

**PATRIOT DRILLING, LLC**

OPERATOR: COG Operating, LLC  
WELL/LEASE: Jack Federal # 1-H  
COUNTY: Eddy Co., New Mexico  
Sec. 31, T25S, R27E

30-015-38643

**STATE OF NEW MEXICO  
DEVIATION REPORT**

| <u>Depth</u> | <u>Deviation</u> | <u>Depth</u> | <u>Deviation</u> |
|--------------|------------------|--------------|------------------|
| 236          | 1/2              | 6,306        | 2 1/4            |
| 700          | 1                | 6,404        | 2 3/4            |
| 918          | 1 1/4            | 6,618        | 2                |
| 1,297        | 1/2              | 6,745        | 2 1/4            |
| 1,521        | 1/2              | 6,903        | 2 3/4            |
| 1,708        | 1                | 7,060        | 3                |
| 2,329        | 1/2              | 7,222        | 2                |
| 2,899        | 1/4              | 7,344        | 1                |
| 3,902        | 1 1/2            | 7,564        | 1/2              |
| 4,405        | 1 1/2            | 7,850        | 2                |
| 4,918        | 1 1/2            | 8,045        | 1 3/4            |
| 5,395        | 1 1/2            | 8,549        | 1/2              |
| 5,832        | 1 3/4            | 9,023        | 1 1/2            |

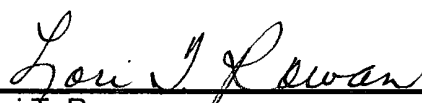
**Patriot Drilling, LLC**

  
M. Leroy Peterson, Executive Vice-  
President

The foregoing instrument was acknowledged before me on this 15th day of February, 2011 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling,

My Commission Expires: 02/01/2015



  
Lori T. Rowan  
Notary Public for Ector Co., Texas

# COG OPERATING

Wildcat (Eddy County, NM)

Eddy County, NM

Jack Federal #1H

VH - Job #32K0112048

Survey: Gyro

## SDI Standard Survey Report

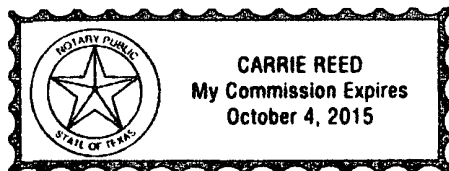
This survey is correct to the best of my knowledge and is supported by actual field data.

*Carrie Reed*

Notarized this date 17th of February, 2012.

*Carrie Reed*

Notary Signature  
County of Midland  
State of Texas



Scientific Drilling  
Directional Drilling Operations

**Scientific Drilling International, Inc.**  
SDI Standard Survey Report



|                  |                           |                                     |                                     |
|------------------|---------------------------|-------------------------------------|-------------------------------------|
| <b>Company:</b>  | COG OPERATING             | <b>Local Co-ordinate Reference:</b> | Well Jack Federal #1H               |
| <b>Project:</b>  | Wildcat (Eddy County, NM) | <b>TVD Reference:</b>               | WELL @ 0 0usft (Original Well Elev) |
| <b>Site:</b>     | Eddy County, NM           | <b>MD Reference:</b>                | WELL @ 0 0usft (Original Well Elev) |
| <b>Well:</b>     | Jack Federal #1H          | <b>North Reference:</b>             | Grnd                                |
| <b>Wellbore:</b> | VH - Job #32K0112048      | <b>Survey Calculation Method:</b>   | Minimum Curvature                   |
| <b>Design:</b>   | VH - Job #32K0112048      | <b>Database:</b>                    | EDM-Regulatory                      |

|                    |                                      |                      |                |
|--------------------|--------------------------------------|----------------------|----------------|
| <b>Project:</b>    | Wildcat (Eddy County, NM)            |                      |                |
| <b>Map System:</b> | US State Plane 1927 (Exact solution) | <b>System Datum:</b> | Mean Sea Level |
| <b>Geo Datum:</b>  | NAD 1927 (NADCON CONUS)              |                      |                |
| <b>Map Zone:</b>   | New Mexico Central 3002              |                      |                |

|                              |                  |                     |                   |                          |                  |
|------------------------------|------------------|---------------------|-------------------|--------------------------|------------------|
| <b>Site:</b>                 | Eddy County, NM  |                     |                   |                          |                  |
| <b>Site Position:</b>        | <b>Northing:</b> | 695,322 90 usft     | <b>Latitude:</b>  | 32° 53' 31 090 N         |                  |
| <b>From:</b>                 | <b>Lat/Long</b>  | <b>Easting:</b>     | 1,178,985 29 usft | <b>Longitude:</b>        | 104° 2' 17 570 W |
| <b>Position Uncertainty:</b> | 0 0 usft         | <b>Slot Radius:</b> | 0"                | <b>Grid Convergence:</b> | 1.20 °           |

|                             |                                            |                            |                  |                      |                   |                  |
|-----------------------------|--------------------------------------------|----------------------------|------------------|----------------------|-------------------|------------------|
| <b>Well:</b>                | Jack Federal #1H, Directional (Pathfinder) |                            |                  |                      |                   |                  |
| <b>Well Position</b>        | <b>+N/-S</b>                               | 0 0 usft                   | <b>Northing:</b> | 403,015 38 usft      | <b>Latitude:</b>  | 32° 5' 31 200 N  |
|                             | <b>+E/-W</b>                               | 0 0 usft                   | <b>Easting:</b>  | 1,123,755.81 usft    | <b>Longitude:</b> | 104° 14' 9 600 W |
| <b>Position Uncertainty</b> | 0 0 usft                                   | <b>Wellhead Elevation:</b> | usft             | <b>Ground Level:</b> | 0 0 usft          |                  |

|                  |                      |                    |                    |                  |                       |
|------------------|----------------------|--------------------|--------------------|------------------|-----------------------|
| <b>Wellbore</b>  | VH - Job #32K0112048 |                    |                    |                  |                       |
| <b>Magnetics</b> | <b>Model Name</b>    | <b>Sample Date</b> | <b>Declination</b> | <b>Dip Angle</b> | <b>Field Strength</b> |
|                  | IGRF2010             | 1/17/2012          | (°) 7 81           | (°) 59 93        | (nT) 48,428           |

|                          |                         |               |              |                      |     |
|--------------------------|-------------------------|---------------|--------------|----------------------|-----|
| <b>Design</b>            | VH - Job #32K0112048    |               |              |                      |     |
| <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          | 176 35               |     |

|                       |             |                             |                  |                    |
|-----------------------|-------------|-----------------------------|------------------|--------------------|
| <b>Survey Program</b> | <b>Date</b> | 2/15/2012                   |                  |                    |
| <b>From</b>           | <b>To</b>   | <b>Survey (Wellbore)</b>    | <b>Tool Name</b> | <b>Description</b> |
| (usft)                | (usft)      |                             |                  |                    |
| 100 0                 | 10,445 0    | Gyro (VH - Job #32K0112048) | Keeper           | Keeper Gyro        |

|               |                       |                    |                |                      |                    |                  |                        |                         |
|---------------|-----------------------|--------------------|----------------|----------------------|--------------------|------------------|------------------------|-------------------------|
| <b>Survey</b> | <b>Measured Depth</b> | <b>Inclination</b> | <b>Azimuth</b> | <b>True Vertical</b> | <b>North/South</b> | <b>East/West</b> | <b>Closure Azimuth</b> | <b>Closure Distance</b> |
|               | (usft)                | (°)                | (°)            | Depth                | (usft)             | (usft)           | (°)                    | (usft)                  |
|               | 0 0                   | 0.00               | 0.00           | 0 0                  | 0 0                | 0 0              | 0 00                   | 0 0                     |
|               | 100 0                 | 0 64               | 185 93         | 100 0                | -0 6               | -0 1             | 185 93                 | 0 6                     |
|               | 200 0                 | 0 76               | 192 16         | 200 0                | -1 8               | -0 3             | 188 25                 | 1 8                     |
|               | 300 0                 | 0 94               | 201 50         | 300 0                | -3 2               | -0 7             | 192 37                 | 3 2                     |
|               | 400 0                 | 0 52               | 232.20         | 400 0                | -4 2               | -1 4             | 197 83                 | 4 4                     |
|               | 500 0                 | 0 38               | 235 91         | 500 0                | -4 7               | -2 0             | 203 03                 | 5 1                     |
|               | 600 0                 | 0 62               | 231 95         | 600 0                | -5 2               | -2 7             | 207 36                 | 5 8                     |
|               | 700 0                 | 0 78               | 225 46         | 700 0                | -6 0               | -3 6             | 210 93                 | 7 0                     |
|               | 800 0                 | 0 83               | 224 11         | 799 9                | -7 0               | -4 6             | 213 23                 | 8 4                     |
|               | 900 0                 | 1 08               | 236 76         | 899 9                | -8 0               | -5 9             | 216 18                 | 10 0                    |
|               | 1,000.0               | 1 25               | 242 89         | 999 9                | -9 1               | -7 6             | 220 16                 | 11 8                    |
|               | 1,100.0               | 1 26               | 244 49         | 1,099.9              | -10 0              | -9 6             | 223 77                 | 13 9                    |

