

Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 19-T3N-R66W

Harris 38N-18HZ

Plan A Rev 0

Plan: Plan A Rev 0 - PERMIT

Sperry Drilling Services

Proposal Report

14 May, 2013

Well Coordinates: 1,318,398.88 N, 3,191,673.70 E (40° 12' 19.32" N, 104° 48' 49.51" W)

Ground Level: 4,867.00 ft

Local Coordinate Origin:

Centered on Well Harris 38N-18HZ

Viewing Datum:

RKB=17 @ 4884.00ft (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. 19-T3N-R66W
Well: Harris 38N-18HZ
Wellbore: Plan A Rev 0
Design: Plan A Rev 0 - PERMIT

Anadarko Petroleum Corp.

HALLIBURTON
Sperry Drilling

SECTION DETAILS

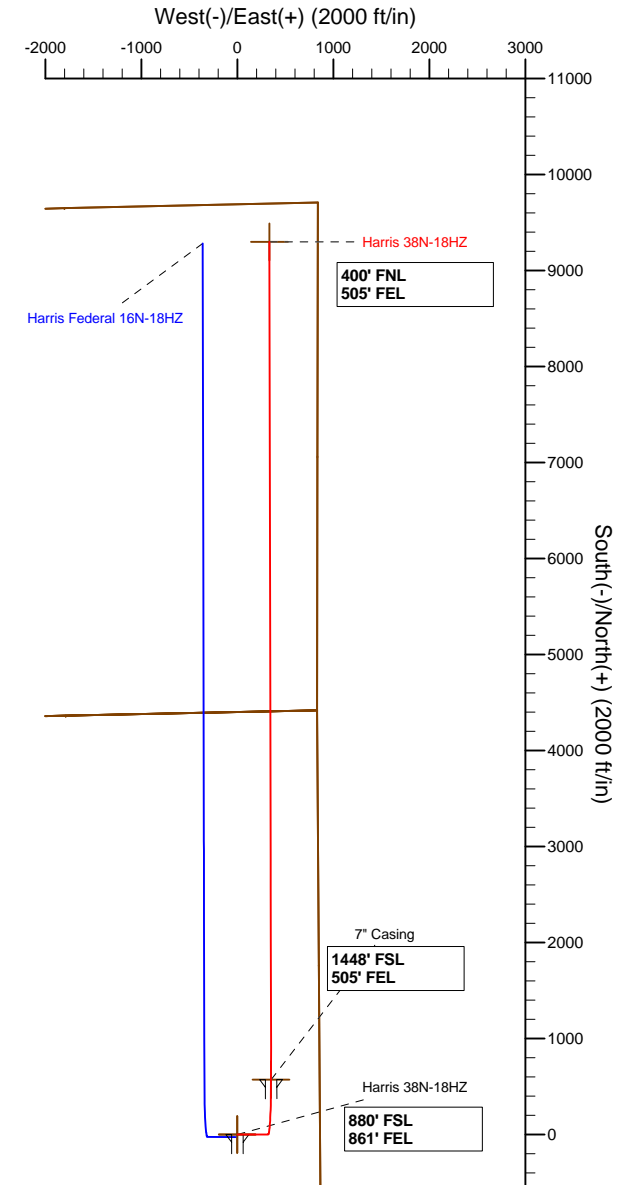
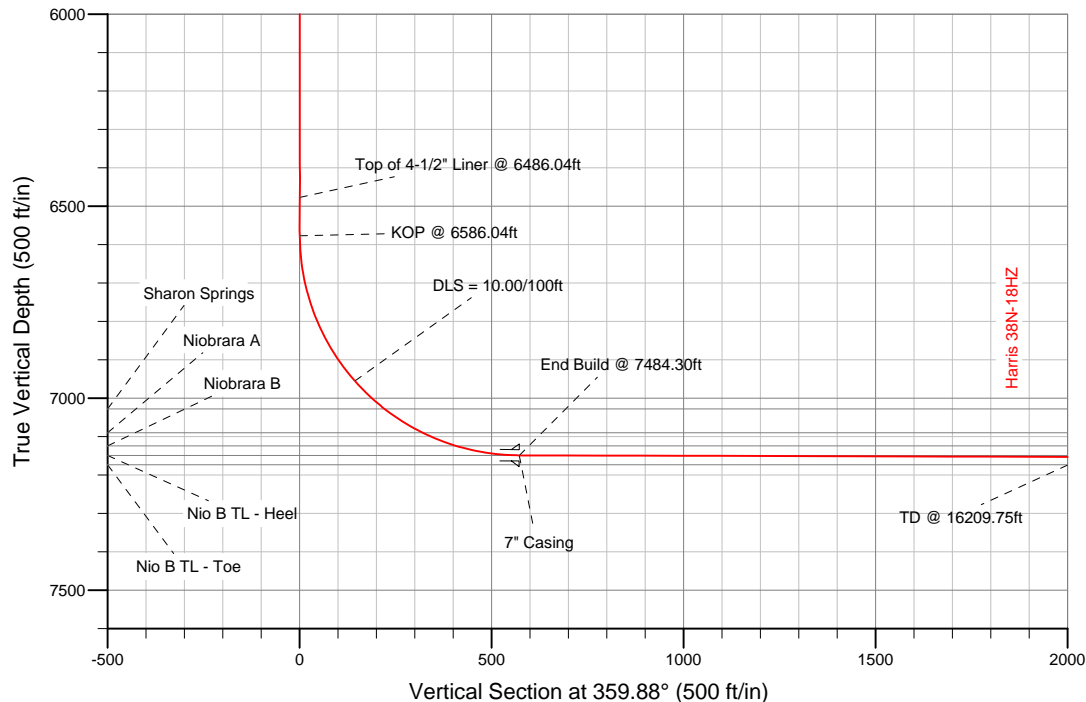
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	
3	961.28	3.23	89.71	961.19	0.02	4.54	2.00	89.71	0.01	
4	6586.04	3.23	89.71	6577.04	1.62	321.02	0.00	0.00	0.95	
5	7484.30	89.84	359.88	7149.00	573.00	352.00	10.00	-89.84	572.27	Harris 38N-18HZ_CP
6	16209.75	89.84	359.88	7174.00	9298.40	334.22	0.00	0.00	9297.67	Harris 38N-18HZ_BHL

