

District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
1301 W. Grand Avenue, Artesia, NM 88210  
District III  
1000 Rio Brazos Rd., Aztec, NM 87410  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
Energy, Minerals & Natural Resources Department  
OIL CONSERVATION DIVISION  
1220 South St. Francis Dr.  
Santa Fe, NM 87505



Form C-102  
Revised October 12, 2005  
Appropriate District Office  
State Lease - 4 Copies  
Fee Lease - 3 Copies  
☒ AMENDED REPORT

### WELL LOCATION AND ACREAGE DEDICATION PLAT

|                                         |                                                             |                                 |                                                |
|-----------------------------------------|-------------------------------------------------------------|---------------------------------|------------------------------------------------|
| <sup>1</sup> API Number<br>30-039-30701 |                                                             | <sup>2</sup> Pool Code<br>71629 | <sup>3</sup> Pool Name<br>Basin Fruitland Coal |
| <sup>4</sup> Property Code<br>35667     | <sup>5</sup> Property Name<br>Carracas 31B                  |                                 | <sup>6</sup> Well Number<br>16                 |
| <sup>7</sup> OGRID No.<br>162928        | <sup>8</sup> Operator Name<br>ENERGEN RESOURCES CORPORATION |                                 | <sup>9</sup> Elevation<br>7,247'               |

#### <sup>10</sup> Surface Location

| UL or lot no.<br>P | Section<br>30 | Township<br>32N | Range<br>04W | Lot Idn | Feet from the<br>970' | North/South line<br>South | Feet from the<br>815' | East/West line<br>East | County<br>Rio Arriba |
|--------------------|---------------|-----------------|--------------|---------|-----------------------|---------------------------|-----------------------|------------------------|----------------------|
|--------------------|---------------|-----------------|--------------|---------|-----------------------|---------------------------|-----------------------|------------------------|----------------------|

#### <sup>11</sup> Bottom Hole Location If Different From Surface

| UL or lot no.<br>I | Section<br>31 | Township<br>32N | Range<br>04W | Lot Idn | Feet from the<br>2,063' | North/South line<br>South | Feet from the<br>1,020' | East/West line<br>East | County<br>Rio Arriba |
|--------------------|---------------|-----------------|--------------|---------|-------------------------|---------------------------|-------------------------|------------------------|----------------------|
|--------------------|---------------|-----------------|--------------|---------|-------------------------|---------------------------|-------------------------|------------------------|----------------------|

|                               |                               |                                  |                         |
|-------------------------------|-------------------------------|----------------------------------|-------------------------|
| <sup>12</sup> Dedicated Acres | <sup>13</sup> Joint or Infill | <sup>14</sup> Consolidation Code | <sup>15</sup> Order No. |
|-------------------------------|-------------------------------|----------------------------------|-------------------------|

No allowable will be assigned to this completion until all interests have been consolidated or a non-standard unit has been approved by the division.

|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b><sup>17</sup> OPERATOR CERTIFICATION</b><br>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such a mineral working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.<br>Signature: <i>[Signature]</i> Date: 6/27/11<br>Andrew Soto<br>Printed Name |
|  | <b><sup>18</sup> SURVEYOR CERTIFICATION</b><br>I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.<br>March 24, 2009<br>Date of Survey<br>Original Survey Conducted and Recorded By: David R. Russell                                                                                                                                                                                                                                                                   |
|  | 10201<br>Certificate Number                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

