

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 13-T3N-R66W

Maverick 1N-13HZ

Plan A Rev 0

Plan: Plan A Rev 0 Permit

Sperry Drilling Services

Proposal Report

24 September, 2012

Well Coordinates: 1,323,546.26 N, 3,217,415.94 E (40° 13' 08.08" N, 104° 43' 17.15" W)

Ground Level: 5,047.00 ft

Local Coordinate Origin:

Centered on Well Maverick 1N-13HZ

Viewing Datum:

RKB=17 @ 5064.00ft (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. 13-T3N-R66W
Well: Maverick 1N-13HZ
Wellbore: Plan A Rev 0
Design: Plan A Rev 0 Permit

Anadarko Petroleum Corp.

HALLIBURTON
Sperry Drilling

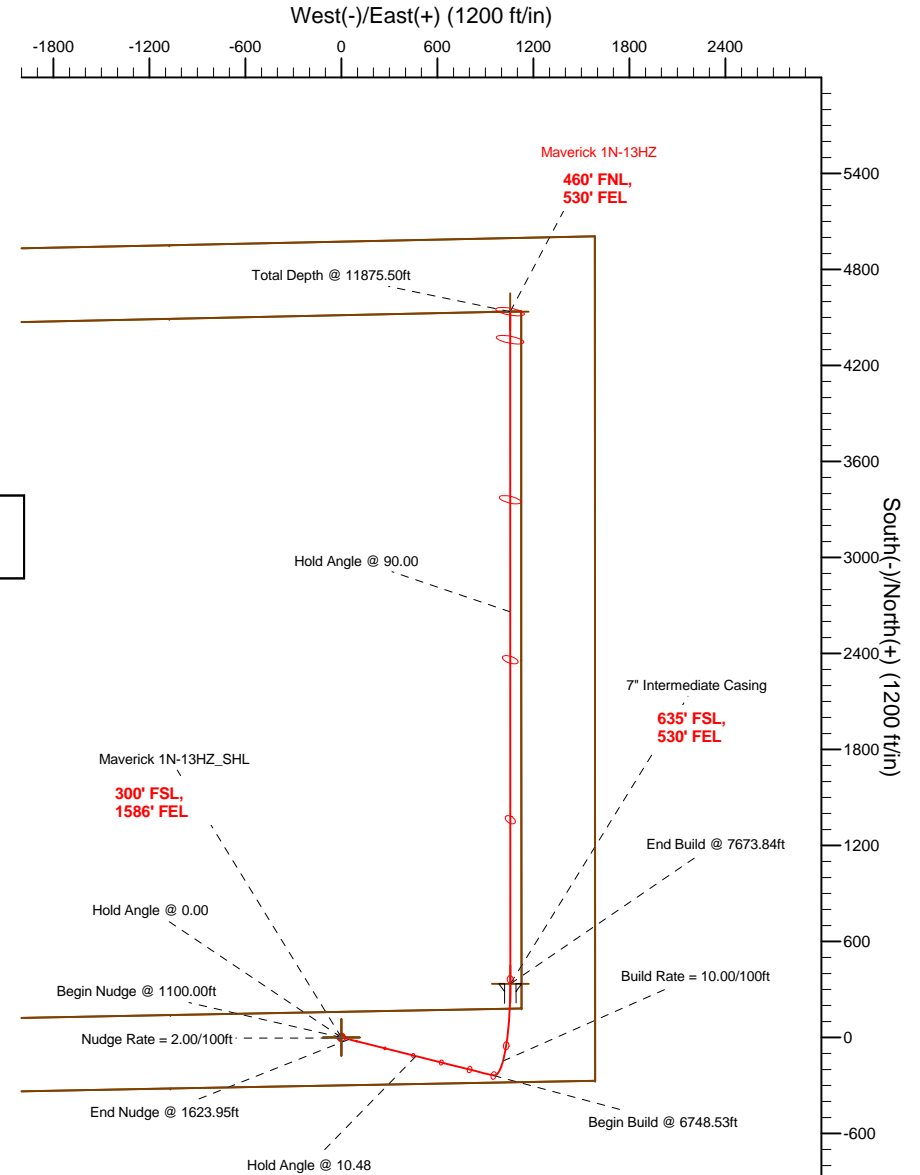
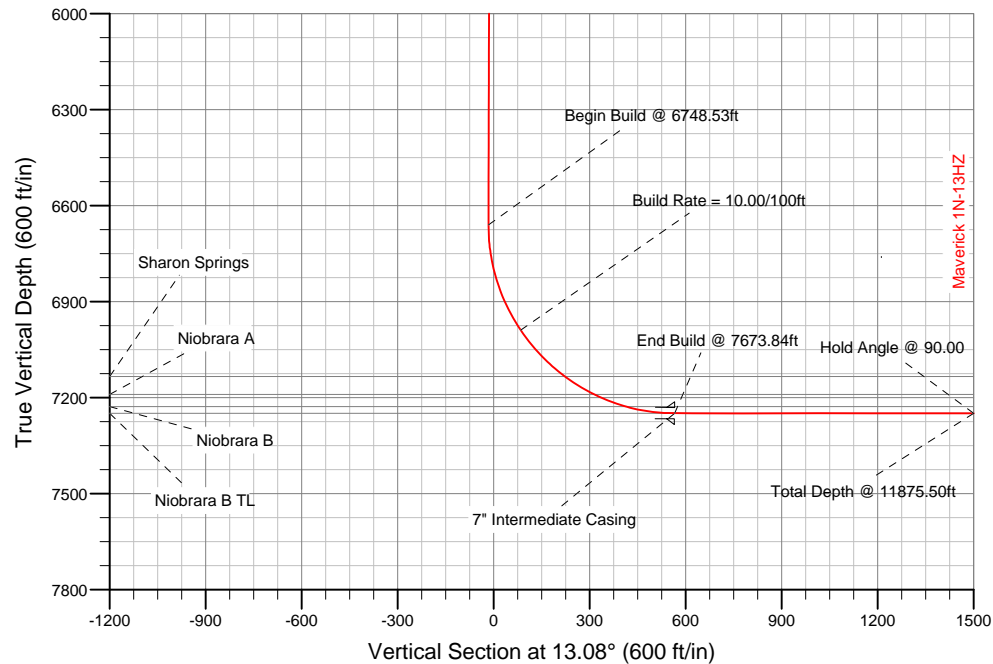
SECTION DETAILS

