

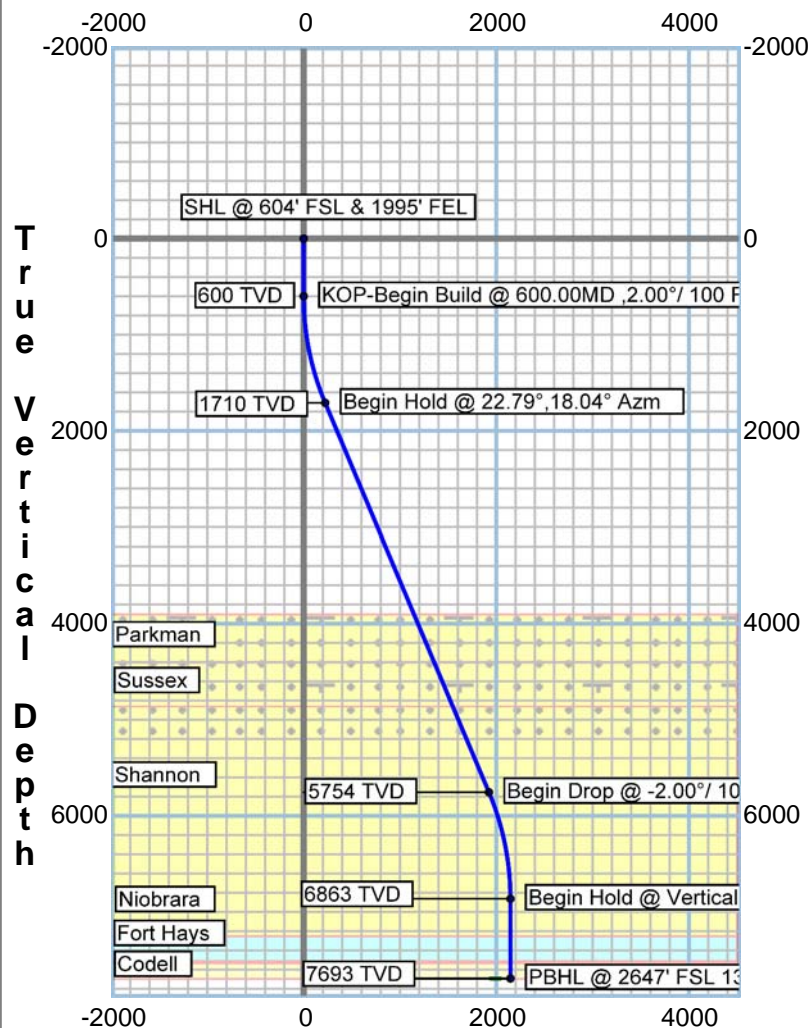


Job ID : Grant Brothers Pad  
Company : Sundance Energy, Inc  
Lease/Well : Grant Brothers 23-2 Ae  
Location : Sec 23 T2N R68W  
API JOB # : 05-123-xxxxx  
Rig Name : Cade 25  
State/Province : CO  
County/Parish : Weld  
Country : USA

Latitude : 40°7'6.8412" N  
Longitude : -104°58'5.0376" W  
Northing : 1286484.16  
Easting : 3148760.52  
System Zone : US State Plane 1983  
Projection Type : LAMBERT  
Elevation (To MSL) : 4919 ft  
RKB : 14 ft  
Comment : Plan 3

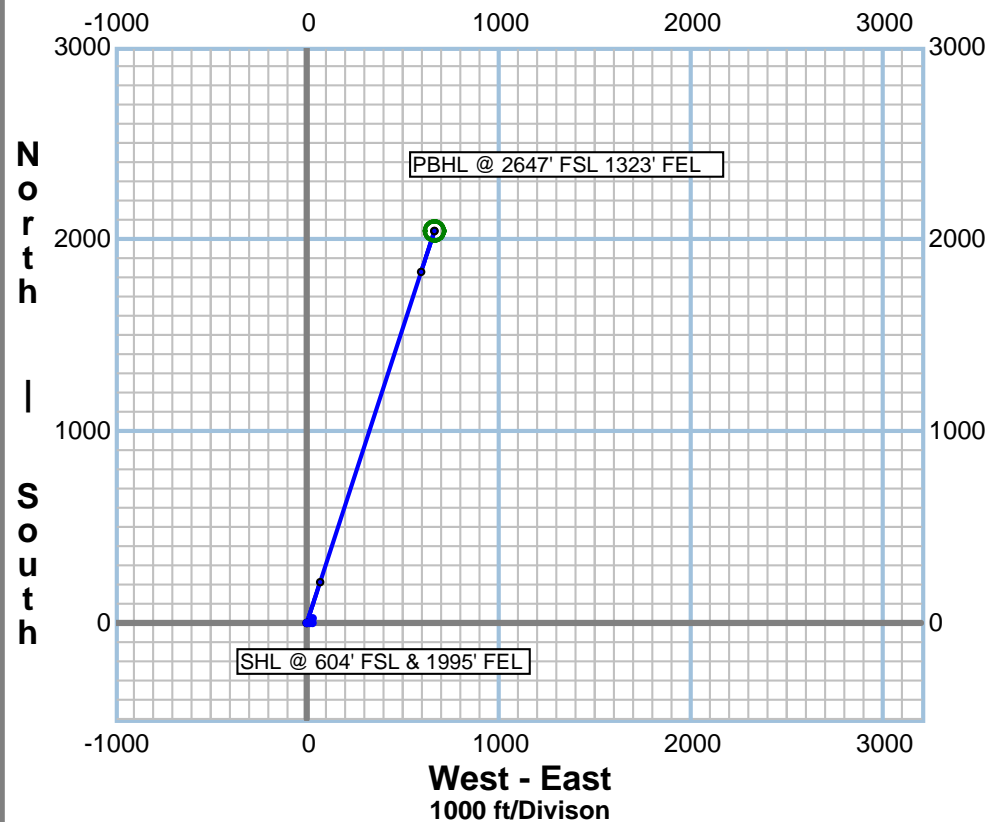


### Vertical Section Plot



Vertical Section (18.04°)  
2000 ft/Division

### Horizontal Plot



#### CRITICAL POINTS - GRANT BROTHERS 23-2 AE PROPOSAL

| MD      | Inc   | Azm    | TVD     | EW     | NS      | VS      | CI      | Cldir | WR      | BR    | DLS  |
|---------|-------|--------|---------|--------|---------|---------|---------|-------|---------|-------|------|
| 0.00    | 0.00  | 0.00   | 0.00    | 0.00   | 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  | 0.00 |
| 1739.47 | 22.79 | 18.04  | 1709.66 | 69.26  | 212.65  | 223.64  | 223.64  | 18.04 | 0.00    | 2.00  | 2.00 |
| 6126.63 | 22.79 | 18.04  | 5754.32 | 595.53 | 1828.49 | 1923.03 | 1923.03 | 18.04 | 0.00    | 0.00  | 0.00 |
| 7265.29 | 0.02  | 356.03 | 6863.17 | 664.72 | 2041.17 | 2146.68 | 2146.68 | 18.04 | -112.71 | -1.99 | 2.00 |
| 8095.13 | 0.02  | 356.03 | 7693.01 | 664.70 | 2041.43 | 2146.92 | 2146.92 | 18.04 | 0.00    | 0.00  | 0.00 |

