



## COG Operating LLC

Eddy County, NM (NAN27 NME)

Dexter #10

Dexter #10

30-015-37351

OH

Design: Actual

## Standard Survey Report

14 March, 2011



Scientific Drilling  
Directional Drilling Operations



Scientific Drilling  
Survey Report



|           |                             |                              |                                          |
|-----------|-----------------------------|------------------------------|------------------------------------------|
| Company:  | COG Operating LLC           | Local Co-ordinate Reference: | Site Dexter #10                          |
| Project:  | Eddy County, NM (NAN27 NME) | TVD Reference:               | KB Elev (14') @ 3665.00usft (United #40) |
| Site:     | Dexter #10                  | MD Reference:                | KB Elev (14') @ 3665.00usft (United #40) |
| Well:     | Dexter #10                  | North Reference:             | Grid                                     |
| Wellbore: | OH                          | Survey Calculation Method:   | Minimum Curvature                        |
| Design:   | Actual                      | Database:                    | EDM-Julio                                |

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project     | Eddy County, NM (NAN27 NME)          |               |                |
| Map System: | US State Plane 1927 (Exact solution) | System Datum: | Mean Sea Level |
| Geo Datum:  | NAD 1927 (NADCON CONUS)              |               |                |
| Map Zone:   | New Mexico East 3001                 |               |                |

|                       |            |                   |                   |
|-----------------------|------------|-------------------|-------------------|
| Site                  | Dexter #10 |                   |                   |
| Site Position:        |            | Northing:         | 661,035.30 usft   |
| From:                 | Map        | Easting:          | 616,693.00 usft   |
| Position Uncertainty: | 0.00 usft  | Slot Radius:      | 0 "               |
|                       |            | Latitude:         | 32° 49' 0.111 N   |
|                       |            | Longitude:        | 103° 57' 12.578 W |
|                       |            | Grid Convergence: | 0.21 °            |

|                      |            |                     |                   |
|----------------------|------------|---------------------|-------------------|
| Well                 | Dexter #10 |                     |                   |
| Well Position        | +N/-S      | 0.00 usft           | Northing:         |
|                      | +E/-W      | 0.00 usft           | Easting:          |
| Position Uncertainty | 0.00 usft  | Wellhead Elevation: | usft              |
|                      |            | Latitude:           | 32° 49' 0.111 N   |
|                      |            | Longitude:          | 103° 57' 12.578 W |
|                      |            | Ground Level:       | 3,651.00 usft     |

|           |            |             |                 |               |                     |
|-----------|------------|-------------|-----------------|---------------|---------------------|
| Wellbore  | OH         |             |                 |               |                     |
| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|           | IGRF200510 | 2011/03/07  | 7.83            | 60.70         | 48,992              |

|                   |                         |              |              |               |        |
|-------------------|-------------------------|--------------|--------------|---------------|--------|
| Design            | Actual                  |              |              |               |        |
| Audit Notes:      |                         |              |              |               |        |
| Version:          | 1.0                     | Phase:       | ACTUAL       | Tie On Depth: | 0.00   |
| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°) |        |
|                   | 0.00                    | 0.00         | 0.00         |               | 331.70 |

|                |                 |                   |           |                                    |  |
|----------------|-----------------|-------------------|-----------|------------------------------------|--|
| Survey Program | Date 2011/03/14 |                   |           |                                    |  |
| From (usft)    | To (usft)       | Survey (Wellbore) | Tool Name | Description                        |  |
| 100.00         | 1,263.00        | Gyro Survey (OH)  | Keeper    | Standard Wireline Keeper ver 1.0.2 |  |
| 1,338.00       | 4,535.00        | MWD Survey (OH)   | MWD       | MWD - Standard                     |  |

