

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 21-T1N-R67W

Howard 4C-33HZ

Plan A Rev 0

Plan: Plan A Rev 0 Permit

Sperry Drilling Services

Proposal Report

28 December, 2012

Well Coordinates: 1,254,407.71 N, 3,168,140.55 E (40° 01' 48.63" N, 104° 53' 58.41" W)

Ground Level: 5,025.00 ft

Local Coordinate Origin:

Centered on Well Howard 4C-33HZ

Viewing Datum:

RKB=17 @ 5042.00ft (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. 21-T1N-R67W
Well: Howard 4C-33HZ
Wellbore: Plan A Rev 0
Design: Plan A Rev 0 Permit

Anadarko Petroleum Corp.

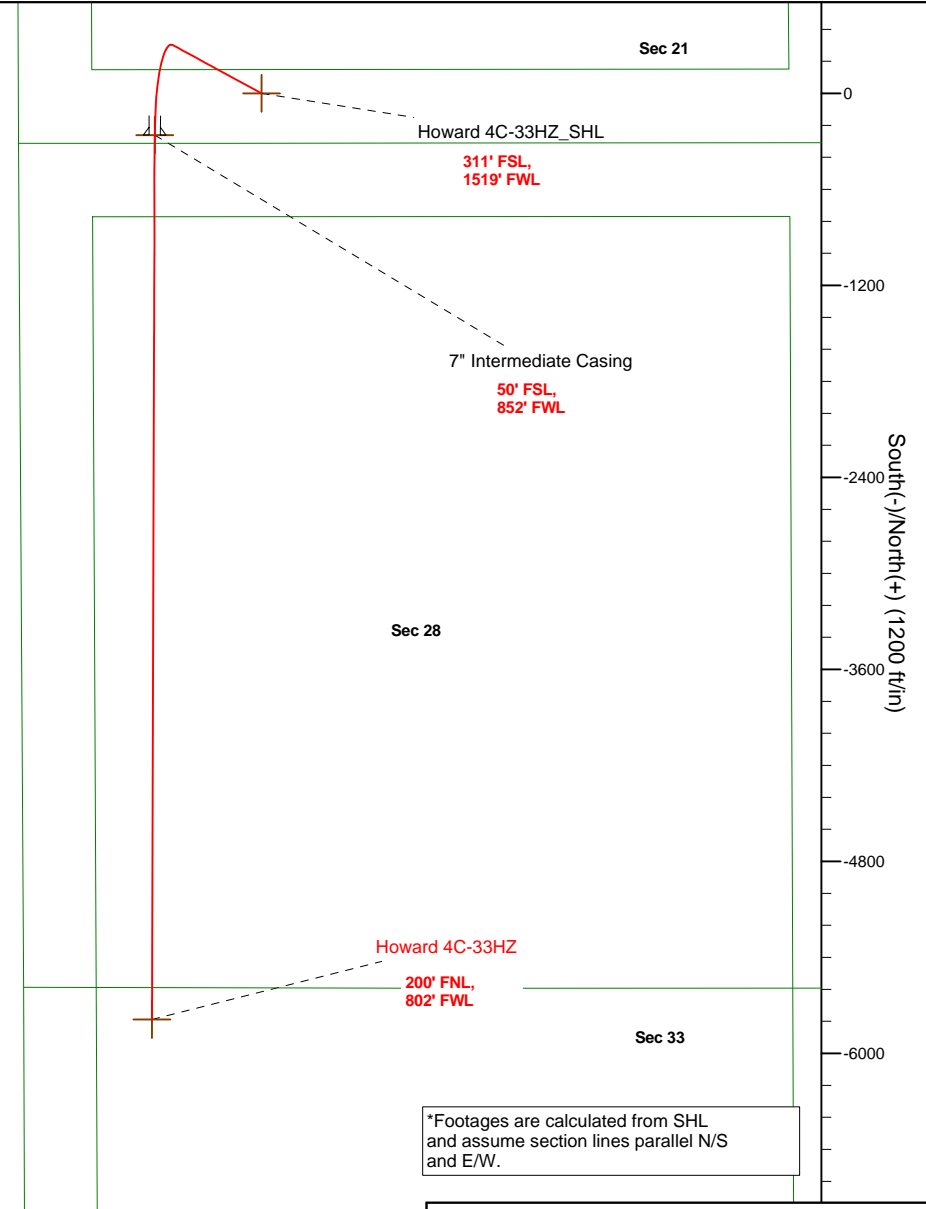
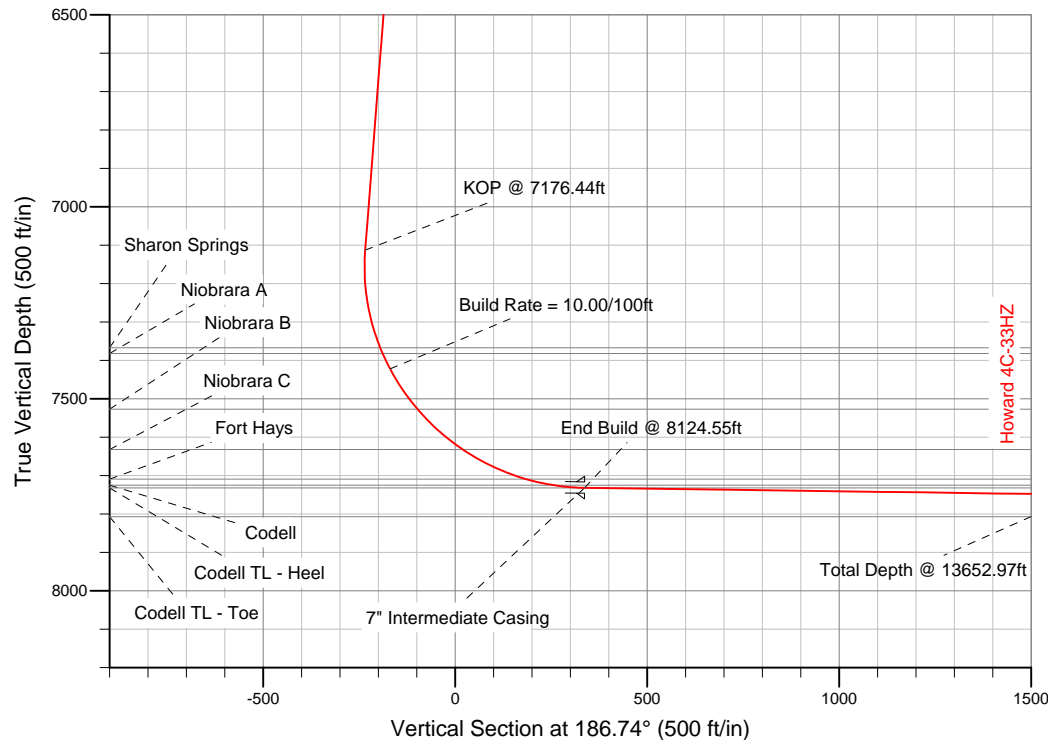
HALLIBURTON
Sperry Drilling

