

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 19-T3N-R66W

Harris Federal 36N-E18HZ

Plan A Rev 0

Plan: Plan A Rev 0 - PERMIT

## Sperry Drilling Services

## Proposal Report

14 May, 2013

Well Coordinates: 1,318,210.21 N, 3,190,733.85 E (40° 12' 17.52" N, 104° 49' 01.64" W)

Ground Level: 4,832.00 ft

Local Coordinate Origin: Centered on Well Harris Federal 36N-E18HZ

Viewing Datum: RKB=17 @ 4849.00ft (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. 19-T3N-R66W  
Well: Harris Federal 36N-E18HZ  
Wellbore: Plan A Rev 0  
Design: Plan A Rev 0 - PERMIT

# Anadarko Petroleum Corp.

**HALLIBURTON**  
Sperry Drilling

## SECTION DETAILS

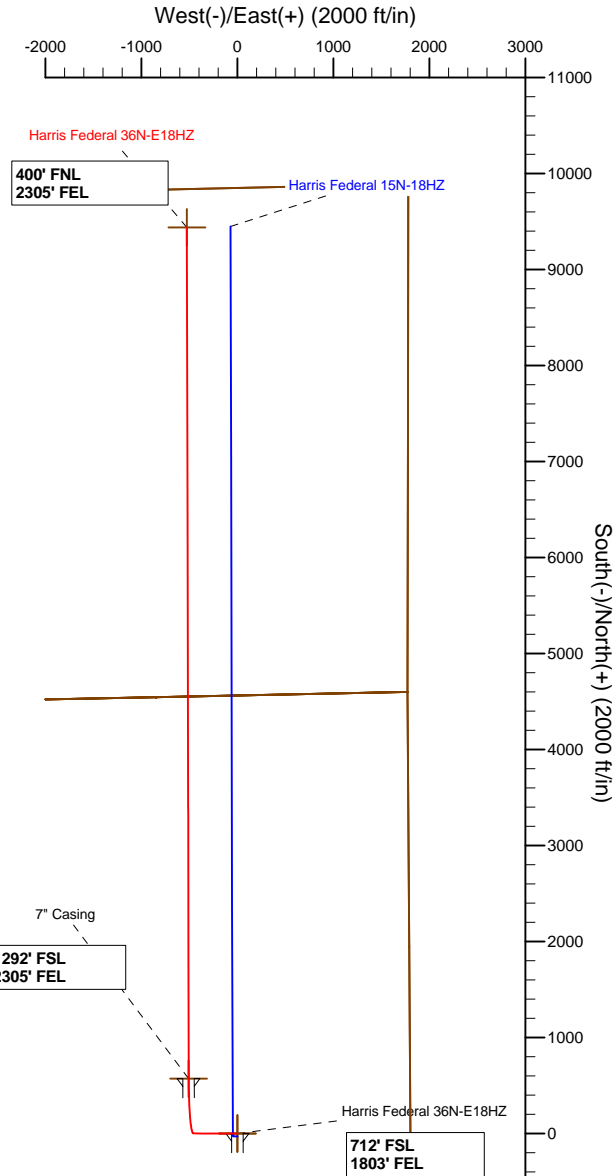
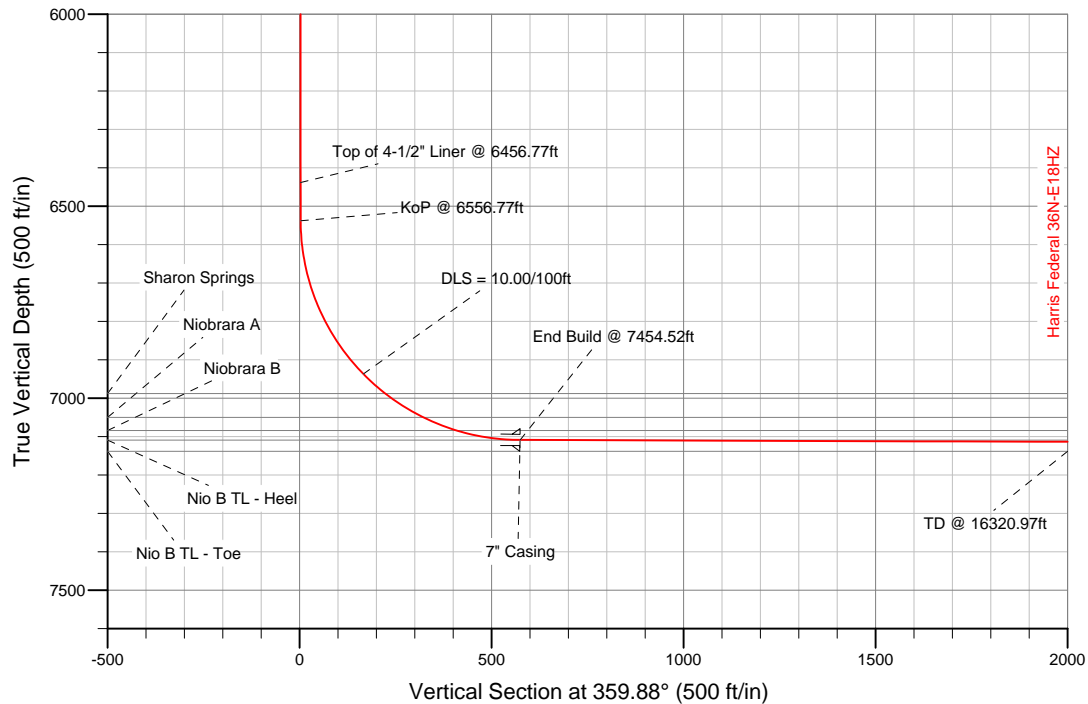
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	
3	1033.09	4.66	270.26	1032.83	0.04	-9.48	2.00	270.26	0.06	
4	6556.77	4.66	270.26	6538.24	2.08	-458.40	0.00	0.00	3.04	
5	7454.52	89.81	359.88	7109.00	573.00	-506.00	10.00	89.64	574.06	Harris Fed 36N-E18HZ_CP
6	16320.97	89.81	359.88	7139.00	9439.38	-524.93	0.00	0.00	9440.46	Harris Fed 36N-E18HZ_BHL

## WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Harris Fed 36N-E18HZ_Sec	0.00	0.00	0.00	40.204868	-104.817123	Polygon
Harris Fed 36N-E18HZ_SHL	0.00	0.00	0.00	40.204868	-104.817123	Point
Harris Fed 36N-E18HZ_CP	7109.00	573.00	-506.00	40.206441	-104.818935	Point
Harris Fed 36N-E18HZ_BHL	7139.00	9439.38	-524.93	40.230779	-104.819003	Point

MD TVD

6456.77 6438.57 Top of 4-1/2" Liner @ 6456.77ft  
6556.77 6538.24 KoP @ 6556.77ft



WELL DETAILS: Harris Federal 36N-E18HZ

Ground Level: 4832.00  
RKB=17 @ 4849.00ft (Drilling Rig)

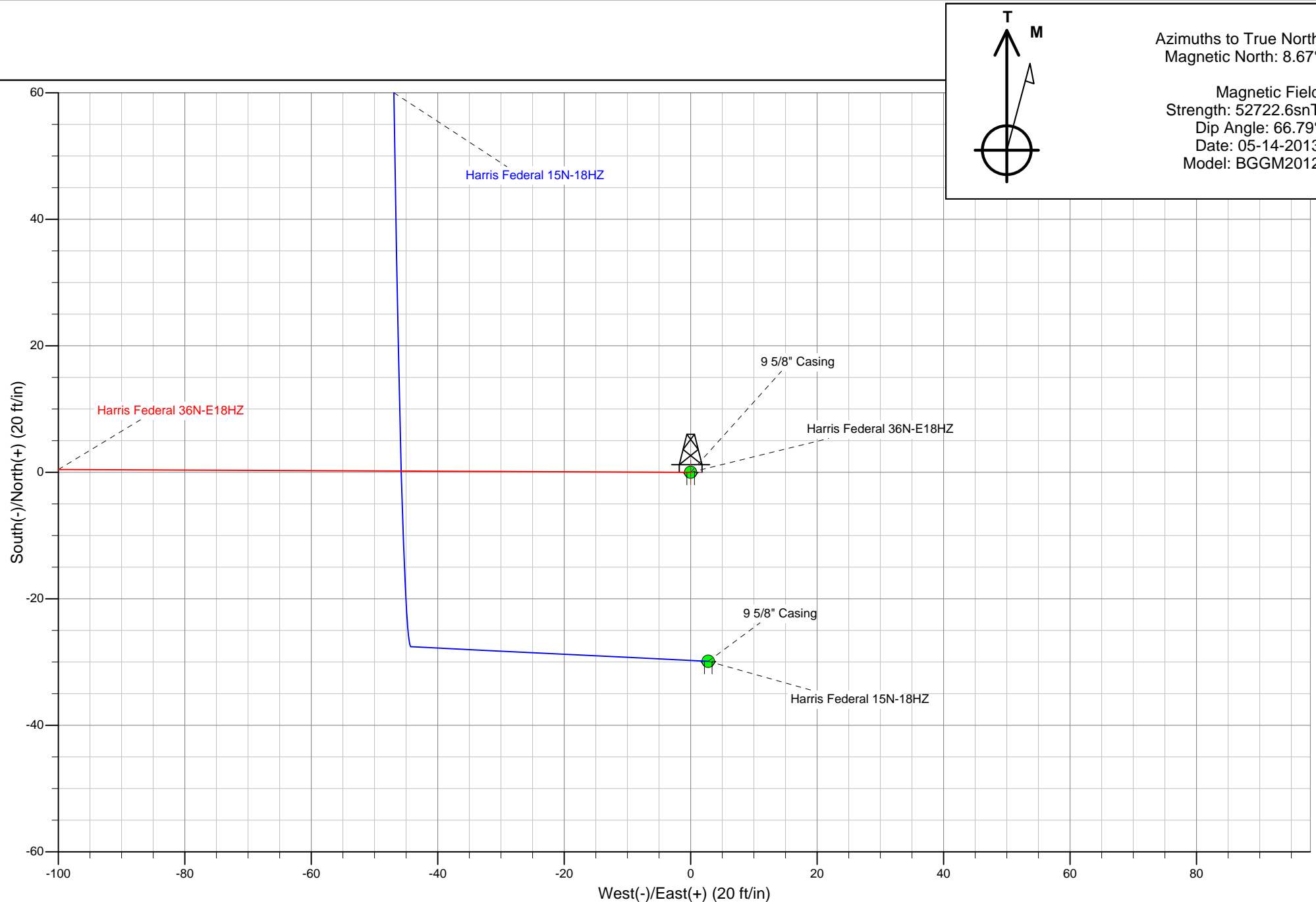
Plan: Plan A Rev 0 - PERMIT (Harris Federal 36N-E18HZ/Plan A Rev 0)

