



Realtime Logs

Natural Formation Evaluation  
Gamma Ray

Scale: 1:240

Company: Anadarko

Well: 3D 16N-21HZ

Field: Weld County

Region: Continental US Country: United States

Surface Location: Latitude: 40° 7' 48.742" N Longitude: 104° 46' 34.385" W

Other Services: DIR

Status: FIELD PRINT

API Number: 051233809900

Section 21 TWN: 2N Range 66 W

Permanent Datum (P.D.): Ground Level Elevation: 4989.00 ft.

Elevations: 5006.00 ft. N/A

Log Measured From: Kelly Bushing 17.00 ft. Above P.D.

Depth Reference: Driller's Depth

KB: 5006.00 ft. DF: N/A GL: 4989.00 ft.

Interval Logged

Dates

Magnetic Field Reference

Top: 6709.0 ft. Date From: 27/Nov/13 Date To: 01/Dec/13 Dip Angle: 66.90° Azi Reference North: True

Bottom: 11756.0 ft. Date To: 01/Dec/13 Total Mag to Reference

Spud Date: 23/Nov/13 Field Strength: 52904.0 nT North Correction: 8.49°

Borehole Record

Casing Record

| Hole Size  | From       | To          | Size      | Weight      | From    | To         |
|------------|------------|-------------|-----------|-------------|---------|------------|
| 13.500 in. | Surface    | 1022.0 ft.  | 9.000 in. | 36.00 lb/ft | Surface | 1005.0 ft. |
| 8.750 in.  | 1022.0 ft. | 7690.0 ft.  | 7.000 in. | 26.00 lb/ft | Surface | 7663.0 ft. |
| 6.125 in.  | 7690.0 ft. | 11811.0 ft. |           |             |         |            |
|            |            |             |           |             |         |            |
|            |            |             |           |             |         |            |
|            |            |             |           |             |         |            |
|            |            |             |           |             |         |            |

Mud Record

Deviation Record

| Type       | From    | To          | Hole Size  | Interval     | Inc / Az (Start) | Inc / Az (End) |
|------------|---------|-------------|------------|--------------|------------------|----------------|
| Water Base | Surface | 11811.0 ft. | 13.500 in. | Surface      | 0.0° / 0.0°      | 0.4° / 294.9°  |
|            |         |             | 8.750 in.  | Intermediate | 0.4° / 294.9°    | 84.8° / 181.3° |
|            |         |             | 6.125 in.  | Lateral      | 84.8° / 181.3°   | 91.7° / 178.8° |
|            |         |             |            |              | /                | /              |
|            |         |             |            |              | /                | /              |
|            |         |             |            |              | /                | /              |

| Acquisition System | Software Version | Other                                 |
|--------------------|------------------|---------------------------------------|
| Advantage          | 2.20U4           | Rig / Contractor: Xtreme 8 / Anadarko |
| PATS               | 6.4.1.34         | Job No: 5896424                       |
|                    |                  | District / Unit: RMD /                |

INTEQ does not guarantee the accuracy or correctness of interpretations provided in or from this log. Since all interpretations are opinions based on measurements, INTEQ shall under no circumstances be responsible for consequential damages or any other loss, costs, damages or expenses incurred or sustained in connection with the use of any such interpretations. INTEQ disclaims all expressed and implied warranties related to this service. INTEQ's liabilities and obligations shall be governed by INTEQ's Standard Terms and Conditions.

Log Run Summary

| LWD<br>Run<br>No. | BHA<br>Run<br>No. | Bit<br>Run<br>No. | Bit<br>Size<br><br>(in.) | Bit<br>Type | Bit<br>Gauge<br>Length<br><br>(in.) | Assembly<br><br>Type | Logged Interval |         | Bit Depth Interval |         | Date / Time       |                   | Circ.<br><br>Time<br><br>(hrs.) |
|-------------------|-------------------|-------------------|--------------------------|-------------|-------------------------------------|----------------------|-----------------|---------|--------------------|---------|-------------------|-------------------|---------------------------------|
|                   |                   |                   |                          |             |                                     |                      | Top             | Bottom  | From               | To      | Start<br><br>End  |                   |                                 |
|                   |                   |                   |                          |             |                                     |                      | (ft.)           | (ft.)   | (ft.)              | (ft.)   |                   |                   |                                 |
| 1                 | 1                 | 1                 | 8.750                    | PDC         | 3.000                               | Mud Motor            | 6709.0          | 7647.0  | 6709.0             | 7690.0  | 27/Nov/2013 09:57 | 28/Nov/2013 21:42 | 56.82                           |
| 2                 | 2                 | 2                 | 6.125                    | PDC         | 6.500                               | Mud Motor            | 7647.0          | 11756.0 | 7691.0             | 11331.0 | 30/Nov/2013 03:42 | 01/Dec/2013 08:41 | 30.7                            |

Crew

| Name           | Arrive      | Depart      | Name           | Arrive      | Depart      | Name | Arrive   | Depart   |
|----------------|-------------|-------------|----------------|-------------|-------------|------|----------|----------|
|                | Wellsite    | Wellsite    |                | Wellsite    | Wellsite    |      | Wellsite | Wellsite |
| Matthew Dickey | 23/Nov/2013 | 02/Dec/2013 | Shirley Arimah | 23/Nov/2013 | 02/Dec/2013 |      |          |          |

| Date / Time |       | LWD<br>Run No. | Measured<br>Depth<br>(ft.) | Mud<br>Type | Density<br>(sg) | Viscosity<br>(cp) | pH  | Fluid<br>Loss<br>(cc) | Oil /<br>Water | Source   | Total<br>Chlorides<br>(ppm) | K+<br>(%) |
|-------------|-------|----------------|----------------------------|-------------|-----------------|-------------------|-----|-----------------------|----------------|----------|-----------------------------|-----------|
| 27/Nov/2013 | 14:00 | 1              | 6937.0                     | Water Based | 10.0            | 13                | 9.0 | N/A                   | 3/89           | Flowline | 2500                        | N/A       |
| 28/Nov/2013 | 20:00 | 1              | 7690.0                     | Water Based | 10.3            | 13                | 9.0 | N/A                   | 3/87           | Flowline | 2600                        | N/A       |
| 30/Nov/2013 | 20:00 | 2              | 10093.0                    | Water Based | 9.2             | 40                | 9.0 | 4.4                   | 4/91           | Flowline | 2600                        | N/A       |

