

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 19-T3N-R66W

Harris Federal 15N-18HZ

Plan A Rev 0

Plan: Plan A Rev 0 - PERMIT

Sperry Drilling Services

Proposal Report

14 May, 2013

Well Coordinates: 1,318,180.36 N, 3,190,736.87 E (40° 12' 17.23" N, 104° 49' 01.61" W)

Ground Level: 4,832.00 ft

Local Coordinate Origin: Centered on Well Harris Federal 15N-18HZ

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 15N-18HZ
 Wellbore: Plan A Rev 0
 Design: Plan A Rev 0 - PERMIT

Anadarko Petroleum Corp.

HALLIBURTON
 Sperry Drilling

SECTION DETAILS

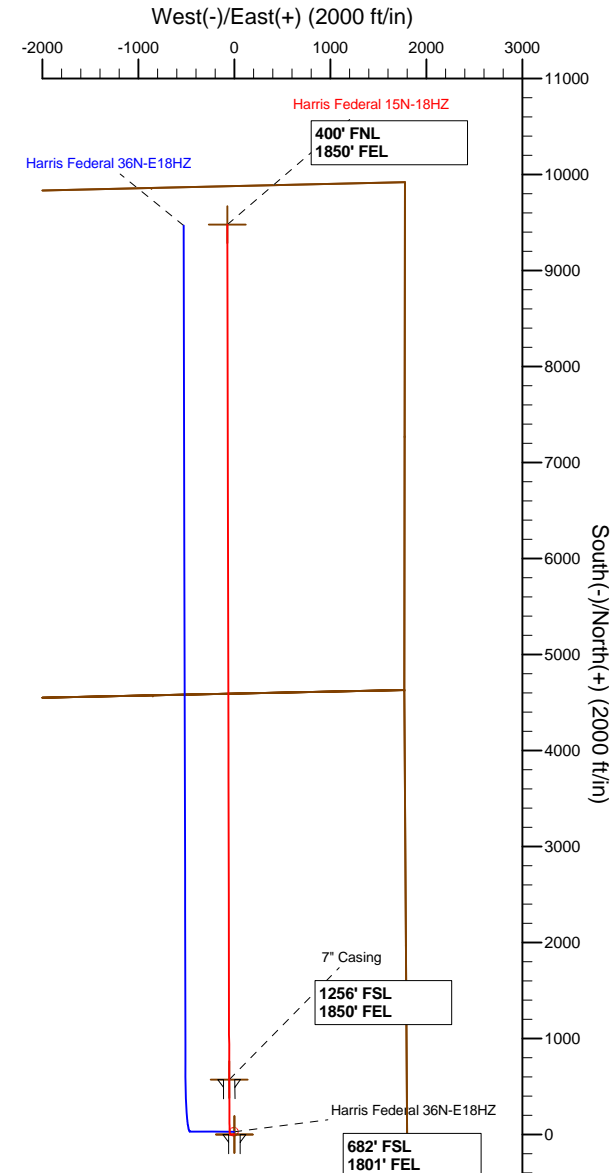
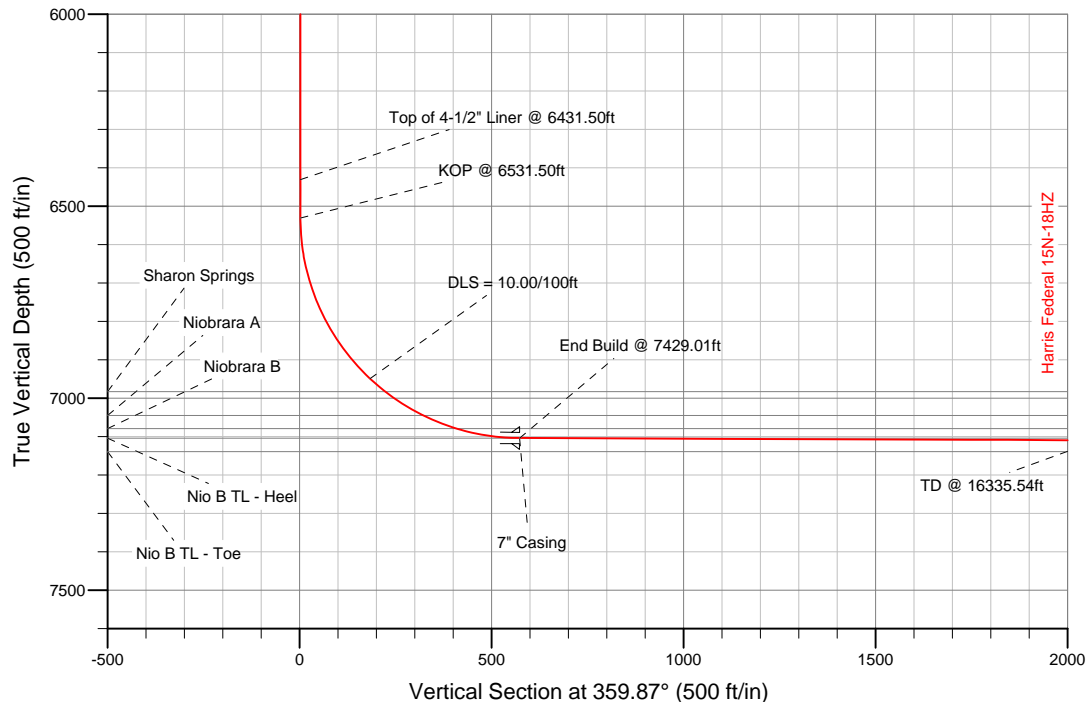
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	
3	823.59	0.47	272.81	823.59	0.00	-0.10	2.00	272.81	0.00	
4	6531.50	0.47	272.81	6531.31	2.31	-47.04	0.00	0.00	2.41	
5	7429.01	89.77	359.87	7104.00	573.00	-53.00	10.00	87.07	573.12	Harris Federal 15N-18HZ_CP
6	16335.54	89.77	359.87	7139.00	9479.45	-72.88	0.00	0.00	9479.59	Harris Federal 15N-18HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Harris Federal 15N-18HZ_Sec	0.00	0.00	0.00	40.204786	-104.817113	Polygon
Harris Federal 15N-18HZ_SHL	0.00	0.00	0.00	40.204786	-104.817113	Point
Harris Federal 15N-18HZ_CP	7104.00	573.00	-53.00	40.206359	-104.817303	Point
Harris Federal 15N-18HZ_BHL	7139.00	9479.45	-72.88	40.230807	-104.817374	Point

