

# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 21-T2N-66W

3D 15C-21HZ

Plan A

Plan: Plan A0 - Permit

## Sperry Drilling Services

## Proposal Report

17 July, 2013

Well Coordinates: 1,291,102.88 N, 3,202,320.63 E (40° 07' 48.74" N, 104° 46' 35.16" W)

Ground Level: 4,989.00 ft

Local Coordinate Origin:

Centered on Well 3D 15C-21HZ

Viewing Datum:

RKB = 17' @ 5006.00ft (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. 21-T2N-66W  
Well: 3D 15C-21HZ  
Wellbore: Plan A  
Design: Plan A0 - Permit



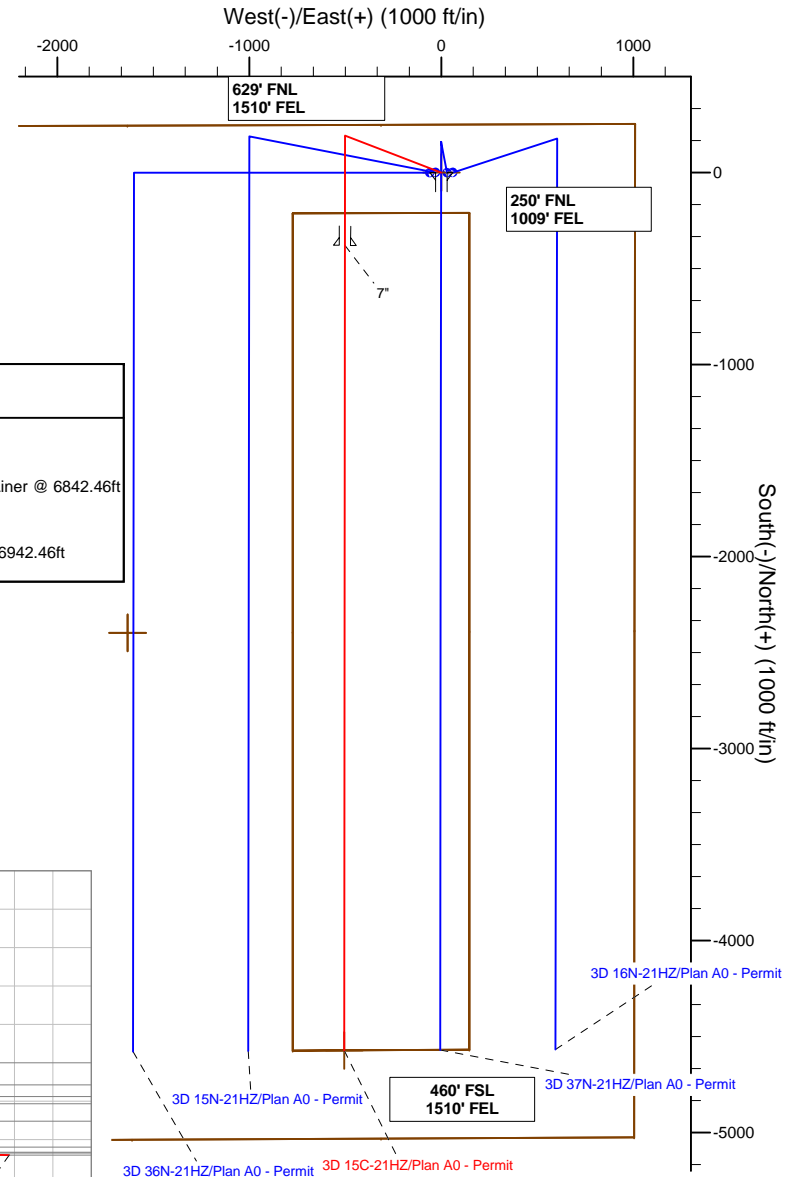
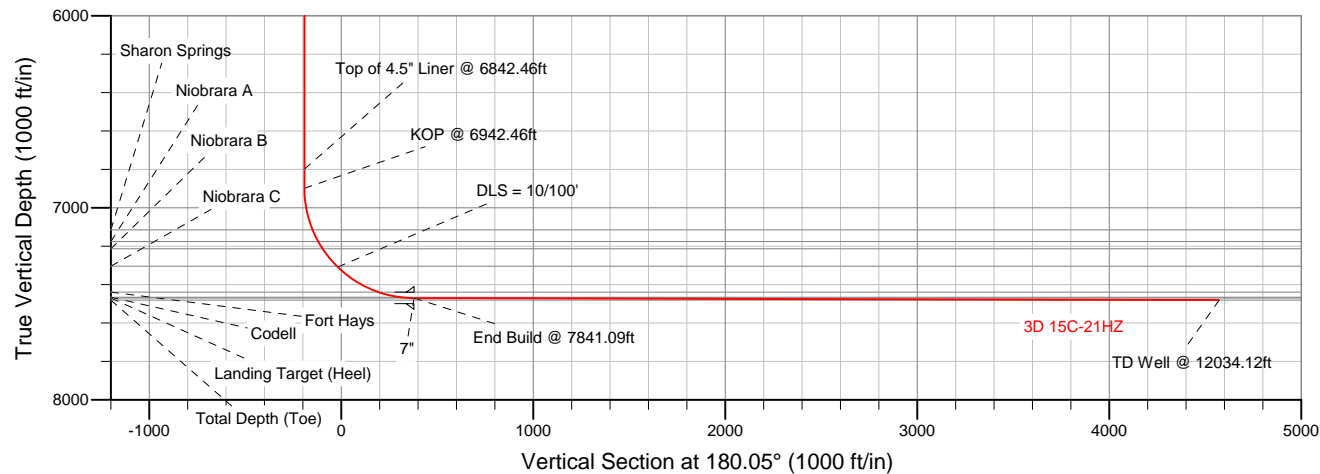
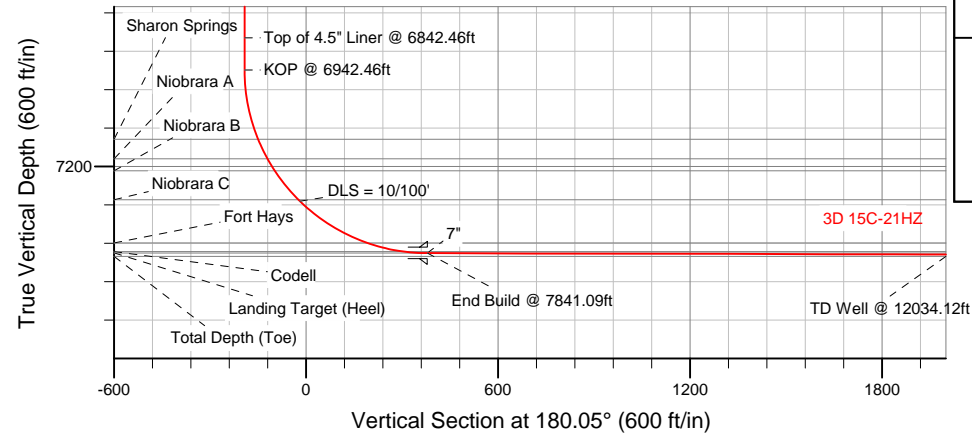
**HALLIBURTON**  
Sperry Drilling

