



CONCHO

## COG OPERATING LLC

LEA COUNTY, NM

BULLDOG

STOVE PIPE FED COM #21H

OWB

Plan: PWP0

## Survey Report - Geographic

10 January, 2017

**HOBBS OCD**  
**MAY 30 2017**  
**RECEIVED**



# COG Operating LLC

## Survey Report - Geographic

Company: COG OPERATING LLC  
Project: LEA COUNTY, NM  
Site: BULLDOG  
Well: STOVE PIPE FED COM #21H  
Wellbore: OWB  
Design: PWP0

Local Co-ordinate Reference: Well STOVE PIPE FED COM #21H  
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)  
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: EDM\_Users

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project     | LEA COUNTY, NM                       |               |                |
| 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                  | BULLDOG  |                   |                  |
| Site Position:        |          | Northing:         | 398,637.10 usft  |
| From:                 | Map      | Easting:          | 741,887.40 usft  |
| Position Uncertainty: | 0.0 usft | Slot Radius:      | 13-3/16 "        |
|                       |          | Latitude:         | 32° 5' 36.820 N  |
|                       |          | Longitude:        | 103° 33' 8.116 W |
|                       |          | Grid Convergence: | 0.42 °           |

|                      |                         |                     |                   |
|----------------------|-------------------------|---------------------|-------------------|
| Well                 | STOVE PIPE FED COM #21H |                     |                   |
| Well Position        | +N/-S                   | 0.0 usft            | Northing:         |
|                      | +E/-W                   | 0.0 usft            | Easting:          |
| Position Uncertainty | 3.0 usft                | Wellhead Elevation: | usf               |
|                      |                         | Latitude:           | 32° 9' 55.714 N   |
|                      |                         | Longitude:          | 103° 23' 56.768 W |
|                      |                         | Ground Level:       | 3,295.0 usf       |

|           |            |                     |                 |
|-----------|------------|---------------------|-----------------|
| Wellbore  | OWB        |                     |                 |
| Magnetics | Model Name | Sample Date         | Declination (°) |
|           | WMM2015    | 12/19/2016          | 6.94            |
|           |            | Dip Angle (°)       | 60.03           |
|           |            | Field Strength (nT) | 47,963.31120632 |

|                   |                         |               |               |
|-------------------|-------------------------|---------------|---------------|
| Design            | PWP0                    |               |               |
| Audit Notes:      |                         |               |               |
| Version:          | Phase:                  | PROTOTYPE     | Tie On Depth: |
|                   |                         |               | 0.0           |
| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft)  | +E/-W (usft)  |
|                   | 0.0                     | 0.0           | 0.0           |
|                   |                         | Direction (°) | 178.75        |

|                     |           |                     |
|---------------------|-----------|---------------------|
| Survey Tool Program | Date      | 1/9/2017            |
| From (usft)         | To (usft) | Survey (Wellbore)   |
| 0.0                 | 22,526.9  | PWP0 (OWB)          |
|                     |           | Tool Name           |
|                     |           | MWD                 |
|                     |           | Description         |
|                     |           | OWSG MWD - Standard |

|                       |                 |             |                       |              |              |                     |                    |                 |                   |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-----------------|-------------------|
| Planned Survey        |                 |             |                       |              |              |                     |                    |                 |                   |
| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude        | Longitude         |
| 0.0                   | 0.00            | 0.00        | 0.0                   | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 100.0                 | 0.00            | 0.00        | 100.0                 | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 200.0                 | 0.00            | 0.00        | 200.0                 | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 300.0                 | 0.00            | 0.00        | 300.0                 | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 400.0                 | 0.00            | 0.00        | 400.0                 | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 500.0                 | 0.00            | 0.00        | 500.0                 | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 600.0                 | 0.00            | 0.00        | 600.0                 | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 700.0                 | 0.00            | 0.00        | 700.0                 | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 800.0                 | 0.00            | 0.00        | 800.0                 | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 900.0                 | 0.00            | 0.00        | 900.0                 | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 1,000.0               | 0.00            | 0.00        | 1,000.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 1,100.0               | 0.00            | 0.00        | 1,100.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |





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North Reference: Grid  
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Database: EDM\_Users