AV

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# **Energen Resources**

**Rio Arriba County**

**Carracas**

**Carracas 31B #16**

**OH**

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**Design: OH**

## **Standard Survey Report**

**23 June, 2011**

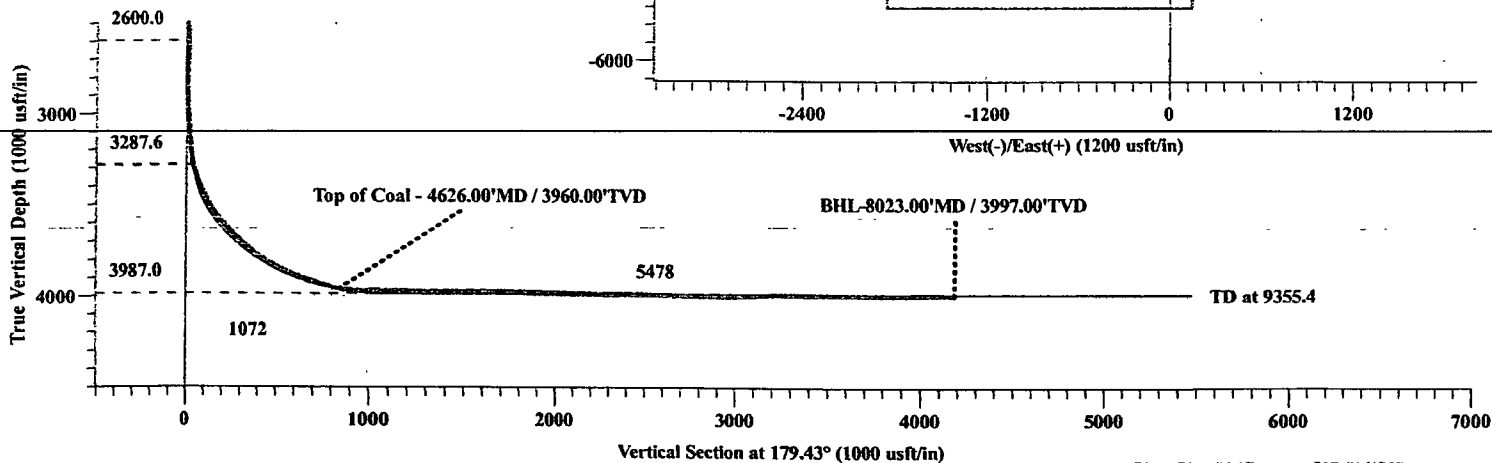
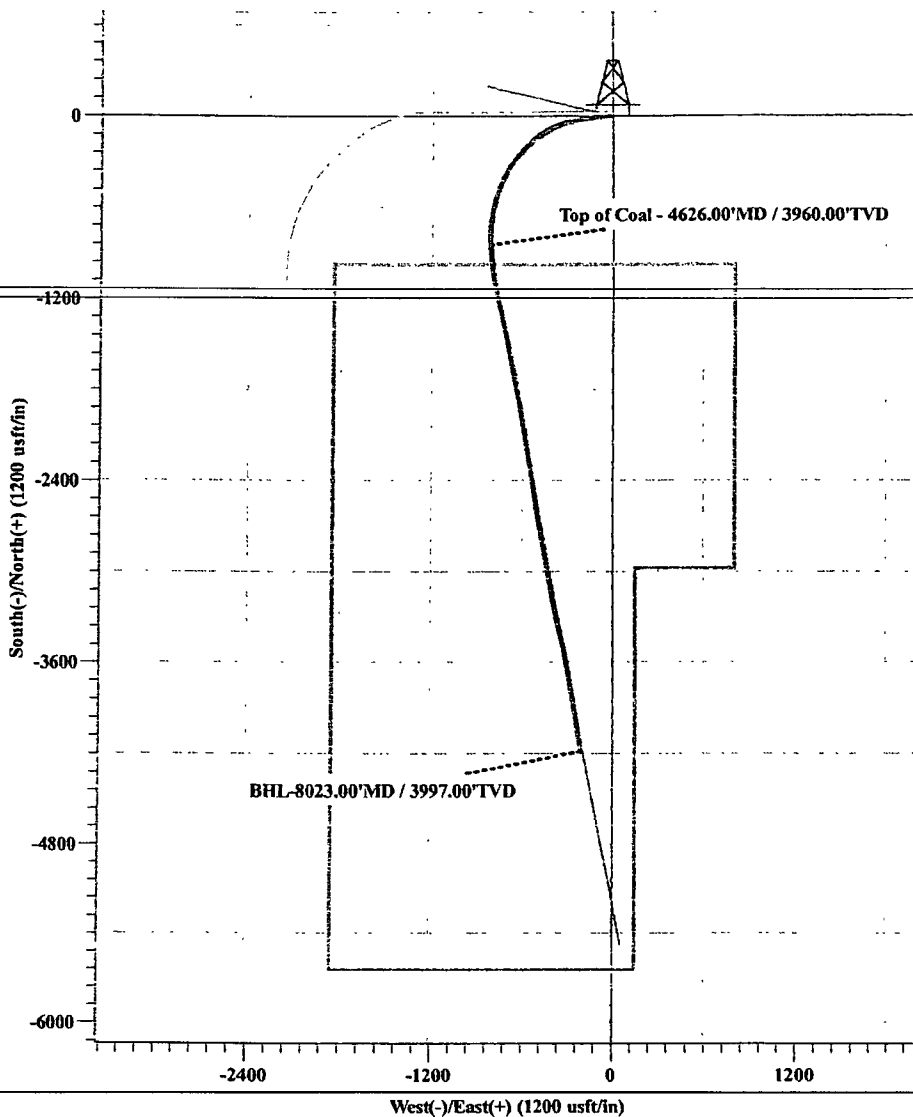