|                       |                 |             |                       |              |              |                         |                         |                        |                       |  |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|--|
| Survey                |                 |             |                       |              |              |                         |                         |                        |                       |  |
| 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) |  |
| 0.00                  | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  |  |
| 100.00                | 0.53            | 180.02      | 100.00                | -0.46        | 0.00         | -0.41                   | 0.53                    | 0.53                   | 0.00                  |  |
| 200.00                | 0.82            | 160.30      | 199.99                | -1.60        | 0.24         | -1.52                   | 0.37                    | 0.29                   | -19.72                |  |
| 300.00                | 0.85            | 148.66      | 299.98                | -2.91        | 0.87         | -2.97                   | 0.17                    | 0.03                   | -11.64                |  |
| 400.00                | 0.58            | 140.94      | 399.97                | -3.93        | 1.57         | -4.21                   | 0.29                    | -0.27                  | -7.72                 |  |
| 500.00                | 0.52            | 107.90      | 499.97                | -4.46        | 2.32         | -5.03                   | 0.32                    | -0.06                  | -33.04                |  |
| 600.00                | 0.63            | 121.50      | 599.96                | -4.89        | 3.22         | -5.84                   | 0.17                    | 0.11                   | 13.60                 |  |
| 700.00                | 0.86            | 119.61      | 699.96                | -5.55        | 4.35         | -6.95                   | 0.23                    | 0.23                   | -1.89                 |  |
| 800.00                | 0.81            | 110.61      | 799.94                | -6.17        | 5.66         | -8.11                   | 0.14                    | -0.05                  | -9.00                 |  |
| 900.00                | 0.82            | 97.91       | 899.93                | -6.52        | 7.03         | -9.07                   | 0.18                    | 0.01                   | -12.70                |  |



# Scientific Drilling Survey Report



|                  |                             |                                     |                                          |
|------------------|-----------------------------|-------------------------------------|------------------------------------------|
| <b>Company:</b>  | COG Operating LLC           | <b>Local Co-ordinate Reference:</b> | Site Dexter #10                          |
| <b>Project:</b>  | Eddy County, NM (NAN27 NME) | <b>TVD Reference:</b>               | KB Elev (14') @ 3665.00usft (United #40) |
| <b>Site:</b>     | Dexter #10                  | <b>MD Reference:</b>                | KB Elev (14') @ 3665.00usft (United #40) |
| <b>Well:</b>     | Dexter #10                  | <b>North Reference:</b>             | Grid                                     |
| <b>Wellbore:</b> | OH                          | <b>Survey Calculation Method:</b>   | Minimum Curvature                        |
| <b>Design:</b>   | Actual                      | <b>Database:</b>                    | EDM-Julio                                |

