

# COG OPERATING

Red Bluff  
Eddy County, NM  
SRO State Unit Com #11H  
VH - Job #32K12111223

Survey: Gyro

## SDI Standard Survey Report

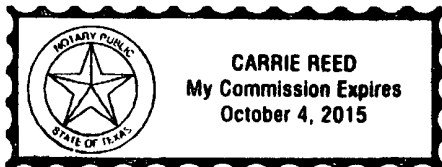
This survey is correct to the best of my knowledge and is supported by actual field data.

*Robert*

Notarized this date 31st of December, 2011.

*Carrie Reed*

Notary Signature  
County of Midland  
State of Texas



## Scientific Drilling International, Inc.

SDI Standard Survey Report



|                  |                         |                                     |                                     |
|------------------|-------------------------|-------------------------------------|-------------------------------------|
| <b>Company:</b>  | COG OPERATING           | <b>Local Co-ordinate Reference:</b> | Well SRO State Unit Com #11H        |
| <b>Project:</b>  | Red Bluff               | <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>     | SRO State Unit Com #11H | <b>North Reference:</b>             | Grid                                |
| <b>Wellbore:</b> | VH - Job #32K12111223   | <b>Survey Calculation Method:</b>   | Minimum Curvature                   |
| <b>Design:</b>   | VH - Job #32K12111223   | <b>Database:</b>                    | EDM-Regulatory                      |

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project     | Red Bluff                            |               |                |
| Map System: | US State Plane 1927 (Exact solution) | System Datum: | Mean Sea Level |
| Geo Datum:  | NAD 1927 (NADCON CONUS)              |               |                |
| Map Zone:   | New Mexico East 3001                 |               |                |

|                       |          |                 |                 |                   |                  |
|-----------------------|----------|-----------------|-----------------|-------------------|------------------|
| Site                  |          | Eddy County, NM |                 |                   |                  |
| Site Position:        |          | Northing:       | 403,456.01 usft | Latitude:         | 32° 6' 32.400 N  |
| From:                 | Lat/Long | Easting:        | 572,556.11 usft | Longitude:        | 104° 5' 56.400 W |
| Position Uncertainty: | 0.0 usft | Slot Radius:    | 13-3/16"        | Grid Convergence: | 0.12 °           |

|                      |                                                   |          |                     |                 |               |                  |
|----------------------|---------------------------------------------------|----------|---------------------|-----------------|---------------|------------------|
| Well                 | SRO State Unit Com #11H, Directional (Pathfinder) |          |                     |                 |               |                  |
| Well Position        | +N/-S                                             | 0 0 usft | Northing:           | 392,919.46 usft | Latitude:     | 32° 4' 48 000 N  |
|                      | +E/-W                                             | 0 0 usft | Easting:            | 578,154 11 usft | Longitude:    | 104° 4' 51 600 W |
| Position Uncertainty |                                                   | 0 0 usft | Wellhead Elevation: | usft            | Ground Level: | 0 0 usft         |

|           |                       |             |                    |                  |                        |
|-----------|-----------------------|-------------|--------------------|------------------|------------------------|
| Wellbore  | VH - Job #32K12111223 |             |                    |                  |                        |
| Magnetics | Model Name            | Sample Date | Declination<br>(°) | Dip Angle<br>(°) | Field Strength<br>(nT) |
|           | IGRF2010              | 12/15/2011  | 7 75               | 59 95            | 48,448                 |

|                   |                            |                       |                 |                   |
|-------------------|----------------------------|-----------------------|-----------------|-------------------|
| Design            |                            | VH - Job #32K12111223 |                 |                   |
| 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             | 0.39              |

|                |              |                              |           |             |  |
|----------------|--------------|------------------------------|-----------|-------------|--|
| Survey Program |              | Date                         | 1/22/2012 |             |  |
| From<br>(usft) | To<br>(usft) | Survey (Wellbore)            | Tool Name | Description |  |
| 100 0          | 9,523 0      | Gyro (VH - Job #32K12111223) | Keeper    | Keeper Gyro |  |

| 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) |
| 0 0                      | 0 00               | 0 00           | 0 0                    | 0 0                   | 0 0                 | 0 00                   | 0 0                        |
| 100 0                    | 0 31               | 240.82         | 100.0                  | -0 1                  | -0 2                | 240 82                 | 0 3                        |
| 200 0                    | 0 46               | 236 27         | 200 0                  | -0 5                  | -0 8                | 238 88                 | 0 9                        |
| 300 0                    | 0 08               | 164 35         | 300 0                  | -0 8                  | -1 1                | 235 29                 | 1 4                        |
| 400 0                    | 0 07               | 115 70         | 400 0                  | -0 9                  | -1 0                | 230 27                 | 1 4                        |
| 500 0                    | 0 20               | 4 36           | 500.0                  | -0 7                  | -1 0                | 233 56                 | 1 2                        |
| 600 0                    | 0 13               | 339 31         | 600 0                  | -0 4                  | -1 0                | 246 24                 | 1 1                        |
| 700 0                    | 0 38               | 309 63         | 700 0                  | -0 1                  | -1 3                | 264 50                 | 1 3                        |
| 800 0                    | 0 87               | 296 44         | 800 0                  | 0 4                   | -2 2                | 280 74                 | 2 3                        |
| 900 0                    | 0 68               | 293 84         | 900 0                  | 1 0                   | -3 5                | 286 16                 | 3 6                        |
| 1,000 0                  | 0 53               | 277 69         | 1,000.0                | 1 3                   | -4 5                | 286 30                 | 4 6                        |
| 1,100 0                  | 0 33               | 267 63         | 1,100 0                | 1 4                   | -5 2                | 284 58                 | 5 4                        |

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## SDI Standard Survey Report



|                  |                         |                                     |                                     |
|------------------|-------------------------|-------------------------------------|-------------------------------------|
| <b>Company:</b>  | COG OPERATING           | <b>Local Co-ordinate Reference:</b> | Well SRO State Unit Com #11H        |
| <b>Project:</b>  | Red Bluff               | <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>     | SRO State Unit Com #11H | <b>North Reference:</b>             | Grid                                |
| <b>Wellbore:</b> | VH - Job #32K12111223   | <b>Survey Calculation Method:</b>   | Minimum Curvature                   |
| <b>Design:</b>   | VH - Job #32K12111223   | <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                  | 0 30               | 315 57         | 1,200 0                | 1 5                   | -5 7                | 285 07                 | 5 9                        |
| 1,300 0                  | 0 24               | 305 23         | 1,300 0                | 1 8                   | -6 0                | 286 94                 | 6 3                        |
| 1,400 0                  | 0 32               | 299 77         | 1,400 0                | 2 1                   | -6 4                | 288 02                 | 6 8                        |
| 1,500 0                  | 0 30               | 284 79         | 1,500 0                | 2 3                   | -6 9                | 288 35                 | 7 3                        |
| 1,600 0                  | 0 34               | 301 10         | 1,600 0                | 2 5                   | -7 4                | 288 71                 | 7 9                        |
| 1,700 0                  | 0 23               | 357 05         | 1,700 0                | 2 9                   | -7 7                | 290 45                 | 8 2                        |
| 1,800 0                  | 1 57               | 66 58          | 1,799 9                | 3 6                   | -6 5                | 299 25                 | 7 4                        |
| 1,900 0                  | 2 94               | 72 75          | 1,899 9                | 4 9                   | -2 8                | 330 74                 | 5 6                        |
| 2,000 0                  | 4 09               | 70 31          | 1,999 7                | 6 9                   | 3 0                 | 23 87                  | 7 5                        |
| 2,100 0                  | 4 45               | 76 37          | 2,099 4                | 9 0                   | 10 2                | 48 50                  | 13 6                       |
| 2,200 0                  | 4 24               | 81 91          | 2,199 1                | 10 4                  | 17 6                | 59 34                  | 20 5                       |
| 2,300 0                  | 2 79               | 80 74          | 2,298 9                | 11 3                  | 23 7                | 64 38                  | 26 2                       |
| 2,400 0                  | 1 58               | 86 50          | 2,398 9                | 11 8                  | 27 4                | 66 69                  | 29 9                       |
| 2,500 0                  | 1 19               | 76 46          | 2,498 8                | 12 2                  | 29 8                | 67 84                  | 32 2                       |
| 2,600 0                  | 1 10               | 76 06          | 2,598 8                | 12 6                  | 31 8                | 68 33                  | 34 2                       |
| 2,700 0                  | 1 07               | 72 72          | 2,698 8                | 13 1                  | 33 6                | 68 65                  | 36 1                       |
| 2,800 0                  | 0 94               | 66 46          | 2,798 8                | 13 7                  | 35 2                | 68 70                  | 37 8                       |
| 2,900 0                  | 0 81               | 61 06          | 2,898 8                | 14 4                  | 36 6                | 68 51                  | 39 3                       |
| 3,000 0                  | 0 75               | 70 93          | 2,998 7                | 15 0                  | 37 8                | 68 42                  | 40 7                       |
| 3,100 0                  | 0 57               | 59 07          | 3,098 7                | 15 4                  | 38 9                | 68 35                  | 41 8                       |
| 3,200 0                  | 0 46               | 53 89          | 3,198 7                | 15 9                  | 39 6                | 68 11                  | 42 7                       |
| 3,300 0                  | 0 31               | 58 78          | 3,298 7                | 16 3                  | 40 2                | 67 92                  | 43 4                       |
| 3,400 0                  | 0 19               | 72 60          | 3,398 7                | 16 5                  | 40 6                | 67 88                  | 43 8                       |
| 3,500 0                  | 0 18               | 77 71          | 3,498 7                | 16 6                  | 40 9                | 67 94                  | 44 1                       |
| 3,600 0                  | 0 14               | 18 17          | 3,598 7                | 16 7                  | 41 1                | 67 85                  | 44 4                       |
| 3,700 0                  | 0 22               | 356 48         | 3,698 7                | 17 0                  | 41 1                | 67 50                  | 44 5                       |
| 3,800 0                  | 0 24               | 346 74         | 3,798 7                | 17 4                  | 41 1                | 67 00                  | 44 6                       |
| 3,900 0                  | 0 24               | 327 18         | 3,898 7                | 17 8                  | 40 9                | 66 47                  | 44 6                       |
| 4,000 0                  | 0 31               | 296 00         | 3,998 7                | 18 1                  | 40 5                | 65 94                  | 44 4                       |
| 4,100 0                  | 0 38               | 266 25         | 4,098 7                | 18 2                  | 40 0                | 65 51                  | 43 9                       |
| 4,200 0                  | 0 54               | 248 25         | 4,198 7                | 18 0                  | 39 2                | 65 33                  | 43 1                       |
| 4,300 0                  | 0 53               | 245 04         | 4,298 7                | 17 6                  | 38 3                | 65 30                  | 42 2                       |
| 4,400 0                  | 0 52               | 252 19         | 4,398 7                | 17 3                  | 37 5                | 65 23                  | 41 3                       |
| 4,500 0                  | 0 62               | 217 22         | 4,498 7                | 16 7                  | 36 7                | 65 51                  | 40 4                       |
| 4,600 0                  | 0 69               | 210 44         | 4,598 7                | 15 8                  | 36 1                | 66 39                  | 39 4                       |
| 4,700 0                  | 0 69               | 214 28         | 4,698 7                | 14 8                  | 35 5                | 67 39                  | 38 4                       |
| 4,800 0                  | 0 64               | 214 06         | 4,798 7                | 13 8                  | 34 8                | 68 36                  | 37 4                       |
| 4,900 0                  | 0 73               | 216 19         | 4,898 7                | 12 8                  | 34 1                | 69 39                  | 36 4                       |
| 5,000 0                  | 0 77               | 221 16         | 4,998 7                | 11 8                  | 33 3                | 70 47                  | 35 3                       |
| 5,100 0                  | 0 84               | 217 33         | 5,098 7                | 10 7                  | 32 4                | 71 70                  | 34 1                       |
| 5,200 0                  | 0 76               | 217 74         | 5,198 7                | 9 6                   | 31 6                | 73 06                  | 33 0                       |
| 5,300 0                  | 0 93               | 211 91         | 5,298 6                | 8 4                   | 30 7                | 74 71                  | 31 9                       |
| 5,400 0                  | 0 83               | 211 82         | 5,398 6                | 7 1                   | 29 9                | 76 66                  | 30 7                       |
| 5,500 0                  | 0 93               | 208 83         | 5,498 6                | 5 8                   | 29 1                | 78 80                  | 29 7                       |