Mnemonics

| Curve | Description                        | Units |
|-------|------------------------------------|-------|
| GRAX  | Gamma Ray Apparent, 0.5 ft. Avg    | API   |
| ROPA  | Rate of Penetration, 3.0 ft. Avg   | ft/hr |
| TCDX  | Downhole Temperature               | degF  |
| WOBA  | Surface Weight on Bit, 1.0 ft. Avg | klbs  |

Equipment and Service Data

| LWD<br>Run<br>No. | Tool | Serial<br>Number | Measurement | Bit<br>Offset<br>(ft.) | Max<br>O.D.<br>(in.) | Min<br>I.D.<br>(in.) |
|-------------------|------|------------------|-------------|------------------------|----------------------|----------------------|
| 1                 | DIR  | 12456780         | Directional | 46.65                  | 6.750                | 2.750                |
| 1                 | SRIG | 10595777         | Gamma       | 43.27                  | 6.750                | 2.750                |
| 2                 | DIR  | 10307183         | Directional | 54.26                  | 4.750                | 2.750                |
| 2                 | SRIG | 12554661         | Gamma       | 50.89                  | 4.750                | 2.750                |

Service and Tool Mnemonics

| Mnemonic | Name                  | Description                                  |
|----------|-----------------------|--|
| DIR      | Directional           | Wellbore directional survey                  |
| SRIG     | Inclination and Gamma | Probe based gamma ray and inclination module |

Comments

|  |
|--|
| (1) Baker Hughes INTEQ run 1 a utilized 6 1/2 inch NaviTrak services (Gamma Ray and Directional) behind an 8 3/4 inch bit and steerable assembly from 1018 to 7690 feet MD (1022 to 7281 feet TVD) |
| (2) Baker Hughes INTEQ run 2 utilized 4 3/4 inch NaviTrak services (Gamma Ray and Directional) behind an 6 1/8 inch bit and steerable assembly from 7690 to 11811 feet MD (7281 to 7779 feet TVD)  |

Remarks

| Number | Measured<br>Depth<br>(ft.) | Hole<br>Section<br>(in.) | LWD<br>Run No. | Remark  |
|--------|----------------------------|--------------------------|----------------|---|
| 1      | 6709                       | 8.750                    | 1              | The interval from Surface to 6709 feet MD (6662 feet TVD) was logged not logged due to Baker Hughes logging services began at the top of the curve section. |
| 2      | 11756                      | 6.125                    | 2              | The interval from 11756 to 11811 feet MD (7281 to 7279 feet TVD) was not logged due to sensor offsets to bit at TD.   |



Company : Anadarko

Well : 3D 16N-21HZ

Interval : 6650.00 - 7300.00 feet

Created : 01/Dec/2013 1:57:58 PM

Gamma Ray Apparent 0.5 ft Avg [GRAX]

0 150

API

TVD feet 1:240

Rate of Penetration 3.0 ft Avg [ROPA]

1000 0

ft/hr

Surface Weight On Bit 1.0 ft Avg [WOBA]

0 100

klbf

Downhole Temperature [TCDX]

150 350

degF

See Remark 1

ROPA

WOBA

GRAX

6660

6680

6700

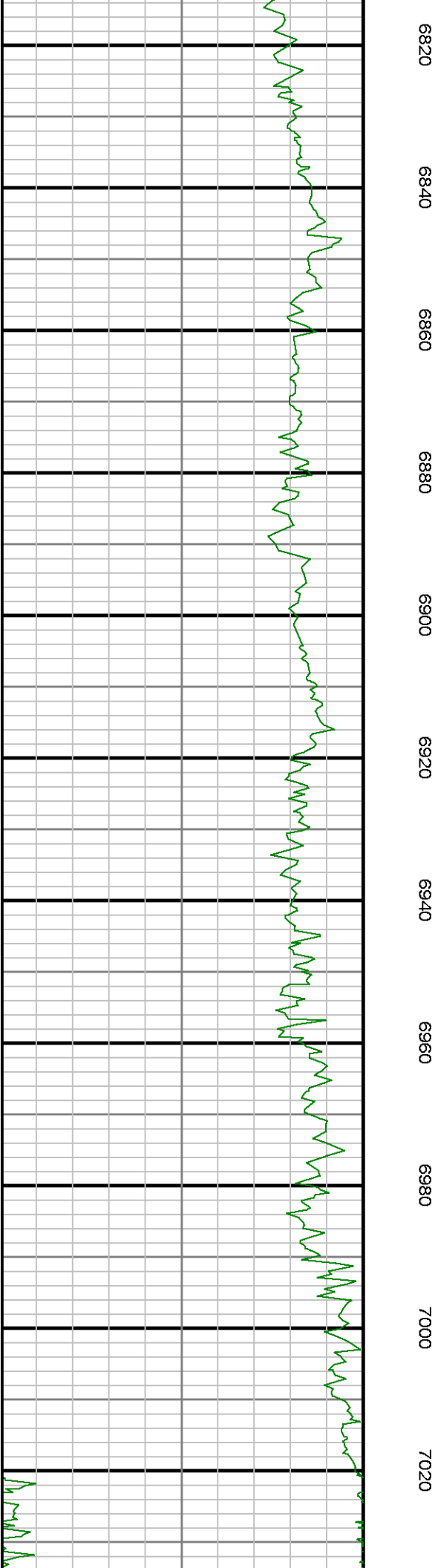
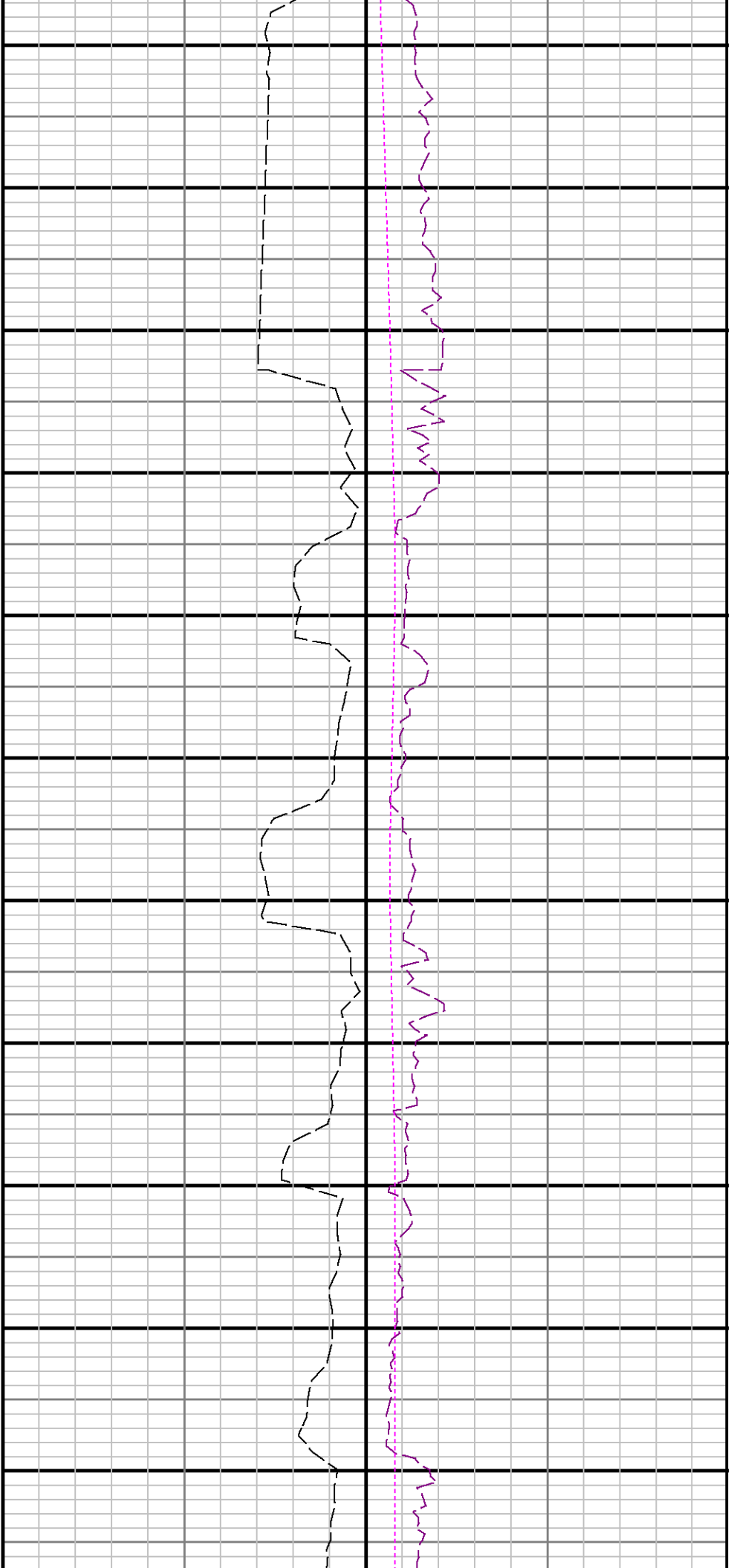
6720