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	3800.00	0.00	0.00	3800.00	0.00	0.00	0.00	0.00	0.00	
3	4389.54	11.79	298.57	4385.38	28.91	-53.09	2.00	298.57	-22.48	
4	7176.44	11.79	298.57	7113.49	301.25	-553.21	0.00	0.00	-234.22	
5	8124.55	89.22	180.18	7732.00	-261.00	-667.00	10.00	-118.02	337.50	Howard 4C-33HZ_CP
6	13652.97	89.22	180.18	7807.00	-5788.89	-684.30	0.00	0.00	5829.19	Howard 4C-33HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Howard 4C-33HZ_SHL	0.00	0.00	0.00	40.030174	-104.899557	Point
Howard 4C-33HZ_CP	7732.00	-261.00	-667.00	40.029457	-104.901939	Point
Howard 4C-33HZ_BHL	7807.00	-5788.89	-684.30	40.014283	-104.902000	Point



*Footages are calculated from SHL and assume section lines parallel N/S and E/W.

WELL DETAILS: Howard 4C-33HZ

Ground Level: 5025.00 RKB=17 @ 5042.00ft (Drilling Rig)

Plan: Plan A Rev 0 Permit (Howard 4C-33HZ/Plan A Rev 0)

Created By: Fred Hartmann Date: 12/28/2012
Reviewed: _____ Date: _____

Plan Report for Howard 4C-33HZ - 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
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
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge @ 3800.00ft										
3,900.00	2.00	298.57	3,899.98	0.83	-1.53	-0.65	2.00	2.00	0.00	298.57
4,000.00	4.00	298.57	3,999.84	3.34	-6.13	-2.59	2.00	2.00	0.00	0.00
4,100.00	6.00	298.57	4,099.45	7.51	-13.78	-5.84	2.00	2.00	0.00	0.00
4,200.00	8.00	298.57	4,198.70	13.33	-24.49	-10.37	2.00	2.00	0.00	0.00
4,300.00	10.00	298.57	4,297.47	20.81	-38.22	-16.18	2.00	2.00	0.00	0.00
4,389.54	11.79	298.57	4,385.39	28.91	-53.09	-22.48	2.00	2.00	0.00	0.00
End Nudge @ 4389.54ft										
4,400.00	11.79	298.57	4,395.63	29.93	-54.96	-23.27	0.00	0.00	0.00	0.00
4,500.00	11.79	298.57	4,493.52	39.70	-72.91	-30.87	0.00	0.00	0.00	0.00
4,600.00	11.79	298.57	4,591.41	49.47	-90.85	-38.47	0.00	0.00	0.00	0.00
4,700.00	11.79	298.57	4,689.30	59.25	-108.80	-46.06	0.00	0.00	0.00	0.00
4,800.00	11.79	298.57	4,787.19	69.02	-126.75	-53.66	0.00	0.00	0.00	0.00
4,835.56	11.79	298.57	4,822.00	72.49	-133.13	-56.36	0.00	0.00	0.00	0.00
Sussex										
4,900.00	11.79	298.57	4,885.08	78.79	-144.69	-61.26	0.00	0.00	0.00	0.00
5,000.00	11.79	298.57	4,982.97	88.56	-162.64	-68.86	0.00	0.00	0.00	0.00
5,100.00	11.79	298.57	5,080.86	98.33	-180.58	-76.46	0.00	0.00	0.00	0.00
5,200.00	11.79	298.57	5,178.75	108.11	-198.53	-84.05	0.00	0.00	0.00	0.00