Created By: Fred Hartmann Date: 05/14/2013  
Reviewed: \_\_\_\_\_ Date: \_\_\_\_\_

# Anadarko Petroleum Corp.

Azimuths to True North  
Magnetic North:  $8.67^\circ$

Magnetic Field  
Strength: 52722.6snT  
Dip Angle: 66.79°  
Date: 05-14-2013  
Model: BGGM2012



**Plan Report for Harris Federal 36N-E18HZ - 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
569.00	0.00	0.00	569.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>9 5/8" Casing</b>										
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
<b>Begin Nudge @ 800.00ft</b>										
900.00	2.00	270.26	899.98	0.01	-1.75	0.01	2.00	2.00	0.00	270.26
1,000.00	4.00	270.26	999.84	0.03	-6.98	0.05	2.00	2.00	0.00	0.00
1,033.09	4.66	270.26	1,032.83	0.04	-9.48	0.06	2.00	2.00	0.00	0.00
<b>End Nudge @ 1033.09ft</b>										
1,100.00	4.66	270.26	1,099.52	0.07	-14.92	0.10	0.00	0.00	0.00	0.00
1,200.00	4.66	270.26	1,199.19	0.10	-23.04	0.15	0.00	0.00	0.00	0.00
1,300.00	4.66	270.26	1,298.86	0.14	-31.17	0.21	0.00	0.00	0.00	0.00
1,400.00	4.66	270.26	1,398.53	0.18	-39.30	0.26	0.00	0.00	0.00	0.00
1,500.00	4.66	270.26	1,498.20	0.21	-47.42	0.31	0.00	0.00	0.00	0.00
1,600.00	4.66	270.26	1,597.87	0.25	-55.55	0.37	0.00	0.00	0.00	0.00
1,700.00	4.66	270.26	1,697.54	0.29	-63.68	0.42	0.00	0.00	0.00	0.00
1,800.00	4.66	270.26	1,797.21	0.33	-71.81	0.48	0.00	0.00	0.00	0.00
1,900.00	4.66	270.26	1,896.88	0.36	-79.93	0.53	0.00	0.00	0.00	0.00
2,000.00	4.66	270.26	1,996.54	0.40	-88.06	0.58	0.00	0.00	0.00	0.00
2,100.00	4.66	270.26	2,096.21	0.44	-96.19	0.64	0.00	0.00	0.00	0.00
2,200.00	4.66	270.26	2,195.88	0.47	-104.31	0.69	0.00	0.00	0.00	0.00
2,300.00	4.66	270.26	2,295.55	0.51	-112.44	0.74	0.00	0.00	0.00	0.00
2,400.00	4.66	270.26	2,395.22	0.55	-120.57	0.80	0.00	0.00	0.00	0.00
2,500.00	4.66	270.26	2,494.89	0.58	-128.70	0.85	0.00	0.00	0.00	0.00
2,600.00	4.66	270.26	2,594.56	0.62	-136.82	0.91	0.00	0.00	0.00	0.00
2,700.00	4.66	270.26	2,694.23	0.66	-144.95	0.96	0.00	0.00	0.00	0.00
2,800.00	4.66	270.26	2,793.90	0.69	-153.08	1.01	0.00	0.00	0.00	0.00
2,900.00	4.66	270.26	2,893.57	0.73	-161.20	1.07	0.00	0.00	0.00	0.00
3,000.00	4.66	270.26	2,993.24	0.77	-169.33	1.12	0.00	0.00	0.00	0.00
3,100.00	4.66	270.26	3,092.91	0.80	-177.46	1.18	0.00	0.00	0.00	0.00
3,200.00	4.66	270.26	3,192.57	0.84	-185.59	1.23	0.00	0.00	0.00	0.00
3,300.00	4.66	270.26	3,292.24	0.88	-193.71	1.28	0.00	0.00	0.00	0.00
3,400.00	4.66	270.26	3,391.91	0.91	-201.84	1.34	0.00	0.00	0.00	0.00
3,500.00	4.66	270.26	3,491.58	0.95	-209.97	1.39	0.00	0.00	0.00	0.00
3,600.00	4.66	270.26	3,591.25	0.99	-218.10	1.44	0.00	0.00	0.00	0.00
3,700.00	4.66	270.26	3,690.92	1.02	-226.22	1.50	0.00	0.00	0.00	0.00
3,800.00	4.66	270.26	3,790.59	1.06	-234.35	1.55	0.00	0.00	0.00	0.00
3,840.54	4.66	270.26	3,831.00	1.08	-237.64	1.57	0.00	0.00	0.00	0.00
<b>Parkman</b>										
3,900.00	4.66	270.26	3,890.26	1.10	-242.48	1.61	0.00	0.00	0.00	0.00
4,000.00	4.66	270.26	3,989.93	1.13	-250.60	1.66	0.00	0.00	0.00	0.00
4,100.00	4.66	270.26	4,089.60	1.17	-258.73	1.71	0.00	0.00	0.00	0.00
4,200.00	4.66	270.26	4,189.27	1.21	-266.86	1.77	0.00	0.00	0.00	0.00
4,269.97	4.66	270.26	4,259.00	1.23	-272.54	1.80	0.00	0.00	0.00	0.00
<b>Sussex</b>										
4,300.00	4.66	270.26	4,288.94	1.24	-274.99	1.82	0.00	0.00	0.00	0.00
4,400.00	4.66	270.26	4,388.60	1.28	-283.11	1.87	0.00	0.00	0.00	0.00
4,500.00	4.66	270.26	4,488.27	1.32	-291.24	1.93	0.00	0.00	0.00	0.00
4,600.00	4.66	270.26	4,587.94	1.36	-299.37	1.98	0.00	0.00	0.00	0.00
4,700.00	4.66	270.26	4,687.61	1.39	-307.49	2.04	0.00	0.00	0.00	0.00
4,800.00	4.66	270.26	4,787.28	1.43	-315.62	2.09	0.00	0.00	0.00	0.00

