

Project: Weld County, CO (NAD 83)  
Site: Sec. 31-T1N-R67W  
Well: Sack 4N-30HZ  
Wellbore: Plan A  
Design: Rev A0 Permit

# Anadarko Petroleum Corp.

**HALLIBURTON**  
Sperry Drilling

## SECTION DETAILS

| Sec | MD       | Inc   | Azi    | TVD     | +N/-S   | +E/-W  | Dleg  | TFace  | VSect   | Target           |
|-----|----------|-------|--------|---------|---------|--------|-------|--------|---------|------------------|
| 1   | 0.00     | 0.00  | 0.00   | 0.00    | 0.00    | 0.00   | 0.00  | 0.00   | 0.00    |                  |
| 2   | 7059.05  | 0.00  | 0.00   | 7059.05 | 0.00    | 0.00   | 0.00  | 0.00   | 0.00    |                  |
| 3   | 7960.92  | 90.19 | 359.88 | 7632.00 | 574.83  | -1.25  | 10.00 | 359.88 | 574.83  |                  |
| 4   | 17158.17 | 90.19 | 359.88 | 7602.00 | 9772.00 | -21.28 | 0.00  | 0.00   | 9772.02 | Sack 4N-30HZ_BHL |

## WELLBORE TARGET DETAILS (LAT/LONG)

| Name             | TVD     | +N/-S   | +E/-W  | Latitude  | Longitude   |         |
|------------------|---------|---------|--------|-----------|-------------|---------|
| Sack 4N-30HZ_LD  | 0.00    | 0.00    | 0.00   | 40.002606 | -104.939261 | Polygon |
| Sack 4N-30HZ_SEC | 0.00    | 0.00    | 0.00   | 40.002606 | -104.939261 |         |
| Sack 4N-30HZ_SHL | 0.00    | 0.00    | 0.00   | 40.002606 | -104.939261 |         |
| Sack 4N-30HZ_BHL | 7602.00 | 9772.00 | -21.28 | 40.029431 | -104.939337 |         |
|                  |         |         |        |           |             |         |

