

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 7-T2N-R65W

Thomsen 34C-18HZ

Plan B Rev 0

Plan: Plan B Rev 0 Permit

## Sperry Drilling Services

### Proposal Report

08 February, 2013

Well Coordinates: 1,299,780.57 N, 3,219,637.53 E (40° 09' 13.04" N, 104° 42' 51.23" W)

Ground Level: 4,946.00 ft

Local Coordinate Origin:

Centered on Well Thomsen 34C-18HZ

Viewing Datum:

RKB=16 @ 4962.00ft (Drilling Rig)

TVDs to System:

N

North Reference:

True

Unit System:

API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 2003.16 Build: 43I

**HALLIBURTON**

Project: Weld County, CO (NAD 83)  
Site: Sec. 7-T2N-R65W  
Well: Thomsen 34C-18HZ  
Wellbore: Plan B Rev 0  
Design: Plan B Rev 0 Permit

# Anadarko Petroleum Corp.

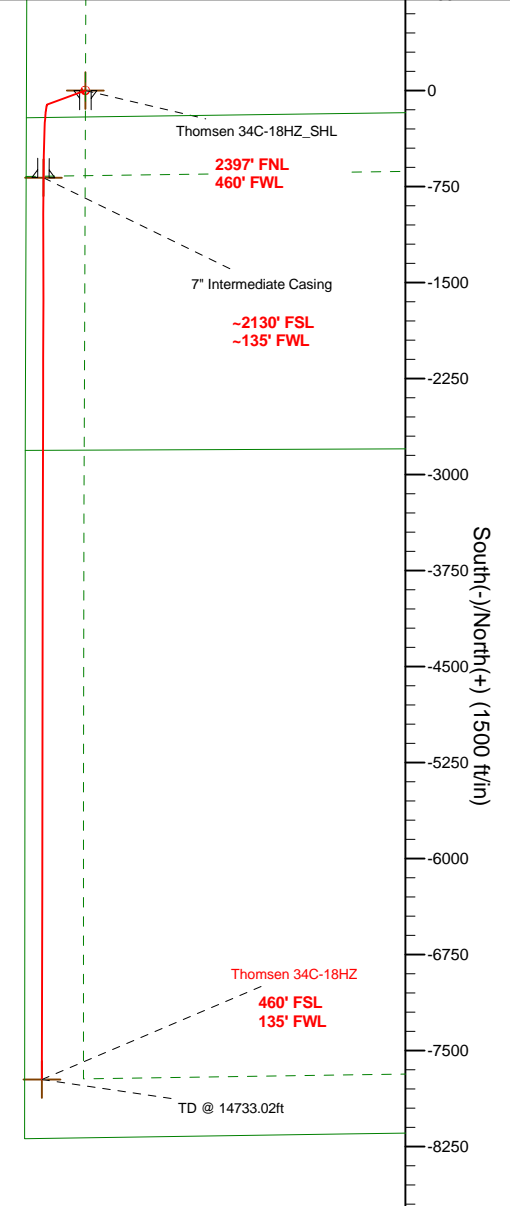
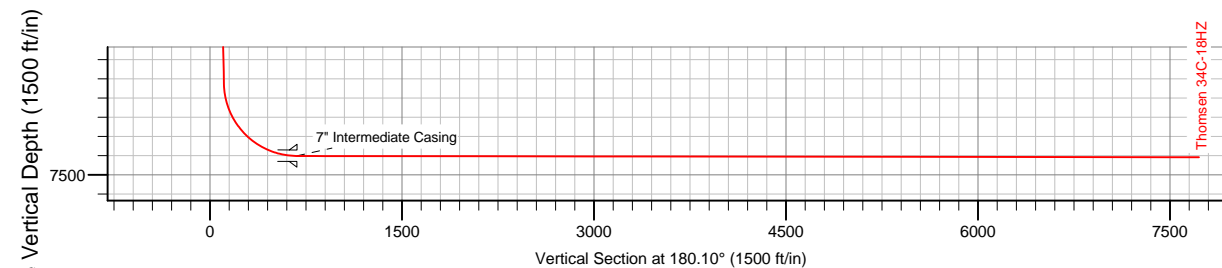
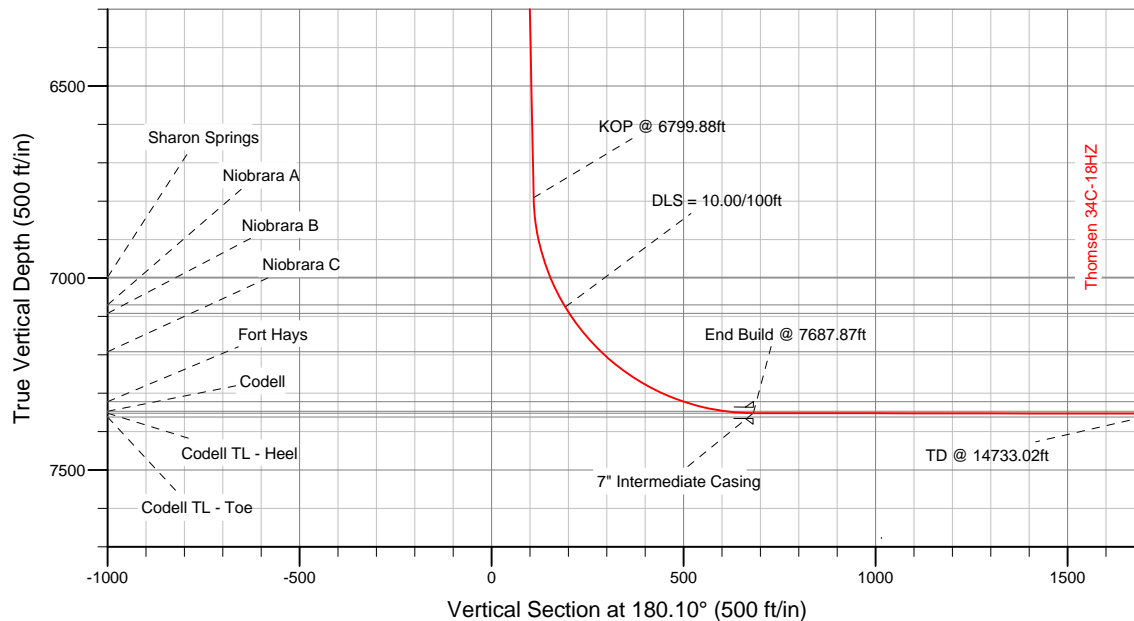
**HALLIBURTON**  
Sperry Drilling

