

15-40586



A Schlumberger Company

**COG Operating LLC**

Eddy County(NAD83)  
Shoeless Joe 32 State Com  
#1H  
OH

Design: OH

**Pathfinder X&Y Report**

17 September, 2012





A Schlumberger Company

Pathfinder  
Pathfinder X&Y Report



|                                         |  |                                     |  |                           |  |
|-----------------------------------------|--|-------------------------------------|--|---------------------------|--|
| <b>Company:</b> COG Operating LLC       |  | <b>Local Co-ordinate Reference:</b> |  | <b>Well #1H</b>           |  |
| <b>Project:</b> Eddy County(NAD83)      |  | <b>TVD Reference:</b>               |  | KB = 18' @ 3342.2usft     |  |
| <b>Site:</b> Shoeless Joe 32 State Corn |  | <b>MD Reference:</b>                |  | KB = 18' @ 3342.2usft     |  |
| <b>Well:</b> #1H                        |  | <b>North Reference:</b>             |  | Grid                      |  |
| <b>Wellbore:</b> OH                     |  | <b>Survey Calculation Method:</b>   |  | Minimum Curvature         |  |
| <b>Design:</b> OH                       |  | <b>Database:</b>                    |  | EDM 5000:1 Single User Db |  |

|                                             |  |                      |  |                |  |
|---------------------------------------------|--|----------------------|--|----------------|--|
| <b>Project:</b> Eddy County(NAD83)          |  |                      |  |                |  |
| <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> Shoeless Joe 32 State Corn |  |                                   |  |                                 |  |
| <b>Site Position:</b>                   |  | <b>Northing:</b> 589,976.150 usft |  | <b>Latitude:</b> 32.621457      |  |
| <b>From:</b> Map                        |  | <b>Easting:</b> 643,416.620 usft  |  | <b>Longitude:</b> -104.001778   |  |
| <b>Position Uncertainty:</b> 0.0 usft   |  | <b>Slot Radius:</b> 13-3/16 "     |  | <b>Grid Convergence:</b> 0.18 ° |  |

|                                      |  |                                   |  |                                   |  |
|--------------------------------------|--|-----------------------------------|--|-----------------------------------|--|
| <b>Well:</b> #1H                     |  |                                   |  |                                   |  |
| <b>Well Position</b>                 |  | <b>Northing:</b> 589,976.150 usft |  | <b>Latitude:</b> 32.621457        |  |
| <b>+N/-S</b> 0.0 usft                |  | <b>Easting:</b> 643,416.620 usft  |  | <b>Longitude:</b> -104.001778     |  |
| <b>+E/-W</b> 0.0 usft                |  | <b>Wellhead Elevation:</b> usft   |  | <b>Ground Level:</b> 3,324.2 usft |  |
| <b>Position Uncertainty</b> 0.0 usft |  |                                   |  |                                   |  |

|                     |                   |                    |                    |                  |                       |
|---------------------|-------------------|--------------------|--------------------|------------------|-----------------------|
| <b>Wellbore:</b> OH |                   |                    |                    |                  |                       |
| <b>Magnetics</b>    | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination</b> | <b>Dip Angle</b> | <b>Field Strength</b> |
|                     |                   |                    | (°)                | (°)              | (nT)                  |
|                     | IGRF200510        | 8/6/2012           | 7.67               | 60.48            | 48,735                |

|                          |                         |                          |              |                  |  |
|--------------------------|-------------------------|--------------------------|--------------|------------------|--|
| <b>Design:</b> OH        |                         |                          |              |                  |  |
| <b>Audit Notes:</b>      |                         |                          |              |                  |  |
| <b>Version:</b> 1.0      | <b>Phase:</b> ACTUAL    | <b>Tie On Depth:</b> 0.0 |              |                  |  |
| <b>Vertical Section:</b> |                         |                          |              |                  |  |
|                          | <b>Depth From (TVD)</b> | <b>+N/-S</b>             | <b>+E/-W</b> | <b>Direction</b> |  |
|                          | (usft)                  | (usft)                   | (usft)       | (°)              |  |
|                          | 0.0                     | 0.0                      | 0.0          | 81.93            |  |



A Schlumberger Company

**Pathfinder**  
Pathfinder X&Y Report



|                  |                           |                                     |                           |
|------------------|---------------------------|-------------------------------------|---------------------------|
| <b>Company:</b>  | COG Operating LLC         | <b>Local Co-ordinate Reference:</b> | Well #1H                  |
| <b>Project:</b>  | Eddy County(NAD83)        | <b>TVD Reference:</b>               | KB = 18' @ 3342.2usft     |
| <b>Site:</b>     | Shoeless Joe 32 State Com | <b>MD Reference:</b>                | KB = 18' @ 3342.2usft     |
| <b>Well:</b>     | #1H                       | <b>North Reference:</b>             | Grid                      |
| <b>Wellbore:</b> | OH                        | <b>Survey Calculation Method:</b>   | Minimum Curvature         |
| <b>Design:</b>   | OH                        | <b>Database:</b>                    | EDM 5000.1 Single User Db |

|                       |                  |                                  |                  |
|-----------------------|------------------|----------------------------------|------------------|
| <b>Survey Program</b> |                  | <b>Date</b> 9/17/2012            |                  |
| <b>From (usft)</b>    | <b>To (usft)</b> | <b>Survey (Wellbore)</b>         | <b>Tool Name</b> |
| 100.0                 | 7,700.0          | Gyro #1 (OH)                     | NS-GYRO-MS       |
| 7,795.0               | 12,887.0         | MWD #2 (OH)                      | MWD              |
|                       |                  | <b>Description</b>               |                  |
|                       |                  | North sensing gyrocompassing m/s |                  |
|                       |                  | MWD - Standard                   |                  |

| <b>Survey</b> |         |                   |            |              |            |            |               |                  |              |               |  |
|---------------|---------|-------------------|------------|--------------|------------|------------|---------------|------------------|--------------|---------------|--|
| MD (usft)     | Inc (") | Azi (azimuth) (") | TVD (usft) | TVDSS (usft) | N/S (usft) | E/W (usft) | V. Sec (usft) | DLeg ("/100usft) | Latitude (") | Longitude (") |  |
| 0.0           | 0.00    | 0.00              | 0.0        | -3,342.2     | 0.0        | 0.0        | 0.0           | 0.00             | 32.62        | -104.00       |  |
| 100.0         | 0.18    | 28.04             | 100.0      | -3,242.2     | 0.1        | 0.1        | 0.1           | 0.18             | 32.62        | -104.00       |  |
| 200.0         | 0.16    | 282.17            | 200.0      | -3,142.2     | 0.3        | 0.0        | 0.1           | 0.27             | 32.62        | -104.00       |  |
| 300.0         | 0.21    | 277.56            | 300.0      | -3,042.2     | 0.4        | -0.3       | -0.3          | 0.05             | 32.62        | -104.00       |  |
| 400.0         | 0.26    | 292.95            | 400.0      | -2,942.2     | 0.5        | -0.7       | -0.6          | 0.08             | 32.62        | -104.00       |  |
| 500.0         | 0.42    | 334.23            | 500.0      | -2,842.2     | 0.9        | -1.1       | -0.9          | 0.28             | 32.62        | -104.00       |  |
| 600.0         | 0.58    | 55.50             | 600.0      | -2,742.2     | 1.5        | -0.8       | -0.6          | 0.66             | 32.62        | -104.00       |  |
| 700.0         | 0.79    | 62.40             | 700.0      | -2,642.2     | 2.1        | 0.2        | 0.5           | 0.23             | 32.62        | -104.00       |  |
| 800.0         | 1.00    | 64.31             | 800.0      | -2,542.2     | 2.8        | 1.6        | 2.0           | 0.21             | 32.62        | -104.00       |  |
| 900.0         | 1.41    | 65.45             | 900.0      | -2,442.2     | 3.7        | 3.5        | 4.0           | 0.41             | 32.62        | -104.00       |  |
| 1,000.0       | 1.81    | 66.59             | 999.9      | -2,342.3     | 4.8        | 6.1        | 6.7           | 0.40             | 32.62        | -104.00       |  |
| 1,100.0       | 2.02    | 68.62             | 1,099.9    | -2,242.3     | 6.1        | 9.2        | 9.9           | 0.22             | 32.62        | -104.00       |  |
| 1,200.0       | 2.24    | 69.64             | 1,199.8    | -2,142.4     | 7.4        | 12.7       | 13.6          | 0.22             | 32.62        | -104.00       |  |
| 1,300.0       | 2.04    | 80.75             | 1,299.7    | -2,042.5     | 8.4        | 16.2       | 17.3          | 0.46             | 32.62        | -104.00       |  |
| 1,400.0       | 1.83    | 91.86             | 1,399.7    | -1,942.5     | 8.6        | 19.6       | 20.6          | 0.43             | 32.62        | -104.00       |  |
| 1,500.0       | 1.31    | 112.26            | 1,499.6    | -1,842.6     | 8.1        | 22.3       | 23.2          | 0.76             | 32.62        | -104.00       |  |
| 1,600.0       | 0.78    | 132.67            | 1,599.6    | -1,742.6     | 7.3        | 23.8       | 24.6          | 0.64             | 32.62        | -104.00       |  |
| 1,700.0       | 0.52    | 116.85            | 1,699.6    | -1,642.6     | 6.6        | 24.7       | 25.4          | 0.31             | 32.62        | -104.00       |  |
| 1,800.0       | 0.25    | 118.04            | 1,799.6    | -1,542.6     | 6.3        | 25.3       | 25.9          | 0.27             | 32.62        | -104.00       |  |
| 1,900.0       | 0.58    | 124.93            | 1,899.6    | -1,442.6     | 5.9        | 25.9       | 26.5          | 0.33             | 32.62        | -104.00       |  |
| 2,000.0       | 0.92    | 168.82            | 1,999.6    | -1,342.6     | 4.8        | 26.5       | 26.9          | 0.64             | 32.62        | -104.00       |  |

