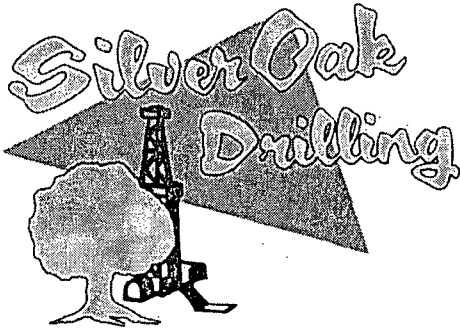
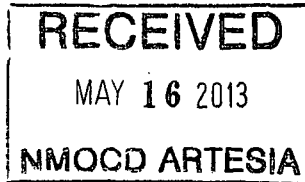


30-015-40570



PO Box 1370  
Artesia, NM 88211-1370  
(575) 748-1288



November 7, 2012

COG, LLC  
One Concho Center  
600 W. Illinois Ave.  
Midland, TX 79701

RE: White Oak State #27  
2270' FNL & 185' FEL  
Sec. 23, T17S, R29E  
Eddy County, New Mexico

Dear Sir,

The attached is the Deviation Survey for the above captioned well.

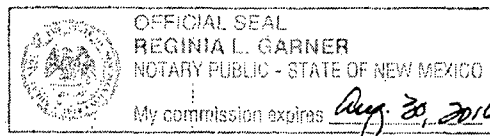
Very truly yours,

A handwritten signature in cursive script, appearing to read "Eddie LaRue".

Eddie LaRue  
Operations Manager

State of New Mexico }  
County of Eddy }

*The foregoing was acknowledged before me this 7<sup>th</sup> day of November, 2012.*

A handwritten signature in cursive script, appearing to read "Regina L. Garner".  
\_\_\_\_\_  
Notary Public



## **COG Operating, LLC**

Eddy County, NM (NAD27)

White Oak State #27

SHL: 2270' FNL, 185' FEL, Sec. 23, T17S, R28E, Unit H

Top of Paddock @ 3700' TVD: 169' N/121' W of surface

Design: Surveys

## **Standard Survey Report**

16 January, 2013





Childress Directional Drilling  
Survey Report



|           |                                                       |                              |                                                            |
|-----------|-------------------------------------------------------|------------------------------|------------------------------------------------------------|
| Company:  | COG Operating, LLC                                    | Local Co-ordinate Reference: | Well SHL: 2270' FNL, 185' FEL, Sec. 23, T17S, R28E, Unit H |
| Project:  | Eddy County, NM (NAD27)                               | TVD Reference:               | WELL @ 3704.00usft (Silver Oak 11)                         |
| Site:     | White Oak State #27                                   | MD Reference:                | WELL @ 3704.00usft (Silver Oak 11)                         |
| Well:     | SHL: 2270' FNL, 185' FEL, Sec. 23, T17S, R28E, Unit H | North Reference:             | Grid                                                       |
| Wellbore: | Top of Paddock @ 3700' TVD: 169' N/121' W of surface  | Survey Calculation Method:   | Minimum Curvature                                          |
| Design:   | Surveys                                               | Database:                    | EDM 5000.1, Single User Db                                 |

|             |                                      |               |                |
|-------------|--------------------------------------|---------------|----------------|
| Project     | Eddy County, NM (NAD27)              |               |                |
| 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:                 | White Oak State #27 |                   |                            |
| Site Position:        | Northings:          | 0.00 usft         | Latitude: 30° 59' 24.512 N |
| From:                 | Map                 | Easting:          | 0.00 usft                  |
| Position Uncertainty: | 0.00 usft           | Slot Radius:      | 13-3/16 "                  |
|                       |                     | Grid Convergence: | -0.82 °                    |

|                      |                                                       |                     |                            |
|----------------------|-------------------------------------------------------|---------------------|----------------------------|
| Well                 | SHL: 2270' FNL, 185' FEL, Sec. 23, T17S, R28E, Unit H |                     |                            |
| Well Position        | +N/-S                                                 | 0.00 usft           | Northings: 662,841.80 usft |
|                      | +E/-W                                                 | 0.00 usft           | Easting: 559,865.90 usft   |
| Position Uncertainty | 0.00 usft                                             | Wellhead Elevation: | usft                       |
|                      |                                                       | Ground Level:       | 3,704.00 usft              |

