

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 28-T1N-R67W

Howard 3C-28HZ

Plan A 0

Plan: Plan A 0-Permit

## Sperry Drilling Services

# Proposal Report

29 May, 2013

Well Coordinates: 1,249,065.54 N, 3,168,571.10 E (40° 00' 55.80" N, 104° 53' 53.34" W)

Ground Level: 5,021.00 ft

Local Coordinate Origin: Centered on Well Howard 3C-28HZ

Viewing Datum: RKB @ 17' @ 5038.00ft (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. 28-T1N-R67W  
 Well: Howard 3C-28HZ  
 Wellbore: Plan A 0  
 Design: Plan A 0-Permit



SECTION DETAILS

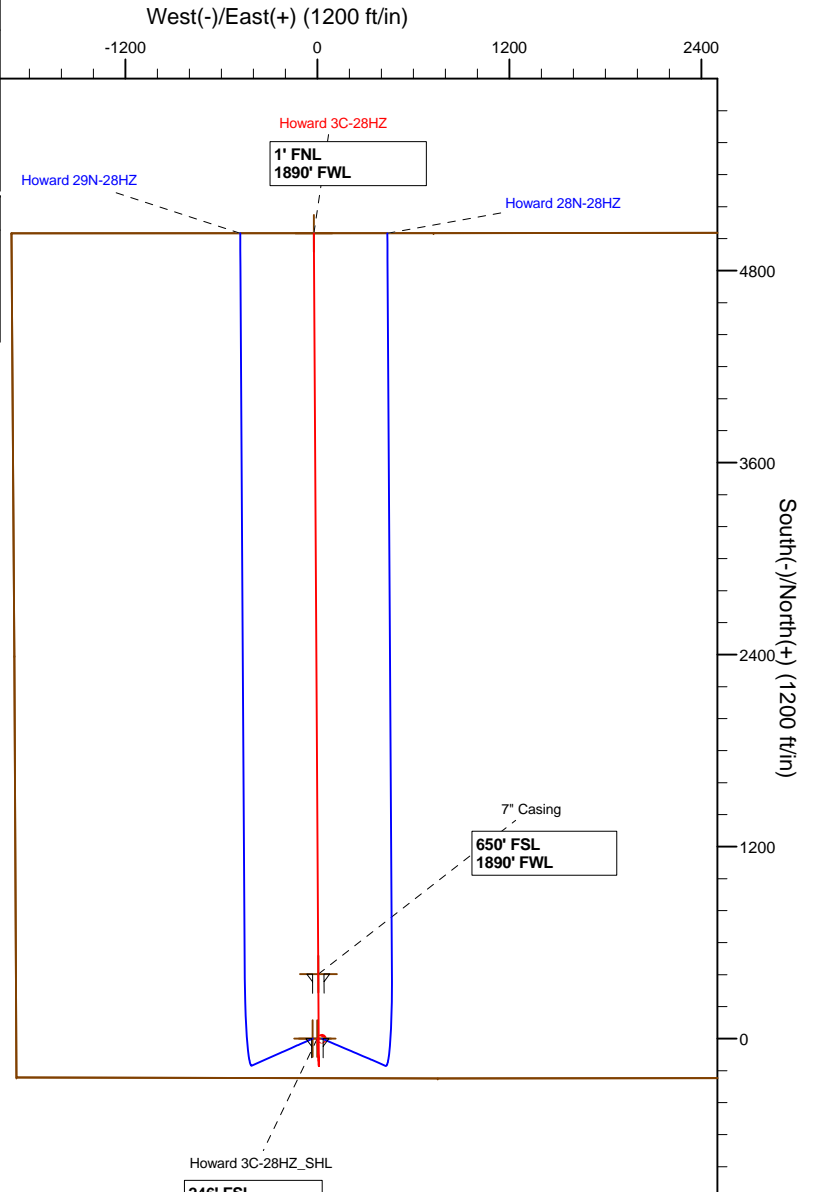
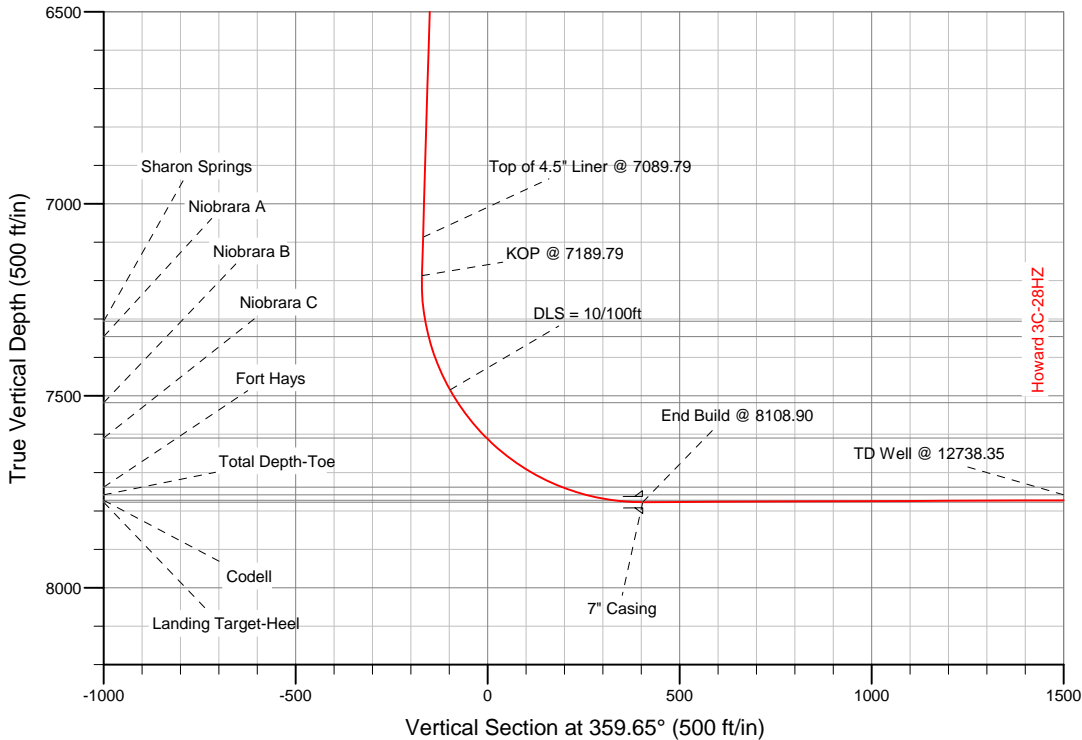
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	
3	1383.92	1.68	177.08	1383.91	-1.23	0.06	2.00	177.08	-1.23	
4	7189.79	1.68	177.08	7187.28	-171.06	8.72	0.00	0.00	-171.11	
5	8108.90	90.24	359.65	7777.00	404.00	6.00	10.00	-177.43	403.96	Howard 3C-28HZ_CP
6	12738.35	90.24	359.65	7758.00	5033.32	-22.12	0.00	0.00	5033.36	Howard 3C-28HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Howard 3C-28HZ_SHL	0.00	0.00	0.00	40.015501	-104.898149	Point
Howard_SEC	1.00	0.00	-29.97	40.015501	-104.898256	Polygon
Howard 3C-28HZ_BHL	7758.00	5033.32	-22.12	40.029318	-104.898228	Point
Howard 3C-28HZ_CP	7777.00	404.00	6.00	40.016610	-104.898128	Point