#### 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   | 1200.00  | 0.00  | 0.00   | 1200.00 | 0.00     | 0.00    | 0.00  | 0.00   | 0.00    |                 |
| 3   | 1700.00  | 10.00 | 291.00 | 1697.47 | 15.60    | -40.63  | 2.00  | 291.00 | -15.56  |                 |
| 4   | 4290.00  | 10.00 | 291.00 | 4248.12 | 176.77   | -460.51 | 0.00  | 0.00   | -176.37 |                 |
| 5   | 4790.00  | 0.00  | 0.00   | 4745.58 | 192.37   | -501.14 | 2.00  | 180.00 | -191.93 |                 |
| 6   | 6942.46  | 0.00  | 0.00   | 6898.04 | 192.37   | -501.14 | 0.00  | 0.00   | -191.93 |                 |
| 7   | 7841.09  | 89.86 | 180.05 | 7471.00 | -379.22  | -501.65 | 10.00 | 180.05 | 379.66  |                 |
| 8   | 12034.12 | 89.86 | 180.05 | 7481.00 | -4572.23 | -505.38 | 0.00  | 0.00   | 4572.67 | 3D 15C-21HZ_BHL |

#### WELLBORE TARGET DETAILS (LAT/LONG)

| Name            | TVD     | +N/-S    | +E/-W    | Latitude  | Longitude   | Shape   |
|-----------------|---------|----------|----------|-----------|-------------|---------|
| 3D 15C-21HZ_LD  | 0.00    | -2397.26 | -1633.21 | 40.123624 | -104.782273 | Polygon |
| 3D 15C-21HZ_SHL | 0.00    | 0.00     | 0.00     | 40.130205 | -104.776433 | Point   |
| 3D_SEC          | 0.00    | -2397.26 | -1633.21 | 40.123624 | -104.782273 | Polygon |
| 3D 15C-21HZ_BHL | 7481.00 | -4572.23 | -505.38  | 40.117654 | -104.778240 | Point   |



