00	0.00
10,300.00	90.11	0.56	7,296.90	2,842.85	207.72	2,844.74	0.00	0.00	0.00	0.00
10,400.00	90.11	0.56	7,296.70	2,942.85	208.68	2,944.74	0.00	0.00	0.00	0.00
10,500.00	90.11	0.56	7,296.51	3,042.84	209.65	3,044.74	0.00	0.00	0.00	0.00
10,600.00	90.11	0.56	7,296.32	3,142.84	210.62	3,144.74	0.00	0.00	0.00	0.00
10,700.00	90.11	0.56	7,296.13	3,242.83	211.59	3,244.74	0.00	0.00	0.00	0.00
10,800.00	90.11	0.56	7,295.93	3,342.83	212.56	3,344.74	0.00	0.00	0.00	0.00
10,900.00	90.11	0.56	7,295.74	3,442.82	213.53	3,444.74	0.00	0.00	0.00	0.00
11,000.00	90.11	0.56	7,295.55	3,542.82	214.50	3,544.74	0.00	0.00	0.00	0.00
11,100.00	90.11	0.56	7,295.36	3,642.81	215.47	3,644.74	0.00	0.00	0.00	0.00
11,200.00	90.11	0.56	7,295.16	3,742.81	216.44	3,744.74	0.00	0.00	0.00	0.00
11,300.00	90.11	0.56	7,294.97	3,842.80	217.41	3,844.74	0.00	0.00	0.00	0.00
11,400.00	90.11	0.56	7,294.78	3,942.80	218.37	3,944.74	0.00	0.00	0.00	0.00
11,500.00	90.11	0.56	7,294.59	4,042.79	219.34	4,044.74	0.00	0.00	0.00	0.00
11,600.00	90.11	0.56	7,294.40	4,142.79	220.31	4,144.74	0.00	0.00	0.00	0.00
11,700.00	90.11	0.56	7,294.20	4,242.78	221.28	4,244.74	0.00	0.00	0.00	0.00
11,800.00	90.11	0.56	7,294.01	4,342.78	222.25	4,344.74	0.00	0.00	0.00	0.00
11,805.50	90.11	0.56	7,294.00	4,348.28	222.30	4,350.24	0.00	0.00	0.00	0.00
<b>Niobrara C TL - Toe</b>										
11,805.51	90.11	0.56	7,294.00	4,348.28	222.30	4,350.25	0.00	0.00	0.00	0.00
<b>Miller 4N-24HZ_BHL</b>										

**Plan Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N-S (ft)	+E-W (ft)	
1,100.00	1,100.00	0.00	0.00	Begin Nudge @ 1100.00ft
1,316.42	1,316.21	-7.55	3.12	End Nudge @ 1316.42ft
6,705.08	6,689.51	-383.47	158.31	KOP @ 6705.08ft
7,100.00	7,061.93	-278.42	170.35	DLS = 10.00/100ft
7,646.02	7,302.00	189.00	182.00	End Build @ 7646.02ft
11,805.51	7,294.00	4,348.29	222.30	TD @ 11805.51ft

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N-S (ft)	+E-W (ft)	
User	No Target (Freehand)	0.56	Slot	0.00	0.00	0.00

**Survey tool program**

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	11,805.51	Plan A Rev 0 Permit	MWD

**Plan Report for Miller 4N-24HZ - Plan A Rev 0 Permit****Casing Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,646.02	7,302.00	7" Intermediate Casing	7	8-3/4

**Formation Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,493.27	4,484.00	Sussex		0.00	
7,150.92	7,102.00	Sharon Springs		0.00	
7,232.60	7,160.00	Niobrara A		0.00	
7,310.16	7,207.00	Niobrara B		0.00	
7,527.42	7,290.00	Niobrara C		0.00	
7,643.81	7,302.00	Niobrara C TL - Heel		0.00	
11,805.50	7,294.00	Niobrara C TL - Toe		0.00	

***Targets associated with this wellbore***

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Miller 4N-24HZ_SHL	0.00	0.00	0.00	Point
Miller 4N-24HZ_BHL	7,294.00	4,348.28	222.30	Point
Miller 4N-24HZ_CP	7,302.00	189.00	182.00	Point

## North Reference Sheet for Sec. 24-T3N-R66W - Miller 4N-24HZ - Plan A Rev 0

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.  
 Vertical Depths are relative to RKB=16 @ 5032.00ft (Drilling Rig). Northing and Easting are relative to Miller 4N-24HZ  
 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 -105.50°, Longitude Origin:0.000000°, Latitude Origin:40.783333°  
 False Easting: 3,000,000.00ft, False Northing: 1,000,000.00ft, Scale Reduction: 0.99995717

Grid Coordinates of Well: 1,318,352.95 ft N, 3,214,126.42 ft E  
 Geographical Coordinates of Well: 40° 12' 17.05" N, 104° 44' 00.14" W  
 Grid Convergence at Surface is: 0.50°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,805.51ft  
 the Bottom Hole Displacement is 4,353.96ft in the Direction of 2.93° (True).

Magnetic Convergence at surface is: -8.17° (21 January 2013, , BGGM2012)