## 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	1261.31	3.23	249.80	1261.23	-1.57	-4.26	2.00	249.80	1.58	
4	6799.88	3.23	249.80	6791.01	-109.22	-296.78	0.00	0.00	109.73	
5	7687.87	89.92	180.10	7352.00	-681.20	-327.40	10.00	-69.73	681.77	Thomsen 34C-18HZ_CP
6	14733.02	89.92	180.10	7362.00	-7726.33	-339.74	0.00	0.00	7726.91	Thomsen 34C-18HZ_BHL

## WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Thomsen 34C-18HZ_SHL	0.00	0.00	0.00	40.153621	-104.714230	Point
Thomsen 34C-18HZ_CP	7352.00	-681.20	-327.40	40.151751	-104.715401	Point
Thomsen 34C-18HZ_BHL	7362.00	-7726.33	-339.74	40.132412	-104.715445	Point



## WELL DETAILS: Thomsen 34C-18HZ

Ground Level: 4946.00  
RKB=16 @ 4962.00ft (Drilling Rig)

Plan: Plan B Rev 0 Permit (Thomsen 34C-18HZ/Plan B Rev 0)

Created By: Fred Hartmann Date: 02/07/2013  
Reviewed: Date:

**Plan Report for Thomsen 34C-18HZ - Plan B 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
<b>9 5/8" Surface Casing</b>										
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	249.80	1,199.98	-0.60	-1.64	0.61	2.00	2.00	0.00	249.80
1,261.31	3.23	249.80	1,261.22	-1.57	-4.26	1.58	2.00	2.00	0.00	0.00
<b>End Nudge @ 1261.31ft</b>										
1,300.00	3.23	249.80	1,299.85	-2.32	-6.30	2.33	0.00	0.00	0.00	0.00
1,400.00	3.23	249.80	1,399.69	-4.26	-11.59	4.28	0.00	0.00	0.00	0.00
1,500.00	3.23	249.80	1,499.54	-6.21	-16.87	6.24	0.00	0.00	0.00	0.00
1,600.00	3.23	249.80	1,599.38	-8.15	-22.15	8.19	0.00	0.00	0.00	0.00
1,700.00	3.23	249.80	1,699.22	-10.09	-27.43	10.14	0.00	0.00	0.00	0.00
1,800.00	3.23	249.80	1,799.06	-12.04	-32.71	12.10	0.00	0.00	0.00	0.00
1,900.00	3.23	249.80	1,898.90	-13.98	-37.99	14.05	0.00	0.00	0.00	0.00
2,000.00	3.23	249.80	1,998.74	-15.93	-43.28	16.00	0.00	0.00	0.00	0.00
2,100.00	3.23	249.80	2,098.59	-17.87	-48.56	17.95	0.00	0.00	0.00	0.00
2,200.00	3.23	249.80	2,198.43	-19.81	-53.84	19.91	0.00	0.00	0.00	0.00
2,300.00	3.23	249.80	2,298.27	-21.76	-59.12	21.86	0.00	0.00	0.00	0.00
2,400.00	3.23	249.80	2,398.11	-23.70	-64.40	23.81	0.00	0.00	0.00	0.00
2,500.00	3.23	249.80	2,497.95	-25.64	-69.68	25.76	0.00	0.00	0.00	0.00
2,600.00	3.23	249.80	2,597.79	-27.59	-74.96	27.72	0.00	0.00	0.00	0.00
2,700.00	3.23	249.80	2,697.63	-29.53	-80.25	29.67	0.00	0.00	0.00	0.00
2,800.00	3.23	249.80	2,797.48	-31.47	-85.53	31.62	0.00	0.00	0.00	0.00
2,900.00	3.23	249.80	2,897.32	-33.42	-90.81	33.58	0.00	0.00	0.00	0.00
3,000.00	3.23	249.80	2,997.16	-35.36	-96.09	35.53	0.00	0.00	0.00	0.00
3,100.00	3.23	249.80	3,097.00	-37.31	-101.37	37.48	0.00	0.00	0.00	0.00
3,200.00	3.23	249.80	3,196.84	-39.25	-106.65	39.43	0.00	0.00	0.00	0.00
3,300.00	3.23	249.80	3,296.68	-41.19	-111.94	41.39	0.00	0.00	0.00	0.00
3,400.00	3.23	249.80	3,396.53	-43.14	-117.22	43.34	0.00	0.00	0.00	0.00
3,500.00	3.23	249.80	3,496.37	-45.08	-122.50	45.29	0.00	0.00	0.00	0.00
3,600.00	3.23	249.80	3,596.21	-47.02	-127.78	47.25	0.00	0.00	0.00	0.00
3,700.00	3.23	249.80	3,696.05	-48.97	-133.06	49.20	0.00	0.00	0.00	0.00
3,800.00	3.23	249.80	3,795.89	-50.91	-138.34	51.15	0.00	0.00	0.00	0.00
3,900.00	3.23	249.80	3,895.73	-52.85	-143.62	53.10	0.00	0.00	0.00	0.00
4,000.00	3.23	249.80	3,995.57	-54.80	-148.91	55.06	0.00	0.00	0.00	0.00
4,100.00	3.23	249.80	4,095.42	-56.74	-154.19	57.01	0.00	0.00	0.00	0.00
4,200.00	3.23	249.80	4,195.26	-58.68	-159.47	58.96	0.00	0.00	0.00	0.00
4,300.00	3.23	249.80	4,295.10	-60.63	-164.75	60.92	0.00	0.00	0.00	0.00
4,400.00	3.23	249.80	4,394.94	-62.57	-170.03	62.87	0.00	0.00	0.00	0.00
4,500.00	3.23	249.80	4,494.78	-64.52	-175.31	64.82	0.00	0.00	0.00	0.00
4,600.00	3.23	249.80	4,594.62	-66.46	-180.60	66.77	0.00	0.00	0.00	0.00
4,615.40	3.23	249.80	4,610.00	-66.76	-181.41	67.08	0.00	0.00	0.00	0.00
<b>Sussex</b>										
4,700.00	3.23	249.80	4,694.46	-68.40	-185.88	68.73	0.00	0.00	0.00	0.00
4,800.00	3.23	249.80	4,794.31	-70.35	-191.16	70.68	0.00	0.00	0.00	0.00
4,900.00	3.23	249.80	4,894.15	-72.29	-196.44	72.63	0.00	0.00	0.00	0.00
5,000.00	3.23	249.80	4,993.99	-74.23	-201.72	74.59	0.00	0.00	0.00	0.00
5,100.00	3.23	249.80	5,093.83	-76.18	-207.00	76.54	0.00	0.00	0.00	0.00