MD TVD

7089.79 7087.33 Top of 4.5" Liner @ 7089.79  
 7189.79 7187.29 KOP @ 7189.79



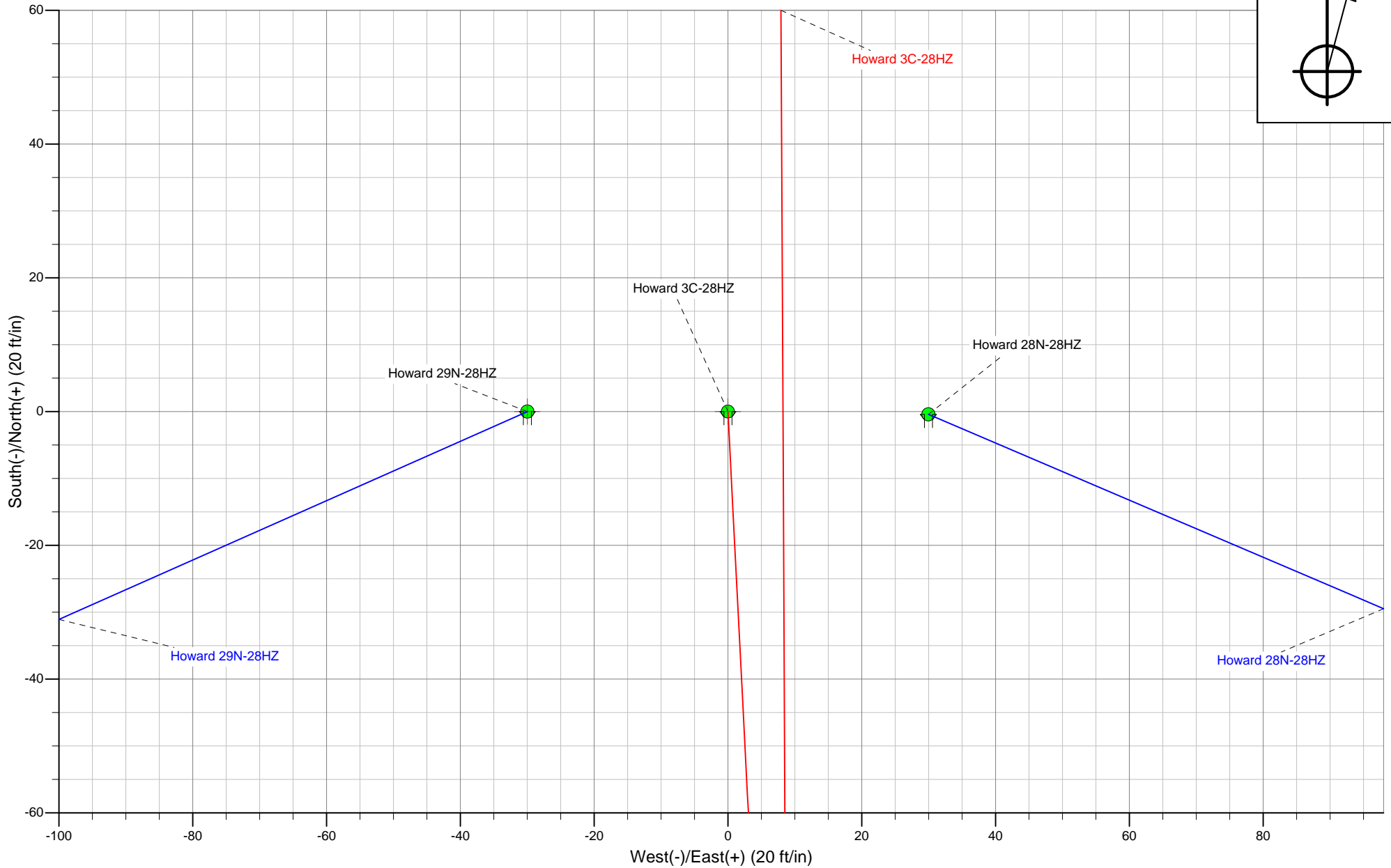
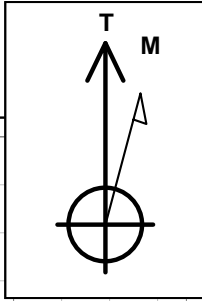
Howard 3C-28HZ\_SHL  
 246' FSL  
 1882' FWL

WELL DETAILS: Howard 3C-28HZ	
Ground Level:	5021.00
RKB @ 17' @ 5038.00ft (Drilling Rig)	
Plan:	Plan A 0-Permit (Howard 3C-28HZ/Plan A 0)
Created By:	Fred Hartmann Date: 05/30/2013