# Scientific Drilling International, Inc.

## SDI Standard Survey Report



|                  |                           |                                     |                                     |
|------------------|---------------------------|-------------------------------------|-------------------------------------|
| <b>Company:</b>  | COG OPERATING             | <b>Local Co-ordinate Reference:</b> | Well Jack Federal #1H               |
| <b>Project:</b>  | Wildcat (Eddy County, NM) | <b>TVD Reference:</b>               | WELL @ 0 0usft (Original Well Elev) |
| <b>Site:</b>     | Eddy County, NM           | <b>MD Reference:</b>                | WELL @ 0 0usft (Original Well Elev) |
| <b>Well:</b>     | Jack Federal #1H          | <b>North Reference:</b>             | Grid                                |
| <b>Wellbore:</b> | VH - Job #32K0112048      | <b>Survey Calculation Method:</b>   | Minimum Curvature                   |
| <b>Design:</b>   | VH - Job #32K0112048      | <b>Database:</b>                    | EDM-Regulatory                      |

| Survey | Measured Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | True Vertical<br>Depth | North/South<br>(usft) | East/West<br>(usft) | Closure Azimuth<br>(°) | Closure Distance<br>(usft) |
|--------|--------------------------|--------------------|----------------|------------------------|-----------------------|---------------------|------------------------|----------------------------|
|        | 1,200 0                  | 1 16               | 238 22         | 1,199 9                | -11 0                 | -11 5               | 226 08                 | 15 9                       |
|        | 1,300 0                  | 0 78               | 215 80         | 1,299 9                | -12 1                 | -12 7               | 226 38                 | 17 6                       |
|        | 1,400 0                  | 0 44               | 202 98         | 1,399 8                | -13 0                 | -13 3               | 225 53                 | 18 6                       |
|        | 1,500 0                  | 0 24               | 172 88         | 1,499 8                | -13 6                 | -13 4               | 224 58                 | 19 1                       |
|        | 1,600 0                  | 0 60               | 106 15         | 1,599 8                | -13 9                 | -12 9               | 222 69                 | 19 0                       |
|        | 1,700 0                  | 0 91               | 86 91          | 1,699 8                | -14 0                 | -11 6               | 219 47                 | 18 2                       |
|        | 1,800 0                  | 0 40               | 81 90          | 1,799 8                | -13 9                 | -10 4               | 216 77                 | 17 4                       |
|        | 1,900 0                  | 0 16               | 341 78         | 1,899 8                | -13 8                 | -10 1               | 216 33                 | 17 1                       |
|        | 2,000 0                  | 0 24               | 311 63         | 1,999 8                | -13 5                 | -10 3               | 217 41                 | 17 0                       |
|        | 2,100 0                  | 0 51               | 300 46         | 2,099 8                | -13 1                 | -10 9               | 219 60                 | 17 0                       |
|        | 2,200 0                  | 0 44               | 307 80         | 2,199 8                | -12 7                 | -11 5               | 222 35                 | 17 1                       |
|        | 2,300 0                  | 0 43               | 290 68         | 2,299 8                | -12 3                 | -12 2               | 224 77                 | 17 3                       |
|        | 2,400 0                  | 0 40               | 288 62         | 2,399 8                | -12 1                 | -12 9               | 226 90                 | 17 6                       |
|        | 2,500 0                  | 0 34               | 281 67         | 2,499 8                | -11 9                 | -13 5               | 228 65                 | 18 0                       |
|        | 2,600 0                  | 0 37               | 279 30         | 2,599 8                | -11 8                 | -14 1               | 230 17                 | 18 4                       |
|        | 2,700 0                  | 0 37               | 282 79         | 2,699 8                | -11 6                 | -14 7               | 231 70                 | 18 8                       |
|        | 2,800 0                  | 0 39               | 279 98         | 2,799 8                | -11 5                 | -15 4               | 233 20                 | 19 2                       |
|        | 2,900 0                  | 0 43               | 259 95         | 2,899 8                | -11 5                 | -16 1               | 234 41                 | 19 8                       |
|        | 3,000 0                  | 0 45               | 244 85         | 2,999 8                | -11 8                 | -16 8               | 235 06                 | 20 5                       |
|        | 3,100 0                  | 0 50               | 234 73         | 3,099 8                | -12 2                 | -17 5               | 235 23                 | 21 4                       |
|        | 3,200 0                  | 0 49               | 229 71         | 3,199 8                | -12 7                 | -18 2               | 235 12                 | 22 2                       |
|        | 3,300 0                  | 0 47               | 231 33         | 3,299 8                | -13 2                 | -18 9               | 234 95                 | 23 1                       |
|        | 3,400 0                  | 0 79               | 211 23         | 3,399 8                | -14 1                 | -19 5               | 234 23                 | 24 1                       |
|        | 3,500 0                  | 0 67               | 203 31         | 3,499 8                | -15 2                 | -20 1               | 232 93                 | 25 2                       |
|        | 3,600 0                  | 0 91               | 197 29         | 3,599 8                | -16 5                 | -20 6               | 231 30                 | 26 4                       |
|        | 3,700 0                  | 0 87               | 194 57         | 3,699 8                | -18 0                 | -21 0               | 229 44                 | 27 7                       |
|        | 3,800 0                  | 0 84               | 199 33         | 3,799 7                | -19 4                 | -21 5               | 227 86                 | 28 9                       |
|        | 3,900 0                  | 0 77               | 211 19         | 3,899 7                | -20 7                 | -22 1               | 226 83                 | 30 2                       |
|        | 4,000 0                  | 0 71               | 211 51         | 3,999 7                | -21 8                 | -22 7               | 226 20                 | 31 5                       |
|        | 4,100 0                  | 0 60               | 152 29         | 4,099 7                | -22 8                 | -22 8               | 225 03                 | 32 2                       |
|        | 4,200 0                  | 0 81               | 130 41         | 4,199 7                | -23 7                 | -22 0               | 222 89                 | 32 4                       |
|        | 4,300 0                  | 0 95               | 169 73         | 4,299 7                | -25 0                 | -21 3               | 220 50                 | 32 9                       |
|        | 4,400 0                  | 1 15               | 181 28         | 4,399 7                | -26 8                 | -21 2               | 218 36                 | 34 2                       |
|        | 4,500 0                  | 1 16               | 186 64         | 4,499 7                | -28 8                 | -21 4               | 216 55                 | 35 9                       |
|        | 4,600 0                  | 1 13               | 183 56         | 4,599 6                | -30 8                 | -21 5               | 214 96                 | 37 6                       |
|        | 4,700 0                  | 0 98               | 184 32         | 4,699 6                | -32 6                 | -21 7               | 213 57                 | 39 2                       |
|        | 4,800 0                  | 1 05               | 177 17         | 4,799 6                | -34 4                 | -21 7               | 212 21                 | 40 7                       |
|        | 4,900 0                  | 1 09               | 173 63         | 4,899 6                | -36 3                 | -21 5               | 210 69                 | 42 2                       |
|        | 5,000 0                  | 1 09               | 185 93         | 4,999 6                | -38 2                 | -21 5               | 209 42                 | 43 8                       |
|        | 5,100 0                  | 1 25               | 193 89         | 5,099 6                | -40 2                 | -21 9               | 208 58                 | 45 7                       |
|        | 5,200 0                  | 1 18               | 194 78         | 5,199 5                | -42 2                 | -22 4               | 207 95                 | 47 8                       |
|        | 5,300 0                  | 1 25               | 194 08         | 5,299 5                | -44 3                 | -22 9               | 207 38                 | 49 9                       |
|        | 5,400 0                  | 1 20               | 206 83         | 5,399 5                | -46 3                 | -23 7               | 207 10                 | 52 0                       |
|        | 5,500 0                  | 1 15               | 215 79         | 5,499 5                | -48 0                 | -24 7               | 207 25                 | 54 0                       |

**Scientific Drilling International, Inc.**  
SDI Standard Survey Report



|                  |                           |                                     |                                     |
|------------------|---------------------------|-------------------------------------|-------------------------------------|
| <b>Company:</b>  | COG OPERATING             | <b>Local Co-ordinate Reference:</b> | Well Jack Federal #1H               |
| <b>Project:</b>  | Wildcat (Eddy County, NM) | <b>TVD Reference:</b>               | WELL @ 0 0usft (Original Well Elev) |
| <b>Site:</b>     | Eddy County, NM           | <b>MD Reference:</b>                | WELL @ 0 0usft (Original Well Elev) |
| <b>Well:</b>     | Jack Federal #1H          | <b>North Reference:</b>             | Grid                                |
| <b>Wellbore:</b> | VH - Job #32K0112048      | <b>Survey Calculation Method:</b>   | Minimum Curvature                   |
| <b>Design:</b>   | VH - Job #32K0112048      | <b>Database:</b>                    | EDM-Regulatory                      |