| Survey                |                 |             |                       |              |              |                         |                         |                        |                       |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 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) |
| 1,000.00              | 1.12            | 84.78       | 999.92                | -6.53        | 8.71         | -9.88                   | 0.37                    | 0.30                   | -13.13                |
| 1,100.00              | 1.63            | 79.15       | 1,099.89              | -6.17        | 11.08        | -10.69                  | 0.53                    | 0.51                   | -5.63                 |
| 1,200.00              | 1.71            | 77.42       | 1,199.85              | -5.58        | 13.93        | -11.52                  | 0.09                    | 0.08                   | -1.73                 |
| 1,263.00              | 1.56            | 69.53       | 1,262.82              | -5.07        | 15.66        | -11.89                  | 0.43                    | -0.24                  | -12.52                |
| Gyro Tie-in           |                 |             |                       |              |              |                         |                         |                        |                       |
| 1,338.00              | 1.29            | 73.48       | 1,337.80              | -4.48        | 17.42        | -12.20                  | 0.38                    | -0.36                  | 5.27                  |
| 1,401.00              | 1.47            | 43.38       | 1,400.78              | -3.69        | 18.66        | -12.09                  | 1.17                    | 0.29                   | -47.78                |
| 1,465.00              | 1.95            | 21.92       | 1,464.75              | -2.08        | 19.63        | -11.14                  | 1.24                    | 0.75                   | -33.53                |
| 1,528.00              | 2.07            | 355.73      | 1,527.72              | 0.05         | 19.94        | -9.41                   | 1.46                    | 0.19                   | -41.57                |
| 1,592.00              | 2.86            | 334.09      | 1,591.66              | 2.64         | 19.16        | -6.76                   | 1.89                    | 1.23                   | -33.81                |
| 1,655.00              | 3.95            | 329.99      | 1,654.55              | 5.93         | 17.39        | -3.02                   | 1.77                    | 1.73                   | -6.51                 |
| 1,718.00              | 4.93            | 325.11      | 1,717.36              | 10.03        | 14.75        | 1.84                    | 1.67                    | 1.56                   | -7.75                 |
| 1,782.00              | 5.91            | 325.27      | 1,781.07              | 14.99        | 11.30        | 7.84                    | 1.53                    | 1.53                   | 0.25                  |
| 1,877.00              | 5.90            | 327.39      | 1,875.57              | 23.13        | 5.88         | 17.57                   | 0.23                    | -0.01                  | 2.23                  |
| 1,972.00              | 5.55            | 326.87      | 1,970.09              | 31.09        | 0.74         | 27.02                   | 0.37                    | -0.37                  | -0.55                 |
| 2,067.00              | 5.13            | 328.40      | 2,064.68              | 38.55        | -3.99        | 35.84                   | 0.47                    | -0.44                  | 1.61                  |
| 2,162.00              | 5.70            | 326.33      | 2,159.26              | 46.10        | -8.84        | 44.78                   | 0.63                    | 0.60                   | -2.18                 |
| 2,257.00              | 5.38            | 328.55      | 2,253.81              | 53.82        | -13.77       | 53.92                   | 0.41                    | -0.34                  | 2.34                  |
| 2,352.00              | 5.95            | 328.43      | 2,348.35              | 61.82        | -18.68       | 63.28                   | 0.60                    | 0.60                   | -0.13                 |
| 2,447.00              | 5.46            | 331.56      | 2,442.88              | 69.99        | -23.41       | 72.72                   | 0.61                    | -0.52                  | 3.29                  |
| 2,542.00              | 6.20            | 337.96      | 2,537.39              | 78.72        | -27.48       | 82.34                   | 1.04                    | 0.78                   | 6.74                  |
| 2,637.00              | 5.82            | 340.11      | 2,631.86              | 88.00        | -31.05       | 92.20                   | 0.46                    | -0.40                  | 2.26                  |
| 2,733.00              | 5.52            | 339.63      | 2,727.39              | 96.91        | -34.31       | 101.59                  | 0.32                    | -0.31                  | -0.50                 |
| 2,828.00              | 6.09            | 329.06      | 2,821.91              | 105.51       | -38.49       | 111.15                  | 1.27                    | 0.60                   | -11.13                |
| 2,922.00              | 6.01            | 329.74      | 2,915.39              | 114.04       | -43.54       | 121.05                  | 0.11                    | -0.09                  | 0.72                  |
| 3,017.00              | 5.81            | 328.07      | 3,009.88              | 122.42       | -48.59       | 130.82                  | 0.28                    | -0.21                  | -1.76                 |
| 3,112.00              | 5.65            | 328.24      | 3,104.41              | 130.47       | -53.59       | 140.28                  | 0.17                    | -0.17                  | 0.18                  |
| 3,209.00              | 5.54            | 329.09      | 3,200.94              | 138.55       | -58.51       | 149.73                  | 0.14                    | -0.11                  | 0.88                  |
| 3,304.00              | 5.92            | 322.61      | 3,295.47              | 146.38       | -63.84       | 159.15                  | 0.79                    | 0.40                   | -8.82                 |
| 3,399.00              | 5.93            | 321.56      | 3,389.96              | 154.11       | -69.86       | 168.81                  | 0.11                    | 0.01                   | -1.11                 |
| 3,501.00              | 5.77            | 321.73      | 3,491.43              | 162.26       | -76.32       | 179.05                  | 0.16                    | -0.16                  | 0.17                  |
| 3,596.00              | 5.59            | 320.09      | 3,585.96              | 169.56       | -82.24       | 188.29                  | 0.26                    | -0.19                  | -1.73                 |
| 3,691.00              | 6.37            | 320.85      | 3,680.45              | 177.20       | -88.54       | 197.99                  | 0.83                    | 0.82                   | 0.80                  |
| 3,786.00              | 6.46            | 320.59      | 3,774.85              | 185.42       | -95.26       | 208.41                  | 0.10                    | 0.09                   | -0.27                 |
| 3,881.00              | 6.17            | 318.37      | 3,869.28              | 193.36       | -102.04      | 218.63                  | 0.40                    | -0.31                  | -2.34                 |
| 3,976.00              | 6.06            | 320.76      | 3,963.74              | 201.06       | -108.61      | 228.52                  | 0.29                    | -0.12                  | 2.52                  |
| 4,040.00              | 5.29            | 323.78      | 4,027.42              | 206.06       | -112.49      | 234.76                  | 1.29                    | -1.20                  | 4.72                  |
| 4,103.00              | 4.22            | 332.71      | 4,090.20              | 210.46       | -115.27      | 239.95                  | 2.06                    | -1.70                  | 14.17                 |
| 4,167.00              | 3.21            | 341.87      | 4,154.07              | 214.26       | -116.90      | 244.07                  | 1.83                    | -1.58                  | 14.31                 |
| 4,230.00              | 1.92            | 334.15      | 4,217.01              | 216.88       | -117.91      | 246.86                  | 2.12                    | -2.05                  | -12.25                |
| 4,294.00              | 0.44            | 1.32        | 4,280.99              | 218.09       | -118.37      | 248.15                  | 2.41                    | -2.31                  | 42.45                 |
| 4,357.00              | 0.38            | 31.74       | 4,343.99              | 218.51       | -118.26      | 248.46                  | 0.35                    | -0.10                  | 48.29                 |
| 4,422.00              | 0.31            | 21.76       | 4,408.99              | 218.86       | -118.08      | 248.68                  | 0.14                    | -0.11                  | -15.35                |