## WELL DETAILS: Sack 4N-30HZ

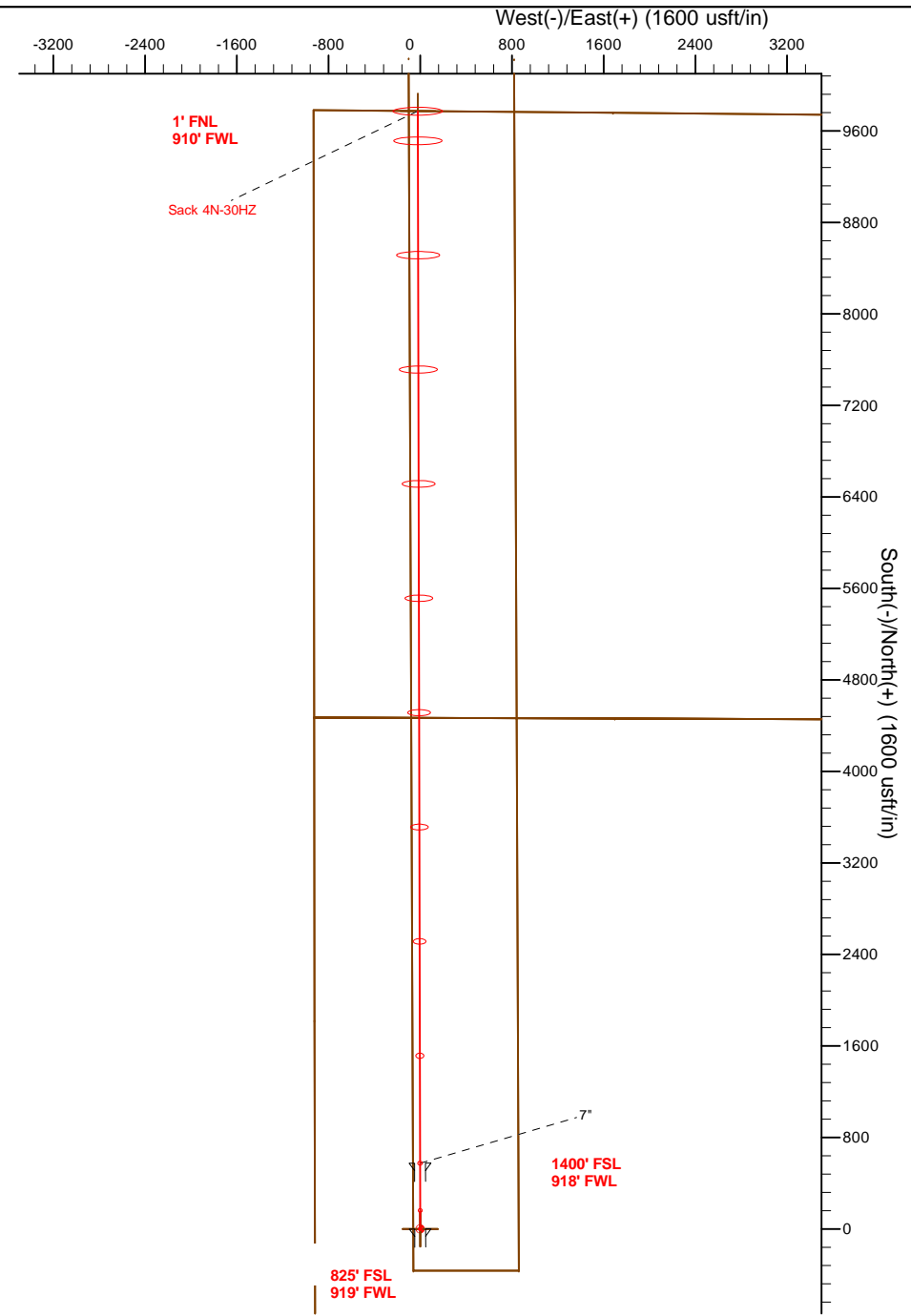
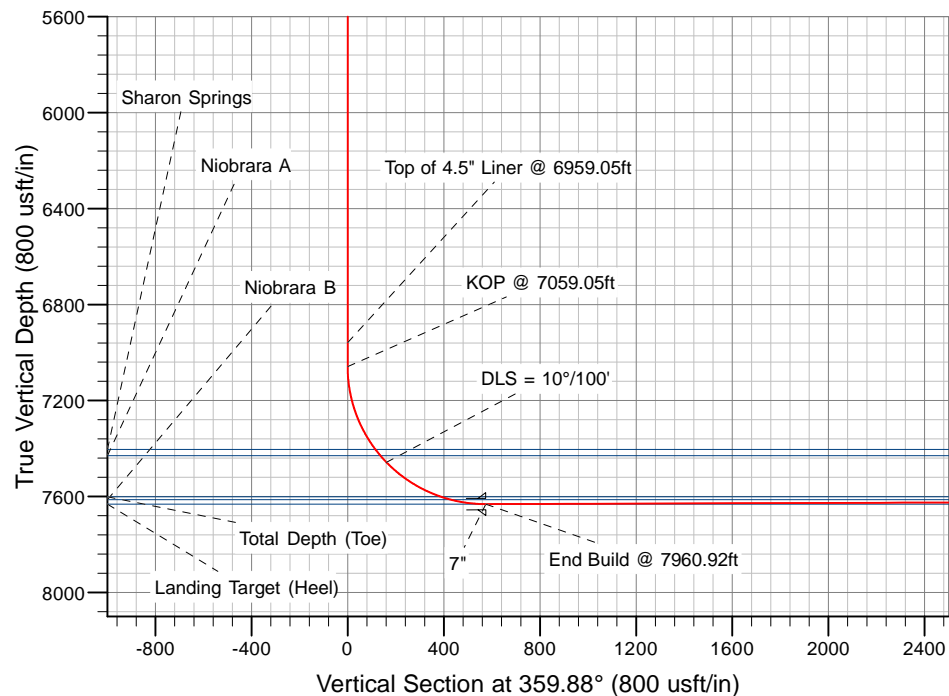
Ground Level: 5065.00  
RKB = 17' @ 5082.00usft (Drilling Rig)

Plan: Rev A0 Permit (Sack 4N-30HZ/Plan A)

Created By: Clint Eshelman Date: 12/23/2013  
Reviewed: Date:

TVD MD

7059.05 7059.05 KOP @ 7059.05ft



# Anadarko Petroleum Corp.

Weld County, CO (NAD 83)