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	1623.95	10.48	104.02	1621.04	-11.58	46.36	2.00	104.02	-0.79	
4	6748.53	10.48	104.02	6660.15	-237.45	950.61	0.00	0.00	-16.15	
5	7673.84	90.00	359.97	7249.00	335.00	1056.00	10.00	-103.83	565.29	Maverick 1N-13HZ_Casing Point
6	11875.50	90.00	359.97	7249.00	4536.65	1054.04	0.00	0.00	4657.49	Maverick 1N-13HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Maverick 1N-13HZ_Section Lines	0.00	0.00	0.00	40.218912	-104.721431	Polygon
Maverick 1N-13HZ_Setback Lines	0.00	0.00	0.00	40.218912	-104.721431	Polygon
Maverick 1N-13HZ_SHL	0.00	0.00	0.00	40.218912	-104.721431	Point
Maverick 1N-13HZ_BHL	7249.00	4536.65	1054.04	40.231365	-104.717656	Point
Maverick 1N-13HZ_Casing Point	7249.00	335.00	1056.00	40.219831	-104.717650	Point

Target Line:
7249' TVDkb @ 0° VS Drilling 90.00°



WELL DETAILS: Maverick 1N-13HZ

Ground Level: 5047.00 RKB=17 @ 5064.00ft (Drilling Rig)

Plan: Plan A Rev 0 Permit (Maverick 1N-13HZ/Plan A Rev 0)