**Plan Report for Harris Federal 36N-E18HZ - 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 (°)
4,900.00	4.66	270.26	4,886.95	1.47	-323.75	2.14	0.00	0.00	0.00	0.00
5,000.00	4.66	270.26	4,986.62	1.50	-331.88	2.20	0.00	0.00	0.00	0.00
5,100.00	4.66	270.26	5,086.29	1.54	-340.00	2.25	0.00	0.00	0.00	0.00
5,200.00	4.66	270.26	5,185.96	1.58	-348.13	2.31	0.00	0.00	0.00	0.00
5,300.00	4.66	270.26	5,285.63	1.61	-356.26	2.36	0.00	0.00	0.00	0.00
5,400.00	4.66	270.26	5,385.30	1.65	-364.39	2.41	0.00	0.00	0.00	0.00
5,500.00	4.66	270.26	5,484.97	1.69	-372.51	2.47	0.00	0.00	0.00	0.00
5,600.00	4.66	270.26	5,584.64	1.72	-380.64	2.52	0.00	0.00	0.00	0.00
5,700.00	4.66	270.26	5,684.30	1.76	-388.77	2.57	0.00	0.00	0.00	0.00
5,800.00	4.66	270.26	5,783.97	1.80	-396.89	2.63	0.00	0.00	0.00	0.00
5,900.00	4.66	270.26	5,883.64	1.83	-405.02	2.68	0.00	0.00	0.00	0.00
6,000.00	4.66	270.26	5,983.31	1.87	-413.15	2.74	0.00	0.00	0.00	0.00
6,100.00	4.66	270.26	6,082.98	1.91	-421.28	2.79	0.00	0.00	0.00	0.00
6,200.00	4.66	270.26	6,182.65	1.94	-429.40	2.84	0.00	0.00	0.00	0.00
6,300.00	4.66	270.26	6,282.32	1.98	-437.53	2.90	0.00	0.00	0.00	0.00
6,400.00	4.66	270.26	6,381.99	2.02	-445.66	2.95	0.00	0.00	0.00	0.00
6,456.77	4.66	270.26	6,438.57	2.04	-450.27	2.98	0.00	0.00	0.00	0.00
<b>Top of 4-1/2" Liner @ 6456.77ft</b>										
6,500.00	4.66	270.26	6,481.66	2.05	-453.78	3.00	0.00	0.00	0.00	0.00
6,556.77	4.66	270.26	6,538.24	2.08	-458.40	3.04	0.00	0.00	0.00	0.00
<b>KoP @ 6556.77ft</b>										
6,600.00	6.37	313.02	6,581.29	3.72	-461.91	4.69	10.00	3.96	98.91	89.64
6,700.00	15.08	342.27	6,679.50	19.94	-469.95	20.92	10.00	8.70	29.25	47.05
6,800.00	24.77	349.71	6,773.42	53.02	-477.67	54.02	10.00	9.69	7.44	18.21
6,900.00	34.63	353.11	6,860.19	101.96	-484.84	102.98	10.00	9.86	3.40	11.19
7,000.00	44.55	355.14	6,937.16	165.28	-491.23	166.31	10.00	9.92	2.03	8.22
<b>DLS = 10.00/100ft</b>										
7,076.56	52.16	356.26	6,988.00	222.29	-495.48	223.32	10.00	9.94	1.46	6.65
<b>Sharon Springs</b>										
7,100.00	54.49	356.56	7,002.00	241.05	-496.66	242.09	10.00	9.95	1.26	5.91
7,193.72	63.82	357.60	7,050.00	321.32	-500.72	322.36	10.00	9.95	1.11	5.73
<b>Niobrara A</b>										
7,200.00	64.44	357.66	7,052.74	326.96	-500.96	328.01	10.00	9.96	1.00	5.20
7,286.30	73.04	358.47	7,084.00	407.27	-503.65	408.32	10.00	9.96	0.94	5.17
<b>Niobrara B</b>										
7,300.00	74.41	358.59	7,087.84	420.42	-503.99	421.47	10.00	9.96	0.88	4.87
7,400.00	84.37	359.43	7,106.23	518.57	-505.67	519.63	10.00	9.97	0.84	4.84
7,454.52	89.81	359.88	7,109.00	573.00	-506.00	574.06	10.00	9.97	0.82	4.68
<b>End Build @ 7454.52ft - Nio B TL - Heel - 7" Casing - Harris Fed 36N-E18HZ_CP</b>										
7,500.00	89.81	359.88	7,109.15	618.47	-506.10	619.53	0.00	0.00	0.00	4.66
7,600.00	89.81	359.88	7,109.49	718.47	-506.31	719.53	0.00	0.00	0.00	0.00
7,700.00	89.81	359.88	7,109.83	818.47	-506.52	819.53	0.00	0.00	0.00	0.00
7,800.00	89.81	359.88	7,110.17	918.47	-506.74	919.53	0.00	0.00	0.00	0.00
7,900.00	89.81	359.88	7,110.51	1,018.47	-506.95	1,019.53	0.00	0.00	0.00	0.00
8,000.00	89.81	359.88	7,110.85	1,118.47	-507.16	1,119.53	0.00	0.00	0.00	0.00
8,100.00	89.81	359.88	7,111.18	1,218.47	-507.38	1,219.53	0.00	0.00	0.00	0.00
8,200.00	89.81	359.88	7,111.52	1,318.47	-507.59	1,319.53	0.00	0.00	0.00	0.00
8,300.00	89.81	359.88	7,111.86	1,418.47	-507.80	1,419.53	0.00	0.00	0.00	0.00
8,400.00	89.81	359.88	7,112.20	1,518.47	-508.02	1,519.53	0.00	0.00	0.00	0.00
8,500.00	89.81	359.88	7,112.54	1,618.47	-508.23	1,619.53	0.00	0.00	0.00	0.00
8,600.00	89.81	359.88	7,112.88	1,718.47	-508.45	1,719.53	0.00	0.00	0.00	0.00
8,700.00	89.81	359.88	7,113.21	1,818.47	-508.66	1,819.53	0.00	0.00	0.00	0.00
8,800.00	89.81	359.88	7,113.55	1,918.46	-508.87	1,919.53	0.00	0.00	0.00	0.00
8,900.00	89.81	359.88	7,113.89	2,018.46	-509.09	2,019.53	0.00	0.00	0.00	0.00
9,000.00	89.81	359.88	7,114.23	2,118.46	-509.30	2,119.52	0.00	0.00	0.00	0.00
9,100.00	89.81	359.88	7,114.57	2,218.46	-509.51	2,219.52	0.00	0.00	0.00	0.00
9,200.00	89.81	359.88	7,114.91	2,318.46	-509.73	2,319.52	0.00	0.00	0.00	0.00
9,300.00	89.81	359.88	7,115.24	2,418.46	-509.94	2,419.52	0.00	0.00	0.00	0.00
9,400.00	89.81	359.88	7,115.58	2,518.46	-510.15	2,519.52	0.00	0.00	0.00	0.00