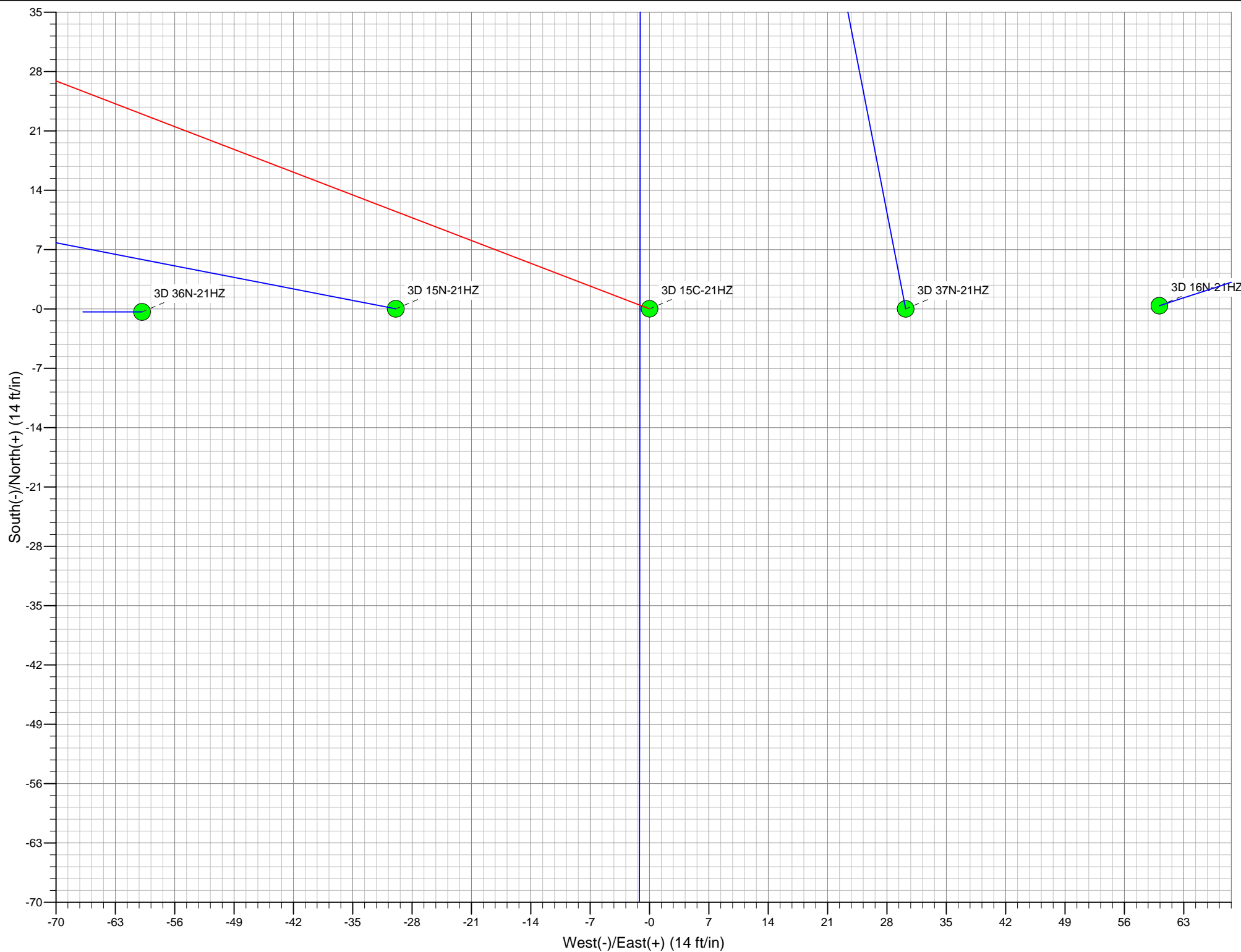
#### WELL DETAILS: 3D 15C-21HZ

Ground Level: 4989.00

RKB = 17' @ 5006.00ft (Drilling Rig)

Plan: Plan A0 - Permit (3D 15C-21HZ/Plan A)

