



## COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 16, T 21 S. , R 33 E

Warbler State Com 4H

Wellbore #1

Design: Wellbore #1

## Survey Report - Geographic

09 August, 2016

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HOBBS OCD





|                  |                            |                                     |                                       |
|------------------|----------------------------|-------------------------------------|---------------------------------------|
| <b>Company:</b>  | COG Operating L L C        | <b>Local Co-ordinate Reference:</b> | Well Warbler State Com 4H             |
| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TVD Reference:</b>               | KB=26' @ 3784.00ft (Scandril Freedom) |
| <b>Site:</b>     | Sec. 16, T 21 S. , R 33 E  | <b>MD Reference:</b>                | KB=26' @ 3784.00ft (Scandril Freedom) |
| <b>Well:</b>     | Warbler State Com 4H       | <b>North Reference:</b>             | Grid                                  |
| <b>Wellbore:</b> | Wellbore #1                | <b>Survey Calculation Method:</b>   | Minimum Curvature                     |
| <b>Design:</b>   | Wellbore #1                | <b>Database:</b>                    | EDM 5000.1 Multi User Db              |

|                    |                                      |                      |                |
|--------------------|--------------------------------------|----------------------|----------------|
| <b>Project</b>     | Lea County, NM (NAD27 NME)           |                      |                |
| <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 East 3001                 |                      |                |

|                              |                           |                          |                   |
|------------------------------|---------------------------|--------------------------|-------------------|
| <b>Site</b>                  | Sec. 16, T 21 S. , R 33 E |                          |                   |
| <b>Site Position:</b>        |                           | <b>Northing:</b>         | 536,198.50 usft   |
| <b>From:</b>                 | Map                       | <b>Easting:</b>          | 735,349.90 usft   |
| <b>Position Uncertainty:</b> | 5.00 ft                   | <b>Slot Radius:</b>      | 13-3/16 "         |
|                              |                           | <b>Latitude:</b>         | 32° 28' 18.509 N  |
|                              |                           | <b>Longitude:</b>        | 103° 34' 12.732 W |
|                              |                           | <b>Grid Convergence:</b> | 0.41 °            |

|                             |                      |                            |                                  |
|-----------------------------|----------------------|----------------------------|----------------------------------|
| <b>Well</b>                 | Warbler State Com 4H |                            |                                  |
| <b>Well Position</b>        | <b>+N/-S</b>         | 0.00 ft                    | <b>Northing:</b> 536,198.50 usft |
|                             | <b>+E/-W</b>         | 0.00 ft                    | <b>Easting:</b> 735,349.90 usft  |
| <b>Position Uncertainty</b> | 5.00 ft              | <b>Wellhead Elevation:</b> | 0.00 ft                          |
|                             |                      | <b>Ground Level:</b>       | 3,758.00 ft                      |

|                  |                   |                    |                        |                      |                            |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore</b>  | Wellbore #1       |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b> | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | IGRF2015          | 5/12/2016          | 7.09                   | 60.31                | 48,196                     |

|                          |                              |                   |                   |                           |
|--------------------------|------------------------------|-------------------|-------------------|---------------------------|
| <b>Design</b>            | Wellbore #1                  |                   |                   |                           |
| <b>Audit Notes:</b>      |                              |                   |                   |                           |
| <b>Version:</b>          | 1.0                          | <b>Phase:</b>     | ACTUAL            | <b>Tie On Depth:</b> 0.00 |
| <b>Vertical Section:</b> | <b>Depth From (TVD) (ft)</b> | <b>+N/-S (ft)</b> | <b>+E/-W (ft)</b> | <b>Direction (°)</b>      |
|                          | 0.00                         | 0.00              | 0.00              | 178.41                    |

|                       |                      |                               |                  |                                  |
|-----------------------|----------------------|-------------------------------|------------------|----------------------------------|
| <b>Survey Program</b> | <b>Date</b> 8/9/2016 |                               |                  |                                  |
| <b>From (ft)</b>      | <b>To (ft)</b>       | <b>Survey (Wellbore)</b>      | <b>Tool Name</b> | <b>Description</b>               |
| 100.00                | 10,270.00            | VES GYROS (Wellbore #1)       | NS-GYRO-MS       | North sensing gyrocompassing m/s |
| 10,368.00             | 21,200.00            | IDS MWD Surveys (Wellbore #1) | MWD              | MWD - Standard                   |

|                            |                        |                    |                            |                   |                   |                            |                           |                  |                   |
|----------------------------|------------------------|--------------------|----------------------------|-------------------|-------------------|----------------------------|---------------------------|------------------|-------------------|
| <b>Survey</b>              |                        |                    |                            |                   |                   |                            |                           |                  |                   |
| <b>Measured Depth (ft)</b> | <b>Inclination (°)</b> | <b>Azimuth (°)</b> | <b>Vertical Depth (ft)</b> | <b>+N/-S (ft)</b> | <b>+E/-W (ft)</b> | <b>Map Northing (usft)</b> | <b>Map Easting (usft)</b> | <b>Latitude</b>  | <b>Longitude</b>  |
| 0.00                       | 0.00                   | 0.00               | 0.00                       | 0.00              | 0.00              | 536,198.50                 | 735,349.90                | 32° 28' 18.509 N | 103° 34' 12.732 W |
| 100.00                     | 0.31                   | 154.78             | 100.00                     | -0.24             | 0.12              | 536,198.26                 | 735,350.01                | 32° 28' 18.507 N | 103° 34' 12.730 W |
| 200.00                     | 0.33                   | 171.37             | 200.00                     | -0.77             | 0.27              | 536,197.73                 | 735,350.17                | 32° 28' 18.502 N | 103° 34' 12.729 W |
| 300.00                     | 0.63                   | 156.58             | 299.99                     | -1.56             | 0.54              | 536,196.94                 | 735,350.43                | 32° 28' 18.494 N | 103° 34' 12.726 W |
| 400.00                     | 1.21                   | 168.85             | 399.98                     | -3.10             | 0.96              | 536,195.40                 | 735,350.85                | 32° 28' 18.478 N | 103° 34' 12.721 W |
| 500.00                     | 1.93                   | 160.38             | 499.94                     | -5.73             | 1.73              | 536,192.78                 | 735,351.62                | 32° 28' 18.452 N | 103° 34' 12.712 W |
| 600.00                     | 2.32                   | 161.52             | 599.87                     | -9.23             | 2.93              | 536,189.27                 | 735,352.83                | 32° 28' 18.418 N | 103° 34' 12.698 W |
| 700.00                     | 1.62                   | 160.39             | 699.81                     | -12.48            | 4.05              | 536,186.02                 | 735,353.95                | 32° 28' 18.385 N | 103° 34' 12.685 W |
| 800.00                     | 0.70                   | 143.09             | 799.79                     | -14.30            | 4.89              | 536,184.20                 | 735,354.79                | 32° 28' 18.367 N | 103° 34' 12.676 W |
| 900.00                     | 0.24                   | 103.11             | 899.79                     | -14.84            | 5.46              | 536,183.66                 | 735,355.36                | 32° 28' 18.362 N | 103° 34' 12.669 W |
| 1,000.00                   | 0.21                   | 117.44             | 999.79                     | -14.97            | 5.83              | 536,183.53                 | 735,355.73                | 32° 28' 18.361 N | 103° 34' 12.665 W |



|                  |                            |                                     |                                       |
|------------------|----------------------------|-------------------------------------|---------------------------------------|
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| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TVD Reference:</b>               | KB=26' @ 3784.00ft (Scandril Freedom) |
| <b>Site:</b>     | Sec. 16, T 21 S. , R 33 E  | <b>MD Reference:</b>                | KB=26' @ 3784.00ft (Scandril Freedom) |
| <b>Well:</b>     | Warbler State Com 4H       | <b>North Reference:</b>             | Grid                                  |
| <b>Wellbore:</b> | Wellbore #1                | <b>Survey Calculation Method:</b>   | Minimum Curvature                     |
| <b>Design:</b>   | Wellbore #1                | <b>Database:</b>                    | EDM 5000.1 Multi User Db              |

## Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude         | Longitude         |
|---------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|------------------|-------------------|
| 1,100.00            | 0.19            | 106.07      | 1,099.79            | -15.10     | 6.15       | 536,183.40          | 735,356.05         | 32° 28' 18.359 N | 103° 34' 12.661 W |
| 1,200.00            | 0.18            | 99.98       | 1,199.79            | -15.17     | 6.47       | 536,183.33          | 735,356.36         | 32° 28' 18.359 N | 103° 34' 12.657 W |
| 1,300.00            | 0.05            | 82.25       | 1,299.79            | -15.20     | 6.66       | 536,183.31          | 735,356.56         | 32° 28' 18.358 N | 103° 34' 12.655 W |
| 1,400.00            | 0.18            | 53.69       | 1,399.79            | -15.10     | 6.83       | 536,183.41          | 735,356.73         | 32° 28' 18.359 N | 103° 34' 12.653 W |
| 1,500.00            | 0.13            | 334.48      | 1,499.79            | -14.90     | 6.91       | 536,183.60          | 735,356.81         | 32° 28' 18.361 N | 103° 34' 12.652 W |
| 1,600.00            | 0.22            | 278.87      | 1,599.79            | -14.77     | 6.67       | 536,183.73          | 735,356.57         | 32° 28' 18.363 N | 103° 34' 12.655 W |
| 1,700.00            | 0.09            | 212.66      | 1,699.79            | -14.81     | 6.44       | 536,183.70          | 735,356.34         | 32° 28' 18.362 N | 103° 34' 12.658 W |
| 1,800.00            | 0.20            | 217.66      | 1,799.79            | -15.01     | 6.29       | 536,183.49          | 735,356.19         | 32° 28' 18.360 N | 103° 34' 12.659 W |
| 1,900.00            | 0.29            | 266.17      | 1,899.79            | -15.17     | 5.93       | 536,183.34          | 735,355.83         | 32° 28' 18.359 N | 103° 34' 12.664 W |
| 2,000.00            | 0.08            | 210.46      | 1,999.78            | -15.24     | 5.64       | 536,183.26          | 735,355.54         | 32° 28' 18.358 N | 103° 34' 12.667 W |
| 2,100.00            | 0.11            | 206.42      | 2,099.78            | -15.39     | 5.57       | 536,183.11          | 735,355.46         | 32° 28' 18.357 N | 103° 34' 12.668 W |
| 2,200.00            | 0.26            | 220.85      | 2,199.78            | -15.65     | 5.38       | 536,182.86          | 735,355.27         | 32° 28' 18.354 N | 103° 34' 12.670 W |
| 2,300.00            | 0.14            | 239.58      | 2,299.78            | -15.88     | 5.12       | 536,182.62          | 735,355.02         | 32° 28' 18.352 N | 103° 34' 12.673 W |
| 2,400.00            | 0.29            | 247.68      | 2,399.78            | -16.04     | 4.78       | 536,182.46          | 735,354.68         | 32° 28' 18.350 N | 103° 34' 12.677 W |
| 2,500.00            | 0.12            | 222.08      | 2,499.78            | -16.21     | 4.48       | 536,182.29          | 735,354.37         | 32° 28' 18.349 N | 103° 34' 12.681 W |
| 2,600.00            | 0.08            | 244.37      | 2,599.78            | -16.32     | 4.34       | 536,182.18          | 735,354.24         | 32° 28' 18.347 N | 103° 34' 12.682 W |
| 2,700.00            | 0.08            | 238.69      | 2,699.78            | -16.39     | 4.22       | 536,182.12          | 735,354.12         | 32° 28' 18.347 N | 103° 34' 12.684 W |
| 2,800.00            | 0.21            | 265.65      | 2,799.78            | -16.44     | 3.98       | 536,182.07          | 735,353.88         | 32° 28' 18.346 N | 103° 34' 12.687 W |
| 2,900.00            | 0.21            | 352.35      | 2,899.78            | -16.27     | 3.77       | 536,182.23          | 735,353.67         | 32° 28' 18.348 N | 103° 34' 12.689 W |
| 3,000.00            | 0.31            | 52.44       | 2,999.78            | -15.92     | 3.96       | 536,182.58          | 735,353.86         | 32° 28' 18.351 N | 103° 34' 12.687 W |
| 3,100.00            | 0.70            | 37.07       | 3,099.78            | -15.27     | 4.55       | 536,183.23          | 735,354.44         | 32° 28' 18.358 N | 103° 34' 12.680 W |
| 3,200.00            | 0.83            | 44.34       | 3,199.77            | -14.26     | 5.42       | 536,184.24          | 735,355.32         | 32° 28' 18.368 N | 103° 34' 12.670 W |
| 3,300.00            | 0.99            | 60.37       | 3,299.75            | -13.32     | 6.68       | 536,185.18          | 735,356.57         | 32° 28' 18.377 N | 103° 34' 12.655 W |
| 3,400.00            | 0.99            | 47.03       | 3,399.74            | -12.30     | 8.06       | 536,186.20          | 735,357.96         | 32° 28' 18.387 N | 103° 34' 12.639 W |
| 3,500.00            | 0.96            | 54.51       | 3,499.73            | -11.23     | 9.37       | 536,187.27          | 735,359.27         | 32° 28' 18.397 N | 103° 34' 12.623 W |
| 3,600.00            | 1.04            | 66.59       | 3,599.71            | -10.38     | 10.89      | 536,188.12          | 735,360.79         | 32° 28' 18.406 N | 103° 34' 12.605 W |
| 3,700.00            | 1.18            | 65.85       | 3,699.69            | -9.60      | 12.66      | 536,188.90          | 735,362.56         | 32° 28' 18.413 N | 103° 34' 12.585 W |
| 3,800.00            | 1.12            | 72.31       | 3,799.67            | -8.88      | 14.53      | 536,189.62          | 735,364.43         | 32° 28' 18.420 N | 103° 34' 12.563 W |
| 3,900.00            | 1.14            | 72.35       | 3,899.65            | -8.28      | 16.41      | 536,190.22          | 735,366.31         | 32° 28' 18.426 N | 103° 34' 12.541 W |
| 4,000.00            | 0.93            | 74.23       | 3,999.64            | -7.76      | 18.14      | 536,190.74          | 735,368.04         | 32° 28' 18.431 N | 103° 34' 12.521 W |
| 4,100.00            | 0.93            | 58.89       | 4,099.62            | -7.12      | 19.62      | 536,191.38          | 735,369.51         | 32° 28' 18.437 N | 103° 34' 12.503 W |
| 4,200.00            | 0.96            | 68.52       | 4,199.61            | -6.39      | 21.09      | 536,192.11          | 735,370.99         | 32° 28' 18.444 N | 103° 34' 12.486 W |
| 4,300.00            | 1.11            | 64.97       | 4,299.59            | -5.68      | 22.75      | 536,192.82          | 735,372.64         | 32° 28' 18.451 N | 103° 34' 12.467 W |
| 4,400.00            | 1.00            | 54.34       | 4,399.58            | -4.76      | 24.33      | 536,193.74          | 735,374.23         | 32° 28' 18.460 N | 103° 34' 12.448 W |
| 4,500.00            | 1.16            | 74.28       | 4,499.56            | -3.98      | 26.02      | 536,194.53          | 735,375.91         | 32° 28' 18.468 N | 103° 34' 12.428 W |
| 4,600.00            | 0.96            | 80.22       | 4,599.54            | -3.56      | 27.82      | 536,194.94          | 735,377.71         | 32° 28' 18.472 N | 103° 34' 12.407 W |
| 4,700.00            | 0.82            | 97.07       | 4,699.53            | -3.51      | 29.35      | 536,195.00          | 735,379.25         | 32° 28' 18.472 N | 103° 34' 12.389 W |
| 4,800.00            | 0.78            | 96.64       | 4,799.52            | -3.67      | 30.74      | 536,194.83          | 735,380.64         | 32° 28' 18.471 N | 103° 34' 12.373 W |
| 4,900.00            | 0.59            | 82.37       | 4,899.51            | -3.68      | 31.93      | 536,194.82          | 735,381.82         | 32° 28' 18.471 N | 103° 34' 12.359 W |
| 5,000.00            | 0.51            | 96.83       | 4,999.51            | -3.67      | 32.88      | 536,194.84          | 735,382.77         | 32° 28' 18.471 N | 103° 34' 12.348 W |
| 5,100.00            | 0.35            | 100.93      | 5,099.51            | -3.78      | 33.62      | 536,194.72          | 735,383.52         | 32° 28' 18.469 N | 103° 34' 12.340 W |
| 5,200.00            | 0.24            | 108.61      | 5,199.50            | -3.90      | 34.12      | 536,194.60          | 735,384.01         | 32° 28' 18.468 N | 103° 34' 12.334 W |
| 5,300.00            | 0.21            | 63.47       | 5,299.50            | -3.89      | 34.48      | 536,194.61          | 735,384.38         | 32° 28' 18.468 N | 103° 34' 12.329 W |
| 5,400.00            | 0.24            | 76.64       | 5,399.50            | -3.76      | 34.85      | 536,194.74          | 735,384.74         | 32° 28' 18.470 N | 103° 34' 12.325 W |
| 5,500.00            | 0.17            | 33.89       | 5,499.50            | -3.59      | 35.13      | 536,194.92          | 735,385.03         | 32° 28' 18.471 N | 103° 34' 12.322 W |
| 5,600.00            | 0.17            | 65.44       | 5,599.50            | -3.40      | 35.35      | 536,195.10          | 735,385.25         | 32° 28' 18.473 N | 103° 34' 12.319 W |
| 5,700.00            | 0.14            | 223.40      | 5,699.50            | -3.43      | 35.40      | 536,195.07          | 735,385.30         | 32° 28' 18.473 N | 103° 34' 12.319 W |
| 5,800.00            | 0.18            | 235.42      | 5,799.50            | -3.61      | 35.19      | 536,194.90          | 735,385.09         | 32° 28' 18.471 N | 103° 34' 12.321 W |
| 5,900.00            | 0.07            | 30.38       | 5,899.50            | -3.64      | 35.09      | 536,194.86          | 735,384.99         | 32° 28' 18.471 N | 103° 34' 12.322 W |
| 6,000.00            | 0.17            | 257.35      | 5,999.50            | -3.62      | 34.98      | 536,194.88          | 735,384.87         | 32° 28' 18.471 N | 103° 34' 12.324 W |
| 6,100.00            | 0.08            | 209.44      | 6,099.50            | -3.72      | 34.80      | 536,194.79          | 735,384.69         | 32° 28' 18.470 N | 103° 34' 12.326 W |
| 6,200.00            | 0.14            | 9.87        | 6,199.50            | -3.66      | 34.79      | 536,194.85          | 735,384.68         | 32° 28' 18.471 N | 103° 34' 12.326 W |
| 6,300.00            | 0.21            | 332.97      | 6,299.50            | -3.37      | 34.72      | 536,195.13          | 735,384.62         | 32° 28' 18.473 N | 103° 34' 12.327 W |
| 6,400.00            | 0.24            | 286.90      | 6,399.50            | -3.15      | 34.44      | 536,195.35          | 735,384.34         | 32° 28' 18.476 N | 103° 34' 12.330 W |
| 6,500.00            | 0.03            | 268.73      | 6,499.50            | -3.09      | 34.21      | 536,195.41          | 735,384.11         | 32° 28' 18.476 N | 103° 34' 12.333 W |



|           |                            |                              |                                       |
|-----------|----------------------------|------------------------------|---------------------------------------|
| Company:  | COG Operating L L C        | Local Co-ordinate Reference: | Well Warbler State Com 4H             |
| Project:  | Lea County, NM (NAD27 NME) | TVD Reference:               | KB=26' @ 3784.00ft (Scandril Freedom) |
| Site:     | Sec. 16, T 21 S., R 33 E   | MD Reference:                | KB=26' @ 3784.00ft (Scandril Freedom) |
| Well:     | Warbler State Com 4H       | North Reference:             | Grid                                  |
| Wellbore: | Wellbore #1                | Survey Calculation Method:   | Minimum Curvature                     |
| Design:   | Wellbore #1                | Database:                    | EDM 5000.1 Multi User Db              |

## Survey

| Measured Depth (ft)  | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude         | Longitude         |
|----------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|------------------|-------------------|
| 6,600.00             | 0.05            | 316.59      | 6,599.50            | -3.06      | 34.16      | 536,195.45          | 735,384.05         | 32° 28' 18.477 N | 103° 34' 12.333 W |
| 6,700.00             | 0.28            | 346.23      | 6,699.50            | -2.79      | 34.07      | 536,195.71          | 735,383.96         | 32° 28' 18.479 N | 103° 34' 12.334 W |
| 6,800.00             | 0.22            | 333.43      | 6,799.50            | -2.38      | 33.92      | 536,196.12          | 735,383.82         | 32° 28' 18.483 N | 103° 34' 12.336 W |
| 6,900.00             | 0.50            | 300.34      | 6,899.50            | -1.99      | 33.46      | 536,196.52          | 735,383.36         | 32° 28' 18.487 N | 103° 34' 12.341 W |
| 7,000.00             | 0.48            | 269.23      | 6,999.49            | -1.77      | 32.67      | 536,196.73          | 735,382.56         | 32° 28' 18.489 N | 103° 34' 12.350 W |
| 7,100.00             | 0.67            | 253.71      | 7,099.49            | -1.94      | 31.69      | 536,196.56          | 735,381.58         | 32° 28' 18.488 N | 103° 34' 12.362 W |
| 7,200.00             | 0.50            | 240.53      | 7,199.48            | -2.32      | 30.75      | 536,196.18          | 735,380.64         | 32° 28' 18.484 N | 103° 34' 12.373 W |
| 7,300.00             | 0.54            | 228.44      | 7,299.48            | -2.85      | 30.01      | 536,195.65          | 735,379.91         | 32° 28' 18.479 N | 103° 34' 12.382 W |
| 7,400.00             | 0.69            | 212.39      | 7,399.47            | -3.67      | 29.34      | 536,194.83          | 735,379.23         | 32° 28' 18.471 N | 103° 34' 12.390 W |
| 7,500.00             | 0.56            | 217.60      | 7,499.47            | -4.56      | 28.72      | 536,193.94          | 735,378.61         | 32° 28' 18.462 N | 103° 34' 12.397 W |
| 7,600.00             | 0.73            | 212.54      | 7,599.46            | -5.49      | 28.08      | 536,193.01          | 735,377.97         | 32° 28' 18.453 N | 103° 34' 12.404 W |
| 7,700.00             | 0.86            | 222.74      | 7,699.45            | -6.58      | 27.22      | 536,191.93          | 735,377.12         | 32° 28' 18.442 N | 103° 34' 12.414 W |
| 7,800.00             | 0.64            | 230.04      | 7,799.44            | -7.49      | 26.29      | 536,191.02          | 735,376.18         | 32° 28' 18.433 N | 103° 34' 12.425 W |
| 7,900.00             | 0.74            | 233.23      | 7,899.43            | -8.23      | 25.34      | 536,190.27          | 735,375.24         | 32° 28' 18.426 N | 103° 34' 12.437 W |
| 8,000.00             | 0.68            | 226.53      | 7,999.43            | -9.03      | 24.39      | 536,189.48          | 735,374.29         | 32° 28' 18.418 N | 103° 34' 12.448 W |
| 8,100.00             | 0.83            | 223.66      | 8,099.42            | -9.96      | 23.46      | 536,188.54          | 735,373.36         | 32° 28' 18.409 N | 103° 34' 12.459 W |
| 8,200.00             | 0.84            | 212.30      | 8,199.41            | -11.10     | 22.57      | 536,187.40          | 735,372.47         | 32° 28' 18.398 N | 103° 34' 12.469 W |
| 8,300.00             | 0.96            | 204.31      | 8,299.39            | -12.49     | 21.83      | 536,186.02          | 735,371.73         | 32° 28' 18.384 N | 103° 34' 12.478 W |
| 8,400.00             | 0.91            | 194.13      | 8,399.38            | -14.02     | 21.30      | 536,184.48          | 735,371.19         | 32° 28' 18.369 N | 103° 34' 12.484 W |
| 8,500.00             | 0.84            | 209.03      | 8,499.37            | -15.43     | 20.75      | 536,183.07          | 735,370.64         | 32° 28' 18.355 N | 103° 34' 12.491 W |
| 8,600.00             | 0.88            | 184.44      | 8,599.36            | -16.84     | 20.33      | 536,181.67          | 735,370.23         | 32° 28' 18.341 N | 103° 34' 12.496 W |
| 8,700.00             | 1.06            | 199.56      | 8,699.34            | -18.47     | 19.96      | 536,180.03          | 735,369.86         | 32° 28' 18.325 N | 103° 34' 12.500 W |
| 8,800.00             | 0.96            | 202.24      | 8,799.33            | -20.12     | 19.34      | 536,178.38          | 735,369.23         | 32° 28' 18.309 N | 103° 34' 12.508 W |
| 8,900.00             | 0.66            | 207.93      | 8,899.32            | -21.40     | 18.75      | 536,177.10          | 735,368.64         | 32° 28' 18.296 N | 103° 34' 12.515 W |
| 9,000.00             | 0.72            | 259.44      | 8,999.31            | -22.03     | 17.86      | 536,176.47          | 735,367.76         | 32° 28' 18.290 N | 103° 34' 12.525 W |
| 9,100.00             | 1.10            | 272.56      | 9,099.30            | -22.10     | 16.28      | 536,176.40          | 735,366.18         | 32° 28' 18.289 N | 103° 34' 12.543 W |
| 9,200.00             | 1.12            | 272.51      | 9,199.28            | -22.02     | 14.35      | 536,176.49          | 735,364.25         | 32° 28' 18.290 N | 103° 34' 12.566 W |
| 9,300.00             | 1.21            | 271.52      | 9,299.26            | -21.94     | 12.32      | 536,176.56          | 735,362.21         | 32° 28' 18.291 N | 103° 34' 12.590 W |
| 9,400.00             | 1.27            | 276.43      | 9,399.24            | -21.79     | 10.16      | 536,176.71          | 735,360.06         | 32° 28' 18.293 N | 103° 34' 12.615 W |
| 9,500.00             | 1.20            | 306.71      | 9,499.22            | -21.04     | 8.22       | 536,177.46          | 735,358.12         | 32° 28' 18.300 N | 103° 34' 12.637 W |
| 9,600.00             | 1.12            | 331.78      | 9,599.20            | -19.56     | 6.92       | 536,178.95          | 735,356.81         | 32° 28' 18.315 N | 103° 34' 12.653 W |
| 9,700.00             | 1.14            | 332.20      | 9,699.18            | -17.81     | 5.99       | 536,180.69          | 735,355.89         | 32° 28' 18.333 N | 103° 34' 12.663 W |
| 9,800.00             | 1.28            | 337.35      | 9,799.15            | -15.90     | 5.10       | 536,182.60          | 735,354.99         | 32° 28' 18.352 N | 103° 34' 12.673 W |
| 9,900.00             | 1.36            | 337.79      | 9,899.13            | -13.77     | 4.22       | 536,184.73          | 735,354.12         | 32° 28' 18.373 N | 103° 34' 12.684 W |
| 10,000.00            | 1.21            | 338.44      | 9,999.10            | -11.69     | 3.38       | 536,186.81          | 735,353.28         | 32° 28' 18.393 N | 103° 34' 12.693 W |
| 10,100.00            | 1.16            | 322.87      | 10,099.08           | -9.90      | 2.38       | 536,188.60          | 735,352.28         | 32° 28' 18.411 N | 103° 34' 12.705 W |
| 10,200.00            | 1.24            | 327.78      | 10,199.06           | -8.18      | 1.20       | 536,190.32          | 735,351.09         | 32° 28' 18.428 N | 103° 34' 12.718 W |
| 10,270.00            | 1.17            | 325.03      | 10,269.04           | -6.96      | 0.38       | 536,191.55          | 735,350.28         | 32° 28' 18.440 N | 103° 34' 12.728 W |
| 10,368.00            | 1.70            | 336.90      | 10,367.01           | -4.80      | -0.76      | 536,193.70          | 735,349.13         | 32° 28' 18.462 N | 103° 34' 12.741 W |
| First IDS MWD Survey |                 |             |                     |            |            |                     |                    |                  |                   |
| 10,440.00            | 0.70            | 257.40      | 10,439.00           | -3.91      | -1.61      | 536,194.59          | 735,348.29         | 32° 28' 18.471 N | 103° 34' 12.751 W |
| 10,461.00            | 3.30            | 200.10      | 10,459.99           | -4.51      | -1.94      | 536,193.99          | 735,347.95         | 32° 28' 18.465 N | 103° 34' 12.755 W |
| 10,492.00            | 8.90            | 198.60      | 10,490.80           | -7.62      | -3.02      | 536,190.88          | 735,346.88         | 32° 28' 18.434 N | 103° 34' 12.767 W |
| 10,523.00            | 13.00           | 195.60      | 10,521.23           | -13.25     | -4.72      | 536,185.25          | 735,345.18         | 32° 28' 18.378 N | 103° 34' 12.788 W |
| 10,554.00            | 15.90           | 192.80      | 10,551.24           | -20.76     | -6.60      | 536,177.75          | 735,343.30         | 32° 28' 18.304 N | 103° 34' 12.810 W |
| 10,585.00            | 18.10           | 191.00      | 10,580.89           | -29.62     | -8.46      | 536,168.88          | 735,341.44         | 32° 28' 18.217 N | 103° 34' 12.833 W |
| 10,648.00            | 22.40           | 184.00      | 10,639.99           | -51.22     | -11.16     | 536,147.28          | 735,338.73         | 32° 28' 18.003 N | 103° 34' 12.866 W |
| 10,679.00            | 25.90           | 183.50      | 10,668.27           | -63.87     | -11.99     | 536,134.63          | 735,337.91         | 32° 28' 17.878 N | 103° 34' 12.877 W |
| 10,710.00            | 29.10           | 181.40      | 10,695.77           | -78.17     | -12.59     | 536,120.33          | 735,337.31         | 32° 28' 17.737 N | 103° 34' 12.885 W |
| 10,742.00            | 33.40           | 179.90      | 10,723.12           | -94.77     | -12.76     | 536,103.74          | 735,337.13         | 32° 28' 17.572 N | 103° 34' 12.888 W |
| 10,789.00            | 39.60           | 178.10      | 10,760.88           | -122.70    | -12.24     | 536,075.80          | 735,337.65         | 32° 28' 17.296 N | 103° 34' 12.885 W |
| 10,835.00            | 46.40           | 176.90      | 10,794.50           | -154.02    | -10.85     | 536,044.48          | 735,339.04         | 32° 28' 16.986 N | 103° 34' 12.871 W |
| 10,882.00            | 52.90           | 177.20      | 10,824.92           | -189.77    | -9.02      | 536,008.73          | 735,340.88         | 32° 28' 16.632 N | 103° 34' 12.853 W |
| 10,928.00            | 58.70           | 179.00      | 10,850.76           | -227.78    | -7.78      | 535,970.72          | 735,342.12         | 32° 28' 16.256 N | 103° 34' 12.841 W |
| 10,975.00            | 63.90           | 179.60      | 10,873.33           | -268.99    | -7.28      | 535,929.51          | 735,342.62         | 32° 28' 15.848 N | 103° 34' 12.839 W |



|           |                            |                              |                                       |
|-----------|----------------------------|------------------------------|---------------------------------------|
| Company:  | COG Operating L L C        | Local Co-ordinate Reference: | Well Warbler State Com 4H             |
| Project:  | Lea County, NM (NAD27 NME) | TVD Reference:               | KB=26' @ 3784.00ft (Scandril Freedom) |
| Site:     | Sec. 16, T 21 S., R 33 E   | MD Reference:                | KB=26' @ 3784.00ft (Scandril Freedom) |
| Well:     | Warbler State Com 4H       | North Reference:             | Grid                                  |
| Wellbore: | Wellbore #1                | Survey Calculation Method:   | Minimum Curvature                     |
| Design:   | Wellbore #1                | Database:                    | EDM 5000.1 Multi User Db              |

## Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude         | Longitude         |
|---------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|------------------|-------------------|
| 11,021.00           | 69.00           | 180.60      | 10,891.70           | -311.14    | -7.36      | 535,887.36          | 735,342.54         | 32° 28' 15.431 N | 103° 34' 12.843 W |
| 11,068.00           | 74.50           | 181.30      | 10,906.41           | -355.76    | -8.10      | 535,842.75          | 735,341.79         | 32° 28' 14.990 N | 103° 34' 12.856 W |
| 11,114.00           | 78.30           | 180.60      | 10,917.23           | -400.45    | -8.84      | 535,798.05          | 735,341.06         | 32° 28' 14.547 N | 103° 34' 12.868 W |
| 11,148.00           | 82.10           | 179.60      | 10,923.01           | -433.95    | -8.90      | 535,764.55          | 735,341.00         | 32° 28' 14.216 N | 103° 34' 12.872 W |
| 11,242.00           | 86.30           | 179.40      | 10,932.51           | -527.44    | -8.08      | 535,671.06          | 735,341.82         | 32° 28' 13.291 N | 103° 34' 12.870 W |
| 11,335.00           | 87.80           | 179.30      | 10,937.30           | -620.31    | -7.03      | 535,578.19          | 735,342.87         | 32° 28' 12.372 N | 103° 34' 12.865 W |
| 11,429.00           | 88.20           | 179.80      | 10,940.58           | -714.25    | -6.29      | 535,484.25          | 735,343.61         | 32° 28' 11.442 N | 103° 34' 12.865 W |
| 11,522.00           | 86.50           | 177.50      | 10,944.88           | -807.12    | -4.10      | 535,391.39          | 735,345.79         | 32° 28' 10.523 N | 103° 34' 12.847 W |
| 11,615.00           | 86.30           | 177.30      | 10,950.72           | -899.84    | 0.11       | 535,298.67          | 735,350.00         | 32° 28' 9.605 N  | 103° 34' 12.805 W |
| 11,709.00           | 86.30           | 177.50      | 10,956.78           | -993.54    | 4.36       | 535,204.96          | 735,354.26         | 32° 28' 8.678 N  | 103° 34' 12.764 W |
| 11,802.00           | 85.70           | 176.70      | 10,963.27           | -1,086.20  | 9.06       | 535,112.31          | 735,358.95         | 32° 28' 7.761 N  | 103° 34' 12.717 W |
| 11,895.00           | 87.00           | 176.00      | 10,969.19           | -1,178.82  | 14.97      | 535,019.69          | 735,364.86         | 32° 28' 6.844 N  | 103° 34' 12.655 W |
| 11,990.00           | 86.00           | 175.80      | 10,974.99           | -1,273.40  | 21.74      | 534,925.11          | 735,371.64         | 32° 28' 5.907 N  | 103° 34' 12.584 W |
| 12,083.00           | 86.90           | 176.50      | 10,980.75           | -1,366.01  | 27.98      | 534,832.50          | 735,377.87         | 32° 28' 4.991 N  | 103° 34' 12.519 W |
| 12,176.00           | 89.20           | 177.90      | 10,983.91           | -1,458.83  | 32.52      | 534,739.67          | 735,382.41         | 32° 28' 4.072 N  | 103° 34' 12.474 W |
| 12,269.00           | 88.80           | 178.20      | 10,985.54           | -1,551.77  | 35.68      | 534,646.74          | 735,385.58         | 32° 28' 3.152 N  | 103° 34' 12.445 W |
| 12,362.00           | 90.00           | 177.60      | 10,986.51           | -1,644.70  | 39.09      | 534,553.81          | 735,388.98         | 32° 28' 2.232 N  | 103° 34' 12.413 W |
| 12,456.00           | 89.60           | 178.10      | 10,986.84           | -1,738.63  | 42.61      | 534,459.88          | 735,392.51         | 32° 28' 1.302 N  | 103° 34' 12.379 W |
| 12,549.00           | 89.30           | 177.80      | 10,987.73           | -1,831.56  | 45.94      | 534,366.94          | 735,395.84         | 32° 28' 0.383 N  | 103° 34' 12.348 W |
| 12,643.00           | 88.70           | 178.30      | 10,989.37           | -1,925.50  | 49.14      | 534,273.01          | 735,399.04         | 32° 27' 59.453 N | 103° 34' 12.319 W |
| 12,737.00           | 88.10           | 179.40      | 10,992.00           | -2,019.44  | 51.02      | 534,179.07          | 735,400.92         | 32° 27' 58.523 N | 103° 34' 12.305 W |
| 12,831.00           | 87.40           | 179.90      | 10,995.69           | -2,113.36  | 51.60      | 534,085.14          | 735,401.49         | 32° 27' 57.594 N | 103° 34' 12.306 W |
| 12,924.00           | 87.00           | 180.00      | 11,000.23           | -2,206.25  | 51.68      | 533,992.25          | 735,401.58         | 32° 27' 56.675 N | 103° 34' 12.313 W |
| 13,018.00           | 87.00           | 178.30      | 11,005.15           | -2,300.11  | 53.07      | 533,898.40          | 735,402.97         | 32° 27' 55.746 N | 103° 34' 12.304 W |
| 13,112.00           | 87.70           | 177.80      | 11,009.50           | -2,393.95  | 56.27      | 533,804.55          | 735,406.16         | 32° 27' 54.817 N | 103° 34' 12.275 W |
| 13,212.00           | 88.30           | 176.40      | 11,012.99           | -2,493.76  | 61.32      | 533,704.75          | 735,411.22         | 32° 27' 53.829 N | 103° 34' 12.224 W |
| 13,306.00           | 87.10           | 176.60      | 11,016.76           | -2,587.51  | 67.06      | 533,611.00          | 735,416.95         | 32° 27' 52.901 N | 103° 34' 12.165 W |
| 13,399.00           | 85.80           | 176.00      | 11,022.52           | -2,680.13  | 73.05      | 533,518.37          | 735,422.94         | 32° 27' 51.984 N | 103° 34' 12.103 W |
| 13,493.00           | 88.30           | 177.50      | 11,027.36           | -2,773.85  | 78.37      | 533,424.66          | 735,428.26         | 32° 27' 51.056 N | 103° 34' 12.048 W |
| 13,586.00           | 89.00           | 179.30      | 11,029.55           | -2,866.78  | 80.96      | 533,331.73          | 735,430.86         | 32° 27' 50.136 N | 103° 34' 12.026 W |
| 13,679.00           | 90.30           | 179.40      | 11,030.12           | -2,959.77  | 82.02      | 533,238.74          | 735,431.91         | 32° 27' 49.216 N | 103° 34' 12.021 W |
| 13,772.00           | 89.10           | 179.80      | 11,030.60           | -3,052.77  | 82.67      | 533,145.74          | 735,432.56         | 32° 27' 48.296 N | 103° 34' 12.022 W |
| 13,866.00           | 87.80           | 180.70      | 11,033.14           | -3,146.73  | 82.26      | 533,051.78          | 735,432.15         | 32° 27' 47.366 N | 103° 34' 12.034 W |
| 13,959.00           | 89.10           | 179.60      | 11,035.66           | -3,239.69  | 82.01      | 532,958.82          | 735,431.91         | 32° 27' 46.446 N | 103° 34' 12.045 W |
| 14,052.00           | 88.60           | 180.00      | 11,037.53           | -3,332.67  | 82.34      | 532,865.84          | 735,432.24         | 32° 27' 45.526 N | 103° 34' 12.049 W |
| 14,146.00           | 88.70           | 177.30      | 11,039.74           | -3,426.61  | 84.55      | 532,771.90          | 735,434.45         | 32° 27' 44.597 N | 103° 34' 12.031 W |
| 14,239.00           | 88.40           | 176.50      | 11,042.10           | -3,519.44  | 89.58      | 532,679.07          | 735,439.48         | 32° 27' 43.678 N | 103° 34' 11.980 W |
| 14,332.00           | 88.20           | 176.20      | 11,044.85           | -3,612.21  | 95.50      | 532,586.30          | 735,445.39         | 32° 27' 42.759 N | 103° 34' 11.919 W |
| 14,425.00           | 87.80           | 177.10      | 11,048.10           | -3,705.00  | 100.93     | 532,493.51          | 735,450.83         | 32° 27' 41.841 N | 103° 34' 11.863 W |
| 14,520.00           | 87.40           | 177.00      | 11,052.08           | -3,799.79  | 105.81     | 532,398.72          | 735,455.71         | 32° 27' 40.902 N | 103° 34' 11.814 W |
| 14,614.00           | 88.10           | 178.80      | 11,055.77           | -3,893.65  | 109.26     | 532,304.86          | 735,459.15         | 32° 27' 39.974 N | 103° 34' 11.781 W |
| 14,708.00           | 90.40           | 179.70      | 11,057.00           | -3,987.62  | 110.49     | 532,210.89          | 735,460.38         | 32° 27' 39.044 N | 103° 34' 11.775 W |
| 14,801.00           | 90.00           | 179.70      | 11,056.67           | -4,080.62  | 110.97     | 532,117.89          | 735,460.87         | 32° 27' 38.123 N | 103° 34' 11.777 W |
| 14,894.00           | 89.50           | 179.70      | 11,057.08           | -4,173.62  | 111.46     | 532,024.89          | 735,461.36         | 32° 27' 37.203 N | 103° 34' 11.779 W |
| 14,988.00           | 89.00           | 179.80      | 11,058.31           | -4,267.61  | 111.87     | 531,930.90          | 735,461.77         | 32° 27' 36.273 N | 103° 34' 11.782 W |
| 15,082.00           | 88.90           | 179.30      | 11,060.03           | -4,361.59  | 112.61     | 531,836.92          | 735,462.50         | 32° 27' 35.343 N | 103° 34' 11.781 W |
| 15,175.00           | 88.50           | 178.90      | 11,062.14           | -4,454.56  | 114.07     | 531,743.95          | 735,463.96         | 32° 27' 34.423 N | 103° 34' 11.772 W |
| 15,269.00           | 87.60           | 179.00      | 11,065.34           | -4,548.48  | 115.79     | 531,650.03          | 735,465.69         | 32° 27' 33.493 N | 103° 34' 11.760 W |
| 15,362.00           | 89.00           | 178.20      | 11,068.10           | -4,641.41  | 118.06     | 531,557.10          | 735,467.96         | 32° 27' 32.574 N | 103° 34' 11.741 W |
| 15,456.00           | 88.30           | 178.50      | 11,070.32           | -4,735.35  | 120.77     | 531,463.16          | 735,470.66         | 32° 27' 31.644 N | 103° 34' 11.717 W |
| 15,549.00           | 87.40           | 178.00      | 11,073.80           | -4,828.24  | 123.60     | 531,370.27          | 735,473.50         | 32° 27' 30.725 N | 103° 34' 11.692 W |
| 15,643.00           | 88.80           | 178.30      | 11,076.92           | -4,922.13  | 126.64     | 531,276.38          | 735,476.53         | 32° 27' 29.795 N | 103° 34' 11.664 W |
| 15,736.00           | 88.60           | 178.50      | 11,079.03           | -5,015.07  | 129.23     | 531,183.44          | 735,479.13         | 32° 27' 28.875 N | 103° 34' 11.642 W |
| 15,830.00           | 88.40           | 178.90      | 11,081.49           | -5,109.02  | 131.37     | 531,089.49          | 735,481.26         | 32° 27' 27.946 N | 103° 34' 11.625 W |
| 15,924.00           | 89.40           | 178.40      | 11,083.30           | -5,202.97  | 133.58     | 530,995.54          | 735,483.48         | 32° 27' 27.016 N | 103° 34' 11.607 W |



|           |                            |                              |                                       |
|-----------|----------------------------|------------------------------|---------------------------------------|
| Company:  | COG Operating L L C        | Local Co-ordinate Reference: | Well Warbler State Com 4H             |
| Project:  | Lea County, NM (NAD27 NME) | TVD Reference:               | KB=26' @ 3784.00ft (Scandril Freedom) |
| Site:     | Sec. 16, T 21 S. , R 33 E  | MD Reference:                | KB=26' @ 3784.00ft (Scandril Freedom) |
| Well:     | Warbler State Com 4H       | North Reference:             | Grid                                  |
| Wellbore: | Wellbore #1                | Survey Calculation Method:   | Minimum Curvature                     |
| Design:   | Wellbore #1                | Database:                    | EDM 5000.1 Multi User Db              |

## Survey

| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude         | Longitude         |
|---------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|------------------|-------------------|
| 16,018.00           | 88.80           | 178.80      | 11,084.77           | -5,296.93  | 135.88     | 530,901.58          | 735,485.77         | 32° 27' 26.086 N | 103° 34' 11.588 W |
| 16,111.00           | 88.50           | 179.30      | 11,086.96           | -5,389.89  | 137.42     | 530,808.62          | 735,487.31         | 32° 27' 25.166 N | 103° 34' 11.578 W |
| 16,204.00           | 87.50           | 179.20      | 11,090.21           | -5,482.83  | 138.63     | 530,715.69          | 735,488.53         | 32° 27' 24.246 N | 103° 34' 11.571 W |
| 16,297.00           | 86.70           | 179.70      | 11,094.91           | -5,575.70  | 139.53     | 530,622.81          | 735,489.42         | 32° 27' 23.327 N | 103° 34' 11.569 W |
| 16,391.00           | 86.60           | 177.90      | 11,100.41           | -5,669.52  | 141.49     | 530,529.00          | 735,491.39         | 32° 27' 22.399 N | 103° 34' 11.553 W |
| 16,484.00           | 88.20           | 178.40      | 11,104.63           | -5,762.37  | 144.49     | 530,436.14          | 735,494.39         | 32° 27' 21.480 N | 103° 34' 11.526 W |
| 16,577.00           | 89.90           | 179.00      | 11,106.17           | -5,855.33  | 146.60     | 530,343.18          | 735,496.50         | 32° 27' 20.560 N | 103° 34' 11.509 W |
| 16,671.00           | 89.30           | 179.70      | 11,106.82           | -5,949.32  | 147.67     | 530,249.19          | 735,497.56         | 32° 27' 19.630 N | 103° 34' 11.505 W |
| 16,764.00           | 89.90           | 177.90      | 11,107.47           | -6,042.29  | 149.61     | 530,156.22          | 735,499.51         | 32° 27' 18.710 N | 103° 34' 11.490 W |
| 16,858.00           | 89.90           | 177.70      | 11,107.64           | -6,136.22  | 153.22     | 530,062.29          | 735,503.12         | 32° 27' 17.780 N | 103° 34' 11.456 W |
| 16,951.00           | 89.40           | 178.10      | 11,108.21           | -6,229.16  | 156.63     | 529,969.35          | 735,506.53         | 32° 27' 16.860 N | 103° 34' 11.424 W |
| 17,046.00           | 88.50           | 178.20      | 11,109.95           | -6,324.09  | 159.70     | 529,874.42          | 735,509.59         | 32° 27' 15.920 N | 103° 34' 11.396 W |
| 17,140.00           | 87.50           | 178.60      | 11,113.23           | -6,418.00  | 162.32     | 529,780.52          | 735,512.21         | 32° 27' 14.991 N | 103° 34' 11.373 W |
| 17,234.00           | 88.70           | 178.10      | 11,116.34           | -6,511.91  | 165.02     | 529,686.61          | 735,514.92         | 32° 27' 14.062 N | 103° 34' 11.349 W |
| 17,327.00           | 88.70           | 176.50      | 11,118.45           | -6,604.77  | 169.40     | 529,593.74          | 735,519.30         | 32° 27' 13.142 N | 103° 34' 11.306 W |
| 17,421.00           | 89.70           | 177.30      | 11,119.77           | -6,698.63  | 174.49     | 529,499.89          | 735,524.38         | 32° 27' 12.213 N | 103° 34' 11.254 W |
| 17,514.00           | 89.30           | 177.60      | 11,120.58           | -6,791.53  | 178.62     | 529,406.99          | 735,528.52         | 32° 27' 11.294 N | 103° 34' 11.214 W |
| 17,607.00           | 87.80           | 178.10      | 11,122.93           | -6,884.43  | 182.11     | 529,314.08          | 735,532.01         | 32° 27' 10.374 N | 103° 34' 11.181 W |
| 17,700.00           | 89.10           | 179.00      | 11,125.45           | -6,977.37  | 184.46     | 529,221.15          | 735,534.36         | 32° 27' 9.454 N  | 103° 34' 11.161 W |
| 17,793.00           | 90.10           | 177.50      | 11,126.10           | -7,070.32  | 187.30     | 529,128.20          | 735,537.20         | 32° 27' 8.534 N  | 103° 34' 11.136 W |
| 17,887.00           | 89.00           | 178.00      | 11,126.83           | -7,164.24  | 190.99     | 529,034.28          | 735,540.89         | 32° 27' 7.605 N  | 103° 34' 11.101 W |
| 17,981.00           | 90.00           | 177.40      | 11,127.65           | -7,258.16  | 194.77     | 528,940.36          | 735,544.66         | 32° 27' 6.675 N  | 103° 34' 11.064 W |
| 18,074.00           | 88.80           | 177.30      | 11,128.63           | -7,351.05  | 199.07     | 528,847.47          | 735,548.96         | 32° 27' 5.756 N  | 103° 34' 11.022 W |
| 18,168.00           | 90.80           | 177.40      | 11,128.96           | -7,444.95  | 203.41     | 528,753.57          | 735,553.31         | 32° 27' 4.826 N  | 103° 34' 10.979 W |
| 18,261.00           | 89.70           | 178.10      | 11,128.55           | -7,537.87  | 207.06     | 528,660.65          | 735,556.96         | 32° 27' 3.907 N  | 103° 34' 10.944 W |
| 18,355.00           | 90.70           | 178.20      | 11,128.22           | -7,631.82  | 210.10     | 528,566.70          | 735,559.99         | 32° 27' 2.977 N  | 103° 34' 10.917 W |
| 18,448.00           | 91.70           | 178.00      | 11,126.27           | -7,724.75  | 213.18     | 528,473.77          | 735,563.08         | 32° 27' 2.057 N  | 103° 34' 10.888 W |
| 18,536.00           | 91.80           | 178.60      | 11,123.59           | -7,812.67  | 215.79     | 528,385.85          | 735,565.69         | 32° 27' 1.187 N  | 103° 34' 10.865 W |
| 18,630.00           | 90.40           | 177.70      | 11,121.78           | -7,906.60  | 218.82     | 528,291.92          | 735,568.72         | 32° 27' 0.257 N  | 103° 34' 10.838 W |
| 18,723.00           | 91.40           | 177.20      | 11,120.32           | -7,999.49  | 222.96     | 528,199.03          | 735,572.86         | 32° 26' 59.338 N | 103° 34' 10.797 W |
| 18,817.00           | 89.50           | 178.20      | 11,119.58           | -8,093.41  | 226.73     | 528,105.11          | 735,576.63         | 32° 26' 58.408 N | 103° 34' 10.761 W |
| 18,910.00           | 90.60           | 178.20      | 11,119.50           | -8,186.36  | 229.65     | 528,012.16          | 735,579.55         | 32° 26' 57.488 N | 103° 34' 10.735 W |
| 19,004.00           | 88.80           | 178.90      | 11,119.99           | -8,280.33  | 232.03     | 527,918.19          | 735,581.93         | 32° 26' 56.558 N | 103° 34' 10.715 W |
| 19,097.00           | 90.20           | 178.20      | 11,120.81           | -8,373.29  | 234.39     | 527,825.23          | 735,584.28         | 32° 26' 55.638 N | 103° 34' 10.695 W |
| 19,190.00           | 91.80           | 178.10      | 11,119.18           | -8,466.22  | 237.39     | 527,732.30          | 735,587.28         | 32° 26' 54.718 N | 103° 34' 10.668 W |
| 19,283.00           | 90.70           | 177.30      | 11,117.15           | -8,559.12  | 241.12     | 527,639.39          | 735,591.01         | 32° 26' 53.799 N | 103° 34' 10.632 W |
| 19,377.00           | 89.80           | 177.50      | 11,116.74           | -8,653.03  | 245.38     | 527,545.49          | 735,595.28         | 32° 26' 52.869 N | 103° 34' 10.590 W |
| 19,470.00           | 88.50           | 177.60      | 11,118.12           | -8,745.93  | 249.36     | 527,452.59          | 735,599.25         | 32° 26' 51.950 N | 103° 34' 10.551 W |
| 19,563.00           | 90.00           | 177.70      | 11,119.34           | -8,838.84  | 253.17     | 527,359.68          | 735,603.07         | 32° 26' 51.030 N | 103° 34' 10.515 W |
| 19,657.00           | 88.80           | 178.40      | 11,120.33           | -8,932.78  | 256.37     | 527,265.74          | 735,606.26         | 32° 26' 50.100 N | 103° 34' 10.485 W |
| 19,750.00           | 90.50           | 178.60      | 11,120.89           | -9,025.74  | 258.80     | 527,172.78          | 735,608.70         | 32° 26' 49.180 N | 103° 34' 10.465 W |
| 19,845.00           | 89.30           | 179.70      | 11,121.06           | -9,120.73  | 260.21     | 527,077.79          | 735,610.11         | 32° 26' 48.240 N | 103° 34' 10.456 W |
| 19,938.00           | 91.00           | 179.30      | 11,120.82           | -9,213.72  | 261.02     | 526,984.80          | 735,610.92         | 32° 26' 47.320 N | 103° 34' 10.454 W |
| 20,032.00           | 88.50           | 180.30      | 11,121.23           | -9,307.71  | 261.35     | 526,890.81          | 735,611.25         | 32° 26' 46.390 N | 103° 34' 10.458 W |
| 20,125.00           | 90.00           | 180.00      | 11,122.44           | -9,400.70  | 261.11     | 526,797.82          | 735,611.00         | 32° 26' 45.470 N | 103° 34' 10.469 W |
| 20,219.00           | 88.50           | 179.60      | 11,123.67           | -9,494.69  | 261.44     | 526,703.83          | 735,611.33         | 32° 26' 44.540 N | 103° 34' 10.473 W |
| 20,312.00           | 90.40           | 179.20      | 11,124.57           | -9,587.67  | 262.41     | 526,610.85          | 735,612.31         | 32° 26' 43.620 N | 103° 34' 10.469 W |
| 20,406.00           | 92.40           | 179.30      | 11,122.27           | -9,681.63  | 263.64     | 526,516.89          | 735,613.54         | 32° 26' 42.690 N | 103° 34' 10.463 W |
| 20,500.00           | 90.70           | 179.20      | 11,119.73           | -9,775.59  | 264.87     | 526,422.94          | 735,614.77         | 32° 26' 41.760 N | 103° 34' 10.456 W |
| 20,594.00           | 88.50           | 178.80      | 11,120.38           | -9,869.56  | 266.51     | 526,328.96          | 735,616.41         | 32° 26' 40.830 N | 103° 34' 10.445 W |
| 20,687.00           | 89.60           | 179.30      | 11,121.93           | -9,962.54  | 268.05     | 526,235.99          | 735,617.95         | 32° 26' 39.910 N | 103° 34' 10.435 W |
| 20,780.00           | 91.50           | 179.40      | 11,121.03           | -10,055.52 | 269.11     | 526,143.00          | 735,619.00         | 32° 26' 38.990 N | 103° 34' 10.430 W |
| 20,874.00           | 89.50           | 178.50      | 11,120.21           | -10,149.50 | 270.83     | 526,049.03          | 735,620.73         | 32° 26' 38.060 N | 103° 34' 10.418 W |
| 20,967.00           | 88.90           | 178.30      | 11,121.51           | -10,242.45 | 273.43     | 525,956.07          | 735,623.32         | 32° 26' 37.140 N | 103° 34' 10.395 W |
| 21,060.00           | 90.40           | 178.00      | 11,122.08           | -10,335.40 | 276.43     | 525,863.12          | 735,626.32         | 32° 26' 36.220 N | 103° 34' 10.368 W |



|                  |                            |                                     |                                        |
|------------------|----------------------------|-------------------------------------|----------------------------------------|
| <b>Company:</b>  | COG Operating L L C        | <b>Local Co-ordinate Reference:</b> | Well Warbler State Com 4H              |
| <b>Project:</b>  | Lea County, NM (NAD27 NME) | <b>TVD Reference:</b>               | KB=26' @ 3784.00ft (Scandriil Freedom) |
| <b>Site:</b>     | Sec. 16, T 21 S. , R 33 E  | <b>MD Reference:</b>                | KB=26' @ 3784.00ft (Scandriil Freedom) |
| <b>Well:</b>     | Warbler State Com 4H       | <b>North Reference:</b>             | Grid                                   |
| <b>Wellbore:</b> | Wellbore #1                | <b>Survey Calculation Method:</b>   | Minimum Curvature                      |
| <b>Design:</b>   | Wellbore #1                | <b>Database:</b>                    | EDM 5000.1 Multi User Db               |

## Survey

| Measured Depth (ft)         | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Map Northing (usft) | Map Easting (usft) | Latitude         | Longitude         |
|-----------------------------|-----------------|-------------|---------------------|------------|------------|---------------------|--------------------|------------------|-------------------|
| 21,148.00                   | 91.60           | 177.90      | 11,120.54           | -10,423.33 | 279.58     | 525,775.20          | 735,629.47         | 32° 26' 35.349 N | 103° 34' 10.339 W |
| <b>Final IDS MWD Survey</b> |                 |             |                     |            |            |                     |                    |                  |                   |
| 21,200.00                   | 91.60           | 177.90      | 11,119.09           | -10,475.27 | 281.48     | 525,723.25          | 735,631.38         | 32° 26' 34.835 N | 103° 34' 10.321 W |
| <b>Projection to TD</b>     |                 |             |                     |            |            |                     |                    |                  |                   |

## Design Annotations

| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates |            | Comment              |
|---------------------|---------------------|-------------------|------------|----------------------|
|                     |                     | +N/-S (ft)        | +E/-W (ft) |                      |
| 10,368.00           | 10,367.01           | -4.80             | -0.76      | First IDS MWD Survey |
| 21,148.00           | 11,120.54           | -10,423.33        | 279.58     | Final IDS MWD Survey |
| 21,200.00           | 11,119.09           | -10,475.27        | 281.48     | Projection to TD     |

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



Company: COG Operating  
Lease/Well: Warbler State Com No./004H

Rig Name: Scan Freedom  
State/County: New Mexico/Lea  
VS-Azi: 0.00 Degrees  
Latitude: 32.47181, Longitude: -103.57020  
Grid North = True North -0.41 degs (NAD 27)  
Grid Correction Applied = -0.41 degs



Depth Reference : RKB = 27.5 Foot

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey-de\_01.ut

Minimum Curvature Method

Report Date/Time: 8/3/2016 / 12:23

VES Survey International

Midland Tx

(432) 563-5444

Surveyor: Gene Heiss

Warbler State Com No 004H / API 30-025-43310

| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Vertical<br>Section<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 0.00                    | 0.00                 | 0.00                      | 0.00      | 0.00        | 0.00        | 0.00                      | 0.00                      | 0.00                        | ****                          |
| 100.00                  | 0.31                 | 154.78                    | 100.00    | -0.24       | 0.11        | -0.24                     | 0.27                      | 154.78                      | 0.31                          |
| 200.00                  | 0.33                 | 171.37                    | 200.00    | -0.77       | 0.27        | -0.77                     | 0.81                      | 160.53                      | 0.09                          |
| 300.00                  | 0.63                 | 156.58                    | 299.99    | -1.56       | 0.53        | -1.56                     | 1.65                      | 161.07                      | 0.33                          |
| 400.00                  | 1.21                 | 168.85                    | 399.98    | -3.10       | 0.96        | -3.10                     | 3.24                      | 162.82                      | 0.60                          |
| 500.00                  | 1.93                 | 160.38                    | 499.94    | -5.72       | 1.73        | -5.72                     | 5.97                      | 163.19                      | 0.76                          |
| 600.00                  | 2.32                 | 161.52                    | 599.87    | -9.22       | 2.93        | -9.22                     | 9.68                      | 162.35                      | 0.39                          |
| 700.00                  | 1.62                 | 160.39                    | 699.81    | -12.48      | 4.05        | -12.48                    | 13.12                     | 162.01                      | 0.70                          |
| 800.00                  | 0.70                 | 143.09                    | 799.79    | -14.30      | 4.90        | -14.30                    | 15.12                     | 161.11                      | 0.97                          |
| 900.00                  | 0.24                 | 103.11                    | 899.79    | -14.84      | 5.47        | -14.84                    | 15.82                     | 159.77                      | 0.54                          |
| 1000.00                 | 0.21                 | 117.44                    | 999.79    | -14.97      | 5.84        | -14.97                    | 16.07                     | 158.71                      | 0.07                          |
| 1100.00                 | 0.19                 | 106.07                    | 1099.79   | -15.10      | 6.16        | -15.10                    | 16.31                     | 157.82                      | 0.04                          |
| 1200.00                 | 0.18                 | 99.98                     | 1199.79   | -15.18      | 6.48        | -15.18                    | 16.50                     | 156.89                      | 0.02                          |
| 1300.00                 | 0.05                 | 82.25                     | 1299.79   | -15.20      | 6.68        | -15.20                    | 16.61                     | 156.26                      | 0.13                          |
| 1400.00                 | 0.18                 | 53.69                     | 1399.79   | -15.10      | 6.86        | -15.10                    | 16.59                     | 155.58                      | 0.13                          |
| 1500.00                 | 0.13                 | 334.48                    | 1499.79   | -14.91      | 6.94        | -14.91                    | 16.44                     | 155.05                      | 0.20                          |
| 1600.00                 | 0.22                 | 278.87                    | 1599.79   | -14.78      | 6.70        | -14.78                    | 16.23                     | 155.61                      | 0.18                          |

| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Vertical<br>Section<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 1700.00                 | 0.09                 | 212.66                    | 1699.79   | -14.82      | 6.47        | -14.82                    | 16.17                     | 156.42                      | 0.20                          |
| 1800.00                 | 0.20                 | 217.66                    | 1799.79   | -15.02      | 6.32        | -15.02                    | 16.30                     | 157.18                      | 0.11                          |
| 1900.00                 | 0.29                 | 266.17                    | 1899.78   | -15.18      | 5.96        | -15.18                    | 16.30                     | 158.56                      | 0.22                          |
| 2000.00                 | 0.08                 | 210.46                    | 1999.78   | -15.25      | 5.67        | -15.25                    | 16.27                     | 159.60                      | 0.25                          |
| 2100.00                 | 0.11                 | 206.42                    | 2099.78   | -15.40      | 5.60        | -15.40                    | 16.38                     | 160.03                      | 0.03                          |
| 2200.00                 | 0.26                 | 220.85                    | 2199.78   | -15.65      | 5.40        | -15.65                    | 16.56                     | 160.95                      | 0.16                          |
| 2300.00                 | 0.14                 | 239.58                    | 2299.78   | -15.89      | 5.15        | -15.89                    | 16.70                     | 162.03                      | 0.14                          |
| 2400.00                 | 0.29                 | 247.68                    | 2399.78   | -16.04      | 4.82        | -16.04                    | 16.75                     | 163.28                      | 0.15                          |
| 2500.00                 | 0.12                 | 222.08                    | 2499.78   | -16.22      | 4.52        | -16.22                    | 16.83                     | 164.43                      | 0.18                          |
| 2600.00                 | 0.08                 | 244.37                    | 2599.78   | -16.32      | 4.39        | -16.32                    | 16.90                     | 164.96                      | 0.06                          |
| 2700.00                 | 0.08                 | 238.69                    | 2699.78   | -16.39      | 4.27        | -16.39                    | 16.93                     | 165.41                      | 0.01                          |
| 2800.00                 | 0.21                 | 265.65                    | 2799.78   | -16.44      | 4.02        | -16.44                    | 16.92                     | 166.26                      | 0.14                          |
| 2900.00                 | 0.21                 | 352.35                    | 2899.78   | -16.28      | 3.81        | -16.28                    | 16.72                     | 166.83                      | 0.29                          |
| 3000.00                 | 0.31                 | 52.44                     | 2999.78   | -15.93      | 4.00        | -15.93                    | 16.43                     | 165.90                      | 0.28                          |
| 3100.00                 | 0.70                 | 37.07                     | 3099.78   | -15.27      | 4.59        | -15.27                    | 15.95                     | 163.28                      | 0.41                          |
| 3200.00                 | 0.83                 | 44.34                     | 3199.77   | -14.27      | 5.46        | -14.27                    | 15.28                     | 159.04                      | 0.16                          |
| 3300.00                 | 0.99                 | 60.37                     | 3299.75   | -13.32      | 6.72        | -13.32                    | 14.92                     | 153.24                      | 0.30                          |
| 3400.00                 | 0.99                 | 47.03                     | 3399.74   | -12.31      | 8.10        | -12.31                    | 14.74                     | 146.66                      | 0.23                          |
| 3500.00                 | 0.96                 | 54.51                     | 3499.73   | -11.24      | 9.41        | -11.24                    | 14.66                     | 140.05                      | 0.13                          |
| 3600.00                 | 1.04                 | 66.59                     | 3599.71   | -10.39      | 10.93       | -10.39                    | 15.08                     | 133.55                      | 0.23                          |
| 3700.00                 | 1.18                 | 65.85                     | 3699.69   | -9.61       | 12.71       | -9.61                     | 15.93                     | 127.09                      | 0.14                          |
| 3800.00                 | 1.12                 | 72.31                     | 3799.67   | -8.89       | 14.58       | -8.89                     | 17.07                     | 121.37                      | 0.14                          |
| 3900.00                 | 1.14                 | 72.35                     | 3899.65   | -8.29       | 16.46       | -8.29                     | 18.42                     | 116.73                      | 0.02                          |
| 4000.00                 | 0.93                 | 74.23                     | 3999.64   | -7.77       | 18.19       | -7.77                     | 19.77                     | 113.12                      | 0.21                          |
| 4100.00                 | 0.93                 | 58.89                     | 4099.62   | -7.13       | 19.66       | -7.13                     | 20.91                     | 109.93                      | 0.25                          |
| 4200.00                 | 0.96                 | 68.52                     | 4199.61   | -6.40       | 21.13       | -6.40                     | 22.08                     | 106.85                      | 0.16                          |
| 4300.00                 | 1.11                 | 64.97                     | 4299.59   | -5.68       | 22.79       | -5.68                     | 23.49                     | 104.00                      | 0.16                          |
| 4400.00                 | 1.00                 | 54.34                     | 4399.58   | -4.77       | 24.38       | -4.77                     | 24.84                     | 101.07                      | 0.22                          |
| 4500.00                 | 1.16                 | 74.28                     | 4499.56   | -3.99       | 26.06       | -3.99                     | 26.36                     | 98.69                       | 0.41                          |
| 4600.00                 | 0.96                 | 80.22                     | 4599.54   | -3.57       | 27.86       | -3.57                     | 28.09                     | 97.30                       | 0.22                          |
| 4700.00                 | 0.82                 | 97.07                     | 4699.53   | -3.51       | 29.41       | -3.51                     | 29.62                     | 96.81                       | 0.30                          |
| 4800.00                 | 0.78                 | 96.64                     | 4799.52   | -3.68       | 30.80       | -3.68                     | 31.01                     | 96.81                       | 0.05                          |
| 4900.00                 | 0.59                 | 82.37                     | 4899.51   | -3.69       | 31.98       | -3.69                     | 32.19                     | 96.58                       | 0.26                          |
| 5000.00                 | 0.51                 | 96.83                     | 4999.51   | -3.68       | 32.93       | -3.68                     | 33.13                     | 96.37                       | 0.16                          |
| 5100.00                 | 0.35                 | 100.93                    | 5099.50   | -3.79       | 33.68       | -3.79                     | 33.89                     | 96.42                       | 0.16                          |
| 5200.00                 | 0.24                 | 108.61                    | 5199.50   | -3.91       | 34.18       | -3.91                     | 34.40                     | 96.53                       | 0.12                          |
| 5300.00                 | 0.21                 | 63.47                     | 5299.50   | -3.90       | 34.54       | -3.90                     | 34.76                     | 96.44                       | 0.17                          |
| 5400.00                 | 0.24                 | 76.64                     | 5399.50   | -3.77       | 34.91       | -3.77                     | 35.11                     | 96.16                       | 0.06                          |
| 5500.00                 | 0.17                 | 33.89                     | 5499.50   | -3.60       | 35.19       | -3.60                     | 35.38                     | 95.83                       | 0.16                          |

| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Vertical<br>Section<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 5600.00                 | 0.17                 | 65.44                     | 5599.50   | -3.41       | 35.41       | -3.41                     | 35.57                     | 95.50                       | 0.09                          |
| 5700.00                 | 0.14                 | 223.40                    | 5699.50   | -3.44       | 35.46       | -3.44                     | 35.63                     | 95.54                       | 0.30                          |
| 5800.00                 | 0.18                 | 235.42                    | 5799.50   | -3.62       | 35.25       | -3.62                     | 35.43                     | 95.86                       | 0.06                          |
| 5900.00                 | 0.07                 | 30.38                     | 5899.50   | -3.66       | 35.15       | -3.66                     | 35.34                     | 95.94                       | 0.25                          |
| 6000.00                 | 0.17                 | 257.35                    | 5999.50   | -3.63       | 35.03       | -3.63                     | 35.22                     | 95.92                       | 0.22                          |
| 6100.00                 | 0.08                 | 209.44                    | 6099.50   | -3.73       | 34.86       | -3.73                     | 35.06                     | 96.10                       | 0.13                          |
| 6200.00                 | 0.14                 | 9.87                      | 6199.50   | -3.66       | 34.85       | -3.66                     | 35.04                     | 96.00                       | 0.22                          |
| 6300.00                 | 0.21                 | 332.97                    | 6299.50   | -3.38       | 34.78       | -3.38                     | 34.95                     | 95.55                       | 0.13                          |
| 6400.00                 | 0.24                 | 286.90                    | 6399.50   | -3.15       | 34.50       | -3.15                     | 34.64                     | 95.22                       | 0.18                          |
| 6500.00                 | 0.03                 | 268.73                    | 6499.50   | -3.09       | 34.27       | -3.09                     | 34.41                     | 95.16                       | 0.22                          |
| 6600.00                 | 0.05                 | 316.59                    | 6599.50   | -3.06       | 34.21       | -3.06                     | 34.35                     | 95.11                       | 0.04                          |
| 6700.00                 | 0.28                 | 346.23                    | 6699.50   | -2.79       | 34.12       | -2.79                     | 34.24                     | 94.68                       | 0.23                          |
| 6800.00                 | 0.22                 | 333.43                    | 6799.50   | -2.39       | 33.98       | -2.39                     | 34.07                     | 94.03                       | 0.08                          |
| 6900.00                 | 0.50                 | 300.34                    | 6899.49   | -2.00       | 33.52       | -2.00                     | 33.58                     | 93.42                       | 0.34                          |
| 7000.00                 | 0.48                 | 269.23                    | 6999.49   | -1.79       | 32.72       | -1.79                     | 32.77                     | 93.13                       | 0.26                          |
| 7100.00                 | 0.67                 | 253.71                    | 7099.49   | -1.96       | 31.74       | -1.96                     | 31.80                     | 93.53                       | 0.24                          |
| 7200.00                 | 0.50                 | 240.53                    | 7199.48   | -2.34       | 30.79       | -2.34                     | 30.88                     | 94.35                       | 0.22                          |
| 7300.00                 | 0.54                 | 228.44                    | 7299.48   | -2.87       | 30.06       | -2.87                     | 30.19                     | 95.45                       | 0.12                          |
| 7400.00                 | 0.69                 | 212.39                    | 7399.47   | -3.69       | 29.38       | -3.69                     | 29.61                     | 97.15                       | 0.23                          |
| 7500.00                 | 0.56                 | 217.60                    | 7499.47   | -4.58       | 28.77       | -4.58                     | 29.13                     | 99.04                       | 0.14                          |
| 7600.00                 | 0.73                 | 212.54                    | 7599.46   | -5.50       | 28.13       | -5.50                     | 28.66                     | 101.06                      | 0.18                          |
| 7700.00                 | 0.86                 | 222.74                    | 7699.45   | -6.59       | 27.27       | -6.59                     | 28.06                     | 103.58                      | 0.19                          |
| 7800.00                 | 0.64                 | 230.04                    | 7799.44   | -7.50       | 26.34       | -7.50                     | 27.38                     | 105.89                      | 0.24                          |
| 7900.00                 | 0.74                 | 233.23                    | 7899.43   | -8.24       | 25.40       | -8.24                     | 26.70                     | 107.97                      | 0.11                          |
| 8000.00                 | 0.68                 | 226.53                    | 7999.43   | -9.03       | 24.45       | -9.03                     | 26.06                     | 110.27                      | 0.10                          |
| 8100.00                 | 0.83                 | 223.66                    | 8099.42   | -9.96       | 23.52       | -9.96                     | 25.54                     | 112.96                      | 0.15                          |
| 8200.00                 | 0.84                 | 212.30                    | 8199.41   | -11.10      | 22.63       | -11.10                    | 25.21                     | 116.13                      | 0.17                          |
| 8300.00                 | 0.96                 | 204.31                    | 8299.39   | -12.48      | 21.90       | -12.48                    | 25.20                     | 119.68                      | 0.17                          |
| 8400.00                 | 0.91                 | 194.13                    | 8399.38   | -14.01      | 21.36       | -14.01                    | 25.55                     | 123.27                      | 0.17                          |
| 8500.00                 | 0.84                 | 209.03                    | 8499.37   | -15.43      | 20.81       | -15.43                    | 25.91                     | 126.56                      | 0.24                          |
| 8600.00                 | 0.88                 | 184.44                    | 8599.36   | -16.83      | 20.39       | -16.83                    | 26.44                     | 129.54                      | 0.37                          |
| 8700.00                 | 1.06                 | 199.56                    | 8699.34   | -18.46      | 20.03       | -18.46                    | 27.24                     | 132.68                      | 0.31                          |
| 8800.00                 | 0.96                 | 202.24                    | 8799.33   | -20.11      | 19.40       | -20.11                    | 27.94                     | 136.03                      | 0.10                          |
| 8900.00                 | 0.66                 | 207.93                    | 8899.32   | -21.40      | 18.81       | -21.40                    | 28.49                     | 138.68                      | 0.31                          |
| 9000.00                 | 0.72                 | 259.44                    | 8999.31   | -22.02      | 17.92       | -22.02                    | 28.39                     | 140.86                      | 0.60                          |
| 9100.00                 | 1.10                 | 272.56                    | 9099.30   | -22.10      | 16.34       | -22.10                    | 27.48                     | 143.52                      | 0.43                          |
| 9200.00                 | 1.12                 | 272.51                    | 9199.28   | -22.01      | 14.40       | -22.01                    | 26.31                     | 146.80                      | 0.01                          |
| 9300.00                 | 1.21                 | 271.52                    | 9299.26   | -21.94      | 12.38       | -21.94                    | 25.19                     | 150.57                      | 0.09                          |
| 9400.00                 | 1.27                 | 276.43                    | 9399.24   | -21.79      | 10.22       | -21.79                    | 24.07                     | 154.86                      | 0.12                          |

| Measured<br>Depth<br>FT | Incl<br>Angle<br>Deg | Drift<br>Direction<br>Deg | TVD<br>FT | +N/-S<br>FT | +E/-W<br>FT | Vertical<br>Section<br>FT | Closure<br>Distance<br>FT | Closure<br>Direction<br>Deg | Dogleg<br>Severity<br>Deg/100 |
|-------------------------|----------------------|---------------------------|-----------|-------------|-------------|---------------------------|---------------------------|-----------------------------|-------------------------------|
| 9500.00                 | 1.20                 | 306.71                    | 9499.21   | -21.04      | 8.28        | -21.04                    | 22.61                     | 158.52                      | 0.65                          |
| 9600.00                 | 1.12                 | 331.78                    | 9599.20   | -19.55      | 6.98        | -19.55                    | 20.76                     | 160.36                      | 0.51                          |
| 9700.00                 | 1.14                 | 332.20                    | 9699.18   | -17.81      | 6.05        | -17.81                    | 18.81                     | 161.23                      | 0.03                          |
| 9800.00                 | 1.28                 | 337.35                    | 9799.15   | -15.89      | 5.16        | -15.89                    | 16.71                     | 162.03                      | 0.18                          |
| 9900.00                 | 1.36                 | 337.79                    | 9899.13   | -13.76      | 4.28        | -13.76                    | 14.41                     | 162.74                      | 0.08                          |
| 10000.00                | 1.21                 | 338.44                    | 9999.10   | -11.69      | 3.44        | -11.69                    | 12.18                     | 163.60                      | 0.16                          |
| 10100.00                | 1.16                 | 322.87                    | 10099.08  | -9.90       | 2.44        | -9.90                     | 10.20                     | 166.14                      | 0.32                          |
| 10200.00                | 1.24                 | 327.78                    | 10199.06  | -8.17       | 1.25        | -8.17                     | 8.27                      | 171.29                      | 0.13                          |
| 10270.00                | 1.17                 | 325.03                    | 10269.04  | -6.95       | 0.44        | -6.95                     | 6.96                      | 176.38                      | 0.14                          |

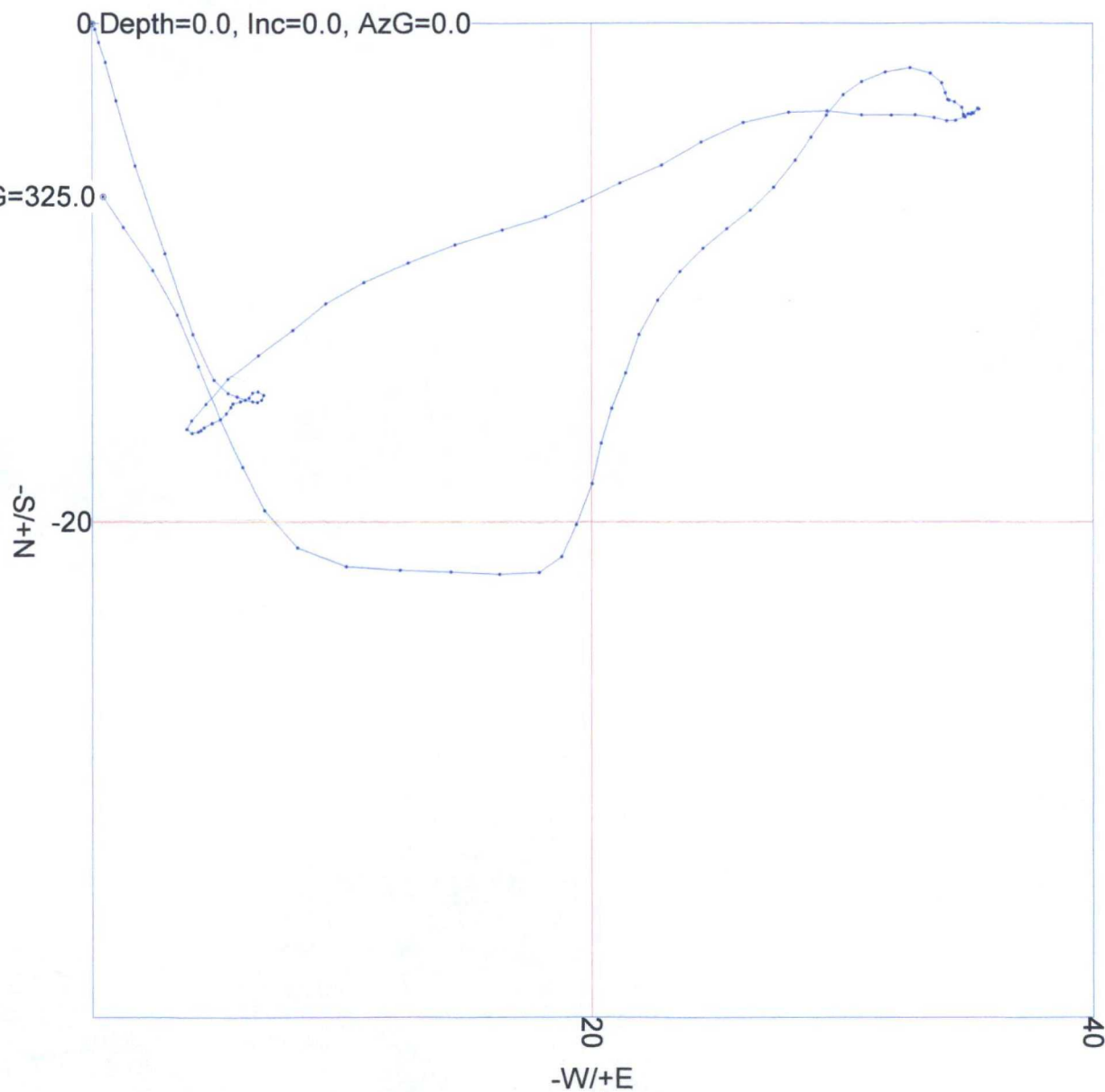


VES Survey International  
Midland Tx  
(432) 563-5444  
Surveyor: Gene Heiss  
Warbler State Com No 004H / API 30-025-43310



0 Depth=0.0, Inc=0.0, AzG=0.0

Depth=10270.0, Inc=1.2, AzG=325.0



VES Survey Date: 7/24/2016



I Gene Heiss certify that I am employed by VES Survey International. That I did on the day(s) of 07/24/16 through 07/24/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 10,270.00 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of Concho for the Warbler State Com Well # 4H API # 30-025-43310 in Lea County / Parish New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by VES Survey International.

A handwritten signature in blue ink, appearing to read "Gene Heiss", is written over a horizontal line.

Gene Heiss  
Service Technician  
VES Survey International

August 3, 2016

Concho Resources, Inc.  
One Concho Center  
600 W. Illinois Avenue  
Midland, Texas 79701

Attn: Kanicia Castillo

RE: **Warbler State Com No. 004H**

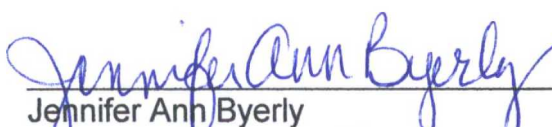
Please find enclosed a copy of the survey from 0' to 10,270' ran on the above referenced well.

Sincerely,

  
Keith Havelka  
Operations

STATE OF TEXAS     §  
                                  §  
COUNTY OF NUECES §

This instrument was acknowledged before me on the 3rd day of August,  
A.D., 2016, by Keith Havelka.

  
Jennifer Ann Byerly  
Notary Public, State of Texas