**Plan Report for Harris Federal 36N-E18HZ - 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	89.81	359.88	7,115.92	2,618.46	-510.37	2,619.52	0.00	0.00	0.00	0.00
9,600.00	89.81	359.88	7,116.26	2,718.46	-510.58	2,719.52	0.00	0.00	0.00	0.00
9,700.00	89.81	359.88	7,116.60	2,818.46	-510.79	2,819.52	0.00	0.00	0.00	0.00
9,800.00	89.81	359.88	7,116.94	2,918.46	-511.01	2,919.52	0.00	0.00	0.00	0.00
9,900.00	89.81	359.88	7,117.27	3,018.46	-511.22	3,019.52	0.00	0.00	0.00	0.00
10,000.00	89.81	359.88	7,117.61	3,118.45	-511.43	3,119.52	0.00	0.00	0.00	0.00
10,100.00	89.81	359.88	7,117.95	3,218.45	-511.65	3,219.52	0.00	0.00	0.00	0.00
10,200.00	89.81	359.88	7,118.29	3,318.45	-511.86	3,319.52	0.00	0.00	0.00	0.00
10,300.00	89.81	359.88	7,118.63	3,418.45	-512.07	3,419.52	0.00	0.00	0.00	0.00
10,400.00	89.81	359.88	7,118.97	3,518.45	-512.29	3,519.52	0.00	0.00	0.00	0.00
10,500.00	89.81	359.88	7,119.30	3,618.45	-512.50	3,619.52	0.00	0.00	0.00	0.00
10,600.00	89.81	359.88	7,119.64	3,718.45	-512.72	3,719.52	0.00	0.00	0.00	0.00
10,700.00	89.81	359.88	7,119.98	3,818.45	-512.93	3,819.52	0.00	0.00	0.00	0.00
10,800.00	89.81	359.88	7,120.32	3,918.45	-513.14	3,919.51	0.00	0.00	0.00	0.00
10,900.00	89.81	359.88	7,120.66	4,018.45	-513.36	4,019.51	0.00	0.00	0.00	0.00
11,000.00	89.81	359.88	7,121.00	4,118.45	-513.57	4,119.51	0.00	0.00	0.00	0.00
11,100.00	89.81	359.88	7,121.33	4,218.45	-513.78	4,219.51	0.00	0.00	0.00	0.00
11,200.00	89.81	359.88	7,121.67	4,318.45	-514.00	4,319.51	0.00	0.00	0.00	0.00
11,300.00	89.81	359.88	7,122.01	4,418.44	-514.21	4,419.51	0.00	0.00	0.00	0.00
11,400.00	89.81	359.88	7,122.35	4,518.44	-514.42	4,519.51	0.00	0.00	0.00	0.00
11,500.00	89.81	359.88	7,122.69	4,618.44	-514.64	4,619.51	0.00	0.00	0.00	0.00
11,600.00	89.81	359.88	7,123.03	4,718.44	-514.85	4,719.51	0.00	0.00	0.00	0.00
11,700.00	89.81	359.88	7,123.36	4,818.44	-515.06	4,819.51	0.00	0.00	0.00	0.00
11,800.00	89.81	359.88	7,123.70	4,918.44	-515.28	4,919.51	0.00	0.00	0.00	0.00
11,900.00	89.81	359.88	7,124.04	5,018.44	-515.49	5,019.51	0.00	0.00	0.00	0.00
12,000.00	89.81	359.88	7,124.38	5,118.44	-515.70	5,119.51	0.00	0.00	0.00	0.00
12,100.00	89.81	359.88	7,124.72	5,218.44	-515.92	5,219.51	0.00	0.00	0.00	0.00
12,200.00	89.81	359.88	7,125.06	5,318.44	-516.13	5,319.51	0.00	0.00	0.00	0.00
12,300.00	89.81	359.88	7,125.39	5,418.44	-516.34	5,419.51	0.00	0.00	0.00	0.00