**Survey**

| Measured Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | True Vertical<br>Depth | North/South<br>(usft) | East/West<br>(usft) | Closure Azimuth<br>(°) | Closure Distance<br>(usft) |
|--------------------------|--------------------|----------------|------------------------|-----------------------|---------------------|------------------------|----------------------------|
| 5,600.0                  | 1.54               | 244.88         | 5,599.4                | -49.4                 | -26.5               | 208.24                 | 56.1                       |
| 5,700.0                  | 1.61               | 251.74         | 5,699.4                | -50.4                 | -29.1               | 209.98                 | 58.2                       |
| 5,800.0                  | 1.50               | 246.73         | 5,799.4                | -51.4                 | -31.6               | 211.62                 | 60.3                       |
| 5,900.0                  | 1.50               | 244.25         | 5,899.3                | -52.4                 | -34.0               | 212.95                 | 62.5                       |
| 6,000.0                  | 1.71               | 215.36         | 5,999.3                | -54.2                 | -36.0               | 213.61                 | 65.1                       |
| 6,100.0                  | 1.88               | 209.92         | 6,099.2                | -56.9                 | -37.7               | 213.56                 | 68.2                       |
| 6,200.0                  | 2.46               | 220.78         | 6,199.2                | -59.9                 | -39.9               | 213.69                 | 72.0                       |
| 6,300.0                  | 2.77               | 223.44         | 6,299.1                | -63.3                 | -43.0               | 214.19                 | 76.5                       |
| 6,400.0                  | 3.01               | 224.91         | 6,398.9                | -66.9                 | -46.5               | 214.81                 | 81.5                       |
| 6,500.0                  | 2.86               | 235.30         | 6,498.8                | -70.2                 | -50.4               | 215.69                 | 86.4                       |
| 6,600.0                  | 2.45               | 235.44         | 6,598.7                | -72.8                 | -54.2               | 216.68                 | 90.8                       |
| 6,700.0                  | 2.06               | 229.01         | 6,698.6                | -75.2                 | -57.4               | 217.33                 | 94.6                       |
| 6,800.0                  | 1.95               | 218.21         | 6,798.6                | -77.7                 | -59.8               | 217.56                 | 98.1                       |
| 6,900.0                  | 2.91               | 207.85         | 6,898.5                | -81.3                 | -62.0               | 217.33                 | 102.3                      |
| 7,000.0                  | 2.91               | 215.10         | 6,998.3                | -85.6                 | -64.6               | 217.05                 | 107.3                      |
| 7,100.0                  | 2.47               | 219.69         | 7,098.2                | -89.4                 | -67.5               | 217.06                 | 112.0                      |
| 7,200.0                  | 1.71               | 211.75         | 7,198.2                | -92.3                 | -69.6               | 217.04                 | 115.6                      |
| 7,300.0                  | 0.96               | 189.54         | 7,298.1                | -94.4                 | -70.6               | 216.78                 | 117.9                      |
| 7,400.0                  | 0.78               | 167.40         | 7,398.1                | -95.9                 | -70.6               | 216.35                 | 119.0                      |
| 7,500.0                  | 0.48               | 172.03         | 7,498.1                | -97.0                 | -70.4               | 215.96                 | 119.8                      |
| 7,600.0                  | 0.62               | 221.96         | 7,598.1                | -97.8                 | -70.7               | 215.85                 | 120.6                      |
| 7,700.0                  | 1.04               | 197.95         | 7,698.1                | -99.0                 | -71.3               | 215.75                 | 122.0                      |
| 7,800.0                  | 1.65               | 180.16         | 7,798.1                | -101.3                | -71.6               | 215.23                 | 124.1                      |
| 7,900.0                  | 2.05               | 161.69         | 7,898.0                | -104.5                | -71.0               | 214.21                 | 126.3                      |
| 8,000.0                  | 1.56               | 150.56         | 7,998.0                | -107.4                | -69.8               | 213.03                 | 128.1                      |
| 8,100.0                  | 0.75               | 125.76         | 8,098.0                | -108.9                | -68.6               | 212.20                 | 128.7                      |
| 8,200.0                  | 0.60               | 106.08         | 8,198.0                | -109.5                | -67.6               | 211.68                 | 128.6                      |
| 8,300.0                  | 0.25               | 70.16          | 8,298.0                | -109.5                | -66.9               | 211.40                 | 128.3                      |
| 8,400.0                  | 0.31               | 35.45          | 8,397.9                | -109.2                | -66.5               | 211.33                 | 127.9                      |
| 8,500.0                  | 0.30               | 18.88          | 8,497.9                | -108.8                | -66.2               | 211.34                 | 127.4                      |
| 8,600.0                  | 0.30               | 29.12          | 8,597.9                | -108.3                | -66.0               | 211.37                 | 126.8                      |
| 8,700.0                  | 0.36               | 33.37          | 8,697.9                | -107.8                | -65.7               | 211.37                 | 126.3                      |
| 8,800.0                  | 0.94               | 32.73          | 8,797.9                | -106.9                | -65.1               | 211.36                 | 125.1                      |
| 8,900.0                  | 0.96               | 33.66          | 8,897.9                | -105.5                | -64.2               | 211.33                 | 123.5                      |
| 9,000.0                  | 1.06               | 11.53          | 8,997.9                | -103.9                | -63.6               | 211.47                 | 121.8                      |
| 9,100.0                  | 1.09               | 1.88           | 9,097.9                | -102.0                | -63.3               | 211.84                 | 120.1                      |
| 9,200.0                  | 1.07               | 356.99         | 9,197.9                | -100.1                | -63.4               | 212.33                 | 118.5                      |
| 9,300.0                  | 1.18               | 339.49         | 9,297.9                | -98.2                 | -63.8               | 212.99                 | 117.1                      |
| 9,400.0                  | 1.28               | 349.32         | 9,397.8                | -96.2                 | -64.3               | 213.79                 | 115.7                      |
| 9,500.0                  | 1.30               | 350.07         | 9,497.8                | -93.9                 | -64.7               | 214.57                 | 114.1                      |
| 9,600.0                  | 1.27               | 351.22         | 9,597.8                | -91.7                 | -65.1               | 215.37                 | 112.5                      |
| 9,700.0                  | 0.77               | 6.54           | 9,697.8                | -90.0                 | -65.2               | 215.93                 | 111.1                      |
| 9,800.0                  | 0.59               | 323.73         | 9,797.8                | -88.9                 | -65.4               | 216.36                 | 110.4                      |
| 9,900.0                  | 0.55               | 300.11         | 9,897.8                | -88.2                 | -66.1               | 216.86                 | 110.3                      |

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SDI Standard Survey Report



|                  |                           |                                     |                                     |
|------------------|---------------------------|-------------------------------------|-------------------------------------|
| <b>Company:</b>  | COG OPERATING             | <b>Local Co-ordinate Reference:</b> | Well Jack Federal #1H               |
| <b>Project:</b>  | Wildcat (Eddy County, NM) | <b>TVD Reference:</b>               | WELL @ 0 0usft (Original Well Elev) |
| <b>Site:</b>     | Eddy County, NM           | <b>MD Reference:</b>                | WELL @ 0 0usft (Original Well Elev) |
| <b>Well:</b>     | Jack Federal #1H          | <b>North Reference:</b>             | Grid                                |
| <b>Wellbore:</b> | VH - Job #32K0112048      | <b>Survey Calculation Method:</b>   | Minimum Curvature                   |
| <b>Design:</b>   | VH - Job #32K0112048      | <b>Database:</b>                    | EDM-Regulatory                      |

| Survey                   |                    |                |                        |                       |                     |                        |                            |
|--------------------------|--------------------|----------------|------------------------|-----------------------|---------------------|------------------------|----------------------------|
| Measured Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | True Vertical<br>Depth | North/South<br>(usft) | East/West<br>(usft) | Closure Azimuth<br>(°) | Closure Distance<br>(usft) |
| 10,000 0                 | 0 68               | 293 92         | 9,997 7                | -87 8                 | -67 1               | 217 41                 | 110 5                      |
| 10,100 0                 | 0 88               | 307 15         | 10,097 7               | -87 0                 | -68 3               | 218 10                 | 110 6                      |
| 10,200 0                 | 1 02               | 322 87         | 10,197 7               | -85 9                 | -69 4               | 218 95                 | 110 4                      |
| 10,300 0                 | 1 39               | 329 90         | 10,297 7               | -84 1                 | -70 6               | 219 99                 | 109 8                      |
| 10,400 0                 | 1 79               | 340 99         | 10,397 7               | -81 6                 | -71 7               | 221 30                 | 108 6                      |
| 10,445 0                 | 2 23               | 355 15         | 10,442.6               | -80 1                 | -72 0               | 221 96                 | 107 7                      |

0



**Scientific Drilling**  
Directional Drilling Operations

Project: Wildcat (Eddy County, NM)  
Eddy County, NM  
Well: Jack Federal #1H  
Wellbore: VH - Job #32K0112048  
Design: VH - Job #32K0112048

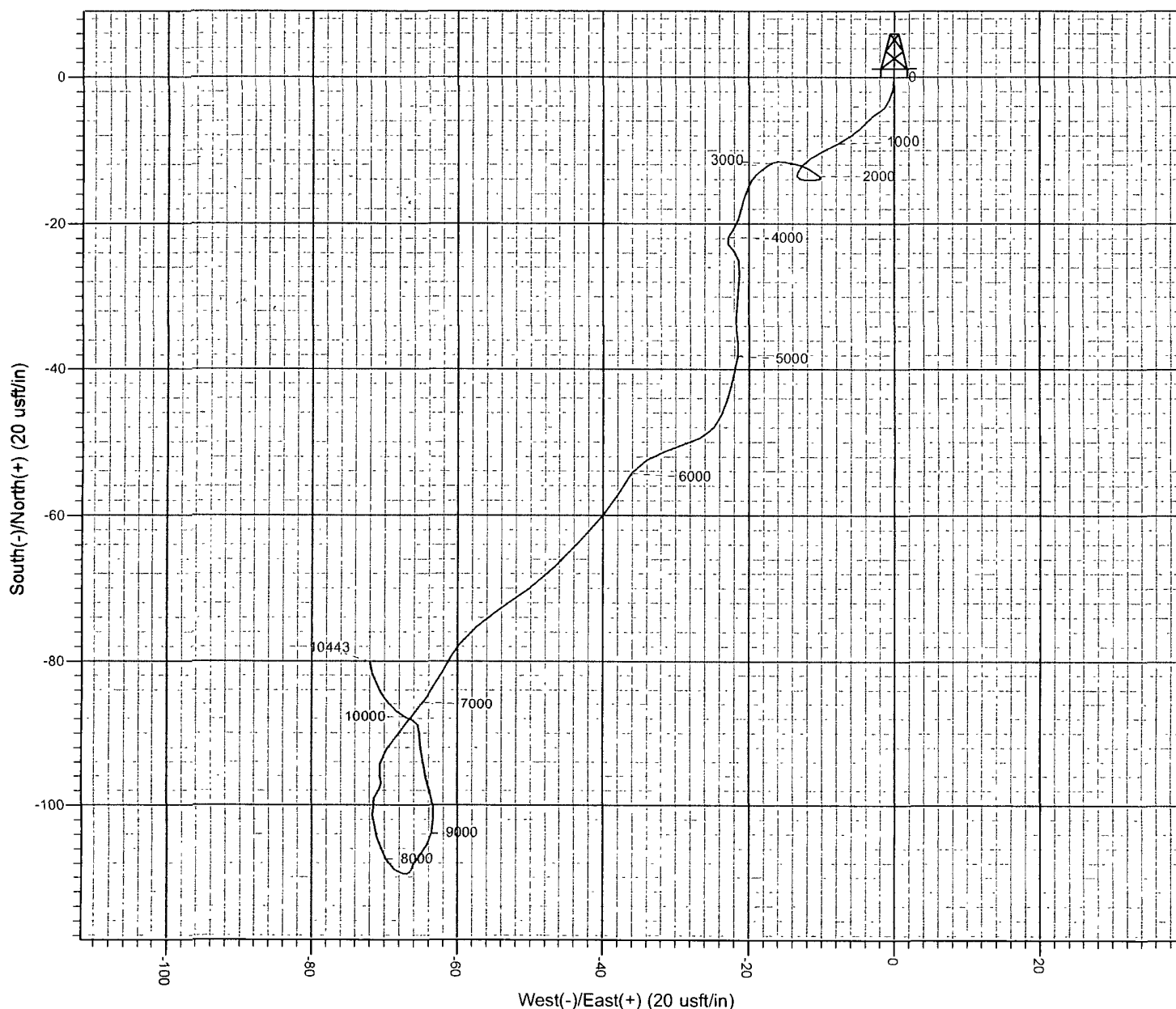


Azimuths to Grid North  
True North -1 07°  
Magnetic North 6 74°

Magnetic Field  
Strength 48428 2snT  
Dip Angle 59 93°  
Date 1/17/2012  
Model IGRF2010