|                  |                           |                                     |                           |
|------------------|---------------------------|-------------------------------------|---------------------------|
| <b>Company:</b>  | COG Operating LLC         | <b>Local Co-ordinate Reference:</b> | Well #1H                  |
| <b>Project:</b>  | Eddy County(NAD83)        | <b>TVD Reference:</b>               | KB = 18' @ 3342.2usft     |
| <b>Site:</b>     | Shoeless Joe 32 State Com | <b>MD Reference:</b>                | KB = 18' @ 3342.2usft     |
| <b>Well:</b>     | #1H                       | <b>North Reference:</b>             | Grid                      |
| <b>Wellbore:</b> | OH                        | <b>Survey Calculation Method:</b>   | Minimum Curvature         |
| <b>Design:</b>   | OH                        | <b>Database:</b>                    | EDM 5000.1 Single User Db |

| Survey       |            |                      |               |                 |               |               |                  |                     |                 |                  |  |
|--------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|-----------------|------------------|--|
| MD<br>(usft) | Inc<br>(°) | Azi (azimuth)<br>(°) | TVD<br>(usft) | TVDSS<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) | DLeg<br>(°/100usft) | Latitude<br>(°) | Longitude<br>(°) |  |
| 2,100.0      | 1.82       | 177.71               | 2,099.6       | -1,242.6        | 2.4           | 26.7          | 26.8             | 0.92                | 32.62           | -104.00          |  |
| 2,200.0      | 2.72       | 186.60               | 2,199.5       | -1,142.7        | -1.5          | 26.5          | 26.0             | 0.96                | 32.62           | -104.00          |  |
| 2,300.0      | 2.73       | 190.55               | 2,299.4       | -1,042.8        | -6.2          | 25.8          | 24.7             | 0.19                | 32.62           | -104.00          |  |
| 2,400.0      | 2.75       | 194.51               | 2,399.3       | -942.9          | -10.9         | 24.8          | 23.0             | 0.19                | 32.62           | -104.00          |  |
| 2,500.0      | 2.65       | 196.04               | 2,499.1       | -843.1          | -15.4         | 23.5          | 21.1             | 0.12                | 32.62           | -104.00          |  |
| 2,600.0      | 2.55       | 197.57               | 2,599.0       | -743.2          | -19.8         | 22.2          | 19.2             | 0.12                | 32.62           | -104.00          |  |
| 2,700.0      | 2.54       | 204.83               | 2,698.9       | -643.3          | -23.9         | 20.6          | 17.0             | 0.32                | 32.62           | -104.00          |  |
| 2,800.0      | 2.52       | 212.10               | 2,798.8       | -543.4          | -27.8         | 18.5          | 14.4             | 0.32                | 32.62           | -104.00          |  |
| 2,900.0      | 2.29       | 216.31               | 2,898.8       | -443.4          | -31.2         | 16.2          | 11.6             | 0.29                | 32.62           | -104.00          |  |
| 3,000.0      | 2.06       | 220.52               | 2,998.7       | -343.5          | -34.2         | 13.8          | 8.9              | 0.28                | 32.62           | -104.00          |  |
| 3,100.0      | 2.09       | 221.09               | 3,098.6       | -243.6          | -37.0         | 11.4          | 6.1              | 0.04                | 32.62           | -104.00          |  |
| 3,200.0      | 2.11       | 221.66               | 3,198.5       | -143.7          | -39.7         | 9.0           | 3.4              | 0.03                | 32.62           | -104.00          |  |
| 3,300.0      | 2.26       | 230.10               | 3,298.5       | -43.7           | -42.3         | 6.3           | 0.3              | 0.35                | 32.62           | -104.00          |  |
| 3,400.0      | 2.41       | 235.53               | 3,398.4       | 56.2            | -44.8         | 3.0           | -3.3             | 0.27                | 32.62           | -104.00          |  |
| 3,500.0      | 2.40       | 237.86               | 3,498.3       | 156.1           | -47.1         | -0.5          | -7.1             | 0.10                | 32.62           | -104.00          |  |
| 3,600.0      | 2.39       | 237.18               | 3,598.2       | 256.0           | -49.3         | -4.0          | -10.9            | 0.03                | 32.62           | -104.00          |  |
| 3,700.0      | 2.14       | 240.96               | 3,698.1       | 355.9           | -51.4         | -7.4          | -14.5            | 0.29                | 32.62           | -104.00          |  |
| 3,800.0      | 1.90       | 244.73               | 3,798.1       | 455.9           | -53.0         | -10.5         | -17.9            | 0.27                | 32.62           | -104.00          |  |
| 3,900.0      | 1.80       | 248.24               | 3,898.0       | 555.8           | -54.3         | -13.5         | -21.0            | 0.15                | 32.62           | -104.00          |  |
| 4,000.0      | 1.69       | 251.74               | 3,998.0       | 655.8           | -55.3         | -16.3         | -23.9            | 0.15                | 32.62           | -104.00          |  |
| 4,100.0      | 1.35       | 259.03               | 4,097.9       | 755.7           | -56.0         | -18.9         | -26.6            | 0.39                | 32.62           | -104.00          |  |
| 4,200.0      | 1.00       | 266.31               | 4,197.9       | 855.7           | -56.3         | -20.9         | -28.6            | 0.38                | 32.62           | -104.00          |  |
| 4,300.0      | 1.19       | 248.32               | 4,297.9       | 955.7           | -56.7         | -22.8         | -30.5            | 0.39                | 32.62           | -104.00          |  |
| 4,400.0      | 1.37       | 230.33               | 4,397.9       | 1,055.7         | -57.9         | -24.6         | -32.5            | 0.44                | 32.62           | -104.00          |  |
| 4,500.0      | 1.49       | 236.55               | 4,497.8       | 1,155.6         | -59.4         | -26.6         | -34.7            | 0.20                | 32.62           | -104.00          |  |
| 4,600.0      | 1.60       | 242.77               | 4,597.8       | 1,255.6         | -60.7         | -29.0         | -37.2            | 0.20                | 32.62           | -104.00          |  |
| 4,700.0      | 1.49       | 245.78               | 4,697.8       | 1,355.6         | -61.9         | -31.4         | -39.8            | 0.14                | 32.62           | -104.00          |  |