|           |                                                      |             |                 |               |                     |
|-----------|------------------------------------------------------|-------------|-----------------|---------------|---------------------|
| Wellbore  | Top of Paddock @ 3700' TVD: 169' N/121' W of surface |             |                 |               |                     |
| Magnetics | Model Name                                           | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|           | IGRF2010                                             | 2012/10/24  | 7.73            | 60.61         | 48.775              |

|                   |                         |              |              |                    |
|-------------------|-------------------------|--------------|--------------|--------------------|
| Design            | Surveys                 |              |              |                    |
| Audit Notes:      |                         |              |              |                    |
| Version:          | 1.0                     | Phase:       | ACTUAL       | Tie On Depth: 0.00 |
| Vertical Section: | Depth From (TVD) (usft) | +N/-S (usft) | +E/-W (usft) | Direction (°)      |
|                   | 0.00                    | 0.00         | 0.00         | 324.54             |

|                |                  |                                        |            |                                  |
|----------------|------------------|----------------------------------------|------------|----------------------------------|
| Survey Program | Date: 2013/01/16 |                                        |            |                                  |
| From (usft)    | To (usft)        | Survey (Wellbore)                      | Tool Name  | Description                      |
| 100.00         | 5,433.00         | VES gyro surveys (Top of Paddock @ 370 | NS-GYRO-MS | North sensing gyrocompassing m/s |

|        |                       |                 |             |                       |              |              |                         |                         |                        |                       |
|--------|-----------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| Survey | Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
|        | 0.00                  | 0.00            | 0.00        | 0.00                  | 0.00         | 0.00         | 0.00                    | 0.00                    | 0.00                   | 0.00                  |
|        | 100.00                | 0.27            | 10.73       | 100.00                | 0.23         | 0.04         | 0.16                    | 0.27                    | 0.27                   | 0.00                  |
|        | 200.00                | 0.21            | 4.64        | 200.00                | 0.65         | 0.10         | 0.47                    | 0.07                    | -0.06                  | -6.09                 |
|        | 300.00                | 0.40            | 28.20       | 300.00                | 1.14         | 0.28         | 0.76                    | 0.22                    | 0.19                   | 23.56                 |
|        | 400.00                | 0.48            | 43.47       | 399.99                | 1.75         | 0.74         | 1.00                    | 0.14                    | 0.08                   | 15.27                 |
|        | 500.00                | 0.71            | 47.74       | 499.99                | 2.47         | 1.48         | 1.15                    | 0.23                    | 0.23                   | 4.27                  |
|        | 600.00                | 0.54            | 49.20       | 599.98                | 3.19         | 2.30         | 1.27                    | 0.17                    | -0.17                  | 1.46                  |
|        | 700.00                | 0.48            | 54.08       | 699.98                | 3.75         | 2.99         | 1.31                    | 0.07                    | -0.06                  | 4.88                  |



# Childress Directional Drilling Survey Report



|           |                                                       |                              |                                                            |
|-----------|-------------------------------------------------------|------------------------------|------------------------------------------------------------|
| Company:  | COG Operating, LLC                                    | Local Co-ordinate Reference: | Well SHL: 2270' FNL, 185' FEL, Sec. 23, T17S, R28E, Unit H |
| Project:  | Eddy County, NM (NAD27)                               | TVD Reference:               | WELL @ 3704.00usft (Silver Oak 11)                         |
| Site:     | White Oak State #27                                   | MD Reference:                | WELL @ 3704.00usft (Silver Oak 11)                         |
| Well:     | SHL: 2270' FNL, 185' FEL, Sec. 23, T17S, R28E, Unit H | North Reference:             | Grid                                                       |
| Wellbore: | Top of Paddock @ 3700' TVD: 169' N/121' W of surface  | Survey Calculation Method:   | Minimum Curvature                                          |
| Design:   | Surveys                                               | Database:                    | EDM:5000.1 Single User Db                                  |

| Measured Depth (usft) | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | N-S (usft) | E-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
|-----------------------|-----------------|-------------|-----------------------|------------|------------|-------------------------|-------------------------|------------------------|-----------------------|
| 800.00                | 0.64            | 15.26       | 799.97                | 4.53       | 3.48       | 1.67                    | 0.40                    | 0.16                   | -38.82                |
| 897.00                | 0.40            | 352.40      | 896.97                | 5.39       | 3.58       | 2.31                    | 0.32                    | -0.25                  | -23.57                |
| 980.00                | 0.30            | 339.50      | 959.97                | 5.76       | 3.49       | 2.67                    | 0.20                    | -0.16                  | -20.48                |
| 991.00                | 0.30            | 346.60      | 990.97                | 5.92       | 3.44       | 2.82                    | 0.12                    | 0.00                   | 22.90                 |
| 1,053.00              | 0.50            | 4.00        | 1,052.97              | 6.34       | 3.42       | 3.18                    | 0.37                    | 0.32                   | 28.06                 |
| 1,148.00              | 1.70            | 337.20      | 1,147.95              | 8.06       | 2.91       | 4.88                    | 1.34                    | 1.26                   | -28.21                |
| 1,241.00              | 3.50            | 336.00      | 1,240.85              | 11.92      | 1.22       | 9.00                    | 1.94                    | 1.94                   | -1.29                 |
| 1,335.00              | 4.70            | 338.10      | 1,334.61              | 18.12      | -1.39      | 15.56                   | 1.29                    | 1.28                   | 2.23                  |
| 1,429.00              | 5.30            | 334.10      | 1,428.25              | 25.60      | -4.72      | 23.59                   | 0.74                    | 0.64                   | -4.26                 |
| 1,523.00              | 5.60            | 326.20      | 1,521.83              | 33.31      | -9.17      | 32.45                   | 0.86                    | 0.32                   | -8.40                 |
| 1,618.00              | 5.80            | 325.60      | 1,616.36              | 41.12      | -14.46     | 41.88                   | 0.22                    | 0.21                   | -0.63                 |
| 1,712.00              | 5.30            | 322.80      | 1,709.91              | 48.50      | -19.76     | 50.97                   | 0.60                    | -0.53                  | -2.98                 |
| 1,806.00              | 5.30            | 321.60      | 1,803.51              | 55.36      | -25.09     | 59.65                   | 0.12                    | 0.00                   | -1.28                 |
| 1,899.00              | 5.30            | 320.90      | 1,896.12              | 62.06      | -30.46     | 68.22                   | 0.07                    | 0.00                   | -0.75                 |
| 1,993.00              | 5.40            | 320.30      | 1,989.71              | 68.83      | -36.03     | 76.97                   | 0.12                    | 0.11                   | -0.64                 |
| 2,087.00              | 5.80            | 318.80      | 2,083.26              | 75.81      | -41.98     | 86.10                   | 0.45                    | 0.43                   | -1.60                 |
| 2,182.00              | 5.50            | 321.80      | 2,177.80              | 83.00      | -47.96     | 95.43                   | 0.44                    | -0.32                  | 3.16                  |
| 2,276.00              | 5.00            | 322.30      | 2,271.40              | 89.78      | -53.25     | 104.02                  | 0.53                    | -0.53                  | 0.53                  |
| 2,370.00              | 5.10            | 321.20      | 2,365.04              | 96.28      | -58.37     | 112.28                  | 0.15                    | 0.11                   | -1.17                 |
| 2,464.00              | 5.60            | 319.10      | 2,458.63              | 103.00     | -63.99     | 121.02                  | 0.57                    | 0.53                   | -2.23                 |
| 2,558.00              | 5.20            | 321.10      | 2,552.21              | 109.78     | -69.67     | 129.84                  | 0.47                    | -0.43                  | 2.13                  |
| 2,652.00              | 4.70            | 325.80      | 2,645.86              | 116.28     | -74.51     | 137.94                  | 0.68                    | -0.53                  | 5.00                  |
| 2,745.00              | 5.20            | 325.80      | 2,738.51              | 122.92     | -79.02     | 145.96                  | 0.54                    | 0.54                   | 0.00                  |
| 2,839.00              | 4.70            | 327.20      | 2,832.16              | 129.68     | -83.50     | 154.07                  | 0.55                    | -0.53                  | 1.49                  |
| 2,933.00              | 4.20            | 320.70      | 2,925.88              | 135.58     | -87.77     | 161.35                  | 0.75                    | -0.53                  | -6.91                 |
| 3,026.00              | 4.60            | 318.30      | 3,018.60              | 141.00     | -92.41     | 168.46                  | 0.47                    | 0.43                   | -2.58                 |
| 3,120.00              | 4.60            | 307.20      | 3,112.30              | 146.10     | -97.92     | 175.80                  | 0.95                    | 0.00                   | -11.81                |
| 3,214.00              | 4.10            | 303.10      | 3,206.03              | 150.21     | -103.73    | 182.53                  | 0.63                    | -0.53                  | -4.36                 |
| 3,308.00              | 4.50            | 303.30      | 3,299.77              | 154.07     | -109.63    | 189.09                  | 0.43                    | 0.43                   | 0.21                  |
| 3,401.00              | 4.00            | 307.20      | 3,392.51              | 158.03     | -115.26    | 195.59                  | 0.62                    | -0.54                  | 4.19                  |
| 3,495.00              | 4.00            | 306.70      | 3,486.28              | 161.97     | -120.50    | 201.84                  | 0.04                    | 0.00                   | -0.53                 |
| 3,588.00              | 4.40            | 311.80      | 3,579.03              | 166.29     | -125.76    | 208.41                  | 0.59                    | 0.43                   | 5.48                  |
| 3,682.00              | 4.60            | 311.80      | 3,672.74              | 171.21     | -131.26    | 215.60                  | 0.21                    | 0.21                   | 0.00                  |
| 3,776.00              | 4.40            | 313.50      | 3,766.45              | 176.20     | -136.69    | 222.82                  | 0.26                    | -0.21                  | 1.81                  |
| 3,869.00              | 4.80            | 313.50      | 3,859.15              | 181.34     | -142.10    | 230.14                  | 0.43                    | 0.43                   | 0.00                  |
| 3,963.00              | 4.70            | 317.60      | 3,952.83              | 186.89     | -147.55    | 237.82                  | 0.38                    | -0.11                  | 4.36                  |
| 4,057.00              | 5.00            | 315.30      | 4,046.49              | 192.64     | -153.02    | 245.69                  | 0.38                    | 0.32                   | -2.45                 |
| 4,152.00              | 4.70            | 319.70      | 4,141.15              | 198.55     | -158.45    | 253.65                  | 0.50                    | -0.32                  | 4.63                  |
| 4,245.00              | 4.00            | 319.50      | 4,233.89              | 203.93     | -163.03    | 260.68                  | 0.75                    | -0.75                  | -0.22                 |
| 4,339.00              | 4.20            | 318.80      | 4,327.65              | 209.01     | -167.42    | 267.37                  | 0.22                    | 0.21                   | -0.74                 |
| 4,433.00              | 4.20            | 320.70      | 4,421.39              | 214.26     | -171.87    | 274.23                  | 0.15                    | 0.00                   | 2.02                  |
| 4,528.00              | 4.40            | 321.80      | 4,516.13              | 219.82     | -176.33    | 281.34                  | 0.23                    | 0.21                   | 1.16                  |



# Childress Directional Drilling Survey Report



|           |                                                       |                              |                                                            |
|-----------|-------------------------------------------------------|------------------------------|------------------------------------------------------------|
| Company:  | COG Operating, LLC                                    | Local Co-ordinate Reference: | Well SHL: 2270' FNL, 185' FEL, Sec. 23, T17S, R28E, Unit H |
| Project:  | Eddy County, NM (NAD27)                               | TVD Reference:               | WELL @ 3704.00usft (Silver Oak 11)                         |
| Site:     | White Oak State #27                                   | MD Reference:                | WELL @ 3704.00usft (Silver Oak 11)                         |
| Well:     | SHL: 2270' FNL, 185' FEL, Sec. 23, T17S, R28E, Unit H | North Reference:             | Grid                                                       |
| Wellbore: | Top of Paddock @ 3700' TVD: 189° N/121° W of surface  | Survey Calculation Method:   | Minimum Curvature                                          |
| Design:   | Surveys                                               | Database:                    | EDM 5000.1 Single User Db                                  |

| Measured Depth (usft)                                   | Inclination (°) | Azimuth (°) | Vertical Depth (usft) | +N/-S (usft) | +E/-W (usft) | Vertical Section (usft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) |
|---------------------------------------------------------|-----------------|-------------|-----------------------|--------------|--------------|-------------------------|-------------------------|------------------------|-----------------------|
| 4,622.00                                                | 4.50            | 321.80      | 4,609.84              | 225.55       | -180.84      | 288.62                  | 0.11                    | 0.11                   | 0.00                  |
| 4,716.00                                                | 5.10            | 323.90      | 4,703.51              | 231.82       | -185.58      | 296.49                  | 0.67                    | 0.64                   | 2.23                  |
| 4,810.00                                                | 4.70            | 324.90      | 4,797.17              | 238.35       | -190.25      | 304.51                  | 0.44                    | -0.43                  | 1.06                  |
| 4,903.00                                                | 4.00            | 325.80      | 4,889.90              | 244.15       | -194.27      | 311.57                  | 0.76                    | -0.75                  | 0.97                  |
| 4,997.00                                                | 4.20            | 325.10      | 4,983.66              | 249.88       | -198.08      | 318.29                  | 0.22                    | 0.21                   | -0.74                 |
| 5,091.00                                                | 4.40            | 324.80      | 5,077.39              | 255.45       | -202.14      | 325.34                  | 0.22                    | 0.21                   | -0.53                 |
| 5,184.00                                                | 4.40            | 324.10      | 5,170.12              | 261.24       | -206.30      | 332.47                  | 0.04                    | 0.00                   | -0.54                 |
| 5,278.00                                                | 4.20            | 326.30      | 5,263.86              | 267.03       | -210.32      | 339.52                  | 0.28                    | -0.21                  | 2.34                  |
| 5,372.00                                                | 3.30            | 327.20      | 5,357.65              | 272.17       | -213.70      | 345.66                  | 0.96                    | -0.96                  | 0.96                  |
| 5,433.00                                                | 3.30            | 327.20      | 5,418.55              | 275.12       | -215.60      | 349.17                  | 0.00                    | 0.00                   | 0.00                  |
| PTB at TD @ 5433' MD 3.30° INC 327.20° AZM 5418.55° AZM |                 |             |                       |              |              |                         |                         |                        |                       |

| Design Annotations    |                       |                   |              |                                                         |
|-----------------------|-----------------------|-------------------|--------------|---------------------------------------------------------|
| Measured Depth (usft) | Vertical Depth (usft) | Local Coordinates |              | Comment                                                 |
|                       |                       | +N/-S (usft)      | +E/-W (usft) |                                                         |
| 5,433.00              | 5,418.55              | 275.12            | -215.60      | PTB at TD @ 5433' MD 3.30° INC 327.20° AZM 5418.55° AZM |

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



Company Name: COG Operating, LLC;  
 Site: White Oak State  
 Well: #27H  
 Project: Eddy County, NM (NAD27)  
 Rig Name: Silver Oak 11



Created By: Gail Deering  
 Date: November 2, 2012  
 Plan: Design #2

#### ANNOTATIONS

| MD      | TVD     | Inc  | Azi    | +N/-S  | +E/-W   | VSDeparture | Annotation |
|---------|---------|------|--------|--------|---------|-------------|------------|
| 800.00  | 799.97  | 0.64 | 15.26  | 4.53   | 3.48    | 1.67        | 0.00       |
| 1050.00 | 1049.96 | 0.64 | 15.26  | 7.22   | 4.21    | 3.44        | 2.79       |
| 1262.91 | 1262.62 | 4.62 | 323.06 | 15.23  | -0.63   | 12.77       | 12.28      |
| 5263.30 | 5250.00 | 4.62 | 323.06 | 272.78 | -194.30 | 334.91      | 334.53     |

#### WELL DETAILS: #27

Ground Level: 3704.00  
 Northing: 662841.80  
 Easting: 559865.90

#### DESIGN TARGET DETAILS

| Name | TVD     | +N/-S  | +E/-W   | Northing  | Easting   |
|------|---------|--------|---------|-----------|-----------|
| PBHL | 5250.00 | 272.78 | -194.30 | 663114.58 | 559671.60 |

#### CASING DETAILS

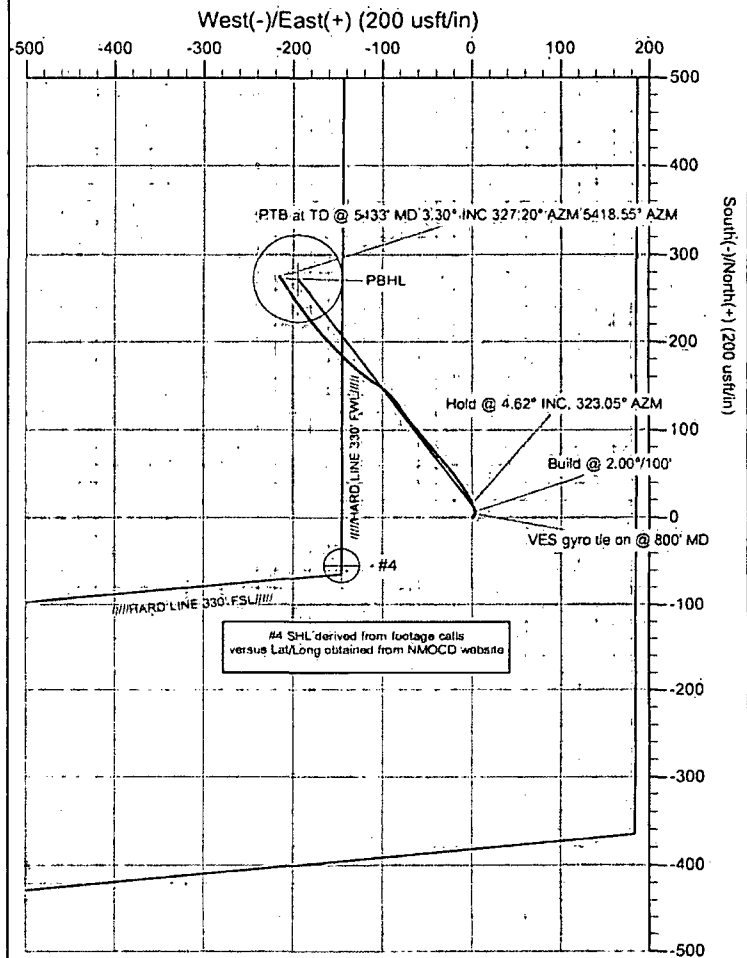
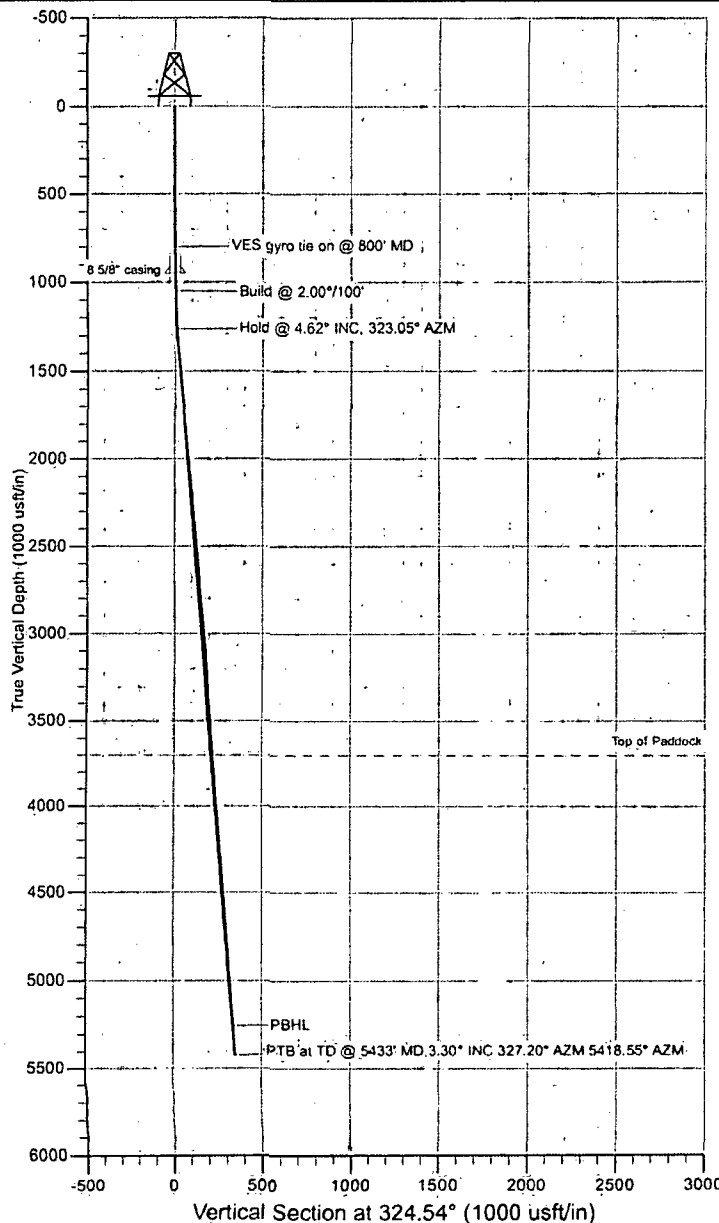
| TVD    | MD     | Name          | Size  |
|--------|--------|---------------|-------|
| 950.00 | 950.03 | 8 5/8" casing | 8-5/8 |



Azimuths to Grid North  
 True North: -0.11°  
 Magnetic North: 7.62°

Magnetic Field  
 Strength: 48775.3nT  
 Dip Angle: 60.81°  
 Date: 10/24/2012  
 Model: IGRF2010

**Magnetic Azimuth Apply:  
 7.62° to convert to Grid North**



#### FORMATION TOP DETAILS

| TVDPath | MDPath  | Formation      |
|---------|---------|----------------|
| 3700.00 | 3708.24 | Top of Paddock |