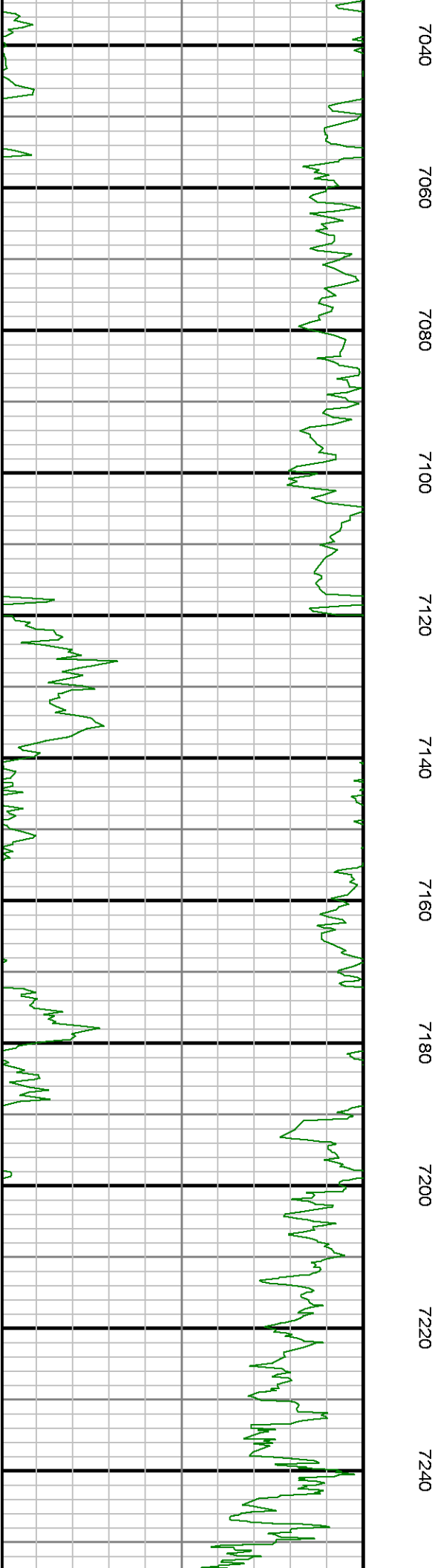
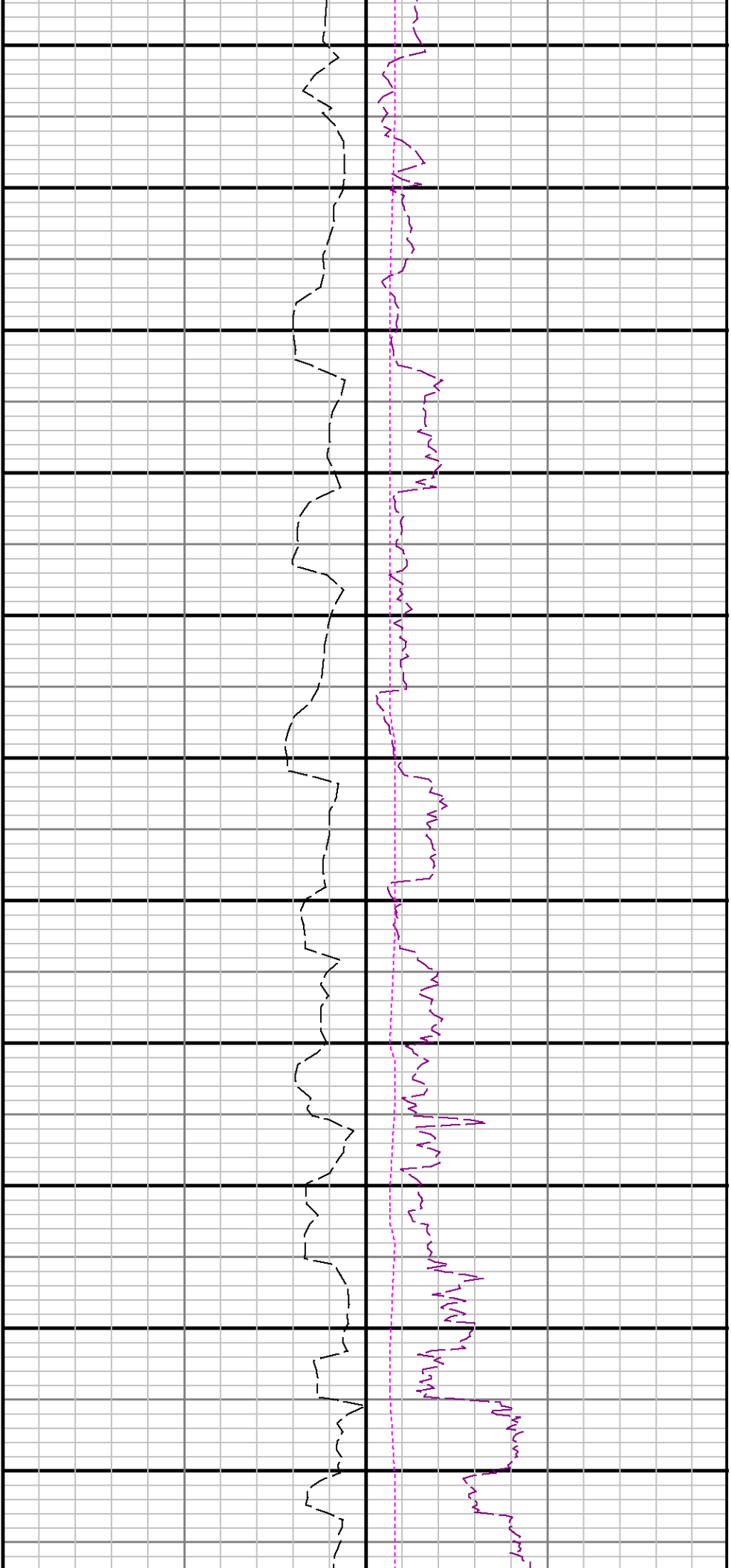
6740