Project: Weld County, CO (NAD 83)  
Site: Sec. 28-T1N-R67W  
Well: Howard 3C-28HZ  
Plan A 0  
Plan A 0-Permit



**HALLIBURTON**  
Sperry Drilling



**Plan Report for Howard 3C-28HZ - Plan A 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
1,180.00	0.00	0.00	1,180.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>9 5/8" Casing</b>										
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Begin Nudge @ 1300.00</b>										
1,383.92	1.68	177.08	1,383.91	-1.23	0.06	-1.23	2.00	2.00	0.00	177.08
<b>End Nudge @ 1383.92</b>										
1,400.00	1.68	177.08	1,399.98	-1.70	0.09	-1.70	0.00	0.00	0.00	0.00
1,500.00	1.68	177.08	1,499.94	-4.62	0.24	-4.62	0.00	0.00	0.00	0.00
1,600.00	1.68	177.08	1,599.90	-7.55	0.38	-7.55	0.00	0.00	0.00	0.00
1,700.00	1.68	177.08	1,699.85	-10.47	0.53	-10.48	0.00	0.00	0.00	0.00
1,800.00	1.68	177.08	1,799.81	-13.40	0.68	-13.40	0.00	0.00	0.00	0.00
1,900.00	1.68	177.08	1,899.77	-16.32	0.83	-16.33	0.00	0.00	0.00	0.00
2,000.00	1.68	177.08	1,999.72	-19.25	0.98	-19.25	0.00	0.00	0.00	0.00
2,100.00	1.68	177.08	2,099.68	-22.17	1.13	-22.18	0.00	0.00	0.00	0.00
2,200.00	1.68	177.08	2,199.64	-25.10	1.28	-25.11	0.00	0.00	0.00	0.00
2,300.00	1.68	177.08	2,299.59	-28.02	1.43	-28.03	0.00	0.00	0.00	0.00
2,400.00	1.68	177.08	2,399.55	-30.95	1.58	-30.96	0.00	0.00	0.00	0.00
2,500.00	1.68	177.08	2,499.51	-33.87	1.73	-33.88	0.00	0.00	0.00	0.00
2,600.00	1.68	177.08	2,599.47	-36.80	1.88	-36.81	0.00	0.00	0.00	0.00
2,700.00	1.68	177.08	2,699.42	-39.72	2.02	-39.74	0.00	0.00	0.00	0.00
2,800.00	1.68	177.08	2,799.38	-42.65	2.17	-42.66	0.00	0.00	0.00	0.00
2,900.00	1.68	177.08	2,899.34	-45.58	2.32	-45.59	0.00	0.00	0.00	0.00
3,000.00	1.68	177.08	2,999.29	-48.50	2.47	-48.51	0.00	0.00	0.00	0.00
3,100.00	1.68	177.08	3,099.25	-51.43	2.62	-51.44	0.00	0.00	0.00	0.00
3,200.00	1.68	177.08	3,199.21	-54.35	2.77	-54.37	0.00	0.00	0.00	0.00
3,300.00	1.68	177.08	3,299.17	-57.28	2.92	-57.29	0.00	0.00	0.00	0.00
3,400.00	1.68	177.08	3,399.12	-60.20	3.07	-60.22	0.00	0.00	0.00	0.00
3,500.00	1.68	177.08	3,499.08	-63.13	3.22	-63.14	0.00	0.00	0.00	0.00
3,600.00	1.68	177.08	3,599.04	-66.05	3.37	-66.07	0.00	0.00	0.00	0.00
3,700.00	1.68	177.08	3,698.99	-68.98	3.51	-69.00	0.00	0.00	0.00	0.00
3,800.00	1.68	177.08	3,798.95	-71.90	3.66	-71.92	0.00	0.00	0.00	0.00
3,900.00	1.68	177.08	3,898.91	-74.83	3.81	-74.85	0.00	0.00	0.00	0.00
4,000.00	1.68	177.08	3,998.87	-77.75	3.96	-77.77	0.00	0.00	0.00	0.00
4,100.00	1.68	177.08	4,098.82	-80.68	4.11	-80.70	0.00	0.00	0.00	0.00
4,200.00	1.68	177.08	4,198.78	-83.60	4.26	-83.63	0.00	0.00	0.00	0.00
4,300.00	1.68	177.08	4,298.74	-86.53	4.41	-86.55	0.00	0.00	0.00	0.00
4,400.00	1.68	177.08	4,398.69	-89.45	4.56	-89.48	0.00	0.00	0.00	0.00
4,500.00	1.68	177.08	4,498.65	-92.38	4.71	-92.40	0.00	0.00	0.00	0.00
4,600.00	1.68	177.08	4,598.61	-95.30	4.86	-95.33	0.00	0.00	0.00	0.00
4,700.00	1.68	177.08	4,698.57	-98.23	5.00	-98.26	0.00	0.00	0.00	0.00
4,800.00	1.68	177.08	4,798.52	-101.15	5.15	-101.18	0.00	0.00	0.00	0.00
4,819.49	1.68	177.08	4,818.00	-101.72	5.18	-101.75	0.00	0.00	0.00	0.00
<b>Sussex</b>										
4,900.00	1.68	177.08	4,898.48	-104.08	5.30	-104.11	0.00	0.00	0.00	0.00
5,000.00	1.68	177.08	4,998.44	-107.00	5.45	-107.03	0.00	0.00	0.00	0.00