**Plan Report for Thomsen 34C-18HZ - Plan B 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 (°)
5,200.00	3.23	249.80	5,193.67	-78.12	-212.29	78.49	0.00	0.00	0.00	0.00
5,300.00	3.23	249.80	5,293.51	-80.06	-217.57	80.44	0.00	0.00	0.00	0.00
5,400.00	3.23	249.80	5,393.36	-82.01	-222.85	82.40	0.00	0.00	0.00	0.00
5,500.00	3.23	249.80	5,493.20	-83.95	-228.13	84.35	0.00	0.00	0.00	0.00
5,600.00	3.23	249.80	5,593.04	-85.90	-233.41	86.30	0.00	0.00	0.00	0.00
5,700.00	3.23	249.80	5,692.88	-87.84	-238.69	88.26	0.00	0.00	0.00	0.00
5,800.00	3.23	249.80	5,792.72	-89.78	-243.97	90.21	0.00	0.00	0.00	0.00
5,900.00	3.23	249.80	5,892.56	-91.73	-249.26	92.16	0.00	0.00	0.00	0.00
6,000.00	3.23	249.80	5,992.40	-93.67	-254.54	94.11	0.00	0.00	0.00	0.00
6,100.00	3.23	249.80	6,092.25	-95.61	-259.82	96.07	0.00	0.00	0.00	0.00
6,200.00	3.23	249.80	6,192.09	-97.56	-265.10	98.02	0.00	0.00	0.00	0.00
6,300.00	3.23	249.80	6,291.93	-99.50	-270.38	99.97	0.00	0.00	0.00	0.00
6,400.00	3.23	249.80	6,391.77	-101.44	-275.66	101.93	0.00	0.00	0.00	0.00
6,500.00	3.23	249.80	6,491.61	-103.39	-280.95	103.88	0.00	0.00	0.00	0.00
6,600.00	3.23	249.80	6,591.45	-105.33	-286.23	105.83	0.00	0.00	0.00	0.00
6,700.00	3.23	249.80	6,691.30	-107.28	-291.51	107.78	0.00	0.00	0.00	0.00
6,799.88	3.23	249.80	6,791.02	-109.22	-296.78	109.73	0.00	0.00	0.00	0.00
<b>KOP @ 6799.88ft</b>										
6,800.00	3.23	249.80	6,791.14	-109.22	-296.79	109.74	0.00	0.00	0.00	0.00
6,900.00	11.53	195.12	6,890.30	-119.88	-302.05	120.40	10.01	8.30	-54.68	-69.73
7,000.00	21.34	187.87	6,986.11	-147.62	-307.16	148.15	10.00	9.81	-7.24	-15.31
7,012.82	22.61	187.39	6,998.00	-152.37	-307.80	152.91	10.00	9.90	-3.77	-8.34
<b>Sharon Springs</b>										
7,093.42	30.61	185.22	7,070.00	-188.22	-311.67	188.77	10.00	9.93	-2.69	-7.89
<b>Niobrara A</b>										
7,100.00	31.26	185.09	7,075.65	-191.60	-311.97	192.14	10.00	9.95	-2.00	-5.95
<b>DLS = 10.00/100ft</b>										
7,119.33	33.19	184.73	7,092.00	-201.87	-312.85	202.41	10.00	9.95	-1.86	-5.84
<b>Niobrara B</b>										
7,200.00	41.22	183.56	7,156.20	-250.48	-316.33	251.03	10.00	9.96	-1.46	-5.53