Sec. 31-T1N-R67W

Sack 4N-30HZ

## Plan A

Plan: Rev A0 Permit

# Sperry Drilling Services

## Proposal Report

23 December, 2013

Well Coordinates: 1,244,292.79 N, 3,157,086.00 E (40° 00' 09.38" N, 104° 56' 21.34" W)

Ground Level: 5,065.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well Sack 4N-30HZ

RKB = 17' @ 5082.00usft (Drilling Rig)

N

True

Dec-Deg - API - US Survey Feet - Custom

**HALLIBURTON**

**Plan Report for Sack 4N-30HZ - Rev A0 Permit**

| Measured<br>Depth<br>(usft)                                  | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) | Toolface<br>Azimuth<br>(°) |
|--|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|----------------------------|
| 0.00   | 0.00               | 0.00           | 0.00                        | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| <b>Sack 4N-30HZ_LD - Sack 4N-30HZ_SHL - Sack 4N-30HZ_SEC</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                       |
| 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                       |
| 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                       |
| 1,237.00   | 0.00               | 0.00           | 1,237.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| <b>Fox Hills Marker</b>                                      |                    |                |                             |                 |                 |                               |                               |                              |                             |                            |
| 1,287.00   | 0.00               | 0.00           | 1,287.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| <b>9 5/8"</b>  |                    |                |                             |                 |                 |                               |                               |                              |                             |                            |
| 1,300.00   | 0.00               | 0.00           | 1,300.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 1,400.00   | 0.00               | 0.00           | 1,400.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 1,500.00   | 0.00               | 0.00           | 1,500.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 1,600.00   | 0.00               | 0.00           | 1,600.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 1,700.00   | 0.00               | 0.00           | 1,700.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 1,800.00   | 0.00               | 0.00           | 1,800.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 1,900.00   | 0.00               | 0.00           | 1,900.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 2,000.00   | 0.00               | 0.00           | 2,000.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 2,100.00   | 0.00               | 0.00           | 2,100.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 2,200.00   | 0.00               | 0.00           | 2,200.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 2,300.00   | 0.00               | 0.00           | 2,300.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 2,400.00   | 0.00               | 0.00           | 2,400.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 2,500.00   | 0.00               | 0.00           | 2,500.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 2,600.00   | 0.00               | 0.00           | 2,600.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 2,700.00   | 0.00               | 0.00           | 2,700.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 2,800.00   | 0.00               | 0.00           | 2,800.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 2,900.00   | 0.00               | 0.00           | 2,900.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 3,000.00   | 0.00               | 0.00           | 3,000.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 3,100.00   | 0.00               | 0.00           | 3,100.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 3,200.00   | 0.00               | 0.00           | 3,200.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 3,300.00   | 0.00               | 0.00           | 3,300.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 3,400.00   | 0.00               | 0.00           | 3,400.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 3,500.00   | 0.00               | 0.00           | 3,500.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 3,600.00   | 0.00               | 0.00           | 3,600.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 3,700.00   | 0.00               | 0.00           | 3,700.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 3,800.00   | 0.00               | 0.00           | 3,800.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 3,900.00   | 0.00               | 0.00           | 3,900.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 4,000.00   | 0.00               | 0.00           | 4,000.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 4,100.00   | 0.00               | 0.00           | 4,100.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 4,200.00   | 0.00               | 0.00           | 4,200.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 4,300.00   | 0.00               | 0.00           | 4,300.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 4,400.00   | 0.00               | 0.00           | 4,400.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 4,500.00   | 0.00               | 0.00           | 4,500.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 4,600.00   | 0.00               | 0.00           | 4,600.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 4,700.00   | 0.00               | 0.00           | 4,700.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 4,800.00   | 0.00               | 0.00           | 4,800.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 4,900.00   | 0.00               | 0.00           | 4,900.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 5,000.00   | 0.00               | 0.00           | 5,000.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 5,082.00   | 0.00               | 0.00           | 5,082.00                    | 0.00            | 0.00            | 0.00                          | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| <b>Sussex</b>  |                    |                |                             |                 |                 |                               |                               |                              |                             |                            |

