

APF # 30-015-35949

## **COG Operating LLC**

Eddy County

High Lonesome 23 Fed Com #1

High Lonesome #1

OH

Survey: MWD #1

## **Pathfinder X & Y Survey Report**

15 January, 2009

# COG Operating, L.L.C.

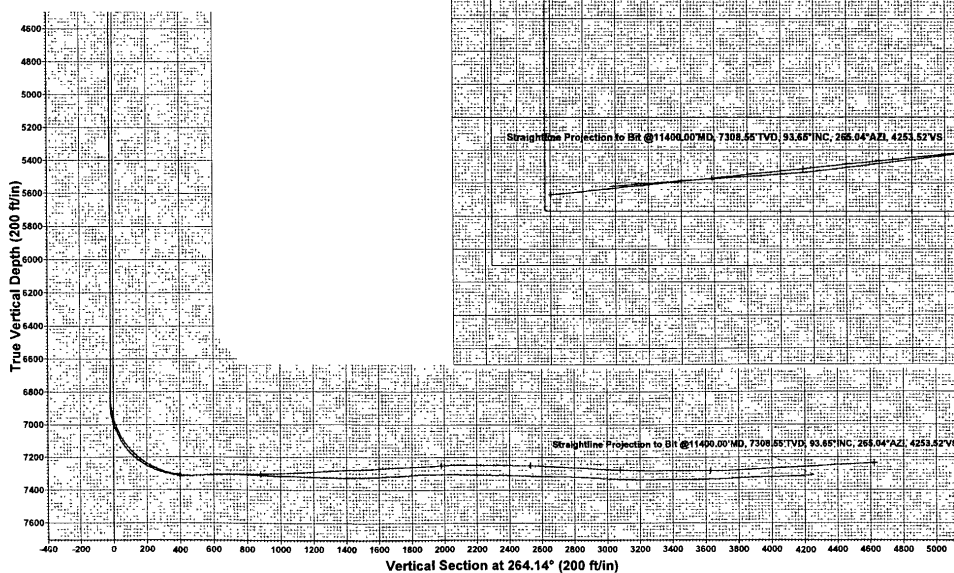
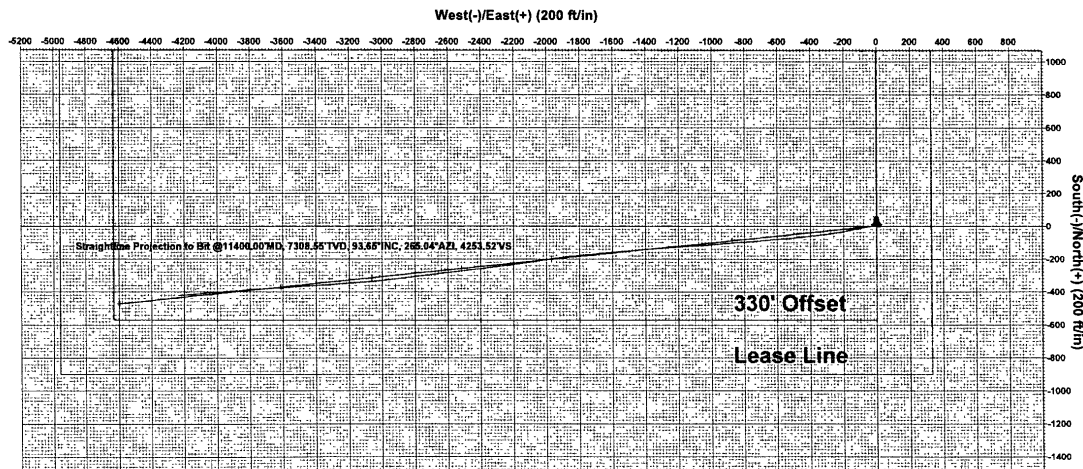
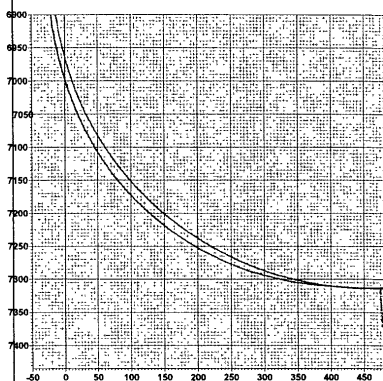


Azimuths to Grid North  
True North: -0.16°  
Magnetic North: 7.99°  
Magnetic Field  
Strength: 49279.2snT  
Dip Angle: 60.81°  
Date: 12/2/2008  
Model: IGRF200510



Project: Eddy County  
Site: High Lonesome 23 Fed Com #1  
Well: High Lonesome #1  
Wellbore: OH  
Plan: Plan #2 (High Lonesome #1/OH)

| WELL DETAILS High Lonesome #1                        |       |            |            |                 |                  |      |
|------------------------------------------------------|-------|------------|------------|-----------------|------------------|------|
| Ground Elevation: 3702.00                            |       |            |            |                 |                  |      |
| RKB Elevation: WELL @ 3702.00ft (Original Well Elev) |       |            |            |                 |                  |      |
| Rig Name: Original Well Elev                         |       |            |            |                 |                  |      |
| +N/-S                                                | +E/-W | Northing   | Easting    | Latitude        | Longitude        | Slot |
| 0.00                                                 | 0.00  | 892133.954 | 632013.144 | 32° 54' 8.438 N | 104° 2' 16.406 W |      |



PROJECT DETAILS: Eddy County  
Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1960  
Zone: New Mexico Eastern Zone  
System Datum: Mean Sea Level  
Local North: Grid

Plan: Plan #2 (High Lonesome #1/OH)  
Created By: Nate Bingham Date: 7/18, January 15 2009  
Checked: \_\_\_\_\_ Date: \_\_\_\_\_