**Carracas 31B #16**  
**Carracas**  
**Rio Arriba Co. NM**

WELL DETAILS: Carracas 31B #16

| Northing   | Easting    | Latitude         | Longitude         |
|------------|------------|------------------|-------------------|
| 2167908.53 | 1336600.95 | 36° 57' 11.448 N | 107° 17' 23.280 W |

EOW  
 No Hardline  
 Crossed



# Survey Report

Company: Energen Resources  
Project: Rio Arriba County  
Site: Carracas  
Well: Carracas 31B #16  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Weil Carracas 31B #16  
TVD Reference: RKStoGL-15' @ 7262.0usft (Original Well Elev)  
MD Reference: RKStoGL-15' @ 7262.0usft (Original Well Elev)  
North Reference: True  
Survey Calculation Method: Minimum Curvature  
Database: EDM 5000.1 Single User Db

Project: Rio Arriba County

Map System: US State Plane 1983  
System Datum: Mean Sea Level  
Geo Datum: North American Datum 1983  
Map Zone: New Mexico Central Zone

Site: Carracas

Site Position: Northing: 2,163,390.79 usft Latitude: 36° 56' 25.836 N  
From: Lat/Long Easting: 1,327,952.79 usft Longitude: 107° 19' 9.192 W  
Position Uncertainty: 3.0 usft Slot Radius: 13-3/16 " Grid Convergence: -0.64 °

Well: Carracas 31B #16

Well Position: +N-S 0.0 usft Northing: 2,167,908.52 usft Latitude: 36° 57' 11.448 N  
+E-W 0.0 usft Easting: 1,336,600.95 usft Longitude: 107° 17' 23.280 W  
Position Uncertainty: 0.0 usft Wellhead Elevation: usft Ground Level: 7,247.0 usft

Wellbore: OH

| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
|-----------|------------|-------------|-----------------|---------------|---------------------|
|           | IGRF2010   | 09/09/10    | 9.81            | 63.75         | 50,990              |

Design: OH

Audit Notes:

Version: 1.0 Phase: ACTUAL Tie On Depth: 0.0

| Vertical Section: | Depth From (TVD) (usft) | +N-S (usft) | +E-W (usft) | Direction (°) |
|-------------------|-------------------------|-------------|-------------|---------------|
|                   | 0.0                     | 0.0         | 0.0         | 179.43        |

Survey Program: Date 06/23/11

| From (usft) | To (usft) | Survey (Wellbore) | Tool Name | Description    |
|-------------|-----------|-------------------|-----------|----------------|
| 335.0       | 8,023.0   | MWD #1 (OH)       | MWD       | MWD - Standard |

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) |
|-----------------------|-----------------|-------------|-----------------------|-------------|-------------|-------------------------|-------------------------|------------------------|-----------------------|
| 0.0                   | 0.00            | 0.00        | 0.0                   | 0.0         | 0.0         | 0.0                     | 0.00                    | 0.00                   | 0.00                  |
| 335.0                 | 0.26            | 355.71      | 335.0                 | 0.8         | -0.1        | -0.8                    | -0.08                   | -0.08                  | 0.00                  |
| 384.0                 | 0.09            | 330.08      | 384.0                 | 0.9         | -0.1        | -0.9                    | 0.37                    | -0.35                  | -52.31                |
| 477.0                 | 0.09            | 234.45      | 477.0                 | 0.9         | -0.2        | -0.9                    | 0.14                    | 0.00                   | -102.83               |
| 569.0                 | 0.09            | 1.71        | 569.0                 | 1.0         | -0.2        | -1.0                    | 0.18                    | 0.00                   | 138.33                |
| 661.0                 | 0.09            | 325.32      | 661.0                 | 1.1         | -0.3        | -1.1                    | 0.06                    | 0.00                   | -39.55                |
| 752.0                 | 0.00            | 0.00        | 752.0                 | 1.1         | -0.3        | -1.1                    | 0.10                    | -0.10                  | 0.00                  |
| 843.0                 | 0.09            | 257.01      | 843.0                 | 1.1         | -0.4        | -1.1                    | 0.10                    | 0.10                   | 0.00                  |
| 935.0                 | 0.09            | 193.94      | 935.0                 | 1.0         | -0.5        | -1.0                    | 0.10                    | 0.00                   | -68.55                |
| 1,027.0               | 0.09            | 38.53       | 1,027.0               | 1.0         | -0.4        | -1.0                    | 0.19                    | 0.00                   | -168.92               |