7,249.53	46.16	183.01	7,192.00	-284.62	-318.28	285.18	10.00	9.97	-1.11	-4.60
<b>Niobrara C</b>										
7,300.00	51.20	182.53	7,225.32	-322.47	-320.10	323.03	10.00	9.98	-0.94	-4.20
7,400.00	61.18	181.76	7,280.90	-405.39	-323.18	405.96	10.00	9.98	-0.77	-3.88
7,500.00	71.16	181.13	7,321.25	-496.72	-325.47	497.29	10.00	9.98	-0.63	-3.45
7,502.33	71.39	181.12	7,322.00	-498.92	-325.51	499.49	10.00	9.98	-0.59	-3.20
<b>Fort Hays</b>										
7,600.00	81.14	180.57	7,345.16	-593.68	-326.89	594.25	10.00	9.99	-0.56	-3.19
7,612.88	82.43	180.50	7,347.00	-606.43	-327.01	607.00	10.00	9.99	-0.54	-3.06
<b>Codell</b>										
7,687.87	89.92	180.10	7,352.00	-681.20	-327.40	681.77	10.00	9.99	-0.53	-3.05
<b>End Build @ 7687.87ft - Codell TL - Heel - 7" Intermediate Casing - Thomsen 34C-18HZ_CP</b>										
7,700.00	89.92	180.10	7,352.02	-693.33	-327.42	693.90	0.00	0.00	0.00	-3.03
7,800.00	89.92	180.10	7,352.16	-793.33	-327.60	793.90	0.00	0.00	0.00	0.00
7,900.00	89.92	180.10	7,352.30	-893.33	-327.77	893.90	0.00	0.00	0.00	0.00
8,000.00	89.92	180.10	7,352.44	-993.32	-327.95	993.90	0.00	0.00	0.00	0.00
8,100.00	89.92	180.10	7,352.58	-1,093.32	-328.12	1,093.90	0.00	0.00	0.00	0.00
8,200.00	89.92	180.10	7,352.73	-1,193.32	-328.30	1,193.90	0.00	0.00	0.00	0.00
8,300.00	89.92	180.10	7,352.87	-1,293.32	-328.47	1,293.90	0.00	0.00	0.00	0.00
8,400.00	89.92	180.10	7,353.01	-1,393.32	-328.65	1,393.90	0.00	0.00	0.00	0.00
8,500.00	89.92	180.10	7,353.15	-1,493.32	-328.82	1,493.90	0.00	0.00	0.00	0.00
8,600.00	89.92	180.10	7,353.29	-1,593.32	-329.00	1,593.90	0.00	0.00	0.00	0.00
8,700.00	89.92	180.10	7,353.44	-1,693.32	-329.17	1,693.90	0.00	0.00	0.00	0.00
8,800.00	89.92	180.10	7,353.58	-1,793.32	-329.35	1,793.90	0.00	0.00	0.00	0.00
8,900.00	89.92	180.10	7,353.72	-1,893.32	-329.52	1,893.89	0.00	0.00	0.00	0.00
9,000.00	89.92	180.10	7,353.86	-1,993.32	-329.70	1,993.89	0.00	0.00	0.00	0.00
9,100.00	89.92	180.10	7,354.00	-2,093.32	-329.87	2,093.89	0.00	0.00	0.00	0.00
9,200.00	89.92	180.10	7,354.15	-2,193.32	-330.05	2,193.89	0.00	0.00	0.00	0.00