**Pathfinder Energy Services**  
Pathfinder X & Y Survey Report

|                  |                             |                                     |                                       |
|------------------|-----------------------------|-------------------------------------|---------------------------------------|
| <b>Company:</b>  | COG Operating LLC           | <b>Local Co-ordinate Reference:</b> | Well High Lonesome #1                 |
| <b>Project:</b>  | Eddy County                 | <b>TVD Reference:</b>               | WELL @ 3702.00ft (Original Well Elev) |
| <b>Site:</b>     | High Lonesome 23 Fed Com #1 | <b>MD Reference:</b>                | WELL @ 3702.00ft (Original Well Elev) |
| <b>Well:</b>     | High Lonesome #1            | <b>North Reference:</b>             | Grid                                  |
| <b>Wellbore:</b> | OH                          | <b>Survey Calculation Method:</b>   | Minimum Curvature                     |
| <b>Design:</b>   | OH                          | <b>Database:</b>                    | EDM 2003.16 Single User Db            |

|                            |                           |                      |                |
|----------------------------|---------------------------|----------------------|----------------|
| <b>Project</b> Eddy County |                           |                      |                |
| <b>Map System:</b>         | US State Plane 1983       | <b>System Datum:</b> | Mean Sea Level |
| <b>Geo Datum:</b>          | North American Datum 1983 |                      |                |
| <b>Map Zone:</b>           | New Mexico Eastern Zone   |                      |                |

|              |                             |
|--------------|-----------------------------|
| <b>Site:</b> | High Lonesome 23 Fed Com #1 |
|--------------|-----------------------------|

|                              |         |                     |                |                          |                  |
|------------------------------|---------|---------------------|----------------|--------------------------|------------------|
| <b>Site Position:</b>        |         | <b>Northing:</b>    | 692,133.954 ft | <b>Latitude:</b>         | 32° 54' 8.438 N  |
| <b>From:</b>                 | Map     | <b>Easting:</b>     | 632,013.144 ft | <b>Longitude:</b>        | 104° 2' 16.406 W |
| <b>Position Uncertainty:</b> | 0.00 ft | <b>Slot Radius:</b> | "              | <b>Grid Convergence:</b> | 0.16 °           |

|                      |                  |                     |           |                |             |                  |
|----------------------|------------------|---------------------|-----------|----------------|-------------|------------------|
| Well                 | High Lonesome #1 |                     |           |                |             |                  |
| Well Position        | +N/-S            | 0.00 ft             | Northing: | 692,133.954 ft | Latitude:   | 32° 54' 8.438 N  |
|                      | +E/-W            | 0.00 ft             | Easting:  | 632,013.144 ft | Longitude:  | 104° 2' 16.406 W |
| Position Uncertainty | 0.00 ft          | Wellhead Elevation: | ft        | Ground Level:  | 3,702.00 ft |                  |

|                  |    |
|------------------|----|
| <b>Wellbore:</b> | OH |
|------------------|----|

| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination<br/>(°)</b> | <b>Dip Angle<br/>(°)</b> | <b>Field Strength<br/>(nT)</b> |
|------------------|-------------------|--------------------|----------------------------|--------------------------|--------------------------------|
|                  | IGRF200510        | 12/2/2008          | 8.15                       | 60.81                    | 49,279                         |

|                |    |
|----------------|----|
| <b>Design:</b> | OH |
|----------------|----|

|              |     |        |        |               |      |
|--------------|-----|--------|--------|---------------|------|
| Audit Notes: |     |        |        |               |      |
| Version:     | 1.0 | Phase: | ACTUAL | Tie On Depth: | 0.00 |

| <b>Vertical Section:</b> | <b>Depth From (TVD)<br/>(ft)</b> | <b>+N/-S<br/>(ft)</b> | <b>+E/-W<br/>(ft)</b> | <b>Direction<br/>(°)</b> |
|--------------------------|----------------------------------|-----------------------|-----------------------|--------------------------|
|                          | 0.00                             | 0.00                  | 0.00                  | 264.11                   |

**Pathfinder Energy Services**  
Pathfinder X & Y Survey Report

|                  |                             |                                     |                                       |
|------------------|-----------------------------|-------------------------------------|---------------------------------------|
| <b>Company:</b>  | COG Operating LLC           | <b>Local Co-ordinate Reference:</b> | Well High Lonesome #1                 |
| <b>Project:</b>  | Eddy County                 | <b>TVD Reference:</b>               | WELL @ 3702.00ft (Original Well Elev) |
| <b>Site:</b>     | High Lonesome 23 Fed Com #1 | <b>MD Reference:</b>                | WELL @ 3702.00ft (Original Well Elev) |
| <b>Well:</b>     | High Lonesome #1            | <b>North Reference:</b>             | Grid                                  |
| <b>Wellbore:</b> | OH                          | <b>Survey Calculation Method:</b>   | Minimum Curvature                     |
| <b>Design:</b>   | OH                          | <b>Database:</b>                    | EDM 2003.16 Single User Db            |

| Survey Program |           | Date              | 1/15/2009  |                                  |  |
|----------------|-----------|-------------------|------------|----------------------------------|--|
| From (ft)      | To (ft)   | Survey (Wellbore) | Tool Name  | Description                      |  |
| 100.00         | 6,600.00  | GYRO (OH)         | NS-GYRO-MS | North sensing gyrocompassing m/s |  |
| 6,806.00       | 11,400.00 | MWD #1 (OH)       |            |                                  |  |