MD TVD

6431.50 6431.31 Top of 4-1/2" Liner @ 6431.50ft
 6531.50 6531.31 KOP @ 6531.50ft



WELL DETAILS: Harris Federal 15N-18HZ

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

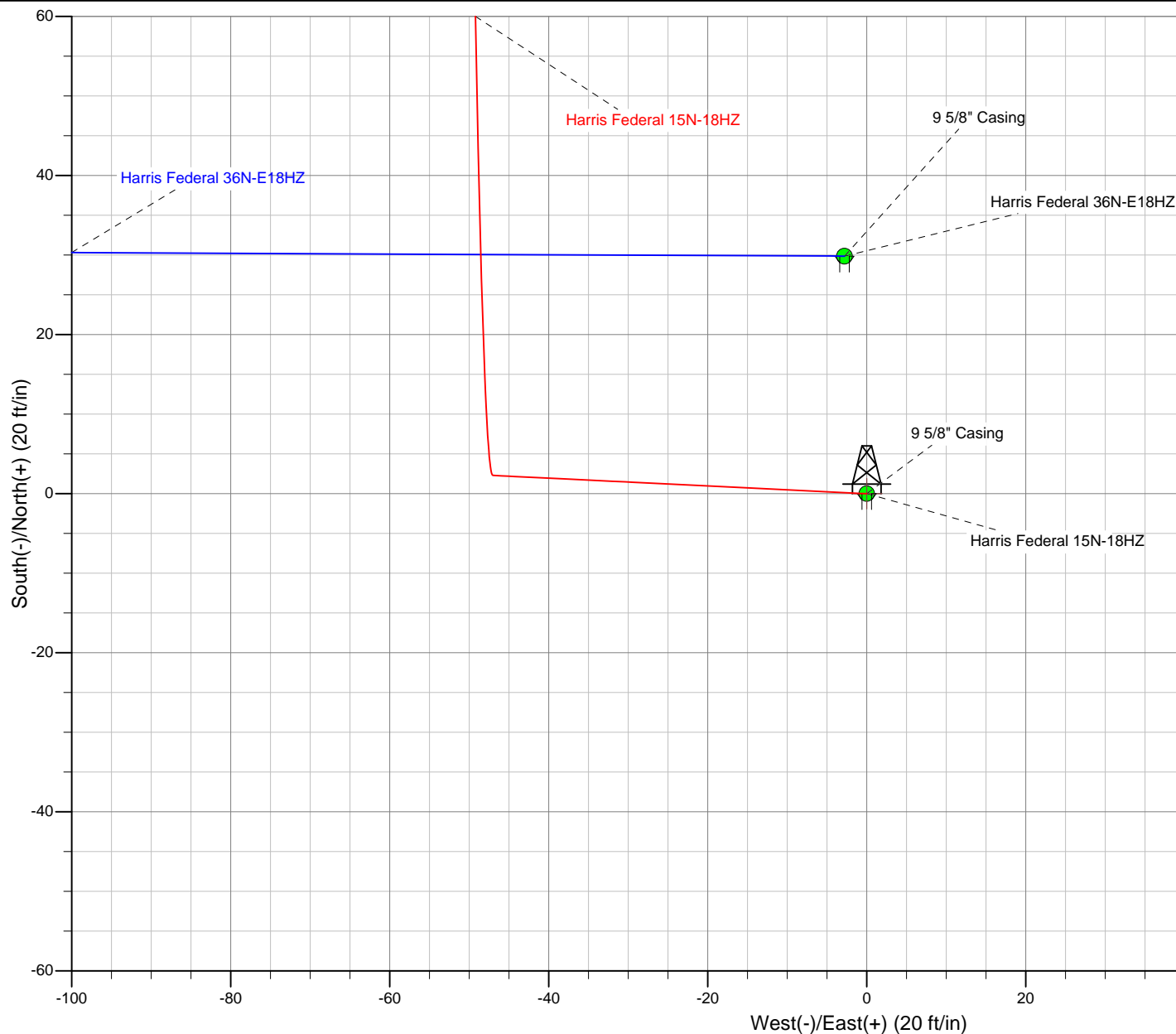
Plan: Plan A Rev 0 - PERMIT (Harris Federal 15N-18HZ/Plan A Rev 0)