|                  |                           |                                     |                           |
|------------------|---------------------------|-------------------------------------|---------------------------|
| <b>Company:</b>  | COG Operating LLC         | <b>Local Co-ordinate Reference:</b> | Well #1H                  |
| <b>Project:</b>  | Eddy County(NAD83)        | <b>TVD Reference:</b>               | KB = 18' @ 3342.2usft     |
| <b>Site:</b>     | Shoeless Joe 32 State Com | <b>MD Reference:</b>                | KB = 18' @ 3342.2usft     |
| <b>Well:</b>     | #1H                       | <b>North Reference:</b>             | Grid                      |
| <b>Wellbore:</b> | OH                        | <b>Survey Calculation Method:</b>   | Minimum Curvature         |
| <b>Design:</b>   | OH                        | <b>Database:</b>                    | EDM 5000.1 Single User Db |

| Survey       |            |                      |               |                 |               |               |                  |                     |                 |                  |  |
|--------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|-----------------|------------------|--|
| MD<br>(usft) | Inc<br>(°) | Azi (azimuth)<br>(°) | TVD<br>(usft) | TVDSS<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) | DLeg<br>(°/100usft) | Latitude<br>(°) | Longitude<br>(°) |  |
| 4,800.0      | 1.39       | 248.79               | 4,797.7       | 1,455.5         | -62.9         | -33.7         | -42.2            | 0.13                | 32.62           | -104.00          |  |
| 4,900.0      | 1.29       | 235.76               | 4,897.7       | 1,555.5         | -63.9         | -35.8         | -44.4            | 0.32                | 32.62           | -104.00          |  |
| 5,000.0      | 1.20       | 222.72               | 4,997.7       | 1,655.5         | -65.3         | -37.4         | -46.2            | 0.30                | 32.62           | -104.00          |  |
| 5,100.0      | 1.30       | 219.11               | 5,097.7       | 1,755.5         | -67.0         | -38.8         | -47.9            | 0.13                | 32.62           | -104.00          |  |
| 5,200.0      | 1.40       | 215.50               | 5,197.6       | 1,855.4         | -68.9         | -40.3         | -49.5            | 0.13                | 32.62           | -104.00          |  |
| 5,300.0      | 1.39       | 205.04               | 5,297.6       | 1,955.4         | -71.0         | -41.5         | -51.0            | 0.25                | 32.62           | -104.00          |  |
| 5,400.0      | 1.38       | 194.57               | 5,397.6       | 2,055.4         | -73.2         | -42.3         | -52.2            | 0.25                | 32.62           | -104.00          |  |
| 5,500.0      | 1.18       | 218.11               | 5,497.6       | 2,155.4         | -75.2         | -43.2         | -53.4            | 0.56                | 32.62           | -104.00          |  |
| 5,600.0      | 0.97       | 231.66               | 5,597.5       | 2,255.3         | -76.5         | -44.5         | -54.8            | 0.33                | 32.62           | -104.00          |  |
| 5,700.0      | 0.67       | 236.94               | 5,697.5       | 2,355.3         | -77.4         | -45.7         | -56.1            | 0.31                | 32.62           | -104.00          |  |
| 5,800.0      | 0.38       | 232.23               | 5,797.5       | 2,455.3         | -77.9         | -46.4         | -56.9            | 0.29                | 32.62           | -104.00          |  |
| 5,900.0      | 0.59       | 182.07               | 5,897.5       | 2,555.3         | -78.6         | -46.7         | -57.3            | 0.45                | 32.62           | -104.00          |  |
| 6,000.0      | 0.81       | 131.92               | 5,997.5       | 2,655.3         | -79.6         | -46.2         | -56.9            | 0.63                | 32.62           | -104.00          |  |
| 6,100.0      | 0.76       | 130.45               | 6,097.5       | 2,755.3         | -80.5         | -45.2         | -56.0            | 0.05                | 32.62           | -104.00          |  |
| 6,200.0      | 0.72       | 128.98               | 6,197.5       | 2,855.3         | -81.3         | -44.2         | -55.2            | 0.04                | 32.62           | -104.00          |  |
| 6,300.0      | 0.91       | 131.96               | 6,297.5       | 2,955.3         | -82.3         | -43.1         | -54.2            | 0.19                | 32.62           | -104.00          |  |
| 6,400.0      | 1.10       | 134.94               | 6,397.5       | 3,055.3         | -83.5         | -41.9         | -53.2            | 0.20                | 32.62           | -104.00          |  |
| 6,500.0      | 1.49       | 131.60               | 6,497.4       | 3,155.2         | -85.0         | -40.2         | -51.7            | 0.40                | 32.62           | -104.00          |  |
| 6,600.0      | 1.87       | 128.25               | 6,597.4       | 3,255.2         | -86.9         | -37.9         | -49.8            | 0.39                | 32.62           | -104.00          |  |
| 6,700.0      | 1.68       | 125.28               | 6,697.4       | 3,355.2         | -88.7         | -35.5         | -47.6            | 0.21                | 32.62           | -104.00          |  |
| 6,800.0      | 1.49       | 122.32               | 6,797.3       | 3,455.1         | -90.3         | -33.2         | -45.5            | 0.21                | 32.62           | -104.00          |  |
| 6,900.0      | 1.56       | 139.14               | 6,897.3       | 3,555.1         | -92.0         | -31.2         | -43.8            | 0.45                | 32.62           | -104.00          |  |
| 7,000.0      | 1.63       | 155.96               | 6,997.2       | 3,655.0         | -94.3         | -29.7         | -42.7            | 0.47                | 32.62           | -104.00          |  |
| 7,100.0      | 1.81       | 142.99               | 7,097.2       | 3,755.0         | -96.9         | -28.2         | -41.5            | 0.43                | 32.62           | -104.00          |  |
| 7,200.0      | 1.99       | 130.02               | 7,197.1       | 3,854.9         | -99.3         | -25.9         | -39.6            | 0.46                | 32.62           | -104.00          |  |
| 7,300.0      | 1.52       | 140.07               | 7,297.1       | 3,954.9         | -101.4        | -23.7         | -37.7            | 0.56                | 32.62           | -104.00          |  |
| 7,400.0      | 1.05       | 150.12               | 7,397.1       | 4,054.9         | -103.2        | -22.4         | -36.7            | 0.52                | 32.62           | -104.00          |  |

|           |                           |                              |                           |
|-----------|---------------------------|------------------------------|---------------------------|
| Company:  | COG Operating LLC         | Local Co-ordinate Reference: | Well #1H                  |
| Project:  | Eddy County(NAD83)        | TVD Reference:               | KB = 18' @ 3342.2usft     |
| Site:     | Shoeless Joe 32 State Com | MD Reference:                | KB = 18' @ 3342.2usft     |
| Well:     | #1H                       | North Reference:             | Grid                      |
| Wellbore: | OH                        | Survey Calculation Method:   | Minimum Curvature         |
| Design:   | OH                        | Database:                    | EDM 5000.1 Single User Db |