12,400.00	89.81	359.88	7,125.73	5,518.44	-516.56	5,519.51	0.00	0.00	0.00	0.00
12,500.00	89.81	359.88	7,126.07	5,618.43	-516.77	5,619.50	0.00	0.00	0.00	0.00
12,600.00	89.81	359.88	7,126.41	5,718.43	-516.99	5,719.50	0.00	0.00	0.00	0.00
12,700.00	89.81	359.88	7,126.75	5,818.43	-517.20	5,819.50	0.00	0.00	0.00	0.00
12,800.00	89.81	359.88	7,127.09	5,918.43	-517.41	5,919.50	0.00	0.00	0.00	0.00
12,900.00	89.81	359.88	7,127.42	6,018.43	-517.63	6,019.50	0.00	0.00	0.00	0.00
13,000.00	89.81	359.88	7,127.76	6,118.43	-517.84	6,119.50	0.00	0.00	0.00	0.00
13,100.00	89.81	359.88	7,128.10	6,218.43	-518.05	6,219.50	0.00	0.00	0.00	0.00
13,200.00	89.81	359.88	7,128.44	6,318.43	-518.27	6,319.50	0.00	0.00	0.00	0.00
13,300.00	89.81	359.88	7,128.78	6,418.43	-518.48	6,419.50	0.00	0.00	0.00	0.00
13,400.00	89.81	359.88	7,129.12	6,518.43	-518.69	6,519.50	0.00	0.00	0.00	0.00
13,500.00	89.81	359.88	7,129.46	6,618.43	-518.91	6,619.50	0.00	0.00	0.00	0.00
13,600.00	89.81	359.88	7,129.79	6,718.43	-519.12	6,719.50	0.00	0.00	0.00	0.00
13,700.00	89.81	359.88	7,130.13	6,818.43	-519.33	6,819.50	0.00	0.00	0.00	0.00
13,800.00	89.81	359.88	7,130.47	6,918.42	-519.55	6,919.50	0.00	0.00	0.00	0.00
13,900.00	89.81	359.88	7,130.81	7,018.42	-519.76	7,019.50	0.00	0.00	0.00	0.00
14,000.00	89.81	359.88	7,131.15	7,118.42	-519.97	7,119.50	0.00	0.00	0.00	0.00
14,100.00	89.81	359.88	7,131.49	7,218.42	-520.19	7,219.50	0.00	0.00	0.00	0.00
14,200.00	89.81	359.88	7,131.82	7,318.42	-520.40	7,319.50	0.00	0.00	0.00	0.00
14,300.00	89.81	359.88	7,132.16	7,418.42	-520.61	7,419.49	0.00	0.00	0.00	0.00
14,400.00	89.81	359.88	7,132.50	7,518.42	-520.83	7,519.49	0.00	0.00	0.00	0.00
14,500.00	89.81	359.88	7,132.84	7,618.42	-521.04	7,619.49	0.00	0.00	0.00	0.00
14,600.00	89.81	359.88	7,133.18	7,718.42	-521.25	7,719.49	0.00	0.00	0.00	0.00
14,700.00	89.81	359.88	7,133.52	7,818.42	-521.47	7,819.49	0.00	0.00	0.00	0.00
14,800.00	89.81	359.88	7,133.85	7,918.42	-521.68	7,919.49	0.00	0.00	0.00	0.00
14,900.00	89.81	359.88	7,134.19	8,018.42	-521.90	8,019.49	0.00	0.00	0.00	0.00
15,000.00	89.81	359.88	7,134.53	8,118.41	-522.11	8,119.49	0.00	0.00	0.00	0.00
15,100.00	89.81	359.88	7,134.87	8,218.41	-522.32	8,219.49	0.00	0.00	0.00	0.00
15,200.00	89.81	359.88	7,135.21	8,318.41	-522.54	8,319.49	0.00	0.00	0.00	0.00
15,300.00	89.81	359.88	7,135.55	8,418.41	-522.75	8,419.49	0.00	0.00	0.00	0.00
15,400.00	89.81	359.88	7,135.88	8,518.41	-522.96	8,519.49	0.00	0.00	0.00	0.00