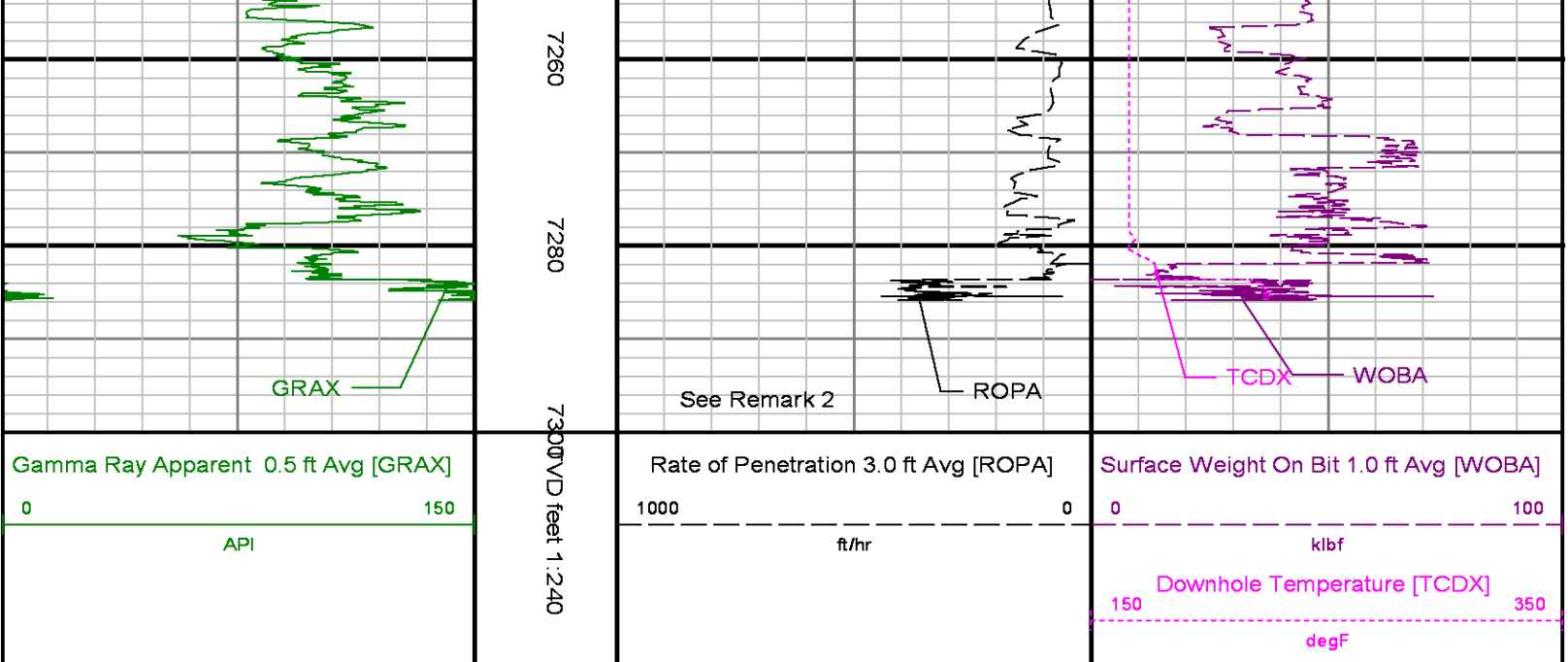
6760

6780

6800







| ADVANTAGE Final Survey Listing   |          |              |             |                     |            |                        |          |                       |               |                  |                    |                   |
|----------------------------------|----------|--------------|-------------|---------------------|------------|------------------------|----------|-----------------------|---------------|------------------|--------------------|-------------------|
| Operator : Anadarko              |          |              |             | Field : Weld County |            |                        |          | API No : 051233809900 |               |                  |                    |                   |
| Well : 3D 16N-21HZ               |          |              |             | Rig : Xtreme 8      |            |                        |          | Job : 5895424         |               |                  |                    |                   |
| Wellbore : 3D 16N-21HZ Orig Hole |          |              |             |                     |            |                        |          |                       |               |                  |                    |                   |
| Well Origin                      |          |              |             |                     |            |                        |          |                       |               |                  |                    |                   |
| Latitude                         |          | 40.1302 deg  |             |                     |            | Longitude              |          | -104.7762 deg         |               |                  |                    |                   |
| North Reference                  |          | True         |             |                     |            | Drill Depth Zero       |          | NULL                  |               |                  |                    |                   |
| Vertical Datum is                |          | Ground Level |             |                     |            | Vertical Datum to DDZ  |          | 17.00 ft              |               |                  |                    |                   |
| Vertical Section North           |          | 0.00 ft      |             |                     |            | Vertical Section East  |          | 0.00 ft               |               |                  |                    |                   |
| Vertical Section Azimuth         |          | 180.0500 deg |             |                     |            | Vertical Section Depth |          | 0.00ft                |               |                  |                    |                   |
| Grid Convergence                 |          | 0.0000 deg   |             |                     |            | Magnetic Declination   |          | 8.4900 deg            |               |                  |                    |                   |
| Total Correction                 |          | 8.4900 deg   |             |                     |            | TVD Calculation Method |          | Minimal Curvature     |               |                  |                    |                   |
| D-Row Calculation                |          | Magcorr1     |             |                     |            | Local Magnetic Field   |          | 52904 nT              |               |                  |                    |                   |
| Local Magnetic Dip Angle         |          | 66.9000 deg  |             |                     |            | Local Gravity Field    |          | 9.798 m/s^2           |               |                  |                    |                   |
| Tie                              | MD<br>ft | Incl<br>deg  | Azim<br>deg | North<br>ft         | East<br>ft | TVD<br>ft              | VS<br>ft | Incr VS<br>ft         | Crs Len<br>ft | DLS<br>deg/100ft | Build<br>deg/100ft | Turn<br>deg/100ft |
| U                                | 917.00   | 0.4100       | 294.8800    | 0.54                | -0.81      | 916.98                 | -0.54    | -1.38                 |               | 0.04             | 0.04               | -7.10             |