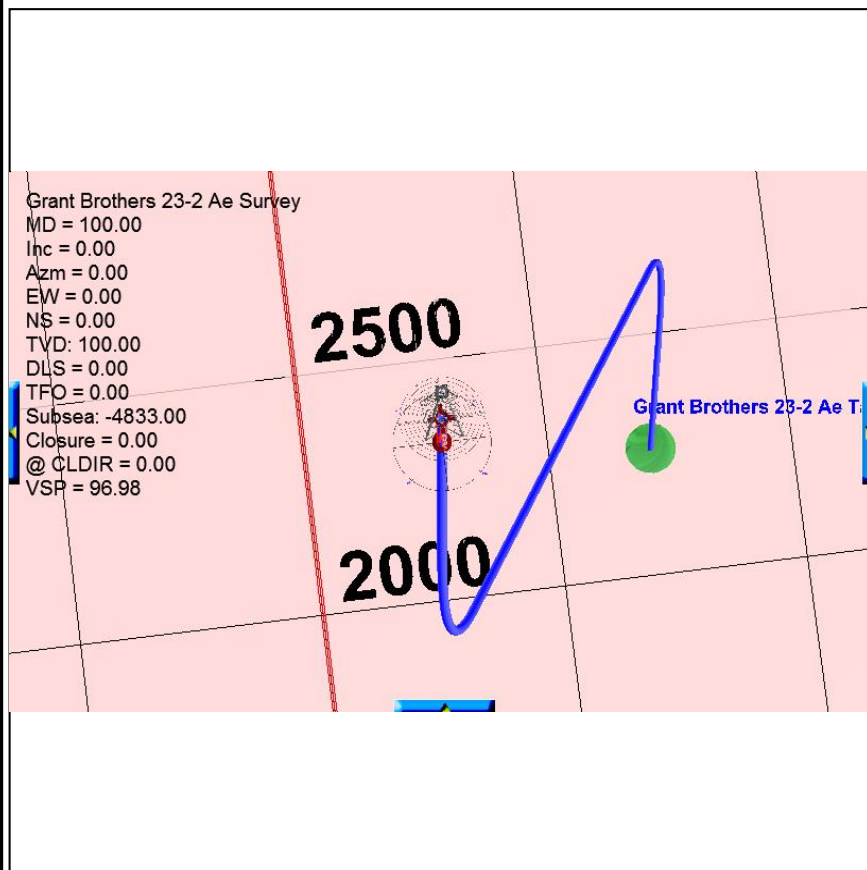


Job ID : Grant Brothers Pad  
Company : Sundance Energy, Inc  
Lease/Well : Grant Brothers 23-2 Ae  
Location : Sec 23 T2N R68W  
API JOB # : 05-123-xxxxx  
Rig Name : Cade 25  
State/Province : CO  
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Latitude : 40°7'6.8412" N  
Longitude : -104°58'5.0376" W  
Northing : 1286484.16  
Easting : 3148760.52  
System Zone : US State Plane 1983  
Projection Type : LAMBERT  
Elevation (To MSL) : 4919 ft  
RKB : 14 ft  
Comment : Plan 3



| TARGETS |                               |            |            |            |         | LITHOLOGY |            |               |             |           |               |
|---------|-------------------------------|------------|------------|------------|---------|-----------|------------|---------------|-------------|-----------|---------------|
| SHAPE   | NAME                          | Easting    | Northing   | Subsea TVD | EW      | Name      | Subsea Top | Subsea Bottom | Description | Dip_Angle | Dip_Direction |
| CIRCLE  | Grant Brothers 23-54 Target   | 3149427.10 | 1287206.54 | 2745.00    | 670.90  | Parkman   | -1028.00   | -528.00       | Parkman     | 0.00      | 0.00          |
| CIRCLE  | Grant Brothers 23-4 Ae Target | 3148106.00 | 1287200.80 | 2750.00    | -650.21 | Sussex    | -528.00    | -70.00        | Sussex      | 0.00      | 0.00          |
| CIRCLE  | Grant Brothers 23-2 Ae Target | 3149412.97 | 1288529.54 | 2760.00    | 664.71  | Shannon   | -70.00     | 2320.00       | Shannon     | 0.00      | 0.00          |
| CIRCLE  | Grant Brothers 23-43 Target   | 3150081.13 | 1287870.58 | 2765.00    | 1328.90 | Niobrara  | 2320.00    | 2580.00       | Niobrara    | 0.00      | 0.00          |
|         |                               |            |            |            |         | Fort Hays | 2580.00    | 2600.00       | Fort Hays   | 0.00      | 0.00          |
|         |                               |            |            |            |         | Codell    | 2600.00    | 2765.00       | Codell      | 0.00      | 0.00          |



#### MAGNETICS INFORMATION :

Magnetic Model: C:\HawkEye\IGRF2005.MIF

Date for Magnetics: 05/31/2013

Latitude: 40°07'6.8412" N

Longitude: -104°58'5.0376" W

Magnetic Declination: 8.63

Total Correction(Mag to Grid): 8.28

Field Strength (nt): 52832

B-X Component (nt): 20634

B-Y Component (nt): 3131

B-Z Component (nt): 48536

B-Horz Component (nt): 20870

Dip Angle: 66.73

#### METHODS OF CORRECTIONS:

\* To correct from Magnetic North to True North use:

8.63°E --> TN = MN + 8.63

\* To correct from True North to Grid North use:

0.34°E --> GN = TN - 0.34 : True to Grid

\* To Correct from Magnetic North to Grid North use:

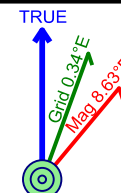
8.28°E --> GN = MN + 8.28 : Magnetic to Grid