**Plan Report for Harris Federal 36N-E18HZ - 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 (°)
15,500.00	89.81	359.88	7,136.22	8,618.41	-523.18	8,619.49	0.00	0.00	0.00	0.00
15,600.00	89.81	359.88	7,136.56	8,718.41	-523.39	8,719.49	0.00	0.00	0.00	0.00
15,700.00	89.81	359.88	7,136.90	8,818.41	-523.60	8,819.49	0.00	0.00	0.00	0.00
15,800.00	89.81	359.88	7,137.24	8,918.41	-523.82	8,919.49	0.00	0.00	0.00	0.00
15,900.00	89.81	359.88	7,137.58	9,018.41	-524.03	9,019.49	0.00	0.00	0.00	0.00
16,000.00	89.81	359.88	7,137.91	9,118.41	-524.24	9,119.48	0.00	0.00	0.00	0.00
16,100.00	89.81	359.88	7,138.25	9,218.41	-524.46	9,219.48	0.00	0.00	0.00	0.00
16,200.00	89.81	359.88	7,138.59	9,318.41	-524.67	9,319.48	0.00	0.00	0.00	0.00
16,300.00	89.81	359.88	7,138.93	9,418.40	-524.88	9,419.48	0.00	0.00	0.00	0.00
16,320.96	89.81	359.88	7,139.00	9,439.36	-524.93	9,440.44	0.00	0.00	0.00	0.00
<b>Nio B TL - Toe</b>										
16,320.97	89.81	359.88	7,139.00	9,439.37	-524.93	9,440.45	0.01	0.00	0.00	0.00
<b>TD @ 16320.97ft - Harris Fed 36N-E18HZ_BHL</b>										