**Plan Report for Howard 3C-28HZ - Plan A 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 (°)
5,100.00	1.68	177.08	5,098.39	-109.93	5.60	-109.96	0.00	0.00	0.00	0.00
5,200.00	1.68	177.08	5,198.35	-112.85	5.75	-112.89	0.00	0.00	0.00	0.00
5,300.00	1.68	177.08	5,298.31	-115.78	5.90	-115.81	0.00	0.00	0.00	0.00
5,400.00	1.68	177.08	5,398.26	-118.70	6.05	-118.74	0.00	0.00	0.00	0.00
5,500.00	1.68	177.08	5,498.22	-121.63	6.20	-121.66	0.00	0.00	0.00	0.00
5,600.00	1.68	177.08	5,598.18	-124.55	6.35	-124.59	0.00	0.00	0.00	0.00
5,700.00	1.68	177.08	5,698.14	-127.48	6.50	-127.52	0.00	0.00	0.00	0.00
5,800.00	1.68	177.08	5,798.09	-130.40	6.64	-130.44	0.00	0.00	0.00	0.00
5,900.00	1.68	177.08	5,898.05	-133.33	6.79	-133.37	0.00	0.00	0.00	0.00
6,000.00	1.68	177.08	5,998.01	-136.26	6.94	-136.29	0.00	0.00	0.00	0.00
6,100.00	1.68	177.08	6,097.96	-139.18	7.09	-139.22	0.00	0.00	0.00	0.00
6,200.00	1.68	177.08	6,197.92	-142.11	7.24	-142.15	0.00	0.00	0.00	0.00
6,300.00	1.68	177.08	6,297.88	-145.03	7.39	-145.07	0.00	0.00	0.00	0.00
6,400.00	1.68	177.08	6,397.84	-147.96	7.54	-148.00	0.00	0.00	0.00	0.00
6,500.00	1.68	177.08	6,497.79	-150.88	7.69	-150.92	0.00	0.00	0.00	0.00
6,600.00	1.68	177.08	6,597.75	-153.81	7.84	-153.85	0.00	0.00	0.00	0.00
6,700.00	1.68	177.08	6,697.71	-156.73	7.99	-156.78	0.00	0.00	0.00	0.00
6,800.00	1.68	177.08	6,797.66	-159.66	8.13	-159.70	0.00	0.00	0.00	0.00
6,900.00	1.68	177.08	6,897.62	-162.58	8.28	-162.63	0.00	0.00	0.00	0.00
7,000.00	1.68	177.08	6,997.58	-165.51	8.43	-165.55	0.00	0.00	0.00	0.00
7,089.79	1.68	177.08	7,087.33	-168.13	8.57	-168.18	0.00	0.00	0.00	0.00
<b>Top of 4.5" Liner @ 7089.79</b>										
7,100.00	1.68	177.08	7,097.54	-168.43	8.58	-168.48	0.00	0.00	0.00	0.00
7,189.79	1.68	177.08	7,187.29	-171.06	8.72	-171.11	0.00	0.00	0.00	0.00
<b>KOP @ 7189.79</b>										
7,200.00	0.66	173.10	7,197.49	-171.27	8.73	-171.32	10.00	-9.98	-39.00	-177.43
7,300.00	9.35	0.11	7,297.08	-163.70	8.82	-163.75	10.00	8.69	-172.99	-173.45