Created By: Clint Eshelman Date: 07/17/2013



**Plan Report for 3D 15C-21HZ - Plan A0 - 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                 |
| 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                 |
| 925.00                         | 0.00            | 0.00        | 925.00              | 0.00       | 0.00       | 0.00                  | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| <b>Fox Hills Base</b>          |                 |             |                     |            |            |                       |                       |                      |                     |                      |
| 975.00                         | 0.00            | 0.00        | 975.00              | 0.00       | 0.00       | 0.00                  | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| <b>9 5/8"</b>                  |                 |             |                     |            |            |                       |                       |                      |                     |                      |
| 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                 |
| <b>Begin Nudge @ 1200.00ft</b> |                 |             |                     |            |            |                       |                       |                      |                     |                      |
| 1,300.00                       | 2.00            | 291.00      | 1,299.98            | 0.63       | -1.63      | -0.62                 | 2.00                  | 2.00                 | 0.00                | 291.00               |
| 1,400.00                       | 4.00            | 291.00      | 1,399.84            | 2.50       | -6.51      | -2.50                 | 2.00                  | 2.00                 | 0.00                | 0.00                 |
| 1,500.00                       | 6.00            | 291.00      | 1,499.45            | 5.62       | -14.65     | -5.61                 | 2.00                  | 2.00                 | 0.00                | 0.00                 |
| 1,600.00                       | 8.00            | 291.00      | 1,598.70            | 9.99       | -26.03     | -9.97                 | 2.00                  | 2.00                 | 0.00                | 0.00                 |
| 1,700.00                       | 10.00           | 291.00      | 1,697.47            | 15.60      | -40.63     | -15.56                | 2.00                  | 2.00                 | 0.00                | 0.00                 |
| <b>End Nudge @ 1700.00ft</b>   |                 |             |                     |            |            |                       |                       |                      |                     |                      |
| 1,800.00                       | 10.00           | 291.00      | 1,795.95            | 21.82      | -56.84     | -21.77                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 1,900.00                       | 10.00           | 291.00      | 1,894.43            | 28.04      | -73.05     | -27.98                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 2,000.00                       | 10.00           | 291.00      | 1,992.91            | 34.27      | -89.27     | -34.19                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 2,100.00                       | 10.00           | 291.00      | 2,091.39            | 40.49      | -105.48    | -40.40                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 2,200.00                       | 10.00           | 291.00      | 2,189.87            | 46.71      | -121.69    | -46.61                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 2,300.00                       | 10.00           | 291.00      | 2,288.35            | 52.94      | -137.90    | -52.81                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 2,400.00                       | 10.00           | 291.00      | 2,386.83            | 59.16      | -154.11    | -59.02                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 2,500.00                       | 10.00           | 291.00      | 2,485.31            | 65.38      | -170.32    | -65.23                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 2,600.00                       | 10.00           | 291.00      | 2,583.79            | 71.60      | -186.53    | -71.44                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 2,700.00                       | 10.00           | 291.00      | 2,682.27            | 77.83      | -202.75    | -77.65                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 2,800.00                       | 10.00           | 291.00      | 2,780.75            | 84.05      | -218.96    | -83.86                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 2,900.00                       | 10.00           | 291.00      | 2,879.23            | 90.27      | -235.17    | -90.07                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 3,000.00                       | 10.00           | 291.00      | 2,977.72            | 96.50      | -251.38    | -96.28                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 3,100.00                       | 10.00           | 291.00      | 3,076.20            | 102.72     | -267.59    | -102.49               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 3,200.00                       | 10.00           | 291.00      | 3,174.68            | 108.94     | -283.80    | -108.69               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 3,300.00                       | 10.00           | 291.00      | 3,273.16            | 115.17     | -300.02    | -114.90               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 3,400.00                       | 10.00           | 291.00      | 3,371.64            | 121.39     | -316.23    | -121.11               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 3,500.00                       | 10.00           | 291.00      | 3,470.12            | 127.61     | -332.44    | -127.32               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 3,600.00                       | 10.00           | 291.00      | 3,568.60            | 133.83     | -348.65    | -133.53               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 3,700.00                       | 10.00           | 291.00      | 3,667.08            | 140.06     | -364.86    | -139.74               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 3,800.00                       | 10.00           | 291.00      | 3,765.56            | 146.28     | -381.07    | -145.95               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 3,900.00                       | 10.00           | 291.00      | 3,864.04            | 152.50     | -397.28    | -152.16               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 4,000.00                       | 10.00           | 291.00      | 3,962.52            | 158.73     | -413.50    | -158.37               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 4,100.00                       | 10.00           | 291.00      | 4,061.00            | 164.95     | -429.71    | -164.57               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 4,150.77                       | 10.00           | 291.00      | 4,111.00            | 168.11     | -437.94    | -167.73               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| <b>Parkman</b>                 |                 |             |                     |            |            |                       |                       |                      |                     |                      |
| 4,200.00                       | 10.00           | 291.00      | 4,159.48            | 171.17     | -445.92    | -170.78               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 4,290.00                       | 10.00           | 291.00      | 4,248.12            | 176.77     | -460.51    | -176.37               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| <b>Begin Drop @ 4290.00ft</b>  |                 |             |                     |            |            |                       |                       |                      |                     |                      |
| 4,300.00                       | 9.80            | 291.00      | 4,257.97            | 177.39     | -462.11    | -176.99               | 2.00                  | -2.00                | 0.00                | 180.00               |
| 4,400.00                       | 7.80            | 291.00      | 4,356.79            | 182.87     | -476.40    | -182.46               | 2.00                  | -2.00                | 0.00                | 180.00               |
| 4,500.00                       | 5.80            | 291.00      | 4,456.08            | 187.11     | -487.45    | -186.69               | 2.00                  | -2.00                | 0.00                | 180.00               |
| 4,556.16                       | 4.68            | 291.00      | 4,512.00            | 188.95     | -492.24    | -188.52               | 2.00                  | -2.00                | 0.00                | 180.00               |