**Plan Report for Thomsen 34C-18HZ - Plan B 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 (°)
9,300.00	89.92	180.10	7,354.29	-2,293.32	-330.22	2,293.89	0.00	0.00	0.00	0.00
9,400.00	89.92	180.10	7,354.43	-2,393.32	-330.40	2,393.89	0.00	0.00	0.00	0.00
9,500.00	89.92	180.10	7,354.57	-2,493.32	-330.57	2,493.89	0.00	0.00	0.00	0.00
9,600.00	89.92	180.10	7,354.71	-2,593.32	-330.75	2,593.89	0.00	0.00	0.00	0.00
9,700.00	89.92	180.10	7,354.86	-2,693.32	-330.92	2,693.89	0.00	0.00	0.00	0.00
9,800.00	89.92	180.10	7,355.00	-2,793.32	-331.10	2,793.89	0.00	0.00	0.00	0.00
9,900.00	89.92	180.10	7,355.14	-2,893.32	-331.27	2,893.89	0.00	0.00	0.00	0.00
10,000.00	89.92	180.10	7,355.28	-2,993.32	-331.45	2,993.89	0.00	0.00	0.00	0.00
10,100.00	89.92	180.10	7,355.42	-3,093.32	-331.62	3,093.89	0.00	0.00	0.00	0.00
10,200.00	89.92	180.10	7,355.57	-3,193.32	-331.80	3,193.89	0.00	0.00	0.00	0.00
10,300.00	89.92	180.10	7,355.71	-3,293.32	-331.98	3,293.89	0.00	0.00	0.00	0.00
10,400.00	89.92	180.10	7,355.85	-3,393.32	-332.15	3,393.89	0.00	0.00	0.00	0.00
10,500.00	89.92	180.10	7,355.99	-3,493.32	-332.33	3,493.89	0.00	0.00	0.00	0.00
10,600.00	89.92	180.10	7,356.13	-3,593.32	-332.50	3,593.89	0.00	0.00	0.00	0.00
10,700.00	89.92	180.10	7,356.28	-3,693.32	-332.68	3,693.89	0.00	0.00	0.00	0.00
10,800.00	89.92	180.10	7,356.42	-3,793.32	-332.85	3,793.89	0.00	0.00	0.00	0.00
10,900.00	89.92	180.10	7,356.56	-3,893.32	-333.03	3,893.89	0.00	0.00	0.00	0.00
11,000.00	89.92	180.10	7,356.70	-3,993.32	-333.20	3,993.89	0.00	0.00	0.00	0.00
11,100.00	89.92	180.10	7,356.84	-4,093.32	-333.38	4,093.89	0.00	0.00	0.00	0.00
11,200.00	89.92	180.10	7,356.99	-4,193.32	-333.55	4,193.89	0.00	0.00	0.00	0.00
11,300.00	89.92	180.10	7,357.13	-4,293.32	-333.73	4,293.89	0.00	0.00	0.00	0.00
11,400.00	89.92	180.10	7,357.27	-4,393.32	-333.90	4,393.89	0.00	0.00	0.00	0.00
11,500.00	89.92	180.10	7,357.41	-4,493.32	-334.08	4,493.89	0.00	0.00	0.00	0.00
11,600.00	89.92	180.10	7,357.55	-4,593.32	-334.25	4,593.89	0.00	0.00	0.00	0.00
11,700.00	89.92	180.10	7,357.69	-4,693.32	-334.43	4,693.89	0.00	0.00	0.00	0.00
11,800.00	89.92	180.10	7,357.84	-4,793.32	-334.60	4,793.89	0.00	0.00	0.00	0.00
11,900.00	89.92	180.10	7,357.98	-4,893.32	-334.78	4,893.89	0.00	0.00	0.00	0.00