WELL DETAILS: Jack Federal #1H  
WELL @ 0 0usft (Original Well Elev)  
Ground Level: 0.0

| +N/-S | +E/-W | Northing  | Easting    | Latitude        | Longitude        | Slot |
|-------|-------|-----------|------------|-----------------|------------------|------|
| 0 0   | 0.0   | 403015.38 | 1123755.81 | 32° 5' 31.200 N | 104° 14' 9.600 W |      |



PROJECT DETAILS: Wildcat (Eddy County, NM)  
Geodetic System: US State Plane 1927 (Exact solution)  
Datum: NAD 1927 (NADCON CONUS)  
Ellipsoid: Clarke 1866  
Zone: New Mexico Central 3002  
System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM  
Site Centre Latitude: 32° 53' 31.090 N  
Longitude: 104° 2' 17.570 W  
Positional Uncertainty: 0.0  
Convergence: 1.20  
Local North: Grid



## **COG Operating LLC**

**Eddy County(NAD27)**

**Jack Federal**

**#1H**

**OH**

**Design: OH**

## **Pathfinder X & Y Report**

**07 February, 2012**



**A Schlumberger Company**



Pathfinder  
Pathfinder X & Y Report

**PATHFINDER**  
A Schlumberger Company

Company: COG Operating LLC  
Project: Eddy County(NAD27)  
Site: Jack Federal  
Well: #1H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Well #1H  
TVD Reference: KB = 17 @ 3258.0usft (Original Well Elev)  
MD Reference: KB = 17 @ 3258.0usft (Original Well Elev)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: EDM 5000 1 Single User Db

Project Eddy County(NAD27)

Map System: US State Plane 1927 (Exact solution)  
Geo Datum: NAD 1927 (NADCON CONUS)  
Map Zone: New Mexico East 3001

System Datum: Mean Sea Level

Site Jack Federal

|                       |          |              |                  |                   |                   |
|-----------------------|----------|--------------|------------------|-------------------|-------------------|
| Site Position:        | Map      | Northing:    | 397,388.500 usft | Latitude:         | 32° 5' 32.999 N   |
| From:                 |          | Easting:     | 530,065.100 usft | Longitude:        | 104° 14' 10.500 W |
| Position Uncertainty: | 0.0 usft | Slot Radius: | 13-3/16 "        | Grid Convergence: | 0.05 °            |

Well #1H

|                      |       |          |                     |                  |               |                   |
|----------------------|-------|----------|---------------------|------------------|---------------|-------------------|
| Well Position        | +N/-S | 0.0 usft | Northing:           | 397,388.500 usft | Latitude:     | 32° 5' 32.999 N   |
|                      | +E/-W | 0.0 usft | Easting:            | 530,065.100 usft | Longitude:    | 104° 14' 10.500 W |
| Position Uncertainty |       | 0.0 usft | Wellhead Elevation: | usft             | Ground Level: | 3,241.0 usft      |

Wellbore OH

| Magnetics | Model Name | Sample Date | Declination<br>(°) | Dip Angle<br>(°) | Field Strength<br>(nT) |
|-----------|------------|-------------|--------------------|------------------|------------------------|
|           | IGRF200510 | 10/6/2011   | 7.83               | 59.96            | 48,472                 |

Design OH

Audit Notes:

Version: 1.0 Phase: ACTUAL Tie On Depth: 0.0

| Vertical Section: | Depth From (TVD)<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Direction<br>(°) |
|-------------------|----------------------------|-----------------|-----------------|------------------|
|                   | 0.0                        | 0.0             | 0.0             | 176.35           |



**Pathfinder**  
Pathfinder X & Y Report

**PATHFINDER**  
A Schlumberger Company

Company: COG Operating LLC  
Project: Eddy County(NAD27)  
Site: Jack Federal  
Well: #1H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Well #1H  
TVD Reference: KB = 17 @ 3258.0usft (Original Well Elev)  
MD Reference: KB = 17 @ 3258.0usft (Original Well Elev)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: EDM 5000.1 Single User Db

| Survey Program | Date 2/7/2012 |                   |            |                                  |  |
|----------------|---------------|-------------------|------------|----------------------------------|--|
| From (usft)    | To (usft)     | Survey (Wellbore) | Tool Name  | Description                      |  |
| 100.0          | 9,100.0       | Gyro #1 (OH)      | NS-GYRO-MS | North sensing gyrocompassing m/s |  |
| 9,151.0        | 13,679.0      | MWD #2 (OH)       | MWD        | MWD - Standard                   |  |

| MD (usft) | Inc (°) | Azi (azimuth) (°) | TVD (usft) | TVDSS (usft) | N/S (usft) | E/W (usft) | V. Sec (usft) | DLeg (°/100usft) | Northing (usft) | Easting (usft) |
|-----------|---------|-------------------|------------|--------------|------------|------------|---------------|------------------|-----------------|----------------|
| 0.0       | 0.00    | 0.00              | 0.0        | -3,258.0     | 0.0        | 0.0        | 0.0           | 0.00             | 397,388.50      | 530,065.10     |
| 100.0     | 0.64    | 185.93            | 100.0      | -3,158.0     | -0.6       | -0.1       | 0.6           | 0.64             | 397,387.94      | 530,065.04     |
| 200.0     | 0.76    | 192.16            | 200.0      | -3,058.0     | -1.8       | -0.3       | 1.7           | 0.14             | 397,386.74      | 530,064.84     |
| 300.0     | 0.94    | 201.50            | 300.0      | -2,958.0     | -3.2       | -0.7       | 3.1           | 0.23             | 397,385.33      | 530,064.40     |
| 400.0     | 0.52    | 232.20            | 400.0      | -2,858.0     | -4.2       | -1.4       | 4.1           | 0.56             | 397,384.29      | 530,063.75     |
| 500.0     | 0.38    | 235.91            | 500.0      | -2,758.0     | -4.7       | -2.0       | 4.5           | 0.14             | 397,383.82      | 530,063.11     |
| 600.0     | 0.62    | 231.95            | 600.0      | -2,658.0     | -5.2       | -2.7       | 5.0           | 0.24             | 397,383.30      | 530,062.41     |
| 700.0     | 0.78    | 225.46            | 700.0      | -2,558.0     | -6.0       | -3.6       | 5.8           | 0.18             | 397,382.49      | 530,061.50     |
| 800.0     | 0.83    | 224.11            | 799.9      | -2,458.1     | -7.0       | -4.6       | 6.7           | 0.05             | 397,381.50      | 530,060.51     |
| 900.0     | 1.08    | 236.76            | 899.9      | -2,358.1     | -8.0       | -5.9       | 7.6           | 0.33             | 397,380.46      | 530,059.22     |
| 1,000.0   | 1.25    | 242.89            | 999.9      | -2,258.1     | -9.1       | -7.6       | 8.5           | 0.21             | 397,379.45      | 530,057.46     |
| 1,100.0   | 1.26    | 244.49            | 1,099.9    | -2,158.1     | -10.0      | -9.6       | 9.4           | 0.04             | 397,378.48      | 530,055.50     |
| 1,200.0   | 1.16    | 238.22            | 1,199.9    | -2,058.1     | -11.0      | -11.5      | 10.3          | 0.17             | 397,377.47      | 530,053.64     |
| 1,300.0   | 0.78    | 215.80            | 1,299.9    | -1,958.1     | -12.1      | -12.7      | 11.3          | 0.53             | 397,376.38      | 530,052.38     |
| 1,400.0   | 0.44    | 202.98            | 1,399.8    | -1,858.2     | -13.0      | -13.3      | 12.2          | 0.36             | 397,375.48      | 530,051.84     |
| 1,500.0   | 0.24    | 172.88            | 1,499.8    | -1,758.2     | -13.6      | -13.4      | 12.7          | 0.26             | 397,374.92      | 530,051.71     |
| 1,600.0   | 0.60    | 106.15            | 1,599.8    | -1,658.2     | -13.9      | -12.9      | 13.1          | 0.55             | 397,374.56      | 530,052.24     |
| 1,700.0   | 0.91    | 86.91             | 1,699.8    | -1,558.2     | -14.0      | -11.6      | 13.3          | 0.40             | 397,374.46      | 530,053.54     |
| 1,800.0   | 0.40    | 81.90             | 1,799.8    | -1,458.2     | -13.9      | -10.4      | 13.3          | 0.51             | 397,374.55      | 530,054.68     |
| 1,900.0   | 0.16    | 341.78            | 1,899.8    | -1,358.2     | -13.8      | -10.1      | 13.1          | 0.46             | 397,374.73      | 530,054.98     |
| 2,000.0   | 0.24    | 311.63            | 1,999.8    | -1,258.2     | -13.5      | -10.3      | 12.8          | 0.13             | 397,375.01      | 530,054.78     |