Plan Report for Howard 4C-33HZ - 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	11.79	298.57	5,276.64	117.88	-216.47	-91.65	0.00	0.00	0.00	0.00
5,400.00	11.79	298.57	5,374.53	127.65	-234.42	-99.25	0.00	0.00	0.00	0.00
5,500.00	11.79	298.57	5,472.42	137.42	-252.36	-106.85	0.00	0.00	0.00	0.00
5,600.00	11.79	298.57	5,570.31	147.20	-270.31	-114.45	0.00	0.00	0.00	0.00
5,700.00	11.79	298.57	5,668.20	156.97	-288.26	-122.04	0.00	0.00	0.00	0.00
5,800.00	11.79	298.57	5,766.09	166.74	-306.20	-129.64	0.00	0.00	0.00	0.00
5,900.00	11.79	298.57	5,863.98	176.51	-324.15	-137.24	0.00	0.00	0.00	0.00
6,000.00	11.79	298.57	5,961.87	186.28	-342.09	-144.84	0.00	0.00	0.00	0.00
6,100.00	11.79	298.57	6,059.76	196.06	-360.04	-152.43	0.00	0.00	0.00	0.00
6,200.00	11.79	298.57	6,157.65	205.83	-377.98	-160.03	0.00	0.00	0.00	0.00
6,300.00	11.79	298.57	6,255.54	215.60	-395.93	-167.63	0.00	0.00	0.00	0.00
6,400.00	11.79	298.57	6,353.43	225.37	-413.87	-175.23	0.00	0.00	0.00	0.00
6,500.00	11.79	298.57	6,451.32	235.14	-431.82	-182.83	0.00	0.00	0.00	0.00
6,600.00	11.79	298.57	6,549.21	244.92	-449.77	-190.42	0.00	0.00	0.00	0.00
6,700.00	11.79	298.57	6,647.10	254.69	-467.71	-198.02	0.00	0.00	0.00	0.00
6,800.00	11.79	298.57	6,744.99	264.46	-485.66	-205.62	0.00	0.00	0.00	0.00
6,900.00	11.79	298.57	6,842.88	274.23	-503.60	-213.22	0.00	0.00	0.00	0.00
7,000.00	11.79	298.57	6,940.77	284.00	-521.55	-220.82	0.00	0.00	0.00	0.00
7,100.00	11.79	298.57	7,038.66	293.78	-539.49	-228.41	0.00	0.00	0.00	0.00
7,176.44	11.79	298.57	7,113.49	301.25	-553.21	-234.22	0.00	0.00	0.00	0.00
KOP @ 7176.44ft										
7,200.00	10.88	287.49	7,136.59	303.07	-557.45	-235.53	10.00	-3.86	-47.04	-118.02
7,300.00	12.37	236.75	7,234.78	300.02	-575.46	-230.39	10.00	1.49	-50.74	-107.16
7,400.00	19.64	210.97	7,330.95	279.69	-593.11	-208.13	10.00	7.26	-25.78	-57.33
7,438.70	22.99	205.64	7,367.00	267.29	-599.72	-195.04	10.00	8.67	-13.75	-32.46
Sharon Springs										
7,455.08	24.46	203.82	7,382.00	261.30	-602.48	-188.77	10.00	8.94	-11.15	-27.50
Niobrara A										
7,500.00	28.56	199.72	7,422.19	242.68	-609.86	-169.41	10.00	9.14	-9.11	-25.83
Build Rate = 10.00/100ft										
7,600.00	37.99	193.61	7,505.72	190.13	-625.21	-115.42	10.00	9.43	-6.11	-22.16
7,627.51	40.63	192.38	7,527.00	173.15	-629.13	-98.10	10.00	9.59	-4.50	-17.04
Niobrara B										
7,700.00	47.63	189.67	7,579.00	123.63	-638.70	-47.80	10.00	9.66	-3.74	-16.08
7,785.77	55.98	187.15	7,632.00	57.00	-648.46	19.52	10.00	9.73	-2.94	-14.13
Niobrara C										
7,800.00	57.37	186.78	7,639.82	45.20	-649.90	31.41	10.00	9.76	-2.58	-12.57
7,900.00	67.16	184.47	7,686.31	-42.78	-658.48	119.78	10.00	9.79	-2.31	-12.37
7,968.01	73.83	183.08	7,709.00	-106.71	-662.68	183.76	10.00	9.81	-2.03	-11.29
Fort Hays										
8,000.00	76.98	182.47	7,717.06	-137.63	-664.18	214.64	10.00	9.82	-1.93	-10.82
8,041.71	81.08	181.69	7,725.00	-178.54	-665.66	255.44	10.00	9.83	-1.87	-10.67
Codell										
8,100.00	86.81	180.62	7,731.15	-236.46	-666.83	313.11	10.00	9.83	-1.83	-10.52
8,124.55	89.22	180.18	7,732.00	-261.00	-667.00	337.50	10.00	9.83	-1.81	-10.41
End Build @ 8124.55ft - Codell TL - Heel - 7" Intermediate Casing - Howard 4C-33HZ_CP										
8,200.00	89.22	180.18	7,733.02	-336.44	-667.24	412.44	0.00	0.00	0.00	-10.39
8,300.00	89.22	180.18	7,734.38	-436.43	-667.55	511.78	0.00	0.00	0.00	0.00
8,400.00	89.22	180.18	7,735.74	-536.42	-667.86	611.11	0.00	0.00	0.00	0.00
8,500.00	89.22	180.18	7,737.09	-636.41	-668.17	710.45	0.00	0.00	0.00	0.00
8,600.00	89.22	180.18	7,738.45	-736.40	-668.49	809.78	0.00	0.00	0.00	0.00
8,700.00	89.22	180.18	7,739.81	-836.39	-668.80	909.12	0.00	0.00	0.00	0.00
8,800.00	89.22	180.18	7,741.16	-936.38	-669.11	1,008.46	0.00	0.00	0.00	0.00
8,900.00	89.22	180.18	7,742.52	-1,036.37	-669.43	1,107.79	0.00	0.00	0.00	0.00
9,000.00	89.22	180.18	7,743.88	-1,136.36	-669.74	1,207.13	0.00	0.00	0.00	0.00
9,100.00	89.22	180.18	7,745.23	-1,236.35	-670.05	1,306.46	0.00	0.00	0.00	0.00
9,200.00	89.22	180.18	7,746.59	-1,336.34	-670.36	1,405.80	0.00	0.00	0.00	0.00
9,300.00	89.22	180.18	7,747.95	-1,436.33	-670.68	1,505.13	0.00	0.00	0.00	0.00
9,400.00	89.22	180.18	7,749.30	-1,536.32	-670.99	1,604.47	0.00	0.00	0.00	0.00

