

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 8-T1N-R67W

NRC 30C-8HZ

Plan A

Plan: Rev A0 Permit

## Sperry Drilling Services

### Proposal Report

05 November, 2013

Well Coordinates: 1,264,991.46 N, 3,161,871.82 E (40° 03' 33.63" N, 104° 55' 18.11" W)

Ground Level: 5,049.00 usft

Local Coordinate Origin:

Centered on Well NRC 30C-8HZ

Viewing Datum:

RKB = 17' @ 5066.00usft (Drilling Rig)

TVDs to System:

N

North Reference:

True

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

**HALLIBURTON**

Project: Weld County, CO (NAD 83)  
 Site: Sec. 8-T1N-R67W  
 Well: NRC 30C-8HZ  
 Wellbore: Plan A  
 Design: Rev A0 Permit

# Anadarko Petroleum Corp.

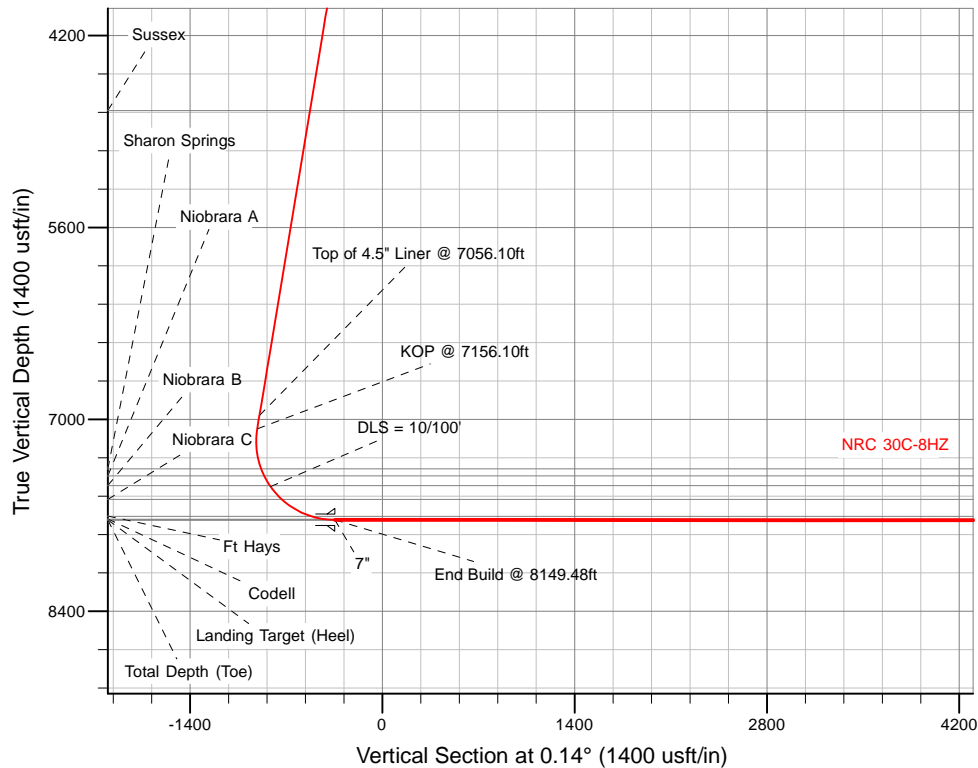
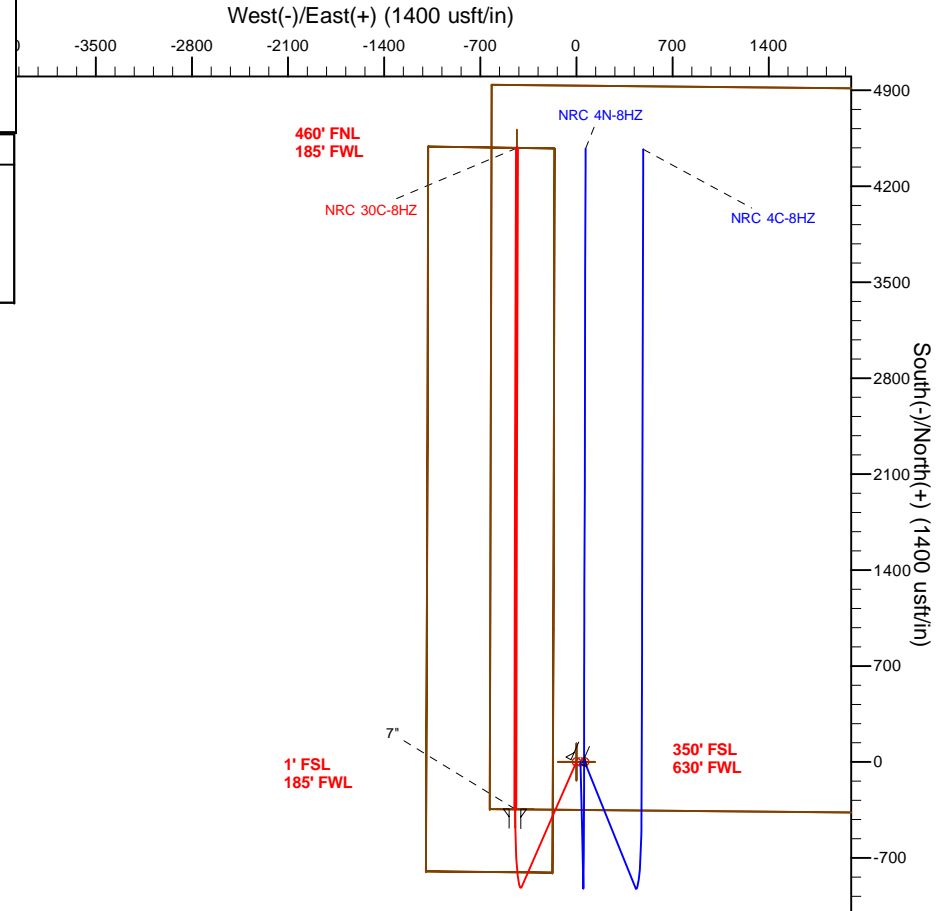