**Plan Report for Sack 4N-30HZ - 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 (°) |
|---|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|----------------------|
| 5,100.00  | 0.00            | 0.00        | 5,100.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 5,200.00  | 0.00            | 0.00        | 5,200.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 5,300.00  | 0.00            | 0.00        | 5,300.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 5,400.00  | 0.00            | 0.00        | 5,400.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 5,403.00  | 0.00            | 0.00        | 5,403.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| <b>Shannon</b>  |                 |             |                       |              |              |                         |                         |                        |                       |                      |
| 5,500.00  | 0.00            | 0.00        | 5,500.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 5,600.00  | 0.00            | 0.00        | 5,600.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 5,700.00  | 0.00            | 0.00        | 5,700.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 5,800.00  | 0.00            | 0.00        | 5,800.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 5,900.00  | 0.00            | 0.00        | 5,900.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,000.00  | 0.00            | 0.00        | 6,000.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,100.00  | 0.00            | 0.00        | 6,100.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,200.00  | 0.00            | 0.00        | 6,200.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,300.00  | 0.00            | 0.00        | 6,300.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,400.00  | 0.00            | 0.00        | 6,400.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,500.00  | 0.00            | 0.00        | 6,500.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,600.00  | 0.00            | 0.00        | 6,600.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,700.00  | 0.00            | 0.00        | 6,700.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,800.00  | 0.00            | 0.00        | 6,800.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,900.00  | 0.00            | 0.00        | 6,900.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 6,959.05  | 0.00            | 0.00        | 6,959.05              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| <b>Top of 4.5" Liner @ 6959.05ft</b>                      |                 |             |                       |              |              |                         |                         |                        |                       |                      |
| 7,000.00  | 0.00            | 0.00        | 7,000.00              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 7,059.05  | 0.00            | 0.00        | 7,059.05              | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| <b>KOP @ 7059.05ft</b>                                    |                 |             |                       |              |              |                         |                         |                        |                       |                      |
| 7,100.00  | 4.10            | 359.88      | 7,099.97              | 1.46         | 0.00         | 1.46                    | 10.00                   | 10.00                  | 0.00                  | 359.88               |
| 7,200.00  | 14.10           | 359.88      | 7,198.58              | 17.25        | -0.04        | 17.25                   | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| 7,300.00  | 24.10           | 359.88      | 7,292.96              | 49.92        | -0.11        | 49.92                   | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| 7,400.00  | 34.10           | 359.88      | 7,380.23              | 98.49        | -0.21        | 98.49                   | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| 7,429.22  | 37.02           | 359.88      | 7,404.00              | 115.48       | -0.25        | 115.48                  | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| <b>Sharon Springs</b>                                     |                 |             |                       |              |              |                         |                         |                        |                       |                      |
| 7,462.53  | 40.35           | 359.88      | 7,430.00              | 136.29       | -0.30        | 136.29                  | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| <b>Niobrara A</b>   |                 |             |                       |              |              |                         |                         |                        |                       |                      |
| 7,500.00  | 44.10           | 359.88      | 7,457.74              | 161.47       | -0.35        | 161.47                  | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| <b>DLS = 10°/100'</b>                                     |                 |             |                       |              |              |                         |                         |                        |                       |                      |
| 7,600.00  | 54.10           | 359.88      | 7,523.14              | 236.95       | -0.52        | 236.95                  | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| 7,700.00  | 64.10           | 359.88      | 7,574.44              | 322.64       | -0.70        | 322.64                  | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| 7,800.00  | 74.10           | 359.88      | 7,610.07              | 415.94       | -0.91        | 415.94                  | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| 7,815.02  | 75.60           | 359.88      | 7,614.00              | 430.44       | -0.94        | 430.44                  | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| <b>Niobrara B</b>   |                 |             |                       |              |              |                         |                         |                        |                       |                      |
| 7,900.00  | 84.10           | 359.88      | 7,628.97              | 514.01       | -1.12        | 514.01                  | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| 7,960.92  | 90.19           | 359.88      | 7,632.00              | 574.83       | -1.25        | 574.83                  | 10.00                   | 10.00                  | 0.00                  | 0.00                 |
| <b>End Build @ 7960.92ft - Landing Target (Heel) - 7"</b> |                 |             |                       |              |              |                         |                         |                        |                       |                      |
| 8,000.00  | 90.19           | 359.88      | 7,631.88              | 613.91       | -1.34        | 613.91                  | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 8,100.00  | 90.19           | 359.88      | 7,631.55              | 713.91       | -1.55        | 713.91                  | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 8,200.00  | 90.19           | 359.88      | 7,631.22              | 813.90       | -1.77        | 813.91                  | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 8,300.00  | 90.19           | 359.88      | 7,630.90              | 913.90       | -1.99        | 913.91                  | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 8,400.00  | 90.19           | 359.88      | 7,630.57              | 1,013.90     | -2.21        | 1,013.91                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 8,500.00  | 90.19           | 359.88      | 7,630.25              | 1,113.90     | -2.43        | 1,113.90                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 8,600.00  | 90.19           | 359.88      | 7,629.92              | 1,213.90     | -2.64        | 1,213.90                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 8,700.00  | 90.19           | 359.88      | 7,629.59              | 1,313.90     | -2.86        | 1,313.90                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 8,800.00  | 90.19           | 359.88      | 7,629.27              | 1,413.90     | -3.08        | 1,413.90                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 8,900.00  | 90.19           | 359.88      | 7,628.94              | 1,513.90     | -3.30        | 1,513.90                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 9,000.00  | 90.19           | 359.88      | 7,628.61              | 1,613.90     | -3.52        | 1,613.90                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 9,100.00  | 90.19           | 359.88      | 7,628.29              | 1,713.90     | -3.73        | 1,713.90                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 9,200.00  | 90.19           | 359.88      | 7,627.96              | 1,813.90     | -3.95        | 1,813.90                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 9,300.00  | 90.19           | 359.88      | 7,627.64              | 1,913.90     | -4.17        | 1,913.90                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 9,400.00  | 90.19           | 359.88      | 7,627.31              | 2,013.90     | -4.39        | 2,013.90                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |

**Plan Report for Sack 4N-30HZ - Rev A0 Permit**

| Measured<br>Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Vertical<br>Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Vertical<br>Section<br>(usft) | Dogleg<br>Rate<br>(°/100usft) | Build<br>Rate<br>(°/100usft) | Turn<br>Rate<br>(°/100usft) | Toolface<br>Azimuth<br>(°) |
|-----------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|----------------------------|
| 9,500.00                    | 90.19              | 359.88         | 7,626.98                    | 2,113.89        | -4.60           | 2,113.90                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 9,600.00                    | 90.19              | 359.88         | 7,626.66                    | 2,213.89        | -4.82           | 2,213.90                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 9,700.00                    | 90.19              | 359.88         | 7,626.33                    | 2,313.89        | -5.04           | 2,313.90                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 9,800.00                    | 90.19              | 359.88         | 7,626.00                    | 2,413.89        | -5.26           | 2,413.90                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 9,900.00                    | 90.19              | 359.88         | 7,625.68                    | 2,513.89        | -5.48           | 2,513.90                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 10,000.00                   | 90.19              | 359.88         | 7,625.35                    | 2,613.89        | -5.69           | 2,613.90                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 10,100.00                   | 90.19              | 359.88         | 7,625.03                    | 2,713.89        | -5.91           | 2,713.90                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 10,200.00                   | 90.19              | 359.88         | 7,624.70                    | 2,813.89        | -6.13           | 2,813.90                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 10,300.00                   | 90.19              | 359.88         | 7,624.37                    | 2,913.89        | -6.35           | 2,913.90                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 10,400.00                   | 90.19              | 359.88         | 7,624.05                    | 3,013.89        | -6.56           | 3,013.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 10,500.00                   | 90.19              | 359.88         | 7,623.72                    | 3,113.89        | -6.78           | 3,113.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 10,600.00                   | 90.19              | 359.88         | 7,623.40                    | 3,213.89        | -7.00           | 3,213.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 10,700.00                   | 90.19              | 359.88         | 7,623.07                    | 3,313.89        | -7.22           | 3,313.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 10,800.00                   | 90.19              | 359.88         | 7,622.74                    | 3,413.88        | -7.44           | 3,413.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 10,900.00                   | 90.19              | 359.88         | 7,622.42                    | 3,513.88        | -7.65           | 3,513.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 11,000.00                   | 90.19              | 359.88         | 7,622.09                    | 3,613.88        | -7.87           | 3,613.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 11,100.00                   | 90.19              | 359.88         | 7,621.76                    | 3,713.88        | -8.09           | 3,713.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 11,200.00                   | 90.19              | 359.88         | 7,621.44                    | 3,813.88        | -8.31           | 3,813.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 11,300.00                   | 90.19              | 359.88         | 7,621.11                    | 3,913.88        | -8.52           | 3,913.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 11,400.00                   | 90.19              | 359.88         | 7,620.79                    | 4,013.88        | -8.74           | 4,013.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 11,500.00                   | 90.19              | 359.88         | 7,620.46                    | 4,113.88        | -8.96           | 4,113.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 11,600.00                   | 90.19              | 359.88         | 7,620.13                    | 4,213.88        | -9.18           | 4,213.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 11,700.00                   | 90.19              | 359.88         | 7,619.81                    | 4,313.88        | -9.40           | 4,313.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 11,800.00                   | 90.19              | 359.88         | 7,619.48                    | 4,413.88        | -9.61           | 4,413.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 11,900.00                   | 90.19              | 359.88         | 7,619.15                    | 4,513.88        | -9.83           | 4,513.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 12,000.00                   | 90.19              | 359.88         | 7,618.83                    | 4,613.88        | -10.05          | 4,613.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 12,100.00                   | 90.19              | 359.88         | 7,618.50                    | 4,713.87        | -10.27          | 4,713.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 12,200.00                   | 90.19              | 359.88         | 7,618.18                    | 4,813.87        | -10.48          | 4,813.89                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 12,300.00                   | 90.19              | 359.88         | 7,617.85                    | 4,913.87        | -10.70          | 4,913.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 12,400.00                   | 90.19              | 359.88         | 7,617.52                    | 5,013.87        | -10.92          | 5,013.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 12,500.00                   | 90.19              | 359.88         | 7,617.20                    | 5,113.87        | -11.14          | 5,113.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 12,600.00                   | 90.19              | 359.88         | 7,616.87                    | 5,213.87        | -11.36          | 5,213.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 12,700.00                   | 90.19              | 359.88         | 7,616.54                    | 5,313.87        | -11.57          | 5,313.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 12,800.00                   | 90.19              | 359.88         | 7,616.22                    | 5,413.87        | -11.79          | 5,413.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 12,900.00                   | 90.19              | 359.88         | 7,615.89                    | 5,513.87        | -12.01          | 5,513.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 13,000.00                   | 90.19              | 359.88         | 7,615.57                    | 5,613.87        | -12.23          | 5,613.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 13,100.00                   | 90.19              | 359.88         | 7,615.24                    | 5,713.87        | -12.44          | 5,713.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 13,200.00                   | 90.19              | 359.88         | 7,614.91                    | 5,813.87        | -12.66          | 5,813.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 13,300.00                   | 90.19              | 359.88         | 7,614.59                    | 5,913.87        | -12.88          | 5,913.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 13,400.00                   | 90.19              | 359.88         | 7,614.26                    | 6,013.86        | -13.10          | 6,013.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 13,500.00                   | 90.19              | 359.88         | 7,613.93                    | 6,113.86        | -13.32          | 6,113.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 13,600.00                   | 90.19              | 359.88         | 7,613.61                    | 6,213.86        | -13.53          | 6,213.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 13,700.00                   | 90.19              | 359.88         | 7,613.28                    | 6,313.86        | -13.75          | 6,313.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 13,800.00                   | 90.19              | 359.88         | 7,612.96                    | 6,413.86        | -13.97          | 6,413.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 13,900.00                   | 90.19              | 359.88         | 7,612.63                    | 6,513.86        | -14.19          | 6,513.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 14,000.00                   | 90.19              | 359.88         | 7,612.30                    | 6,613.86        | -14.40          | 6,613.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 14,100.00                   | 90.19              | 359.88         | 7,611.98                    | 6,713.86        | -14.62          | 6,713.88                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 14,200.00                   | 90.19              | 359.88         | 7,611.65                    | 6,813.86        | -14.84          | 6,813.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 14,300.00                   | 90.19              | 359.88         | 7,611.32                    | 6,913.86        | -15.06          | 6,913.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 14,400.00                   | 90.19              | 359.88         | 7,611.00                    | 7,013.86        | -15.28          | 7,013.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 14,500.00                   | 90.19              | 359.88         | 7,610.67                    | 7,113.86        | -15.49          | 7,113.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 14,600.00                   | 90.19              | 359.88         | 7,610.35                    | 7,213.86        | -15.71          | 7,213.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 14,700.00                   | 90.19              | 359.88         | 7,610.02                    | 7,313.85        | -15.93          | 7,313.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 14,800.00                   | 90.19              | 359.88         | 7,609.69                    | 7,413.85        | -16.15          | 7,413.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 14,900.00                   | 90.19              | 359.88         | 7,609.37                    | 7,513.85        | -16.37          | 7,513.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 15,000.00                   | 90.19              | 359.88         | 7,609.04                    | 7,613.85        | -16.58          | 7,613.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 15,100.00                   | 90.19              | 359.88         | 7,608.71                    | 7,713.85        | -16.80          | 7,713.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 15,200.00                   | 90.19              | 359.88         | 7,608.39                    | 7,813.85        | -17.02          | 7,813.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 15,300.00                   | 90.19              | 359.88         | 7,608.06                    | 7,913.85        | -17.24          | 7,913.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |
| 15,400.00                   | 90.19              | 359.88         | 7,607.74                    | 8,013.85        | -17.45          | 8,013.87                      | 0.00                          | 0.00                         | 0.00                        | 0.00                       |