# Survey Report

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 Project: Rio Arriba County  
 Site: Carracas  
 Well: Carracas 31B #16  
 Wellbore: OH  
 Design: OH

Local Co-ordinate Reference: Well Carracas 31B #16  
 TVD Reference: RKBioGL-15' @ 7262 Gusft (Original Well Elev)  
 MD Reference: RKBioGL-15' @ 7262 Gusft (Original Well Elev)  
 North Reference: True  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

## Survey

| Measured |             |         | Vertical |        |        | Vertical | Dogleg      | Build       | Turn        |
|----------|-------------|---------|----------|--------|--------|----------|-------------|-------------|-------------|
| Depth    | Inclination | Azimuth | Depth    | +N-S   | +E-W   | Section  | Rate        | Rate        | Rate        |
| (usft)   | (°)         | (°)     | (usft)   | (usft) | (usft) | (usft)   | (°/100usft) | (°/100usft) | (°/100usft) |
| 1,119.0  | 0.09        | 358.06  | 1,119.0  | 1.2    | -0.4   | -1.2     | 0.07        | 0.00        | -43.99      |
| 1,213.0  | 0.09        | 270.22  | 1,213.0  | 1.2    | -0.5   | -1.2     | 0.13        | 0.00        | -93.45      |
| 1,305.0  | 0.00        | 348.14  | 1,305.0  | 1.2    | -0.6   | -1.2     | 0.10        | -0.10       | 0.00        |
| 1,381.0  | 0.26        | 274.07  | 1,381.0  | 1.2    | -0.7   | -1.3     | 0.34        | 0.34        | 0.00        |
| 1,471.0  | 0.26        | 177.23  | 1,471.0  | 1.1    | -0.9   | -1.1     | 0.43        | 0.00        | -107.60     |
| 1,561.0  | 0.09        | 292.90  | 1,561.0  | 0.9    | -1.0   | -0.9     | 0.34        | -0.19       | 128.52      |
| 1,651.0  | 0.00        | 0.00    | 1,651.0  | 0.9    | -1.0   | -0.9     | 0.10        | -0.10       | 0.00        |
| 1,741.0  | 0.09        | 251.34  | 1,741.0  | 0.9    | -1.1   | -0.9     | 0.10        | 0.10        | 0.00        |
| 1,831.0  | 0.09        | 85.42   | 1,831.0  | 0.9    | -1.1   | -0.9     | 0.20        | 0.00        | -184.36     |
| 1,921.0  | 0.09        | 40.09   | 1,921.0  | 0.9    | -1.0   | -0.9     | 0.08        | 0.00        | -50.37      |
| 2,011.0  | 0.00        | 93.90   | 2,011.0  | 1.0    | -0.9   | -1.0     | 0.10        | -0.10       | 0.00        |
| 2,101.0  | 0.09        | 347.29  | 2,101.0  | 1.0    | -1.0   | -1.1     | 0.10        | 0.10        | 0.00        |
| 2,190.0  | 0.00        | 347.19  | 2,190.0  | 1.1    | -1.0   | -1.1     | 0.10        | -0.10       | 0.00        |
| 2,280.0  | 0.09        | 157.67  | 2,280.0  | 1.1    | -0.9   | -1.1     | 0.10        | 0.10        | 0.00        |
| 2,325.0  | 0.44        | 172.40  | 2,325.0  | 0.8    | -0.9   | -0.9     | 0.79        | 0.78        | 32.73       |
| 2,370.0  | 1.49        | 167.40  | 2,370.0  | 0.1    | -0.8   | -0.1     | 2.34        | 2.33        | -11.11      |
| 2,415.0  | 2.46        | 174.25  | 2,415.0  | -1.4   | -0.5   | 1.4      | 2.21        | 2.16        | 15.22       |
| 2,460.0  | 2.73        | 188.71  | 2,459.9  | -3.4   | -0.6   | 3.4      | 1.57        | 0.60        | 32.13       |
| 2,505.0  | 2.73        | 196.79  | 2,504.9  | -5.5   | -1.1   | 5.5      | 0.85        | 0.00        | 17.96       |