### SECTION DETAILS

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	1300.00	0.00	0.00	1300.00	0.00	0.00	0.00	0.00	0.00	
3	1811.08	10.22	203.70	1808.37	-41.63	-18.27	2.00	203.70	-41.68	
4	7156.10	10.22	203.70	7068.56	-910.18	-399.45	0.00	0.00	-911.15	
5	8149.48	89.98	0.14	7733.00	-344.97	-445.92	10.00	156.11	-346.06	NRC 30C-8HZ_CP
6	12973.43	89.98	0.14	7735.00	4478.96	-434.08	0.00	0.00	4477.89	NRC 30C-8HZ_BHL

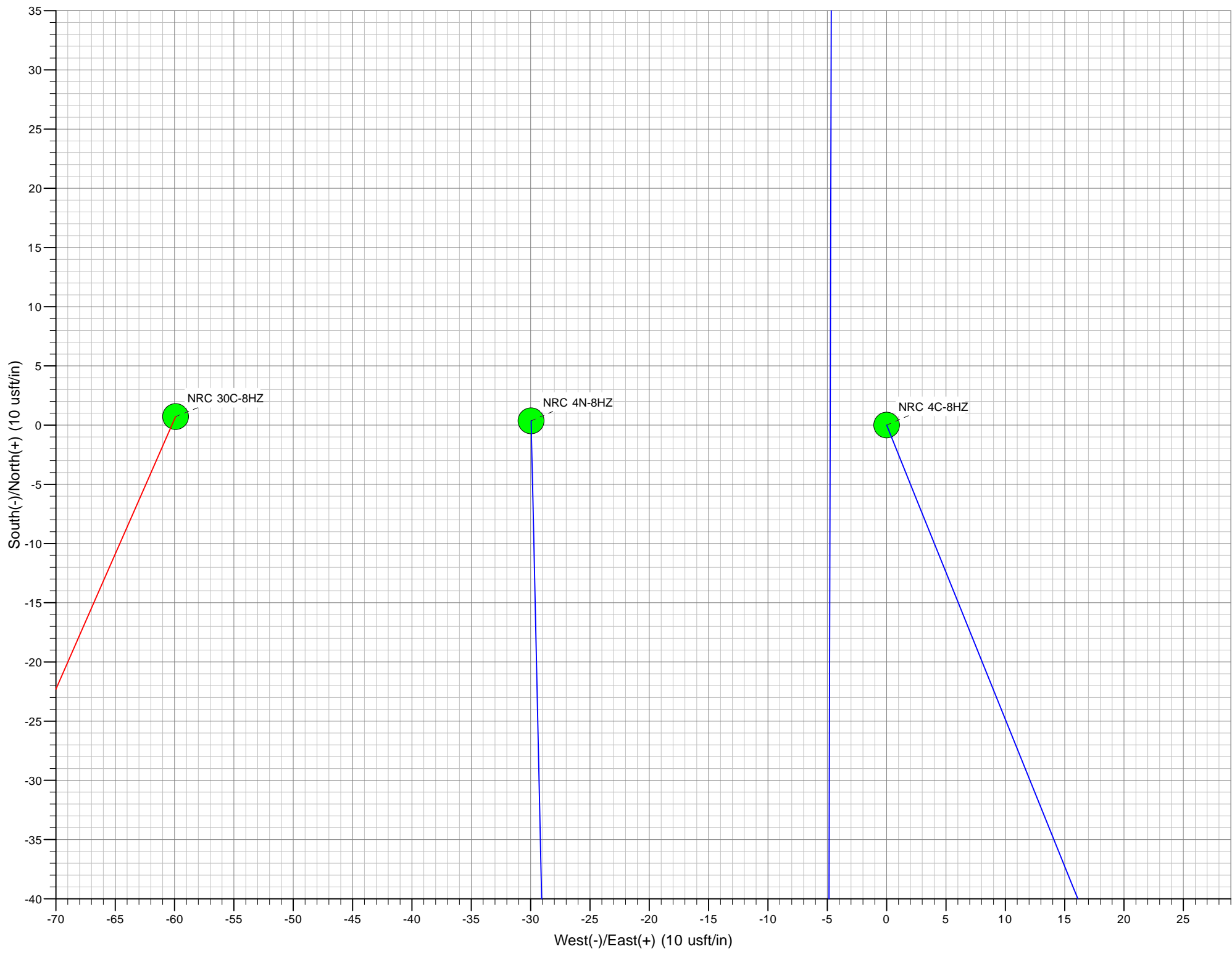
### WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Polygon
NRC 30C-8HZ_LD	0.00	0.00	0.00	40.059342	-104.921696	Polygon
NRC 30C-8HZ_SEC	0.00	0.00	0.00	40.059342	-104.921696	Polygon
NRC 30C-8HZ_SHL	0.00	0.00	0.00	40.059342	-104.921696	Polygon
NRC 30C-8HZ_CP	7733.00	-344.97	-445.92	40.058395	-104.923289	Point
NRC 30C-8HZ_BHL	7735.00	4478.96	-434.08	40.071637	-104.923247	Point



TVD	MD	Target
6970.15	7056.10	Top of 4.5" Liner @ 7056.10ft
7068.56	7156.10	KOP @ 7156.10ft

WELL DETAILS: NRC 30C-8HZ	
Ground Level:	5049.00
RKB = 17' @ 5066.00usft (Drilling Rig)	
Plan: Rev A0 Permit (NRC 30C-8HZ/Plan A)	
Created By: Clint Eshelman	Date: 11/04/2013
Reviewed:	Date:



**Plan Report for NRC 30C-8HZ - Rev A0 Permit**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>NRC 30C-8HZ_SHL - NRC 30C-8HZ_SEC - NRC 30C-8HZ_LD</b>										
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
567.00	0.00	0.00	567.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Fox Hills Base</b>										
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
617.00	0.00	0.00	617.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>9 5/8"</b>										
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
<b>Begin Nudge @ 1300.00ft</b>										
1,400.00	2.00	203.70	1,399.98	-1.60	-0.70	-1.60	2.00	2.00	0.00	203.70
1,500.00	4.00	203.70	1,499.84	-6.39	-2.80	-6.40	2.00	2.00	0.00	0.00
1,600.00	6.00	203.70	1,599.45	-14.37	-6.31	-14.39	2.00	2.00	0.00	0.00
1,700.00	8.00	203.70	1,698.70	-25.53	-11.20	-25.56	2.00	2.00	0.00	0.00
1,800.00	10.00	203.70	1,797.47	-39.85	-17.49	-39.90	2.00	2.00	0.00	0.00
1,811.08	10.22	203.70	1,808.37	-41.63	-18.27	-41.68	2.00	2.00	0.00	0.00
<b>End Nudge @ 1811.08ft</b>										
1,900.00	10.22	203.70	1,895.88	-56.08	-24.61	-56.14	0.00	0.00	0.00	0.00
2,000.00	10.22	203.70	1,994.29	-72.33	-31.74	-72.41	0.00	0.00	0.00	0.00
2,100.00	10.22	203.70	2,092.71	-88.58	-38.88	-88.68	0.00	0.00	0.00	0.00
2,200.00	10.22	203.70	2,191.12	-104.83	-46.01	-104.94	0.00	0.00	0.00	0.00
2,300.00	10.22	203.70	2,289.53	-121.08	-53.14	-121.21	0.00	0.00	0.00	0.00
2,400.00	10.22	203.70	2,387.95	-137.33	-60.27	-137.48	0.00	0.00	0.00	0.00
2,500.00	10.22	203.70	2,486.36	-153.58	-67.40	-153.75	0.00	0.00	0.00	0.00
2,600.00	10.22	203.70	2,584.77	-169.83	-74.53	-170.01	0.00	0.00	0.00	0.00
2,700.00	10.22	203.70	2,683.19	-186.08	-81.66	-186.28	0.00	0.00	0.00	0.00
2,800.00	10.22	203.70	2,781.60	-202.33	-88.80	-202.55	0.00	0.00	0.00	0.00
2,900.00	10.22	203.70	2,880.01	-218.58	-95.93	-218.81	0.00	0.00	0.00	0.00
3,000.00	10.22	203.70	2,978.42	-234.83	-103.06	-235.08	0.00	0.00	0.00	0.00
3,100.00	10.22	203.70	3,076.84	-251.08	-110.19	-251.35	0.00	0.00	0.00	0.00
3,200.00	10.22	203.70	3,175.25	-267.33	-117.32	-267.61	0.00	0.00	0.00	0.00
3,300.00	10.22	203.70	3,273.66	-283.58	-124.45	-283.88	0.00	0.00	0.00	0.00
3,400.00	10.22	203.70	3,372.08	-299.83	-131.58	-300.15	0.00	0.00	0.00	0.00
3,500.00	10.22	203.70	3,470.49	-316.08	-138.72	-316.41	0.00	0.00	0.00	0.00
3,600.00	10.22	203.70	3,568.90	-332.33	-145.85	-332.68	0.00	0.00	0.00	0.00
3,700.00	10.22	203.70	3,667.31	-348.58	-152.98	-348.95	0.00	0.00	0.00	0.00
3,800.00	10.22	203.70	3,765.73	-364.82	-160.11	-365.21	0.00	0.00	0.00	0.00
3,900.00	10.22	203.70	3,864.14	-381.07	-167.24	-381.48	0.00	0.00	0.00	0.00
4,000.00	10.22	203.70	3,962.55	-397.32	-174.37	-397.75	0.00	0.00	0.00	0.00
4,100.00	10.22	203.70	4,060.97	-413.57	-181.50	-414.02	0.00	0.00	0.00	0.00
4,200.00	10.22	203.70	4,159.38	-429.82	-188.64	-430.28	0.00	0.00	0.00	0.00
4,300.00	10.22	203.70	4,257.79	-446.07	-195.77	-446.55	0.00	0.00	0.00	0.00
4,400.00	10.22	203.70	4,356.20	-462.32	-202.90	-462.82	0.00	0.00	0.00	0.00
4,500.00	10.22	203.70	4,454.62	-478.57	-210.03	-479.08	0.00	0.00	0.00	0.00
4,600.00	10.22	203.70	4,553.03	-494.82	-217.16	-495.35	0.00	0.00	0.00	0.00
4,700.00	10.22	203.70	4,651.44	-511.07	-224.29	-511.62	0.00	0.00	0.00	0.00
4,797.10	10.22	203.70	4,747.00	-526.85	-231.22	-527.41	0.00	0.00	0.00	0.00
<b>Sussex</b>										