### Planned Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude        | Longitude         |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-----------------|-------------------|
| 1,200.0               | 0.00            | 0.00        | 1,200.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 1,300.0               | 0.00            | 0.00        | 1,300.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 1,400.0               | 0.00            | 0.00        | 1,400.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 1,500.0               | 0.00            | 0.00        | 1,500.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 1,600.0               | 0.00            | 0.00        | 1,600.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 1,700.0               | 0.00            | 0.00        | 1,700.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 1,800.0               | 0.00            | 0.00        | 1,800.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 1,900.0               | 0.00            | 0.00        | 1,900.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 2,000.0               | 0.00            | 0.00        | 2,000.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 2,100.0               | 0.00            | 0.00        | 2,100.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 2,200.0               | 0.00            | 0.00        | 2,200.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 2,300.0               | 0.00            | 0.00        | 2,300.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 2,400.0               | 0.00            | 0.00        | 2,400.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 2,500.0               | 0.00            | 0.00        | 2,500.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 2,600.0               | 0.00            | 0.00        | 2,600.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 2,700.0               | 0.00            | 0.00        | 2,700.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 2,800.0               | 0.00            | 0.00        | 2,800.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 2,900.0               | 0.00            | 0.00        | 2,900.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 3,000.0               | 0.00            | 0.00        | 3,000.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
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| 3,400.0               | 0.00            | 0.00        | 3,400.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 3,500.0               | 0.00            | 0.00        | 3,500.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 3,600.0               | 0.00            | 0.00        | 3,600.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
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|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-----------------|-------------------|
| 6,700.0               | 0.00            | 0.00        | 6,700.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 6,800.0               | 0.00            | 0.00        | 6,800.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
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| 8,000.0               | 0.00            | 0.00        | 8,000.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 8,100.0               | 0.00            | 0.00        | 8,100.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
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| 8,800.0               | 0.00            | 0.00        | 8,800.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 8,900.0               | 0.00            | 0.00        | 8,900.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 9,000.0               | 0.00            | 0.00        | 9,000.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 9,100.0               | 0.00            | 0.00        | 9,100.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 9,200.0               | 0.00            | 0.00        | 9,200.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 9,300.0               | 0.00            | 0.00        | 9,300.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 9,400.0               | 0.00            | 0.00        | 9,400.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 9,500.0               | 0.00            | 0.00        | 9,500.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 9,600.0               | 0.00            | 0.00        | 9,600.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 9,700.0               | 0.00            | 0.00        | 9,700.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 9,800.0               | 0.00            | 0.00        | 9,800.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 9,900.0               | 0.00            | 0.00        | 9,900.0               | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 10,000.0              | 0.00            | 0.00        | 10,000.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 10,100.0              | 0.00            | 0.00        | 10,100.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 10,200.0              | 0.00            | 0.00        | 10,200.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 10,300.0              | 0.00            | 0.00        | 10,300.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 10,400.0              | 0.00            | 0.00        | 10,400.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 10,500.0              | 0.00            | 0.00        | 10,500.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 10,600.0              | 0.00            | 0.00        | 10,600.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 10,700.0              | 0.00            | 0.00        | 10,700.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 10,800.0              | 0.00            | 0.00        | 10,800.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 10,900.0              | 0.00            | 0.00        | 10,900.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 11,000.0              | 0.00            | 0.00        | 11,000.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 11,100.0              | 0.00            | 0.00        | 11,100.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 11,200.0              | 0.00            | 0.00        | 11,200.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 11,300.0              | 0.00            | 0.00        | 11,300.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 11,400.0              | 0.00            | 0.00        | 11,400.0              | 0.970        | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 11,500.0              | 0.00            | 0.00        | 11,500.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 11,600.0              | 0.00            | 0.00        | 11,600.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 11,700.0              | 0.00            | 0.00        | 11,700.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 11,800.0              | 0.00            | 0.00        | 11,800.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 11,900.0              | 0.00            | 0.00        | 11,900.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 12,000.0              | 0.00            | 0.00        | 12,000.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 12,100.0              | 0.00            | 0.00        | 12,100.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |





# COG Operating LLC

## Survey Report - Geographic

**Company:** COG OPERATING LLC  
**Project:** LEA COUNTY, NM  
**Site:** BULLDOG  
**Well:** STOVE PIPE FED COM #21H  
**Wellbore:** OWB  
**Design:** PWP0

**Local Co-ordinate Reference:** Well STOVE PIPE FED COM #21H  
**TVD Reference:** RKB=3295+29 @ 3324.0usft (NORAM 21)  
**MD Reference:** RKB=3295+29 @ 3324.0usft (NORAM 21)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM\_Users

### Planned Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude        | Longitude         |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-----------------|-------------------|
| 12,200.0              | 0.00            | 0.00        | 12,200.0              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 12,251.5              | 0.00            | 0.00        | 12,251.5              | 0.0          | 0.0          | 425,175.90          | 789,091.00         | 32° 9' 55.714 N | 103° 23' 56.768 W |
| 12,300.0              | 5.82            | 159.60      | 12,299.9              | -2.3         | 0.9          | 425,173.59          | 789,091.86         | 32° 9' 55.691 N | 103° 23' 56.758 W |
| 12,400.0              | 17.82           | 159.60      | 12,397.6              | -21.5        | 8.0          | 425,154.43          | 789,098.98         | 32° 9' 55.501 N | 103° 23' 56.677 W |
| 12,500.0              | 29.82           | 159.60      | 12,488.9              | -59.3        | 22.0         | 425,116.65          | 789,113.03         | 32° 9' 55.126 N | 103° 23' 56.517 W |
| 12,600.0              | 41.82           | 159.60      | 12,569.9              | -114.0       | 42.4         | 425,061.90          | 789,133.39         | 32° 9' 54.582 N | 103° 23' 56.286 W |
| 12,700.0              | 53.82           | 159.60      | 12,636.9              | -183.3       | 68.2         | 424,992.57          | 789,159.18         | 32° 9' 53.894 N | 103° 23' 55.993 W |
| 12,800.0              | 65.82           | 159.60      | 12,687.1              | -264.2       | 98.3         | 424,911.70          | 789,189.25         | 32° 9' 53.091 N | 103° 23' 55.651 W |
| 12,900.0              | 77.81           | 159.60      | 12,718.2              | -353.1       | 131.3        | 424,822.82          | 789,222.31         | 32° 9' 52.209 N | 103° 23' 55.276 W |
| 13,000.0              | 89.81           | 159.60      | 12,729.0              | -446.1       | 165.9        | 424,729.81          | 789,256.90         | 32° 9' 51.285 N | 103° 23' 54.883 W |
| 13,001.6              | 90.00           | 159.60      | 12,729.0              | -447.6       | 166.4        | 424,728.35          | 789,257.44         | 32° 9' 51.271 N | 103° 23' 54.877 W |
| 13,100.0              | 90.12           | 163.54      | 12,728.9              | -540.9       | 197.6        | 424,634.97          | 789,288.56         | 32° 9' 50.344 N | 103° 23' 54.524 W |
| 13,200.0              | 90.24           | 167.53      | 12,728.6              | -637.7       | 222.5        | 424,538.16          | 789,313.53         | 32° 9' 49.384 N | 103° 23' 54.243 W |
| 13,300.0              | 90.36           | 171.53      | 12,728.1              | -736.1       | 240.7        | 424,439.85          | 789,331.70         | 32° 9' 48.410 N | 103° 23' 54.042 W |
| 13,400.0              | 90.48           | 175.53      | 12,727.3              | -835.4       | 252.0        | 424,340.51          | 789,342.96         | 32° 9' 47.426 N | 103° 23' 53.921 W |
| 13,500.0              | 90.60           | 179.53      | 12,726.4              | -935.3       | 256.3        | 424,240.62          | 789,347.27         | 32° 9' 46.437 N | 103° 23' 53.881 W |
| 13,518.0              | 90.62           | 180.25      | 12,726.2              | -953.3       | 256.3        | 424,222.61          | 789,347.30         | 32° 9' 46.259 N | 103° 23' 53.882 W |
| 13,600.0              | 90.62           | 180.25      | 12,725.3              | -1,035.3     | 255.9        | 424,140.63          | 789,346.95         | 32° 9' 45.448 N | 103° 23' 53.895 W |
| 13,700.0              | 90.62           | 180.25      | 12,724.2              | -1,135.3     | 255.5        | 424,040.64          | 789,346.51         | 32° 9' 44.458 N | 103° 23' 53.910 W |
| 13,800.0              | 90.62           | 180.25      | 12,723.1              | -1,235.3     | 255.1        | 423,940.64          | 789,346.08         | 32° 9' 43.469 N | 103° 23' 53.925 W |
| 13,900.0              | 90.62           | 180.25      | 12,722.1              | -1,335.2     | 254.6        | 423,840.65          | 789,345.64         | 32° 9' 42.479 N | 103° 23' 53.940 W |
| 14,000.0              | 90.62           | 180.25      | 12,721.0              | -1,435.2     | 254.2        | 423,740.66          | 789,345.21         | 32° 9' 41.490 N | 103° 23' 53.955 W |
| 14,100.0              | 90.62           | 180.25      | 12,719.9              | -1,535.2     | 253.8        | 423,640.66          | 789,344.77         | 32° 9' 40.501 N | 103° 23' 53.971 W |
| 14,200.0              | 90.62           | 180.25      | 12,718.8              | -1,635.2     | 253.3        | 423,540.67          | 789,344.34         | 32° 9' 39.511 N | 103° 23' 53.986 W |
| 14,300.0              | 90.62           | 180.25      | 12,717.7              | -1,735.2     | 252.9        | 423,440.68          | 789,343.90         | 32° 9' 38.522 N | 103° 23' 54.001 W |
| 14,400.0              | 90.62           | 180.25      | 12,716.7              | -1,835.2     | 252.5        | 423,340.68          | 789,343.47         | 32° 9' 37.532 N | 103° 23' 54.016 W |
| 14,500.0              | 90.62           | 180.25      | 12,715.6              | -1,935.2     | 252.0        | 423,240.69          | 789,343.03         | 32° 9' 36.543 N | 103° 23' 54.031 W |
| 14,600.0              | 90.62           | 180.25      | 12,714.5              | -2,035.2     | 251.6        | 423,140.70          | 789,342.59         | 32° 9' 35.554 N | 103° 23' 54.046 W |
| 14,700.0              | 90.62           | 180.25      | 12,713.4              | -2,135.2     | 251.2        | 423,040.70          | 789,342.16         | 32° 9' 34.564 N | 103° 23' 54.062 W |
| 14,800.0              | 90.62           | 180.25      | 12,712.4              | -2,235.2     | 250.7        | 422,940.71          | 789,341.72         | 32° 9' 33.575 N | 103° 23' 54.077 W |
| 14,900.0              | 90.62           | 180.25      | 12,711.3              | -2,335.2     | 250.3        | 422,840.72          | 789,341.29         | 32° 9' 32.585 N | 103° 23' 54.092 W |
| 15,000.0              | 90.62           | 180.25      | 12,710.2              | -2,435.2     | 249.9        | 422,740.73          | 789,340.85         | 32° 9' 31.596 N | 103° 23' 54.107 W |
| 15,100.0              | 90.62           | 180.25      | 12,709.1              | -2,535.2     | 249.4        | 422,640.73          | 789,340.42         | 32° 9' 30.606 N | 103° 23' 54.122 W |
| 15,200.0              | 90.62           | 180.25      | 12,708.0              | -2,635.2     | 249.0        | 422,540.74          | 789,339.98         | 32° 9' 29.617 N | 103° 23' 54.137 W |
| 15,300.0              | 90.62           | 180.25      | 12,707.0              | -2,735.2     | 248.6        | 422,440.75          | 789,339.55         | 32° 9' 28.628 N | 103° 23' 54.153 W |
| 15,400.0              | 90.62           | 180.25      | 12,705.9              | -2,835.1     | 248.1        | 422,340.75          | 789,339.11         | 32° 9' 27.638 N | 103° 23' 54.168 W |
| 15,500.0              | 90.62           | 180.25      | 12,704.8              | -2,935.1     | 247.7        | 422,240.76          | 789,338.68         | 32° 9' 26.649 N | 103° 23' 54.183 W |
| 15,600.0              | 90.62           | 180.25      | 12,703.7              | -3,035.1     | 247.2        | 422,140.77          | 789,338.24         | 32° 9' 25.659 N | 103° 23' 54.198 W |
| 15,700.0              | 90.62           | 180.25      | 12,702.6              | -3,135.1     | 246.8        | 422,040.77          | 789,337.81         | 32° 9' 24.670 N | 103° 23' 54.213 W |
| 15,800.0              | 90.62           | 180.25      | 12,701.6              | -3,235.1     | 246.4        | 421,940.78          | 789,337.37         | 32° 9' 23.681 N | 103° 23' 54.228 W |
| 15,900.0              | 90.62           | 180.25      | 12,700.5              | -3,335.1     | 245.9        | 421,840.79          | 789,336.94         | 32° 9' 22.691 N | 103° 23' 54.244 W |
| 16,000.0              | 90.62           | 180.25      | 12,699.4              | -3,435.1     | 245.5        | 421,740.79          | 789,336.50         | 32° 9' 21.702 N | 103° 23' 54.259 W |
| 16,100.0              | 90.62           | 180.25      | 12,698.3              | -3,535.1     | 245.1        | 421,640.80          | 789,336.07         | 32° 9' 20.712 N | 103° 23' 54.274 W |
| 16,200.0              | 90.62           | 180.25      | 12,697.3              | -3,635.1     | 244.6        | 421,540.81          | 789,335.63         | 32° 9' 19.723 N | 103° 23' 54.289 W |
| 16,300.0              | 90.62           | 180.25      | 12,696.2              | -3,735.1     | 244.2        | 421,440.81          | 789,335.20         | 32° 9' 18.734 N | 103° 23' 54.304 W |
| 16,400.0              | 90.62           | 180.25      | 12,695.1              | -3,835.1     | 243.8        | 421,340.82          | 789,334.76         | 32° 9' 17.744 N | 103° 23' 54.319 W |
| 16,500.0              | 90.62           | 180.25      | 12,694.0              | -3,935.1     | 243.3        | 421,240.83          | 789,334.33         | 32° 9' 16.755 N | 103° 23' 54.335 W |
| 16,600.0              | 90.62           | 180.25      | 12,692.9              | -4,035.1     | 242.9        | 421,140.83          | 789,333.89         | 32° 9' 15.765 N | 103° 23' 54.350 W |
| 16,700.0              | 90.62           | 180.25      | 12,691.9              | -4,135.1     | 242.5        | 421,040.84          | 789,333.46         | 32° 9' 14.776 N | 103° 23' 54.365 W |
| 16,800.0              | 90.62           | 180.25      | 12,690.8              | -4,235.1     | 242.0        | 420,940.85          | 789,333.02         | 32° 9' 13.786 N | 103° 23' 54.380 W |
| 16,900.0              | 90.62           | 180.25      | 12,689.7              | -4,335.0     | 241.6        | 420,840.85          | 789,332.59         | 32° 9' 12.797 N | 103° 23' 54.395 W |
| 17,000.0              | 90.62           | 180.25      | 12,688.6              | -4,435.0     | 241.2        | 420,740.86          | 789,332.15         | 32° 9' 11.808 N | 103° 23' 54.410 W |
| 17,100.0              | 90.62           | 180.25      | 12,687.5              | -4,535.0     | 240.7        | 420,640.87          | 789,331.72         | 32° 9' 10.818 N | 103° 23' 54.426 W |
| 17,200.0              | 90.62           | 180.25      | 12,686.5              | -4,635.0     | 240.3        | 420,540.87          | 789,331.28         | 32° 9' 9.829 N  | 103° 23' 54.441 W |
| 17,300.0              | 90.62           | 180.25      | 12,685.4              | -4,735.0     | 239.8        | 420,440.88          | 789,330.84         | 32° 9' 8.839 N  | 103° 23' 54.456 W |





# COG Operating LLC

## Survey Report - Geographic

Company: COG OPERATING LLC  
Project: LEA COUNTY, NM  
Site: BULLDOG  
Well: STOVE PIPE FED COM #21H  
Wellbore: OWB  
Design: PWP0

Local Co-ordinate Reference: Well STOVE PIPE FED COM #21H  
TVD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)  
MD Reference: RKB=3295+29 @ 3324.0usft (NORAM 21)  
North Reference: Grid  
Survey Calculation Method: Minimum Curvature  
Database: EDM\_Users

### Planned Survey

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Map Northing (usft) | Map Easting (usft) | Latitude        | Longitude         |
|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|---------------------|--------------------|-----------------|-------------------|
| 17,400.0              | 90.62           | 180.25      | 12,684.3              | -4,835.0     | 239.4        | 420,340.89          | 789,330.41         | 32° 9' 7.850 N  | 103° 23' 54.471 W |
| 17,500.0              | 90.62           | 180.25      | 12,683.2              | -4,935.0     | 239.0        | 420,240.89          | 789,329.97         | 32° 9' 6.861 N  | 103° 23' 54.486 W |
| 17,600.0              | 90.62           | 180.25      | 12,682.1              | -5,035.0     | 238.5        | 420,140.90          | 789,329.54         | 32° 9' 5.871 N  | 103° 23' 54.501 W |
| 17,700.0              | 90.62           | 180.25      | 12,681.1              | -5,135.0     | 238.1        | 420,040.91          | 789,329.10         | 32° 9' 4.882 N  | 103° 23' 54.517 W |
| 17,800.0              | 90.62           | 180.25      | 12,680.0              | -5,235.0     | 237.7        | 419,940.91          | 789,328.67         | 32° 9' 3.892 N  | 103° 23' 54.532 W |
| 17,900.0              | 90.62           | 180.25      | 12,678.9              | -5,335.0     | 237.2        | 419,840.92          | 789,328.23         | 32° 9' 2.903 N  | 103° 23' 54.547 W |
| 18,000.0              | 90.62           | 180.25      | 12,677.8              | -5,435.0     | 236.8        | 419,740.93          | 789,327.80         | 32° 9' 1.913 N  | 103° 23' 54.562 W |
| 18,100.0              | 90.62           | 180.25      | 12,676.8              | -5,535.0     | 236.4        | 419,640.93          | 789,327.36         | 32° 9' 0.924 N  | 103° 23' 54.577 W |
| 18,200.0              | 90.62           | 180.25      | 12,675.7              | -5,635.0     | 235.9        | 419,540.94          | 789,326.93         | 32° 8' 59.935 N | 103° 23' 54.592 W |
| 18,300.0              | 90.62           | 180.25      | 12,674.6              | -5,735.0     | 235.5        | 419,440.95          | 789,326.49         | 32° 8' 58.945 N | 103° 23' 54.607 W |
| 18,400.0              | 90.62           | 180.25      | 12,673.5              | -5,834.9     | 235.1        | 419,340.96          | 789,326.06         | 32° 8' 57.956 N | 103° 23' 54.623 W |
| 18,500.0              | 90.62           | 180.25      | 12,672.4              | -5,934.9     | 234.6        | 419,240.96          | 789,325.62         | 32° 8' 56.966 N | 103° 23' 54.638 W |
| 18,600.0              | 90.62           | 180.25      | 12,671.4              | -6,034.9     | 234.2        | 419,140.97          | 789,325.19         | 32° 8' 55.977 N | 103° 23' 54.653 W |
| 18,700.0              | 90.62           | 180.25      | 12,670.3              | -6,134.9     | 233.8        | 419,040.98          | 789,324.75         | 32° 8' 54.988 N | 103° 23' 54.668 W |
| 18,800.0              | 90.62           | 180.25      | 12,669.2              | -6,234.9     | 233.3        | 418,940.98          | 789,324.32         | 32° 8' 53.998 N | 103° 23' 54.683 W |
| 18,900.0              | 90.62           | 180.25      | 12,668.1              | -6,334.9     | 232.9        | 418,840.99          | 789,323.88         | 32° 8' 53.009 N | 103° 23' 54.698 W |
| 19,000.0              | 90.62           | 180.25      | 12,667.0              | -6,434.9     | 232.4        | 418,741.00          | 789,323.45         | 32° 8' 52.019 N | 103° 23' 54.714 W |
| 19,100.0              | 90.62           | 180.25      | 12,666.0              | -6,534.9     | 232.0        | 418,641.00          | 789,323.01         | 32° 8' 51.030 N | 103° 23' 54.729 W |
| 19,200.0              | 90.62           | 180.25      | 12,664.9              | -6,634.9     | 231.6        | 418,541.01          | 789,322.58         | 32° 8' 50.041 N | 103° 23' 54.744 W |
| 19,300.0              | 90.62           | 180.25      | 12,663.8              | -6,734.9     | 231.1        | 418,441.02          | 789,322.14         | 32° 8' 49.051 N | 103° 23' 54.759 W |
| 19,400.0              | 90.62           | 180.25      | 12,662.7              | -6,834.9     | 230.7        | 418,341.02          | 789,321.71         | 32° 8' 48.062 N | 103° 23' 54.774 W |
| 19,500.0              | 90.62           | 180.25      | 12,661.7              | -6,934.9     | 230.3        | 418,241.03          | 789,321.27         | 32° 8' 47.072 N | 103° 23' 54.789 W |
| 19,600.0              | 90.62           | 180.25      | 12,660.6              | -7,034.9     | 229.8        | 418,141.04          | 789,320.84         | 32° 8' 46.083 N | 103° 23' 54.805 W |
| 19,700.0              | 90.62           | 180.25      | 12,659.5              | -7,134.9     | 229.4        | 418,041.04          | 789,320.40         | 32° 8' 45.093 N | 103° 23' 54.820 W |
| 19,800.0              | 90.62           | 180.25      | 12,658.4              | -7,234.8     | 229.0        | 417,941.05          | 789,319.96         | 32° 8' 44.104 N | 103° 23' 54.835 W |
| 19,900.0              | 90.62           | 180.25      | 12,657.3              | -7,334.8     | 228.5        | 417,841.06          | 789,319.53         | 32° 8' 43.115 N | 103° 23' 54.850 W |
| 20,000.0              | 90.62           | 180.25      | 12,656.3              | -7,434.8     | 228.1        | 417,741.06          | 789,319.09         | 32° 8' 42.125 N | 103° 23' 54.865 W |
| 20,100.0              | 90.62           | 180.25      | 12,655.2              | -7,534.8     | 227.7        | 417,641.07          | 789,318.66         | 32° 8' 41.136 N | 103° 23' 54.880 W |
| 20,200.0              | 90.62           | 180.25      | 12,654.1              | -7,634.8     | 227.2        | 417,541.08          | 789,318.22         | 32° 8' 40.146 N | 103° 23' 54.895 W |
| 20,300.0              | 90.62           | 180.25      | 12,653.0              | -7,734.8     | 226.8        | 417,441.08          | 789,317.79         | 32° 8' 39.157 N | 103° 23' 54.911 W |
| 20,400.0              | 90.62           | 180.25      | 12,651.9              | -7,834.8     | 226.4        | 417,341.09          | 789,317.35         | 32° 8' 38.168 N | 103° 23' 54.926 W |
| 20,500.0              | 90.62           | 180.25      | 12,650.9              | -7,934.8     | 225.9        | 417,241.10          | 789,316.92         | 32° 8' 37.178 N | 103° 23' 54.941 W |
| 20,600.0              | 90.62           | 180.25      | 12,649.8              | -8,034.8     | 225.5        | 417,141.10          | 789,316.48         | 32° 8' 36.189 N | 103° 23' 54.956 W |
| 20,700.0              | 90.62           | 180.25      | 12,648.7              | -8,134.8     | 225.1        | 417,041.11          | 789,316.05         | 32° 8' 35.199 N | 103° 23' 54.971 W |
| 20,800.0              | 90.62           | 180.25      | 12,647.6              | -8,234.8     | 224.6        | 416,941.12          | 789,315.61         | 32° 8' 34.210 N | 103° 23' 54.986 W |
| 20,900.0              | 90.62           | 180.25      | 12,646.6              | -8,334.8     | 224.2        | 416,841.12          | 789,315.18         | 32° 8' 33.220 N | 103° 23' 55.002 W |
| 21,000.0              | 90.62           | 180.25      | 12,645.5              | -8,434.8     | 223.7        | 416,741.13          | 789,314.74         | 32° 8' 32.231 N | 103° 23' 55.017 W |
| 21,100.0              | 90.62           | 180.25      | 12,644.4              | -8,534.8     | 223.3        | 416,641.14          | 789,314.31         | 32° 8' 31.242 N | 103° 23' 55.032 W |
| 21,200.0              | 90.62           | 180.25      | 12,643.3              | -8,634.8     | 222.9        | 416,541.14          | 789,313.87         | 32° 8' 30.252 N | 103° 23' 55.047 W |
| 21,300.0              | 90.62           | 180.25      | 12,642.2              | -8,734.7     | 222.4        | 416,441.15          | 789,313.44         | 32° 8' 29.263 N | 103° 23' 55.062 W |
| 21,400.0              | 90.62           | 180.25      | 12,641.2              | -8,834.7     | 222.0        | 416,341.16          | 789,313.00         | 32° 8' 28.273 N | 103° 23' 55.077 W |
| 21,500.0              | 90.62           | 180.25      | 12,640.1              | -8,934.7     | 221.6        | 416,241.16          | 789,312.57         | 32° 8' 27.284 N | 103° 23' 55.093 W |
| 21,600.0              | 90.62           | 180.25      | 12,639.0              | -9,034.7     | 221.1        | 416,141.17          | 789,312.13         | 32° 8' 26.295 N | 103° 23' 55.108 W |
| 21,700.0              | 90.62           | 180.25      | 12,637.9              | -9,134.7     | 220.7        | 416,041.18          | 789,311.70         | 32° 8' 25.305 N | 103° 23' 55.123 W |
| 21,800.0              | 90.62           | 180.25      | 12,636.8              | -9,234.7     | 220.3        | 415,941.19          | 789,311.26         | 32° 8' 24.316 N | 103° 23' 55.138 W |
| 21,900.0              | 90.62           | 180.25      | 12,635.8              | -9,334.7     | 219.8        | 415,841.19          | 789,310.83         | 32° 8' 23.326 N | 103° 23' 55.153 W |
| 22,000.0              | 90.62           | 180.25      | 12,634.7              | -9,434.7     | 219.4        | 415,741.20          | 789,310.39         | 32° 8' 22.337 N | 103° 23' 55.168 W |
| 22,100.0              | 90.62           | 180.25      | 12,633.6              | -9,534.7     | 219.0        | 415,641.21          | 789,309.96         | 32° 8' 21.347 N | 103° 23' 55.183 W |
| 22,200.0              | 90.62           | 180.25      | 12,632.5              | -9,634.7     | 218.5        | 415,541.21          | 789,309.52         | 32° 8' 20.358 N | 103° 23' 55.199 W |
| 22,300.0              | 90.62           | 180.25      | 12,631.4              | -9,734.7     | 218.1        | 415,441.22          | 789,309.09         | 32° 8' 19.369 N | 103° 23' 55.214 W |
| 22,400.0              | 90.62           | 180.25      | 12,630.4              | -9,834.7     | 217.7        | 415,341.23          | 789,308.65         | 32° 8' 18.379 N | 103° 23' 55.229 W |
| 22,500.0              | 90.62           | 180.25      | 12,629.3              | -9,934.7     | 217.2        | 415,241.23          | 789,308.21         | 32° 8' 17.390 N | 103° 23' 55.244 W |
| 22,526.9              | 90.62           | 180.25      | 12,629.0              | -9,961.6     | 217.1        | 415,214.30          | 789,308.10         | 32° 8' 17.123 N | 103° 23' 55.248 W |



CONCHO

# COG Operating LLC

## Survey Report - Geographic

**Company:** COG OPERATING LLC  
**Project:** LEA COUNTY, NM  
**Site:** BULLDOG  
**Well:** STOVE PIPE FED COM #21H  
**Wellbore:** OWB  
**Design:** PWP0

**Local Co-ordinate Reference:** Well STOVE PIPE FED COM #21H  
**TVD Reference:** RKB=3295+29 @ 3324.0usft (NORAM 21)  
**MD Reference:** RKB=3295+29 @ 3324.0usft (NORAM 21)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM\_Users

### Design Targets

| Target Name               | Dip Angle | Dip Dir. | TVD      | +N/-S    | +E/-W  | Northing   | Easting    | Latitude        | Longitude         |
|---------------------------|-----------|----------|----------|----------|--------|------------|------------|-----------------|-------------------|
| - hit/miss target         | (°)       | (°)      | (usft)   | (usft)   | (usft) | (usft)     | (usft)     |                 |                   |
| - Shape                   |           |          |          |          |        |            |            |                 |                   |
| PBHL-Stove Pipe Fed       | 0.00      | 0.00     | 12,629.0 | -9,961.6 | 217.1  | 415,214.30 | 789,308.10 | 32° 8' 17.123 N | 103° 23' 55.248 W |
| - plan hits target center |           |          |          |          |        |            |            |                 |                   |
| - Point                   |           |          |          |          |        |            |            |                 |                   |

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



# WELL DETAILS: STOVE PIPE FED COM #21H

3295.0  
 +N/-S +E/-W Northing Easting Latitude Longitude Slot  
 0.0 0.0 425175.90 789091.00 32° 9' 55.714 N 103° 23' 56.768 W

| SECTION DETAILS |         |       |        |         |         |       |       |        |        |
|-----------------|---------|-------|--------|---------|---------|-------|-------|--------|--------|
| Sec             | MD      | Inc   | Azi    | TVD     | +N/-S   | +E/-W | Dleg  | TFace  | Vsect  |
| 1               | 0.0     | 0.00  | 0.00   | 0.0     | 0.0     | 0.0   | 0.00  | 0.00   | 0.0    |
| 2               | 12251.5 | 0.00  | 0.00   | 12251.5 | 0.0     | 0.0   | 0.00  | 0.00   | 0.0    |
| 3               | 13001.6 | 90.00 | 159.60 | 12729.0 | -447.6  | 166.4 | 12.00 | 159.60 | 451.1  |
| 4               | 13518.0 | 90.62 | 180.25 | 12726.2 | -953.3  | 256.3 | 4.00  | 88.25  | 958.6  |
| 5               | 22526.9 | 90.62 | 180.25 | 12629.0 | -9961.6 | 217.1 | 0.00  | 0.00   | 9964.0 |

Project: LEA COUNTY, NM  
 Site: BULLDOG  
 Well: STOVE PIPE FED COM #21H  
 Wellbore: OWB  
 Design: PWP0

## LEGEND

- STOVE PIPE FED COM #1H, OWB, PWP0 V0
- PWP0