Created By: Fred Hartmann Date: 09/21/2012
Reviewed: _____ Date: _____

Plan Report for Maverick 1N-13HZ - 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
Maverick 1N-13HZ_SHL - Maverick 1N-13HZ_Section Lines - Maverick 1N-13HZ_Setback Lines										
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
Hold Angle @ 0.00										
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
775.00	0.00	0.00	775.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills										
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
Begin Nudge @ 1100.00ft										
1,200.00	2.00	104.02	1,199.98	-0.42	1.69	-0.03	2.00	2.00	0.00	104.02
1,300.00	4.00	104.02	1,299.84	-1.69	6.77	-0.12	2.00	2.00	0.00	0.00
1,400.00	6.00	104.02	1,399.45	-3.80	15.23	-0.26	2.00	2.00	0.00	0.00
Nudge Rate = 2.00/100ft										
1,500.00	8.00	104.02	1,498.70	-6.76	27.05	-0.46	2.00	2.00	0.00	0.00
1,600.00	10.00	104.02	1,597.47	-10.55	42.23	-0.72	2.00	2.00	0.00	0.00
1,623.95	10.48	104.02	1,621.03	-11.58	46.36	-0.79	2.00	2.00	0.00	0.00
End Nudge @ 1623.95ft										
1,700.00	10.48	104.02	1,695.82	-14.93	59.78	-1.02	0.00	0.00	0.00	0.00
1,800.00	10.48	104.02	1,794.15	-19.34	77.42	-1.32	0.00	0.00	0.00	0.00
1,900.00	10.48	104.02	1,892.48	-23.75	95.07	-1.62	0.00	0.00	0.00	0.00
2,000.00	10.48	104.02	1,990.81	-28.15	112.71	-1.92	0.00	0.00	0.00	0.00
2,100.00	10.48	104.02	2,089.14	-32.56	130.36	-2.22	0.00	0.00	0.00	0.00
2,200.00	10.48	104.02	2,187.48	-36.97	148.00	-2.52	0.00	0.00	0.00	0.00
2,300.00	10.48	104.02	2,285.81	-41.38	165.65	-2.82	0.00	0.00	0.00	0.00
2,400.00	10.48	104.02	2,384.14	-45.78	183.29	-3.11	0.00	0.00	0.00	0.00
2,500.00	10.48	104.02	2,482.47	-50.19	200.94	-3.41	0.00	0.00	0.00	0.00
2,600.00	10.48	104.02	2,580.80	-54.60	218.58	-3.71	0.00	0.00	0.00	0.00
2,700.00	10.48	104.02	2,679.14	-59.01	236.23	-4.01	0.00	0.00	0.00	0.00
2,800.00	10.48	104.02	2,777.47	-63.41	253.88	-4.31	0.00	0.00	0.00	0.00
2,900.00	10.48	104.02	2,875.80	-67.82	271.52	-4.61	0.00	0.00	0.00	0.00
3,000.00	10.48	104.02	2,974.13	-72.23	289.17	-4.91	0.00	0.00	0.00	0.00
3,100.00	10.48	104.02	3,072.47	-76.64	306.81	-5.21	0.00	0.00	0.00	0.00
3,200.00	10.48	104.02	3,170.80	-81.04	324.46	-5.51	0.00	0.00	0.00	0.00
3,300.00	10.48	104.02	3,269.13	-85.45	342.10	-5.81	0.00	0.00	0.00	0.00
3,400.00	10.48	104.02	3,367.46	-89.86	359.75	-6.11	0.00	0.00	0.00	0.00
3,500.00	10.48	104.02	3,465.79	-94.27	377.39	-6.41	0.00	0.00	0.00	0.00
3,600.00	10.48	104.02	3,564.13	-98.67	395.04	-6.71	0.00	0.00	0.00	0.00
3,700.00	10.48	104.02	3,662.46	-103.08	412.68	-7.01	0.00	0.00	0.00	0.00
3,800.00	10.48	104.02	3,760.79	-107.49	430.33	-7.31	0.00	0.00	0.00	0.00
3,900.00	10.48	104.02	3,859.12	-111.90	447.98	-7.61	0.00	0.00	0.00	0.00
4,000.00	10.48	104.02	3,957.45	-116.30	465.62	-7.91	0.00	0.00	0.00	0.00
Hold Angle @ 10.48										
4,100.00	10.48	104.02	4,055.79	-120.71	483.27	-8.21	0.00	0.00	0.00	0.00
4,102.25	10.48	104.02	4,058.00	-120.81	483.66	-8.22	0.00	0.00	0.00	0.00
Parkman										
4,200.00	10.48	104.02	4,154.12	-125.12	500.91	-8.51	0.00	0.00	0.00	0.00
4,300.00	10.48	104.02	4,252.45	-129.53	518.56	-8.81	0.00	0.00	0.00	0.00
4,400.00	10.48	104.02	4,350.78	-133.94	536.20	-9.11	0.00	0.00	0.00	0.00
4,500.00	10.48	104.02	4,449.12	-138.34	553.85	-9.41	0.00	0.00	0.00	0.00
4,600.00	10.48	104.02	4,547.45	-142.75	571.49	-9.71	0.00	0.00	0.00	0.00