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
Harris 38N-18HZ_Sec	0.00	0.00	0.00	40.205366	-104.813753	Polygon
Harris 38N-18HZ_SHL	0.00	0.00	0.00	40.205366	-104.813753	Point
Harris 38N-18HZ_CP	7149.00	573.00	352.00	40.206939	-104.812493	Point
Harris 38N-18HZ_BHL	7174.00	9298.40	334.22	40.230890	-104.812556	Point

MD TVD

6486.04 6477.20 Top of 4-1/2" Liner @ 6486.04ft
6586.04 6577.04 KOP @ 6586.04ft



WELL DETAILS: Harris 38N-18HZ

Ground Level: 4867.00
RKB=17 @ 4884.00ft (Drilling Rig)

Plan: Plan A Rev 0 - PERMIT (Harris 38N-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 38N-18HZ
Plan A Rev 0
Plan A Rev 0 - PERMIT

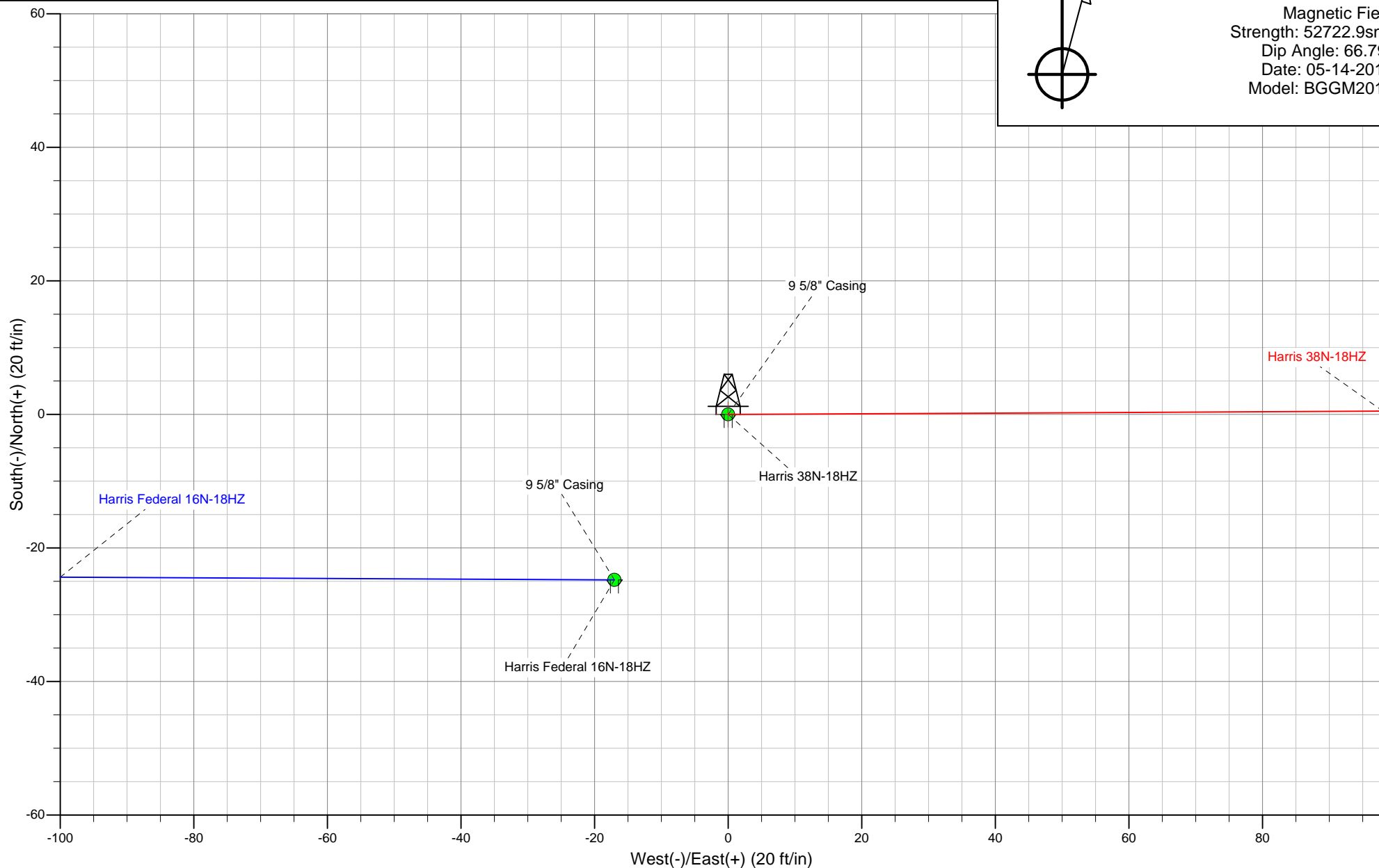
Anadarko Petroleum Corp.

HALLIBURTON
Sperry Drilling



Azimuths to True North
Magnetic North: 8.67°

Magnetic Field
Strength: 52722.9snT
Dip Angle: 66.79°
Date: 05-14-2013
Model: BGGM2012