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SDI Standard Survey Report



|                  |                         |                                     |                                     |
|------------------|-------------------------|-------------------------------------|-------------------------------------|
| <b>Company:</b>  | COG OPERATING           | <b>Local Co-ordinate Reference:</b> | Well SRO State Unit Com #11H        |
| <b>Project:</b>  | Red Bluff               | <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>     | SRO State Unit Com #11H | <b>North Reference:</b>             | Grid                                |
| <b>Wellbore:</b> | VH - Job #32K12111223   | <b>Survey Calculation Method:</b>   | Minimum Curvature                   |
| <b>Design:</b>   | VH - Job #32K12111223   | <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                  | 0 92               | 206 56         | 5,598 6                | 4 3                   | 28 4                | 81 31                  | 28 7                       |
| 5,700 0                  | 1 01               | 202 13         | 5,698 6                | 2 8                   | 27 7                | 84 22                  | 27 8                       |
| 5,800 0                  | 1 07               | 202 59         | 5,798 6                | 1 1                   | 27 0                | 87 61                  | 27 0                       |
| 5,900 0                  | 1 28               | 206 88         | 5,898 6                | -0 7                  | 26 1                | 91 60                  | 26 2                       |
| 6,000 0                  | 1 28               | 214 39         | 5,998 5                | -2 7                  | 25 0                | 96 05                  | 25 1                       |
| 6,100 0                  | 1 61               | 213 51         | 6,098 5                | -4 7                  | 23 6                | 101 36                 | 24 1                       |
| 6,200 0                  | 1 75               | 233 73         | 6,198 5                | -6 8                  | 21 6                | 107 52                 | 22 6                       |
| 6,300 0                  | 1 76               | 244 42         | 6,298 4                | -8 4                  | 19 0                | 113 84                 | 20 7                       |
| 6,400 0                  | 2 20               | 292 63         | 6,398 4                | -8 3                  | 15 8                | 117 71                 | 17 9                       |
| 6,500 0                  | 3 11               | 297 98         | 6,498 2                | -6 3                  | 11 7                | 118 39                 | 13 2                       |
| 6,600 0                  | 3 52               | 297 63         | 6,598 1                | -3 6                  | 6 5                 | 118 84                 | 7 5                        |
| 6,700 0                  | 2 62               | 289 22         | 6,697 9                | -1 4                  | 1 7                 | 130 64                 | 2 2                        |
| 6,800 0                  | 2 26               | 286 32         | 6,797 8                | -0 1                  | -2 4                | 267 16                 | 2 4                        |
| 6,900 0                  | 1 79               | 277 16         | 6,897 8                | 0 6                   | -5 8                | 276 17                 | 5 9                        |
| 7,000 0                  | 1 76               | 257 67         | 6,997 7                | 0 5                   | -8 9                | 273 20                 | 8 9                        |
| 7,100 0                  | 2 13               | 242 76         | 7,097 7                | -0 7                  | -12 0               | 266 76                 | 12 1                       |
| 7,200 0                  | 2 16               | 233 85         | 7,197 6                | -2 6                  | -15 2               | 260 14                 | 15 4                       |
| 7,300 0                  | 2 18               | 233 19         | 7,297 5                | -4 9                  | -18 3               | 254 99                 | 18 9                       |
| 7,400 0                  | 1 46               | 224 45         | 7,397 5                | -6 9                  | -20 7               | 251 43                 | 21 8                       |
| 7,500 0                  | 1 19               | 176 49         | 7,497 5                | -8 9                  | -21 5               | 247 53                 | 23 3                       |
| 7,600 0                  | 2 25               | 170 84         | 7,597 4                | -11 9                 | -21 1               | 240 67                 | 24 2                       |
| 7,700 0                  | 2 31               | 167 78         | 7,697 3                | -15 8                 | -20 4               | 232 27                 | 25 8                       |
| 7,800 0                  | 1 36               | 158 99         | 7,797 3                | -18 8                 | -19 5               | 226 01                 | 27 1                       |
| 7,900 0                  | 1 53               | 160 25         | 7,897 3                | -21 2                 | -18 7               | 221 32                 | 28 2                       |
| 8,000 0                  | 1 56               | 157 24         | 7,997 2                | -23 7                 | -17 7               | 216 69                 | 29 6                       |
| 8,100 0                  | 1 48               | 167 51         | 8,097 2                | -26 2                 | -16 9               | 212 73                 | 31 2                       |
| 8,200 0                  | 0 93               | 159 52         | 8,197 2                | -28 3                 | -16 3               | 209 98                 | 32 6                       |
| 8,300 0                  | 0 59               | 150 71         | 8,297 2                | -29 5                 | -15 8               | 208 15                 | 33 4                       |
| 8,400 0                  | 0 85               | 181 07         | 8,397 1                | -30 7                 | -15 5               | 206 86                 | 34 4                       |
| 8,500 0                  | 0 79               | 192 02         | 8,497 1                | -32 1                 | -15 7               | 206 06                 | 35 7                       |
| 8,600 0                  | 0 82               | 182 98         | 8,597 1                | -33 5                 | -15 9               | 205 37                 | 37 0                       |
| 8,700 0                  | 1 31               | 197 06         | 8,697 1                | -35 3                 | -16 2               | 204 72                 | 38 8                       |
| 8,800 0                  | 1 34               | 204 05         | 8,797 1                | -37 4                 | -17 1               | 204 49                 | 41 1                       |
| 8,900 0                  | 1 48               | 196 91         | 8,897 0                | -39 7                 | -17 9               | 204 26                 | 43 6                       |
| 9,000 0                  | 1 25               | 194 64         | 8,997 0                | -42 0                 | -18 6               | 203 82                 | 45 9                       |
| 9,100 0                  | 1 38               | 202 37         | 9,097 0                | -44 2                 | -19 3               | 203 58                 | 48 2                       |
| 9,200 0                  | 1 58               | 195 76         | 9,197 0                | -46 6                 | -20 1               | 203 34                 | 50 8                       |
| 9,300 0                  | 1 69               | 198 92         | 9,296 9                | -49 4                 | -21 0               | 203 02                 | 53 6                       |
| 9,400 0                  | 1 58               | 204 82         | 9,396 9                | -52 0                 | -22 0               | 202 96                 | 56 5                       |
| 9,500 0                  | 1 96               | 224 98         | 9,496 8                | -54 5                 | -23 8               | 203 62                 | 59 4                       |
| 9,523 0                  | 1 80               | 229 47         | 9,519 8                | -55 0                 | -24 4               | 203 91                 | 60 1                       |