**Job Number:** Grant Brothers Pad  
**Company:** Sundance Energy, Inc  
**Lease/Well:** Grant Brothers 23-2 Ae  
**Location:** Sec 23 T2N R68W  
**Rig Name:** Cade 25  
**State/County:** CO/ Weld  
**Country:** USA  
**API Number:** 05-123-xxxx

**Elevation :** 4919.00 ft  
**RKB:** 14.00 ft  
**Projection System:** US State Plane 1983  
**Projection Group:** Colorado Northern Zone  
**Projection Datum:** GRS80  
**Mag. Declination:** 8.63°  
**Grid Convergence:** 0.34370 E  
**Date:** Friday, August 02, 2013

Calculated by HawkEye Software  
Minimum Curvature Method  
Vertical Section Plane 18.04°  
Northing (US ft): 1286484.16 Easting (US ft): 3148760.52  
Latitude: 40°07'6.8412" N Longitude: -104°58'5.0376" W  
Well Location: 622.60 FSL, 1996.34 FEL, Section 23, T2N, R68W, Meridian 06, Weld County, CO  
Direction Reference: True North



| Measured Depth (Ft)                              | INC Deg | AZM Deg | TVD (Ft) | NS (Ft) | EW (Ft) | VS (Ft) | DLS °/100Ft | Build Rate °/100Ft | Walk Rate °/100Ft | Latitude Dec. Deg | Longitude Dec. Deg |
|--|---------|---------|----------|---------|---------|---------|-------------|--------------------|-------------------|-------------------|--------------------|
| <b>SHL @ 604' FSL &amp; 1995' FEL</b>            |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 0.00   | 0.00    | 0.00    | 0.00     | 0.00    | 0.00    | 0.00    | 0.00        | 0.00               | 0.00              | 40.1185670        | -104.9680660       |
| <b>KOP-Begin Build @ 600.00MD ,2.00°/ 100 Ft</b> |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 600.00   | 0.00    | 0.00    | 600.00   | 0.00    | 0.00    | 0.00    | 0.00        | 0.00               | 0.00              | 40.1185670        | -104.9680660       |
| <b>Begin Hold @ 22.79°,18.04° Azm</b>            |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 1739.47  | 22.79   | 18.04   | 1709.66  | 212.65  | 69.26   | 223.64  | 2.00        | 2.00               | 0.00              | 40.1191507        | -104.9678183       |
| <b>Parkman</b>                                   |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 4120.71  | 22.79   | 18.04   | 3905.00  | 1089.69 | 354.90  | 1146.03 | 0.00        | 0.00               | 0.00              | 40.1215583        | -104.9667969       |
| <b>Sussex</b>                                    |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 4663.05  | 22.79   | 18.04   | 4405.00  | 1289.44 | 419.96  | 1356.11 | 0.00        | 0.00               | 0.00              | 40.1221067        | -104.9665643       |
| <b>Shannon</b>                                   |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 5159.84  | 22.79   | 18.04   | 4863.00  | 1472.41 | 479.55  | 1548.54 | 0.00        | 0.00               | 0.00              | 40.1226090        | -104.9663512       |
| <b>Begin Drop @ -2.00°/ 100 Ft</b>               |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 6126.63  | 22.79   | 18.04   | 5754.32  | 1828.49 | 595.53  | 1923.03 | 0.00        | 0.00               | 0.00              | 40.1235865        | -104.9659364       |
| <b>Begin Hold @ Vertical</b>                     |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 7265.29  | 0.02    | 356.03  | 6863.17  | 2041.17 | 664.72  | 2146.68 | 2.00        | -1.99              | -112.71           | 40.1241703        | -104.9656890       |
| <b>Niobrara</b>                                  |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 7655.12  | 0.02    | 356.03  | 7253.00  | 2041.30 | 664.71  | 2146.80 | 0.00        | 0.00               | 0.00              | 40.1241706        | -104.9656890       |
| <b>Fort Hays</b>                                 |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 7915.12  | 0.02    | 356.03  | 7513.00  | 2041.38 | 664.71  | 2146.87 | 0.00        | 0.00               | 0.00              | 40.1241708        | -104.9656890       |
| <b>Codell</b>                                    |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 7935.12  | 0.02    | 356.03  | 7533.00  | 2041.38 | 664.71  | 2146.88 | 0.00        | 0.00               | 0.00              | 40.1241709        | -104.9656890       |
| <b>Grant Brothers 23-2 Ae Target</b>             |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 8095.12  | 0.02    | 356.03  | 7693.00  | 2041.43 | 664.70  | 2146.92 | 0.00        | 0.00               | 0.00              | 40.1241710        | -104.9656890       |
| <b>PBHL @ 2647' FSL 1323' FEL</b>                |         |         |          |         |         |         |             |                    |                   |                   |                    |
| 8095.13  | 0.02    | 356.03  | 7693.01  | 2041.43 | 664.70  | 2146.92 | 2.78        | 0.00               | 0.00              | 40.1241710        | -104.9656890       |

#### TARGET DATA

| Name                          | Shape  | Easting (Ft) | Northing (Ft) | Subsea (Ft) | TVD (Ft) | NS (Ft) | EW (Ft) | Side A (Ft) | Side B (Ft) | Dia. (Ft) |
|-------------------------------|--------|--------------|---------------|-------------|----------|---------|---------|-------------|-------------|-----------|
| Grant Brothers 23-2 Ae Target | CIRCLE | 3149413.0    | 1288529.5     | 2760.0      | 7693.0   | 2041.4  | 664.7   | 100.0       | 200.0       | 100.0     |

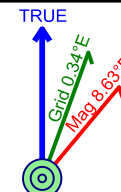
| LITHOLOGY DATA |             |          |                 |                    |                    |                        |
|----------------|-------------|----------|-----------------|--------------------|--------------------|------------------------|
| Name           | Description | Pattern  | TVD Top<br>(Ft) | TVD Bottom<br>(Ft) | Dip Angle<br>(deg) | Dip Direction<br>(deg) |
| Parkman        | Parkman     | SANDSTON | 3905            | 4405               | 0.0                | 0.0                    |
| Sussex         | Sussex      | SANDSTON | 4405            | 4863               | 0.0                | 0.0                    |
| Shannon        | Shannon     | SANDSTON | 4863            | 7253               | 0.0                | 0.0                    |
| Niobrara       | Niobrara    | CHALK    | 7253            | 7513               | 0.0                | 0.0                    |
| Fort Hays      | Fort Hays   | LIMESTON | 7513            | 7533               | 0.0                | 0.0                    |
| Codell         | Codell      | SANDSTON | 7533            | 7698               | 0.0                | 0.0                    |






**Job Number:** Grant Brothers Pad  
**Company:** Sundance Energy, Inc  
**Lease/Well:** Grant Brothers 23-2 Ae  
**Location:** Sec 23 T2N R68W  
**Rig Name:** Cade 25  
**State/County:** CO/ Weld  
**Country:** USA  
**API Number:** 05-123-xxxx

**Elevation :** 4919.00 ft  
**RKB:** 14.00 ft  
**Projection System:** US State Plane 1983  
**Projection Group:** Colorado Northern Zone  
**Projection Datum:** GRS80  
**Mag. Declination:** 8.63°  
**Grid Convergence:** 0.34370 E  
**Date:** Friday, August 02, 2013





Calculated by HawkEye Software  
Minimum Curvature Method  
Vertical Section Plane 18.04°  
Northing (US ft): 1286484.16 Easting (US ft): 3148760.52  
Latitude: 40°07'6.8412" N Longitude: -104°58'5.0376" W  
Well Location: 622.60 FSL, 1996.34 FEL, Section 23, T2N, R68W, Meridian 06, Weld County, CO  
Direction Reference: True North



| Measured<br>Depth<br>(Ft)                        | INC<br>Deg | AZM<br>Deg | TVD<br>(Ft) | NS<br>(Ft) | EW<br>(Ft) | VS<br>(Ft) | DLS<br>°/100Ft | Build<br>Rate<br>°/100Ft | Walk<br>Rate<br>°/100Ft | Latitude<br>Dec.<br>Deg | Longitude<br>Dec.<br>Deg |
|--|------------|------------|-------------|------------|------------|------------|----------------|--------------------------|-------------------------|-------------------------|--------------------------|
| <b>SHL @ 604' FSL &amp; 1995' FEL</b>            |            |            |             |            |            |            |                |                          |                         |                         |                          |
| 0.00   | 0.00       | 0.00       | 0.00        | 0.00       | 0.00       | 0.00       | 0.00           | 0.00                     | 0.00                    | 40.1185670              | -104.9680660             |
| <b>KOP-Begin Build @ 600.00MD ,2.00°/ 100 Ft</b> |            |            |             |            |            |            |                |                          |                         |                         |                          |
| 600.00   | 0.00       | 0.00       | 600.00      | 0.00       | 0.00       | 0.00       | 0.00           | 0.00                     | 0.00                    | 40.1185670              | -104.9680660             |
| 620.00   | 0.40       | 18.04      | 620.00      | 0.07       | 0.02       | 0.07       | 2.00           | 2.00                     | 90.18                   | 40.1185672              | -104.9680659             |
| 640.00   | 0.80       | 18.04      | 640.00      | 0.27       | 0.09       | 0.28       | 2.00           | 2.00                     | 0.01                    | 40.1185677              | -104.9680657             |
| 660.00   | 1.20       | 18.04      | 660.00      | 0.60       | 0.19       | 0.63       | 2.00           | 2.00                     | 0.00                    | 40.1185686              | -104.9680653             |
| 680.00   | 1.60       | 18.04      | 679.99      | 1.06       | 0.35       | 1.12       | 2.00           | 2.00                     | 0.00                    | 40.1185699              | -104.9680648             |
| 700.00   | 2.00       | 18.04      | 699.98      | 1.66       | 0.54       | 1.75       | 2.00           | 2.00                     | 0.00                    | 40.1185715              | -104.9680641             |
| 720.00   | 2.40       | 18.04      | 719.96      | 2.39       | 0.78       | 2.51       | 2.00           | 2.00                     | 0.00                    | 40.1185736              | -104.9680632             |
| 740.00   | 2.80       | 18.04      | 739.94      | 3.25       | 1.06       | 3.42       | 2.00           | 2.00                     | 0.00                    | 40.1185759              | -104.9680622             |
| 760.00   | 3.20       | 18.04      | 759.92      | 4.25       | 1.38       | 4.47       | 2.00           | 2.00                     | 0.00                    | 40.1185787              | -104.9680610             |
| 780.00   | 3.60       | 18.04      | 779.88      | 5.38       | 1.75       | 5.65       | 2.00           | 2.00                     | 0.00                    | 40.1185817              | -104.9680597             |
| 800.00   | 4.00       | 18.04      | 799.84      | 6.64       | 2.16       | 6.98       | 2.00           | 2.00                     | 0.00                    | 40.1185852              | -104.9680583             |
| 820.00   | 4.40       | 18.04      | 819.78      | 8.03       | 2.61       | 8.44       | 2.00           | 2.00                     | 0.00                    | 40.1185890              | -104.9680566             |
| 840.00   | 4.80       | 18.04      | 839.72      | 9.55       | 3.11       | 10.05      | 2.00           | 2.00                     | 0.00                    | 40.1185932              | -104.9680549             |
| 860.00   | 5.20       | 18.04      | 859.64      | 11.21      | 3.65       | 11.79      | 2.00           | 2.00                     | 0.00                    | 40.1185978              | -104.9680529             |
| 880.00   | 5.60       | 18.04      | 879.55      | 13.00      | 4.23       | 13.67      | 2.00           | 2.00                     | 0.00                    | 40.1186027              | -104.9680509             |
| 900.00   | 6.00       | 18.04      | 899.45      | 14.92      | 4.86       | 15.69      | 2.00           | 2.00                     | 0.00                    | 40.1186080              | -104.9680486             |
| 920.00   | 6.40       | 18.04      | 919.33      | 16.98      | 5.53       | 17.85      | 2.00           | 2.00                     | 0.00                    | 40.1186136              | -104.9680462             |
| 940.00   | 6.80       | 18.04      | 939.20      | 19.16      | 6.24       | 20.15      | 2.00           | 2.00                     | 0.00                    | 40.1186196              | -104.9680437             |
| 960.00   | 7.20       | 18.04      | 959.05      | 21.48      | 7.00       | 22.59      | 2.00           | 2.00                     | 0.00                    | 40.1186260              | -104.9680410             |
| 980.00   | 7.60       | 18.04      | 978.89      | 23.93      | 7.79       | 25.17      | 2.00           | 2.00                     | 0.00                    | 40.1186327              | -104.9680381             |
| 1000.00  | 8.00       | 18.04      | 998.70      | 26.51      | 8.63       | 27.88      | 2.00           | 2.00                     | 0.00                    | 40.1186398              | -104.9680351             |
| 1020.00  | 8.40       | 18.04      | 1018.50     | 29.22      | 9.52       | 30.73      | 2.00           | 2.00                     | 0.00                    | 40.1186472              | -104.9680320             |
| 1040.00  | 8.80       | 18.04      | 1038.27     | 32.07      | 10.44      | 33.72      | 2.00           | 2.00                     | 0.00                    | 40.1186550              | -104.9680286             |
| 1060.00  | 9.20       | 18.04      | 1058.03     | 35.04      | 11.41      | 36.85      | 2.00           | 2.00                     | 0.00                    | 40.1186632              | -104.9680252             |
| 1080.00  | 9.60       | 18.04      | 1077.76     | 38.15      | 12.42      | 40.12      | 2.00           | 2.00                     | 0.00                    | 40.1186717              | -104.9680216             |

| Measured<br>Depth<br>(Ft)  | INC<br>Deg | AZM<br>Deg | TVD<br>(Ft) | NS<br>(Ft) | EW<br>(Ft) | VS<br>(Ft) | DLS<br>°/100Ft | Build<br>Rate<br>°/100Ft | Walk<br>Rate<br>°/100Ft | Latitude<br>Dec.<br>Deg | Longitude<br>Dec.<br>Deg |
|--|------------|------------|-------------|------------|------------|------------|----------------|--------------------------|-------------------------|-------------------------|--------------------------|
| 1100.00  | 10.00      | 18.04      | 1097.47     | 41.38      | 13.48      | 43.52      | 2.00           | 2.00                     | 0.00                    | 40.1186806              | -104.9680178             |
| 1120.00  | 10.40      | 18.04      | 1117.15     | 44.75      | 14.57      | 47.07      | 2.00           | 2.00                     | 0.00                    | 40.1186898              | -104.9680139             |
| 1140.00  | 10.80      | 18.04      | 1136.81     | 48.25      | 15.71      | 50.74      | 2.00           | 2.00                     | 0.00                    | 40.1186994              | -104.9680098             |
| 1160.00  | 11.20      | 18.04      | 1156.44     | 51.88      | 16.90      | 54.56      | 2.00           | 2.00                     | 0.00                    | 40.1187094              | -104.9680056             |
| 1180.00  | 11.60      | 18.04      | 1176.05     | 55.64      | 18.12      | 58.51      | 2.00           | 2.00                     | 0.00                    | 40.1187197              | -104.9680012             |
| 1200.00  | 12.00      | 18.04      | 1195.62     | 59.53      | 19.39      | 62.60      | 2.00           | 2.00                     | 0.00                    | 40.1187304              | -104.9679967             |
| 1220.00  | 12.40      | 18.04      | 1215.17     | 63.55      | 20.70      | 66.83      | 2.00           | 2.00                     | 0.00                    | 40.1187414              | -104.9679920             |
| 1240.00  | 12.80      | 18.04      | 1234.69     | 67.69      | 22.05      | 71.19      | 2.00           | 2.00                     | 0.00                    | 40.1187528              | -104.9679872             |
| 1260.00  | 13.20      | 18.04      | 1254.18     | 71.97      | 23.44      | 75.69      | 2.00           | 2.00                     | 0.00                    | 40.1187646              | -104.9679822             |
| 1280.00  | 13.60      | 18.04      | 1273.63     | 76.38      | 24.88      | 80.33      | 2.00           | 2.00                     | 0.00                    | 40.1187767              | -104.9679770             |
| 1300.00  | 14.00      | 18.04      | 1293.06     | 80.91      | 26.35      | 85.10      | 2.00           | 2.00                     | 0.00                    | 40.1187891              | -104.9679718             |
| 1320.00  | 14.40      | 18.04      | 1312.44     | 85.58      | 27.87      | 90.00      | 2.00           | 2.00                     | 0.00                    | 40.1188019              | -104.9679663             |
| 1340.00  | 14.80      | 18.04      | 1331.80     | 90.37      | 29.43      | 95.05      | 2.00           | 2.00                     | 0.00                    | 40.1188151              | -104.9679607             |
| 1360.00  | 15.20      | 18.04      | 1351.12     | 95.30      | 31.04      | 100.22     | 2.00           | 2.00                     | 0.00                    | 40.1188286              | -104.9679550             |
| 1380.00  | 15.60      | 18.04      | 1370.40     | 100.35     | 32.68      | 105.53     | 2.00           | 2.00                     | 0.00                    | 40.1188425              | -104.9679491             |
| 1400.00  | 16.00      | 18.04      | 1389.64     | 105.52     | 34.37      | 110.98     | 2.00           | 2.00                     | 0.00                    | 40.1188567              | -104.9679431             |
| 1420.00  | 16.40      | 18.04      | 1408.85     | 110.83     | 36.10      | 116.56     | 2.00           | 2.00                     | 0.00                    | 40.1188712              | -104.9679369             |
| 1440.00  | 16.80      | 18.04      | 1428.01     | 116.26     | 37.87      | 122.27     | 2.00           | 2.00                     | 0.00                    | 40.1188861              | -104.9679306             |
| 1460.00  | 17.20      | 18.04      | 1447.14     | 121.82     | 39.68      | 128.12     | 2.00           | 2.00                     | 0.00                    | 40.1189014              | -104.9679241             |
| 1480.00  | 17.60      | 18.04      | 1466.23     | 127.51     | 41.53      | 134.10     | 2.00           | 2.00                     | 0.00                    | 40.1189170              | -104.9679175             |
| 1500.00  | 18.00      | 18.04      | 1485.27     | 133.32     | 43.42      | 140.21     | 2.00           | 2.00                     | 0.00                    | 40.1189330              | -104.9679107             |
| 1520.00  | 18.40      | 18.04      | 1504.27     | 139.26     | 45.36      | 146.46     | 2.00           | 2.00                     | 0.00                    | 40.1189493              | -104.9679038             |
| 1540.00  | 18.80      | 18.04      | 1523.22     | 145.33     | 47.33      | 152.84     | 2.00           | 2.00                     | 0.00                    | 40.1189659              | -104.9678967             |
| 1560.00  | 19.20      | 18.04      | 1542.13     | 151.52     | 49.35      | 159.35     | 2.00           | 2.00                     | 0.00                    | 40.1189829              | -104.9678895             |
| 1580.00  | 19.60      | 18.04      | 1561.00     | 157.84     | 51.41      | 166.00     | 2.00           | 2.00                     | 0.00                    | 40.1190003              | -104.9678822             |
| 1600.00  | 20.00      | 18.04      | 1579.82     | 164.28     | 53.50      | 172.77     | 2.00           | 2.00                     | 0.00                    | 40.1190180              | -104.9678747             |
| 1620.00  | 20.40      | 18.04      | 1598.59     | 170.84     | 55.64      | 179.68     | 2.00           | 2.00                     | 0.00                    | 40.1190360              | -104.9678670             |
| 1640.00  | 20.80      | 18.04      | 1617.31     | 177.53     | 57.82      | 186.71     | 2.00           | 2.00                     | 0.00                    | 40.1190543              | -104.9678592             |
| 1660.00  | 21.20      | 18.04      | 1635.98     | 184.35     | 60.04      | 193.88     | 2.00           | 2.00                     | 0.00                    | 40.1190731              | -104.9678513             |
| 1680.00  | 21.60      | 18.04      | 1654.60     | 191.29     | 62.30      | 201.18     | 2.00           | 2.00                     | 0.00                    | 40.1190921              | -104.9678432             |
| 1700.00  | 22.00      | 18.04      | 1673.17     | 198.35     | 64.60      | 208.61     | 2.00           | 2.00                     | 0.00                    | 40.1191115              | -104.9678350             |
| 1720.00  | 22.40      | 18.04      | 1691.69     | 205.54     | 66.94      | 216.16     | 2.00           | 2.00                     | 0.00                    | 40.1191312              | -104.9678266             |
| <b>Begin Hold @ 22.79°,18.04° Azm</b>  |            |            |             |            |            |            |                |                          |                         |                         |                          |
| 1739.47  | 22.79      | 18.04      | 1709.66     | 212.65     | 69.26      | 223.64     | 2.00           | 2.00                     | 0.00                    | 40.1191507              | -104.9678183             |
|  <b>Parkman</b> | 4120.71    | 22.79      | 18.04       | 3905.00    | 1089.69    | 354.90     | 1146.03        | 0.00                     | 0.00                    | 40.1215583              | -104.9667969             |
|  <b>Sussex</b>  | 4663.05    | 22.79      | 18.04       | 4405.00    | 1289.44    | 419.96     | 1356.11        | 0.00                     | 0.00                    | 40.1221067              | -104.9665643             |
|  |            |            |             |            |            |            |                |                          |                         |                         |                          |
|  <b>Shannon</b> | 5159.84    | 22.79      | 18.04       | 4863.00    | 1472.41    | 479.55     | 1548.54        | 0.00                     | 0.00                    | 40.1226090              | -104.9663512             |

| Measured<br>Depth<br>(Ft)          | INC<br>Deg | AZM<br>Deg | TVD<br>(Ft) | NS<br>(Ft) | EW<br>(Ft) | VS<br>(Ft) | DLS<br>°/100Ft | Build<br>Rate<br>°/100Ft | Walk<br>Rate<br>°/100Ft | Latitude<br>Dec.<br>Deg | Longitude<br>Dec.<br>Deg |
|------------------------------------|------------|------------|-------------|------------|------------|------------|----------------|--------------------------|-------------------------|-------------------------|--------------------------|
| <b>Begin Drop @ -2.00°/ 100 Ft</b> |            |            |             |            |            |            |                |                          |                         |                         |                          |
| 6126.63                            | 22.79      | 18.04      | 5754.32     | 1828.49    | 595.53     | 1923.03    | 0.00           | 0.00                     | 0.00                    | 40.1235865              | -104.9659364             |
| 6146.63                            | 22.39      | 18.04      | 5772.78     | 1835.80    | 597.90     | 1930.71    | 2.00           | -2.00                    | 0.00                    | 40.1236065              | -104.9659279             |
| 6166.63                            | 21.99      | 18.04      | 5791.30     | 1842.98    | 600.24     | 1938.27    | 2.00           | -2.00                    | 0.00                    | 40.1236262              | -104.9659195             |
| 6186.63                            | 21.59      | 18.04      | 5809.87     | 1850.04    | 602.54     | 1945.69    | 2.00           | -2.00                    | 0.00                    | 40.1236456              | -104.9659113             |
| 6206.63                            | 21.19      | 18.04      | 5828.50     | 1856.98    | 604.80     | 1952.98    | 2.00           | -2.00                    | 0.00                    | 40.1236646              | -104.9659033             |
| 6226.63                            | 20.79      | 18.04      | 5847.17     | 1863.79    | 607.02     | 1960.15    | 2.00           | -2.00                    | 0.00                    | 40.1236833              | -104.9658953             |
| 6246.63                            | 20.39      | 18.04      | 5865.89     | 1870.48    | 609.20     | 1967.18    | 2.00           | -2.00                    | 0.00                    | 40.1237017              | -104.9658875             |
| 6266.63                            | 19.99      | 18.04      | 5884.66     | 1877.04    | 611.33     | 1974.08    | 2.00           | -2.00                    | 0.00                    | 40.1237197              | -104.9658799             |
| 6286.63                            | 19.59      | 18.04      | 5903.48     | 1883.48    | 613.43     | 1980.86    | 2.00           | -2.00                    | 0.00                    | 40.1237374              | -104.9658724             |
| 6306.63                            | 19.19      | 18.04      | 5922.35     | 1889.79    | 615.49     | 1987.50    | 2.00           | -2.00                    | 0.00                    | 40.1237547              | -104.9658650             |
| 6326.63                            | 18.79      | 18.04      | 5941.26     | 1895.98    | 617.50     | 1994.00    | 2.00           | -2.00                    | 0.00                    | 40.1237717              | -104.9658578             |
| 6346.63                            | 18.39      | 18.04      | 5960.22     | 1902.04    | 619.48     | 2000.38    | 2.00           | -2.00                    | 0.00                    | 40.1237884              | -104.9658508             |
| 6366.63                            | 17.99      | 18.04      | 5979.22     | 1907.98    | 621.41     | 2006.62    | 2.00           | -2.00                    | 0.00                    | 40.1238047              | -104.9658439             |
| 6386.63                            | 17.59      | 18.03      | 5998.26     | 1913.79    | 623.30     | 2012.73    | 2.00           | -2.00                    | 0.00                    | 40.1238206              | -104.9658371             |
| 6406.63                            | 17.19      | 18.03      | 6017.35     | 1919.47    | 625.15     | 2018.71    | 2.00           | -2.00                    | 0.00                    | 40.1238362              | -104.9658305             |
| 6426.63                            | 16.79      | 18.03      | 6036.47     | 1925.03    | 626.96     | 2024.56    | 2.00           | -2.00                    | 0.00                    | 40.1238515              | -104.9658240             |
| 6446.63                            | 16.39      | 18.03      | 6055.64     | 1930.46    | 628.73     | 2030.27    | 2.00           | -2.00                    | 0.00                    | 40.1238664              | -104.9658177             |
| 6466.63                            | 15.99      | 18.03      | 6074.85     | 1935.76    | 630.46     | 2035.84    | 2.00           | -2.00                    | 0.00                    | 40.1238809              | -104.9658115             |
| 6486.63                            | 15.59      | 18.03      | 6094.09     | 1940.94    | 632.14     | 2041.28    | 2.00           | -2.00                    | 0.00                    | 40.1238951              | -104.9658055             |
| 6506.63                            | 15.19      | 18.03      | 6113.37     | 1945.99    | 633.78     | 2046.59    | 2.00           | -2.00                    | 0.00                    | 40.1239090              | -104.9657996             |
| 6526.63                            | 14.79      | 18.03      | 6132.69     | 1950.90    | 635.38     | 2051.77    | 2.00           | -2.00                    | 0.00                    | 40.1239225              | -104.9657939             |
| 6546.63                            | 14.39      | 18.03      | 6152.05     | 1955.69    | 636.94     | 2056.80    | 2.00           | -2.00                    | 0.00                    | 40.1239356              | -104.9657883             |
| 6566.63                            | 13.99      | 18.03      | 6171.44     | 1960.36    | 638.46     | 2061.71    | 2.00           | -2.00                    | 0.00                    | 40.1239484              | -104.9657829             |
| 6586.63                            | 13.59      | 18.03      | 6190.86     | 1964.89    | 639.94     | 2066.47    | 2.00           | -2.00                    | 0.00                    | 40.1239609              | -104.9657776             |
| 6606.63                            | 13.19      | 18.03      | 6210.32     | 1969.29    | 641.37     | 2071.10    | 2.00           | -2.00                    | 0.00                    | 40.1239730              | -104.9657725             |
| 6626.63                            | 12.79      | 18.03      | 6229.81     | 1973.57    | 642.76     | 2075.60    | 2.00           | -2.00                    | 0.00                    | 40.1239847              | -104.9657675             |
| 6646.63                            | 12.39      | 18.03      | 6249.33     | 1977.71    | 644.11     | 2079.96    | 2.00           | -2.00                    | 0.00                    | 40.1239961              | -104.9657627             |
| 6666.63                            | 11.99      | 18.02      | 6268.87     | 1981.73    | 645.42     | 2084.18    | 2.00           | -2.00                    | -0.01                   | 40.1240071              | -104.9657580             |
| 6686.63                            | 11.59      | 18.02      | 6288.45     | 1985.62    | 646.68     | 2088.27    | 2.00           | -2.00                    | -0.01                   | 40.1240178              | -104.9657535             |
| 6706.63                            | 11.19      | 18.02      | 6308.06     | 1989.37    | 647.90     | 2092.22    | 2.00           | -2.00                    | -0.01                   | 40.1240281              | -104.9657491             |
| 6726.63                            | 10.79      | 18.02      | 6327.69     | 1993.00    | 649.08     | 2096.03    | 2.00           | -2.00                    | -0.01                   | 40.1240380              | -104.9657449             |
| 6746.63                            | 10.39      | 18.02      | 6347.35     | 1996.49    | 650.22     | 2099.71    | 2.00           | -2.00                    | -0.01                   | 40.1240476              | -104.9657408             |
| 6766.63                            | 9.99       | 18.02      | 6367.04     | 1999.86    | 651.31     | 2103.25    | 2.00           | -2.00                    | -0.01                   | 40.1240569              | -104.9657369             |
| 6786.63                            | 9.59       | 18.02      | 6386.74     | 2003.09    | 652.37     | 2106.65    | 2.00           | -2.00                    | -0.01                   | 40.1240658              | -104.9657331             |
| 6806.63                            | 9.19       | 18.01      | 6406.48     | 2006.20    | 653.37     | 2109.91    | 2.00           | -2.00                    | -0.01                   | 40.1240743              | -104.9657295             |
| 6826.63                            | 8.79       | 18.01      | 6426.23     | 2009.17    | 654.34     | 2113.03    | 2.00           | -2.00                    | -0.01                   | 40.1240824              | -104.9657261             |
| 6846.63                            | 8.39       | 18.01      | 6446.01     | 2012.01    | 655.26     | 2116.02    | 2.00           | -2.00                    | -0.01                   | 40.1240902              | -104.9657228             |
| 6866.63                            | 7.99       | 18.01      | 6465.80     | 2014.72    | 656.15     | 2118.87    | 2.00           | -2.00                    | -0.01                   | 40.1240977              | -104.9657196             |
| 6886.63                            | 7.59       | 18.01      | 6485.62     | 2017.30    | 656.98     | 2121.58    | 2.00           | -2.00                    | -0.01                   | 40.1241047              | -104.9657166             |
| 6906.63                            | 7.19       | 18.00      | 6505.45     | 2019.74    | 657.78     | 2124.15    | 2.00           | -2.00                    | -0.01                   | 40.1241115              | -104.9657138             |