| MD (ft)  | Inc (°) | Azi (°) | TVD (ft) | TVDSS (ft) | N/S (ft) | E/W (ft) | V. Sec (ft) | DLeg (°/100ft) | Northing (ft) | Easting (ft) |
|----------|---------|---------|----------|------------|----------|----------|-------------|----------------|---------------|--------------|
| 6,600.00 | 0.36    | 156.51  | 6,599.82 | 2,897.82   | 8.27     | 15.88    | -16.64      | 0.00           | 692,142.22    | 632,029.02   |
| 6,806.00 | 2.37    | 103.18  | 6,805.75 | 3,103.75   | 6.70     | 20.28    | -20.87      | 1.06           | 692,140.66    | 632,033.43   |
| 6,838.00 | 2.20    | 105.52  | 6,837.73 | 3,135.73   | 6.39     | 21.52    | -22.06      | 0.61           | 692,140.34    | 632,034.66   |
| 6,871.00 | 1.49    | 242.02  | 6,870.72 | 3,168.72   | 6.02     | 21.75    | -22.25      | 10.42          | 692,139.97    | 632,034.90   |
| 6,901.00 | 5.45    | 261.17  | 6,900.66 | 3,198.66   | 5.61     | 20.00    | -20.47      | 13.57          | 692,139.57    | 632,033.14   |
| 6,933.00 | 9.76    | 264.74  | 6,932.37 | 3,230.37   | 5.13     | 15.79    | -16.24      | 13.54          | 692,139.09    | 632,028.94   |
| 6,966.00 | 14.33   | 266.00  | 6,964.63 | 3,262.63   | 4.59     | 8.93     | -9.36       | 13.87          | 692,138.54    | 632,022.08   |
| 6,998.00 | 17.15   | 264.77  | 6,995.43 | 3,293.43   | 3.88     | 0.28     | -0.68       | 8.87           | 692,137.84    | 632,013.43   |
| 7,030.00 | 20.58   | 261.77  | 7,025.71 | 3,323.71   | 2.65     | -9.99    | 9.66        | 11.14          | 692,136.60    | 632,003.16   |
| 7,062.00 | 24.27   | 262.99  | 7,055.28 | 3,353.28   | 1.04     | -22.08   | 21.86       | 11.62          | 692,134.99    | 631,991.06   |
| 7,094.00 | 28.31   | 260.84  | 7,083.97 | 3,381.97   | -0.97    | -36.11   | 36.02       | 12.97          | 692,132.98    | 631,977.03   |
| 7,126.00 | 32.18   | 261.13  | 7,111.61 | 3,409.61   | -3.49    | -52.03   | 52.11       | 12.10          | 692,130.46    | 631,961.12   |
| 7,158.00 | 36.93   | 260.17  | 7,137.95 | 3,435.95   | -6.45    | -69.93   | 70.22       | 14.94          | 692,127.50    | 631,943.22   |
| 7,190.00 | 41.77   | 258.90  | 7,162.69 | 3,460.69   | -10.15   | -89.87   | 90.44       | 15.33          | 692,123.81    | 631,923.27   |
| 7,222.00 | 46.34   | 258.18  | 7,185.68 | 3,483.68   | -14.57   | -111.67  | 112.58      | 14.37          | 692,119.38    | 631,901.47   |
| 7,254.00 | 49.07   | 257.96  | 7,207.22 | 3,505.22   | -19.47   | -134.83  | 136.11      | 8.55           | 692,114.49    | 631,878.32   |
| 7,285.00 | 53.55   | 258.39  | 7,226.59 | 3,524.59   | -24.42   | -158.51  | 160.17      | 14.49          | 692,109.53    | 631,854.64   |
| 7,317.00 | 57.95   | 259.11  | 7,244.60 | 3,542.60   | -29.57   | -184.44  | 186.50      | 13.88          | 692,104.38    | 631,828.70   |
| 7,349.00 | 62.61   | 260.07  | 7,260.46 | 3,558.46   | -34.59   | -211.77  | 214.20      | 14.79          | 692,099.36    | 631,801.38   |
| 7,381.00 | 66.04   | 260.81  | 7,274.32 | 3,572.32   | -39.38   | -240.20  | 242.98      | 10.92          | 692,094.58    | 631,772.94   |
| 7,413.00 | 71.05   | 261.72  | 7,286.02 | 3,584.02   | -43.89   | -269.63  | 272.71      | 15.88          | 692,090.06    | 631,743.51   |

# Pathfinder Energy Services

## Pathfinder X & Y Survey Report

|                  |                             |                                     |                                       |
|------------------|-----------------------------|-------------------------------------|---------------------------------------|
| <b>Company:</b>  | COG Operating LLC           | <b>Local Co-ordinate Reference:</b> | Well High Lonesome #1                 |
| <b>Project:</b>  | Eddy County                 | <b>TVD Reference:</b>               | WELL @ 3702.00ft (Original Well Elev) |
| <b>Site:</b>     | High Lonesome 23 Fed Com #1 | <b>MD Reference:</b>                | WELL @ 3702.00ft (Original Well Elev) |
| <b>Well:</b>     | High Lonesome #1            | <b>North Reference:</b>             | Grid                                  |
| <b>Wellbore:</b> | OH                          | <b>Survey Calculation Method:</b>   | Minimum Curvature                     |
| <b>Design:</b>   | OH                          | <b>Database:</b>                    | EDM 2003.16 Single User Db            |