Plan Report for Howard 4C-33HZ - 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 (°)
9,500.00	89.22	180.18	7,750.66	-1,636.31	-671.30	1,703.81	0.00	0.00	0.00	0.00
9,600.00	89.22	180.18	7,752.02	-1,736.30	-671.62	1,803.14	0.00	0.00	0.00	0.00
9,700.00	89.22	180.18	7,753.37	-1,836.30	-671.93	1,902.48	0.00	0.00	0.00	0.00
9,800.00	89.22	180.18	7,754.73	-1,936.29	-672.24	2,001.81	0.00	0.00	0.00	0.00
9,900.00	89.22	180.18	7,756.09	-2,036.28	-672.55	2,101.15	0.00	0.00	0.00	0.00
10,000.00	89.22	180.18	7,757.44	-2,136.27	-672.87	2,200.48	0.00	0.00	0.00	0.00
10,100.00	89.22	180.18	7,758.80	-2,236.26	-673.18	2,299.82	0.00	0.00	0.00	0.00
10,200.00	89.22	180.18	7,760.16	-2,336.25	-673.49	2,399.16	0.00	0.00	0.00	0.00
10,300.00	89.22	180.18	7,761.51	-2,436.24	-673.81	2,498.49	0.00	0.00	0.00	0.00
10,400.00	89.22	180.18	7,762.87	-2,536.23	-674.12	2,597.83	0.00	0.00	0.00	0.00
10,500.00	89.22	180.18	7,764.23	-2,636.22	-674.43	2,697.16	0.00	0.00	0.00	0.00
10,600.00	89.22	180.18	7,765.58	-2,736.21	-674.74	2,796.50	0.00	0.00	0.00	0.00
10,700.00	89.22	180.18	7,766.94	-2,836.20	-675.06	2,895.83	0.00	0.00	0.00	0.00
10,800.00	89.22	180.18	7,768.30	-2,936.19	-675.37	2,995.17	0.00	0.00	0.00	0.00
10,900.00	89.22	180.18	7,769.65	-3,036.18	-675.68	3,094.51	0.00	0.00	0.00	0.00
11,000.00	89.22	180.18	7,771.01	-3,136.17	-676.00	3,193.84	0.00	0.00	0.00	0.00
11,100.00	89.22	180.18	7,772.37	-3,236.16	-676.31	3,293.18	0.00	0.00	0.00	0.00
11,200.00	89.22	180.18	7,773.72	-3,336.15	-676.62	3,392.51	0.00	0.00	0.00	0.00
11,300.00	89.22	180.18	7,775.08	-3,436.14	-676.93	3,491.85	0.00	0.00	0.00	0.00
11,400.00	89.22	180.18	7,776.44	-3,536.13	-677.25	3,591.18	0.00	0.00	0.00	0.00
11,500.00	89.22	180.18	7,777.79	-3,636.12	-677.56	3,690.52	0.00	0.00	0.00	0.00
11,600.00	89.22	180.18	7,779.15	-3,736.11	-677.87	3,789.85	0.00	0.00	0.00	0.00
11,700.00	89.22	180.18	7,780.51	-3,836.10	-678.19	3,889.19	0.00	0.00	0.00	0.00
11,800.00	89.22	180.18	7,781.86	-3,936.09	-678.50	3,988.53	0.00	0.00	0.00	0.00
11,900.00	89.22	180.18	7,783.22	-4,036.08	-678.81	4,087.86	0.00	0.00	0.00	0.00
12,000.00	89.22	180.18	7,784.58	-4,136.07	-679.12	4,187.20	0.00	0.00	0.00	0.00
12,100.00	89.22	180.18	7,785.93	-4,236.06	-679.44	4,286.53	0.00	0.00	0.00	0.00
12,200.00	89.22	180.18	7,787.29	-4,336.05	-679.75	4,385.87	0.00	0.00	0.00	0.00
12,300.00	89.22	180.18	7,788.65	-4,436.04	-680.06	4,485.20	0.00	0.00	0.00	0.00
12,400.00	89.22	180.18	7,790.00	-4,536.03	-680.38	4,584.54	0.00	0.00	0.00	0.00
12,500.00	89.22	180.18	7,791.36	-4,636.02	-680.69	4,683.88	0.00	0.00	0.00	0.00
12,600.00	89.22	180.18	7,792.72	-4,736.01	-681.00	4,783.21	0.00	0.00	0.00	0.00
12,700.00	89.22	180.18	7,794.07	-4,836.00	-681.31	4,882.55	0.00	0.00	0.00	0.00
12,800.00	89.22	180.18	7,795.43	-4,935.99	-681.63	4,981.88	0.00	0.00	0.00	0.00
12,900.00	89.22	180.18	7,796.78	-5,035.98	-681.94	5,081.22	0.00	0.00	0.00	0.00
13,000.00	89.22	180.18	7,798.14	-5,135.98	-682.25	5,180.55	0.00	0.00	0.00	0.00
13,100.00	89.22	180.18	7,799.50	-5,235.97	-682.57	5,279.89	0.00	0.00	0.00	0.00
13,200.00	89.22	180.18	7,800.85	-5,335.96	-682.88	5,379.23	0.00	0.00	0.00	0.00
13,300.00	89.22	180.18	7,802.21	-5,435.95	-683.19	5,478.56	0.00	0.00	0.00	0.00
13,400.00	89.22	180.18	7,803.57	-5,535.94	-683.50	5,577.90	0.00	0.00	0.00	0.00
13,500.00	89.22	180.18	7,804.92	-5,635.93	-683.82	5,677.23	0.00	0.00	0.00	0.00
13,600.00	89.22	180.18	7,806.28	-5,735.92	-684.13	5,776.57	0.00	0.00	0.00	0.00
13,652.97	89.22	180.18	7,807.00	-5,788.88	-684.30	5,829.19	0.00	0.00	0.00	0.00