## Plan Report for 3D 15C-21HZ - Plan A0 - 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 (°) |
|--------------------------------------|-----------------|-------------|---------------------|-----------|-----------|-----------------------|-----------------------|----------------------|---------------------|----------------------|
| <b>Sussex</b>                        |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 4,600.00                             | 3.80            | 291.00      | 4,555.72            | 190.11    | -495.26   | -189.68               | 2.00                  | -2.00                | 0.00                | -180.00              |
| 4,700.00                             | 1.80            | 291.00      | 4,655.60            | 191.86    | -499.82   | -191.43               | 2.00                  | -2.00                | 0.00                | 180.00               |
| 4,790.00                             | 0.00            | 0.00        | 4,745.58            | 192.37    | -501.14   | -191.93               | 2.00                  | -2.00                | 76.67               | 180.00               |
| <b>End Drop @ 4790.00ft</b>          |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 4,800.00                             | 0.00            | 0.00        | 4,755.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 180.00               |
| 4,900.00                             | 0.00            | 0.00        | 4,855.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 5,000.00                             | 0.00            | 0.00        | 4,955.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 5,100.00                             | 0.00            | 0.00        | 5,055.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 5,200.00                             | 0.00            | 0.00        | 5,155.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 5,300.00                             | 0.00            | 0.00        | 5,255.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 5,400.00                             | 0.00            | 0.00        | 5,355.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 5,500.00                             | 0.00            | 0.00        | 5,455.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 5,600.00                             | 0.00            | 0.00        | 5,555.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 5,700.00                             | 0.00            | 0.00        | 5,655.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 5,800.00                             | 0.00            | 0.00        | 5,755.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 5,900.00                             | 0.00            | 0.00        | 5,855.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,000.00                             | 0.00            | 0.00        | 5,955.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,100.00                             | 0.00            | 0.00        | 6,055.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,200.00                             | 0.00            | 0.00        | 6,155.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,300.00                             | 0.00            | 0.00        | 6,255.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,400.00                             | 0.00            | 0.00        | 6,355.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,500.00                             | 0.00            | 0.00        | 6,455.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,600.00                             | 0.00            | 0.00        | 6,555.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,700.00                             | 0.00            | 0.00        | 6,655.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,800.00                             | 0.00            | 0.00        | 6,755.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,842.46                             | 0.00            | 0.00        | 6,798.04            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| <b>Top of 4.5" Liner @ 6842.46ft</b> |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 6,900.00                             | 0.00            | 0.00        | 6,855.58            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 6,942.46                             | 0.00            | 0.00        | 6,898.04            | 192.37    | -501.14   | -191.93               | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| <b>KOP @ 6942.46ft</b>               |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 6,950.00                             | 0.75            | 180.05      | 6,905.58            | 192.32    | -501.14   | -191.88               | 10.00                 | 10.00                | 0.00                | 180.05               |
| 7,000.00                             | 5.75            | 180.05      | 6,955.49            | 189.48    | -501.14   | -189.05               | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,050.00                             | 10.75           | 180.05      | 7,004.95            | 182.31    | -501.15   | -181.87               | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,100.00                             | 15.75           | 180.05      | 7,053.61            | 170.85    | -501.16   | -170.41               | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,150.00                             | 20.75           | 180.05      | 7,101.07            | 155.19    | -501.17   | -154.75               | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,164.97                             | 22.25           | 180.05      | 7,115.00            | 149.70    | -501.18   | -149.27               | 10.00                 | 10.00                | 0.00                | 0.00                 |
| <b>Sharon Springs</b>                |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 7,200.00                             | 25.75           | 180.05      | 7,147.00            | 135.46    | -501.19   | -135.02               | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,232.67                             | 29.02           | 180.05      | 7,176.00            | 120.43    | -501.20   | -119.99               | 10.00                 | 10.00                | 0.00                | 0.00                 |
| <b>Niobrara A</b>                    |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 7,250.00                             | 30.75           | 180.05      | 7,191.03            | 111.80    | -501.21   | -111.36               | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,275.93                             | 33.35           | 180.05      | 7,213.00            | 98.04     | -501.22   | -97.60                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| <b>Niobrara B</b>                    |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 7,300.00                             | 35.75           | 180.05      | 7,232.83            | 84.39     | -501.24   | -83.95                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,350.00                             | 40.75           | 180.05      | 7,272.08            | 53.44     | -501.26   | -53.00                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,393.61                             | 45.12           | 180.05      | 7,304.00            | 23.74     | -501.29   | -23.30                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| <b>Niobrara C</b>                    |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 7,400.00                             | 45.75           | 180.05      | 7,308.48            | 19.19     | -501.29   | -18.75                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| <b>DLS = 10/100'</b>                 |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 7,450.00                             | 50.75           | 180.05      | 7,341.76            | -18.11    | -501.33   | 18.54                 | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,500.00                             | 55.75           | 180.05      | 7,371.67            | -58.16    | -501.36   | 58.60                 | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,550.00                             | 60.75           | 180.05      | 7,397.97            | -100.66   | -501.40   | 101.10                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,600.00                             | 65.75           | 180.05      | 7,420.46            | -145.30   | -501.44   | 145.74                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,650.00                             | 70.75           | 180.05      | 7,438.98            | -191.73   | -501.48   | 192.16                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,650.06                             | 70.75           | 180.05      | 7,439.00            | -191.79   | -501.48   | 192.22                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| <b>Fort Hays</b>                     |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 7,700.00                             | 75.75           | 180.05      | 7,453.38            | -239.59   | -501.53   | 240.03                | 10.01                 | 10.01                | 0.00                | 0.00                 |
| 7,750.00                             | 80.75           | 180.05      | 7,463.56            | -288.53   | -501.57   | 288.97                | 10.00                 | 10.00                | 0.00                | 0.00                 |