Scientific Drilling  
Survey Report



|           |                             |                              |                                          |
|-----------|-----------------------------|------------------------------|------------------------------------------|
| Company:  | COG Operating LLC           | Local Co-ordinate Reference: | Site Dexter #10                          |
| Project:  | Eddy County, NM (NAN27 NME) | TVD Reference:               | KB Elev (14') @ 3665.00usft (United #40) |
| Site:     | Dexter #10                  | MD Reference:                | KB Elev (14') @ 3665.00usft (United #40) |
| Well:     | Dexter #10                  | North Reference:             | Grid                                     |
| Wellbore: | OH                          | Survey Calculation Method:   | Minimum Curvature                        |
| Design:   | Actual                      | Database:                    | EDM-Julio                                |

Survey

| 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) |
|-----------------------------|--------------------|----------------|-----------------------------|-----------------|-----------------|-------------------------------|-------------------------------|------------------------------|-----------------------------|
| Last MWD Survey             |                    |                |                             |                 |                 |                               |                               |                              |                             |
| 4,535.00                    | 0.31               | 21.76          | 4,521.99                    | 219.43          | -117.85         | 249.07                        | 0.00                          | 0.00                         | 0.00                        |
| Projection to Bit           |                    |                |                             |                 |                 |                               |                               |                              |                             |

Design Annotations

| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 | Comment           |
|-----------------------------|-----------------------------|-------------------|-----------------|-------------------|
|                             |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) |                   |
| 1,263.00                    | 1,262.82                    | -5.07             | 15.66           | Gyro Tie-in       |
| 4,422.00                    | 4,408.99                    | 218.86            | -118.08         | Last MWD Survey   |
| 4,535.00                    | 4,521.99                    | 219.43            | -117.85         | Projection to Bit |