|                                  | 1065.00  | 0.4800       | 243.5000    | 0.49                | -1.85      | 1064.98                | -0.48    | -0.34                 | 148.00        | 0.26             | 0.05               | -34.72            |
|                                  | 1339.00  | 0.6300       | 197.0600    | -1.47               | -3.31      | 1338.96                | 1.47     | 2.10                  | 274.00        | 0.17             | 0.05               | -16.95            |
|                                  | 1614.00  | 0.5300       | 148.8000    | -4.00               | -3.10      | 1613.95                | 4.00     | 4.64                  | 275.00        | 0.18             | -0.04              | -17.55            |
|                                  | 1888.00  | 0.6900       | 146.1400    | -6.45               | -1.52      | 1887.94                | 6.45     | 7.56                  | 274.00        | 0.06             | 0.06               | -0.97             |
|                                  | 2147.00  | 0.4600       | 158.9100    | -8.72               | -0.28      | 2146.92                | 8.72     | 10.14                 | 259.00        | 0.10             | -0.09              | 4.93              |
|                                  | 2485.00  | 0.3200       | 120.0400    | -10.46              | 1.03       | 2484.92                | 10.46    | 12.32                 | 338.00        | 0.09             | -0.04              | -11.50            |
|                                  | 2825.00  | 0.5800       | 51.9300     | -9.87               | 3.20       | 2824.91                | 9.87     | 14.57                 | 340.00        | 0.16             | 0.08               | -20.03            |
|                                  | 3081.00  | 0.8500       | 41.5600     | -7.65               | 5.48       | 3080.89                | 7.65     | 17.75                 | 256.00        | 0.12             | 0.11               | -4.05             |
|                                  | 3166.00  | 2.1600       | 54.3900     | -6.25               | 7.20       | 3165.86                | 6.24     | 19.98                 | 85.00         | 1.58             | 1.54               | 15.09             |
| 3252.00                          | 3.5800   | 56.6200      | -3.83       | 10.76               | 3251.75    | 3.82                   | 24.28    | 86.00                 | 1.66          | 1.65             | 2.59               |                   |
| 3337.00                          | 4.9400   | 56.1100      | -0.32       | 16.02               | 3336.51    | 0.31                   | 30.59    | 85.00                 | 1.60          | 1.60             | -0.60              |                   |
| 3422.00                          | 4.8600   | 55.3000      | 3.77        | 22.01               | 3421.20    | -3.79                  | 37.85    | 85.00                 | 0.12          | -0.09            | -0.95              |                   |
| 3507.00                          | 5.2000   | 57.4500      | 7.89        | 28.22               | 3505.87    | -7.91                  | 45.31    | 85.00                 | 0.46          | 0.40             | 2.53               |                   |
| 3592.00                          | 6.3800   | 67.6100      | 11.76       | 35.84               | 3590.44    | -11.79                 | 53.85    | 85.00                 | 1.83          | 1.39             | 11.95              |                   |
| 3678.00                          | 7.8100   | 68.2700      | 15.74       | 45.68               | 3675.78    | -15.78                 | 64.47    | 86.00                 | 1.67          | 1.66             | 0.77               |                   |
| 3763.00                          | 9.6000   | 68.3600      | 20.50       | 57.64               | 3759.79    | -20.55                 | 77.33    | 85.00                 | 2.11          | 2.11             | 0.11               |                   |
| 3848.00                          | 9.1100   | 66.4600      | 25.80       | 70.39               | 3843.66    | -25.86                 | 91.15    | 85.00                 | 0.68          | -0.58            | -2.24              |                   |
| 3933.00                          | 10.3400  | 71.8900      | 30.86       | 83.81               | 3927.44    | -30.93                 | 105.49   | 85.00                 | 1.80          | 1.45             | 6.39               |                   |