**Plan Report for 3D 15C-21HZ - Plan A0 - 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 (°) |
|---|-----------------|-------------|---------------------|-----------|-----------|-----------------------|-----------------------|----------------------|---------------------|----------------------|
| 7,766.71  | 82.42           | 180.05      | 7,466.00            | -305.05   | -501.58   | 305.49                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| <b>Codell</b>   |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 7,800.00  | 85.75           | 180.05      | 7,469.43            | -338.17   | -501.61   | 338.60                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| 7,841.09  | 89.86           | 180.05      | 7,471.00            | -379.22   | -501.65   | 379.66                | 10.00                 | 10.00                | 0.00                | 0.00                 |
| <b>End Build @ 7841.09ft - Landing Target (Heel) - 7"</b> |                 |             |                     |           |           |                       |                       |                      |                     |                      |
| 7,900.00  | 89.86           | 180.05      | 7,471.14            | -438.13   | -501.70   | 438.57                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 8,000.00  | 89.86           | 180.05      | 7,471.38            | -538.13   | -501.79   | 538.56                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 8,100.00  | 89.86           | 180.05      | 7,471.62            | -638.13   | -501.88   | 638.56                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 8,200.00  | 89.86           | 180.05      | 7,471.86            | -738.13   | -501.97   | 738.56                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 8,300.00  | 89.86           | 180.05      | 7,472.09            | -838.13   | -502.06   | 838.56                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 8,400.00  | 89.86           | 180.05      | 7,472.33            | -938.13   | -502.15   | 938.56                | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 8,500.00  | 89.86           | 180.05      | 7,472.57            | -1,038.13 | -502.24   | 1,038.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 8,600.00  | 89.86           | 180.05      | 7,472.81            | -1,138.13 | -502.33   | 1,138.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 8,700.00  | 89.86           | 180.05      | 7,473.05            | -1,238.13 | -502.41   | 1,238.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 8,800.00  | 89.86           | 180.05      | 7,473.29            | -1,338.12 | -502.50   | 1,338.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 8,900.00  | 89.86           | 180.05      | 7,473.52            | -1,438.12 | -502.59   | 1,438.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 9,000.00  | 89.86           | 180.05      | 7,473.76            | -1,538.12 | -502.68   | 1,538.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 9,100.00  | 89.86           | 180.05      | 7,474.00            | -1,638.12 | -502.77   | 1,638.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 9,200.00  | 89.86           | 180.05      | 7,474.24            | -1,738.12 | -502.86   | 1,738.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 9,300.00  | 89.86           | 180.05      | 7,474.48            | -1,838.12 | -502.95   | 1,838.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 9,400.00  | 89.86           | 180.05      | 7,474.72            | -1,938.12 | -503.04   | 1,938.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 9,500.00  | 89.86           | 180.05      | 7,474.96            | -2,038.12 | -503.13   | 2,038.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 9,600.00  | 89.86           | 180.05      | 7,475.19            | -2,138.12 | -503.22   | 2,138.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 9,700.00  | 89.86           | 180.05      | 7,475.43            | -2,238.12 | -503.31   | 2,238.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 9,800.00  | 89.86           | 180.05      | 7,475.67            | -2,338.12 | -503.39   | 2,338.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 9,900.00  | 89.86           | 180.05      | 7,475.91            | -2,438.12 | -503.48   | 2,438.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 10,000.00   | 89.86           | 180.05      | 7,476.15            | -2,538.12 | -503.57   | 2,538.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 10,100.00   | 89.86           | 180.05      | 7,476.39            | -2,638.12 | -503.66   | 2,638.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 10,200.00   | 89.86           | 180.05      | 7,476.63            | -2,738.12 | -503.75   | 2,738.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 10,300.00   | 89.86           | 180.05      | 7,476.86            | -2,838.12 | -503.84   | 2,838.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 10,400.00   | 89.86           | 180.05      | 7,477.10            | -2,938.12 | -503.93   | 2,938.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 10,500.00   | 89.86           | 180.05      | 7,477.34            | -3,038.12 | -504.02   | 3,038.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 10,600.00   | 89.86           | 180.05      | 7,477.58            | -3,138.12 | -504.11   | 3,138.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 10,700.00   | 89.86           | 180.05      | 7,477.82            | -3,238.12 | -504.20   | 3,238.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 10,800.00   | 89.86           | 180.05      | 7,478.06            | -3,338.12 | -504.29   | 3,338.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 10,900.00   | 89.86           | 180.05      | 7,478.29            | -3,438.12 | -504.37   | 3,438.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 11,000.00   | 89.86           | 180.05      | 7,478.53            | -3,538.12 | -504.46   | 3,538.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 11,100.00   | 89.86           | 180.05      | 7,478.77            | -3,638.12 | -504.55   | 3,638.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 11,200.00   | 89.86           | 180.05      | 7,479.01            | -3,738.12 | -504.64   | 3,738.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 11,300.00   | 89.86           | 180.05      | 7,479.25            | -3,838.12 | -504.73   | 3,838.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 11,400.00   | 89.86           | 180.05      | 7,479.49            | -3,938.12 | -504.82   | 3,938.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 11,500.00   | 89.86           | 180.05      | 7,479.73            | -4,038.12 | -504.91   | 4,038.56              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 11,600.00   | 89.86           | 180.05      | 7,479.96            | -4,138.12 | -505.00   | 4,138.55              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 11,700.00   | 89.86           | 180.05      | 7,480.20            | -4,238.12 | -505.09   | 4,238.55              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 11,800.00   | 89.86           | 180.05      | 7,480.44            | -4,338.11 | -505.18   | 4,338.55              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 11,900.00   | 89.86           | 180.05      | 7,480.68            | -4,438.11 | -505.27   | 4,438.55              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 12,000.00   | 89.86           | 180.05      | 7,480.92            | -4,538.11 | -505.35   | 4,538.55              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| 12,034.12   | 89.86           | 180.05      | 7,481.00            | -4,572.23 | -505.38   | 4,572.67              | 0.00                  | 0.00                 | 0.00                | 0.00                 |
| <b>Total Depth (Toe) - 3D 15C-21HZ_BHL</b>                |                 |             |                     |           |           |                       |                       |                      |                     |                      |