7,309.05	10.25	0.07	7,306.00	-162.16	8.82	-162.21	10.00	10.00	-0.45	-0.46
<b>Sharon Springs</b>										
7,350.00	14.34	359.95	7,346.00	-153.44	8.82	-153.49	10.00	10.00	-0.30	-0.42
<b>Niobrara A</b>										
7,400.00	19.34	359.87	7,393.84	-138.95	8.79	-139.01	10.00	10.00	-0.16	-0.30
7,500.00	29.34	359.79	7,484.83	-97.78	8.66	-97.84	10.00	10.00	-0.08	-0.23
<b>DLS = 10/100ft</b>										
7,538.82	33.23	359.77	7,518.00	-77.63	8.58	-77.68	10.00	10.00	-0.05	-0.15
<b>Niobrara B</b>										
7,600.00	39.34	359.74	7,567.29	-41.44	8.43	-41.49	10.00	10.00	-0.04	-0.14
7,657.70	45.11	359.73	7,610.00	-2.68	8.25	-2.73	10.00	10.00	-0.03	-0.12
<b>Niobrara C</b>										
7,700.00	49.34	359.72	7,638.72	28.37	8.10	28.32	10.00	10.00	-0.02	-0.11
7,800.00	59.34	359.70	7,696.93	109.52	7.68	109.47	10.00	10.00	-0.02	-0.10
7,893.92	68.74	359.68	7,738.00	193.87	7.22	193.82	10.00	10.00	-0.02	-0.09
<b>Fort Hays</b>										
7,900.00	69.34	359.68	7,740.17	199.54	7.19	199.50	10.00	10.00	-0.02	-0.08
8,000.00	79.34	359.67	7,767.13	295.71	6.64	295.66	10.00	10.00	-0.01	-0.08
8,030.77	82.42	359.66	7,772.00	326.08	6.47	326.04	10.00	10.00	-0.01	-0.08
<b>Codell</b>										
8,100.00	89.34	359.65	7,776.97	395.10	6.05	395.05	10.00	10.00	-0.01	-0.08
8,108.90	90.23	359.65	7,777.00	404.00	6.00	403.96	10.00	10.00	-0.01	-0.08
<b>End Build @ 8108.90 - Landing Target-Heel - 7" Casing - Howard 3C-28HZ_CP</b>										
8,200.00	90.24	359.65	7,776.63	495.09	5.45	495.05	0.00	0.00	0.00	-0.08
8,300.00	90.24	359.65	7,776.22	595.09	4.84	595.05	0.00	0.00	0.00	0.00
8,400.00	90.24	359.65	7,775.81	695.09	4.23	695.05	0.00	0.00	0.00	0.00
8,500.00	90.24	359.65	7,775.39	795.09	3.62	795.05	0.00	0.00	0.00	0.00
8,600.00	90.24	359.65	7,774.98	895.08	3.02	895.05	0.00	0.00	0.00	0.00
8,700.00	90.24	359.65	7,774.57	995.08	2.41	995.05	0.00	0.00	0.00	0.00
8,800.00	90.24	359.65	7,774.16	1,095.08	1.80	1,095.05	0.00	0.00	0.00	0.00
8,900.00	90.24	359.65	7,773.75	1,195.07	1.19	1,195.04	0.00	0.00	0.00	0.00