Pathfinder  
Pathfinder X & Y Report

**PATHFINDER**  
A Schlumberger Company

Company: COG Operating LLC  
Project: Eddy County(NAD27)  
Site: Jack Federal  
Well: #1H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference:  
TVD Reference:  
MD Reference:  
North Reference:  
Survey Calculation Method:  
Database:

Well #1H  
KB = 17 @ 3258.0usft (Original Well Elev)  
KB = 17 @ 3258 0usft (Original Well Elev)  
Grid  
Minimum Curvature  
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) | Northing<br>(usft) | Easting<br>(usft) |
|--------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|--------------------|-------------------|
| 2,100.0      | 0.51       | 300.46               | 2,099.8       | -1,158.2        | -13.1         | -10.9         | 12.4             | 0.28                | 397,375.37         | 530,054.24        |
| 2,200.0      | 0.44       | 307.80               | 2,199.8       | -1,058.2        | -12.7         | -11.5         | 11.9             | 0.09                | 397,375.83         | 530,053.55        |
| 2,300.0      | 0.43       | 290.68               | 2,299.8       | -958.2          | -12.3         | -12.2         | 11.5             | 0.13                | 397,376.20         | 530,052.90        |
| 2,400.0      | 0.40       | 288.62               | 2,399.8       | -858.2          | -12.1         | -12.9         | 11.2             | 0.03                | 397,376.44         | 530,052.21        |
| 2,500.0      | 0.34       | 281.67               | 2,499.8       | -758.2          | -11.9         | -13.5         | 11.0             | 0.07                | 397,376.61         | 530,051.59        |
| 2,600.0      | 0.37       | 279.30               | 2,599.8       | -658.2          | -11.8         | -14.1         | 10.8             | 0.03                | 397,376.73         | 530,050.98        |
| 2,700.0      | 0.37       | 282.79               | 2,699.8       | -558.2          | -11.6         | -14.7         | 10.7             | 0.02                | 397,376.85         | 530,050.35        |
| 2,800.0      | 0.39       | 279.98               | 2,799.8       | -458.2          | -11.5         | -15.4         | 10.5             | 0.03                | 397,376.98         | 530,049.70        |
| 2,900.0      | 0.43       | 259.95               | 2,899.8       | -358.2          | -11.5         | -16.1         | 10.5             | 0.15                | 397,376.97         | 530,049.00        |
| 3,000.0      | 0.45       | 244.85               | 2,999.8       | -258.2          | -11.8         | -16.8         | 10.7             | 0.12                | 397,376.74         | 530,048.27        |
| 3,100.0      | 0.50       | 234.73               | 3,099.8       | -158.2          | -12.2         | -17.5         | 11.0             | 0.10                | 397,376.32         | 530,047.56        |
| 3,200.0      | 0.49       | 229.71               | 3,199.8       | -58.2           | -12.7         | -18.2         | 11.5             | 0.04                | 397,375.80         | 530,046.88        |
| 3,300.0      | 0.47       | 231.33               | 3,299.8       | 41.8            | -13.2         | -18.9         | 12.0             | 0.02                | 397,375.26         | 530,046.23        |
| 3,400.0      | 0.79       | 211.23               | 3,399.8       | 141.8           | -14.1         | -19.5         | 12.8             | 0.38                | 397,374.42         | 530,045.55        |
| 3,500.0      | 0.67       | 203.31               | 3,499.8       | 241.8           | -15.2         | -20.1         | 13.9             | 0.16                | 397,373.29         | 530,044.96        |
| 3,600.0      | 0.91       | 197.29               | 3,599.8       | 341.8           | -16.5         | -20.6         | 15.2             | 0.25                | 397,371.99         | 530,044.50        |
| 3,700.0      | 0.87       | 194.57               | 3,699.8       | 441.8           | -18.0         | -21.0         | 16.6             | 0.06                | 397,370.50         | 530,044.07        |
| 3,800.0      | 0.84       | 199.33               | 3,799.7       | 541.7           | -19.4         | -21.5         | 18.0             | 0.08                | 397,369.08         | 530,043.64        |
| 3,900.0      | 0.77       | 211.19               | 3,899.7       | 641.7           | -20.7         | -22.1         | 19.2             | 0.18                | 397,367.81         | 530,043.05        |
| 4,000.0      | 0.71       | 211.51               | 3,999.7       | 741.7           | -21.8         | -22.7         | 20.3             | 0.06                | 397,366.71         | 530,042.37        |
| 4,100.0      | 0.60       | 152.29               | 4,099.7       | 841.7           | -22.8         | -22.8         | 21.3             | 0.65                | 397,365.71         | 530,042.29        |
| 4,200.0      | 0.81       | 130.41               | 4,199.7       | 941.7           | -23.7         | -22.0         | 22.3             | 0.34                | 397,364.79         | 530,043.07        |
| 4,300.0      | 0.95       | 169.73               | 4,299.7       | 1,041.7         | -25.0         | -21.3         | 23.6             | 0.61                | 397,363.52         | 530,043.76        |
| 4,400.0      | 1.15       | 181.28               | 4,399.7       | 1,141.7         | -26.8         | -21.2         | 25.4             | 0.29                | 397,361.70         | 530,043.89        |
| 4,500.0      | 1.16       | 186.64               | 4,499.7       | 1,241.7         | -28.8         | -21.4         | 27.4             | 0.11                | 397,359.69         | 530,043.75        |
| 4,600.0      | 1.13       | 183.56               | 4,599.6       | 1,341.6         | -30.8         | -21.5         | 29.4             | 0.07                | 397,357.70         | 530,043.57        |
| 4,700.0      | 0.98       | 184.32               | 4,699.6       | 1,441.6         | -32.6         | -21.7         | 31.2             | 0.15                | 397,355.86         | 530,043.44        |



Pathfinder  
Pathfinder X & Y Report

PATHFINDER  
A Schlumberger Company

Company: COG Operating LLC  
Project: Eddy County(NAD27)  
Site: Jack Federal  
Well: #1H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference:  
TVD Reference:  
MD Reference:  
North Reference:  
Survey Calculation Method:  
Database:  
Well #1H  
KB = 17 @ 3258.0usft (Original Well Elev)  
KB = 17 @ 3258.0usft (Original Well Elev)  
Grid  
Minimum Curvature  
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) | Northing<br>(usft) | Easting<br>(usft) |  |
| 4,800.0      | 105        | 177.17               | 4,799.6       | 1,541.6         | -34.4         | -21.7         | 33.0             | 0.14                | 397,354.10         | 530,043.42        |  |
| 4,900.0      | 109        | 173.63               | 4,899.6       | 1,641.6         | -36.3         | -21.5         | 34.8             | 0.08                | 397,352.24         | 530,043.57        |  |
| 5,000.0      | 109        | 185.93               | 4,999.6       | 1,741.6         | -38.2         | -21.5         | 36.7             | 0.23                | 397,350.34         | 530,043.58        |  |
| 5,100.0      | 125        | 193.89               | 5,099.6       | 1,841.6         | -40.2         | -21.9         | 38.7             | 0.23                | 397,348.34         | 530,043.22        |  |
| 5,200.0      | 118        | 194.78               | 5,199.5       | 1,941.5         | -42.2         | -22.4         | 40.7             | 0.07                | 397,346.29         | 530,042.70        |  |
| 5,300.0      | 125        | 194.08               | 5,299.5       | 2,041.5         | -44.3         | -22.9         | 42.7             | 0.07                | 397,344.23         | 530,042.17        |  |
| 5,400.0      | 120        | 206.83               | 5,399.5       | 2,141.5         | -46.3         | -23.7         | 44.7             | 0.28                | 397,342.24         | 530,041.43        |  |
| 5,500.0      | 115        | 215.79               | 5,499.5       | 2,241.5         | -48.0         | -24.7         | 46.3             | 0.19                | 397,340.49         | 530,040.37        |  |
| 5,600.0      | 154        | 244.88               | 5,599.4       | 2,341.4         | -49.4         | -26.5         | 47.6             | 0.77                | 397,339.11         | 530,038.57        |  |
| 5,700.0      | 161        | 251.74               | 5,699.4       | 2,441.4         | -50.4         | -29.1         | 48.4             | 0.20                | 397,338.10         | 530,036.02        |  |
| 5,800.0      | 150        | 246.73               | 5,799.4       | 2,541.4         | -51.4         | -31.6         | 49.2             | 0.17                | 397,337.14         | 530,033.48        |  |
| 5,900.0      | 150        | 244.25               | 5,899.3       | 2,641.3         | -52.4         | -34.0         | 50.2             | 0.06                | 397,336.05         | 530,031.10        |  |
| 6,000.0      | 171        | 215.36               | 5,999.3       | 2,741.3         | -54.2         | -36.0         | 51.8             | 0.83                | 397,334.27         | 530,029.06        |  |
| 6,100.0      | 188        | 209.92               | 6,099.2       | 2,841.2         | -56.9         | -37.7         | 54.4             | 0.24                | 397,331.63         | 530,027.38        |  |
| 6,200.0      | 246        | 220.78               | 6,199.2       | 2,941.2         | -59.9         | -39.9         | 57.3             | 0.71                | 397,328.58         | 530,025.16        |  |
| 6,300.0      | 277        | 223.44               | 6,299.1       | 3,041.1         | -63.3         | -43.0         | 60.4             | 0.33                | 397,325.20         | 530,022.09        |  |
| 6,400.0      | 3.01       | 224.91               | 6,398.9       | 3,140.9         | -66.9         | -46.5         | 63.8             | 0.25                | 397,321.59         | 530,018.58        |  |
| 6,500.0      | 2.86       | 235.30               | 6,498.8       | 3,240.8         | -70.2         | -50.4         | 66.8             | 0.55                | 397,318.31         | 530,014.67        |  |
| 6,600.0      | 2.45       | 235.44               | 6,598.7       | 3,340.7         | -72.8         | -54.2         | 69.2             | 0.41                | 397,315.68         | 530,010.86        |  |
| 6,700.0      | 2.06       | 229.01               | 6,698.6       | 3,440.6         | -75.2         | -57.4         | 71.4             | 0.46                | 397,313.28         | 530,007.74        |  |
| 6,800.0      | 1.95       | 218.21               | 6,798.6       | 3,540.6         | -77.7         | -59.8         | 73.8             | 0.39                | 397,310.77         | 530,005.34        |  |
| 6,900.0      | 2.91       | 207.85               | 6,898.5       | 3,640.5         | -81.3         | -62.0         | 77.2             | 1.05                | 397,307.19         | 530,003.10        |  |
| 7,000.0      | 2.91       | 215.10               | 6,998.3       | 3,740.3         | -85.6         | -64.6         | 81.3             | 0.37                | 397,302.87         | 530,000.45        |  |
| 7,100.0      | 2.47       | 219.69               | 7,098.2       | 3,840.2         | -89.4         | -67.5         | 84.9             | 0.49                | 397,299.13         | 529,997.62        |  |
| 7,200.0      | 1.71       | 211.75               | 7,198.2       | 3,940.2         | -92.3         | -69.6         | 87.7             | 0.81                | 397,296.20         | 529,995.45        |  |
| 7,300.0      | 0.96       | 189.54               | 7,298.1       | 4,040.1         | -94.4         | -70.6         | 89.7             | 0.90                | 397,294.11         | 529,994.53        |  |
| 7,400.0      | 0.78       | 167.40               | 7,398.1       | 4,140.1         | -95.9         | -70.6         | 91.2             | 0.38                | 397,292.62         | 529,994.54        |  |