| Survey                                             |            |                      |               |                 |               |               |                  |                     |                 |                  |  |
|----------------------------------------------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|-----------------|------------------|--|
| MD<br>(usft)                                       | Inc<br>(°) | Azi (azimuth)<br>(°) | TVD<br>(usft) | TVDSS<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) | DLeg<br>(°/100usft) | Latitude<br>(°) | Longitude<br>(°) |  |
| 7,500.0                                            | 1.02       | 143.24               | 7,497.1       | 4,154.9         | -104.7        | -21.4         | -35.9            | 0.13                | 32.62           | -104.00          |  |
| 7,600.0                                            | 0.99       | 136.35               | 7,597.0       | 4,254.8         | -106.1        | -20.3         | -35.0            | 0.12                | 32.62           | -104.00          |  |
| 7,700.0                                            | 0.82       | 122.98               | 7,697.0       | 4,354.8         | -107.1        | -19.1         | -33.9            | 0.27                | 32.62           | -104.00          |  |
| 7,795.0                                            | 0.44       | 163.13               | 7,792.0       | 4,449.8         | -107.8        | -18.4         | -33.4            | 0.59                | 32.62           | -104.00          |  |
| 7,827.0                                            | 0.97       | 103.21               | 7,824.0       | 4,481.8         | -108.0        | -18.1         | -33.1            | 2.63                | 32.62           | -104.00          |  |
| 7,858.0                                            | 6.51       | 82.89                | 7,854.9       | 4,512.7         | -107.8        | -16.1         | -31.1            | 18.10               | 32.62           | -104.00          |  |
| KOP - 7858.0 'MD, 7854.9 'TVD, -107.8 'N, -16.1 'E |            |                      |               |                 |               |               |                  |                     |                 |                  |  |
| 7,890.0                                            | 8.71       | 79.37                | 7,886.7       | 4,544.5         | -107.1        | -11.9         | -26.9            | 7.02                | 32.62           | -104.00          |  |
| 7,922.0                                            | 11.43      | 75.07                | 7,918.2       | 4,576.0         | -105.9        | -6.5          | -21.3            | 8.81                | 32.62           | -104.00          |  |
| 7,953.0                                            | 14.51      | 74.63                | 7,948.4       | 4,606.2         | -104.1        | 0.2           | -14.4            | 9.94                | 32.62           | -104.00          |  |
| 7,985.0                                            | 18.11      | 74.19                | 7,979.1       | 4,636.9         | -101.6        | 8.9           | -5.5             | 11.26               | 32.62           | -104.00          |  |
| 8,017.0                                            | 22.25      | 74.45                | 8,009.1       | 4,666.9         | -98.7         | 19.5          | 5.5              | 12.94               | 32.62           | -104.00          |  |
| 8,048.0                                            | 26.38      | 72.08                | 8,037.4       | 4,695.2         | -95.0         | 31.7          | 18.1             | 13.69               | 32.62           | -104.00          |  |
| 8,080.0                                            | 29.63      | 69.00                | 8,065.6       | 4,723.4         | -89.9         | 45.9          | 32.8             | 11.11               | 32.62           | -104.00          |  |
| 8,112.0                                            | 31.74      | 64.61                | 8,093.1       | 4,750.9         | -83.5         | 60.9          | 48.5             | 9.61                | 32.62           | -104.00          |  |
| 8,143.0                                            | 33.33      | 63.29                | 8,119.3       | 4,777.1         | -76.2         | 75.8          | 64.4             | 5.62                | 32.62           | -104.00          |  |
| 8,175.0                                            | 35.44      | 64.08                | 8,145.7       | 4,803.5         | -68.2         | 92.0          | 81.6             | 6.74                | 32.62           | -104.00          |  |
| 8,206.0                                            | 37.64      | 65.93                | 8,170.6       | 4,828.4         | -60.4         | 108.8         | 99.2             | 7.94                | 32.62           | -104.00          |  |
| 8,238.0                                            | 40.89      | 67.86                | 8,195.3       | 4,853.1         | -52.4         | 127.4         | 118.8            | 10.85               | 32.62           | -104.00          |  |
| 8,270.0                                            | 43.00      | 70.59                | 8,219.1       | 4,876.9         | -44.9         | 147.4         | 139.6            | 8.72                | 32.62           | -104.00          |  |
| 8,301.0                                            | 45.99      | 71.82                | 8,241.3       | 4,899.1         | -37.9         | 168.0         | 161.0            | 10.04               | 32.62           | -104.00          |  |
| 8,333.0                                            | 49.07      | 72.26                | 8,262.9       | 4,920.7         | -30.6         | 190.4         | 184.2            | 9.68                | 32.62           | -104.00          |  |
| 8,365.0                                            | 52.14      | 71.38                | 8,283.2       | 4,941.0         | -22.9         | 213.9         | 208.6            | 9.83                | 32.62           | -104.00          |  |
| 8,396.0                                            | 54.96      | 70.76                | 8,301.6       | 4,959.4         | -14.8         | 237.5         | 233.1            | 9.24                | 32.62           | -104.00          |  |
| 8,428.0                                            | 58.65      | 71.90                | 8,319.1       | 4,976.9         | -6.2          | 262.8         | 259.4            | 11.91               | 32.62           | -104.00          |  |
| 8,460.0                                            | 62.96      | 72.52                | 8,334.7       | 4,992.5         | 2.3           | 289.4         | 286.9            | 13.57               | 32.62           | -104.00          |  |
| 8,491.0                                            | 67.36      | 72.96                | 8,347.7       | 5,005.5         | 10.7          | 316.3         | 314.7            | 14.25               | 32.62           | -104.00          |  |

|                  |                           |                                     |                           |
|------------------|---------------------------|-------------------------------------|---------------------------|
| <b>Company:</b>  | COG Operating LLC         | <b>Local Co-ordinate Reference:</b> | Well #1H                  |
| <b>Project:</b>  | Eddy County(NAD83)        | <b>TVD Reference:</b>               | KB = 18' @ 3342.2usft     |
| <b>Site:</b>     | Shoeless Joe 32 State Com | <b>MD Reference:</b>                | KB = 18' @ 3342.2usft     |
| <b>Well:</b>     | #1H                       | <b>North Reference:</b>             | Grid                      |
| <b>Wellbore:</b> | OH                        | <b>Survey Calculation Method:</b>   | Minimum Curvature         |
| <b>Design:</b>   | OH                        | <b>Database:</b>                    | EDM 5000.1 Single User Db |