**Plan Report for Howard 3C-28HZ - Plan A 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 (°)
9,000.00	90.24	359.65	7,773.34	1,295.07	0.59	1,295.04	0.00	0.00	0.00	0.00
9,100.00	90.24	359.65	7,772.93	1,395.07	-0.02	1,395.04	0.00	0.00	0.00	0.00
9,200.00	90.24	359.65	7,772.52	1,495.07	-0.63	1,495.04	0.00	0.00	0.00	0.00
9,300.00	90.24	359.65	7,772.11	1,595.06	-1.24	1,595.04	0.00	0.00	0.00	0.00
9,400.00	90.24	359.65	7,771.70	1,695.06	-1.84	1,695.04	0.00	0.00	0.00	0.00
9,500.00	90.24	359.65	7,771.29	1,795.06	-2.45	1,795.04	0.00	0.00	0.00	0.00
9,600.00	90.24	359.65	7,770.88	1,895.06	-3.06	1,895.04	0.00	0.00	0.00	0.00
9,700.00	90.24	359.65	7,770.47	1,995.05	-3.67	1,995.04	0.00	0.00	0.00	0.00
9,800.00	90.24	359.65	7,770.06	2,095.05	-4.27	2,095.04	0.00	0.00	0.00	0.00
9,900.00	90.24	359.65	7,769.65	2,195.05	-4.88	2,195.04	0.00	0.00	0.00	0.00
10,000.00	90.24	359.65	7,769.24	2,295.04	-5.49	2,295.04	0.00	0.00	0.00	0.00
10,100.00	90.24	359.65	7,768.83	2,395.04	-6.10	2,395.03	0.00	0.00	0.00	0.00
10,200.00	90.24	359.65	7,768.42	2,495.04	-6.70	2,495.03	0.00	0.00	0.00	0.00
10,300.00	90.24	359.65	7,768.01	2,595.04	-7.31	2,595.03	0.00	0.00	0.00	0.00
10,400.00	90.24	359.65	7,767.60	2,695.03	-7.92	2,695.03	0.00	0.00	0.00	0.00
10,500.00	90.24	359.65	7,767.19	2,795.03	-8.53	2,795.03	0.00	0.00	0.00	0.00
10,600.00	90.24	359.65	7,766.78	2,895.03	-9.13	2,895.03	0.00	0.00	0.00	0.00
10,700.00	90.24	359.65	7,766.37	2,995.03	-9.74	2,995.03	0.00	0.00	0.00	0.00
10,800.00	90.24	359.65	7,765.96	3,095.02	-10.35	3,095.03	0.00	0.00	0.00	0.00
10,900.00	90.24	359.65	7,765.54	3,195.02	-10.96	3,195.03	0.00	0.00	0.00	0.00
11,000.00	90.24	359.65	7,765.13	3,295.02	-11.56	3,295.03	0.00	0.00	0.00	0.00
11,100.00	90.24	359.65	7,764.72	3,395.02	-12.17	3,395.03	0.00	0.00	0.00	0.00
11,200.00	90.24	359.65	7,764.31	3,495.01	-12.78	3,495.03	0.00	0.00	0.00	0.00
11,300.00	90.24	359.65	7,763.90	3,595.01	-13.39	3,595.02	0.00	0.00	0.00	0.00
11,400.00	90.24	359.65	7,763.49	3,695.01	-13.99	3,695.02	0.00	0.00	0.00	0.00
11,500.00	90.24	359.65	7,763.08	3,795.00	-14.60	3,795.02	0.00	0.00	0.00	0.00
11,600.00	90.24	359.65	7,762.67	3,895.00	-15.21	3,895.02	0.00	0.00	0.00	0.00
11,700.00	90.24	359.65	7,762.26	3,995.00	-15.82	3,995.02	0.00	0.00	0.00	0.00
11,800.00	90.24	359.65	7,761.85	4,095.00	-16.42	4,095.02	0.00	0.00	0.00	0.00
11,900.00	90.24	359.65	7,761.44	4,194.99	-17.03	4,195.02	0.00	0.00	0.00	0.00
12,000.00	90.24	359.65	7,761.03	4,294.99	-17.64	4,295.02	0.00	0.00	0.00	0.00
12,100.00	90.24	359.65	7,760.62	4,394.99	-18.25	4,395.02	0.00	0.00	0.00	0.00
12,200.00	90.24	359.65	7,760.21	4,494.99	-18.85	4,495.02	0.00	0.00	0.00	0.00
12,300.00	90.24	359.65	7,759.80	4,594.98	-19.46	4,595.02	0.00	0.00	0.00	0.00
12,400.00	90.24	359.65	7,759.39	4,694.98	-20.07	4,695.02	0.00	0.00	0.00	0.00
12,500.00	90.24	359.65	7,758.98	4,794.98	-20.68	4,795.01	0.00	0.00	0.00	0.00
12,600.00	90.24	359.65	7,758.57	4,894.97	-21.28	4,895.01	0.00	0.00	0.00	0.00
12,700.00	90.24	359.65	7,758.16	4,994.97	-21.89	4,995.01	0.00	0.00	0.00	0.00
12,738.34	90.24	359.65	7,758.00	5,033.31	-22.12	5,033.35	0.00	0.00	0.00	0.00
<b>Total Depth-Toe</b>										
12,738.35	90.24	359.65	7,758.00	5,033.32	-22.12	5,033.36	0.01	0.00	0.00	0.00
<b>TD Well @ 12738.35 - Howard 3C-28HZ_BHL</b>										