Total Depth @ 13652.97ft - Howard 4C-33HZ_BHL**Plan Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
3,800.00	3,800.00	0.00	0.00	Begin Nudge @ 3800.00ft
4,389.54	4,385.39	28.91	-53.09	End Nudge @ 4389.54ft
7,176.44	7,113.49	301.25	-553.21	KOP @ 7176.44ft
7,500.00	7,422.19	242.68	-609.86	Build Rate = 10.00/100ft
8,124.55	7,732.00	-261.00	-667.00	End Build @ 8124.55ft
13,652.97	7,807.00	-5,788.88	-684.30	Total Depth @ 13652.97ft

Plan Report for Howard 4C-33HZ - Plan A Rev 0 Permit

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (ft)	Origin +E/-W (ft)	Start TVD (ft)
Target	Howard 4C-33HZ_BHL	186.74	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	8,124.55	Plan A Rev 0 Permit	MWD
8,124.55	13,652.97	Plan A Rev 0 Permit	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
8,124.55	7,732.00	7" Intermediate Casing	7	8-3/4

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,835.56	4,822.00	Sussex		0.00	
7,438.70	7,367.00	Sharon Springs		0.00	
7,455.08	7,382.00	Niobrara A		0.00	
7,627.51	7,527.00	Niobrara B		0.00	
7,785.77	7,632.00	Niobrara C		0.00	
7,968.01	7,709.00	Fort Hays		0.00	
8,041.71	7,725.00	Codell		0.00	
8,124.55	7,732.00	Codell TL - Heel		0.00	
13,652.97	7,807.00	Codell TL - Toe		0.00	

Targets associated with this wellbore

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Howard 4C-33HZ_SHL	0.00	0.00	0.00	Point
Howard 4C-33HZ_BHL	7,807.00	-5,788.89	-684.30	Point
Howard 4C-33HZ_CP	7,732.00	-261.00	-667.00	Point

North Reference Sheet for Sec. 21-T1N-R67W - Howard 4C-33HZ - 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=17 @ 5042.00ft (Drilling Rig). Northing and Easting are relative to Howard 4C-33HZ
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: 0.99996422

Grid Coordinates of Well: 1,254,407.71 ft N, 3,168,140.55 ft E
Geographical Coordinates of Well: 40° 01' 48.63" N, 104° 53' 58.41" W
Grid Convergence at Surface is: 0.39°

Based upon Minimum Curvature type calculations, at a Measured Depth of 13,652.97ft
the Bottom Hole Displacement is 5,829.19ft in the Direction of 186.74° (True).

Magnetic Convergence at surface is: -8.36° (27 December 2012, , BGGM2012)