Plan Report for Maverick 1N-13HZ - 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 (°)
4,621.92	10.48	104.02	4,569.00	-143.72	575.36	-9.78	0.00	0.00	0.00	0.00
Sussex										
4,700.00	10.48	104.02	4,645.78	-147.16	589.14	-10.01	0.00	0.00	0.00	0.00
4,800.00	10.48	104.02	4,744.11	-151.57	606.78	-10.31	0.00	0.00	0.00	0.00
4,900.00	10.48	104.02	4,842.44	-155.97	624.43	-10.61	0.00	0.00	0.00	0.00
5,000.00	10.48	104.02	4,940.78	-160.38	642.07	-10.91	0.00	0.00	0.00	0.00
5,100.00	10.48	104.02	5,039.11	-164.79	659.72	-11.21	0.00	0.00	0.00	0.00
5,200.00	10.48	104.02	5,137.44	-169.20	677.37	-11.51	0.00	0.00	0.00	0.00
5,300.00	10.48	104.02	5,235.77	-173.60	695.01	-11.81	0.00	0.00	0.00	0.00
5,400.00	10.48	104.02	5,334.10	-178.01	712.66	-12.11	0.00	0.00	0.00	0.00
5,500.00	10.48	104.02	5,432.44	-182.42	730.30	-12.41	0.00	0.00	0.00	0.00
5,600.00	10.48	104.02	5,530.77	-186.83	747.95	-12.71	0.00	0.00	0.00	0.00
5,700.00	10.48	104.02	5,629.10	-191.23	765.59	-13.01	0.00	0.00	0.00	0.00
5,800.00	10.48	104.02	5,727.43	-195.64	783.24	-13.31	0.00	0.00	0.00	0.00
5,900.00	10.48	104.02	5,825.77	-200.05	800.88	-13.61	0.00	0.00	0.00	0.00
6,000.00	10.48	104.02	5,924.10	-204.46	818.53	-13.91	0.00	0.00	0.00	0.00
6,100.00	10.48	104.02	6,022.43	-208.86	836.17	-14.21	0.00	0.00	0.00	0.00
6,200.00	10.48	104.02	6,120.76	-213.27	853.82	-14.51	0.00	0.00	0.00	0.00
6,300.00	10.48	104.02	6,219.09	-217.68	871.47	-14.81	0.00	0.00	0.00	0.00
6,400.00	10.48	104.02	6,317.43	-222.09	889.11	-15.11	0.00	0.00	0.00	0.00
6,500.00	10.48	104.02	6,415.76	-226.49	906.76	-15.41	0.00	0.00	0.00	0.00
6,600.00	10.48	104.02	6,514.09	-230.90	924.40	-15.71	0.00	0.00	0.00	0.00
6,700.00	10.48	104.02	6,612.42	-235.31	942.05	-16.01	0.00	0.00	0.00	0.00
6,748.53	10.48	104.02	6,660.14	-237.45	950.61	-16.15	0.00	0.00	0.00	0.00
Begin Build @ 6748.53ft										
6,800.00	10.50	75.47	6,710.79	-237.41	959.70	-14.06	10.00	0.04	-55.48	-103.83
6,900.00	16.15	38.25	6,808.22	-224.16	977.17	2.80	10.00	5.65	-37.22	-75.73
7,000.00	24.69	22.95	6,901.92	-193.93	993.97	36.05	10.00	8.53	-15.30	-39.40
7,100.00	34.00	15.40	6,989.02	-147.63	1,009.58	84.68	10.00	9.31	-7.55	-25.01
Build Rate = 10.00/100ft										
7,200.00	43.59	10.84	7,066.89	-86.66	1,023.52	147.22	10.00	9.59	-4.56	-18.41
7,300.00	53.30	7.66	7,133.15	-12.88	1,035.38	221.77	10.00	9.72	-3.18	-14.84
7,301.42	53.44	7.62	7,134.00	-11.76	1,035.53	222.90	10.00	9.75	-2.74	-12.72
Sharon Springs										
7,400.00	63.08	5.20	7,185.81	71.46	1,044.78	306.05	10.00	9.78	-2.45	-12.70
7,409.41	64.00	4.99	7,190.00	79.86	1,045.53	314.40	10.00	9.80	-2.20	-11.42
Niobrara A										
7,500.00	72.90	3.14	7,223.24	163.81	1,051.46	397.52	10.00	9.82	-2.05	-11.33
7,516.99	74.57	2.81	7,228.00	180.10	1,052.30	413.57	10.00	9.83	-1.92	-10.65
Niobrara B										
7,600.00	82.73	1.28	7,244.32	261.36	1,055.20	493.38	10.00	9.84	-1.84	-10.56
7,673.84	90.00	359.97	7,249.00	335.00	1,056.00	565.29	10.00	9.84	-1.78	-10.26
End Build @ 7673.84ft - Niobrara B TL - 7" Intermediate Casing - Maverick 1N-13HZ Casing Point										
7,700.00	90.00	359.97	7,249.00	361.16	1,055.99	590.77	0.00	0.00	0.00	-10.17
7,800.00	90.00	359.97	7,249.00	461.16	1,055.94	688.16	0.00	0.00	0.00	0.00
7,900.00	90.00	359.97	7,249.00	561.16	1,055.89	785.56	0.00	0.00	0.00	0.00
8,000.00	90.00	359.97	7,249.00	661.16	1,055.85	882.95	0.00	0.00	0.00	0.00
8,100.00	90.00	359.97	7,249.00	761.16	1,055.80	980.35	0.00	0.00	0.00	0.00
8,200.00	90.00	359.97	7,249.00	861.16	1,055.75	1,077.74	0.00	0.00	0.00	0.00
8,300.00	90.00	359.97	7,249.00	961.16	1,055.71	1,175.14	0.00	0.00	0.00	0.00
8,400.00	90.00	359.97	7,249.00	1,061.16	1,055.66	1,272.53	0.00	0.00	0.00	0.00
8,500.00	90.00	359.97	7,249.00	1,161.16	1,055.61	1,369.93	0.00	0.00	0.00	0.00
8,600.00	90.00	359.97	7,249.00	1,261.16	1,055.57	1,467.32	0.00	0.00	0.00	0.00
8,700.00	90.00	359.97	7,249.00	1,361.16	1,055.52	1,564.72	0.00	0.00	0.00	0.00
8,800.00	90.00	359.97	7,249.00	1,461.16	1,055.47	1,662.11	0.00	0.00	0.00	0.00
8,900.00	90.00	359.97	7,249.00	1,561.16	1,055.43	1,759.51	0.00	0.00	0.00	0.00
9,000.00	90.00	359.97	7,249.00	1,661.16	1,055.38	1,856.90	0.00	0.00	0.00	0.00
9,100.00	90.00	359.97	7,249.00	1,761.16	1,055.33	1,954.30	0.00	0.00	0.00	0.00