Pathfinder  
Pathfinder X & Y Report

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A Schlumberger Company

Company: COG Operating LLC  
Project: Eddy County(NAD27)  
Site: Jack Federal  
Well: #1H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Well #1H  
TVD Reference: KB = 17 @ 3258 0usft (Original Well Elev)  
MD Reference: KB = 17 @ 3258 0usft (Original Well Elev)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
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) | Northing<br>(usft) | Easting<br>(usft) |
|--------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|--------------------|-------------------|
| 7,500 0      | 0 48       | 172 03               | 7,498 1       | 4,240.1         | -97 0         | -70 4         | 92 3             | 0 30                | 397,291 54         | 529,994 75        |
| 7,600 0      | 0 62       | 221 96               | 7,598 1       | 4,340 1         | -97 8         | -70 7         | 93.1             | 0 48                | 397,290.72         | 529,994 44        |
| 7,700 0      | 1 04       | 197.95               | 7,698 1       | 4,440 1         | -99 0         | -71 3         | 94 3             | 0 54                | 397,289.46         | 529,993 80        |
| 7,800.0      | 1 65       | 180 16               | 7,798.1       | 4,540.1         | -101 3        | -71.6         | 96 6             | 0 73                | 397,287 15         | 529,993 52        |
| 7,900 0      | 2 05       | 161 69               | 7,898 0       | 4,640.0         | -104.5        | -71.0         | 99 7             | 0 71                | 397,284.02         | 529,994 08        |
| 8,000 0      | 1 56       | 150.56               | 7,998 0       | 4,740.0         | -107.4        | -69.8         | 102.7            | 0 60                | 397,281 13         | 529,995 31        |
| 8,100 0      | 0 75       | 125 76               | 8,098.0       | 4,840.0         | -108 9        | -68 6         | 104.3            | 0 93                | 397,279.57         | 529,996.51        |
| 8,200 0      | 0 60       | 106 08               | 8,198.0       | 4,940.0         | -109.5        | -67.6         | 104.9            | 0 27                | 397,279.04         | 529,997 54        |
| 8,300 0      | 0 25       | 70 16                | 8,298 0       | 5,040 0         | -109 5        | -66 9         | 105 1            | 0 42                | 397,278 97         | 529,998 25        |
| 8,400.0      | 0 31       | 35 45                | 8,397.9       | 5,139 9         | -109 2        | -66 5         | 104 8            | 0 18                | 397,279.26         | 529,998.61        |
| 8,500 0      | 0 30       | 18 88                | 8,497.9       | 5,239 9         | -108 8        | -66 2         | 104 3            | 0 09                | 397,279.73         | 529,998 85        |
| 8,600.0      | 0 30       | 29 12                | 8,597 9       | 5,339 9         | -108 3        | -66 0         | 103 9            | 0 05                | 397,280 21         | 529,999 07        |
| 8,700 0      | 0 36       | 33.37                | 8,697 9       | 5,439 9         | -107 8        | -65 7         | 103.4            | 0 06                | 397,280.70         | 529,999.37        |
| 8,800 0      | 0 94       | 32.73                | 8,797 9       | 5,539 9         | -106.9        | -65 1         | 102.5            | 0 58                | 397,281 65         | 529,999 98        |
| 8,900 0      | 0 96       | 33 66                | 8,897 9       | 5,639 9         | -105.5        | -64 2         | 101 2            | 0 03                | 397,283 04         | 530,000 89        |
| 9,000 0      | 1 06       | 11 53                | 8,997 9       | 5,739.9         | -103 9        | -63 6         | 99 6             | 0 40                | 397,284 64         | 530,001 54        |
| 9,100 0      | 1 09       | 1.88                 | 9,097.9       | 5,839 9         | -102 0        | -63.3         | 97.8             | 0 18                | 397,286 50         | 530,001.76        |
| 9,151 0      | 1 41       | 124 93               | 9,148.9       | 5,890 9         | -101 9        | -62.8         | 97.7             | 4 32                | 397,286.62         | 530,002 29        |
| 9,183 0      | 4 84       | 143 73               | 9,180.8       | 5,922 8         | -103 2        | -61.7         | 99.1             | 11 05               | 397,285.31         | 530,003 41        |
| 9,215 0      | 7 74       | 151 09               | 9,212 6       | 5,954 6         | -106 2        | -59 9         | 102.1            | 9 39                | 397,282.33         | 530,005.25        |
| 9,247 0      | 10 82      | 156 02               | 9,244.2       | 5,986 2         | -110 8        | -57 6         | 106 9            | 9 93                | 397,277.70         | 530,007.51        |
| 9,277 0      | 14 07      | 158 16               | 9,273.5       | 6,015 5         | -116 8        | -55 1         | 113 0            | 10 94               | 397,271.74         | 530,010.01        |
| 9,309 0      | 17 67      | 158 89               | 9,304.3       | 6,046 3         | -124 9        | -51.9         | 121 3            | 11 27               | 397,263 60         | 530,013.21        |
| 9,340 0      | 21 72      | 159.05               | 9,333 5       | 6,075.5         | -134 7        | -48 1         | 131 3            | 13 07               | 397,253 85         | 530,016 96        |
| 9,372 0      | 25 59      | 158.79               | 9,362 8       | 6,104.8         | -146 6        | -43 5         | 143.6            | 12.10               | 397,241.87         | 530,021 58        |
| 9,404 0      | 29 11      | 156 25               | 9,391 2       | 6,133.2         | -160 2        | -37 9         | 157 5            | 11.59               | 397,228 30         | 530,027 21        |
| 9,436 0      | 32 45      | 154 20               | 9,418 7       | 6,160 7         | -175 1        | -31 0         | 172 7            | 10 94               | 397,213.44         | 530,034 09        |