|     |          |             |             |             |            |           |          |               |               |                  |                    |                   |
|-----|----------|-------------|-------------|-------------|------------|-----------|----------|---------------|---------------|------------------|--------------------|-------------------|
|     | 4019.00  | 9.9500      | 69.5300     | 35.85       | 98.11      | 4012.10   | -35.94   | 120.64        | 86.00         | 0.66             | -0.45              | -2.74             |
|     | 4104.00  | 9.4800      | 67.4500     | 41.11       | 111.45     | 4095.88   | -41.20   | 134.98        | 85.00         | 0.69             | -0.55              | -2.45             |
|     | 4190.00  | 10.7400     | 66.5600     | 47.01       | 125.35     | 4180.54   | -47.12   | 150.07        | 86.00         | 1.48             | 1.47               | -1.03             |
|     | 4275.00  | 11.0100     | 66.6000     | 53.38       | 140.06     | 4264.02   | -53.51   | 166.11        | 85.00         | 0.32             | 0.32               | 0.05              |
|     | 4360.00  | 11.3700     | 76.3600     | 58.58       | 155.66     | 4347.41   | -58.72   | 182.55        | 85.00         | 2.27             | 0.42               | 11.48             |
|     | 4445.00  | 9.9400      | 67.2600     | 63.40       | 170.57     | 4430.95   | -63.54   | 198.21        | 85.00         | 2.59             | -1.68              | -10.71            |
|     | 4531.00  | 9.6100      | 63.2300     | 69.50       | 183.82     | 4515.70   | -69.66   | 212.81        | 86.00         | 0.88             | -0.38              | -4.69             |
|     | 4616.00  | 9.9100      | 63.3500     | 75.97       | 196.69     | 4599.47   | -76.15   | 227.21        | 85.00         | 0.35             | 0.35               | 0.14              |
|     | 4701.00  | 8.8200      | 68.9000     | 81.60       | 209.31     | 4683.34   | -81.78   | 241.03        | 85.00         | 1.66             | -1.28              | 6.53              |
|     | 4786.00  | 9.2300      | 68.7200     | 86.42       | 221.74     | 4767.28   | -86.62   | 254.36        | 85.00         | 0.48             | 0.48               | -0.21             |
|     | 4872.00  | 9.2800      | 67.0100     | 91.63       | 234.55     | 4852.16   | -91.84   | 268.19        | 86.00         | 0.33             | 0.06               | -1.99             |
|     | 4955.00  | 11.0100     | 71.1500     | 96.81       | 248.22     | 4933.86   | -97.02   | 282.80        | 83.00         | 2.26             | 2.08               | 4.99              |
|     | 5040.00  | 10.7400     | 70.1400     | 102.12      | 263.35     | 5017.34   | -102.35  | 298.84        | 85.00         | 0.39             | -0.32              | -1.19             |
|     | 5125.00  | 10.5000     | 69.0000     | 107.59      | 278.03     | 5100.88   | -107.83  | 314.50        | 85.00         | 0.38             | -0.28              | -1.34             |
|     | 5210.00  | 10.2600     | 67.3700     | 113.28      | 292.24     | 5184.49   | -113.53  | 329.82        | 85.00         | 0.45             | -0.28              | -1.92             |
|     | 5295.00  | 10.6400     | 70.9300     | 118.75      | 306.65     | 5268.08   | -119.02  | 345.23        | 85.00         | 0.88             | 0.45               | 4.19              |
|     | 5381.00  | 10.7000     | 71.0900     | 123.93      | 321.70     | 5352.59   | -124.21  | 361.15        | 86.00         | 0.08             | 0.07               | 0.19              |
|     | 5466.00  | 10.1000     | 70.0300     | 129.04      | 336.17     | 5436.20   | -129.33  | 376.49        | 85.00         | 0.74             | -0.71              | -1.25             |
|     | 5551.00  | 9.3400      | 70.0600     | 133.93      | 349.66     | 5519.98   | -134.24  | 390.84        | 85.00         | 0.89             | -0.89              | 0.04              |
|     | 5636.00  | 9.1200      | 70.4300     | 138.54      | 362.49     | 5603.88   | -138.86  | 404.48        | 85.00         | 0.27             | -0.26              | 0.44              |
|     | 5722.00  | 8.5300      | 68.4700     | 143.17      | 374.85     | 5688.86   | -143.49  | 417.67        | 86.00         | 0.77             | -0.69              | -2.28             |
|     | 5807.00  | 7.7700      | 68.8000     | 147.56      | 386.07     | 5773.00   | -147.89  | 429.72        | 85.00         | 0.90             | -0.89              | 0.39              |
|     | 5892.00  | 9.3300      | 72.5000     | 151.71      | 398.00     | 5857.05   | -152.06  | 442.35        | 85.00         | 1.95             | 1.84               | 4.35              |
|     | 5977.00  | 10.0800     | 69.8800     | 156.34      | 411.56     | 5940.84   | -156.70  | 456.68        | 85.00         | 1.02             | 0.88               | -3.08             |
|     | 6063.00  | 10.7200     | 74.3200     | 161.09      | 426.32     | 6025.42   | -161.46  | 472.19        | 86.00         | 1.19             | 0.74               | 5.16              |
|     | 6148.00  | 9.8500      | 73.4400     | 165.30      | 440.90     | 6109.06   | -165.68  | 487.36        | 85.00         | 1.04             | -1.02              | -1.04             |
|     | 6233.00  | 10.2600     | 71.5900     | 169.76      | 455.05     | 6192.75   | -170.16  | 502.20        | 85.00         | 0.61             | 0.48               | -2.18             |
|     | 6318.00  | 9.6500      | 68.5600     | 174.76      | 468.87     | 6276.47   | -175.17  | 516.89        | 85.00         | 0.95             | -0.72              | -3.56             |
|     | 6403.00  | 10.1800     | 70.5300     | 179.86      | 482.58     | 6360.20   | -180.29  | 531.53        | 85.00         | 0.74             | 0.62               | 2.32              |
|     | 6489.00  | 9.4400      | 70.1000     | 184.80      | 496.38     | 6444.94   | -185.23  | 546.18        | 86.00         | 0.86             | -0.86              | -0.50             |