Created By: Fred Hartmann Date: 05/14/2013
 Reviewed: _____ Date: _____

Project: Weld County, CO (NAD 83)
Site: Sec. 19-T3N-R66W
Well: Harris Federal 15N-18HZ
Plan A Rev 0
Plan A Rev 0 - PERMIT

Anadarko Petroleum Corp.

HALLIBURTON
Sperry Drilling



Azimuths to True North
Magnetic North: 8.67°

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

Plan Report for Harris Federal 15N-18HZ - 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
9 5/8" Casing										
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
Begin Nudge @ 800.00ft										
823.59	0.47	272.81	823.59	0.00	-0.10	0.00	2.00	2.00	0.00	272.81
End Nudge @ 823.59ft										
900.00	0.47	272.81	900.00	0.04	-0.73	0.04	0.00	0.00	0.00	0.00
1,000.00	0.47	272.81	999.99	0.08	-1.55	0.08	0.00	0.00	0.00	0.00
1,100.00	0.47	272.81	1,099.99	0.12	-2.37	0.12	0.00	0.00	0.00	0.00
1,200.00	0.47	272.81	1,199.99	0.16	-3.19	0.16	0.00	0.00	0.00	0.00
1,300.00	0.47	272.81	1,299.98	0.20	-4.01	0.21	0.00	0.00	0.00	0.00
1,400.00	0.47	272.81	1,399.98	0.24	-4.84	0.25	0.00	0.00	0.00	0.00
1,500.00	0.47	272.81	1,499.98	0.28	-5.66	0.29	0.00	0.00	0.00	0.00
1,600.00	0.47	272.81	1,599.97	0.32	-6.48	0.33	0.00	0.00	0.00	0.00
1,700.00	0.47	272.81	1,699.97	0.36	-7.30	0.37	0.00	0.00	0.00	0.00
1,800.00	0.47	272.81	1,799.97	0.40	-8.13	0.42	0.00	0.00	0.00	0.00
1,900.00	0.47	272.81	1,899.96	0.44	-8.95	0.46	0.00	0.00	0.00	0.00
2,000.00	0.47	272.81	1,999.96	0.48	-9.77	0.50	0.00	0.00	0.00	0.00
2,100.00	0.47	272.81	2,099.96	0.52	-10.59	0.54	0.00	0.00	0.00	0.00
2,200.00	0.47	272.81	2,199.95	0.56	-11.42	0.59	0.00	0.00	0.00	0.00
2,300.00	0.47	272.81	2,299.95	0.60	-12.24	0.63	0.00	0.00	0.00	0.00
2,400.00	0.47	272.81	2,399.95	0.64	-13.06	0.67	0.00	0.00	0.00	0.00
2,500.00	0.47	272.81	2,499.94	0.68	-13.88	0.71	0.00	0.00	0.00	0.00
2,600.00	0.47	272.81	2,599.94	0.72	-14.71	0.75	0.00	0.00	0.00	0.00
2,700.00	0.47	272.81	2,699.94	0.76	-15.53	0.80	0.00	0.00	0.00	0.00
2,800.00	0.47	272.81	2,799.93	0.80	-16.35	0.84	0.00	0.00	0.00	0.00
2,900.00	0.47	272.81	2,899.93	0.84	-17.17	0.88	0.00	0.00	0.00	0.00
3,000.00	0.47	272.81	2,999.93	0.88	-17.99	0.92	0.00	0.00	0.00	0.00
3,100.00	0.47	272.81	3,099.92	0.92	-18.82	0.97	0.00	0.00	0.00	0.00
3,200.00	0.47	272.81	3,199.92	0.96	-19.64	1.01	0.00	0.00	0.00	0.00
3,300.00	0.47	272.81	3,299.92	1.00	-20.46	1.05	0.00	0.00	0.00	0.00
3,400.00	0.47	272.81	3,399.91	1.04	-21.28	1.09	0.00	0.00	0.00	0.00
3,500.00	0.47	272.81	3,499.91	1.08	-22.11	1.13	0.00	0.00	0.00	0.00
3,600.00	0.47	272.81	3,599.91	1.12	-22.93	1.18	0.00	0.00	0.00	0.00
3,700.00	0.47	272.81	3,699.90	1.16	-23.75	1.22	0.00	0.00	0.00	0.00
3,800.00	0.47	272.81	3,799.90	1.20	-24.57	1.26	0.00	0.00	0.00	0.00
3,826.10	0.47	272.81	3,826.00	1.22	-24.79	1.27	0.00	0.00	0.00	0.00
Parkman										
3,900.00	0.47	272.81	3,899.90	1.24	-25.40	1.30	0.00	0.00	0.00	0.00
4,000.00	0.47	272.81	3,999.89	1.29	-26.22	1.34	0.00	0.00	0.00	0.00
4,100.00	0.47	272.81	4,099.89	1.33	-27.04	1.39	0.00	0.00	0.00	0.00
4,200.00	0.47	272.81	4,199.89	1.37	-27.86	1.43	0.00	0.00	0.00	0.00
4,254.12	0.47	272.81	4,254.00	1.39	-28.31	1.45	0.00	0.00	0.00	0.00
Sussex										
4,300.00	0.47	272.81	4,299.88	1.41	-28.69	1.47	0.00	0.00	0.00	0.00
4,400.00	0.47	272.81	4,399.88	1.45	-29.51	1.51	0.00	0.00	0.00	0.00
4,500.00	0.47	272.81	4,499.88	1.49	-30.33	1.56	0.00	0.00	0.00	0.00
4,600.00	0.47	272.81	4,599.87	1.53	-31.15	1.60	0.00	0.00	0.00	0.00
4,700.00	0.47	272.81	4,699.87	1.57	-31.97	1.64	0.00	0.00	0.00	0.00
4,800.00	0.47	272.81	4,799.86	1.61	-32.80	1.68	0.00	0.00	0.00	0.00