Pathfinder  
Pathfinder X & Y Report



A Schlumberger Company

Company: COG Operating LLC  
Project: Eddy County(NAD27)  
Site: Jack Federal  
Well: #1H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference:  
TVD Reference:  
MD Reference:  
North Reference:  
Survey Calculation Method:  
Database:  
Well #1H  
KB = 17 @ 3258.0usft (Original Well Elev)  
KB = 17 @ 3258.0usft (Original Well Elev)  
Grid  
Minimum Curvature  
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) | Northing<br>(usft) | Easting<br>(usft) |  |  |
| 9,467.0      | 36.32      | 154.02               | 9,444.3       | 6,186.3         | -190.8        | -23.4         | 188.9            | 12.49               | 397,197.69         | 530,041.73        |  |  |
| 9,499.0      | 40.63      | 153.96               | 9,469.3       | 6,211.3         | -208.7        | -14.6         | 207.3            | 13.47               | 397,179.81         | 530,050.46        |  |  |
| 9,530.0      | 44.23      | 154.14               | 9,492.2       | 6,234.2         | -227.5        | -5.5          | 226.7            | 11.62               | 397,161.00         | 530,059.61        |  |  |
| 9,562.0      | 47.31      | 154.73               | 9,514.5       | 6,256.5         | -248.2        | 4.4           | 248.0            | 9.72                | 397,140.32         | 530,069.50        |  |  |
| 9,593.0      | 50.39      | 155.22               | 9,534.9       | 6,276.9         | -269.3        | 14.3          | 269.7            | 10.01               | 397,119.17         | 530,079.37        |  |  |
| 9,625.0      | 54.78      | 155.85               | 9,554.3       | 6,296.3         | -292.5        | 24.8          | 293.4            | 13.81               | 397,096.04         | 530,089.89        |  |  |
| 9,657.0      | 58.74      | 155.82               | 9,571.9       | 6,313.9         | -316.9        | 35.7          | 318.5            | 12.38               | 397,071.62         | 530,100.85        |  |  |
| 9,688.0      | 61.73      | 155.97               | 9,587.3       | 6,329.3         | -341.4        | 46.7          | 343.7            | 9.65                | 397,047.06         | 530,111.83        |  |  |
| 9,719.0      | 64.28      | 156.22               | 9,601.3       | 6,343.3         | -366.7        | 57.9          | 369.6            | 8.26                | 397,021.81         | 530,123.03        |  |  |
| 9,750.0      | 67.36      | 156.07               | 9,614.0       | 6,356.0         | -392.5        | 69.4          | 396.2            | 9.95                | 396,995.95         | 530,134.46        |  |  |
| 9,828.0      | 72.81      | 158.23               | 9,640.6       | 6,382.6         | -460.1        | 97.8          | 465.4            | 7.46                | 396,928.39         | 530,162.90        |  |  |
| 9,859.0      | 76.77      | 153.20               | 9,648.7       | 6,390.7         | -487.4        | 110.1         | 493.4            | 20.20               | 396,901.15         | 530,175.21        |  |  |
| 9,891.0      | 81.34      | 152.80               | 9,654.8       | 6,396.8         | -515.3        | 124.4         | 522.2            | 14.33               | 396,873.16         | 530,189.47        |  |  |
| 9,923.0      | 84.06      | 158.90               | 9,658.9       | 6,400.9         | -544.3        | 137.3         | 551.9            | 20.73               | 396,844.21         | 530,202.45        |  |  |
| 9,954.0      | 85.03      | 159.14               | 9,661.8       | 6,403.8         | -573.1        | 148.4         | 581.4            | 3.22                | 396,815.40         | 530,213.49        |  |  |
| 9,985.0      | 85.21      | 157.95               | 9,664.4       | 6,406.4         | -601.8        | 159.7         | 610.8            | 3.87                | 396,786.65         | 530,224.79        |  |  |
| 10,017.0     | 86.44      | 161.50               | 9,666.8       | 6,408.8         | -631.8        | 170.7         | 641.4            | 11.71               | 396,756.72         | 530,235.85        |  |  |
| 10,049.0     | 87.93      | 161.29               | 9,668.4       | 6,410.4         | -662.1        | 180.9         | 672.3            | 4.70                | 396,726.43         | 530,246.05        |  |  |
| 10,080.0     | 88.99      | 161.06               | 9,669.2       | 6,411.2         | -691.4        | 190.9         | 702.2            | 3.50                | 396,697.10         | 530,256.05        |  |  |
| 10,112.0     | 88.90      | 159.01               | 9,669.8       | 6,411.8         | -721.5        | 201.9         | 732.9            | 6.41                | 396,667.03         | 530,266.97        |  |  |
| 10,144.0     | 88.90      | 161.57               | 9,670.4       | 6,412.4         | -751.6        | 212.7         | 763.6            | 8.00                | 396,636.91         | 530,277.76        |  |  |
| 10,175.0     | 90.66      | 158.67               | 9,670.5       | 6,412.5         | -780.7        | 223.2         | 793.4            | 10.94               | 396,607.76         | 530,288.30        |  |  |
| 10,239.0     | 91.01      | 161.57               | 9,669.6       | 6,411.6         | -840.9        | 245.0         | 854.8            | 4.56                | 396,547.59         | 530,310.06        |  |  |
| 10,333.0     | 92.95      | 163.63               | 9,666.3       | 6,408.3         | -930.5        | 273.0         | 946.0            | 3.01                | 396,457.95         | 530,338.15        |  |  |
| 10,429.0     | 91.10      | 174.17               | 9,662.9       | 6,404.9         | -1,024.6      | 291.5         | 1,041.0          | 11.14               | 396,363.95         | 530,356.59        |  |  |
| 10,492.0     | 86.44      | 179.56               | 9,664.3       | 6,406.3         | -1,087.4      | 294.9         | 1,104.0          | 11.31               | 396,301.09         | 530,360.03        |  |  |
| 10,618.0     | 92.07      | 183.94               | 9,665.9       | 6,407.9         | -1,213.3      | 291.1         | 1,229.3          | 5.66                | 396,175.25         | 530,356.18        |  |  |



Pathfinder  
Pathfinder X & Y Report

**PATHFINDER**  
A Schlumberger Company

Company: COG Operating LLC  
Project: Eddy County(NAD27)  
Site: Jack Federal  
Well: #1H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Well #1H  
TVD Reference: KB = 17 @ 3258.0usft (Original Well Elev)  
MD Reference: KB = 17 @ 3258.0usft (Original Well Elev)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
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) | Northing<br>(usft) | Easting<br>(usft) |  |
| 10,713.0     | 89 52      | 185 64               | 9,664.6       | 6,406 6         | -1,307 9      | 283.2         | 1,323.3          | 3 23                | 396,080 60         | 530,348 25        |  |
| 10,808 0     | 90 66      | 183.65               | 9,664 4       | 6,406.4         | -1,402 6      | 275 5         | 1,417 3          | 2 41                | 395,985 92         | 530,340 56        |  |
| 10,903 0     | 92 07      | 185 73               | 9,662 2       | 6,404.2         | -1,497 2      | 267 7         | 1,511 2          | 2.64                | 395,891 27         | 530,332.80        |  |
| 10,998 0     | 90 31      | 184 15               | 9,660 2       | 6,402 2         | -1,591 9      | 259 5         | 1,605 1          | 2.49                | 395,796 65         | 530,324 62        |  |
| 11,093 0     | 89.25      | 181 99               | 9,660 6       | 6,402 6         | -1,686 7      | 254 4         | 1,699 5          | 2 53                | 395,701 79         | 530,319 53        |  |
| 11,189 0     | 89 08      | 177.87               | 9,662.0       | 6,404.0         | -1,782.7      | 254 5         | 1,795.3          | 4 29                | 395,605.82         | 530,319.65        |  |
| 11,284 0     | 89 43      | 179.21               | 9,663.2       | 6,405.2         | -1,877 6      | 257 0         | 1,890 2          | 1 46                | 395,510 86         | 530,322 07        |  |
| 11,379 0     | 89 43      | 177.91               | 9,664 2       | 6,406 2         | -1,972 6      | 259.4         | 1,985 1          | 1 37                | 395,415 90         | 530,324.45        |  |
| 11,473 0     | 89 52      | 178 00               | 9,665 0       | 6,407 0         | -2,066 5      | 262.7         | 2,079 1          | 0 14                | 395,321 97         | 530,327.81        |  |
| 11,570 0     | 89 16      | 179 08               | 9,666.1       | 6,408 1         | -2,163.5      | 265 2         | 2,176 0          | 1 17                | 395,225.00         | 530,330.28        |  |
| 11,665 0     | 88 90      | 177 46               | 9,667.7       | 6,409.7         | -2,258 4      | 268.0         | 2,270 9          | 1 73                | 395,130 07         | 530,333 15        |  |
| 11,760 0     | 88 81      | 176 87               | 9,669 6       | 6,411 6         | -2,353 3      | 272 7         | 2,365 9          | 0 63                | 395,035 20         | 530,337 85        |  |
| 11,856 0     | 89.78      | 178.93               | 9,670 8       | 6,412.8         | -2,449 2      | 276 3         | 2,461.8          | 2 37                | 394,939 28         | 530,341 36        |  |
| 11,949 0     | 90 66      | 180.47               | 9,670 5       | 6,412 5         | -2,542 2      | 276.7         | 2,554 7          | 1 91                | 394,846.28         | 530,341 85        |  |
| 12,045 0     | 90 48      | 179 99               | 9,669 5       | 6,411.5         | -2,638.2      | 276.4         | 2,650.5          | 0 53                | 394,750.29         | 530,341.46        |  |
| 12,140 0     | 90 22      | 180 78               | 9,668.9       | 6,410 9         | -2,733 2      | 275 7         | 2,745.2          | 0 88                | 394,655.30         | 530,340 83        |  |
| 12,235.0     | 90 57      | 180 11               | 9,668.3       | 6,410 3         | -2,828.2      | 275 0         | 2,840 0          | 0.80                | 394,560 30         | 530,340.09        |  |
| 12,330 0     | 88 64      | 178 42               | 9,668 9       | 6,410 9         | -2,923.2      | 276 2         | 2,934 8          | 2 70                | 394,465 32         | 530,341.31        |  |
| 12,425 0     | 89 60      | 178.63               | 9,670 4       | 6,412.4         | -3,018 1      | 278 7         | 3,029 8          | 1 03                | 394,370 36         | 530,343.75        |  |
| 12,520 0     | 89 96      | 179.74               | 9,670 8       | 6,412 8         | -3,113 1      | 280 0         | 3,124 6          | 1 23                | 394,275 37         | 530,345.10        |  |
| 12,615 0     | 90.31      | 180 23               | 9,670 5       | 6,412.5         | -3,208 1      | 280 0         | 3,219 4          | 0 63                | 394,180 38         | 530,345.13        |  |
| 12,711 0     | 90 48      | 179 12               | 9,669 9       | 6,411 9         | -3,304.1      | 280 6         | 3,315.3          | 1 17                | 394,084 38         | 530,345 67        |  |
| 12,806 0     | 91 19      | 181 13               | 9,668 5       | 6,410 5         | -3,399 1      | 280 4         | 3,410 1          | 2 24                | 393,989 40         | 530,345 46        |  |
| 12,901 0     | 91 71      | 180 79               | 9,666 1       | 6,408 1         | -3,494 1      | 278 8         | 3,504.7          | 0.65                | 393,894 44         | 530,343 87        |  |
| 12,996 0     | 91 01      | 180 39               | 9,663 8       | 6,405 8         | -3,589 0      | 277 8         | 3,599.4          | 0.85                | 393,799.47         | 530,342.90        |  |
| 13,091 0     | 90 84      | 181 75               | 9,662 3       | 6,404 3         | -3,684 0      | 276.0         | 3,694 1          | 1 44                | 393,704 50         | 530,341 12        |  |
| 13,186 0     | 91 01      | 181 91               | 9,660 8       | 6,402 8         | -3,778 9      | 273 0         | 3,788.6          | 0 25                | 393,609 57         | 530,338.09        |  |