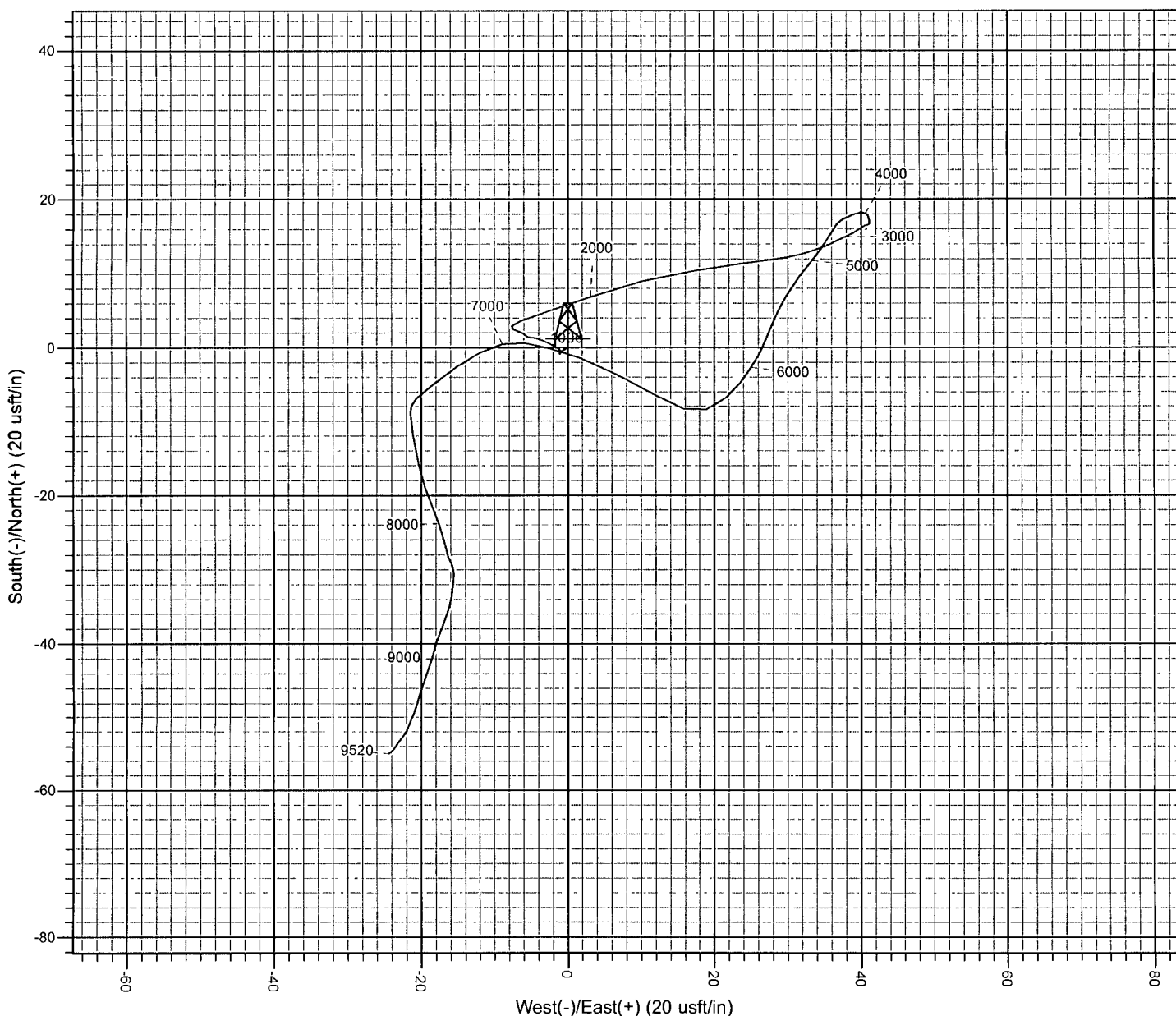
Project: Red Bluff  
 Eddy County, NM  
 Well: SRO State Unit Com #11H  
 Wellbore: VH - Job #32K12111223  
 Design: VH - Job #32K12111223



Azimuths to Grid North  
 True North -0 13°  
 Magnetic North 7 61°  
 Magnetic Field  
 Strength 48447 7nT  
 Dip Angle 59 95°  
 Date 12/15/2011  
 Model IGRF2010

WELL DETAILS: SRO State Unit Com #11H  
 WELL @ 0.0usft (Original Well Elev)  
 Ground Level: 0.0

| +N/-S | +E/-W | Northing  | Easting   | Latitude        | Longitude        | Slot |
|-------|-------|-----------|-----------|-----------------|------------------|------|
| 0.0   | 0.0   | 392919.46 | 578154.11 | 32° 4' 48.000 N | 104° 4' 51.600 W |      |



PROJECT DETAILS: Red Bluff  
 Geodetic System: US State Plane 1927 (Exact solution)  
 Datum: NAD 1927 (NADCON CONUS)  
 Ellipsoid: Clarke 1866  
 Zone: New Mexico East 3001  
 System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM  
 Site Centre Latitude: 32° 6' 32.400 N  
 Longitude: 104° 5' 56.400 W  
 Positional Uncertainty: 0 0  
 Convergence: 0.12  
 Local North Grid



## **Cog Operating LLC- Eastern NM**

Eddy County (NAD 27)

SRO State Unit Com

#11H

OH

Design: OH

## **Pathfinder X & Y Report**

29 December, 2011

**PATHFINDER®**  
A Schlumberger Company



Pathfinder  
Pathfinder X & Y Report

**PATHFINDER**  
A Schlumberger Company

|           |                               |                              |                                        |
|-----------|-------------------------------|------------------------------|----------------------------------------|
| Company:  | Cog Operating LLC- Eastern NM | Local Co-ordinate Reference: | Well #11H                              |
| Project:  | Eddy County (NAD 27)          | TVD Reference:               | WELL @ 2966.0usft (Original Well Elev) |
| Site:     | SRO State Unit Com            | MD Reference:                | WELL @ 2966.0usft (Original Well Elev) |
| Well:     | #11H                          | North Reference:             | Grid                                   |
| Wellbore: | OH                            | Survey Calculation Method:   | Minimum Curvature                      |
| Design:   | OH                            | Database:                    | EDM 5000.1 Single User Db              |

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project     | Eddy County (NAD 27)                 |               |                |
| Map System: | US State Plane 1927 (Exact solution) | System Datum: | Mean Sea Level |
| Geo Datum:  | NAD 1927 (NADCON CONUS)              |               |                |
| Map Zone:   | New Mexico East 3001                 |               |                |

|                       |                    |                   |                  |
|-----------------------|--------------------|-------------------|------------------|
| Site                  | SRO State Unit Com |                   |                  |
| Site Position:        |                    | Northing:         | 391,812.000 usft |
| From:                 | Map                | Easting:          | 572,493.500 usft |
| Position Uncertainty: | 0 0 usft           | Slot Radius:      | 13-3/16 "        |
|                       |                    | Latitude:         | 32° 4' 37.166 N  |
|                       |                    | Longitude:        | 104° 5' 57.422 W |
|                       |                    | Grid Convergence: | 0.12 °           |

|                      |       |          |                     |
|----------------------|-------|----------|---------------------|
| Well                 | #11H  |          |                     |
| Well Position        | +N/-S | 0.0 usft | Northing:           |
|                      | +E/-W | 0 0 usft | Easting:            |
| Position Uncertainty |       | 0.0 usft | Wellhead Elevation: |
|                      |       |          | usft                |
|                      |       |          | Latitude:           |
|                      |       |          | Longitude:          |
|                      |       |          | Ground Level:       |
|                      |       |          | 2,947.0 usft        |

|           |            |             |                        |
|-----------|------------|-------------|------------------------|
| Wellbore  | OH         |             |                        |
| Magnetics | Model Name | Sample Date | Declination<br>(°)     |
|           | IGRF200510 | 8/27/2010   | 7.89                   |
|           |            |             | Dip Angle<br>(°)       |
|           |            |             | 60.00                  |
|           |            |             | Field Strength<br>(nT) |
|           |            |             | 48,589                 |

|                   |                            |                 |                  |
|-------------------|----------------------------|-----------------|------------------|
| 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)  |
|                   | 0.0                        | 0.0             | 0.0              |
|                   |                            |                 | Direction<br>(°) |
|                   |                            |                 | 0.39             |