| 2,549.0  | 2.37        | 207.22  | 2,548.8  | -7.3   | -1.8   | 7.3      | 1.33        | -0.82       | 23.70       |
| 2,594.0  | 2.29        | 255.04  | 2,593.8  | -8.4   | -3.1   | 8.4      | 4.20        | -0.18       | 106.27      |
| 2,639.0  | 3.52        | 297.39  | 2,638.7  | -8.0   | -5.2   | 7.9      | 5.31        | 2.73        | 94.11       |
| 2,685.0  | 6.16        | 294.07  | 2,684.6  | -6.3   | -8.7   | 6.3      | 5.77        | 5.74        | -7.22       |
| 2,731.0  | 9.15        | 283.39  | 2,730.2  | -4.5   | -14.5  | 4.3      | 7.17        | 6.50        | -23.22      |
| 2,776.0  | 11.52       | 272.54  | 2,774.4  | -3.5   | -22.5  | 3.2      | 6.79        | 5.27        | -24.11      |
| 2,821.0  | 14.16       | 266.86  | 2,818.3  | -3.6   | -32.5  | 3.2      | 6.50        | 5.87        | -12.62      |
| 2,866.0  | 16.97       | 266.34  | 2,861.6  | -4.3   | -44.5  | 3.8      | 6.25        | 6.24        | -1.16       |
| 2,911.0  | 19.35       | 266.23  | 2,904.4  | -5.2   | -58.5  | 4.6      | 5.29        | 5.29        | -0.24       |
| 2,956.0  | 21.90       | 263.45  | 2,946.5  | -6.6   | -74.3  | 5.9      | 6.07        | 5.67        | -6.18       |
| 3,000.0  | 24.89       | 262.85  | 2,986.9  | -8.7   | -91.6  | 7.8      | 6.82        | 6.80        | -1.36       |
| 3,045.0  | 27.44       | 262.77  | 3,027.3  | -11.2  | -111.3 | 10.1     | 5.67        | 5.67        | -0.18       |
| 3,091.0  | 30.07       | 262.90  | 3,067.6  | -14.0  | -133.3 | 12.6     | 5.72        | 5.72        | 0.28        |
| 3,136.0  | 32.71       | 261.80  | 3,106.0  | -17.1  | -156.5 | 15.5     | 6.00        | 5.87        | -2.44       |
| 3,181.0  | 34.29       | 261.00  | 3,143.5  | -20.8  | -181.1 | 19.0     | 3.65        | 3.51        | -1.78       |
| 3,225.0  | 36.58       | 260.65  | 3,179.4  | -24.9  | -206.2 | 22.8     | 5.22        | 5.20        | -0.80       |
| 3,271.0  | 39.66       | 261.12  | 3,215.6  | -29.4  | -234.3 | 27.1     | 6.73        | 6.70        | 1.02        |
| 3,316.0  | 41.94       | 260.32  | 3,249.6  | -34.1  | -263.3 | 31.5     | 5.20        | 5.07        | -1.78       |
| 3,361.0  | 44.05       | 257.44  | 3,282.5  | -40.1  | -293.4 | 37.1     | 6.40        | 4.69        | -6.40       |
| 3,405.0  | 44.41       | 252.56  | 3,314.1  | -48.0  | -323.0 | 44.8     | 7.78        | 0.82        | -11.09      |
| 3,429.0  | 44.32       | 250.03  | 3,331.2  | -53.4  | -338.9 | 50.0     | 7.38        | -0.38       | -10.54      |
| 3,460.0  | 44.41       | 247.00  | 3,353.4  | -61.3  | -359.1 | 57.7     | 6.84        | 0.29        | -9.77       |
| 3,490.0  | 44.85       | 245.24  | 3,374.8  | -69.9  | -378.3 | 66.1     | 4.37        | 1.47        | -5.87       |
| 3,535.0  | 45.37       | 242.16  | 3,406.5  | -84.0  | -406.9 | 79.9     | 4.98        | 1.16        | -6.84       |
| 3,580.0  | 45.99       | 239.67  | 3,438.0  | -99.6  | -435.0 | 95.3     | 4.19        | 1.38        | -5.53       |

# Survey Report

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 Site: Carracas  
 Well: Carracas 31B #16  
 Wellbore: OH  
 Design: OH