12,000.00	89.92	180.10	7,358.12	-4,993.31	-334.95	4,993.89	0.00	0.00	0.00	0.00
12,100.00	89.92	180.10	7,358.26	-5,093.31	-335.13	5,093.89	0.00	0.00	0.00	0.00
12,200.00	89.92	180.10	7,358.40	-5,193.31	-335.30	5,193.89	0.00	0.00	0.00	0.00
12,300.00	89.92	180.10	7,358.55	-5,293.31	-335.48	5,293.89	0.00	0.00	0.00	0.00
12,400.00	89.92	180.10	7,358.69	-5,393.31	-335.65	5,393.89	0.00	0.00	0.00	0.00
12,500.00	89.92	180.10	7,358.83	-5,493.31	-335.83	5,493.89	0.00	0.00	0.00	0.00
12,600.00	89.92	180.10	7,358.97	-5,593.31	-336.00	5,593.89	0.00	0.00	0.00	0.00
12,700.00	89.92	180.10	7,359.11	-5,693.31	-336.18	5,693.89	0.00	0.00	0.00	0.00
12,800.00	89.92	180.10	7,359.26	-5,793.31	-336.35	5,793.89	0.00	0.00	0.00	0.00
12,900.00	89.92	180.10	7,359.40	-5,893.31	-336.53	5,893.89	0.00	0.00	0.00	0.00
13,000.00	89.92	180.10	7,359.54	-5,993.31	-336.70	5,993.89	0.00	0.00	0.00	0.00
13,100.00	89.92	180.10	7,359.68	-6,093.31	-336.88	6,093.89	0.00	0.00	0.00	0.00
13,200.00	89.92	180.10	7,359.82	-6,193.31	-337.05	6,193.89	0.00	0.00	0.00	0.00
13,300.00	89.92	180.10	7,359.97	-6,293.31	-337.23	6,293.89	0.00	0.00	0.00	0.00
13,400.00	89.92	180.10	7,360.11	-6,393.31	-337.41	6,393.89	0.00	0.00	0.00	0.00
13,500.00	89.92	180.10	7,360.25	-6,493.31	-337.58	6,493.89	0.00	0.00	0.00	0.00
13,600.00	89.92	180.10	7,360.39	-6,593.31	-337.76	6,593.89	0.00	0.00	0.00	0.00
13,700.00	89.92	180.10	7,360.53	-6,693.31	-337.93	6,693.89	0.00	0.00	0.00	0.00
13,800.00	89.92	180.10	7,360.68	-6,793.31	-338.11	6,793.89	0.00	0.00	0.00	0.00
13,900.00	89.92	180.10	7,360.82	-6,893.31	-338.28	6,893.89	0.00	0.00	0.00	0.00
14,000.00	89.92	180.10	7,360.96	-6,993.31	-338.46	6,993.89	0.00	0.00	0.00	0.00
14,100.00	89.92	180.10	7,361.10	-7,093.31	-338.63	7,093.89	0.00	0.00	0.00	0.00
14,200.00	89.92	180.10	7,361.24	-7,193.31	-338.81	7,193.89	0.00	0.00	0.00	0.00
14,300.00	89.92	180.10	7,361.39	-7,293.31	-338.98	7,293.89	0.00	0.00	0.00	0.00
14,400.00	89.92	180.10	7,361.53	-7,393.31	-339.16	7,393.89	0.00	0.00	0.00	0.00
14,500.00	89.92	180.10	7,361.67	-7,493.31	-339.33	7,493.89	0.00	0.00	0.00	0.00
14,600.00	89.92	180.10	7,361.81	-7,593.31	-339.51	7,593.89	0.00	0.00	0.00	0.00
14,700.00	89.92	180.10	7,361.95	-7,693.31	-339.68	7,693.89	0.00	0.00	0.00	0.00
14,733.02	89.92	180.10	7,362.00	-7,726.33	-339.74	7,726.91	0.00	0.00	0.00	0.00