**Plan Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
1,300.00	1,300.00	0.00	0.00	Begin Nudge @ 1300.00
1,383.92	1,383.91	-1.23	0.06	End Nudge @ 1383.92
7,089.79	7,087.33	-168.13	8.57	Top of 4.5" Liner @ 7089.79
7,189.79	7,187.29	-171.06	8.72	KOP @ 7189.79
7,500.00	7,484.83	-97.78	8.66	DLS = 10/100ft
8,108.90	7,777.00	404.00	6.00	End Build @ 8108.90
12,738.35	7,758.00	5,033.32	-22.12	TD Well @ 12738.35

**Plan Report for Howard 3C-28HZ - Plan A 0-Permit****Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/_S (ft)	Origin +E/-W (ft)	Start TVD (ft)
User	No Target (Freehand)	359.65	Slot	0.00	0.00	0.00

**Survey tool program**

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	12,738.35	Plan A 0-Permit	MWD

**Casing Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
1,180.00	1,180.00	9 5/8" Casing	9-5/8	13-1/2
8,108.90	7,777.00	7" Casing	7	8-3/4

**Formation Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,819.49	4,818.00	Sussex		0.00	
7,309.05	7,306.00	Sharon Springs		0.00	
7,350.00	7,346.00	Niobrara A		0.00	
7,538.82	7,518.00	Niobrara B		0.00	
7,657.70	7,610.00	Niobrara C		0.00	
7,893.92	7,738.00	Fort Hays		0.00	
8,030.77	7,772.00	Codell		0.00	
8,108.90	7,777.00	Landing Target-Heel		0.00	
12,738.34	7,758.00	Total Depth-Toe		0.00	

**Targets associated with this wellbore**

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Howard 3C-28HZ_SHL	0.00	0.00	0.00	Point
Howard_SEC	1.00	0.00	-29.97	Polygon
Howard 3C-28HZ_CP	7,777.00	404.00	6.00	Point
Howard 3C-28HZ_BHL	7,758.00	5,033.32	-22.12	Point

**North Reference Sheet for Sec. 28-T1N-R67W - Howard 3C-28HZ - Plan A 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 @ 17' @ 5038.00ft (Drilling Rig). Northing and Easting are relative to Howard 3C-28HZ  
 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: 0.99996523

Grid Coordinates of Well: 1,249,065.54 ft N, 3,168,571.10 ft E  
 Geographical Coordinates of Well: 40° 00' 55.80" N, 104° 53' 53.34" W  
 Grid Convergence at Surface is: 0.39°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,738.35ft  
 the Bottom Hole Displacement is 5,033.37ft in the Direction of 359.75° (True).

Magnetic Convergence at surface is: -8.30° (29 May 2013, , BGGM2012)