Plan Report for Harris 38N-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
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
604.00	0.00	0.00	604.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8" Casing										
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										
900.00	2.00	89.71	899.98	0.01	1.75	0.01	2.00	2.00	0.00	89.71
961.28	3.23	89.71	961.19	0.02	4.54	0.01	2.00	2.00	0.00	0.00
End Nudge @ 961.28ft										
1,000.00	3.23	89.71	999.85	0.03	6.72	0.02	0.00	0.00	0.00	0.00
1,100.00	3.23	89.71	1,099.70	0.06	12.34	0.04	0.00	0.00	0.00	0.00
1,200.00	3.23	89.71	1,199.54	0.09	17.97	0.05	0.00	0.00	0.00	0.00
1,300.00	3.23	89.71	1,299.38	0.12	23.60	0.07	0.00	0.00	0.00	0.00
1,400.00	3.23	89.71	1,399.22	0.15	29.22	0.09	0.00	0.00	0.00	0.00
1,500.00	3.23	89.71	1,499.06	0.18	34.85	0.10	0.00	0.00	0.00	0.00
1,600.00	3.23	89.71	1,598.90	0.20	40.48	0.12	0.00	0.00	0.00	0.00
1,700.00	3.23	89.71	1,698.74	0.23	46.10	0.14	0.00	0.00	0.00	0.00
1,800.00	3.23	89.71	1,798.59	0.26	51.73	0.15	0.00	0.00	0.00	0.00
1,900.00	3.23	89.71	1,898.43	0.29	57.36	0.17	0.00	0.00	0.00	0.00
2,000.00	3.23	89.71	1,998.27	0.32	62.98	0.19	0.00	0.00	0.00	0.00
2,100.00	3.23	89.71	2,098.11	0.35	68.61	0.20	0.00	0.00	0.00	0.00
2,200.00	3.23	89.71	2,197.95	0.37	74.24	0.22	0.00	0.00	0.00	0.00
2,300.00	3.23	89.71	2,297.79	0.40	79.86	0.24	0.00	0.00	0.00	0.00
2,400.00	3.23	89.71	2,397.64	0.43	85.49	0.25	0.00	0.00	0.00	0.00
2,500.00	3.23	89.71	2,497.48	0.46	91.12	0.27	0.00	0.00	0.00	0.00
2,600.00	3.23	89.71	2,597.32	0.49	96.74	0.29	0.00	0.00	0.00	0.00
2,700.00	3.23	89.71	2,697.16	0.52	102.37	0.30	0.00	0.00	0.00	0.00
2,800.00	3.23	89.71	2,797.00	0.55	108.00	0.32	0.00	0.00	0.00	0.00
2,900.00	3.23	89.71	2,896.84	0.57	113.62	0.34	0.00	0.00	0.00	0.00
3,000.00	3.23	89.71	2,996.68	0.60	119.25	0.35	0.00	0.00	0.00	0.00
3,100.00	3.23	89.71	3,096.53	0.63	124.88	0.37	0.00	0.00	0.00	0.00
3,200.00	3.23	89.71	3,196.37	0.66	130.50	0.39	0.00	0.00	0.00	0.00
3,300.00	3.23	89.71	3,296.21	0.69	136.13	0.40	0.00	0.00	0.00	0.00
3,400.00	3.23	89.71	3,396.05	0.72	141.76	0.42	0.00	0.00	0.00	0.00
3,500.00	3.23	89.71	3,495.89	0.74	147.38	0.44	0.00	0.00	0.00	0.00
3,600.00	3.23	89.71	3,595.73	0.77	153.01	0.45	0.00	0.00	0.00	0.00
3,700.00	3.23	89.71	3,695.58	0.80	158.64	0.47	0.00	0.00	0.00	0.00
3,800.00	3.23	89.71	3,795.42	0.83	164.26	0.49	0.00	0.00	0.00	0.00
3,875.70	3.23	89.71	3,871.00	0.85	168.52	0.50	0.00	0.00	0.00	0.00
Parkman										
3,900.00	3.23	89.71	3,895.26	0.86	169.89	0.50	0.00	0.00	0.00	0.00
4,000.00	3.23	89.71	3,995.10	0.89	175.52	0.52	0.00	0.00	0.00	0.00
4,100.00	3.23	89.71	4,094.94	0.91	181.14	0.54	0.00	0.00	0.00	0.00
4,200.00	3.23	89.71	4,194.78	0.94	186.77	0.55	0.00	0.00	0.00	0.00
4,300.00	3.23	89.71	4,294.63	0.97	192.40	0.57	0.00	0.00	0.00	0.00
4,304.38	3.23	89.71	4,299.00	0.97	192.64	0.57	0.00	0.00	0.00	0.00
Sussex										
4,400.00	3.23	89.71	4,394.47	1.00	198.02	0.59	0.00	0.00	0.00	0.00
4,500.00	3.23	89.71	4,494.31	1.03	203.65	0.60	0.00	0.00	0.00	0.00
4,600.00	3.23	89.71	4,594.15	1.06	209.28	0.62	0.00	0.00	0.00	0.00
4,700.00	3.23	89.71	4,693.99	1.09	214.90	0.64	0.00	0.00	0.00	0.00
4,800.00	3.23	89.71	4,793.83	1.11	220.53	0.65	0.00	0.00	0.00	0.00

Plan Report for Harris 38N-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	3.23	89.71	4,893.67	1.14	226.16	0.67	0.00	0.00	0.00	0.00
5,000.00	3.23	89.71	4,993.52	1.17	231.78	0.69	0.00	0.00	0.00	0.00
5,100.00	3.23	89.71	5,093.36	1.20	237.41	0.70	0.00	0.00	0.00	0.00
5,200.00	3.23	89.71	5,193.20	1.23	243.04	0.72	0.00	0.00	0.00	0.00
5,300.00	3.23	89.71	5,293.04	1.26	248.66	0.74	0.00	0.00	0.00	0.00
5,400.00	3.23	89.71	5,392.88	1.28	254.29	0.75	0.00	0.00	0.00	0.00
5,500.00	3.23	89.71	5,492.72	1.31	259.92	0.77	0.00	0.00	0.00	0.00
5,600.00	3.23	89.71	5,592.57	1.34	265.54	0.79	0.00	0.00	0.00	0.00
5,700.00	3.23	89.71	5,692.41	1.37	271.17	0.80	0.00	0.00	0.00	0.00
5,800.00	3.23	89.71	5,792.25	1.40	276.80	0.82	0.00	0.00	0.00	0.00
5,900.00	3.23	89.71	5,892.09	1.43	282.42	0.83	0.00	0.00	0.00	0.00
6,000.00	3.23	89.71	5,991.93	1.45	288.05	0.85	0.00	0.00	0.00	0.00
6,100.00	3.23	89.71	6,091.77	1.48	293.68	0.87	0.00	0.00	0.00	0.00
6,200.00	3.23	89.71	6,191.62	1.51	299.30	0.88	0.00	0.00	0.00	0.00
6,300.00	3.23	89.71	6,291.46	1.54	304.93	0.90	0.00	0.00	0.00	0.00
6,400.00	3.23	89.71	6,391.30	1.57	310.56	0.92	0.00	0.00	0.00	0.00
6,486.04	3.23	89.71	6,477.20	1.59	315.40	0.93	0.00	0.00	0.00	0.00
Top of 4-1/2" Liner @ 6486.04ft										
6,500.00	3.23	89.71	6,491.14	1.60	316.18	0.93	0.00	0.00	0.00	0.00
6,586.04	3.23	89.71	6,577.04	1.62	321.02	0.95	0.00	0.00	0.00	0.00
KOP @ 6586.04ft										
6,600.00	3.52	66.32	6,590.98	1.80	321.81	1.12	10.00	2.10	-167.56	-89.84
6,700.00	11.85	15.46	6,690.07	12.95	327.37	12.26	10.00	8.33	-50.86	-66.48
6,800.00	21.64	8.04	6,785.73	41.17	332.70	40.47	10.00	9.79	-7.42	-15.91
6,900.00	31.55	5.14	6,875.04	85.59	337.63	84.89	10.00	9.92	-2.90	-8.78
7,000.00	41.51	3.53	6,955.29	144.88	342.02	144.16	10.00	9.95	-1.61	-6.17
DLS = 10.00/100ft										
7,100.00	51.48	2.45	7,024.05	217.22	345.74	216.49	10.00	9.97	-1.08	-4.87
7,106.38	52.11	2.39	7,028.00	222.23	345.95	221.50	10.00	9.97	-0.91	-4.12
Sharon Springs										
7,200.00	61.45	1.63	7,079.23	300.42	348.67	299.68	10.00	9.98	-0.81	-4.09
7,223.43	63.79	1.46	7,090.00	321.21	349.23	320.48	10.00	9.98	-0.71	-3.67
Niobrara A										
7,300.00	71.44	0.96	7,119.14	391.94	350.72	391.21	10.00	9.98	-0.66	-3.60
7,315.93	73.03	0.86	7,124.00	407.11	350.96	406.37	10.00	9.98	-0.62	-3.40
Niobrara B										
7,400.00	81.42	0.36	7,142.58	489.02	351.82	488.28	10.00	9.98	-0.59	-3.37
7,484.30	89.84	359.88	7,149.00	573.00	352.00	572.27	10.00	9.98	-0.57	-3.26
End Build @ 7484.30ft - Nio B TL - Heel - 7" Casing - Harris 38N-18HZ_CP										
7,500.00	89.84	359.88	7,149.04	588.70	351.97	587.96	0.00	0.00	0.00	-3.23
7,600.00	89.84	359.88	7,149.33	688.70	351.76	687.96	0.00	0.00	0.00	0.00
7,700.00	89.84	359.88	7,149.62	788.70	351.56	787.96	0.00	0.00	0.00	0.00
7,800.00	89.84	359.88	7,149.90	888.70	351.36	887.96	0.00	0.00	0.00	0.00
7,900.00	89.84	359.88	7,150.19	988.70	351.15	987.96	0.00	0.00	0.00	0.00
8,000.00	89.84	359.88	7,150.48	1,088.70	350.95	1,087.96	0.00	0.00	0.00	0.00
8,100.00	89.84	359.88	7,150.76	1,188.70	350.75	1,187.96	0.00	0.00	0.00	0.00
8,200.00	89.84	359.88	7,151.05	1,288.70	350.54	1,287.96	0.00	0.00	0.00	0.00
8,300.00	89.84	359.88	7,151.34	1,388.70	350.34	1,387.96	0.00	0.00	0.00	0.00
8,400.00	89.84	359.88	7,151.62	1,488.69	350.13	1,487.96	0.00	0.00	0.00	0.00
8,500.00	89.84	359.88	7,151.91	1,588.69	349.93	1,587.96	0.00	0.00	0.00	0.00
8,600.00	89.84	359.88	7,152.20	1,688.69	349.73	1,687.96	0.00	0.00	0.00	0.00
8,700.00	89.84	359.88	7,152.48	1,788.69	349.52	1,787.96	0.00	0.00	0.00	0.00
8,800.00	89.84	359.88	7,152.77	1,888.69	349.32	1,887.96	0.00	0.00	0.00	0.00
8,900.00	89.84	359.88	7,153.06	1,988.69	349.12	1,987.96	0.00	0.00	0.00	0.00
9,000.00	89.84	359.88	7,153.34	2,088.69	348.91	2,087.96	0.00	0.00	0.00	0.00
9,100.00	89.84	359.88	7,153.63	2,188.69	348.71	2,187.96	0.00	0.00	0.00	0.00
9,200.00	89.84	359.88	7,153.92	2,288.69	348.50	2,287.95	0.00	0.00	0.00	0.00
9,300.00	89.84	359.88	7,154.20	2,388.69	348.30	2,387.95	0.00	0.00	0.00	0.00
9,400.00	89.84	359.88	7,154.49	2,488.69	348.10	2,487.95	0.00	0.00	0.00	0.00

Plan Report for Harris 38N-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	89.84	359.88	7,154.78	2,588.69	347.89	2,587.95	0.00	0.00	0.00	0.00
9,600.00	89.84	359.88	7,155.06	2,688.69	347.69	2,687.95	0.00	0.00	0.00	0.00
9,700.00	89.84	359.88	7,155.35	2,788.69	347.49	2,787.95	0.00	0.00	0.00	0.00
9,800.00	89.84	359.88	7,155.63	2,888.69	347.28	2,887.95	0.00	0.00	0.00	0.00
9,900.00	89.84	359.88	7,155.92	2,988.69	347.08	2,987.95	0.00	0.00	0.00	0.00
10,000.00	89.84	359.88	7,156.21	3,088.68	346.87	3,087.95	0.00	0.00	0.00	0.00
10,100.00	89.84	359.88	7,156.49	3,188.68	346.67	3,187.95	0.00	0.00	0.00	0.00
10,200.00	89.84	359.88	7,156.78	3,288.68	346.47	3,287.95	0.00	0.00	0.00	0.00
10,300.00	89.84	359.88	7,157.07	3,388.68	346.26	3,387.95	0.00	0.00	0.00	0.00
10,400.00	89.84	359.88	7,157.35	3,488.68	346.06	3,487.95	0.00	0.00	0.00	0.00
10,500.00	89.84	359.88	7,157.64	3,588.68	345.86	3,587.95	0.00	0.00	0.00	0.00
10,600.00	89.84	359.88	7,157.93	3,688.68	345.65	3,687.95	0.00	0.00	0.00	0.00
10,700.00	89.84	359.88	7,158.21	3,788.68	345.45	3,787.95	0.00	0.00	0.00	0.00
10,800.00	89.84	359.88	7,158.50	3,888.68	345.24	3,887.95	0.00	0.00	0.00	0.00
10,900.00	89.84	359.88	7,158.79	3,988.68	345.04	3,987.95	0.00	0.00	0.00	0.00
11,000.00	89.84	359.88	7,159.07	4,088.68	344.84	4,087.95	0.00	0.00	0.00	0.00
11,100.00	89.84	359.88	7,159.36	4,188.68	344.63	4,187.95	0.00	0.00	0.00	0.00
11,200.00	89.84	359.88	7,159.65	4,288.68	344.43	4,287.95	0.00	0.00	0.00	0.00
11,300.00	89.84	359.88	7,159.93	4,388.68	344.23	4,387.95	0.00	0.00	0.00	0.00
11,400.00	89.84	359.88	7,160.22	4,488.68	344.02	4,487.95	0.00	0.00	0.00	0.00
11,500.00	89.84	359.88	7,160.51	4,588.68	343.82	4,587.95	0.00	0.00	0.00	0.00
11,600.00	89.84	359.88	7,160.79	4,688.67	343.61	4,687.94	0.00	0.00	0.00	0.00
11,700.00	89.84	359.88	7,161.08	4,788.67	343.41	4,787.94	0.00	0.00	0.00	0.00
11,800.00	89.84	359.88	7,161.37	4,888.67	343.21	4,887.94	0.00	0.00	0.00	0.00
11,900.00	89.84	359.88	7,161.65	4,988.67	343.00	4,987.94	0.00	0.00	0.00	0.00
12,000.00	89.84	359.88	7,161.94	5,088.67	342.80	5,087.94	0.00	0.00	0.00	0.00
12,100.00	89.84	359.88	7,162.22	5,188.67	342.60	5,187.94	0.00	0.00	0.00	0.00
12,200.00	89.84	359.88	7,162.51	5,288.67	342.39	5,287.94	0.00	0.00	0.00	0.00
12,300.00	89.84	359.88	7,162.80	5,388.67	342.19	5,387.94	0.00	0.00	0.00	0.00
12,400.00	89.84	359.88	7,163.08	5,488.67	341.98	5,487.94	0.00	0.00	0.00	0.00
12,500.00	89.84	359.88	7,163.37	5,588.67	341.78	5,587.94	0.00	0.00	0.00	0.00
12,600.00	89.84	359.88	7,163.66	5,688.67	341.58	5,687.94	0.00	0.00	0.00	0.00
12,700.00	89.84	359.88	7,163.94	5,788.67	341.37	5,787.94	0.00	0.00	0.00	0.00
12,800.00	89.84	359.88	7,164.23	5,888.67	341.17	5,887.94	0.00	0.00	0.00	0.00
12,900.00	89.84	359.88	7,164.52	5,988.67	340.97	5,987.94	0.00	0.00	0.00	0.00
13,000.00	89.84	359.88	7,164.80	6,088.67	340.76	6,087.94	0.00	0.00	0.00	0.00
13,100.00	89.84	359.88	7,165.09	6,188.67	340.56	6,187.94	0.00	0.00	0.00	0.00
13,200.00	89.84	359.88	7,165.38	6,288.66	340.35	6,287.94	0.00	0.00	0.00	0.00
13,300.00	89.84	359.88	7,165.66	6,388.66	340.15	6,387.94	0.00	0.00	0.00	0.00
13,400.00	89.84	359.88	7,165.95	6,488.66	339.95	6,487.94	0.00	0.00	0.00	0.00
13,500.00	89.84	359.88	7,166.24	6,588.66	339.74	6,587.94	0.00	0.00	0.00	0.00
13,600.00	89.84	359.88	7,166.52	6,688.66	339.54	6,687.94	0.00	0.00	0.00	0.00
13,700.00	89.84	359.88	7,166.81	6,788.66	339.34	6,787.94	0.00	0.00	0.00	0.00
13,800.00	89.84	359.88	7,167.10	6,888.66	339.13	6,887.94	0.00	0.00	0.00	0.00
13,900.00	89.84	359.88	7,167.38	6,988.66	338.93	6,987.94	0.00	0.00	0.00	0.00
14,000.00	89.84	359.88	7,167.67	7,088.66	338.72	7,087.93	0.00	0.00	0.00	0.00
14,100.00	89.84	359.88	7,167.96	7,188.66	338.52	7,187.93	0.00	0.00	0.00	0.00
14,200.00	89.84	359.88	7,168.24	7,288.66	338.32	7,287.93	0.00	0.00	0.00	0.00
14,300.00	89.84	359.88	7,168.53	7,388.66	338.11	7,387.93	0.00	0.00	0.00	0.00
14,400.00	89.84	359.88	7,168.81	7,488.66	337.91	7,487.93	0.00	0.00	0.00	0.00
14,500.00	89.84	359.88	7,169.10	7,588.66	337.71	7,587.93	0.00	0.00	0.00	0.00
14,600.00	89.84	359.88	7,169.39	7,688.66	337.50	7,687.93	0.00	0.00	0.00	0.00
14,700.00	89.84	359.88	7,169.67	7,788.66	337.30	7,787.93	0.00	0.00	0.00	0.00
14,800.00	89.84	359.88	7,169.96	7,888.65	337.10	7,887.93	0.00	0.00	0.00	0.00
14,900.00	89.84	359.88	7,170.25	7,988.65	336.89	7,987.93	0.00	0.00	0.00	0.00
15,000.00	89.84	359.88	7,170.53	8,088.65	336.69	8,087.93	0.00	0.00	0.00	0.00
15,100.00	89.84	359.88	7,170.82	8,188.65	336.48	8,187.93	0.00	0.00	0.00	0.00
15,200.00	89.84	359.88	7,171.11	8,288.65	336.28	8,287.93	0.00	0.00	0.00	0.00
15,300.00	89.84	359.88	7,171.39	8,388.65	336.08	8,387.93	0.00	0.00	0.00	0.00
15,400.00	89.84	359.88	7,171.68	8,488.65	335.87	8,487.93	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	89.84	359.88	7,171.97	8,588.65	335.67	8,587.93	0.00	0.00	0.00	0.00
15,600.00	89.84	359.88	7,172.25	8,688.65	335.47	8,687.93	0.00	0.00	0.00	0.00
15,700.00	89.84	359.88	7,172.54	8,788.65	335.26	8,787.93	0.00	0.00	0.00	0.00
15,800.00	89.84	359.88	7,172.83	8,888.65	335.06	8,887.93	0.00	0.00	0.00	0.00
15,900.00	89.84	359.88	7,173.11	8,988.65	334.85	8,987.93	0.00	0.00	0.00	0.00
16,000.00	89.84	359.88	7,173.40	9,088.65	334.65	9,087.93	0.00	0.00	0.00	0.00
16,100.00	89.84	359.88	7,173.69	9,188.65	334.45	9,187.93	0.00	0.00	0.00	0.00
16,200.00	89.84	359.88	7,173.97	9,288.65	334.24	9,287.93	0.00	0.00	0.00	0.00
16,209.74	89.84	359.88	7,174.00	9,298.39	334.22	9,297.67	0.00	0.00	0.00	0.00
Nio B TL - Toe										
16,209.75	89.84	359.88	7,174.00	9,298.40	334.22	9,297.67	0.00	0.00	0.00	0.00
Harris 38N-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
961.28	961.19	0.02	4.54	End Nudge @ 961.28ft
6,486.04	6,477.20	1.59	315.40	Top of 4-1/2" Liner @ 6486.04ft
6,586.04	6,577.04	1.62	321.02	KOP @ 6586.04ft
7,000.00	6,955.29	144.88	342.02	DLS = 10.00/100ft
7,484.30	7,149.00	573.00	352.00	End Build @ 7484.30ft
16,209.75	7,174.00	9,298.40	334.22	TD @ 16209.75ft

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	16,209.75	Plan A Rev 0 - PERMIT	MWD

Casing Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
604.00	604.00	9 5/8" Casing	9-5/8	13-1/2
7,484.30	7,149.00	7" Casing	7	8-3/4

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Formation Details

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,875.70	3,871.00	Parkman		0.00	
4,304.38	4,299.00	Sussex		0.00	
7,106.38	7,028.00	Sharon Springs		0.00	
7,223.43	7,090.00	Niobrara A		0.00	
7,315.93	7,124.00	Niobrara B		0.00	
7,484.21	7,149.00	Nio B TL - Heel		0.00	
16,209.74	7,174.00	Nio B TL - Toe		0.00	

Targets associated with this wellbore

Target Name	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Shape
Harris 38N-18HZ_CP	7,149.00	573.00	352.00	Point
Harris 38N-18HZ_SHL	0.00	0.00	0.00	Point
Harris 38N-18HZ_BHL	7,174.00	9,298.40	334.22	Point
Harris 38N-18HZ_Sec	0.00	0.00	0.00	Polygon

North Reference Sheet for Sec. 19-T3N-R66W - Harris 38N-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 @ 4884.00ft (Drilling Rig). Northing and Easting are relative to Harris 38N-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: 0.99995716

Grid Coordinates of Well: 1,318,398.88 ft N, 3,191,673.70 ft E

Geographical Coordinates of Well: 40° 12' 19.32" N, 104° 48' 49.51" W

Grid Convergence at Surface is: 0.44°

Based upon Minimum Curvature type calculations, at a Measured Depth of 16,209.75ft
the Bottom Hole Displacement is 9,304.40ft in the Direction of 2.06° (True).

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