| Measured Depth<br>(Ft)  | INC<br>Deg  | AZM<br>Deg      | TVD<br>(Ft)      | NS<br>(Ft)         | EW<br>(Ft)         | VS<br>(Ft)             | DLS<br>°/100Ft | Build<br>Rate<br>°/100Ft | Walk<br>Rate<br>°/100Ft | Latitude<br>Dec.<br>Deg | Longitude<br>Dec.<br>Deg |
|---|-------------|-----------------|------------------|--------------------|--------------------|------------------------|----------------|--------------------------|-------------------------|-------------------------|--------------------------|
| 6926.63   | 6.79        | 18.00           | 6525.30          | 2022.06            | 658.53             | 2126.59                | 2.00           | -2.00                    | -0.02                   | 40.1241178              | -104.9657111             |
| 6946.63   | 6.39        | 18.00           | 6545.17          | 2024.24            | 659.24             | 2128.88                | 2.00           | -2.00                    | -0.02                   | 40.1241238              | -104.9657086             |
| 6966.63   | 5.99        | 17.99           | 6565.05          | 2026.29            | 659.91             | 2131.04                | 2.00           | -2.00                    | -0.02                   | 40.1241294              | -104.9657062             |
| 6986.63   | 5.59        | 17.99           | 6584.95          | 2028.21            | 660.53             | 2133.06                | 2.00           | -2.00                    | -0.02                   | 40.1241347              | -104.9657040             |
| 7006.63   | 5.19        | 17.98           | 6604.86          | 2030.00            | 661.11             | 2134.94                | 2.00           | -2.00                    | -0.03                   | 40.1241396              | -104.9657019             |
| 7026.63   | 4.79        | 17.98           | 6624.79          | 2031.65            | 661.65             | 2136.68                | 2.00           | -2.00                    | -0.03                   | 40.1241442              | -104.9657000             |
| 7046.63   | 4.39        | 17.97           | 6644.72          | 2033.17            | 662.14             | 2138.28                | 2.00           | -2.00                    | -0.04                   | 40.1241483              | -104.9656982             |
| 7066.63   | 3.99        | 17.96           | 6664.67          | 2034.56            | 662.59             | 2139.74                | 2.00           | -2.00                    | -0.04                   | 40.1241521              | -104.9656966             |
| 7086.63   | 3.59        | 17.95           | 6684.63          | 2035.82            | 663.00             | 2141.06                | 2.00           | -2.00                    | -0.05                   | 40.1241556              | -104.9656951             |
| 7106.63   | 3.19        | 17.93           | 6704.59          | 2036.95            | 663.36             | 2142.24                | 2.00           | -2.00                    | -0.07                   | 40.1241587              | -104.9656938             |
| 7126.63   | 2.79        | 17.92           | 6724.56          | 2037.94            | 663.68             | 2143.29                | 2.00           | -2.00                    | -0.09                   | 40.1241614              | -104.9656927             |
| 7146.63   | 2.39        | 17.89           | 6744.54          | 2038.80            | 663.96             | 2144.19                | 2.00           | -2.00                    | -0.12                   | 40.1241638              | -104.9656917             |
| 7166.63   | 1.99        | 17.86           | 6764.53          | 2039.53            | 664.20             | 2144.95                | 2.00           | -2.00                    | -0.16                   | 40.1241658              | -104.9656908             |
| 7186.63   | 1.59        | 17.81           | 6784.52          | 2040.12            | 664.39             | 2145.58                | 2.00           | -2.00                    | -0.25                   | 40.1241674              | -104.9656902             |
| 7206.63   | 1.19        | 17.73           | 6804.51          | 2040.58            | 664.54             | 2146.06                | 2.00           | -2.00                    | -0.41                   | 40.1241687              | -104.9656896             |
| 7226.63   | 0.79        | 17.56           | 6824.51          | 2040.91            | 664.64             | 2146.41                | 2.00           | -2.00                    | -0.83                   | 40.1241696              | -104.9656892             |
| 7246.63   | 0.39        | 17.06           | 6844.51          | 2041.11            | 664.70             | 2146.62                | 2.00           | -2.00                    | -2.52                   | 40.1241701              | -104.9656890             |
| <b>Begin Hold @ Vertical</b>  |             |                 |                  |                    |                    |                        |                |                          |                         |                         |                          |
| 7265.29   | 0.02        | 356.03          | 6863.17          | 2041.17            | 664.72             | 2146.68                | 2.00           | -1.99                    | -112.71                 | 40.1241703              | -104.9656890             |
|  <b>Niobrara</b>                       |             |                 |                  |                    |                    |                        |                |                          |                         |                         |                          |
| 7655.12   | 0.02        | 356.03          | 7253.00          | 2041.30            | 664.71             | 2146.80                | 0.00           | 0.00                     | 0.00                    | 40.1241706              | -104.9656890             |
|  <b>Fort Hays</b>                      |             |                 |                  |                    |                    |                        |                |                          |                         |                         |                          |
| 7915.12   | 0.02        | 356.03          | 7513.00          | 2041.38            | 664.71             | 2146.87                | 0.00           | 0.00                     | 0.00                    | 40.1241708              | -104.9656890             |
|  <b>Codell</b>                         |             |                 |                  |                    |                    |                        |                |                          |                         |                         |                          |
| 7935.12   | 0.02        | 356.03          | 7533.00          | 2041.38            | 664.71             | 2146.88                | 0.00           | 0.00                     | 0.00                    | 40.1241709              | -104.9656890             |
|  <b>Grant Brothers 23-2 Ae Target</b> |             |                 |                  |                    |                    |                        |                |                          |                         |                         |                          |
| 8095.12   | 0.02        | 356.03          | 7693.00          | 2041.43            | 664.70             | 2146.92                | 0.00           | 0.00                     | 0.00                    | 40.1241710              | -104.9656890             |
| <b>PBHL @ 2647' FSL 1323' FEL</b>   |             |                 |                  |                    |                    |                        |                |                          |                         |                         |                          |
| 8095.13   | 0.02        | 356.03          | 7693.01          | 2041.43            | 664.70             | 2146.92                | 2.78           | 0.00                     | 0.00                    | 40.1241710              | -104.9656890             |
| <b>TARGET DATA</b>  |             |                 |                  |                    |                    |                        |                |                          |                         |                         |                          |
| Name  | Shape       | Easting<br>(Ft) | Northing<br>(Ft) | Subsea<br>(Ft)     | TVD<br>(Ft)        | NS<br>(Ft)             | EW<br>(Ft)     | Side A<br>(Ft)           | Side B<br>(Ft)          | Dia.<br>(Ft)            |                          |
| Grant Brothers 23-2 Ae Target   | CIRCLE      | 3149413.0       | 1288529.5        | 2760.0             | 7693.0             | 2041.4                 | 664.7          | 100.0                    | 200.0                   | 100.0                   |                          |
| <b>LITHOLOGY DATA</b>   |             |                 |                  |                    |                    |                        |                |                          |                         |                         |                          |
| Name  | Description | Pattern         | TVD Top<br>(Ft)  | TVD Bottom<br>(Ft) | Dip Angle<br>(deg) | Dip Direction<br>(deg) |                |                          |                         |                         |                          |
| Parkman   | Parkman     | SANDSTON        | 3905             | 4405               | 0.0                | 0.0                    |                |                          |                         |                         |                          |
| Sussex  | Sussex      | SANDSTON        | 4405             | 4863               | 0.0                | 0.0                    |                |                          |                         |                         |                          |
| Shannon   | Shannon     | SANDSTON        | 4863             | 7253               | 0.0                | 0.0                    |                |                          |                         |                         |                          |
| Niobrara  | Niobrara    | CHALK           | 7253             | 7513               | 0.0                | 0.0                    |                |                          |                         |                         |                          |
| Fort Hays   | Fort Hays   | LIMESTON        | 7513             | 7533               | 0.0                | 0.0                    |                |                          |                         |                         |                          |



| LITHOLOGY DATA (cont.) |             |          |                 |                    |                    |                        |  |
|------------------------|-------------|----------|-----------------|--------------------|--------------------|------------------------|--|
| Name                   | Description | Pattern  | TVD Top<br>(Ft) | TVD Bottom<br>(Ft) | Dip Angle<br>(deg) | Dip Direction<br>(deg) |  |
| Codell                 | Codell      | SANDSTON | 7533            | 7698               | 0.0                | 0.0                    |  |