## Plan Report for 3D 15C-21HZ - Plan A0 - Permit

Plan Annotations

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates |            | Comment                       |
|---------------------|---------------------|-------------------|------------|-------------------------------|
|                     |                     | +N/-S (ft)        | +E/-W (ft) |                               |
| 1,200.00            | 1,200.00            | 0.00              | 0.00       | Begin Nudge @ 1200.00ft       |
| 1,700.00            | 1,697.47            | 15.60             | -40.63     | End Nudge @ 1700.00ft         |
| 4,290.00            | 4,248.12            | 176.77            | -460.51    | Begin Drop @ 4290.00ft        |
| 4,790.00            | 4,745.58            | 192.37            | -501.14    | End Drop @ 4790.00ft          |
| 6,842.46            | 6,798.04            | 192.37            | -501.14    | Top of 4.5" Liner @ 6842.46ft |
| 6,942.46            | 6,898.04            | 192.37            | -501.14    | KOP @ 6942.46ft               |
| 7,400.00            | 7,308.48            | 19.19             | -501.29    | DLS = 10/100'                 |
| 7,841.09            | 7,471.00            | -379.22           | -501.65    | End Build @ 7841.09ft         |
| 12,034.12           | 7,481.00            | -4,572.23         | -505.38    | TD Well @ 12034.12ft          |

Vertical Section Information

| Angle Type | Target               | Azimuth (°) | Origin Type | Origin     |            | Start TVD (ft) |
|------------|----------------------|-------------|-------------|------------|------------|----------------|
|            |                      |             |             | +N/-S (ft) | +E/-W (ft) |                |
| User       | No Target (Freehand) | 180.05      | Slot        | 0.00       | 0.00       | 0.00           |

Survey tool program

| From (ft) | To (ft)   | Survey/Plan      | Survey Tool |
|-----------|-----------|------------------|-------------|
| 0.00      | 12,034.12 | Plan A0 - Permit | MWD         |

Casing Details

| Measured Depth (ft) | Vertical Depth (ft) | Name   | Casing Diameter (") | Hole Diameter (") |
|---------------------|---------------------|--------|---------------------|-------------------|
| 975.00              | 975.00              | 9 5/8" | 9-5/8               | 13-1/2            |
| 7,841.09            | 7,471.00            | 7"     | 7                   | 8-3/4             |

Formation Details

| Measured Depth (ft) | Vertical Depth (ft) | Name                  | Lithology | Dip (°) | Dip Direction (°) |
|---------------------|---------------------|-----------------------|-----------|---------|-------------------|
| 925.00              | 925.00              | Fox Hills Base        |           | 0.00    |                   |
| 4,150.77            | 4,111.00            | Parkman               |           | 0.00    |                   |
| 4,556.16            | 4,512.00            | Sussex                |           | 0.00    |                   |
| 7,164.97            | 7,115.00            | Sharon Springs        |           | 0.00    |                   |
| 7,232.67            | 7,176.00            | Niobrara A            |           | 0.00    |                   |
| 7,275.93            | 7,213.00            | Niobrara B            |           | 0.00    |                   |
| 7,393.61            | 7,304.00            | Niobrara C            |           | 0.00    |                   |
| 7,650.06            | 7,439.00            | Fort Hays             |           | 0.00    |                   |
| 7,766.71            | 7,466.00            | Codell                |           | 0.00    |                   |
| 7,841.09            | 7,471.00            | Landing Target (Heel) |           | 0.00    |                   |
| 12,034.12           | 7,481.00            | Total Depth (Toe)     |           | 0.00    |                   |

## Plan Report for 3D 15C-21HZ - Plan A0 - Permit

### Targets associated with this wellbore

| Target Name     | TVD<br>(ft) | +N/-S<br>(ft) | +E/-W<br>(ft) | Shape   |
|-----------------|-------------|---------------|---------------|---------|
| 3D_SEC          | 0.00        | -2,397.26     | -1,633.21     | Polygon |
| 3D 15C-21HZ_BHL | 7,481.00    | -4,572.23     | -505.38       | Point   |
| 3D 15C-21HZ_SHL | 0.00        | 0.02          | 0.00          | Point   |
| 3D 15C-21HZ_LD  | 0.00        | -2,397.26     | -1,633.21     | Polygon |

## North Reference Sheet for Sec. 21-T2N-66W - 3D 15C-21HZ - 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' @ 5006.00ft (Drilling Rig). Northing and Easting are relative to 3D 15C-21HZ  
 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: 0.99995905

Grid Coordinates of Well: 1,291,102.88 ft N, 3,202,320.63 ft E  
 Geographical Coordinates of Well: 40° 07' 48.74" N, 104° 46' 35.16" W  
 Grid Convergence at Surface is: 0.47°

Based upon Minimum Curvature type calculations, at a Measured Depth of 12,034.12ft  
 the Bottom Hole Displacement is 4,600.08ft in the Direction of 186.31° (True).

Magnetic Convergence at surface is: -8.13° (15 July 2013, , BGGM2013)