Plan Report for Harris Federal 15N-18HZ - 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	0.47	272.81	4,899.86	1.65	-33.62	1.72	0.00	0.00	0.00	0.00
5,000.00	0.47	272.81	4,999.86	1.69	-34.44	1.77	0.00	0.00	0.00	0.00
5,100.00	0.47	272.81	5,099.85	1.73	-35.26	1.81	0.00	0.00	0.00	0.00
5,200.00	0.47	272.81	5,199.85	1.77	-36.09	1.85	0.00	0.00	0.00	0.00
5,300.00	0.47	272.81	5,299.85	1.81	-36.91	1.89	0.00	0.00	0.00	0.00
5,400.00	0.47	272.81	5,399.84	1.85	-37.73	1.94	0.00	0.00	0.00	0.00
5,500.00	0.47	272.81	5,499.84	1.89	-38.55	1.98	0.00	0.00	0.00	0.00
5,600.00	0.47	272.81	5,599.84	1.93	-39.38	2.02	0.00	0.00	0.00	0.00
5,700.00	0.47	272.81	5,699.83	1.97	-40.20	2.06	0.00	0.00	0.00	0.00
5,800.00	0.47	272.81	5,799.83	2.01	-41.02	2.10	0.00	0.00	0.00	0.00
5,900.00	0.47	272.81	5,899.83	2.05	-41.84	2.15	0.00	0.00	0.00	0.00
6,000.00	0.47	272.81	5,999.82	2.09	-42.66	2.19	0.00	0.00	0.00	0.00
6,100.00	0.47	272.81	6,099.82	2.13	-43.49	2.23	0.00	0.00	0.00	0.00
6,200.00	0.47	272.81	6,199.82	2.17	-44.31	2.27	0.00	0.00	0.00	0.00
6,300.00	0.47	272.81	6,299.81	2.21	-45.13	2.31	0.00	0.00	0.00	0.00
6,400.00	0.47	272.81	6,399.81	2.25	-45.95	2.36	0.00	0.00	0.00	0.00
6,431.50	0.47	272.81	6,431.31	2.27	-46.21	2.37	0.00	0.00	0.00	0.00
Top of 4-1/2" Liner @ 6431.50ft										
6,500.00	0.47	272.81	6,499.81	2.29	-46.78	2.40	0.00	0.00	0.00	0.00
6,531.50	0.47	272.81	6,531.31	2.31	-47.04	2.41	0.00	0.00	0.00	0.00
KOP @ 6531.50ft										
6,600.00	6.89	355.97	6,599.64	6.42	-47.61	6.53	10.00	9.37	121.41	87.07
6,700.00	16.88	358.32	6,697.37	26.97	-48.46	27.08	10.00	9.99	2.35	3.93
6,800.00	26.88	358.94	6,790.05	64.18	-49.30	64.29	10.00	10.00	0.62	1.62
6,900.00	36.88	359.25	6,874.86	116.92	-50.11	117.03	10.00	10.00	0.30	1.04
7,000.00	46.88	359.43	6,949.23	183.58	-50.87	183.69	10.00	10.00	0.19	0.79
DLS = 10.00/100ft										
7,052.00	52.08	359.51	6,983.00	223.09	-51.24	223.20	10.00	10.00	0.14	0.65
Sharon Springs										
7,100.00	56.88	359.57	7,010.89	262.14	-51.55	262.26	10.00	10.00	0.12	0.60
7,168.94	63.77	359.64	7,045.00	322.01	-51.96	322.12	10.00	10.00	0.11	0.56
Niobrara A										
7,200.00	66.87	359.67	7,057.97	350.22	-52.13	350.34	10.00	10.00	0.10	0.53
7,261.36	73.01	359.73	7,079.00	407.83	-52.43	407.95	10.00	10.00	0.09	0.51
Niobrara B										
7,300.00	76.87	359.76	7,089.04	445.14	-52.60	445.26	10.00	10.00	0.09	0.49
7,400.00	86.87	359.85	7,103.15	544.01	-52.93	544.13	10.00	10.00	0.08	0.48
7,429.01	89.77	359.87	7,104.00	573.00	-53.00	573.12	10.00	10.00	0.08	0.47
End Build @ 7429.01ft - Nio B TL - Heel - 7" Casing - Harris Federal 15N-18HZ_CP										
7,500.00	89.77	359.87	7,104.28	643.99	-53.16	644.11	0.00	0.00	0.00	0.47
7,600.00	89.77	359.87	7,104.67	743.99	-53.38	744.11	0.00	0.00	0.00	0.00
7,700.00	89.77	359.87	7,105.06	843.99	-53.60	844.11	0.00	0.00	0.00	0.00
7,800.00	89.77	359.87	7,105.46	943.99	-53.83	944.11	0.00	0.00	0.00	0.00
7,900.00	89.77	359.87	7,105.85	1,043.99	-54.05	1,044.11	0.00	0.00	0.00	0.00
8,000.00	89.77	359.87	7,106.24	1,143.99	-54.27	1,144.11	0.00	0.00	0.00	0.00
8,100.00	89.77	359.87	7,106.64	1,243.99	-54.50	1,244.11	0.00	0.00	0.00	0.00
8,200.00	89.77	359.87	7,107.03	1,343.98	-54.72	1,344.10	0.00	0.00	0.00	0.00
8,300.00	89.77	359.87	7,107.42	1,443.98	-54.94	1,444.10	0.00	0.00	0.00	0.00
8,400.00	89.77	359.87	7,107.82	1,543.98	-55.17	1,544.10	0.00	0.00	0.00	0.00
8,500.00	89.77	359.87	7,108.21	1,643.98	-55.39	1,644.10	0.00	0.00	0.00	0.00
8,600.00	89.77	359.87	7,108.60	1,743.98	-55.61	1,744.10	0.00	0.00	0.00	0.00
8,700.00	89.77	359.87	7,108.99	1,843.98	-55.84	1,844.10	0.00	0.00	0.00	0.00
8,800.00	89.77	359.87	7,109.39	1,943.98	-56.06	1,944.10	0.00	0.00	0.00	0.00
8,900.00	89.77	359.87	7,109.78	2,043.98	-56.28	2,044.10	0.00	0.00	0.00	0.00
9,000.00	89.77	359.87	7,110.17	2,143.98	-56.51	2,144.10	0.00	0.00	0.00	0.00
9,100.00	89.77	359.87	7,110.57	2,243.97	-56.73	2,244.10	0.00	0.00	0.00	0.00
9,200.00	89.77	359.87	7,110.96	2,343.97	-56.95	2,344.10	0.00	0.00	0.00	0.00
9,300.00	89.77	359.87	7,111.35	2,443.97	-57.18	2,444.10	0.00	0.00	0.00	0.00
9,400.00	89.77	359.87	7,111.75	2,543.97	-57.40	2,544.10	0.00	0.00	0.00	0.00