**Plan Report for Sack 4N-30HZ - 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 (°) |
|--|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|----------------------|
| 15,500.00                                      | 90.19           | 359.88      | 7,607.41              | 8,113.85     | -17.67       | 8,113.87                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 15,600.00                                      | 90.19           | 359.88      | 7,607.08              | 8,213.85     | -17.89       | 8,213.87                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 15,700.00                                      | 90.19           | 359.88      | 7,606.76              | 8,313.85     | -18.11       | 8,313.87                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 15,800.00                                      | 90.19           | 359.88      | 7,606.43              | 8,413.85     | -18.33       | 8,413.87                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 15,900.00                                      | 90.19           | 359.88      | 7,606.10              | 8,513.85     | -18.54       | 8,513.87                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 16,000.00                                      | 90.19           | 359.88      | 7,605.78              | 8,613.84     | -18.76       | 8,613.87                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 16,100.00                                      | 90.19           | 359.88      | 7,605.45              | 8,713.84     | -18.98       | 8,713.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 16,200.00                                      | 90.19           | 359.88      | 7,605.13              | 8,813.84     | -19.20       | 8,813.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 16,300.00                                      | 90.19           | 359.88      | 7,604.80              | 8,913.84     | -19.41       | 8,913.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 16,400.00                                      | 90.19           | 359.88      | 7,604.47              | 9,013.84     | -19.63       | 9,013.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 16,500.00                                      | 90.19           | 359.88      | 7,604.15              | 9,113.84     | -19.85       | 9,113.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 16,600.00                                      | 90.19           | 359.88      | 7,603.82              | 9,213.84     | -20.07       | 9,213.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 16,700.00                                      | 90.19           | 359.88      | 7,603.49              | 9,313.84     | -20.29       | 9,313.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 16,800.00                                      | 90.19           | 359.88      | 7,603.17              | 9,413.84     | -20.50       | 9,413.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 16,900.00                                      | 90.19           | 359.88      | 7,602.84              | 9,513.84     | -20.72       | 9,513.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 17,000.00                                      | 90.19           | 359.88      | 7,602.52              | 9,613.84     | -20.94       | 9,613.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 17,100.00                                      | 90.19           | 359.88      | 7,602.19              | 9,713.84     | -21.16       | 9,713.86                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| 17,158.16                                      | 90.19           | 359.88      | 7,602.00              | 9,772.00     | -21.28       | 9,772.02                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| <b>Total Depth (Toe)</b>                       |                 |             |                       |              |              |                         |                         |                        |                       |                      |
| 17,158.17                                      | 90.19           | 359.88      | 7,602.00              | 9,772.00     | -21.28       | 9,772.02                | 0.00                    | 0.00                   | 0.00                  | 0.00                 |
| <b>TD Well @ 17158.17ft - Sack 4N-30HZ_BHL</b> |                 |             |                       |              |              |                         |                         |                        |                       |                      |