**Plan Annotations**

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
800.00	800.00	0.00	0.00	Begin Nudge @ 800.00ft
1,033.09	1,032.83	0.04	-9.48	End Nudge @ 1033.09ft
6,456.77	6,438.57	2.04	-450.27	Top of 4-1/2" Liner @ 6456.77ft
6,556.77	6,538.24	2.08	-458.40	KoP @ 6556.77ft
7,000.00	6,937.16	165.28	-491.23	DLS = 10.00/100ft
7,454.52	7,109.00	573.00	-506.00	End Build @ 7454.52ft
16,320.97	7,139.00	9,439.37	-524.93	TD @ 16320.97ft

**Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
User	No Target (Freehand)	359.88	Slot	0.00	0.00	0.00

**Survey tool program**

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	16,320.97	Plan A Rev 0 - PERMIT	MWD

**Casing Details**

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
569.00	569.00	9 5/8" Casing	9-5/8	13-1/2
7,454.52	7,109.00	7" Casing	7	8-3/4

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### Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,840.54	3,831.00	Parkman		0.00	
4,269.97	4,259.00	Sussex		0.00	
7,076.56	6,988.00	Sharon Springs		0.00	
7,193.72	7,050.00	Niobrara A		0.00	
7,286.30	7,084.00	Niobrara B		0.00	
7,454.52	7,109.00	Nio B TL - Heel		0.00	
16,320.96	7,139.00	Nio B TL - Toe		0.00	

### *Targets associated with this wellbore*

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Harris Fed 36N-E18HZ_Sec	0.00	0.00	0.00	Polygon
Harris Fed 36N-E18HZ_CP	7,109.00	573.00	-506.00	Point
Harris Fed 36N-E18HZ_BHL	7,139.00	9,439.38	-524.93	Point
Harris Fed 36N-E18HZ_SHL	0.00	0.00	0.00	Point



# North Reference Sheet for Sec. 19-T3N-R66W - Harris Federal 36N-E18HZ - 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 @ 4849.00ft (Drilling Rig). Northing and Easting are relative to Harris Federal 36N-E18HZ  
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: 0.99995716

Grid Coordinates of Well: 1,318,210.21 ft N, 3,190,733.85 ft E  
Geographical Coordinates of Well: 40° 12' 17.52" N, 104° 49' 01.64" W  
Grid Convergence at Surface is: 0.44°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,320.97ft  
the Bottom Hole Displacement is 9,453.96ft in the Direction of 356.82° (True).

Magnetic Convergence at surface is: -8.23° (14 May 2013, , BGGM2012)