| Survey     |            |            |             |               |             |             |                |                   |                  |                 |  |
|------------|------------|------------|-------------|---------------|-------------|-------------|----------------|-------------------|------------------|-----------------|--|
| MD<br>(ft) | Inc<br>(°) | Azi<br>(°) | TVD<br>(ft) | TVDSS<br>(ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) | DLeg<br>(°/100ft) | Northing<br>(ft) | Easting<br>(ft) |  |
| 7,445.00   | 75.10      | 262.71     | 7,295.33    | 3,593.33      | -48.04      | -299.96     | 303.30         | 13.00             | 692,085.92       | 631,713.19      |  |
| 7,477.00   | 78.70      | 263.34     | 7,302.59    | 3,600.59      | -51.82      | -330.89     | 334.46         | 11.41             | 692,082.13       | 631,682.25      |  |
| 7,509.00   | 83.27      | 263.21     | 7,307.60    | 3,605.60      | -55.52      | -362.27     | 366.05         | 14.29             | 692,078.43       | 631,650.88      |  |
| 7,541.00   | 85.21      | 262.88     | 7,310.81    | 3,608.81      | -59.37      | -393.87     | 397.88         | 6.15              | 692,074.58       | 631,619.27      |  |
| 7,573.00   | 87.58      | 263.67     | 7,312.82    | 3,610.82      | -63.11      | -425.59     | 429.82         | 7.81              | 692,070.84       | 631,587.56      |  |
| 7,605.00   | 90.84      | 264.64     | 7,313.26    | 3,611.26      | -66.37      | -457.41     | 461.81         | 10.63             | 692,067.58       | 631,555.73      |  |
| 7,669.00   | 93.03      | 264.95     | 7,311.10    | 3,609.10      | -72.17      | -521.11     | 525.76         | 3.46              | 692,061.78       | 631,492.04      |  |
| 7,732.00   | 92.24      | 264.74     | 7,308.21    | 3,606.21      | -77.83      | -583.79     | 588.69         | 1.30              | 692,056.12       | 631,429.36      |  |
| 7,797.00   | 90.57      | 264.42     | 7,306.61    | 3,604.61      | -83.97      | -648.47     | 653.67         | 2.62              | 692,049.99       | 631,364.67      |  |
| 7,861.00   | 89.08      | 265.51     | 7,306.81    | 3,604.81      | -89.58      | -712.22     | 717.66         | 2.88              | 692,044.37       | 631,300.92      |  |
| 7,925.00   | 88.11      | 265.60     | 7,308.38    | 3,606.38      | -94.54      | -776.01     | 781.62         | 1.52              | 692,039.41       | 631,237.13      |  |
| 7,988.00   | 87.76      | 265.72     | 7,310.65    | 3,608.65      | -99.31      | -838.79     | 844.55         | 0.59              | 692,034.65       | 631,174.36      |  |
| 8,052.00   | 88.11      | 265.58     | 7,312.95    | 3,610.95      | -104.16     | -902.56     | 908.49         | 0.59              | 692,029.80       | 631,110.58      |  |
| 8,116.00   | 88.37      | 265.74     | 7,314.92    | 3,612.92      | -109.00     | -966.35     | 972.43         | 0.48              | 692,024.96       | 631,046.79      |  |
| 8,180.00   | 89.25      | 265.80     | 7,316.25    | 3,614.25      | -113.72     | -1,030.16   | 1,036.39       | 1.38              | 692,020.24       | 630,982.98      |  |
| 8,244.00   | 87.58      | 266.00     | 7,318.02    | 3,616.02      | -118.29     | -1,093.97   | 1,100.33       | 2.63              | 692,015.66       | 630,919.17      |  |
| 8,308.00   | 86.88      | 266.02     | 7,321.11    | 3,619.11      | -122.74     | -1,157.74   | 1,164.22       | 1.09              | 692,011.21       | 630,855.40      |  |
| 8,372.00   | 87.58      | 266.23     | 7,324.20    | 3,622.20      | -127.06     | -1,221.52   | 1,228.11       | 1.14              | 692,006.89       | 630,791.63      |  |
| 8,436.00   | 89.08      | 265.63     | 7,326.07    | 3,624.07      | -131.60     | -1,285.33   | 1,292.05       | 2.52              | 692,002.35       | 630,727.82      |  |
| 8,500.00   | 89.60      | 265.08     | 7,326.81    | 3,624.81      | -136.78     | -1,349.11   | 1,356.03       | 1.18              | 691,997.17       | 630,664.03      |  |
| 8,564.00   | 90.22      | 264.67     | 7,326.91    | 3,624.91      | -142.50     | -1,412.86   | 1,420.02       | 1.16              | 691,991.45       | 630,600.29      |  |
| 8,627.00   | 90.75      | 264.95     | 7,326.37    | 3,624.37      | -148.20     | -1,475.60   | 1,483.01       | 0.95              | 691,985.76       | 630,537.55      |  |
| 8,691.00   | 92.86      | 265.31     | 7,324.36    | 3,622.36      | -153.63     | -1,539.33   | 1,546.97       | 3.34              | 691,980.32       | 630,473.81      |  |
| 8,755.00   | 93.21      | 264.71     | 7,320.97    | 3,618.97      | -159.19     | -1,603.00   | 1,610.87       | 1.08              | 691,974.77       | 630,410.15      |  |
| 8,819.00   | 92.77      | 264.98     | 7,317.63    | 3,615.63      | -164.93     | -1,666.65   | 1,674.78       | 0.81              | 691,969.02       | 630,346.49      |  |
| 8,883.00   | 93.47      | 265.11     | 7,314.15    | 3,612.15      | -170.45     | -1,730.32   | 1,738.67       | 1.11              | 691,963.50       | 630,282.83      |  |
| 8,947.00   | 93.39      | 263.73     | 7,310.32    | 3,608.32      | -176.66     | -1,793.90   | 1,802.56       | 2.16              | 691,957.29       | 630,219.25      |  |

# Pathfinder Energy Services

## Pathfinder X & Y Survey Report

|                  |                             |                                     |                                       |
|------------------|-----------------------------|-------------------------------------|---------------------------------------|
| <b>Company:</b>  | COG Operating LLC           | <b>Local Co-ordinate Reference:</b> | Well High Lonesome #1                 |
| <b>Project:</b>  | Eddy County                 | <b>TVD Reference:</b>               | WELL @ 3702.00ft (Original Well Elev) |
| <b>Site:</b>     | High Lonesome 23 Fed Com #1 | <b>MD Reference:</b>                | WELL @ 3702.00ft (Original Well Elev) |
| <b>Well:</b>     | High Lonesome #1            | <b>North Reference:</b>             | Grid                                  |
| <b>Wellbore:</b> | OH                          | <b>Survey Calculation Method:</b>   | Minimum Curvature                     |
| <b>Design:</b>   | OH                          | <b>Database:</b>                    | EDM 2003.16 Single User Db            |