|     | 6574.00  | 8.9200      | 76.1600     | 188.75      | 509.33     | 6528.86   | -189.19  | 559.72        | 85.00         | 1.29             | -0.61              | 7.13              |
| Tie | MD<br>ft | Incl<br>deg | Azim<br>deg | North<br>ft | East<br>ft | TVD<br>ft | VS<br>ft | Incr VS<br>ft | Crs Len<br>ft | DLS<br>deg/100ft | Build<br>deg/100ft | Turn<br>deg/100ft |
|     | 6660.00  | 9.1500      | 78.9300     | 191.65      | 522.52     | 6613.79   | -192.11  | 573.22        | 86.00         | 0.57             | 0.27               | 3.22              |
|     | 6702.00  | 9.2800      | 83.4300     | 192.68      | 529.16     | 6655.25   | -193.15  | 579.94        | 42.00         | 1.74             | 0.31               | 10.71             |
|     | 6745.00  | 10.3800     | 99.1500     | 192.46      | 536.43     | 6697.63   | -192.93  | 587.22        | 43.00         | 6.72             | 2.56               | 36.56             |
|     | 6788.00  | 13.2000     | 117.2100    | 189.60      | 544.62     | 6739.73   | -190.08  | 595.90        | 43.00         | 10.73            | 6.56               | 42.00             |
|     | 6830.00  | 16.8200     | 129.4900    | 183.54      | 553.58     | 6780.30   | -184.02  | 606.71        | 42.00         | 11.43            | 8.62               | 29.24             |
|     | 6873.00  | 20.9900     | 139.8600    | 173.69      | 563.36     | 6820.98   | -174.18  | 620.59        | 43.00         | 12.42            | 9.70               | 24.12             |
|     | 6916.00  | 22.9900     | 149.3300    | 160.57      | 572.61     | 6860.86   | -161.07  | 636.64        | 43.00         | 9.45             | 4.65               | 22.02             |
|     | 6958.00  | 23.9500     | 156.0800    | 145.72      | 580.25     | 6899.40   | -146.23  | 653.34        | 42.00         | 6.79             | 2.29               | 16.07             |
|     | 7001.00  | 25.9400     | 161.9700    | 128.80      | 586.70     | 6938.39   | -129.31  | 671.45        | 43.00         | 7.40             | 4.63               | 13.70             |
|     | 7043.00  | 28.8500     | 162.7700    | 110.38      | 592.55     | 6975.67   | -110.90  | 690.78        | 42.00         | 6.98             | 6.93               | 1.90              |
|     | 7086.00  | 33.4900     | 164.0900    | 89.05       | 598.88     | 7012.46   | -89.57   | 713.03        | 43.00         | 10.91            | 10.79              | 3.07              |
|     | 7129.00  | 38.7300     | 166.4500    | 64.55       | 605.28     | 7047.19   | -65.08   | 738.35        | 43.00         | 12.61            | 12.19              | 5.49              |
|     | 7171.00  | 42.7500     | 167.2300    | 37.86       | 611.52     | 7079.00   | -38.39   | 765.76        | 42.00         | 9.65             | 9.57               | 1.86              |
|     | 7214.00  | 46.6900     | 168.6900    | 8.27        | 617.81     | 7109.55   | -8.81    | 796.01        | 43.00         | 9.47             | 9.16               | 3.40              |
|     | 7256.00  | 50.5600     | 171.3700    | -22.76      | 623.25     | 7137.31   | 22.21    | 827.51        | 42.00         | 10.38            | 9.21               | 6.38              |
|     | 7299.00  | 55.2000     | 172.1800    | -56.68      | 628.14     | 7163.25   | 56.14    | 861.79        | 43.00         | 10.89            | 10.79              | 1.88              |
|     | 7342.00  | 58.9300     | 173.1900    | -92.47      | 632.73     | 7186.63   | 91.92    | 897.87        | 43.00         | 8.90             | 8.67               | 2.35              |
|     | 7384.00  | 61.8400     | 172.6300    | -128.70     | 637.24     | 7207.38   | 128.15   | 934.38        | 42.00         | 7.02             | 6.93               | -1.33             |
|     | 7427.00  | 64.8800     | 174.4300    | -166.89     | 641.56     | 7226.66   | 166.33   | 972.81        | 43.00         | 8.00             | 7.07               | 4.19              |
|     | 7469.00  | 68.4800     | 176.6700    | -205.33     | 644.54     | 7243.29   | 204.77   | 1011.37       | 42.00         | 9.87             | 8.57               | 5.33              |
|     | 7512.00  | 73.8600     | 179.1300    | -245.99     | 646.02     | 7257.16   | 245.42   | 1052.05       | 43.00         | 13.63            | 12.51              | 5.72              |
|     | 7555.00  | 79.2900     | 181.4200    | -287.79     | 645.81     | 7267.14   | 287.23   | 1093.86       | 43.00         | 13.65            | 12.63              | 5.33              |
|     | 7597.00  | 82.8300     | 181.6500    | -329.26     | 644.70     | 7273.67   | 328.70   | 1135.34       | 42.00         | 8.45             | 8.43               | 0.55              |
|     | 7640.00  | 84.8100     | 181.3400    | -371.99     | 643.58     | 7278.30   | 371.43   | 1178.09       | 43.00         | 4.66             | 4.60               | -0.72             |
|     | 7735.00  | 89.2900     | 180.8400    | -466.83     | 641.78     | 7283.18   | 466.26   | 1272.94       | 95.00         | 4.74             | 4.72               | -0.53             |
|     | 7863.00  | 90.6400     | 181.6800    | -594.79     | 638.96     | 7283.26   | 594.23   | 1400.93       | 128.00        | 1.24             | 1.05               | 0.66              |
|     | 7947.00  | 91.4400     | 181.2000    | -678.75     | 636.85     | 7281.74   | 678.19   | 1484.92       | 84.00         | 1.11             | 0.95               | -0.57             |
|     | 8033.00  | 91.2900     | 181.1000    | -764.71     | 635.13     | 7279.69   | 764.15   | 1570.89       | 86.00         | 0.21             | -0.17              | -0.12             |
|     | 8119.00  | 91.7800     | 180.2300    | -850.67     | 634.13     | 7277.39   | 850.12   | 1656.86       | 86.00         | 1.16             | 0.57               | -1.01             |
|     | 8204.00  | 91.6300     | 179.5900    | -935.63     | 634.26     | 7274.86   | 935.08   | 1741.82       | 85.00         | 0.77             | -0.18              | -0.75             |