**Pathfinder**  
Pathfinder X & Y Report

**PATHFINDER**  
A Schlumberger Company

|                  |                               |                                     |                                        |
|------------------|-------------------------------|-------------------------------------|----------------------------------------|
| <b>Company:</b>  | Cog Operating LLC- Eastern NM | <b>Local Co-ordinate Reference:</b> | Well #11H                              |
| <b>Project:</b>  | Eddy County (NAD 27)          | <b>TVD Reference:</b>               | WELL @ 2966.0usft (Original Well Elev) |
| <b>Site:</b>     | SRO State Unit Com            | <b>MD Reference:</b>                | WELL @ 2966.0usft (Original Well Elev) |
| <b>Well:</b>     | #11H                          | <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 Program |           | Date              | 12/29/2011 |                                  |  |  |
|----------------|-----------|-------------------|------------|----------------------------------|--|--|
| From (usft)    | To (usft) | Survey (Wellbore) | Tool Name  | Description                      |  |  |
| 100 0          | 7,500.0   | Gyro #1 (OH)      | NS-GYRO-MS | North sensing gyrocompassing m/s |  |  |
| 7,537.0        | 12,420 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        | -2,966.0     | 0 0        | 0 0        | 0 0           | 0.00             | 392,810.10      | 578,149.50     |
| 100 0     | 0 31    | 240 82            | 100 0      | -2,866 0     | -0 1       | -0.2       | -0.1          | 0.31             | 392,809 97      | 578,149.26     |
| 200 0     | 0 46    | 236 27            | 200 0      | -2,766 0     | -0 5       | -0.8       | -0 5          | 0 15             | 392,809.61      | 578,148 69     |
| 300 0     | 0 08    | 164 35            | 300 0      | -2,666 0     | -0 8       | -1 1       | -0 8          | 0 44             | 392,809 32      | 578,148 38     |
| 400 0     | 0 07    | 115.70            | 400.0      | -2,566 0     | -0 9       | -1 0       | -0 9          | 0 06             | 392,809 23      | 578,148 45     |
| 500 0     | 0 20    | 4 36              | 500.0      | -2,466.0     | -0 7       | -1 0       | -0 7          | 0.23             | 392,809.38      | 578,148.52     |
| 600 0     | 0 13    | 339 31            | 600 0      | -2,366 0     | -0 4       | -1 0       | -0 4          | 0 10             | 392,809 66      | 578,148 49     |
| 700 0     | 0 38    | 309 63            | 700 0      | -2,266 0     | -0 1       | -1.3       | -0.1          | 0 27             | 392,809 97      | 578,148 20     |
| 800 0     | 0 87    | 296 44            | 800 0      | -2,166 0     | 0 4        | -2 2       | 0 4           | 0 51             | 392,810 52      | 578,147 26     |
| 900 0     | 0 68    | 293 84            | 900.0      | -2,066.0     | 1 0        | -3 5       | 1 0           | 0 19             | 392,811 10      | 578,146 04     |
| 1,000 0   | 0 53    | 277.69            | 1,000 0    | -1,966 0     | 1.3        | -4 5       | 1 3           | 0 23             | 392,811.40      | 578,145.04     |
| 1,100 0   | 0 33    | 267 63            | 1,100 0    | -1,866 0     | 1 4        | -5.2       | 1 3           | 0 21             | 392,811 45      | 578,144 29     |
| 1,200.0   | 0 30    | 315 57            | 1,200.0    | -1,766 0     | 1.5        | -5 7       | 1.5           | 0 26             | 392,811.63      | 578,143 82     |
| 1,300.0   | 0 24    | 305 23            | 1,300 0    | -1,666 0     | 1 8        | -6 0       | 1 8           | 0 08             | 392,811 94      | 578,143 47     |
| 1,400 0   | 0 32    | 299 77            | 1,400.0    | -1,566.0     | 2 1        | -6 4       | 2 1           | 0 08             | 392,812.20      | 578,143 05     |
| 1,500 0   | 0 30    | 284 79            | 1,500.0    | -1,466 0     | 2 3        | -6 9       | 2 3           | 0.08             | 392,812 40      | 578,142 56     |
| 1,600.0   | 0 34    | 301 10            | 1,600 0    | -1,366 0     | 2 5        | -7 4       | 2 5           | 0 10             | 392,812 62      | 578,142 05     |
| 1,700 0   | 0 23    | 357 05            | 1,700 0    | -1,266 0     | 2 9        | -7.7       | 2.8           | 0 28             | 392,812 98      | 578,141 79     |
| 1,800 0   | 1 57    | 66 58             | 1,799 9    | -1,166 1     | 3 6        | -6 5       | 3 6           | 1 51             | 392,813 72      | 578,143 03     |
| 1,900 0   | 2 94    | 72 75             | 1,899 9    | -1,066.1     | 4 9        | -2 8       | 4 9           | 1 39             | 392,815.03      | 578,146 74     |
| 2,000.0   | 4 09    | 70 31             | 1,999 7    | -966 3       | 6 9        | 3 0        | 6 9           | 1.16             | 392,816 99      | 578,152 55     |



Pathfinder  
Pathfinder X & Y Report

**PATHFINDER**  
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|                  |                               |                                     |                                        |
|------------------|-------------------------------|-------------------------------------|----------------------------------------|
| <b>Company:</b>  | Cog Operating LLC- Eastern NM | <b>Local Co-ordinate Reference:</b> | Well #11H                              |
| <b>Project:</b>  | Eddy County (NAD 27)          | <b>TVD Reference:</b>               | WELL @ 2966.0usft (Original Well Elev) |
| <b>Site:</b>     | SRO State Unit Com            | <b>MD Reference:</b>                | WELL @ 2966.0usft (Original Well Elev) |
| <b>Well:</b>     | #11H                          | <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) | Northing<br>(usft) | Easting<br>(usft) |  |
| 2,100.0      | 4.45       | 76.37                | 2,099.4       | -866.6          | 9.0           | 10.2          | 9.1              | 0.58                | 392,819.10         | 578,159.68        |  |
| 2,200.0      | 4.24       | 81.91                | 2,199.1       | -766.9          | 10.4          | 17.6          | 10.6             | 0.47                | 392,820.54         | 578,167.11        |  |
| 2,300.0      | 2.79       | 80.74                | 2,298.9       | -667.1          | 11.3          | 23.7          | 11.5             | 1.45                | 392,821.45         | 578,173.17        |  |
| 2,400.0      | 1.58       | 86.50                | 2,398.9       | -567.1          | 11.8          | 27.4          | 12.0             | 1.23                | 392,821.93         | 578,176.95        |  |
| 2,500.0      | 1.19       | 76.46                | 2,498.8       | -467.2          | 12.2          | 29.8          | 12.4             | 0.46                | 392,822.25         | 578,179.33        |  |
| 2,600.0      | 1.10       | 76.06                | 2,598.8       | -367.2          | 12.6          | 31.8          | 12.8             | 0.09                | 392,822.73         | 578,181.27        |  |
| 2,700.0      | 1.07       | 72.72                | 2,698.8       | -267.2          | 13.1          | 33.6          | 13.4             | 0.07                | 392,823.24         | 578,183.10        |  |
| 2,800.0      | 0.94       | 66.46                | 2,798.8       | -167.2          | 13.7          | 35.2          | 14.0             | 0.17                | 392,823.84         | 578,184.74        |  |
| 2,900.0      | 0.81       | 61.06                | 2,898.8       | -67.2           | 14.4          | 36.6          | 14.7             | 0.15                | 392,824.51         | 578,186.11        |  |
| 3,000.0      | 0.75       | 70.93                | 2,998.7       | 32.7            | 15.0          | 37.8          | 15.2             | 0.15                | 392,825.07         | 578,187.35        |  |
| 3,100.0      | 0.57       | 59.07                | 3,098.7       | 132.7           | 15.4          | 38.9          | 15.7             | 0.23                | 392,825.54         | 578,188.39        |  |
| 3,200.0      | 0.46       | 53.89                | 3,198.7       | 232.7           | 15.9          | 39.6          | 16.2             | 0.12                | 392,826.03         | 578,189.14        |  |
| 3,300.0      | 0.31       | 58.78                | 3,298.7       | 332.7           | 16.3          | 40.2          | 16.6             | 0.15                | 392,826.40         | 578,189.70        |  |
| 3,400.0      | 0.19       | 72.60                | 3,398.7       | 432.7           | 16.5          | 40.6          | 16.8             | 0.13                | 392,826.59         | 578,190.09        |  |
| 3,500.0      | 0.18       | 77.71                | 3,498.7       | 532.7           | 16.6          | 40.9          | 16.9             | 0.02                | 392,826.68         | 578,190.40        |  |
| 3,600.0      | 0.14       | 18.17                | 3,598.7       | 632.7           | 16.7          | 41.1          | 17.0             | 0.16                | 392,826.83         | 578,190.59        |  |
| 3,700.0      | 0.22       | 356.48               | 3,698.7       | 732.7           | 17.0          | 41.1          | 17.3             | 0.10                | 392,827.13         | 578,190.62        |  |
| 3,800.0      | 0.24       | 346.74               | 3,798.7       | 832.7           | 17.4          | 41.1          | 17.7             | 0.04                | 392,827.53         | 578,190.56        |  |
| 3,900.0      | 0.24       | 327.18               | 3,898.7       | 932.7           | 17.8          | 40.9          | 18.1             | 0.08                | 392,827.91         | 578,190.40        |  |
| 4,000.0      | 0.31       | 296.00               | 3,998.7       | 1,032.7         | 18.1          | 40.5          | 18.4             | 0.16                | 392,828.20         | 578,190.04        |  |
| 4,100.0      | 0.38       | 266.25               | 4,098.7       | 1,132.7         | 18.2          | 40.0          | 18.5             | 0.19                | 392,828.30         | 578,189.47        |  |
| 4,200.0      | 0.54       | 248.25               | 4,198.7       | 1,232.7         | 18.0          | 39.2          | 18.3             | 0.21                | 392,828.11         | 578,188.70        |  |
| 4,300.0      | 0.53       | 245.04               | 4,298.7       | 1,332.7         | 17.6          | 38.3          | 17.9             | 0.03                | 392,827.74         | 578,187.84        |  |
| 4,400.0      | 0.52       | 252.19               | 4,398.7       | 1,432.7         | 17.3          | 37.5          | 17.6             | 0.07                | 392,827.40         | 578,186.99        |  |
| 4,500.0      | 0.62       | 217.22               | 4,498.7       | 1,532.7         | 16.7          | 36.7          | 17.0             | 0.36                | 392,826.83         | 578,186.23        |  |
| 4,600.0      | 0.69       | 210.44               | 4,598.7       | 1,632.7         | 15.8          | 36.1          | 16.0             | 0.10                | 392,825.88         | 578,185.60        |  |
| 4,700.0      | 0.69       | 214.28               | 4,698.7       | 1,732.7         | 14.8          | 35.5          | 15.0             | 0.05                | 392,824.87         | 578,184.95        |  |



**Pathfinder**  
Pathfinder X & Y Report

**PATHFINDER**  
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|                  |                               |                                     |                                        |
|------------------|-------------------------------|-------------------------------------|----------------------------------------|
| <b>Company:</b>  | Cog Operating LLC- Eastern NM | <b>Local Co-ordinate Reference:</b> | Well #11H                              |
| <b>Project:</b>  | Eddy County (NAD 27)          | <b>TVD Reference:</b>               | WELL @ 2966.0usft (Original Well Elev) |
| <b>Site:</b>     | SRO State Unit Com            | <b>MD Reference:</b>                | WELL @ 2966.0usft (Original Well Elev) |
| <b>Well:</b>     | #11H                          | <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) | Northing<br>(usft) | Easting<br>(usft) |  |
| 4,800.0      | 0.64       | 214.06               | 4,798.7       | 1,832.7         | 13.8          | 34.8          | 14.0             | 0.05                | 392,823.91         | 578,184.30        |  |
| 4,900.0      | 0.73       | 216.19               | 4,898.7       | 1,932.7         | 12.8          | 34.1          | 13.1             | 0.09                | 392,822.93         | 578,183.61        |  |
| 5,000.0      | 0.77       | 221.16               | 4,998.7       | 2,032.7         | 11.8          | 33.3          | 12.0             | 0.08                | 392,821.91         | 578,182.79        |  |
| 5,100.0      | 0.84       | 217.33               | 5,098.7       | 2,132.7         | 10.7          | 32.4          | 10.9             | 0.09                | 392,820.82         | 578,181.91        |  |
| 5,200.0      | 0.76       | 217.74               | 5,198.7       | 2,232.7         | 9.6           | 31.6          | 9.8              | 0.08                | 392,819.71         | 578,181.06        |  |
| 5,300.0      | 0.93       | 211.91               | 5,298.6       | 2,332.6         | 8.4           | 30.7          | 8.6              | 0.19                | 392,818.50         | 578,180.22        |  |
| 5,400.0      | 0.83       | 211.82               | 5,398.6       | 2,432.6         | 7.1           | 29.9          | 7.3              | 0.10                | 392,817.19         | 578,179.41        |  |
| 5,500.0      | 0.93       | 208.83               | 5,498.6       | 2,532.6         | 5.8           | 29.1          | 6.0              | 0.11                | 392,815.87         | 578,178.64        |  |
| 5,600.0      | 0.92       | 206.56               | 5,598.6       | 2,632.6         | 4.3           | 28.4          | 4.5              | 0.04                | 392,814.44         | 578,177.89        |  |
| 5,700.0      | 1.01       | 202.13               | 5,698.6       | 2,732.6         | 2.8           | 27.7          | 3.0              | 0.12                | 392,812.90         | 578,177.20        |  |
| 5,800.0      | 1.07       | 202.59               | 5,798.6       | 2,832.6         | 1.1           | 27.0          | 1.3              | 0.06                | 392,811.23         | 578,176.51        |  |
| 5,900.0      | 1.28       | 206.88               | 5,898.6       | 2,932.6         | -0.7          | 26.1          | -0.6             | 0.23                | 392,809.37         | 578,175.64        |  |
| 6,000.0      | 1.28       | 214.39               | 5,998.5       | 3,032.5         | -2.7          | 25.0          | -2.5             | 0.17                | 392,807.45         | 578,174.51        |  |
| 6,100.0      | 1.61       | 213.51               | 6,098.5       | 3,132.5         | -4.7          | 23.6          | -4.6             | 0.33                | 392,805.36         | 578,173.10        |  |
| 6,200.0      | 1.75       | 233.73               | 6,198.5       | 3,232.5         | -6.8          | 21.6          | -6.7             | 0.61                | 392,803.28         | 578,171.09        |  |
| 6,300.0      | 1.76       | 244.42               | 6,298.4       | 3,332.4         | -8.4          | 19.0          | -8.3             | 0.33                | 392,801.72         | 578,168.48        |  |
| 6,400.0      | 2.20       | 292.63               | 6,398.4       | 3,432.4         | -8.3          | 15.8          | -8.2             | 1.67                | 392,801.79         | 578,165.32        |  |
| 6,500.0      | 3.11       | 297.98               | 6,498.2       | 3,532.2         | -6.3          | 11.7          | -6.2             | 0.94                | 392,803.80         | 578,161.15        |  |
| 6,600.0      | 3.52       | 297.63               | 6,598.1       | 3,632.1         | -3.6          | 6.5           | -3.6             | 0.41                | 392,806.50         | 578,156.04        |  |
| 6,700.0      | 2.62       | 289.22               | 6,697.9       | 3,731.9         | -1.4          | 1.7           | -1.4             | 1.00                | 392,808.68         | 578,151.16        |  |
| 6,800.0      | 2.26       | 286.32               | 6,797.8       | 3,831.8         | -0.1          | -2.4          | -0.1             | 0.38                | 392,809.98         | 578,147.11        |  |
| 6,900.0      | 1.79       | 277.16               | 6,897.8       | 3,931.8         | 0.6           | -5.8          | 0.6              | 0.57                | 392,810.73         | 578,143.67        |  |
| 7,000.0      | 1.76       | 257.67               | 6,997.7       | 4,031.7         | 0.5           | -8.9          | 0.4              | 0.60                | 392,810.60         | 578,140.62        |  |
| 7,100.0      | 2.13       | 242.76               | 7,097.7       | 4,131.7         | -0.7          | -12.0         | -0.8             | 0.62                | 392,809.42         | 578,137.47        |  |
| 7,200.0      | 2.16       | 233.85               | 7,197.6       | 4,231.6         | -2.6          | -15.2         | -2.7             | 0.33                | 392,807.46         | 578,134.29        |  |
| 7,300.0      | 2.18       | 233.19               | 7,297.5       | 4,331.5         | -4.9          | -18.3         | -5.0             | 0.03                | 392,805.20         | 578,131.25        |  |
| 7,400.0      | 1.46       | 224.45               | 7,397.5       | 4,431.5         | -6.9          | -20.7         | -7.1             | 0.77                | 392,803.16         | 578,128.83        |  |



Pathfinder  
Pathfinder X & Y Report

**PATHFINDER**  
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|                  |                               |                                     |                                        |
|------------------|-------------------------------|-------------------------------------|----------------------------------------|
| <b>Company:</b>  | Cog Operating LLC- Eastern NM | <b>Local Co-ordinate Reference:</b> | Well #11H                              |
| <b>Project:</b>  | Eddy County (NAD 27)          | <b>TVD Reference:</b>               | WELL @ 2966.0usft (Original Well Elev) |
| <b>Site:</b>     | SRO State Unit Com            | <b>MD Reference:</b>                | WELL @ 2966 0usft (Original Well Elev) |
| <b>Well:</b>     | #11H                          | <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) | Northing<br>(usft) | Easting<br>(usft) |  |
| 7,500 0      | 1 19       | 176 49               | 7,497 5       | 4,531 5         | -8 9          | -21.5         | -9 0             | 1 10                | 392,801 21         | 578,128 00        |  |
| 7,551 0      | 0 62       | 30 46                | 7,548 5       | 4,582.5         | -9 2          | -21 3         | -9.3             | 3 41                | 392,800 92         | 578,128 18        |  |
| 7,583 0      | 3.78       | 8 14                 | 7,580.4       | 4,614 4         | -8 0          | -21.1         | -8 1             | 10 05               | 392,802 11         | 578,128 41        |  |
| 7,615 0      | 7 65       | 0 58                 | 7,612 3       | 4,646 3         | -4 8          | -20 9         | -5 0             | 12 29               | 392,805 29         | 578,128 58        |  |
| 7,647 0      | 11 70      | 356 54               | 7,643 8       | 4,677 8         | 0 6           | -21.1         | 0 4              | 12.83               | 392,810 66         | 578,128 41        |  |
| 7,678 0      | 15 39      | 355 57               | 7,673 9       | 4,707 9         | 7 8           | -21 6         | 7 7              | 11 93               | 392,817 90         | 578,127 90        |  |
| 7,710 0      | 19 35      | 356 36               | 7,704 5       | 4,738 5         | 17.3          | -22 3         | 17 2             | 12.40               | 392,827 43         | 578,127.24        |  |
| 7,741 0      | 23 65      | 357 85               | 7,733 3       | 4,767 3         | 28 7          | -22.8         | 28 5             | 13.98               | 392,838.77         | 578,126 68        |  |
| 7,773 0      | 27 96      | 359 79               | 7,762 1       | 4,796 1         | 42 6          | -23 1         | 42.4             | 13 72               | 392,852 69         | 578,126.41        |  |
| 7,805 0      | 32 36      | 1.81                 | 7,789 8       | 4,823 8         | 58 7          | -22.8         | 58.5             | 14 11               | 392,868.76         | 578,126 65        |  |
| 7,837 0      | 37 02      | 2 25                 | 7,816.1       | 4,850 1         | 76 9          | -22 2         | 76 7             | 14 58               | 392,886 96         | 578,127 30        |  |
| 7,869 0      | 41 24      | 1 90                 | 7,840 9       | 4,874 9         | 97 0          | -21.5         | 96.9             | 13 21               | 392,907 14         | 578,128 03        |  |
| 7,900 0      | 44 14      | 2.25                 | 7,863 7       | 4,897 7         | 118 0         | -20.7         | 117 9            | 9 39                | 392,928.14         | 578,128.79        |  |
| 7,932 0      | 46 25      | 2 60                 | 7,886.2       | 4,920 2         | 140.7         | -19 7         | 140 6            | 6 64                | 392,950 82         | 578,129.75        |  |
| 7,964 0      | 48.36      | 1 90                 | 7,907 9       | 4,941 9         | 164 2         | -18 8         | 164 1            | 6 79                | 392,974 32         | 578,130 68        |  |
| 7,996 0      | 51 35      | 1 02                 | 7,928 6       | 4,962 6         | 188 7         | -18 2         | 188.5            | 9 58                | 392,998.77         | 578,131 29        |  |
| 8,027 0      | 55 49      | 0 31                 | 7,947.0       | 4,981 0         | 213 6         | -17 9         | 213 4            | 13 48               | 393,023 66         | 578,131.58        |  |
| 8,058 0      | 59.09      | 0.05                 | 7,963 8       | 4,997 8         | 239.6         | -17 8         | 239.5            | 11 63               | 393,049 74         | 578,131 66        |  |
| 8,089 0      | 62 08      | 0 67                 | 7,979 0       | 5,013.0         | 266 6         | -17.7         | 266.5            | 9 80                | 393,076.74         | 578,131 83        |  |
| 8,121 0      | 65.33      | 1 46                 | 7,993 2       | 5,027 2         | 295 3         | -17 1         | 295 2            | 10.39               | 393,105 42         | 578,132.37        |  |
| 8,153 0      | 67 80      | 1 72                 | 8,005.9       | 5,039 9         | 324 7         | -16 3         | 324 5            | 7 75                | 393,134 76         | 578,133 18        |  |
| 8,185 0      | 68 68      | 1.99                 | 8,017 8       | 5,051 8         | 354 4         | -15 4         | 354.3            | 2 86                | 393,164 47         | 578,134 14        |  |
| 8,217 0      | 70 08      | 2 42                 | 8,029 0       | 5,063 0         | 384 3         | -14 2         | 384.2            | 4.55                | 393,194 39         | 578,135.30        |  |
| 8,248 0      | 72 98      | 2.60                 | 8,038 9       | 5,072 9         | 413.7         | -12 9         | 413 6            | 9 37                | 393,223 77         | 578,136 59        |  |
| 8,280 0      | 76 50      | 2 34                 | 8,047 3       | 5,081.3         | 444 5         | -11 6         | 444 4            | 11 03               | 393,254 60         | 578,137 92        |  |
| 8,311 0      | 79 93      | 2 25                 | 8,053 6       | 5,087.6         | 474 8         | -10 4         | 474 7            | 11 07               | 393,284.92         | 578,139 13        |  |
| 8,342 0      | 82 13      | 1.99                 | 8,058 4       | 5,092 4         | 505 4         | -9 2          | 505.3            | 7.14                | 393,315 52         | 578,140.26        |  |



**Pathfinder**  
Pathfinder X & Y Report

**PATHFINDER**  
A Schlumberger Company

**Company:** Cog Operating LLC- Eastern NM  
**Project:** Eddy County (NAD 27)  
**Site:** SRO State Unit Com  
**Well:** #11H  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well #11H  
**TVD Reference:** WELL @ 2966 0usft (Original Well Elev)  
**MD Reference:** WELL @ 2966 0usft (Original Well Elev)  
**North Reference:** Gnd  
**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) |
|--------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|--------------------|-------------------|
| 8,374 0      | 84 15      | 1 90                 | 8,062 3       | 5,096.3         | 537 2         | -8 2          | 537 1            | 6 32                | 393,347 27         | 578,141 34        |
| 8,405 0      | 86 00      | 1 72                 | 8,064.9       | 5,098.9         | 568 0         | -7 2          | 568 0            | 6 00                | 393,378 14         | 578,142.32        |
| 8,437 0      | 87 23      | 1 72                 | 8,066 8       | 5,100 8         | 600 0         | -6 2          | 599 9            | 3 84                | 393,410 07         | 578,143 27        |
| 8,468 0      | 88 64      | 1 81                 | 8,067 9       | 5,101 9         | 630 9         | -5 3          | 630 9            | 4 56                | 393,441 03         | 578,144 23        |
| 8,500.0      | 89 87      | 1 81                 | 8,068 3       | 5,102 3         | 662.9         | -4.3          | 662.9            | 3.84                | 393,473 01         | 578,145 24        |
| 8,531 0      | 90 13      | 1 63                 | 8,068 3       | 5,102.3         | 693 9         | -3 3          | 693 9            | 1.02                | 393,504 00         | 578,146 17        |
| 8,594 0      | 90 57      | 1 81                 | 8,068 0       | 5,102.0         | 756 9         | -1 4          | 756 8            | 0 75                | 393,566 97         | 578,148 06        |
| 8,657 0      | 90 57      | 0 75                 | 8,067 3       | 5,101 3         | 819 9         | 0.0           | 819.8            | 1 68                | 393,629 95         | 578,149 47        |
| 8,719 0      | 90 84      | 0 14                 | 8,066 6       | 5,100 6         | 881 8         | 0 4           | 881 8            | 1 08                | 393,691 94         | 578,149.95        |
| 8,783 0      | 90 13      | 0 67                 | 8,066.0       | 5,100 0         | 945.8         | 0 9           | 945 8            | 1 38                | 393,755 94         | 578,150 40        |
| 8,846 0      | 90 04      | 0 58                 | 8,065.9       | 5,099 9         | 1,008.8       | 1 6           | 1,008 8          | 0.20                | 393,818 94         | 578,151 09        |
| 8,910 0      | 90 31      | 359 88               | 8,065 7       | 5,099 7         | 1,072 8       | 1 8           | 1,072 8          | 1 17                | 393,882 93         | 578,151 35        |
| 8,973 0      | 89 96      | 359 26               | 8,065.6       | 5,099.6         | 1,135.8       | 1.4           | 1,135 8          | 1 13                | 393,945 93         | 578,150 87        |
| 9,036 0      | 90 04      | 358 91               | 8,065 6       | 5,099.6         | 1,198.8       | 0 4           | 1,198 8          | 0 57                | 394,008 92         | 578,149 87        |
| 9,099.0      | 88 99      | 358 82               | 8,066.1       | 5,100 1         | 1,261.8       | -0.9          | 1,261 8          | 1 67                | 394,071 91         | 578,148 62        |
| 9,163 0      | 88 90      | 359 17               | 8,067.3       | 5,101 3         | 1,325 8       | -2 0          | 1,325 7          | 0 56                | 394,135 89         | 578,147 50        |
| 9,226 0      | 88 90      | 359 09               | 8,068 5       | 5,102 5         | 1,388 8       | -3 0          | 1,388 7          | 0 13                | 394,198 87         | 578,146 54        |
| 9,289 0      | 88 81      | 359 70               | 8,069 8       | 5,103.8         | 1,451 8       | -3 6          | 1,451 7          | 0.98                | 394,261.85         | 578,145 88        |
| 9,352 0      | 89 08      | 359 70               | 8,070 9       | 5,104 9         | 1,514 7       | -4 0          | 1,514 7          | 0 43                | 394,324 84         | 578,145 55        |
| 9,415 0      | 87 76      | 0 49                 | 8,072 7       | 5,106 7         | 1,577.7       | -3 8          | 1,577 7          | 2 44                | 394,387 82         | 578,145.65        |
| 9,478 0      | 88 46      | 0.84                 | 8,074.7       | 5,108 7         | 1,640 7       | -3 1          | 1,640 6          | 1 24                | 394,450 78         | 578,146.38        |
| 9,541.0      | 89 87      | 1 28                 | 8,075 7       | 5,109.7         | 1,703.7       | -2 0          | 1,703 6          | 2 34                | 394,513 76         | 578,147 55        |
| 9,604 0      | 90 40      | 1 28                 | 8,075 5       | 5,109 5         | 1,766.6       | -0 5          | 1,766 6          | 0 84                | 394,576 74         | 578,148 95        |
| 9,667 0      | 90 57      | 0 84                 | 8,075 0       | 5,109.0         | 1,829 6       | 0 6           | 1,829 6          | 0 75                | 394,639 73         | 578,150 12        |
| 9,731 0      | 91 01      | 0 84                 | 8,074 1       | 5,108 1         | 1,893 6       | 1 6           | 1,893.6          | 0 69                | 394,703 71         | 578,151 06        |
| 9,794 0      | 91.19      | 0 67                 | 8,072 9       | 5,106 9         | 1,956 6       | 2 4           | 1,956 6          | 0 39                | 394,766.70         | 578,151 89        |
| 9,857 0      | 91 89      | 0 93                 | 8,071 2       | 5,105 2         | 2,019 6       | 3 3           | 2,019 5          | 1 19                | 394,829.67         | 578,152 77        |



**Pathfinder**  
Pathfinder X & Y Report

**PATHFINDER**  
A Schlumberger Company

|                  |                               |                                     |                                        |
|------------------|-------------------------------|-------------------------------------|----------------------------------------|
| <b>Company:</b>  | Cog Operating LLC- Eastern NM | <b>Local Co-ordinate Reference:</b> | Well #11H                              |
| <b>Project:</b>  | Eddy County (NAD 27)          | <b>TVD Reference:</b>               | WELL @ 2966.0usft (Original Well Elev) |
| <b>Site:</b>     | SRO State Unit Com            | <b>MD Reference:</b>                | WELL @ 2966.0usft (Original Well Elev) |
| <b>Well:</b>     | #11H                          | <b>North Reference:</b>             | Gnd                                    |
| <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) | Northing<br>(usft) | Easting<br>(usft) |  |
| 9,920.0      | 90.75      | 0.67                 | 8,069.7       | 5,103.7         | 2,082.5       | 4.1           | 2,082.5          | 1.86                | 394,892.64         | 578,153.65        |  |
| 9,983.0      | 90.75      | 0.75                 | 8,068.9       | 5,102.9         | 2,145.5       | 4.9           | 2,145.5          | 0.13                | 394,955.63         | 578,154.43        |  |
| 10,045.0     | 90.04      | 0.31                 | 8,068.5       | 5,102.5         | 2,207.5       | 5.5           | 2,207.5          | 1.35                | 395,017.63         | 578,155.00        |  |
| 10,108.0     | 89.96      | 359.96               | 8,068.5       | 5,102.5         | 2,270.5       | 5.6           | 2,270.5          | 0.57                | 395,080.63         | 578,155.15        |  |
| 10,171.0     | 90.13      | 359.79               | 8,068.4       | 5,102.4         | 2,333.5       | 5.5           | 2,333.5          | 0.38                | 395,143.63         | 578,155.01        |  |
| 10,234.0     | 90.48      | 0.31                 | 8,068.1       | 5,102.1         | 2,396.5       | 5.6           | 2,396.5          | 0.99                | 395,206.63         | 578,155.07        |  |
| 10,296.0     | 89.16      | 0.05                 | 8,068.3       | 5,102.3         | 2,458.5       | 5.8           | 2,458.5          | 2.17                | 395,268.63         | 578,155.26        |  |
| 10,380.0     | 88.90      | 359.97               | 8,069.7       | 5,103.7         | 2,542.5       | 5.8           | 2,542.5          | 0.32                | 395,352.61         | 578,155.28        |  |
| 10,455.0     | 90.40      | 0.33                 | 8,070.2       | 5,104.2         | 2,617.5       | 6.0           | 2,617.5          | 2.06                | 395,427.61         | 578,155.47        |  |
| 10,517.0     | 90.84      | 0.02                 | 8,069.5       | 5,103.5         | 2,679.5       | 6.2           | 2,679.5          | 0.87                | 395,489.61         | 578,155.66        |  |
| 10,581.0     | 91.19      | 0.97                 | 8,068.4       | 5,102.4         | 2,743.5       | 6.7           | 2,743.5          | 1.58                | 395,553.59         | 578,156.21        |  |
| 10,644.0     | 91.36      | 0.90                 | 8,067.0       | 5,101.0         | 2,806.5       | 7.7           | 2,806.5          | 0.29                | 395,616.57         | 578,157.24        |  |
| 10,706.0     | 92.07      | 1.15                 | 8,065.1       | 5,099.1         | 2,868.4       | 8.9           | 2,868.4          | 1.21                | 395,678.53         | 578,158.35        |  |
| 10,770.0     | 91.01      | 1.07                 | 8,063.4       | 5,097.4         | 2,932.4       | 10.1          | 2,932.4          | 1.66                | 395,742.49         | 578,159.59        |  |
| 10,833.0     | 90.04      | 0.69                 | 8,062.8       | 5,096.8         | 2,995.4       | 11.1          | 2,995.4          | 1.65                | 395,805.48         | 578,160.56        |  |
| 10,896.0     | 90.04      | 0.48                 | 8,062.8       | 5,096.8         | 3,058.4       | 11.7          | 3,058.4          | 0.33                | 395,868.48         | 578,161.20        |  |
| 10,959.0     | 89.87      | 359.68               | 8,062.8       | 5,096.8         | 3,121.4       | 11.8          | 3,121.4          | 1.30                | 395,931.48         | 578,161.29        |  |
| 11,022.0     | 89.50      | 359.55               | 8,063.2       | 5,097.2         | 3,184.4       | 11.4          | 3,184.4          | 0.62                | 395,994.48         | 578,160.86        |  |
| 11,086.0     | 89.69      | 1.12                 | 8,063.6       | 5,097.6         | 3,248.4       | 11.7          | 3,248.4          | 2.47                | 396,058.47         | 578,161.24        |  |
| 11,149.0     | 90.22      | 1.52                 | 8,063.7       | 5,097.7         | 3,311.4       | 13.2          | 3,311.4          | 1.05                | 396,121.45         | 578,162.69        |  |
| 11,212.0     | 91.01      | 1.63                 | 8,063.0       | 5,097.0         | 3,374.3       | 14.9          | 3,374.3          | 1.27                | 396,184.43         | 578,164.42        |  |
| 11,275.0     | 90.92      | 1.01                 | 8,061.9       | 5,095.9         | 3,437.3       | 16.4          | 3,437.3          | 0.99                | 396,247.40         | 578,165.87        |  |
| 11,338.0     | 89.87      | 1.49                 | 8,061.5       | 5,095.5         | 3,500.3       | 17.7          | 3,500.3          | 1.83                | 396,310.38         | 578,167.25        |  |
| 11,401.0     | 89.52      | 1.74                 | 8,061.8       | 5,095.8         | 3,563.3       | 19.5          | 3,563.3          | 0.68                | 396,373.36         | 578,169.02        |  |
| 11,465.0     | 89.69      | 1.45                 | 8,062.3       | 5,096.3         | 3,627.2       | 21.3          | 3,627.2          | 0.53                | 396,437.33         | 578,170.80        |  |
| 11,528.0     | 89.08      | 0.95                 | 8,063.0       | 5,097.0         | 3,690.2       | 22.6          | 3,690.2          | 1.25                | 396,500.31         | 578,172.12        |  |
| 11,590.0     | 88.55      | 0.63                 | 8,064.2       | 5,098.2         | 3,752.2       | 23.5          | 3,752.2          | 1.00                | 396,562.29         | 578,172.98        |  |



Pathfinder  
Pathfinder X & Y Report

**PATHFINDER**  
A Schlumberger Company

|           |                               |                              |                                        |
|-----------|-------------------------------|------------------------------|----------------------------------------|
| Company:  | Cog Operating LLC- Eastern NM | Local Co-ordinate Reference: | Well #111H                             |
| Project:  | Eddy County (NAD 27)          | TVD Reference:               | WELL @ 2966.0usft (Original Well Elev) |
| Site:     | SRO State Unit Com            | MD Reference:                | WELL @ 2966.0usft (Original Well Elev) |
| Well:     | #111H                         | North Reference:             | Grid                                   |
| Wellbore: | OH                            | Survey Calculation Method:   | Minimum Curvature                      |
| Design:   | OH                            | Database:                    | EDM 5000 1 Single User Db              |

| 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) |
|--------------|------------|----------------------|---------------|-----------------|---------------|---------------|------------------|---------------------|--------------------|-------------------|
| 11,653.0     | 89.25      | 0.43                 | 8,065.4       | 5,099.4         | 3,815.2       | 24.1          | 3,815.3          | 1.16                | 396,625.28         | 578,173.56        |
| 11,717.0     | 89.60      | 0.88                 | 8,066.1       | 5,100.1         | 3,879.2       | 24.8          | 3,879.2          | 0.89                | 396,689.27         | 578,174.29        |
| 11,812.0     | 89.43      | 0.94                 | 8,066.9       | 5,100.9         | 3,974.2       | 26.3          | 3,974.2          | 0.19                | 396,784.26         | 578,175.80        |
| 11,906.0     | 88.99      | 0.32                 | 8,068.2       | 5,102.2         | 4,068.1       | 27.3          | 4,068.2          | 0.81                | 396,878.24         | 578,176.83        |
| 12,000.0     | 89.43      | 0.10                 | 8,069.5       | 5,103.5         | 4,162.1       | 27.7          | 4,162.2          | 0.52                | 396,972.23         | 578,177.18        |
| 12,096.0     | 88.11      | 0.45                 | 8,071.5       | 5,105.5         | 4,258.1       | 28.1          | 4,258.2          | 1.42                | 397,068.20         | 578,177.64        |
| 12,191.0     | 89.69      | 1.21                 | 8,073.4       | 5,107.4         | 4,353.1       | 29.5          | 4,353.2          | 1.85                | 397,163.17         | 578,179.02        |
| 12,281.0     | 89.87      | 0.69                 | 8,073.7       | 5,107.7         | 4,443.1       | 31.0          | 4,443.2          | 0.61                | 397,253.16         | 578,180.51        |
| 12,366.0     | 90.48      | 0.26                 | 8,073.5       | 5,107.5         | 4,528.1       | 31.7          | 4,528.2          | 0.88                | 397,338.16         | 578,181.21        |
| 12,420.0     | 90.48      | 0.26                 | 8,073.0       | 5,107.0         | 4,582.1       | 32.0          | 4,582.2          | 0.00                | 397,392.15         | 578,181.46        |

| Design Annotations          |                             |                   |                 |                                                    |
|-----------------------------|-----------------------------|-------------------|-----------------|----------------------------------------------------|
| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 | Comment                                            |
|                             |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) |                                                    |
| 7,583.0                     | 7,580.4                     | -8.0              | -21.1           | KOP - 7583.0 'MD, 7580.4 'TVD, -8.2 'N, -21.1 'E   |
| 8,500.0                     | 8,068.3                     | 662.9             | -4.3            | LP - 8500.0 'MD, 8068.3 'TVD, 662.7 'N, -4.2 'E    |
| 12,420.0                    | 8,073.0                     | 4,582.1           | 32.0            | BHL - 12420.0 'MD, 8073.0 'TVD, 4581.8 'N, 32.0 'E |

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

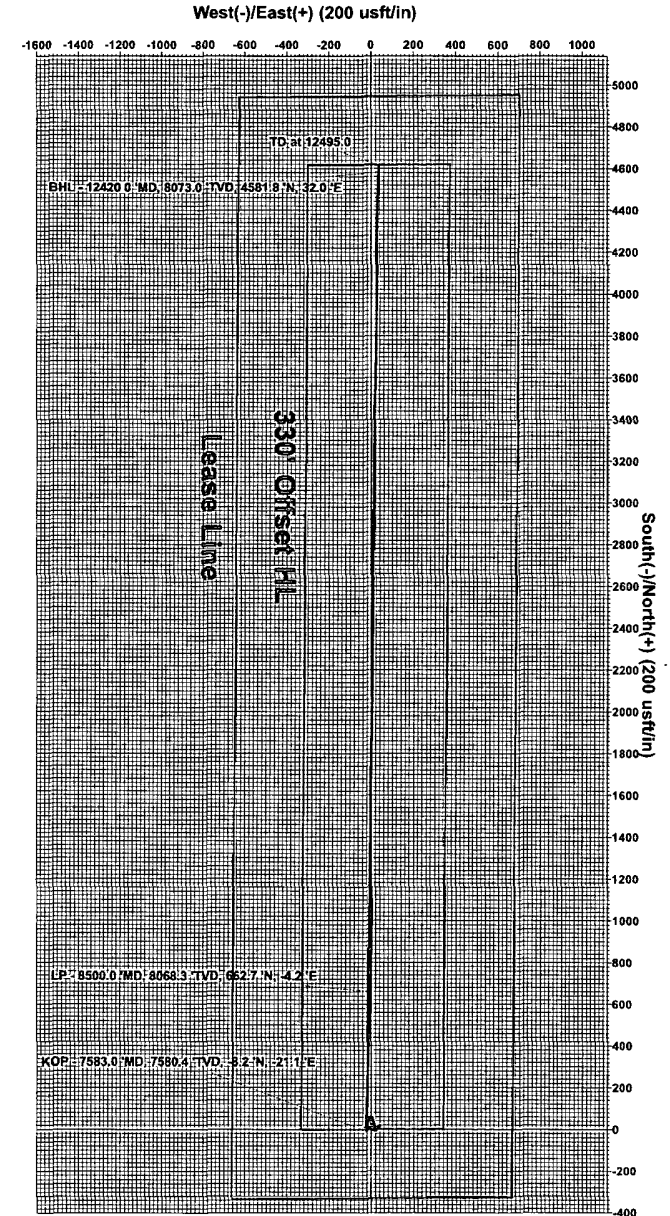
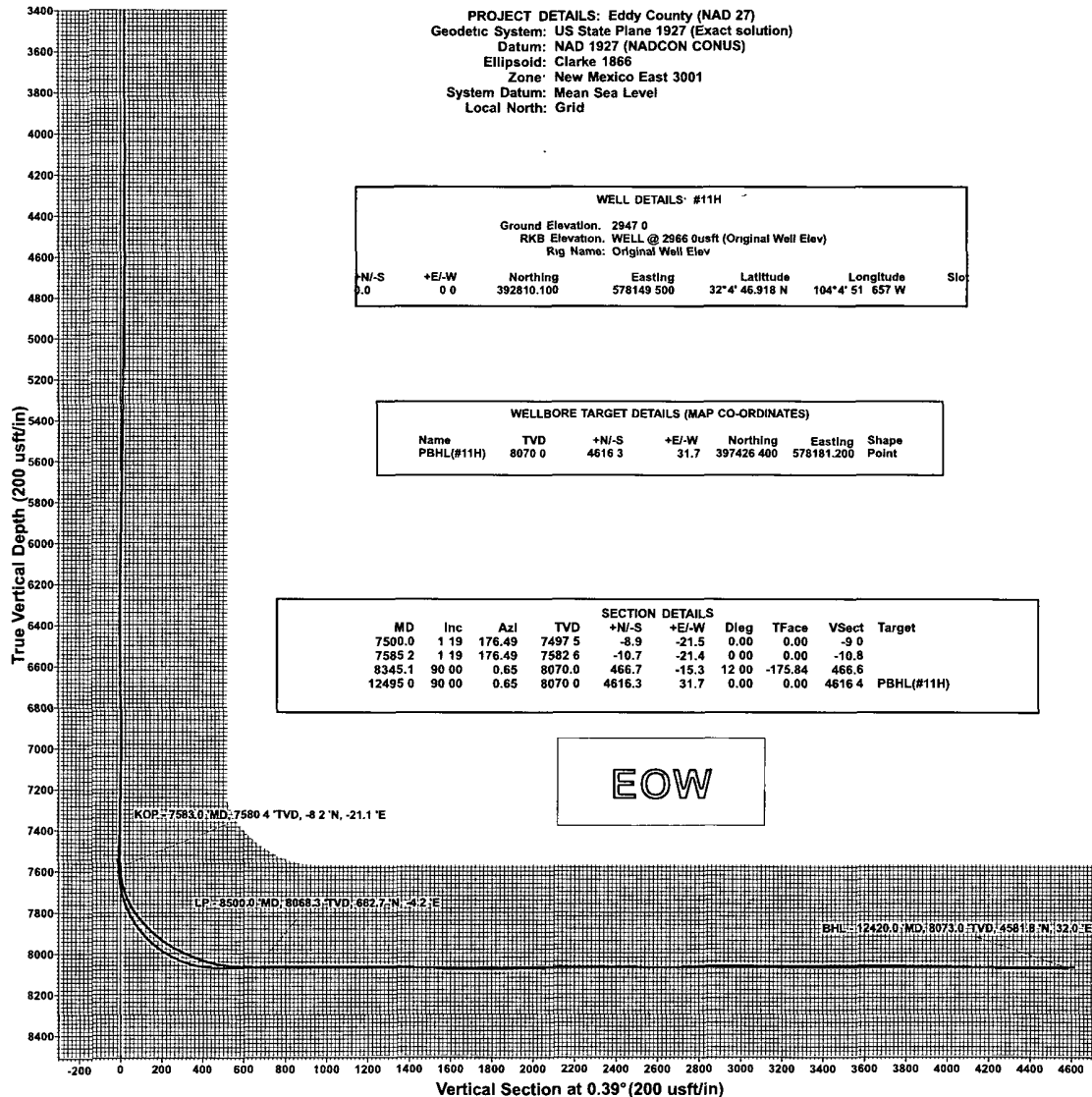


Project: Eddy County (NAD 27)  
Site: SRO State Unit Com  
Well: #11H  
Wellbore: OH  
Plan: Post Gyro Plan #2 (#11H/OH)



Azimuths to Grid North  
True North: -0.13°  
Magnetic North: 7.76°  
  
Magnetic Field  
Strength: 48589.3snT  
Dip Angle: 60.00°  
Date: 8/27/2010  
Model: IGRF200510

**PATHFINDER**  
A Schlumberger Company



Plan: Post Gyro Plan #2 (#11H/OH)  
Created By: Sam Biffe Date: 10/07, December 29 2011  
Checked: \_\_\_\_\_ Date: \_\_\_\_\_

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Eddy County (NAD 27)  
SRO State Unit Com  
#11H  
Original Well Elev  
OH  
Post Gyro Plan #2