| Survey                                          |            |                      |               |                 |               |               |                  |                     |                 |                  |  |
|-------------------------------------------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|-----------------|------------------|--|
| MD<br>(usft)                                    | Inc<br>(°) | Azi (azimuth)<br>(°) | TVD<br>(usft) | TVDSS<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) | DLeg<br>(°/100usft) | Latitude<br>(°) | Longitude<br>(°) |  |
| 8,523.0                                         | 70.96      | 74.98                | 8,359.1       | 5,016.9         | 18.9          | 345.0         | 344.3            | 12.70               | 32.62           | -104.00          |  |
| 8,555.0                                         | 73.07      | 75.68                | 8,369.0       | 5,026.8         | 26.6          | 374.5         | 374.5            | 6.91                | 32.62           | -104.00          |  |
| 8,586.0                                         | 74.57      | 75.51                | 8,377.6       | 5,035.4         | 34.0          | 403.3         | 404.1            | 4.87                | 32.62           | -104.00          |  |
| 8,618.0                                         | 76.41      | 75.95                | 8,385.6       | 5,043.4         | 41.7          | 433.3         | 434.9            | 5.90                | 32.62           | -104.00          |  |
| 8,650.0                                         | 79.49      | 76.03                | 8,392.3       | 5,050.1         | 49.2          | 463.7         | 466.0            | 9.63                | 32.62           | -104.00          |  |
| 8,690.0                                         | 83.45      | 78.14                | 8,398.3       | 5,056.1         | 58.1          | 502.2         | 505.4            | 11.19               | 32.62           | -104.00          |  |
| 8,721.0                                         | 86.09      | 79.29                | 8,401.1       | 5,058.9         | 64.1          | 532.5         | 536.2            | 9.28                | 32.62           | -104.00          |  |
| 8,753.0                                         | 86.53      | 79.37                | 8,403.1       | 5,060.9         | 70.0          | 563.9         | 568.1            | 1.40                | 32.62           | -104.00          |  |
| 8,785.0                                         | 86.53      | 79.11                | 8,405.1       | 5,062.9         | 76.0          | 595.3         | 600.0            | 0.81                | 32.62           | -104.00          |  |
| 8,816.0                                         | 88.02      | 78.50                | 8,406.6       | 5,064.4         | 82.0          | 625.7         | 631.0            | 5.19                | 32.62           | -104.00          |  |
| 8,848.0                                         | 90.48      | 78.58                | 8,407.0       | 5,064.8         | 88.3          | 657.0         | 662.9            | 7.69                | 32.62           | -104.00          |  |
| LP - 8848.0 'MD, 8407.0 'TVD, 88.3 'N, 657.0 'E |            |                      |               |                 |               |               |                  |                     |                 |                  |  |
| 8,880.0                                         | 91.80      | 78.50                | 8,406.3       | 5,064.1         | 94.7          | 688.4         | 694.8            | 4.13                | 32.62           | -104.00          |  |
| 8,911.0                                         | 91.98      | 78.14                | 8,405.3       | 5,063.1         | 101.0         | 718.7         | 725.8            | 1.30                | 32.62           | -104.00          |  |
| 8,943.0                                         | 91.71      | 79.64                | 8,404.3       | 5,062.1         | 107.1         | 750.1         | 757.7            | 4.76                | 32.62           | -104.00          |  |
| 8,975.0                                         | 91.45      | 80.43                | 8,403.4       | 5,061.2         | 112.7         | 781.6         | 789.7            | 2.60                | 32.62           | -104.00          |  |
| 9,006.0                                         | 91.54      | 80.43                | 8,402.6       | 5,060.4         | 117.8         | 812.2         | 820.7            | 0.29                | 32.62           | -104.00          |  |
| 9,038.0                                         | 90.57      | 80.17                | 8,402.0       | 5,059.8         | 123.2         | 843.7         | 852.6            | 3.14                | 32.62           | -104.00          |  |
| 9,133.0                                         | 88.11      | 81.04                | 8,403.1       | 5,060.9         | 138.7         | 937.4         | 947.6            | 2.75                | 32.62           | -104.00          |  |
| 9,228.0                                         | 88.37      | 80.25                | 8,406.0       | 5,063.8         | 154.2         | 1,031.1       | 1,042.5          | 0.88                | 32.62           | -104.00          |  |
| 9,323.0                                         | 90.04      | 81.66                | 8,407.3       | 5,065.1         | 169.1         | 1,124.9       | 1,137.5          | 2.30                | 32.62           | -104.00          |  |
| 9,418.0                                         | 91.01      | 82.63                | 8,406.5       | 5,064.3         | 182.1         | 1,219.0       | 1,232.5          | 1.44                | 32.62           | -104.00          |  |
| 9,513.0                                         | 88.90      | 81.13                | 8,406.5       | 5,064.3         | 195.5         | 1,313.0       | 1,327.5          | 2.73                | 32.62           | -104.00          |  |
| 9,608.0                                         | 89.08      | 80.43                | 8,408.2       | 5,066.0         | 210.7         | 1,406.8       | 1,422.4          | 0.76                | 32.62           | -104.00          |  |
| 9,703.0                                         | 89.34      | 79.55                | 8,409.5       | 5,067.3         | 227.2         | 1,500.3       | 1,517.4          | 0.97                | 32.62           | -104.00          |  |
| 9,798.0                                         | 89.87      | 78.94                | 8,410.2       | 5,068.0         | 244.9         | 1,593.7       | 1,612.3          | 0.85                | 32.62           | -104.00          |  |
| 9,893.0                                         | 89.25      | 80.61                | 8,410.9       | 5,068.7         | 261.8         | 1,687.2       | 1,707.2          | 1.88                | 32.62           | -104.00          |  |

|           |                           |                              |                           |
|-----------|---------------------------|------------------------------|---------------------------|
| Company:  | COG Operating LLC         | Local Co-ordinate Reference: | Well #1H                  |
| Project:  | Eddy County(NAD83)        | TVD Reference:               | KB = 18' @ 3342.2usft     |
| Site:     | Shoeless Joe 32 State Com | MD Reference:                | KB = 18' @ 3342.2usft     |
| Well:     | #1H                       | North Reference:             | Grid                      |
| Wellbore: | OH                        | Survey Calculation Method:   | Minimum Curvature         |
| Design:   | OH                        | Database:                    | EDM 5000.1 Single User Db |

| Survey       |            |                      |               |                 |               |               |                  |                     |                 |                  |  |
|--------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|-----------------|------------------|--|
| MD<br>(usft) | Inc<br>(°) | Azi (azimuth)<br>(°) | TVD<br>(usft) | TVDSS<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) | DLeg<br>(°/100usft) | Latitude<br>(°) | Longitude<br>(°) |  |
| 9,988.0      | 88.29      | 83.07                | 8,412.9       | 5,070.7         | 275.3         | 1,781.2       | 1,802.2          | 2.78                | 32.62           | -104.00          |  |
| 10,083.0     | 89.16      | 82.45                | 8,415.1       | 5,072.9         | 287.3         | 1,875.4       | 1,897.1          | 1.12                | 32.62           | -104.00          |  |
| 10,177.0     | 90.13      | 81.75                | 8,415.6       | 5,073.4         | 300.2         | 1,968.5       | 1,991.1          | 1.27                | 32.62           | -104.00          |  |
| 10,272.0     | 90.48      | 83.42                | 8,415.1       | 5,072.9         | 312.4         | 2,062.7       | 2,086.1          | 1.80                | 32.62           | -104.00          |  |
| 10,367.0     | 88.99      | 83.51                | 8,415.6       | 5,073.4         | 323.3         | 2,157.1       | 2,181.1          | 1.57                | 32.62           | -103.99          |  |
| 10,462.0     | 90.04      | 83.59                | 8,416.4       | 5,074.2         | 333.9         | 2,251.5       | 2,276.0          | 1.11                | 32.62           | -103.99          |  |
| 10,557.0     | 88.37      | 83.33                | 8,417.7       | 5,075.5         | 344.7         | 2,345.8       | 2,371.0          | 1.78                | 32.62           | -103.99          |  |
| 10,652.0     | 88.99      | 82.19                | 8,419.9       | 5,077.7         | 356.7         | 2,440.0       | 2,466.0          | 1.37                | 32.62           | -103.99          |  |
| 10,747.0     | 90.31      | 81.84                | 8,420.5       | 5,078.3         | 369.9         | 2,534.1       | 2,561.0          | 1.44                | 32.62           | -103.99          |  |
| 10,842.0     | 89.34      | 82.71                | 8,420.8       | 5,078.6         | 382.7         | 2,628.3       | 2,655.9          | 1.37                | 32.62           | -103.99          |  |
| 10,937.0     | 88.02      | 82.80                | 8,422.9       | 5,080.7         | 394.7         | 2,722.5       | 2,750.9          | 1.39                | 32.62           | -103.99          |  |
| 11,032.0     | 88.99      | 82.10                | 8,425.4       | 5,083.2         | 407.1         | 2,816.6       | 2,845.9          | 1.26                | 32.62           | -103.99          |  |
| 11,127.0     | 90.48      | 82.01                | 8,425.9       | 5,083.7         | 420.3         | 2,910.7       | 2,940.9          | 1.57                | 32.62           | -103.99          |  |
| 11,222.0     | 89.96      | 81.92                | 8,425.5       | 5,083.3         | 433.5         | 3,004.8       | 3,035.9          | 0.56                | 32.62           | -103.99          |  |
| 11,317.0     | 88.20      | 84.47                | 8,427.0       | 5,084.8         | 444.8         | 3,099.1       | 3,130.8          | 3.26                | 32.62           | -103.99          |  |
| 11,412.0     | 88.20      | 85.18                | 8,430.0       | 5,087.8         | 453.4         | 3,193.6       | 3,225.7          | 0.75                | 32.62           | -103.99          |  |
| 11,507.0     | 89.52      | 85.26                | 8,431.9       | 5,089.7         | 461.3         | 3,288.3       | 3,320.5          | 1.39                | 32.62           | -103.99          |  |
| 11,602.0     | 87.05      | 84.56                | 8,434.7       | 5,092.5         | 469.7         | 3,382.9       | 3,415.3          | 2.70                | 32.62           | -103.99          |  |
| 11,697.0     | 87.76      | 84.03                | 8,439.0       | 5,096.8         | 479.1         | 3,477.3       | 3,510.1          | 0.93                | 32.62           | -103.99          |  |
| 11,792.0     | 88.99      | 83.07                | 8,441.7       | 5,099.5         | 489.8         | 3,571.6       | 3,605.0          | 1.64                | 32.62           | -103.99          |  |
| 11,887.0     | 90.48      | 82.19                | 8,442.2       | 5,100.0         | 502.0         | 3,665.9       | 3,700.0          | 1.82                | 32.62           | -103.99          |  |
| 11,982.0     | 89.16      | 82.71                | 8,442.5       | 5,100.3         | 514.5         | 3,760.0       | 3,795.0          | 1.49                | 32.62           | -103.99          |  |
| 12,077.0     | 88.46      | 82.98                | 8,444.4       | 5,102.2         | 526.3         | 3,854.3       | 3,890.0          | 0.79                | 32.62           | -103.99          |  |
| 12,172.0     | 89.52      | 83.07                | 8,446.1       | 5,103.9         | 537.8         | 3,948.5       | 3,985.0          | 1.12                | 32.62           | -103.99          |  |
| 12,267.0     | 88.37      | 83.15                | 8,447.9       | 5,105.7         | 549.2         | 4,042.8       | 4,079.9          | 1.21                | 32.62           | -103.99          |  |
| 12,363.0     | 88.81      | 82.98                | 8,450.2       | 5,108.0         | 560.8         | 4,138.1       | 4,175.9          | 0.49                | 32.62           | -103.99          |  |
| 12,458.0     | 89.69      | 82.27                | 8,451.5       | 5,109.3         | 573.0         | 4,232.3       | 4,270.8          | 1.19                | 32.62           | -103.99          |  |