TD @ 14733.02ft - Thomsen 34C-18HZ\_BHL

**Plan Report for Thomsen 34C-18HZ - Plan B Rev 0 Permit****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
1,261.31	1,261.22	-1.57	-4.26	End Nudge @ 1261.31ft
6,799.88	6,791.02	-109.22	-296.78	KOP @ 6799.88ft
7,100.00	7,075.65	-191.60	-311.97	DLS = 10.00/100ft
7,687.87	7,352.00	-681.20	-327.40	End Build @ 7687.87ft
14,733.02	7,362.00	-7,726.33	-339.74	TD @ 14733.02ft

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/_S (ft)	+E/-W (ft)	
User	No Target (Freehand)	180.10	Slot	0.00	0.00	0.00

**Survey tool program**

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	14,733.02	Plan B Rev 0 Permit	MWD

**Casing Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
900.00	900.00	9 5/8" Surface Casing	9-5/8	13-1/2
7,687.87	7,352.00	7" Intermediate Casing	7	8-3/4

**Formation Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,615.40	4,610.00	Sussex		0.00	
7,012.82	6,998.00	Sharon Springs		0.00	
7,093.42	7,070.00	Niobrara A		0.00	
7,119.33	7,092.00	Niobrara B		0.00	
7,249.53	7,192.00	Niobrara C		0.00	
7,502.33	7,322.00	Fort Hays		0.00	
7,612.88	7,347.00	Codell		0.00	
7,687.87	7,352.00	Codell TL - Heel		0.00	
14,733.02	7,362.00	Codell TL - Toe		0.00	

**Targets associated with this wellbore**

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Thomsen 34C-18HZ_Sec	0.00	0.00	0.00	Polygon
Thomsen 34C-18HZ_7-18	0.00	0.00	0.00	Polygon
Thomsen 34C-18HZ_7/2 460	0.00	0.00	0.00	Polygon
Thomsen 34C-18HZ_CP	7,352.00	-681.20	-327.40	Point
Thomsen 34C-18HZ_7/2	0.00	0.00	0.00	Polygon
Thomsen 34C-18HZ_BHL	7,362.00	-7,726.33	-339.74	Point
Thomsen 34C-18HZ_SHL	0.00	0.00	0.00	Point

## North Reference Sheet for Sec. 7-T2N-R65W - Thomsen 34C-18HZ - Plan B 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 @ 4962.00ft (Drilling Rig). Northing and Easting are relative to Thomsen 34C-18HZ

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: 0.99995828

Grid Coordinates of Well: 1,299,780.57 ft N, 3,219,637.53 ft E

Geographical Coordinates of Well: 40° 09' 13.04" N, 104° 42' 51.23" W

Grid Convergence at Surface is: 0.51°

Based upon Minimum Curvature type calculations, at a Measured Depth of 14,733.02ft  
the Bottom Hole Displacement is 7,733.79ft in the Direction of 182.52° (True).

Magnetic Convergence at surface is: -8.15° ( 4 January 2013, , BGGM2012)