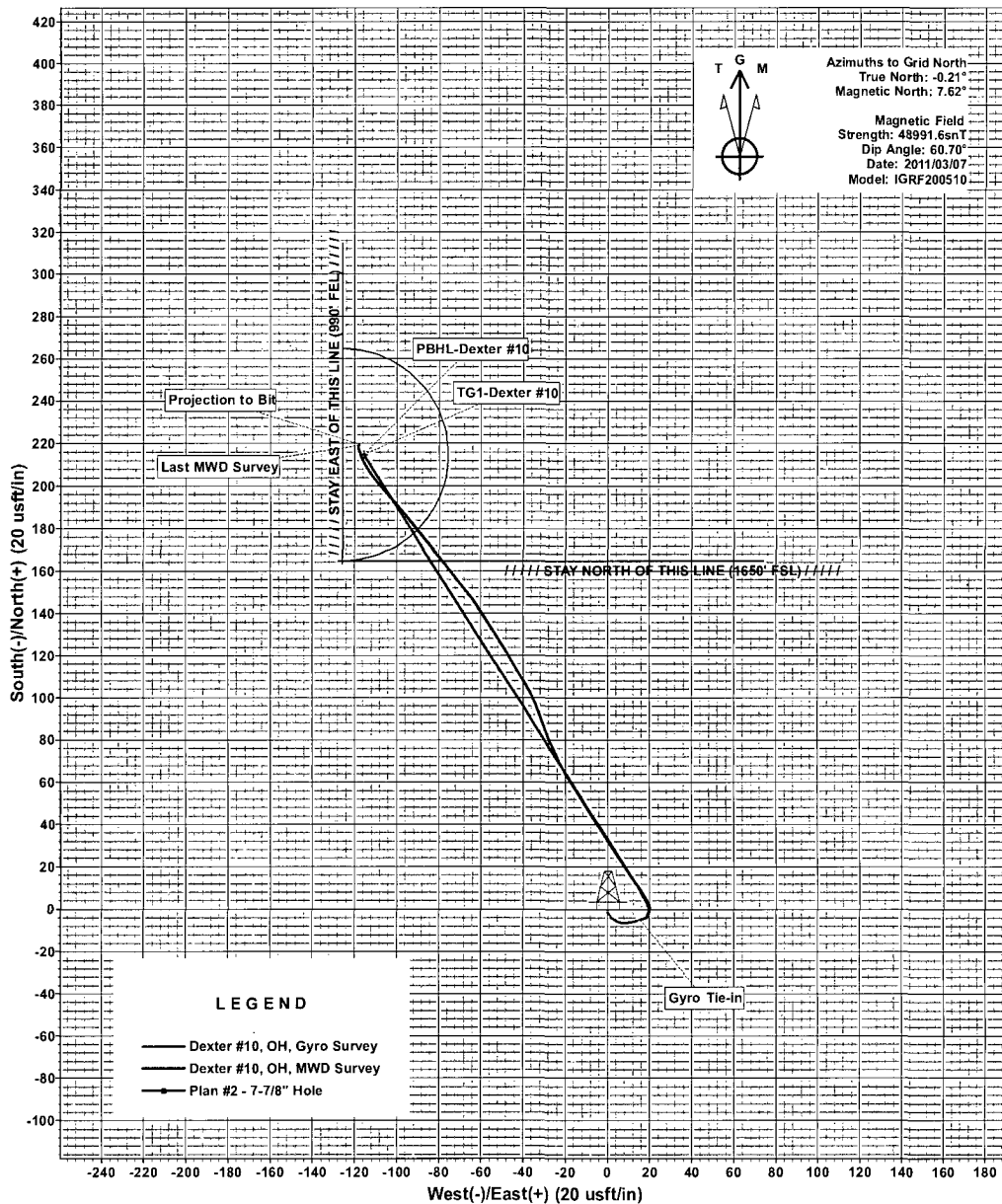
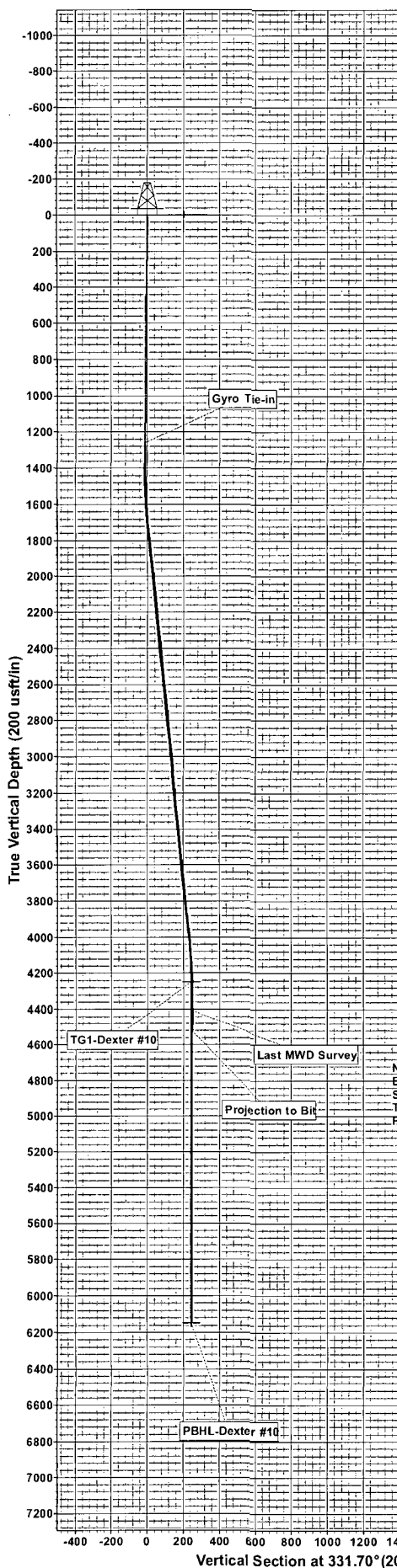
Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_