Plan Report for Harris Federal 15N-18HZ - 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	89.77	359.87	7,112.14	2,643.97	-57.62	2,644.09	0.00	0.00	0.00	0.00
9,600.00	89.77	359.87	7,112.53	2,743.97	-57.84	2,744.09	0.00	0.00	0.00	0.00
9,700.00	89.77	359.87	7,112.92	2,843.97	-58.07	2,844.09	0.00	0.00	0.00	0.00
9,800.00	89.77	359.87	7,113.32	2,943.97	-58.29	2,944.09	0.00	0.00	0.00	0.00
9,900.00	89.77	359.87	7,113.71	3,043.97	-58.51	3,044.09	0.00	0.00	0.00	0.00
10,000.00	89.77	359.87	7,114.10	3,143.97	-58.74	3,144.09	0.00	0.00	0.00	0.00
10,100.00	89.77	359.87	7,114.50	3,243.96	-58.96	3,244.09	0.00	0.00	0.00	0.00
10,200.00	89.77	359.87	7,114.89	3,343.96	-59.18	3,344.09	0.00	0.00	0.00	0.00
10,300.00	89.77	359.87	7,115.28	3,443.96	-59.41	3,444.09	0.00	0.00	0.00	0.00
10,400.00	89.77	359.87	7,115.68	3,543.96	-59.63	3,544.09	0.00	0.00	0.00	0.00
10,500.00	89.77	359.87	7,116.07	3,643.96	-59.85	3,644.09	0.00	0.00	0.00	0.00
10,600.00	89.77	359.87	7,116.46	3,743.96	-60.08	3,744.09	0.00	0.00	0.00	0.00
10,700.00	89.77	359.87	7,116.85	3,843.96	-60.30	3,844.09	0.00	0.00	0.00	0.00
10,800.00	89.77	359.87	7,117.25	3,943.96	-60.52	3,944.08	0.00	0.00	0.00	0.00
10,900.00	89.77	359.87	7,117.64	4,043.96	-60.75	4,044.08	0.00	0.00	0.00	0.00
11,000.00	89.77	359.87	7,118.03	4,143.96	-60.97	4,144.08	0.00	0.00	0.00	0.00
11,100.00	89.77	359.87	7,118.43	4,243.95	-61.19	4,244.08	0.00	0.00	0.00	0.00
11,200.00	89.77	359.87	7,118.82	4,343.95	-61.42	4,344.08	0.00	0.00	0.00	0.00
11,300.00	89.77	359.87	7,119.21	4,443.95	-61.64	4,444.08	0.00	0.00	0.00	0.00
11,400.00	89.77	359.87	7,119.60	4,543.95	-61.86	4,544.08	0.00	0.00	0.00	0.00
11,500.00	89.77	359.87	7,120.00	4,643.95	-62.08	4,644.08	0.00	0.00	0.00	0.00
11,600.00	89.77	359.87	7,120.39	4,743.95	-62.31	4,744.08	0.00	0.00	0.00	0.00
11,700.00	89.77	359.87	7,120.78	4,843.95	-62.53	4,844.08	0.00	0.00	0.00	0.00
11,800.00	89.77	359.87	7,121.18	4,943.95	-62.75	4,944.08	0.00	0.00	0.00	0.00
11,900.00	89.77	359.87	7,121.57	5,043.95	-62.98	5,044.08	0.00	0.00	0.00	0.00
12,000.00	89.77	359.87	7,121.96	5,143.95	-63.20	5,144.08	0.00	0.00	0.00	0.00
12,100.00	89.77	359.87	7,122.36	5,243.94	-63.42	5,244.07	0.00	0.00	0.00	0.00
12,200.00	89.77	359.87	7,122.75	5,343.94	-63.65	5,344.07	0.00	0.00	0.00	0.00
12,300.00	89.77	359.87	7,123.14	5,443.94	-63.87	5,444.07	0.00	0.00	0.00	0.00
12,400.00	89.77	359.87	7,123.53	5,543.94	-64.09	5,544.07	0.00	0.00	0.00	0.00
12,500.00	89.77	359.87	7,123.93	5,643.94	-64.32	5,644.07	0.00	0.00	0.00	0.00
12,600.00	89.77	359.87	7,124.32	5,743.94	-64.54	5,744.07	0.00	0.00	0.00	0.00
12,700.00	89.77	359.87	7,124.71	5,843.94	-64.76	5,844.07	0.00	0.00	0.00	0.00
12,800.00	89.77	359.87	7,125.11	5,943.94	-64.99	5,944.07	0.00	0.00	0.00	0.00
12,900.00	89.77	359.87	7,125.50	6,043.94	-65.21	6,044.07	0.00	0.00	0.00	0.00
13,000.00	89.77	359.87	7,125.89	6,143.94	-65.43	6,144.07	0.00	0.00	0.00	0.00
13,100.00	89.77	359.87	7,126.29	6,243.93	-65.66	6,244.07	0.00	0.00	0.00	0.00
13,200.00	89.77	359.87	7,126.68	6,343.93	-65.88	6,344.07	0.00	0.00	0.00	0.00
13,300.00	89.77	359.87	7,127.07	6,443.93	-66.10	6,444.07	0.00	0.00	0.00	0.00
13,400.00	89.77	359.87	7,127.46	6,543.93	-66.32	6,544.06	0.00	0.00	0.00	0.00
13,500.00	89.77	359.87	7,127.86	6,643.93	-66.55	6,644.06	0.00	0.00	0.00	0.00
13,600.00	89.77	359.87	7,128.25	6,743.93	-66.77	6,744.06	0.00	0.00	0.00	0.00
13,700.00	89.77	359.87	7,128.64	6,843.93	-66.99	6,844.06	0.00	0.00	0.00	0.00
13,800.00	89.77	359.87	7,129.04	6,943.93	-67.22	6,944.06	0.00	0.00	0.00	0.00
13,900.00	89.77	359.87	7,129.43	7,043.93	-67.44	7,044.06	0.00	0.00	0.00	0.00
14,000.00	89.77	359.87	7,129.82	7,143.92	-67.66	7,144.06	0.00	0.00	0.00	0.00
14,100.00	89.77	359.87	7,130.21	7,243.92	-67.89	7,244.06	0.00	0.00	0.00	0.00
14,200.00	89.77	359.87	7,130.61	7,343.92	-68.11	7,344.06	0.00	0.00	0.00	0.00
14,300.00	89.77	359.87	7,131.00	7,443.92	-68.33	7,444.06	0.00	0.00	0.00	0.00
14,400.00	89.77	359.87	7,131.39	7,543.92	-68.56	7,544.06	0.00	0.00	0.00	0.00
14,500.00	89.77	359.87	7,131.79	7,643.92	-68.78	7,644.06	0.00	0.00	0.00	0.00
14,600.00	89.77	359.87	7,132.18	7,743.92	-69.00	7,744.06	0.00	0.00	0.00	0.00
14,700.00	89.77	359.87	7,132.57	7,843.92	-69.23	7,844.05	0.00	0.00	0.00	0.00
14,800.00	89.77	359.87	7,132.97	7,943.92	-69.45	7,944.05	0.00	0.00	0.00	0.00
14,900.00	89.77	359.87	7,133.36	8,043.92	-69.67	8,044.05	0.00	0.00	0.00	0.00
15,000.00	89.77	359.87	7,133.75	8,143.91	-69.90	8,144.05	0.00	0.00	0.00	0.00
15,100.00	89.77	359.87	7,134.14	8,243.91	-70.12	8,244.05	0.00	0.00	0.00	0.00
15,200.00	89.77	359.87	7,134.54	8,343.91	-70.34	8,344.05	0.00	0.00	0.00	0.00
15,300.00	89.77	359.87	7,134.93	8,443.91	-70.56	8,444.05	0.00	0.00	0.00	0.00
15,400.00	89.77	359.87	7,135.32	8,543.91	-70.79	8,544.05	0.00	0.00	0.00	0.00