|     |          |         |          |          |        |         |         |         |         |           |           |           |
|-----|----------|---------|----------|----------|--------|---------|---------|---------|---------|-----------|-----------|-----------|
|     | 8289.00  | 90.6400 | 179.5700 | -1020.61 | 634.89 | 7273.17 | 1020.06 | 1826.81 | 85.00   | 1.16      | -1.16     | -0.02     |
|     | 8374.00  | 91.0100 | 179.3800 | -1105.60 | 635.67 | 7271.95 | 1105.04 | 1911.80 | 85.00   | 0.49      | 0.44      | -0.22     |
|     | 8460.00  | 89.7800 | 179.1600 | -1191.59 | 636.76 | 7271.36 | 1191.03 | 1997.79 | 86.00   | 1.45      | -1.43     | -0.26     |
|     | 8545.00  | 89.5900 | 178.7700 | -1276.57 | 638.30 | 7271.82 | 1276.01 | 2082.79 | 85.00   | 0.51      | -0.22     | -0.46     |
|     | 8630.00  | 89.2900 | 179.3600 | -1361.56 | 639.68 | 7272.65 | 1361.00 | 2167.79 | 85.00   | 0.78      | -0.35     | 0.69      |
|     | 8715.00  | 89.5900 | 179.3600 | -1446.55 | 640.63 | 7273.49 | 1445.99 | 2252.78 | 85.00   | 0.35      | 0.35      | 0.00      |
|     | 8801.00  | 89.5600 | 179.9300 | -1532.54 | 641.17 | 7274.12 | 1531.98 | 2338.78 | 86.00   | 0.66      | -0.03     | 0.66      |
|     | 8886.00  | 89.4400 | 179.9500 | -1617.54 | 641.25 | 7274.86 | 1616.98 | 2423.78 | 85.00   | 0.14      | -0.14     | 0.02      |
|     | 8971.00  | 89.9000 | 180.8500 | -1702.53 | 640.66 | 7275.35 | 1701.98 | 2508.77 | 85.00   | 1.19      | 0.54      | 1.06      |
|     | 9056.00  | 90.1800 | 181.2400 | -1787.52 | 639.11 | 7275.29 | 1786.96 | 2593.77 | 85.00   | 0.56      | 0.33      | 0.46      |
|     | 9141.00  | 89.0400 | 180.6400 | -1872.51 | 637.72 | 7275.87 | 1871.95 | 2678.77 | 85.00   | 1.52      | -1.34     | -0.71     |
|     | 9227.00  | 88.6100 | 180.8500 | -1958.48 | 636.60 | 7277.64 | 1957.92 | 2764.75 | 86.00   | 0.56      | -0.50     | 0.24      |
|     | 9312.00  | 89.5900 | 180.9400 | -2043.46 | 635.27 | 7278.97 | 2042.90 | 2849.74 | 85.00   | 1.16      | 1.15      | 0.11      |
|     | 9397.00  | 89.0400 | 180.6400 | -2128.44 | 634.10 | 7279.99 | 2127.89 | 2934.73 | 85.00   | 0.74      | -0.65     | -0.35     |
|     | 9481.00  | 89.6600 | 180.7600 | -2212.43 | 633.07 | 7280.94 | 2211.88 | 3018.73 | 84.00   | 0.75      | 0.74      | 0.14      |
|     | 9566.00  | 89.6600 | 180.9900 | -2297.42 | 631.78 | 7281.45 | 2296.87 | 3103.73 | 85.00   | 0.27      | 0.00      | 0.27      |
|     | 9651.00  | 89.6900 | 179.9700 | -2382.41 | 631.06 | 7281.93 | 2381.86 | 3188.72 | 85.00   | 1.20      | 0.04      | -1.20     |
|     | 9736.00  | 90.5200 | 179.7200 | -2467.41 | 631.29 | 7281.77 | 2466.86 | 3273.72 | 85.00   | 1.02      | 0.98      | -0.29     |
|     | 9822.00  | 91.5700 | 179.9200 | -2553.40 | 631.56 | 7280.20 | 2552.84 | 3359.71 | 86.00   | 1.24      | 1.22      | 0.23      |
|     | 9907.00  | 91.7200 | 179.6800 | -2638.36 | 631.86 | 7277.76 | 2637.81 | 3444.67 | 85.00   | 0.33      | 0.18      | -0.28     |
| Tie | MD       | Incl    | Azim     | North    | East   | TVD     | VS      | Incr VS | Crs Len | DLS       | Build     | Turn      |
|     | ft       | deg     | deg      | ft       | ft     | ft      | ft      | ft      | ft      | deg/100ft | deg/100ft | deg/100ft |
|     | 9992.00  | 91.7200 | 180.6600 | -2723.32 | 631.61 | 7275.21 | 2722.77 | 3529.63 | 85.00   | 1.15      | 0.00      | 1.15      |
|     | 10077.00 | 91.1400 | 180.4800 | -2808.29 | 630.76 | 7273.09 | 2807.74 | 3614.61 | 85.00   | 0.71      | -0.68     | -0.21     |
|     | 10163.00 | 91.1400 | 179.3300 | -2894.27 | 630.91 | 7271.38 | 2893.72 | 3700.59 | 86.00   | 1.34      | 0.00      | -1.34     |
|     | 10248.00 | 90.4000 | 179.0100 | -2979.25 | 632.14 | 7270.24 | 2978.70 | 3785.58 | 85.00   | 0.95      | -0.87     | -0.38     |
|     | 10333.00 | 89.0100 | 178.5000 | -3064.23 | 633.98 | 7270.68 | 3063.68 | 3870.58 | 85.00   | 1.74      | -1.64     | -0.60     |
|     | 10418.00 | 88.6700 | 178.9900 | -3149.19 | 635.84 | 7272.40 | 3148.64 | 3955.56 | 85.00   | 0.70      | -0.40     | 0.58      |
|     | 10503.00 | 89.3800 | 178.6000 | -3234.16 | 637.63 | 7273.84 | 3233.60 | 4040.54 | 85.00   | 0.95      | 0.84      | -0.46     |
|     | 10589.00 | 89.0100 | 178.7200 | -3320.13 | 639.64 | 7275.05 | 3319.57 | 4126.54 | 86.00   | 0.45      | -0.43     | 0         |