**Plan Annotations**

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                       |
|-----------------------|-----------------------|-------------------|--------------|-------------------------------|
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                               |
| 6,959.05              | 6,959.05              | 0.00              | 0.00         | Top of 4.5" Liner @ 6959.05ft |
| 7,059.05              | 7,059.05              | 0.00              | 0.00         | KOP @ 7059.05ft               |
| 7,500.00              | 7,457.74              | 161.47            | -0.35        | DLS = 10°/100'                |
| 7,960.92              | 7,632.00              | 574.83            | -1.25        | End Build @ 7960.92ft         |
| 17,158.17             | 7,602.00              | 9,772.00          | -21.28       | TD Well @ 17158.17ft          |

**Vertical Section Information**

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

**Survey tool program**

| From (usft) | To (usft) | Survey/Plan   | Survey Tool |
|-------------|-----------|---------------|-------------|
| 0.00        | 7,960.92  | Rev A0 Permit | MWD         |
| 7,960.92    | 17,158.17 | Rev A0 Permit | MWD         |

**Casing Details**

| Measured Depth (usft) | Vertical Depth (usft) | Name   | Casing Diameter (") | Hole Diameter (") |
|-----------------------|-----------------------|--------|---------------------|-------------------|
| 1,287.00              | 1,287.00              | 9 5/8" | 9-5/8               | 13-1/2            |
| 7,960.92              | 7,632.00              | 7"     | 7                   | 8-3/4             |

## Plan Report for Sack 4N-30HZ - Rev A0 Permit

**Formation Details**

| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Name                  | Lithology | Dip<br>(°) | Dip<br>Direction<br>(°) |
|-----------------------------|-----------------------------|-----------------------|-----------|------------|-------------------------|
| 1,237.00                    | 1,237.00                    | Fox Hills Marker      |           | 0.00       |                         |
| 5,082.00                    | 5,082.00                    | Sussex                |           | 0.00       |                         |
| 5,403.00                    | 5,403.00                    | Shannon               |           | 0.00       |                         |
| 7,429.22                    | 7,404.00                    | Sharon Springs        |           | 0.00       |                         |
| 7,462.53                    | 7,430.00                    | Niobrara A            |           | 0.00       |                         |
| 7,815.02                    | 7,614.00                    | Niobrara B            |           | 0.00       |                         |
| 7,960.92                    | 7,632.00                    | Landing Target (Heel) |           | 0.00       |                         |
| 17,158.16                   | 7,602.00                    | Total Depth (Toe)     |           | 0.00       |                         |

**Targets associated with this wellbore**

| Target Name      | TVD<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Shape   |
|------------------|---------------|-----------------|-----------------|---------|
| Sack 4N-30HZ_LD  | 0.00          | 0.00            | 0.00            | Polygon |
| Sack 4N-30HZ_SHL | 0.00          | 0.00            | 0.00            | Point   |
| Sack 4N-30HZ_SEC | 0.00          | 0.00            | 0.00            | Polygon |
| Sack 4N-30HZ_BHL | 7,602.00      | 9,772.00        | -21.28          | Point   |

**Directional Difficulty Index**

|                                     |                |                               |                                     |
|-------------------------------------|----------------|-------------------------------|-------------------------------------|
| Average Dogleg over Survey:         | 0.53 °/100usft | Maximum Dogleg over Survey:   | 10.00 °/100usft at 7,960.92<br>usft |
| Net Tortousity applicable to Plans: | 0.53 °/100usft | Directional Difficulty Index: | 6.576                               |

**Audit Info**

**North Reference Sheet for Sec. 31-T1N-R67W - Sack 4N-30HZ - 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' @ 5082.00usft (Drilling Rig). Northing and Easting are relative to Sack 4N-30HZ  
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: 0.99996617

Grid Coordinates of Well: 1,244,292.79 usft N, 3,157,086.00 usft E  
Geographical Coordinates of Well: 40° 00' 09.38" N, 104° 56' 21.34" W  
Grid Convergence at Surface is: 0.36°

Based upon Minimum Curvature type calculations, at a Measured Depth of 17,158.17usft  
the Bottom Hole Displacement is 9,772.02usft in the Direction of 359.88° ( True).  
Magnetic Convergence at surface is: -8.26° (23 December 2013, , BGGM2013)