| Survey     |            |            |             |               |             |             |                |                   |                  |                 |  |
|------------|------------|------------|-------------|---------------|-------------|-------------|----------------|-------------------|------------------|-----------------|--|
| MD<br>(ft) | Inc<br>(°) | Azi<br>(°) | TVD<br>(ft) | TVDSS<br>(ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) | DLeg<br>(°/100ft) | Northing<br>(ft) | Easting<br>(ft) |  |
| 9,011.00   | 91.54      | 262.47     | 7,307.57    | 3,605.57      | -184.34     | -1,857.37   | 1,866.48       | 3.50              | 691,949.61       | 630,155.77      |  |
| 9,075.00   | 90.40      | 262.12     | 7,306.48    | 3,604.48      | -192.92     | -1,920.78   | 1,930.44       | 1.86              | 691,941.03       | 630,092.36      |  |
| 9,139.00   | 89.78      | 262.46     | 7,306.38    | 3,604.38      | -201.51     | -1,984.20   | 1,994.41       | 1.10              | 691,932.44       | 630,028.94      |  |
| 9,203.00   | 88.81      | 262.01     | 7,307.17    | 3,605.17      | -210.16     | -2,047.61   | 2,058.37       | 1.67              | 691,923.80       | 629,965.53      |  |
| 9,267.00   | 88.81      | 262.05     | 7,308.50    | 3,606.50      | -219.03     | -2,110.98   | 2,122.31       | 0.06              | 691,914.93       | 629,902.16      |  |
| 9,330.00   | 88.55      | 262.30     | 7,309.95    | 3,607.95      | -227.60     | -2,173.38   | 2,185.26       | 0.57              | 691,906.35       | 629,839.77      |  |
| 9,394.00   | 89.16      | 262.55     | 7,311.23    | 3,609.23      | -236.04     | -2,236.81   | 2,249.22       | 1.03              | 691,897.92       | 629,776.34      |  |
| 9,458.00   | 89.87      | 263.05     | 7,311.77    | 3,609.77      | -244.06     | -2,300.30   | 2,313.20       | 1.36              | 691,889.90       | 629,712.85      |  |
| 9,522.00   | 88.90      | 263.01     | 7,312.46    | 3,610.46      | -251.82     | -2,363.82   | 2,377.18       | 1.52              | 691,882.13       | 629,649.32      |  |
| 9,586.00   | 89.25      | 263.24     | 7,313.49    | 3,611.49      | -259.48     | -2,427.35   | 2,441.17       | 0.65              | 691,874.47       | 629,585.79      |  |
| 9,650.00   | 89.69      | 263.69     | 7,314.08    | 3,612.08      | -266.77     | -2,490.93   | 2,505.16       | 0.98              | 691,867.19       | 629,522.21      |  |
| 9,714.00   | 88.55      | 262.98     | 7,315.06    | 3,613.06      | -274.19     | -2,554.49   | 2,569.14       | 2.10              | 691,859.76       | 629,458.65      |  |
| 9,778.00   | 88.29      | 262.57     | 7,316.83    | 3,614.83      | -282.24     | -2,617.96   | 2,633.10       | 0.76              | 691,851.71       | 629,395.19      |  |
| 9,841.00   | 89.25      | 262.26     | 7,318.18    | 3,616.18      | -290.55     | -2,680.39   | 2,696.06       | 1.60              | 691,843.40       | 629,332.75      |  |
| 9,905.00   | 89.25      | 262.98     | 7,319.02    | 3,617.02      | -298.77     | -2,743.86   | 2,760.03       | 1.12              | 691,835.18       | 629,269.29      |  |
| 9,968.00   | 87.76      | 263.76     | 7,320.66    | 3,618.66      | -306.05     | -2,806.41   | 2,823.00       | 2.67              | 691,827.91       | 629,206.73      |  |
| 10,031.00  | 86.26      | 263.12     | 7,323.95    | 3,621.95      | -313.23     | -2,868.91   | 2,885.91       | 2.59              | 691,820.72       | 629,144.23      |  |
| 10,095.00  | 86.17      | 262.96     | 7,328.17    | 3,626.17      | -320.97     | -2,932.30   | 2,949.76       | 0.29              | 691,812.98       | 629,080.84      |  |
| 10,159.00  | 87.67      | 263.53     | 7,331.61    | 3,629.61      | -328.49     | -2,995.76   | 3,013.66       | 2.51              | 691,805.47       | 629,017.38      |  |
| 10,223.00  | 88.81      | 264.51     | 7,333.58    | 3,631.58      | -335.15     | -3,059.38   | 3,077.63       | 2.35              | 691,798.80       | 628,953.76      |  |
| 10,287.00  | 88.81      | 265.76     | 7,334.91    | 3,632.91      | -340.58     | -3,123.14   | 3,141.60       | 1.95              | 691,793.38       | 628,890.01      |  |
| 10,351.00  | 88.81      | 265.45     | 7,336.24    | 3,634.24      | -345.48     | -3,186.94   | 3,205.56       | 0.48              | 691,788.47       | 628,826.21      |  |
| 10,415.00  | 90.75      | 266.19     | 7,336.48    | 3,634.48      | -350.15     | -3,250.76   | 3,269.53       | 3.24              | 691,783.81       | 628,762.38      |  |
| 10,479.00  | 91.01      | 266.33     | 7,335.50    | 3,633.50      | -354.32     | -3,314.62   | 3,333.48       | 0.46              | 691,779.63       | 628,698.53      |  |
| 10,541.00  | 89.69      | 266.30     | 7,335.12    | 3,633.12      | -358.30     | -3,376.49   | 3,395.43       | 2.13              | 691,775.65       | 628,636.66      |  |
| 10,605.00  | 89.69      | 266.26     | 7,335.47    | 3,633.47      | -362.46     | -3,440.35   | 3,459.38       | 0.06              | 691,771.50       | 628,572.79      |  |
| 10,669.00  | 91.01      | 265.83     | 7,335.08    | 3,633.08      | -366.87     | -3,504.20   | 3,523.34       | 2.17              | 691,767.08       | 628,508.95      |  |

**Pathfinder Energy Services**  
Pathfinder X & Y Survey Report

|                  |                             |                                     |                                       |
|------------------|-----------------------------|-------------------------------------|---------------------------------------|
| <b>Company:</b>  | COG Operating LLC           | <b>Local Co-ordinate Reference:</b> | Well High Lonesome #1                 |
| <b>Project:</b>  | Eddy County                 | <b>TVD Reference:</b>               | WELL @ 3702.00ft (Original Well Elev) |
| <b>Site:</b>     | High Lonesome 23 Fed Com #1 | <b>MD Reference:</b>                | WELL @ 3702.00ft (Original Well Elev) |
| <b>Well:</b>     | High Lonesome #1            | <b>North Reference:</b>             | Grid                                  |
| <b>Wellbore:</b> | OH                          | <b>Survey Calculation Method:</b>   | Minimum Curvature                     |
| <b>Design:</b>   | OH                          | <b>Database:</b>                    | EDM 2003.16 Single User Db            |

| Survey     |            |            |             |              |             |             |                |                    |                  |                 |  |
|------------|------------|------------|-------------|--------------|-------------|-------------|----------------|--------------------|------------------|-----------------|--|
| MD<br>(ft) | Inc<br>(°) | Azi<br>(°) | TVD<br>(ft) | TVDS<br>(ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) | D Leg<br>(°/100ft) | Northing<br>(ft) | Easting<br>(ft) |  |
| 10,733.00  | 91.54      | 265.78     | 7,333.65    | 3,631.65     | -371.55     | -3,568.01   | 3,587.30       | 0.83               | 691,762.40       | 628,445.14      |  |
| 10,796.00  | 91.19      | 266.04     | 7,332.15    | 3,630.15     | -376.04     | -3,630.83   | 3,650.25       | 0.69               | 691,757.91       | 628,382.31      |  |
| 10,860.00  | 91.71      | 266.07     | 7,330.53    | 3,628.53     | -380.45     | -3,694.66   | 3,714.19       | 0.81               | 691,753.51       | 628,318.49      |  |
| 10,924.00  | 92.51      | 265.78     | 7,328.18    | 3,626.18     | -384.99     | -3,758.45   | 3,778.12       | 1.33               | 691,748.96       | 628,254.69      |  |
| 10,988.00  | 92.59      | 266.26     | 7,325.33    | 3,623.33     | -389.43     | -3,822.23   | 3,842.02       | 0.76               | 691,744.53       | 628,190.91      |  |
| 11,052.00  | 91.54      | 265.75     | 7,323.02    | 3,621.02     | -393.88     | -3,886.04   | 3,905.94       | 1.82               | 691,740.07       | 628,127.11      |  |
| 11,116.00  | 91.63      | 265.75     | 7,321.25    | 3,619.25     | -398.63     | -3,949.84   | 3,969.89       | 0.14               | 691,735.33       | 628,063.31      |  |
| 11,179.00  | 91.89      | 265.54     | 7,319.32    | 3,617.32     | -403.41     | -4,012.62   | 4,032.84       | 0.53               | 691,730.55       | 628,000.52      |  |
| 11,243.00  | 91.89      | 265.15     | 7,317.21    | 3,615.21     | -408.60     | -4,076.38   | 4,096.79       | 0.61               | 691,725.36       | 627,936.77      |  |
| 11,307.00  | 93.21      | 265.17     | 7,314.36    | 3,612.36     | -413.99     | -4,140.09   | 4,160.71       | 2.06               | 691,719.96       | 627,873.06      |  |
| 11,337.00  | 93.65      | 265.04     | 7,312.56    | 3,610.56     | -416.55     | -4,169.92   | 4,190.65       | 1.53               | 691,717.41       | 627,843.22      |  |
| 11,400.00  | 93.65      | 265.04     | 7,308.55    | 3,606.55     | -421.98     | -4,232.56   | 4,253.52       | 0.00               | 691,711.97       | 627,780.58      |  |

**Straightline Projection to Bit @11400.00'MD, 7308.55'TVD, 93.65°INC, 265.04°AZI, 4253.52°VS**

**Pathfinder Energy Services**  
Pathfinder X & Y Survey Report

|                  |                             |                                     |                                       |
|------------------|-----------------------------|-------------------------------------|---------------------------------------|
| <b>Company:</b>  | COG Operating LLC           | <b>Local Co-ordinate Reference:</b> | Well High Lonesome #1                 |
| <b>Project:</b>  | Eddy County                 | <b>TVD Reference:</b>               | WELL @ 3702.00ft (Original Well Elev) |
| <b>Site:</b>     | High Lonesome 23 Fed Com #1 | <b>MD Reference:</b>                | WELL @ 3702.00ft (Original Well Elev) |
| <b>Well:</b>     | High Lonesome #1            | <b>North Reference:</b>             | Grid                                  |
| <b>Wellbore:</b> | OH                          | <b>Survey Calculation Method:</b>   | Minimum Curvature                     |
| <b>Design:</b>   | OH                          | <b>Database:</b>                    | EDM 2003.16 Single User Db            |

| Targets                                                                           |           |          |          |         |           |             |             |                 |                  |
|-----------------------------------------------------------------------------------|-----------|----------|----------|---------|-----------|-------------|-------------|-----------------|------------------|
| Target Name                                                                       | Dip Angle | Dip Dir. | TVD      | +N/-S   | +E/-W     | Northing    | Easting     | Latitude        | Longitude        |
| hit/miss target                                                                   | (°)       | (°)      | (ft)     | (ft)    | (ft)      | (ft)        | (ft)        |                 |                  |
| Shape                                                                             |           |          |          |         |           |             |             |                 |                  |
| Target 4                                                                          | 0.00      | 0.00     | 7,251.00 | -257.36 | -2,517.00 | 691,876.594 | 629,496.144 | 32° 54' 5.961 N | 104° 2' 45.937 W |
| - survey misses by 64.49ft at 9673.83ft MD (7314.30 TVD, -269.44 N, -2514.61 E)   |           |          |          |         |           |             |             |                 |                  |
| - Point                                                                           |           |          |          |         |           |             |             |                 |                  |
| Target 1                                                                          | 0.00      | 0.00     | 7,314.00 | -38.72  | -398.13   | 692,095.234 | 631,615.014 | 32° 54' 8.066 N | 104° 2' 21.077 W |
| - survey misses by 21.24ft at 7543.01ft MD (7310.97 TVD, -59.62 N, -395.86 E)     |           |          |          |         |           |             |             |                 |                  |
| - Point                                                                           |           |          |          |         |           |             |             |                 |                  |
| Target 5                                                                          | 0.00      | 0.00     | 7,277.00 | -313.80 | -3,064.00 | 691,820.154 | 628,949.144 | 32° 54' 5.417 N | 104° 2' 52.355 W |
| - survey misses by 60.63ft at 10224.61ft MD (7333.61 TVD, -335.31 N, -3060.99 E)  |           |          |          |         |           |             |             |                 |                  |
| - Point                                                                           |           |          |          |         |           |             |             |                 |                  |
| Target 2                                                                          | 0.00      | 0.00     | 7,305.00 | -88.02  | -875.60   | 692,045.934 | 631,137.544 | 32° 54' 7.592 N | 104° 2' 26.679 W |
| - survey misses by 15.67ft at 8023.62ft MD (7311.98 TVD, -101.99 N, -874.29 E)    |           |          |          |         |           |             |             |                 |                  |
| - Point                                                                           |           |          |          |         |           |             |             |                 |                  |
| PBHL 2 (High Loneso                                                               | 0.00      | 359.85   | 7,235.00 | -471.85 | -4,595.84 | 691,662.104 | 627,417.304 | 32° 54' 3.894 N | 104° 3' 10.328 W |
| - survey misses by 373.99ft at 11400.00ft MD (7308.55 TVD, -421.98 N, -4232.56 E) |           |          |          |         |           |             |             |                 |                  |
| - Point                                                                           |           |          |          |         |           |             |             |                 |                  |
| Target 3                                                                          | 0.00      | 0.00     | 7,251.00 | -200.92 | -1,970.00 | 691,933.034 | 630,043.144 | 32° 54' 6.504 N | 104° 2' 39.520 W |
| - survey misses by 55.36ft at 9124.93ft MD (7306.34 TVD, -199.65 N, -1970.26 E)   |           |          |          |         |           |             |             |                 |                  |
| - Point                                                                           |           |          |          |         |           |             |             |                 |                  |
| Target 6                                                                          | 0.00      | 0.00     | 7,283.00 | -370.25 | -3,611.09 | 691,763.704 | 628,402.054 | 32° 54' 4.873 N | 104° 2' 58.774 W |
| - survey misses by 49.77ft at 10777.07ft MD (7332.56 TVD, -374.72 N, -3611.95 E)  |           |          |          |         |           |             |             |                 |                  |
| - Point                                                                           |           |          |          |         |           |             |             |                 |                  |

| Survey Annotations |                |                   |            |                                                                          |
|--------------------|----------------|-------------------|------------|--------------------------------------------------------------------------|
| Measured Depth     | Vertical Depth | Local Coordinates |            | Comment                                                                  |
| (ft)               | (ft)           | +N/-S (ft)        | +E/-W (ft) |                                                                          |
| 11,400.00          | 7,308.55       | -421.98           | -4,232.56  | Straightline Projection to Bit @ 11400.00' MD, 7308.55' TVD, 93.65° INC, |

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



COG Operating, L.L.C.



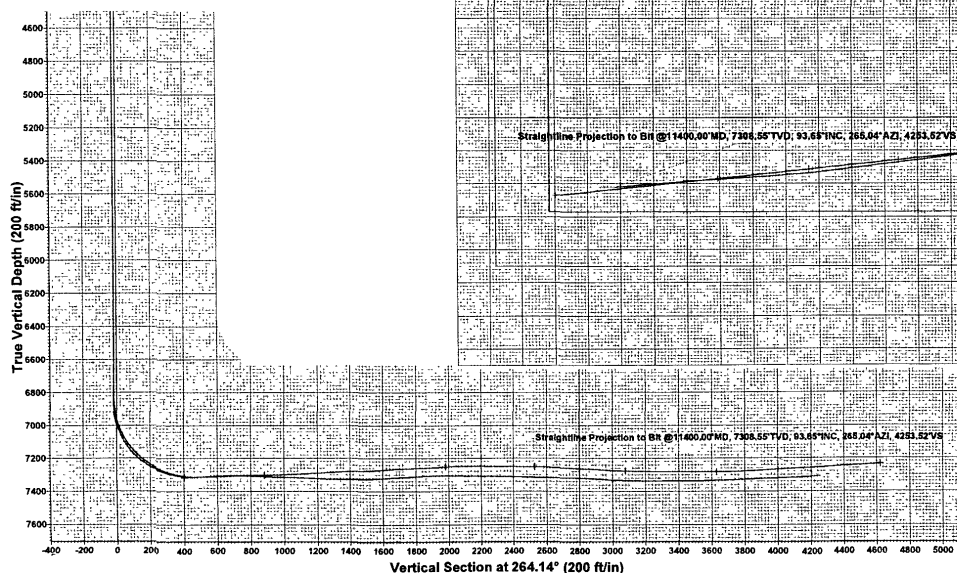
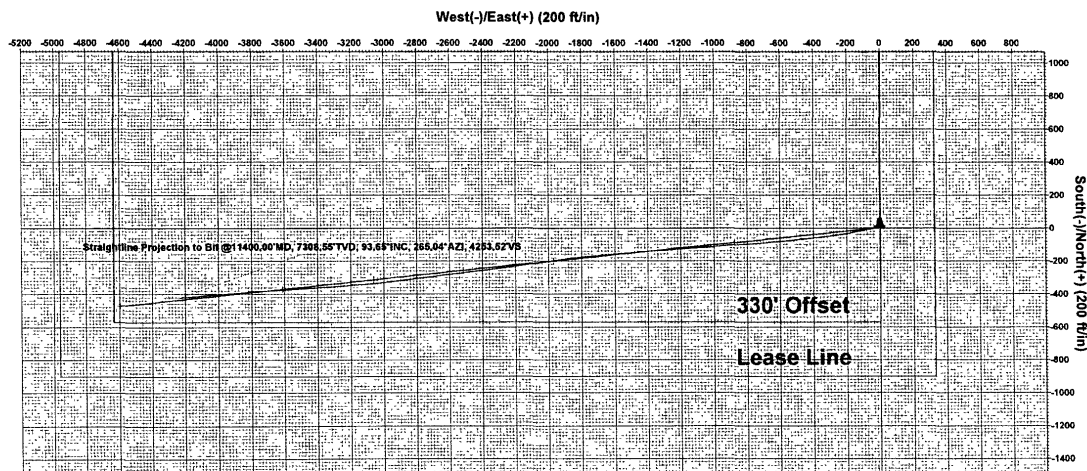
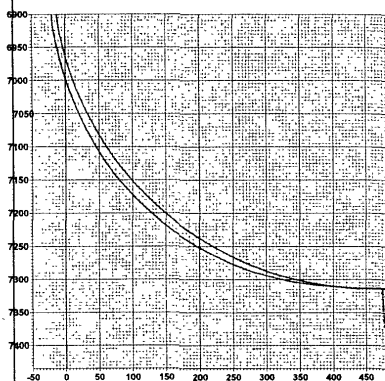
Azimuths to Grid North  
True North: -0.16°  
Magnetic North: 7.99°  
  
Magnetic Field  
Strength: 49279.2snT  
Dip Angle: 60.81°  
Date: 12/2/2008  
Model: IGRF200510



EOW

Project: Eddy County  
Site: High Lonesome 23 Fed Com #1  
Well: High Lonesome #1  
Wellbore: OH  
Plan: Plan #2 (High Lonesome #1/OH)

| WELL DETAILS High Lonesome #1                        |      |            |            |                 |                  |      |
|------------------------------------------------------|------|------------|------------|-----------------|------------------|------|
| Ground Elevation: 3702.00                            |      |            |            |                 |                  |      |
| RKB Elevation: WELL @ 3702.00ft (Original Well Elev) |      |            |            |                 |                  |      |
| Rig Name: Original Well Elev                         |      |            |            |                 |                  |      |
| +N/S                                                 | +E/W | Northing   | Easting    | Latitude        | Longitude        | Slot |
| 0.00                                                 | 0.00 | 692133.954 | 632013.144 | 32° 54' 8.438 N | 104° 2' 18.406 W |      |



PROJECT DETAILS: Eddy County  
Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: New Mexico Eastern Zone  
System Datum: Mean Sea Level  
Local North: Gnd

Plan: Plan #2 (High Lonesome #1/OH)  
Created By: Nate Bingham Date: 11/35, January 15 2008  
Checked: \_\_\_\_\_ Date: \_\_\_\_\_

# COG Operating, L.L.C.



Azimuths to Grid North  
True North: -0.16°  
Magnetic North: 7.99°

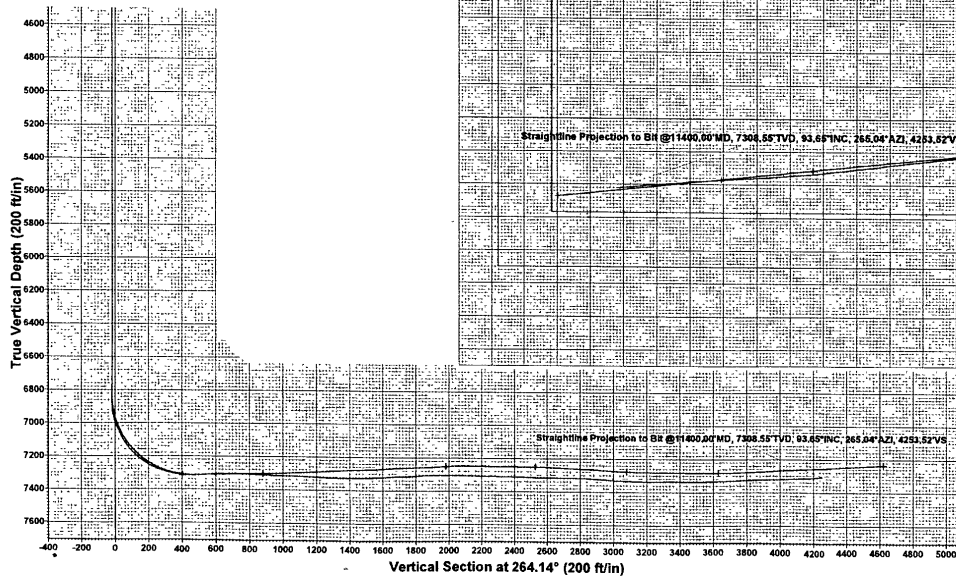
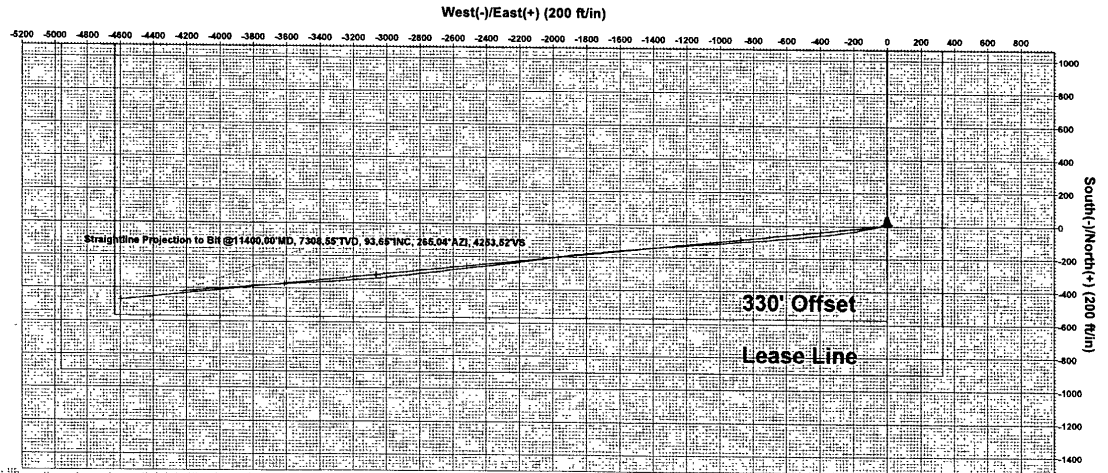
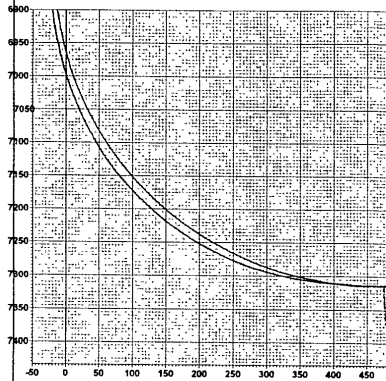
Magnetic Field  
Strength: 49279.2snT  
Dip Angle: 60.81°  
Date: 12/2/2008  
Model: IGRF200510



## EOW

Project: Eddy County  
Site: High Lonesome 23 Fed Com #1  
Well: High Lonesome #1  
Wellbore: OH  
Plan: Plan #2 (High Lonesome #1/OH)

| WELL DETAILS High Lonesome #1                       |      |            |            |                 |                  |      |
|-----------------------------------------------------|------|------------|------------|-----------------|------------------|------|
| Ground Elevation: 3702.00                           |      |            |            |                 |                  |      |
| RKB Elevation: WELL @ 3702.00R (Original Well Elev) |      |            |            |                 |                  |      |
| Rig Name: Original Well Elev                        |      |            |            |                 |                  |      |
| +N/S                                                | +E/W | Northing   | Easting    | Latitude        | Longitude        | Slot |
| 0.00                                                | 0.00 | 692133.954 | 632013.144 | 32° 54' 8.438 N | 104° 2' 16.406 W |      |



PROJECT DETAILS: Eddy County  
Geodetic System: US State Plane 1983  
Datum: North American Datum 1983  
Ellipsoid: GRS 1980  
Zone: New Mexico Eastern Zone  
System Datum: Mean Sea Level  
Local North: Grid

Plan: Plan #2 (High Lonesome #1/OH)  
Created By: Nate Slingham Date: 11/15, January 15, 2009  
Checked: \_\_\_\_\_ Date: \_\_\_\_\_