**Plan Report for NRC 30C-8HZ - Rev A0 Permit**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
4,800.00	10.22	203.70	4,749.86	-527.32	-231.42	-527.88	0.00	0.00	0.00	0.00
4,900.00	10.22	203.70	4,848.27	-543.57	-238.56	-544.15	0.00	0.00	0.00	0.00
5,000.00	10.22	203.70	4,946.68	-559.82	-245.69	-560.42	0.00	0.00	0.00	0.00
5,100.00	10.22	203.70	5,045.09	-576.07	-252.82	-576.68	0.00	0.00	0.00	0.00
5,200.00	10.22	203.70	5,143.51	-592.32	-259.95	-592.95	0.00	0.00	0.00	0.00
5,300.00	10.22	203.70	5,241.92	-608.57	-267.08	-609.22	0.00	0.00	0.00	0.00
5,400.00	10.22	203.70	5,340.33	-624.82	-274.21	-625.49	0.00	0.00	0.00	0.00
5,500.00	10.22	203.70	5,438.75	-641.07	-281.34	-641.75	0.00	0.00	0.00	0.00
5,600.00	10.22	203.70	5,537.16	-657.32	-288.48	-658.02	0.00	0.00	0.00	0.00
5,700.00	10.22	203.70	5,635.57	-673.57	-295.61	-674.29	0.00	0.00	0.00	0.00
5,800.00	10.22	203.70	5,733.98	-689.82	-302.74	-690.55	0.00	0.00	0.00	0.00
5,900.00	10.22	203.70	5,832.40	-706.07	-309.87	-706.82	0.00	0.00	0.00	0.00
6,000.00	10.22	203.70	5,930.81	-722.31	-317.00	-723.09	0.00	0.00	0.00	0.00
6,100.00	10.22	203.70	6,029.22	-738.56	-324.13	-739.35	0.00	0.00	0.00	0.00
6,200.00	10.22	203.70	6,127.64	-754.81	-331.26	-755.62	0.00	0.00	0.00	0.00
6,300.00	10.22	203.70	6,226.05	-771.06	-338.40	-771.89	0.00	0.00	0.00	0.00
6,400.00	10.22	203.70	6,324.46	-787.31	-345.53	-788.15	0.00	0.00	0.00	0.00
6,500.00	10.22	203.70	6,422.87	-803.56	-352.66	-804.42	0.00	0.00	0.00	0.00
6,600.00	10.22	203.70	6,521.29	-819.81	-359.79	-820.69	0.00	0.00	0.00	0.00
6,700.00	10.22	203.70	6,619.70	-836.06	-366.92	-836.96	0.00	0.00	0.00	0.00
6,800.00	10.22	203.70	6,718.11	-852.31	-374.05	-853.22	0.00	0.00	0.00	0.00
6,900.00	10.22	203.70	6,816.53	-868.56	-381.18	-869.49	0.00	0.00	0.00	0.00
7,000.00	10.22	203.70	6,914.94	-884.81	-388.32	-885.76	0.00	0.00	0.00	0.00
7,056.10	10.22	203.70	6,970.15	-893.93	-392.32	-894.88	0.00	0.00	0.00	0.00
<b>Top of 4.5" Liner @ 7056.10ft</b>										
7,100.00	10.22	203.70	7,013.35	-901.06	-395.45	-902.02	0.00	0.00	0.00	0.00
7,156.10	10.22	203.70	7,068.56	-910.18	-399.45	-911.15	0.00	0.00	0.00	0.00
<b>KOP @ 7156.10ft</b>										
7,200.00	6.45	219.70	7,112.00	-915.64	-402.59	-916.62	10.00	-8.58	36.46	156.11
7,300.00	6.50	320.90	7,211.61	-915.58	-409.77	-916.57	10.00	0.04	101.20	140.26
7,400.00	15.57	345.16	7,309.70	-898.17	-416.79	-899.18	10.00	9.07	24.26	39.42
7,452.94	20.72	349.16	7,360.00	-882.09	-420.38	-883.11	10.00	9.72	7.56	15.53
<b>Sharon Springs</b>										
7,500.00	25.34	351.39	7,403.29	-863.95	-423.45	-864.98	10.00	9.83	4.74	11.72
7,508.56	26.19	351.72	7,411.00	-860.27	-424.00	-861.30	10.00	9.86	3.80	9.67
<b>Niobrara A</b>										
7,592.03	34.45	354.11	7,483.00	-818.48	-429.08	-819.53	10.00	9.90	2.87	9.37
<b>Niobrara B</b>										
7,600.00	35.24	354.29	7,489.54	-813.95	-429.54	-815.00	10.00	9.92	2.20	7.30
<b>DLS = 10/100'</b>										
7,700.00	45.18	356.04	7,565.82	-749.70	-434.88	-750.76	10.00	9.94	1.75	7.16
7,724.93	47.66	356.38	7,583.00	-731.69	-436.07	-732.75	10.00	9.95	1.37	5.82
<b>Niobrara C</b>										
7,800.00	55.13	357.26	7,629.81	-673.15	-439.30	-674.23	10.00	9.96	1.18	5.58
7,900.00	65.10	358.23	7,679.58	-586.63	-442.67	-587.71	10.00	9.97	0.96	5.03
7,976.22	72.70	358.86	7,707.00	-515.59	-444.47	-516.68	10.00	9.97	0.83	4.54
<b>Ft Hays</b>										
8,000.00	75.07	359.04	7,713.60	-492.76	-444.89	-493.84	10.00	9.97	0.78	4.32
8,073.87	82.43	359.59	7,728.00	-420.36	-445.75	-421.45	10.00	9.97	0.75	4.27
<b>Codell</b>										
8,100.00	85.04	359.78	7,730.85	-394.39	-445.89	-395.48	10.00	9.97	0.73	4.16
8,149.48	89.98	0.14	7,733.00	-344.97	-445.92	-346.06	10.00	9.97	0.72	4.14
<b>End Build @ 8149.48ft - Landing Target (Heel) - 7" - NRC 30C-8HZ_CP</b>										
8,200.00	89.98	0.14	7,733.02	-294.45	-445.80	-295.54	0.00	0.00	0.00	4.12
8,300.00	89.98	0.14	7,733.06	-194.45	-445.55	-195.54	0.00	0.00	0.00	0.00
8,400.00	89.98	0.14	7,733.10	-94.45	-445.30	-95.54	0.00	0.00	0.00	0.00
8,500.00	89.98	0.14	7,733.15	5.55	-445.06	4.46	0.00	0.00	0.00	0.00
8,600.00	89.98	0.14	7,733.19	105.55	-444.81	104.46	0.00	0.00	0.00	0.00

**Plan Report for NRC 30C-8HZ - Rev A0 Permit**

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	Toolface Azimuth (°)
8,700.00	89.98	0.14	7,733.23	205.55	-444.57	204.46	0.00	0.00	0.00	0.00
8,800.00	89.98	0.14	7,733.27	305.55	-444.32	304.46	0.00	0.00	0.00	0.00
8,900.00	89.98	0.14	7,733.31	405.55	-444.08	404.46	0.00	0.00	0.00	0.00
9,000.00	89.98	0.14	7,733.35	505.55	-443.83	504.46	0.00	0.00	0.00	0.00
9,100.00	89.98	0.14	7,733.39	605.55	-443.59	604.46	0.00	0.00	0.00	0.00
9,200.00	89.98	0.14	7,733.44	705.55	-443.34	704.46	0.00	0.00	0.00	0.00
9,300.00	89.98	0.14	7,733.48	805.55	-443.10	804.46	0.00	0.00	0.00	0.00
9,400.00	89.98	0.14	7,733.52	905.54	-442.85	904.46	0.00	0.00	0.00	0.00
9,500.00	89.98	0.14	7,733.56	1,005.54	-442.60	1,004.46	0.00	0.00	0.00	0.00
9,600.00	89.98	0.14	7,733.60	1,105.54	-442.36	1,104.46	0.00	0.00	0.00	0.00
9,700.00	89.98	0.14	7,733.64	1,205.54	-442.11	1,204.46	0.00	0.00	0.00	0.00
9,800.00	89.98	0.14	7,733.68	1,305.54	-441.87	1,304.46	0.00	0.00	0.00	0.00
9,900.00	89.98	0.14	7,733.73	1,405.54	-441.62	1,404.46	0.00	0.00	0.00	0.00
10,000.00	89.98	0.14	7,733.77	1,505.54	-441.38	1,504.46	0.00	0.00	0.00	0.00
10,100.00	89.98	0.14	7,733.81	1,605.54	-441.13	1,604.46	0.00	0.00	0.00	0.00
10,200.00	89.98	0.14	7,733.85	1,705.54	-440.89	1,704.46	0.00	0.00	0.00	0.00
10,300.00	89.98	0.14	7,733.89	1,805.54	-440.64	1,804.46	0.00	0.00	0.00	0.00
10,400.00	89.98	0.14	7,733.93	1,905.54	-440.40	1,904.46	0.00	0.00	0.00	0.00
10,500.00	89.98	0.14	7,733.97	2,005.54	-440.15	2,004.46	0.00	0.00	0.00	0.00
10,600.00	89.98	0.14	7,734.02	2,105.54	-439.90	2,104.46	0.00	0.00	0.00	0.00
10,700.00	89.98	0.14	7,734.06	2,205.54	-439.66	2,204.46	0.00	0.00	0.00	0.00
10,800.00	89.98	0.14	7,734.10	2,305.54	-439.41	2,304.46	0.00	0.00	0.00	0.00
10,900.00	89.98	0.14	7,734.14	2,405.54	-439.17	2,404.46	0.00	0.00	0.00	0.00
11,000.00	89.98	0.14	7,734.18	2,505.54	-438.92	2,504.46	0.00	0.00	0.00	0.00
11,100.00	89.98	0.14	7,734.22	2,605.54	-438.68	2,604.46	0.00	0.00	0.00	0.00
11,200.00	89.98	0.14	7,734.26	2,705.54	-438.43	2,704.46	0.00	0.00	0.00	0.00
11,300.00	89.98	0.14	7,734.31	2,805.54	-438.19	2,804.46	0.00	0.00	0.00	0.00
11,400.00	89.98	0.14	7,734.35	2,905.54	-437.94	2,904.46	0.00	0.00	0.00	0.00
11,500.00	89.98	0.14	7,734.39	3,005.54	-437.69	3,004.46	0.00	0.00	0.00	0.00
11,600.00	89.98	0.14	7,734.43	3,105.54	-437.45	3,104.46	0.00	0.00	0.00	0.00
11,700.00	89.98	0.14	7,734.47	3,205.54	-437.20	3,204.46	0.00	0.00	0.00	0.00
11,800.00	89.98	0.14	7,734.51	3,305.54	-436.96	3,304.46	0.00	0.00	0.00	0.00
11,900.00	89.98	0.14	7,734.55	3,405.54	-436.71	3,404.46	0.00	0.00	0.00	0.00
12,000.00	89.98	0.14	7,734.60	3,505.54	-436.47	3,504.46	0.00	0.00	0.00	0.00
12,100.00	89.98	0.14	7,734.64	3,605.54	-436.22	3,604.46	0.00	0.00	0.00	0.00
12,200.00	89.98	0.14	7,734.68	3,705.54	-435.98	3,704.46	0.00	0.00	0.00	0.00
12,300.00	89.98	0.14	7,734.72	3,805.54	-435.73	3,804.46	0.00	0.00	0.00	0.00
12,400.00	89.98	0.14	7,734.76	3,905.54	-435.49	3,904.46	0.00	0.00	0.00	0.00
12,500.00	89.98	0.14	7,734.80	4,005.54	-435.24	4,004.46	0.00	0.00	0.00	0.00
12,600.00	89.98	0.14	7,734.85	4,105.54	-434.99	4,104.46	0.00	0.00	0.00	0.00
12,700.00	89.98	0.14	7,734.89	4,205.53	-434.75	4,204.46	0.00	0.00	0.00	0.00
12,800.00	89.98	0.14	7,734.93	4,305.53	-434.50	4,304.46	0.00	0.00	0.00	0.00
12,900.00	89.98	0.14	7,734.97	4,405.53	-434.26	4,404.46	0.00	0.00	0.00	0.00
12,973.43	89.98	0.14	7,735.00	4,478.96	-434.08	4,477.89	0.00	0.00	0.00	0.00

TD Well @ 12973.43ft - Total Depth (Toe) - NRC 30C-8HZ\_BHL

**Plan Annotations**

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,300.00	1,300.00	0.00	0.00	Begin Nudge @ 1300.00ft
1,811.08	1,808.37	-41.63	-18.27	End Nudge @ 1811.08ft
7,056.10	6,970.15	-893.93	-392.32	Top of 4.5" Liner @ 7056.10ft
7,156.10	7,068.56	-910.18	-399.45	KOP @ 7156.10ft
7,600.00	7,489.54	-813.95	-429.54	DLS = 10/100'
8,149.48	7,733.00	-344.97	-445.92	End Build @ 8149.48ft
12,973.43	7,735.00	4,478.96	-434.08	TD Well @ 12973.43ft

**Plan Report for NRC 30C-8HZ - Rev A0 Permit****Vertical Section Information**

Angle Type	Target	Azimuth (°)	Origin Type	Origin +N/-S (usft)	Origin +E/-W (usft)	Start TVD (usft)
User	No Target (Freehand)	0.14	Slot	0.00	0.00	0.00

**Survey tool program**

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	8,149.48	Rev A0 Permit	MWD
8,149.48	12,973.43	Rev A0 Permit	MWD

**Casing Details**

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
617.00	617.00	9 5/8"	9-5/8	13-1/2
8,149.48	7,733.00	7"	7	8-3/4

**Formation Details**

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
567.00	567.00	Fox Hills Base			
4,797.10	4,747.00	Sussex			
7,452.94	7,360.00	Sharon Springs			
7,508.56	7,411.00	Niobrara A			
7,592.03	7,483.00	Niobrara B			
7,724.93	7,583.00	Niobrara C			
7,976.22	7,707.00	Ft Hays			
8,073.87	7,728.00	Codell			
8,149.48	7,733.00	Landing Target (Heel)			
12,973.43	7,735.00	Total Depth (Toe)			

**Targets associated with this wellbore**

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
NRC 30C-8HZ_SHL	0.00	0.00	0.00	Point
NRC 30C-8HZ_SEC	0.00	0.00	0.00	Polygon
NRC 30C-8HZ_LD	0.00	0.00	0.00	Polygon
NRC 30C-8HZ_CP	7,733.00	-344.97	-445.92	Point
NRC 30C-8HZ_BHL	7,735.00	4,478.96	-434.08	Point

**Plan Report for NRC 30C-8HZ - Rev A0 Permit**

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**Directional Difficulty Index**

Average Dogleg over Survey:	0.85 °/100usft	Maximum Dogleg over Survey:	10.00 °/100usft at 8,149.48 usft
Net Tortosity applicable to Plans:	0.85 °/100usft	Directional Difficulty Index:	6.254

**Audit Info**

**North Reference Sheet for Sec. 8-T1N-R67W - NRC 30C-8HZ - Plan A**

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' @ 5066.00usft (Drilling Rig). Northing and Easting are relative to NRC 30C-8HZ  
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: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99996240

Grid Coordinates of Well: 1,264,991.46 usft N, 3,161,871.82 usft E  
Geographical Coordinates of Well: 40° 03' 33.63" N, 104° 55' 18.11" W  
Grid Convergence at Surface is: 0.37°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,973.43usft  
the Bottom Hole Displacement is 4,499.94usft in the Direction of 354.46° ( True).

Magnetic Convergence at surface is: -8.26° (24 October 2013, , BGGM2013)

Magnetic Model: BGGM2013  
Date: 24-Oct-13  
Declination: 8.64°  
Inclination/Dip: 66.66°  
Field Strength: 52611

Grid North is 0.37° East of True North (Grid Convergence)  
Magnetic North is 8.64° East of True North (Magnetic Declination)  
Magnetic North is 8.26° East of Grid North (Magnetic Convergence)

To convert a True Direction to a Grid Direction, Subtract 0.37°  
To convert a Magnetic Direction to a True Direction, Add 8.64° East  
To convert a Magnetic Direction to a Grid Direction, Add 8.26°