|                  |                           |                                     |                           |
|------------------|---------------------------|-------------------------------------|---------------------------|
| <b>Company:</b>  | COG Operating LLC         | <b>Local Co-ordinate Reference:</b> | Well #1H                  |
| <b>Project:</b>  | Eddy County(NAD83)        | <b>TVD Reference:</b>               | KB = 18' @ 3342.2usft     |
| <b>Site:</b>     | Shoeless Joe 32 State Com | <b>MD Reference:</b>                | KB = 18' @ 3342.2usft     |
| <b>Well:</b>     | #1H                       | <b>North Reference:</b>             | Grid                      |
| <b>Wellbore:</b> | OH                        | <b>Survey Calculation Method:</b>   | Minimum Curvature         |
| <b>Design:</b>   | OH                        | <b>Database:</b>                    | EDM 5000.1 Single User Db |

| Survey                                                        |            |                      |               |                 |               |               |                  |                     |                 |                  |  |
|---------------------------------------------------------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|-----------------|------------------|--|
| MD<br>(usft)                                                  | Inc<br>(°) | Azi (azimuth)<br>(°) | TVD<br>(usft) | TVDSS<br>(usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) | DLeg<br>(°/100usft) | Latitude<br>(°) | Longitude<br>(°) |  |
| 12,553.0                                                      | 90.57      | 82.01                | 8,451.3       | 5,109.1         | 586.0         | 4,326.4       | 4,365.8          | 0.97                | 32.62           | -103.99          |  |
| 12,648.0                                                      | 91.36      | 81.40                | 8,449.7       | 5,107.5         | 599.7         | 4,420.4       | 4,460.8          | 1.05                | 32.62           | -103.99          |  |
| 12,744.0                                                      | 92.33      | 81.04                | 8,446.6       | 5,104.4         | 614.3         | 4,515.2       | 4,556.8          | 1.08                | 32.62           | -103.99          |  |
| 12,887.0                                                      | 92.33      | 81.04                | 8,440.8       | 5,098.6         | 636.6         | 4,656.4       | 4,699.6          | 0.00                | 32.62           | -103.99          |  |
| PROJECTED BHL - 12887.0 'MD, 8440.8 'TVD, 636.6 'N, 4656.4 'E |            |                      |               |                 |               |               |                  |                     |                 |                  |  |

| Design Annotations          |                             |                   |                 |                                                               |  |
|-----------------------------|-----------------------------|-------------------|-----------------|---------------------------------------------------------------|--|
| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 |                                                               |  |
|                             |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) | Comment                                                       |  |
| 7,858.0                     | 7,854.9                     | -107.8            | -16.1           | KOP - 7858.0 'MD, 7854.9 'TVD, -107.8 'N, -16.1 'E            |  |
| 8,848.0                     | 8,407.0                     | 88.3              | 657.0           | LP - 8848.0 'MD, 8407.0 'TVD, 88.3 'N, 657.0 'E               |  |
| 12,887.0                    | 8,440.8                     | 636.6             | 4,656.4         | PROJECTED BHL - 12887.0 'MD, 8440.8 'TVD, 636.6 'N, 4656.4 'E |  |

|                   |                    |             |
|-------------------|--------------------|-------------|
| Checked By: _____ | Approved By: _____ | Date: _____ |
|-------------------|--------------------|-------------|



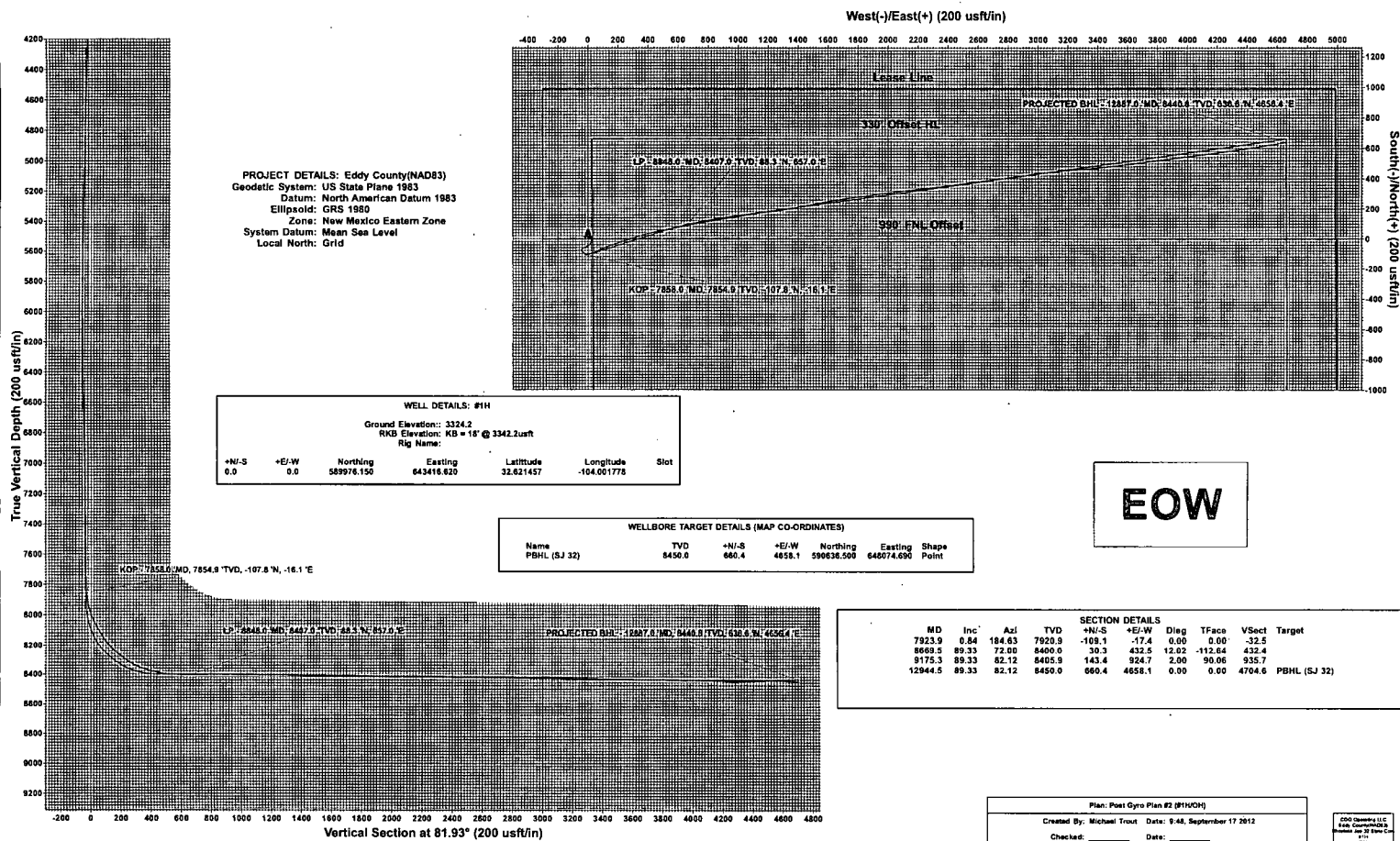
Project: Eddy County(NAD83)  
Site: Shoeless Joe 32 State Con  
Well: #1H  
Wellbore: OH  
Plan: Post Gyro Plan #2 (#1H/OH)