Plan Report for Maverick 1N-13HZ - 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 (°)
9,200.00	90.00	359.97	7,249.00	1,861.16	1,055.29	2,051.69	0.00	0.00	0.00	0.00
9,300.00	90.00	359.97	7,249.00	1,961.16	1,055.24	2,149.09	0.00	0.00	0.00	0.00
9,400.00	90.00	359.97	7,249.00	2,061.16	1,055.19	2,246.48	0.00	0.00	0.00	0.00
9,500.00	90.00	359.97	7,249.00	2,161.16	1,055.15	2,343.88	0.00	0.00	0.00	0.00
9,600.00	90.00	359.97	7,249.00	2,261.16	1,055.10	2,441.27	0.00	0.00	0.00	0.00
9,700.00	90.00	359.97	7,249.00	2,361.16	1,055.05	2,538.67	0.00	0.00	0.00	0.00
9,800.00	90.00	359.97	7,249.00	2,461.16	1,055.01	2,636.06	0.00	0.00	0.00	0.00
9,900.00	90.00	359.97	7,249.00	2,561.16	1,054.96	2,733.46	0.00	0.00	0.00	0.00
10,000.00	90.00	359.97	7,249.00	2,661.16	1,054.91	2,830.85	0.00	0.00	0.00	0.00
Hold Angle @ 90.00										
10,100.00	90.00	359.97	7,249.00	2,761.16	1,054.87	2,928.25	0.00	0.00	0.00	0.00
10,200.00	90.00	359.97	7,249.00	2,861.16	1,054.82	3,025.64	0.00	0.00	0.00	0.00
10,300.00	90.00	359.97	7,249.00	2,961.16	1,054.77	3,123.04	0.00	0.00	0.00	0.00
10,400.00	90.00	359.97	7,249.00	3,061.16	1,054.73	3,220.43	0.00	0.00	0.00	0.00
10,500.00	90.00	359.97	7,249.00	3,161.16	1,054.68	3,317.83	0.00	0.00	0.00	0.00
10,600.00	90.00	359.97	7,249.00	3,261.16	1,054.63	3,415.22	0.00	0.00	0.00	0.00
10,700.00	90.00	359.97	7,249.00	3,361.16	1,054.59	3,512.62	0.00	0.00	0.00	0.00
10,800.00	90.00	359.97	7,249.00	3,461.16	1,054.54	3,610.01	0.00	0.00	0.00	0.00
10,900.00	90.00	359.97	7,249.00	3,561.16	1,054.49	3,707.41	0.00	0.00	0.00	0.00
11,000.00	90.00	359.97	7,249.00	3,661.16	1,054.45	3,804.80	0.00	0.00	0.00	0.00
11,100.00	90.00	359.97	7,249.00	3,761.16	1,054.40	3,902.20	0.00	0.00	0.00	0.00
11,200.00	90.00	359.97	7,249.00	3,861.16	1,054.35	3,999.59	0.00	0.00	0.00	0.00
11,300.00	90.00	359.97	7,249.00	3,961.16	1,054.31	4,096.99	0.00	0.00	0.00	0.00
11,400.00	90.00	359.97	7,249.00	4,061.16	1,054.26	4,194.38	0.00	0.00	0.00	0.00
11,500.00	90.00	359.97	7,249.00	4,161.16	1,054.21	4,291.78	0.00	0.00	0.00	0.00
11,600.00	90.00	359.97	7,249.00	4,261.16	1,054.17	4,389.17	0.00	0.00	0.00	0.00
11,700.00	90.00	359.97	7,249.00	4,361.16	1,054.12	4,486.57	0.00	0.00	0.00	0.00
11,800.00	90.00	359.97	7,249.00	4,461.16	1,054.07	4,583.96	0.00	0.00	0.00	0.00
11,875.50	90.00	359.97	7,249.00	4,536.65	1,054.04	4,657.49	0.00	0.00	0.00	0.00
Maverick 1N-13HZ_BHL										