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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	89.77	359.87	7,135.72	8,643.91	-71.01	8,644.05	0.00	0.00	0.00	0.00
15,600.00	89.77	359.87	7,136.11	8,743.91	-71.23	8,744.05	0.00	0.00	0.00	0.00
15,700.00	89.77	359.87	7,136.50	8,843.91	-71.46	8,844.05	0.00	0.00	0.00	0.00
15,800.00	89.77	359.87	7,136.90	8,943.91	-71.68	8,944.05	0.00	0.00	0.00	0.00
15,900.00	89.77	359.87	7,137.29	9,043.91	-71.90	9,044.05	0.00	0.00	0.00	0.00
16,000.00	89.77	359.87	7,137.68	9,143.90	-72.13	9,144.04	0.00	0.00	0.00	0.00
16,100.00	89.77	359.87	7,138.07	9,243.90	-72.35	9,244.04	0.00	0.00	0.00	0.00
16,200.00	89.77	359.87	7,138.47	9,343.90	-72.57	9,344.04	0.00	0.00	0.00	0.00
16,300.00	89.77	359.87	7,138.86	9,443.90	-72.80	9,444.04	0.00	0.00	0.00	0.00
16,335.54	89.77	359.87	7,139.00	9,479.44	-72.88	9,479.58	0.00	0.00	0.00	0.00

TD @ 16335.54ft - Harris Federal 15N-18HZ_BHL

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
823.59	823.59	0.00	-0.10	End Nudge @ 823.59ft
6,431.50	6,431.31	2.27	-46.21	Top of 4-1/2" Liner @ 6431.50ft
6,531.50	6,531.31	2.31	-47.04	KOP @ 6531.50ft
7,000.00	6,949.23	183.58	-50.87	DLS = 10.00/100ft
7,429.01	7,104.00	573.00	-53.00	End Build @ 7429.01ft
16,335.54	7,139.00	9,479.44	-72.88	TD @ 16335.54ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (ft)
				+N/-S (ft)	+E/-W (ft)	
User	No Target (Freehand)	359.87	Slot	0.00	0.00	0.00

Survey tool program

From (ft)	To (ft)	Survey/Plan	Survey Tool
0.00	16,335.54	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
7,429.01	7,104.00	7" Casing	7	8-3/4

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Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,826.10	3,826.00	Parkman		0.00	
4,254.12	4,254.00	Sussex		0.00	
7,052.00	6,983.00	Sharon Springs		0.00	
7,168.94	7,045.00	Niobrara A		0.00	
7,261.36	7,079.00	Niobrara B		0.00	
7,429.01	7,104.00	Nio B TL - Heel		0.00	
16,335.54	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 Federal 15N-18HZ_Sec	0.00	0.00	0.00	Polygon
Harris Federal 15N-18HZ_BHL	7,139.00	9,479.45	-72.88	Point
Harris Federal 15N-18HZ_CP	7,104.00	573.00	-53.00	Point
Harris Federal 15N-18HZ_SHL	0.00	0.00	0.00	Point

North Reference Sheet for Sec. 19-T3N-R66W - Harris Federal 15N-18HZ - 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 15N-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: 0.99995717

Grid Coordinates of Well: 1,318,180.36 ft N, 3,190,736.87 ft E
Geographical Coordinates of Well: 40° 12' 17.23" N, 104° 49' 01.61" W
Grid Convergence at Surface is: 0.44°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,335.54ft
the Bottom Hole Displacement is 9,479.72ft in the Direction of 359.56° (True).

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