Azimuths to Grid North  
True North: -0.18°  
Magnetic North: 7.49°  
Magnetic Field  
Strength: 48735.4nT  
Dip Angle: 60.48°  
Date: 8/6/2012  
Model: IGRF200510

# PATHFINDER®

A Schlumberger Company



Company: COG  
Lease/Well: Shoeless Joe 32 State Com/#1H



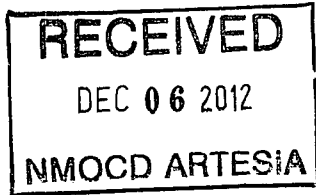
Rig Name: Patriot #6  
State/County: New Mexico/Eddy  
Latitude: 32.62, Longitude: -104.00  
GRID North is 0.18 Degrees East of True North  
VS-Azi: 0.00 Degrees



30-015-40586

**FIELD COPY ONLY (NOT DEFINITIVE)**

RKB : 17 Feet



**DRILLOG HA GYRO SURVEY CALCULATIONS**

Filename: gyro survey.ut  
Minimum Curvature Method  
Report Date/Time: 9/8/2012 / 09:11

Vaughn Energy Services  
12006 East Hwy. 158  
Gardendale, TX 79758  
Dustin Wedel  
(432) 563-5444

| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|-----------------------------|-------------------------------|
| 0.00                    | 0.00                 | 0.00                      | 0.00      | 0.00        | 0.00        | 0.00                      | 0.00                        | ****                          |
| 100.00                  | 0.18                 | 28.04                     | 100.00    | 0.14        | 0.07        | 0.15                      | 28.04                       | 0.18                          |
| 200.00                  | 0.16                 | 282.17                    | 200.00    | 0.30        | 0.01        | 0.30                      | 1.31                        | 0.27                          |
| 300.00                  | 0.21                 | 277.56                    | 300.00    | 0.35        | -0.31       | 0.47                      | 318.46                      | 0.05                          |
| 400.00                  | 0.26                 | 292.95                    | 400.00    | 0.47        | -0.71       | 0.85                      | 303.44                      | 0.08                          |
| 500.00                  | 0.42                 | 334.23                    | 500.00    | 0.89        | -1.08       | 1.40                      | 309.44                      | 0.28                          |
| 600.00                  | 0.58                 | 55.50                     | 599.99    | 1.50        | -0.82       | 1.71                      | 331.31                      | 0.66                          |
| 700.00                  | 0.79                 | 62.40                     | 699.99    | 2.11        | 0.20        | 2.12                      | 5.49                        | 0.23                          |
| 800.00                  | 1.00                 | 64.31                     | 799.97    | 2.80        | 1.60        | 3.22                      | 29.67                       | 0.21                          |
| 900.00                  | 1.41                 | 65.45                     | 899.95    | 3.69        | 3.50        | 5.08                      | 43.47                       | 0.41                          |
| 1000.00                 | 1.81                 | 66.59                     | 999.91    | 4.83        | 6.06        | 7.75                      | 51.48                       | 0.41                          |
| 1100.00                 | 2.02                 | 68.62                     | 1099.86   | 6.10        | 9.16        | 11.00                     | 56.34                       | 0.22                          |
| 1200.00                 | 2.24                 | 69.64                     | 1199.79   | 7.42        | 12.63       | 14.65                     | 59.57                       | 0.22                          |
| 1300.00                 | 2.04                 | 80.75                     | 1299.72   | 8.39        | 16.22       | 18.26                     | 62.66                       | 0.46                          |
| 1400.00                 | 1.83                 | 91.86                     | 1399.66   | 8.62        | 19.57       | 21.39                     | 66.23                       | 0.42                          |
| 1500.00                 | 1.31                 | 112.26                    | 1499.62   | 8.14        | 22.23       | 23.67                     | 69.90                       | 0.76                          |
| 1600.00                 | 0.78                 | 132.67                    | 1599.61   | 7.24        | 23.79       | 24.87                     | 73.08                       | 0.64                          |
| 1700.00                 | 0.52                 | 116.85                    | 1699.60   | 6.57        | 24.70       | 25.56                     | 75.10                       | 0.32                          |
| 1800.00                 | 0.25                 | 118.04                    | 1799.60   | 6.26        | 25.29       | 26.05                     | 76.09                       | 0.27                          |
| 1900.00                 | 0.58                 | 124.93                    | 1899.60   | 5.87        | 25.90       | 26.56                     | 77.23                       | 0.34                          |
| 2000.00                 | 0.92                 | 168.82                    | 1999.59   | 4.79        | 26.48       | 26.90                     | 79.75                       | 0.64                          |
| 2100.00                 | 1.82                 | 177.71                    | 2099.56   | 2.42        | 26.69       | 26.80                     | 84.83                       | 0.92                          |
| 2200.00                 | 2.72                 | 186.60                    | 2199.48   | -1.53       | 26.49       | 26.53                     | 93.30                       | 0.96                          |
| 2300.00                 | 2.73                 | 190.55                    | 2299.37   | -6.23       | 25.78       | 26.52                     | 103.58                      | 0.19                          |

| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | .TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|------------|-------------|-------------|---------------------------|-----------------------------|-------------------------------|
| 2400.00                 | 2.75                 | 194.51                    | 2399.25    | -10.89      | 24.74       | 27.03                     | 113.76                      | 0.19                          |
| 2500.00                 | 2.65                 | 196.04                    | 2499.14    | -15.43      | 23.50       | 28.11                     | 123.29                      | 0.12                          |
| 2600.00                 | 2.55                 | 197.57                    | 2599.04    | -19.77      | 22.19       | 29.72                     | 131.70                      | 0.12                          |
| 2700.00                 | 2.54                 | 204.83                    | 2698.94    | -23.90      | 20.59       | 31.54                     | 139.25                      | 0.32                          |
| 2800.00                 | 2.52                 | 212.10                    | 2798.84    | -27.77      | 18.49       | 33.36                     | 146.34                      | 0.32                          |
| 2900.00                 | 2.29                 | 216.31                    | 2898.75    | -31.25      | 16.14       | 35.17                     | 152.69                      | 0.29                          |
| 3000.00                 | 2.06                 | 220.52                    | 2998.68    | -34.23      | 13.78       | 36.90                     | 158.06                      | 0.28                          |
| 3100.00                 | 2.09                 | 221.09                    | 3098.62    | -36.97      | 11.42       | 38.69                     | 162.83                      | 0.03                          |
| 3200.00                 | 2.11                 | 221.66                    | 3198.55    | -39.71      | 9.00        | 40.72                     | 167.23                      | 0.03                          |
| 3300.00                 | 2.26                 | 230.10                    | 3298.48    | -42.35      | 6.26        | 42.81                     | 171.59                      | 0.35                          |
| 3400.00                 | 2.41                 | 235.53                    | 3398.39    | -44.81      | 3.02        | 44.91                     | 176.15                      | 0.27                          |
| 3500.00                 | 2.40                 | 237.86                    | 3498.31    | -47.11      | -0.49       | 47.11                     | 180.59                      | 0.10                          |
| 3600.00                 | 2.39                 | 237.18                    | 3598.22    | -49.35      | -4.01       | 49.52                     | 184.65                      | 0.03                          |
| 3700.00                 | 2.14                 | 240.96                    | 3698.14    | -51.39      | -7.39       | 51.92                     | 188.19                      | 0.29                          |
| 3800.00                 | 1.90                 | 244.73                    | 3798.08    | -53.00      | -10.53      | 54.04                     | 191.23                      | 0.28                          |
| 3900.00                 | 1.80                 | 248.24                    | 3898.03    | -54.29      | -13.48      | 55.94                     | 193.94                      | 0.15                          |
| 4000.00                 | 1.69                 | 251.74                    | 3997.98    | -55.33      | -16.33      | 57.69                     | 196.45                      | 0.15                          |
| 4100.00                 | 1.35                 | 259.03                    | 4097.95    | -56.02      | -18.89      | 59.12                     | 198.63                      | 0.39                          |
| 4200.00                 | 1.00                 | 266.31                    | 4197.92    | -56.30      | -20.92      | 60.06                     | 200.38                      | 0.38                          |
| 4300.00                 | 1.19                 | 248.32                    | 4297.91    | -56.74      | -22.75      | 61.13                     | 201.85                      | 0.39                          |
| 4400.00                 | 1.37                 | 230.33                    | 4397.88    | -57.89      | -24.63      | 62.91                     | 203.05                      | 0.44                          |
| 4500.00                 | 1.49                 | 236.55                    | 4497.85    | -59.37      | -26.64      | 65.07                     | 204.17                      | 0.19                          |
| 4600.00                 | 1.60                 | 242.77                    | 4597.81    | -60.72      | -28.97      | 67.28                     | 205.50                      | 0.20                          |
| 4700.00                 | 1.49                 | 245.78                    | 4697.78    | -61.90      | -31.40      | 69.41                     | 206.90                      | 0.14                          |
| 4800.00                 | 1.39                 | 248.79                    | 4797.75    | -62.87      | -33.72      | 71.34                     | 208.21                      | 0.13                          |
| 4900.00                 | 1.29                 | 235.76                    | 4897.72    | -63.94      | -35.78      | 73.27                     | 209.23                      | 0.32                          |
| 5000.00                 | 1.20                 | 222.72                    | 4997.70    | -65.35      | -37.42      | 75.30                     | 209.80                      | 0.30                          |
| 5100.00                 | 1.30                 | 219.11                    | 5097.67    | -67.00      | -38.85      | 77.44                     | 210.11                      | 0.13                          |
| 5200.00                 | 1.40                 | 215.50                    | 5197.64    | -68.87      | -40.27      | 79.78                     | 210.32                      | 0.13                          |
| 5300.00                 | 1.39                 | 205.04                    | 5297.61    | -70.97      | -41.50      | 82.21                     | 210.32                      | 0.26                          |
| 5400.00                 | 1.38                 | 194.57                    | 5397.59    | -73.24      | -42.32      | 84.58                     | 210.02                      | 0.25                          |
| 5500.00                 | 1.18                 | 218.11                    | 5497.56    | -75.21      | -43.25      | 86.76                     | 209.90                      | 0.56                          |
| 5600.00                 | 0.97                 | 231.66                    | 5597.54    | -76.55      | -44.55      | 88.57                     | 210.20                      | 0.32                          |
| 5700.00                 | 0.67                 | 236.94                    | 5697.53    | -77.39      | -45.71      | 89.88                     | 210.57                      | 0.31                          |
| 5800.00                 | 0.38                 | 232.23                    | 5797.53    | -77.92      | -46.46      | 90.72                     | 210.81                      | 0.30                          |
| 5900.00                 | 0.59                 | 182.07                    | 5897.53    | -78.63      | -46.74      | 91.48                     | 210.73                      | 0.45                          |
| 6000.00                 | 0.81                 | 131.92                    | 5997.52    | -79.62      | -46.24      | 92.07                     | 210.15                      | 0.62                          |
| 6100.00                 | 0.76                 | 130.45                    | 6097.51    | -80.52      | -45.21      | 92.34                     | 209.31                      | 0.05                          |
| 6200.00                 | 0.72                 | 128.98                    | 6197.50    | -81.34      | -44.21      | 92.58                     | 208.53                      | 0.05                          |
| 6300.00                 | 0.91                 | 131.96                    | 6297.49    | -82.27      | -43.13      | 92.89                     | 207.67                      | 0.20                          |
| 6400.00                 | 1.10                 | 134.94                    | 6397.48    | -83.48      | -41.86      | 93.39                     | 206.63                      | 0.20                          |
| 6500.00                 | 1.49                 | 131.60                    | 6497.45    | -85.02      | -40.21      | 94.05                     | 205.31                      | 0.39                          |
| 6600.00                 | 1.87                 | 128.25                    | 6597.41    | -86.89      | -37.96      | 94.82                     | 203.60                      | 0.40                          |
| 6700.00                 | 1.68                 | 125.28                    | 6697.36    | -88.75      | -35.48      | 95.58                     | 201.79                      | 0.21                          |
| 6800.00                 | 1.49                 | 122.32                    | 6797.32    | -90.29      | -33.19      | 96.20                     | 200.18                      | 0.21                          |
| 6900.00                 | 1.56                 | 139.14                    | 6897.29    | -92.01      | -31.21      | 97.16                     | 198.73                      | 0.45                          |
| 7000.00                 | 1.63                 | 155.96                    | 6997.25    | -94.34      | -29.74      | 98.92                     | 197.49                      | 0.47                          |
| 7100.00                 | 1.81                 | 142.99                    | 7097.20    | -96.90      | -28.20      | 100.92                    | 196.23                      | 0.43                          |
| 7200.00                 | 1.99                 | 130.02                    | 7197.15    | -99.29      | -25.92      | 102.61                    | 194.63                      | 0.47                          |

| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|-----------------------------|-------------------------------|
| 7300.00                 | 1.52                 | 140.07                    | 7297.10   | -101.42     | -23.73      | 104.16                    | 193.17                      | 0.56                          |
| 7400.00                 | 1.05                 | 150.12                    | 7397.08   | -103.24     | -22.42      | 105.65                    | 192.25                      | 0.52                          |
| 7500.00                 | 1.02                 | 143.24                    | 7497.06   | -104.75     | -21.43      | 106.92                    | 191.56                      | 0.13                          |
| 7600.00                 | 0.99                 | 136.35                    | 7597.04   | -106.08     | -20.31      | 108.01                    | 190.84                      | 0.12                          |
| 7700.00                 | 0.82                 | 122.98                    | 7697.03   | -107.10     | -19.11      | 108.79                    | 190.12                      | 0.27                          |
| 7800.00                 | 0.65                 | 119.60                    | 7797.02   | -107.76     | -18.02      | 109.26                    | 189.49                      | 0.17                          |
| 7900.00                 | 0.86                 | 170.79                    | 7897.02   | -108.79     | -17.41      | 110.17                    | 189.09                      | 0.68                          |
| 8000.00                 | 1.08                 | 221.98                    | 7997.00   | -110.23     | -17.92      | 111.68                    | 189.23                      | 0.86                          |
| 8100.00                 | 1.51                 | 223.13                    | 8096.98   | -111.89     | -19.45      | 113.57                    | 189.86                      | 0.44                          |
| 8200.00                 | 1.95                 | 214.29                    | 8196.93   | -114.26     | -21.31      | 116.23                    | 190.56                      | 0.51                          |
| 8300.00                 | 1.67                 | 214.37                    | 8296.88   | -116.87     | -23.09      | 119.13                    | 191.18                      | 0.28                          |
| 8400.00                 | 1.39                 | 224.46                    | 8396.85   | -118.94     | -24.76      | 121.49                    | 191.76                      | 0.39                          |
| 8500.00                 | 1.16                 | 239.41                    | 8496.82   | -120.32     | -26.48      | 123.20                    | 192.41                      | 0.40                          |
| 8600.00                 | 0.94                 | 244.37                    | 8596.80   | -121.19     | -28.09      | 124.40                    | 193.05                      | 0.24                          |
| 8700.00                 | 0.76                 | 254.81                    | 8696.79   | -121.71     | -29.47      | 125.23                    | 193.61                      | 0.23                          |
| 8800.00                 | 0.58                 | 265.26                    | 8796.79   | -121.93     | -30.61      | 125.71                    | 194.09                      | 0.21                          |
| 8900.00                 | 0.43                 | 274.90                    | 8896.78   | -121.94     | -31.49      | 125.94                    | 194.48                      | 0.18                          |
| 9000.00                 | 0.27                 | 284.55                    | 8996.78   | -121.85     | -32.10      | 126.00                    | 194.76                      | 0.16                          |

HORIZONTAL DISPLACEMENT IS  
126.00 FEET AT 194.76 DEGREES