Pathfinder  
Pathfinder X & Y Report

**PATHFINDER**  
A Schlumberger Company

Company: COG Operating LLC  
Project: Eddy County(NAD27)  
Site: Jack Federal  
Well: #1H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Well #1H  
TVD Reference: KB = 17 @ 3258.0usft (Original Well Elev)  
MD Reference: KB = 17 @ 3258.0usft (Original Well Elev)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
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) | Northing<br>(usft) | Easting<br>(usft) |
|--------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|--------------------|-------------------|
| 13,282.0     | 91.80      | 182.80               | 9,658.4       | 6,400.4         | -3,874.8      | 269.0         | 3,884.1          | 1.24                | 393,513.68         | 530,334.15        |
| 13,377.0     | 90.40      | 184.20               | 9,656.6       | 6,398.6         | -3,969.6      | 263.2         | 3,978.3          | 2.08                | 393,418.88         | 530,328.35        |
| 13,471.0     | 89.87      | 183.02               | 9,656.4       | 6,398.4         | -4,063.4      | 257.3         | 4,071.6          | 1.38                | 393,325.07         | 530,322.43        |
| 13,566.0     | 90.57      | 180.22               | 9,656.0       | 6,398.0         | -4,158.4      | 254.6         | 4,166.2          | 3.04                | 393,230.11         | 530,319.74        |
| 13,679.0     | 90.57      | 180.22               | 9,654.9       | 6,396.9         | -4,271.4      | 254.2         | 4,278.9          | 0.00                | 393,117.12         | 530,319.31        |

Design Annotations

| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 | Comment                                                                       |
|-----------------------------|-----------------------------|-------------------|-----------------|-------------------------------------------------------------------------------|
|                             |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) |                                                                               |
| 9,183.0                     | 9,180.8                     | -103.2            | -61.7           | KOP - 9183.0 'MD, 9180.8 'TVD, 143.73 'AZI, 4.84 'INC, -103.2 'N, -61.7 'E    |
| 10,080.0                    | 9,669.2                     | -691.4            | 190.9           | LP - 10080.0 'MD, 9669.2 'TVD, 161.06 'AZI, 88.99 'INC, -691.4 'N, 190.9 'E   |
| 13,679.0                    | 9,654.9                     | -4,271.4          | 254.2           | BHL - 13679.0 'MD, 9654.9 'TVD, 180.22 'AZI, 90.57 'INC, -4271.4 'N, 254.2 'E |

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



Project: Eddy County(NA)  
 Site: Jack Federal  
 Well: #1H  
 Wellbore: OH  
 Plan: Post Gyro Plan #3 (#1H/OH)

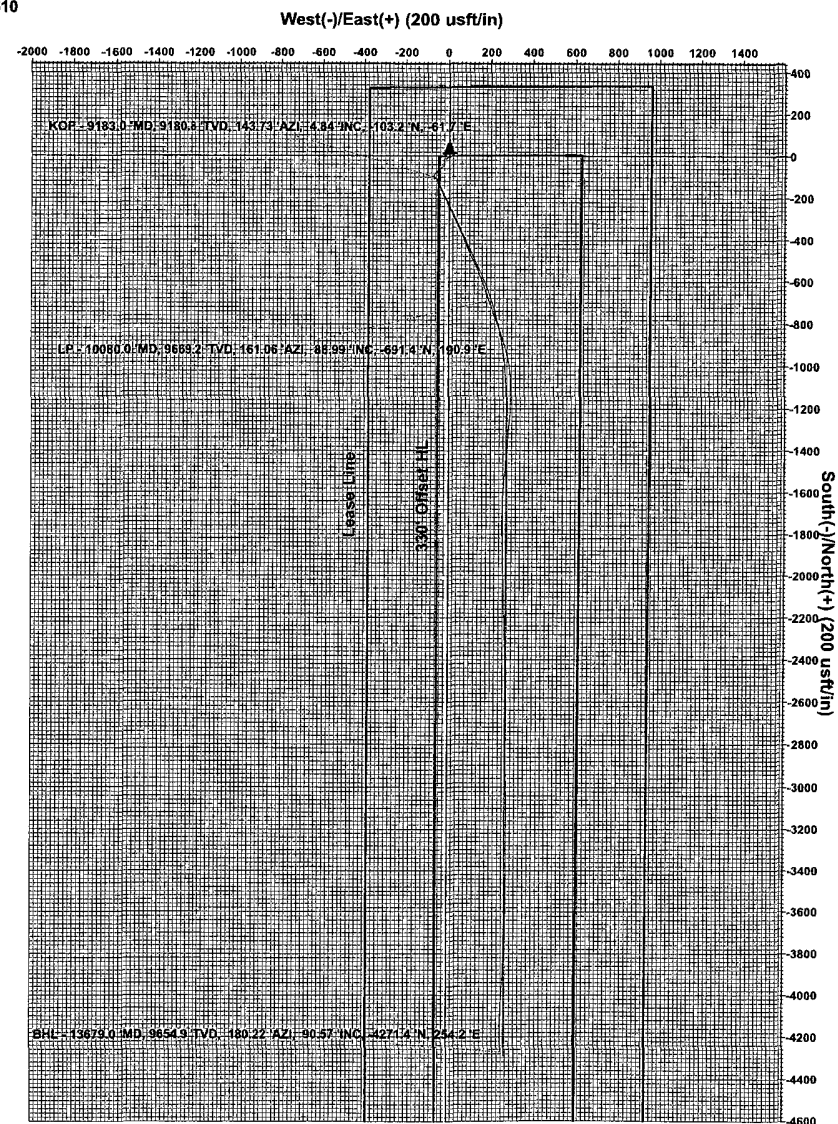
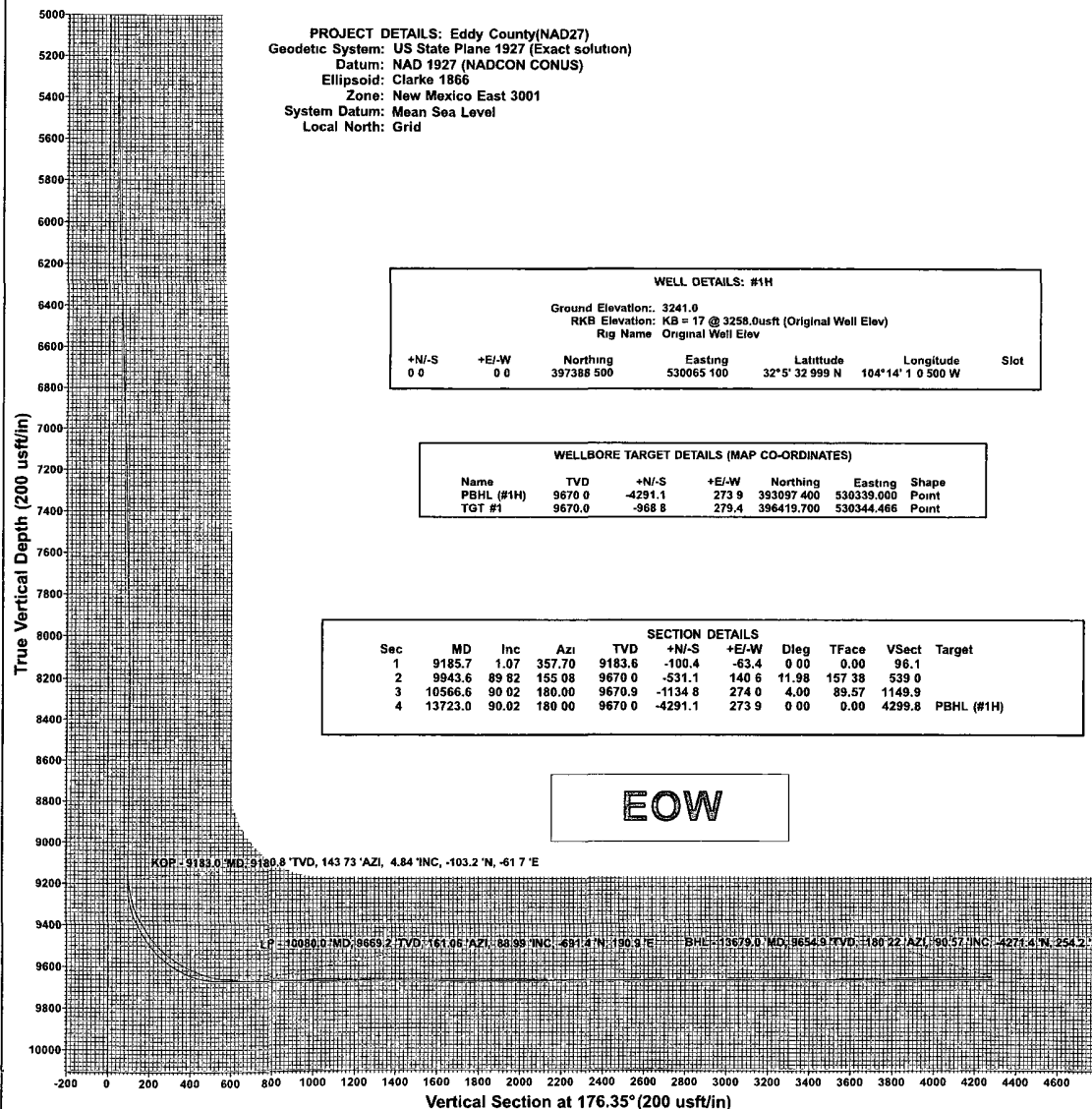


Azimuths to Grid North  
 True North: -0.05°  
 Magnetic North: 7.78°

Magnetic Field  
 Strength: 48471.9nT  
 Dip Angle: 59.96°  
 Date: 10/6/2011  
 Model: IGRF200510

**PATHFINDER**

A Schlumberger Company



Plan: Post Gyro Plan #3 (#1H/OH)

Created By: Michael Trout Date: 13 26, February 07 2012

Checked: \_\_\_\_\_ Date: \_\_\_\_\_