Scientific Drilling for COG Operating LLC  
Site: Eddy County, NM (NAN27 NME)  
Well: Dexter #10  
Wellbore: OH  
Design: Plan #2 - 7-7/8" Hole



Scientific Drilling  
Directional Drilling Operations



WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

| Name                | TVD     | +N/-S  | +E/-W   | Northing  | Easting   | Latitude                          | Longitude | Shape                            |
|---------------------|---------|--------|---------|-----------|-----------|-----------------------------------|-----------|----------------------------------|
| East HL-Dexter #10  | 0.00    | 164.70 | -125.60 | 661200.00 | 616567.40 | 32° 49' 1.746 N 103° 57' 14.042 W | 14.042 W  | Rectangle (Sides: L150.00 W0.00) |
| South HL-Dexter #10 | 0.00    | 164.70 | -125.60 | 661200.00 | 616567.40 | 32° 49' 1.746 N 103° 57' 14.042 W | 14.042 W  | Rectangle (Sides: L0.00 W200.00) |
| TG1-Dexter #10      | 4250.00 | 214.70 | -115.60 | 661250.00 | 616577.40 | 32° 49' 2.240 N 103° 57' 13.923 W | 13.923 W  | Circle (Radius: 50.00)           |
| PBHL-Dexter #10     | 6150.00 | 214.70 | -115.60 | 661250.00 | 616577.40 | 32° 49' 2.240 N 103° 57' 13.923 W | 13.923 W  | Circle (Radius: 5.00)            |

SECTION DETAILS

| Sec | MD      | Inc  | Azi    | TVD     | +N/-S  | +E/-W   | Dleg | TFace   | VSec   | Target          |
|-----|---------|------|--------|---------|--------|---------|------|---------|--------|-----------------|
| 1   | 1263.00 | 1.56 | 69.53  | 1262.82 | -5.07  | 15.66   | 0.00 | 0.00    | -11.89 |                 |
| 2   | 1375.00 | 1.56 | 69.53  | 1374.78 | -4.01  | 18.51   | 0.00 | 0.00    | -12.30 |                 |
| 3   | 1685.86 | 5.70 | 327.56 | 1685.12 | 10.52  | 14.19   | 2.00 | -116.13 | 2.54   |                 |
| 4   | 3977.36 | 5.70 | 327.56 | 3965.27 | 202.73 | -107.99 | 0.00 | 0.00    | 229.70 |                 |
| 5   | 4262.56 | 0.00 | 0.00   | 4250.00 | 214.70 | -115.60 | 2.00 | 180.00  | 243.84 | TG1-Dexter #10  |
| 6   | 6162.56 | 0.00 | 0.00   | 6150.00 | 214.70 | -115.60 | 0.00 | 0.00    | 243.84 | PBHL-Dexter #10 |

WELL DETAILS: Dexter #10

| +N/-S | +E/-W | Northing  | Ground Level:                | Latitude        | Longitude  | Slot    |
|-------|-------|-----------|------------------------------|-----------------|------------|---------|
| 0.00  | 0.00  | 661035.30 | Easting 3651.00<br>616693.00 | 32° 49' 0.111 N | 103° 57' 1 | 2.578 W |

PROJECT DETAILS: Eddy County, NM (NAN27 NME)

Plan: Plan #2 - 7-7/8" Hole (Dexter #10/OH)

Geodetic System: US State Plane 1927 (Exact solution) Created By: Julio Pina

Date: 07-Mar-11

Datum: NAD 1927 (NADCON CONUS)

Ellipsoid: Clarke 1866

Checked:

Date:

Zone: New Mexico East 3001

Reviewed:

Date:

System Datum: Mean Sea Level

Approved:

Date: