



## **COG Operating LLC**

**Lea County, NM (NAD27 NME)**

**MC Federal #62**

**MC Federal #62**

**OH**

**Plan: Plan #3 - 7-7/8" Hole**

**SHL = 2012' FSL & 553' FWL**

**BHL = 1660' FSL & 340' FWL**

**Top of Paddock = 225' S of Surface & 135' W of Surface @ 5375' TVD**

## **Standard Planning Report**

**05 December, 2011**





Scientific Drilling  
Planning Report



EDM-Julio  
COG Operating LLC  
Lea County, NM (NAD27 NME)  
MC Federal #82  
MC Federal #82  
OH  
Plan #3 - 7-7/8" Hole

Local Coordinates Reference:  
TMD  
MCS  
MCS  
MCS  
MCS

Well MC Federal #82  
GL Elev @ 4020.00usft  
GL Elev @ 4020.00usft  
Grid  
Minimum Curvature

Lea County, NM (NAD27 NME)

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

System Datum: Mean Sea Level

MC Federal #82

Site Position: Northing: 661,858.27 usft Latitude: 32° 49' 5.891 N  
From: Lat/Long Easting: 670,690.22 usft Longitude: 103° 46' 39.803 W  
Position Uncertainty: 0.00 usft Slot Radius: 0" Grid Convergence: 0.30 °

MC Federal #82

Well Position +N/-S 0.00 usft Northing: 661,858.27 usft Latitude: 32° 49' 5.891 N  
+E/-W 0.00 usft Easting: 670,690.22 usft Longitude: 103° 46' 39.803 W  
Position Uncertainty 0.00 usft Wellhead Elevation: Ground Level: 4,020.00 usft

OH

IGRF2010 2011/12/05 7.67 60.69 48,900

Plan #3 - 7-7/8" Hole

Audit Notes:

Version: Phase: PLAN Tie On Depth: 0.00

Vertical Section Depth From (TVD) +N/-S +E/-W Direction  
(usft) (usft) (usft) (°)  
0.00 0.00 0.00 210.84

Plan Section

| Measured Depth (usft) | True Vertical Depth (usft) | Angle (°) | Depth (usft) | +N/-S (usft) | +E/-W (usft) | Logging Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | TMD (°) | Target      |
|-----------------------|----------------------------|-----------|--------------|--------------|--------------|--------------------------|------------------------|-----------------------|---------|-------------|
| 0.00                  | 0.00                       | 0.00      | 0.00         | 0.00         | 0.00         | 0.00                     | 0.00                   | 0.00                  | 0.00    |             |
| 2,200.00              | 0.00                       | 0.00      | 2,200.00     | 0.00         | 0.00         | 0.00                     | 0.00                   | 0.00                  | 0.00    |             |
| 2,445.65              | 4.91                       | 210.84    | 2,445.35     | -9.04        | -5.40        | 2.00                     | 2.00                   | -60.72                | 210.84  |             |
| 7,117.47              | 4.91                       | 210.84    | 7,100.00     | -352.56      | -210.51      | 0.00                     | 0.00                   | 0.00                  | 0.00    | PBHL-MC #82 |



Scientific Drilling  
Planning Report



EDM-Julio  
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MC Federal #82  
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Plan #3 - 7-7/8" Hole

Well MC Federal #82  
GL Elev @ 4020.00usft  
GL Elev @ 4020.00usft  
Grid  
Minimum Curvature

| Station                          | Interval | Altitude | Vertical | Horizontal | Depth   | Angle  | Rate | Rate | Rate |
|----------------------------------|----------|----------|----------|------------|---------|--------|------|------|------|
| (ft)                             | (ft)     | (ft)     | (ft)     | (ft)       | (ft)    | (ft)   | (ft) | (ft) | (ft) |
| 0.00                             | 0.00     | 0.00     | 0.00     | 0.00       | 0.00    | 0.00   | 0.00 | 0.00 | 0.00 |
| East HL-MC #82 - South HL-MC #82 |          |          |          |            |         |        |      |      |      |
| 2,100.00                         | 0.00     | 0.00     | 2,100.00 | 0.00       | 0.00    | 0.00   | 0.00 | 0.00 | 0.00 |
| 8-5/8" Casing                    |          |          |          |            |         |        |      |      |      |
| 2,200.00                         | 0.00     | 0.00     | 2,200.00 | 0.00       | 0.00    | 0.00   | 0.00 | 0.00 | 0.00 |
| KOP Start Build 2.00"/100'       |          |          |          |            |         |        |      |      |      |
| 2,300.00                         | 2.00     | 210.84   | 2,299.98 | -1.50      | -0.89   | 1.75   | 2.00 | 2.00 | 0.00 |
| 2,400.00                         | 4.00     | 210.84   | 2,399.84 | -5.99      | -3.58   | 6.98   | 2.00 | 2.00 | 0.00 |
| 2,445.65                         | 4.91     | 210.84   | 2,445.35 | -9.04      | -5.40   | 10.53  | 2.00 | 2.00 | 0.00 |
| EOG Hold 4.91°                   |          |          |          |            |         |        |      |      |      |
| 2,500.00                         | 4.91     | 210.84   | 2,499.50 | -13.03     | -7.78   | 15.18  | 0.00 | 0.00 | 0.00 |
| 2,600.00                         | 4.91     | 210.84   | 2,599.13 | -20.39     | -12.17  | 23.74  | 0.00 | 0.00 | 0.00 |
| 2,700.00                         | 4.91     | 210.84   | 2,698.76 | -27.74     | -16.56  | 32.31  | 0.00 | 0.00 | 0.00 |
| 2,800.00                         | 4.91     | 210.84   | 2,798.40 | -35.09     | -20.95  | 40.87  | 0.00 | 0.00 | 0.00 |
| 2,900.00                         | 4.91     | 210.84   | 2,898.03 | -42.45     | -25.34  | 49.44  | 0.00 | 0.00 | 0.00 |
| 3,000.00                         | 4.91     | 210.84   | 2,997.66 | -49.80     | -29.74  | 58.00  | 0.00 | 0.00 | 0.00 |
| 3,100.00                         | 4.91     | 210.84   | 3,097.30 | -57.15     | -34.13  | 66.57  | 0.00 | 0.00 | 0.00 |
| 3,200.00                         | 4.91     | 210.84   | 3,196.93 | -64.51     | -38.52  | 75.13  | 0.00 | 0.00 | 0.00 |
| 3,300.00                         | 4.91     | 210.84   | 3,296.56 | -71.86     | -42.91  | 83.69  | 0.00 | 0.00 | 0.00 |
| 3,400.00                         | 4.91     | 210.84   | 3,396.19 | -79.21     | -47.30  | 92.26  | 0.00 | 0.00 | 0.00 |
| 3,500.00                         | 4.91     | 210.84   | 3,495.83 | -86.57     | -51.69  | 100.82 | 0.00 | 0.00 | 0.00 |
| 3,600.00                         | 4.91     | 210.84   | 3,595.46 | -93.92     | -56.08  | 109.39 | 0.00 | 0.00 | 0.00 |
| 3,700.00                         | 4.91     | 210.84   | 3,695.09 | -101.27    | -60.47  | 117.95 | 0.00 | 0.00 | 0.00 |
| 3,800.00                         | 4.91     | 210.84   | 3,794.72 | -108.62    | -64.86  | 126.52 | 0.00 | 0.00 | 0.00 |
| 3,900.00                         | 4.91     | 210.84   | 3,894.36 | -115.98    | -69.25  | 135.08 | 0.00 | 0.00 | 0.00 |
| 4,000.00                         | 4.91     | 210.84   | 3,993.99 | -123.33    | -73.64  | 143.64 | 0.00 | 0.00 | 0.00 |
| 4,100.00                         | 4.91     | 210.84   | 4,093.62 | -130.68    | -78.03  | 152.21 | 0.00 | 0.00 | 0.00 |
| 4,200.00                         | 4.91     | 210.84   | 4,193.25 | -138.04    | -82.42  | 160.77 | 0.00 | 0.00 | 0.00 |
| 4,300.00                         | 4.91     | 210.84   | 4,292.89 | -145.39    | -86.81  | 169.34 | 0.00 | 0.00 | 0.00 |
| 4,400.00                         | 4.91     | 210.84   | 4,392.52 | -152.74    | -91.20  | 177.90 | 0.00 | 0.00 | 0.00 |
| 4,500.00                         | 4.91     | 210.84   | 4,492.15 | -160.10    | -95.59  | 186.46 | 0.00 | 0.00 | 0.00 |
| 4,600.00                         | 4.91     | 210.84   | 4,591.78 | -167.45    | -99.98  | 195.03 | 0.00 | 0.00 | 0.00 |
| 4,700.00                         | 4.91     | 210.84   | 4,691.42 | -174.80    | -104.37 | 203.59 | 0.00 | 0.00 | 0.00 |
| 4,800.00                         | 4.91     | 210.84   | 4,791.05 | -182.16    | -108.77 | 212.16 | 0.00 | 0.00 | 0.00 |
| 4,900.00                         | 4.91     | 210.84   | 4,890.68 | -189.51    | -113.16 | 220.72 | 0.00 | 0.00 | 0.00 |
| 5,000.00                         | 4.91     | 210.84   | 4,990.31 | -196.86    | -117.55 | 229.29 | 0.00 | 0.00 | 0.00 |
| 5,100.00                         | 4.91     | 210.84   | 5,089.95 | -204.22    | -121.94 | 237.85 | 0.00 | 0.00 | 0.00 |
| 5,200.00                         | 4.91     | 210.84   | 5,189.58 | -211.57    | -126.33 | 246.41 | 0.00 | 0.00 | 0.00 |
| 5,300.00                         | 4.91     | 210.84   | 5,289.21 | -218.92    | -130.72 | 254.98 | 0.00 | 0.00 | 0.00 |
| 5,386.10                         | 4.91     | 210.84   | 5,375.00 | -225.25    | -134.50 | 262.35 | 0.00 | 0.00 | 0.00 |
| Top of Paddock                   |          |          |          |            |         |        |      |      |      |
| 5,400.00                         | 4.91     | 210.84   | 5,388.84 | -226.28    | -135.11 | 263.54 | 0.00 | 0.00 | 0.00 |
| 5,500.00                         | 4.91     | 210.84   | 5,488.48 | -233.63    | -139.50 | 272.11 | 0.00 | 0.00 | 0.00 |
| 5,600.00                         | 4.91     | 210.84   | 5,588.11 | -240.98    | -143.89 | 280.67 | 0.00 | 0.00 | 0.00 |
| 5,700.00                         | 4.91     | 210.84   | 5,687.74 | -248.33    | -148.28 | 289.24 | 0.00 | 0.00 | 0.00 |
| 5,800.00                         | 4.91     | 210.84   | 5,787.38 | -255.69    | -152.67 | 297.80 | 0.00 | 0.00 | 0.00 |
| 5,900.00                         | 4.91     | 210.84   | 5,887.01 | -263.04    | -157.06 | 306.36 | 0.00 | 0.00 | 0.00 |
| 6,000.00                         | 4.91     | 210.84   | 5,986.64 | -270.39    | -161.45 | 314.93 | 0.00 | 0.00 | 0.00 |
| 6,100.00                         | 4.91     | 210.84   | 6,086.27 | -277.75    | -165.84 | 323.49 | 0.00 | 0.00 | 0.00 |
| 6,200.00                         | 4.91     | 210.84   | 6,185.91 | -285.10    | -170.23 | 332.06 | 0.00 | 0.00 | 0.00 |
| 6,300.00                         | 4.91     | 210.84   | 6,285.54 | -292.45    | -174.62 | 340.62 | 0.00 | 0.00 | 0.00 |



Scientific Drilling  
Planning Report



Client: EDM-Julio  
Company: COG Operating LLC  
Location: Lea County, NM (NAD27 NME)  
Well: MC Federal #62  
Status: OH  
Plan: Plan #3 - 7-7/8" Hole

Local Coordinates Reference:  
T.M. Survey:  
NAD 83 datum (2011)  
Survey Method:  
Survey Calculation Method:

Well MC Federal #62  
GL Elev @ 4020.00usft  
GL Elev @ 4020.00usft  
Grid  
Minimum Curvature

| Measured Depth (usft) | True Vertical Depth (ft) | Horizontal Depth (ft) | Vertical Depth (usft) | MD (usft) | MD (usft) | Vertical Depth (usft) | Depth Rate (usft/hr) | Surf Rate (usft/hr) | Plan Rate (usft/hr) |
|-----------------------|--------------------------|-----------------------|-----------------------|-----------|-----------|-----------------------|----------------------|---------------------|---------------------|
| 6,400.00              | 4.91                     | 210.84                | 6,385.17              | -299.81   | -179.01   | 349.19                | 0.00                 | 0.00                | 0.00                |
| 6,500.00              | 4.91                     | 210.84                | 6,484.80              | -307.16   | -183.40   | 357.75                | 0.00                 | 0.00                | 0.00                |
| 6,600.00              | 4.91                     | 210.84                | 6,584.44              | -314.51   | -187.80   | 366.31                | 0.00                 | 0.00                | 0.00                |
| 6,700.00              | 4.91                     | 210.84                | 6,684.07              | -321.87   | -192.19   | 374.88                | 0.00                 | 0.00                | 0.00                |
| 6,800.00              | 4.91                     | 210.84                | 6,783.70              | -329.22   | -196.58   | 383.44                | 0.00                 | 0.00                | 0.00                |
| 6,900.00              | 4.91                     | 210.84                | 6,883.33              | -336.57   | -200.97   | 392.01                | 0.00                 | 0.00                | 0.00                |
| 7,000.00              | 4.91                     | 210.84                | 6,982.97              | -343.93   | -205.36   | 400.57                | 0.00                 | 0.00                | 0.00                |
| 7,100.00              | 4.91                     | 210.84                | 7,082.60              | -351.28   | -209.75   | 409.13                | 0.00                 | 0.00                | 0.00                |
| 7,117.47              | 4.91                     | 210.84                | 7,100.00              | -352.56   | -210.51   | 410.63                | 0.00                 | 0.00                | 0.00                |
| PBHL-MC #62           |                          |                       |                       |           |           |                       |                      |                     |                     |

| Target Name                                                                         | Dip Angle (°) | Surf Rate (ft) | TVD (usft) | MD (usft) | MD (usft) | Surf Rate (usft/hr) | Depth Rate (usft/hr) | Latitude        | Longitude         |
|-------------------------------------------------------------------------------------|---------------|----------------|------------|-----------|-----------|---------------------|----------------------|-----------------|-------------------|
| East HL-MC #62                                                                      | 0.00          | 0.00           | 0.00       | -362.56   | -220.51   | 661,495.70          | 670,469.70           | 32° 49' 2.315 N | 103° 46' 42.409 W |
| - plan misses target center by 424 36usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) |               |                |            |           |           |                     |                      |                 |                   |
| - Rectangle (sides W0.00 H200.00 D0.00)                                             |               |                |            |           |           |                     |                      |                 |                   |
| South HL-MC #62                                                                     | 0.00          | 0.00           | 0.00       | -362.56   | -220.51   | 661,495.70          | 670,469.70           | 32° 49' 2.315 N | 103° 46' 42.409 W |
| - plan misses target center by 424 36usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) |               |                |            |           |           |                     |                      |                 |                   |
| - Rectangle (sides W200.00 H0.00 D0.00)                                             |               |                |            |           |           |                     |                      |                 |                   |
| PBHL-MC #62                                                                         | 0.00          | 0.01           | 7,100.00   | -352.56   | -210.51   | 661,505.70          | 670,479.70           | 32° 49' 2.413 N | 103° 46' 42.291 W |
| - plan hits target center                                                           |               |                |            |           |           |                     |                      |                 |                   |
| - Circle (radius 10.00)                                                             |               |                |            |           |           |                     |                      |                 |                   |

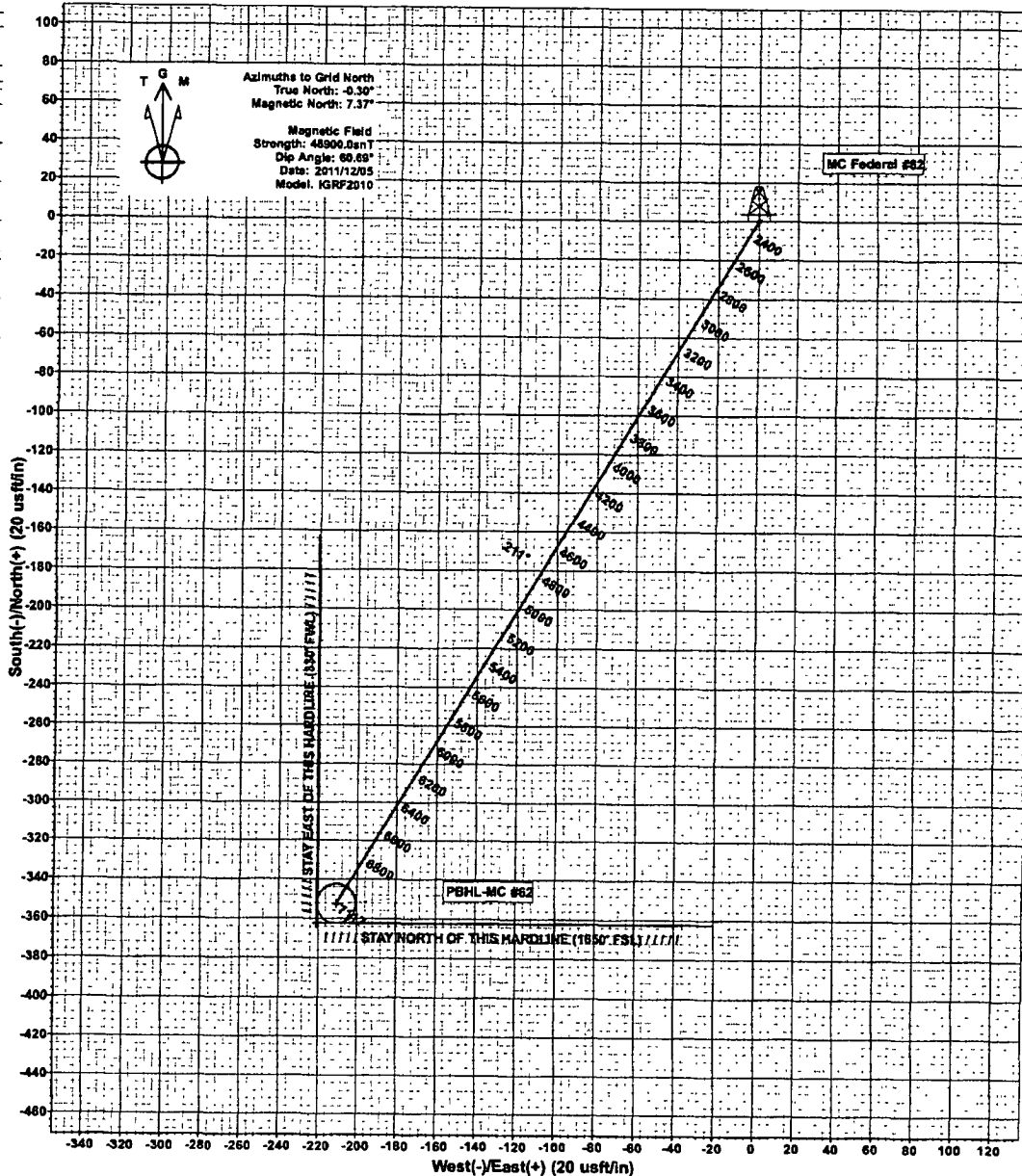
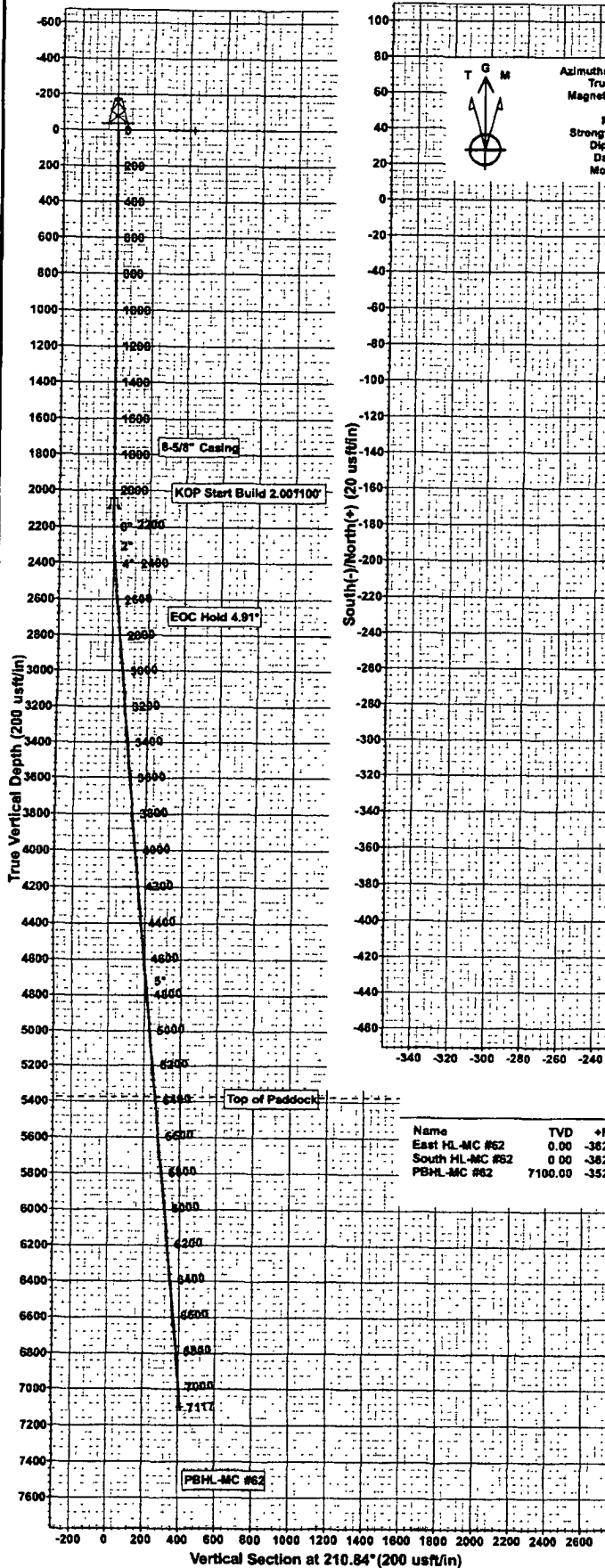
| Measured Depth (usft) | Vertical Depth (usft) | Name          | Casing Diameter (") | Well Diameter (") |
|-----------------------|-----------------------|---------------|---------------------|-------------------|
| 2,100.00              | 2,100.00              | 8-5/8" Casing | 8-5/8               | 12-1/4            |

| Measured Depth (usft) | Vertical Depth (usft) | Name           | Log Name | Dip (°) | Dip Direction (°) |
|-----------------------|-----------------------|----------------|----------|---------|-------------------|
| 5,386.10              | 5,375.00              | Top of Paddock |          | 0.00    |                   |

| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates (usft) | MD (usft) | Comment                    |
|-----------------------|-----------------------|--------------------------|-----------|----------------------------|
| 2,200.00              | 2,200.00              | 0.00                     | 0.00      | KOP Start Build 2.00°/100' |
| 2,445.65              | 2,445.35              | -9.04                    | -5.40     | EOC Hold 4.91°             |



Scientific Drilling for COG Operating LLC  
Site: Lea County, NM (NAD27 NME)  
Well: MC Federal #62  
Wellbore: OH  
Design: Plan #3 - 7-7/8" Hole



WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

| Name            | TVD     | +N/-S   | +E/-W   | Northing  | Easting   | Latitude        | Longitude         | Shape                             |
|-----------------|---------|---------|---------|-----------|-----------|-----------------|-------------------|-----------------------------------|
| East HL-MC #62  | 0.00    | -382.56 | -220.51 | 661495.70 | 670469.70 | 32° 49' 2.315 N | 103° 46' 42.409 W | Rectangle (Sides: L2 00.00 W0.00) |
| South HL-MC #62 | 0.00    | -382.56 | -220.51 | 661495.70 | 670469.70 | 32° 49' 2.315 N | 103° 46' 42.409 W | Rectangle (Sides: L 0.00 W200.00) |
| PBHL-MC #62     | 7100.00 | -352.56 | -210.51 | 661503.70 | 670479.70 | 32° 49' 2.413 N | 103° 46' 42.291 W | Circle (Radius: 10.0 0)           |

SECTION DETAILS

| Sec | MD       | Inc  | Azi    | TVD     | +N/-S   | +E/-W   | Dleg | TFace  | VFace  | Target      |
|-----|----------|------|--------|---------|---------|---------|------|--------|--------|-------------|
| 1   | 0.00     | 0.00 | 0.00   | 0.00    | 0.00    | 0.00    | 0.00 | 0.00   | 0.00   |             |
| 2   | 2200.00  | 0.00 | 0.00   | 2200.00 | 0.00    | 0.00    | 0.00 | 0.00   | 0.00   |             |
| 3   | 2445.65  | 4.91 | 210.84 | 2445.35 | -0.04   | -5.40   | 2.00 | 210.84 | 10.53  |             |
| 4   | 47117.47 | 4.91 | 210.84 | 7100.00 | -352.56 | -210.51 | 0.00 | 0.00   | 410.63 | PBHL-MC #62 |

WELL DETAILS: MC Federal #62

| +N/-S | +E/-W | Northing  | Easting   | Ground Level: | Latitude        | Longitude          | Slat |
|-------|-------|-----------|-----------|---------------|-----------------|--------------------|------|
| 0.00  | 0.00  | 661858.28 | 670690.21 | 4020.00       | 32° 49' 5.891 N | 103° 46' 3 9.803 W |      |

| PROJECT DETAILS: Lea County, NM (NAD27 NME)                                 |  |  |  | Plan: Plan #3 - 7-7/8" Hole (MC Federal #62/OH) |  |  |  |
|-----------------------------------------------------------------------------|--|--|--|-------------------------------------------------|--|--|--|
| Geodetic System: US State Plane 1927 (Exact solution)Created By: Julio Pina |  |  |  | Date: 05-Dec-11                                 |  |  |  |
| Datum: NAD 1927 (NADCON CONUS)                                              |  |  |  | Checked: _____                                  |  |  |  |
| Ellipsoid: Clarke 1886                                                      |  |  |  | Date: _____                                     |  |  |  |
| Zone: New Mexico East 3001                                                  |  |  |  | Reviewed: _____                                 |  |  |  |
| System Datum: Mean Sea Level                                                |  |  |  | Date: _____                                     |  |  |  |
|                                                                             |  |  |  | Approved: _____                                 |  |  |  |
|                                                                             |  |  |  | Date: _____                                     |  |  |  |