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
600.00	600.00	0.00	0.00	Hold Angle @ 0.00
1,100.00	1,100.00	0.00	0.00	Begin Nudge @ 1100.00ft
1,400.00	1,399.45	-3.80	15.23	Nudge Rate = 2.00/100ft
1,623.95	1,621.03	-11.58	46.36	End Nudge @ 1623.95ft
4,000.00	3,957.45	-116.30	465.62	Hold Angle @ 10.48
6,748.53	6,660.14	-237.45	950.61	Begin Build @ 6748.53ft
7,100.00	6,989.02	-147.63	1,009.58	Build Rate = 10.00/100ft
7,673.84	7,249.00	335.00	1,056.00	End Build @ 7673.84ft
10,000.00	7,249.00	2,661.16	1,054.91	Hold Angle @ 90.00
11,875.50	7,249.00	4,536.66	1,054.04	Total Depth @ 11875.50ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
Target	Maverick 1N-13HZ_BHL	13.08	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	11,875.50	Plan A Rev 0 Permit	MWD

Plan Report for Maverick 1N-13HZ - Plan A Rev 0 Permit**Casing Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
7,673.84	7,249.00	7" Intermediate Casing	7	8-3/4

Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
775.00	775.00	Fox Hills		0.00	
4,102.25	4,058.00	Parkman		0.00	
4,621.92	4,569.00	Sussex		0.00	
7,301.42	7,134.00	Sharon Springs		0.00	
7,409.41	7,190.00	Niobrara A		0.00	
7,516.99	7,228.00	Niobrara B		0.00	
7,673.84	7,249.00	Niobrara B TL		0.00	

Targets associated with this wellbore

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Maverick 1N-13HZ_Setback Lines	0.00	0.00	0.00	Point
Maverick 1N-13HZ_Section Lines	0.00	0.00	0.00	Point
Maverick 1N-13HZ_SHL	0.00	0.00	0.00	Point
Maverick 1N-13HZ_Casing Point	7,249.00	335.00	1,056.00	Point
Maverick 1N-13HZ_BHL	7,249.00	4,536.65	1,054.04	Point

North Reference Sheet for Sec. 13-T3N-R66W - Maverick 1N-13HZ - 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 @ 5064.00ft (Drilling Rig). Northing and Easting are relative to Maverick 1N-13HZ
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: 0.99995700

Grid Coordinates of Well: 1,323,546.26 ft N, 3,217,415.94 ft E
Geographical Coordinates of Well: 40° 13' 08.08" N, 104° 43' 17.15" W
Grid Convergence at Surface is: 0.50°

Based upon Minimum Curvature type calculations, at a Measured Depth of 11,875.50ft
the Bottom Hole Displacement is 4,657.49ft in the Direction of 13.08° (True).

Magnetic Convergence at surface is: -8.20° (24 September 2012, , BGGM2012)