Local Co-ordinate Reference: Well Carracas 31B #16  
 TVD Reference: RKBtoGL-15' @ 7262.0usft (Original Well Elev)  
 MD Reference: RKBtoGL-15' @ 7262.0usft (Original Well Elev)  
 North Reference: True  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

## Survey

| Measured                               |             |         | Vertical |          |        | Vertical | Dogleg      | Build       | Turn        |
|----------------------------------------|-------------|---------|----------|----------|--------|----------|-------------|-------------|-------------|
| Depth                                  | Inclination | Azimuth | Depth    | +N-S     | +E-W   | Section  | Rate        | Rate        | Rate        |
| (usft)                                 | (°)         | (°)     | (usft)   | (usft)   | (usft) | (usft)   | (°/100usft) | (°/100usft) | (°/100usft) |
| 3,625.0                                | 47.04       | 237.66  | 3,468.9  | -116.6   | -462.9 | 112.0    | 3.99        | 2.33        | -4.47       |
| 3,670.0                                | 47.92       | 235.83  | 3,499.3  | -134.8   | -490.7 | 129.9    | 3.58        | 1.96        | -4.07       |
| 3,715.0                                | 49.15       | 234.38  | 3,529.1  | -154.1   | -518.3 | 148.9    | 3.65        | 2.73        | -3.22       |
| 3,760.0                                | 50.47       | 231.02  | 3,558.2  | -174.9   | -545.6 | 169.5    | 6.41        | 2.93        | -7.47       |
| 3,805.0                                | 51.44       | 228.46  | 3,586.5  | -197.5   | -572.3 | 191.8    | 4.92        | 2.16        | -5.69       |
| 3,850.0                                | 52.50       | 226.20  | 3,614.3  | -221.5   | -598.4 | 215.6    | 4.60        | 2.36        | -5.02       |
| 3,895.0                                | 53.55       | 222.64  | 3,641.3  | -247.2   | -623.5 | 241.0    | 6.74        | 2.33        | -7.91       |
| 3,940.0                                | 53.38       | 219.70  | 3,668.1  | -274.4   | -647.3 | 268.0    | 5.26        | -0.38       | -6.53       |
| 3,985.0                                | 53.64       | 216.27  | 3,694.9  | -302.9   | -669.6 | 296.3    | 6.15        | 0.58        | -7.62       |
| 4,030.0                                | 54.35       | 212.93  | 3,721.3  | -332.9   | -696.2 | 326.0    | 6.21        | 1.58        | -7.42       |
| 4,074.0                                | 56.10       | 210.36  | 3,746.4  | -363.7   | -709.2 | 356.6    | 6.23        | 3.98        | -5.84       |
| 4,119.0                                | 58.04       | 206.87  | 3,770.9  | -396.8   | -727.2 | 389.6    | 7.81        | 4.31        | -7.76       |
| 4,164.0                                | 59.79       | 204.37  | 3,794.1  | -431.6   | -743.9 | 424.1    | 6.14        | 3.89        | -5.56       |
| 4,209.0                                | 61.55       | 201.15  | 3,816.2  | -467.7   | -759.1 | 460.2    | 7.36        | 3.91        | -7.16       |
| 4,254.0                                | 63.84       | 198.57  | 3,836.8  | -505.3   | -772.6 | 497.6    | 7.20        | 5.09        | -5.73       |
| 4,299.0                                | 65.69       | 196.04  | 3,856.0  | -544.2   | -784.7 | 536.4    | 6.54        | 4.11        | -5.62       |
| 4,344.0                                | 67.53       | 194.32  | 3,873.9  | -584.1   | -795.5 | 576.1    | 5.39        | 4.09        | -3.82       |
| 4,389.0                                | 68.76       | 192.16  | 3,890.6  | -624.7   | -805.1 | 616.7    | 5.23        | 2.73        | -4.80       |
| 4,409.0                                | 69.03       | 191.18  | 3,897.8  | -643.0   | -808.9 | 634.9    | 4.77        | 1.35        | -4.90       |
| 4,453.0                                | 70.52       | 188.09  | 3,913.1  | -683.7   | -815.8 | 675.5    | 7.41        | 3.39        | -7.02       |
| 4,498.0                                | 72.19       | 184.84  | 3,927.4  | -726.0   | -820.6 | 717.8    | 7.78        | 3.71        | -7.22       |
| 4,543.0                                | 74.13       | 181.80  | 3,940.5  | -769.0   | -823.1 | 760.8    | 7.77        | 4.31        | -6.76       |
| 4,588.0                                | 76.41       | 178.44  | 3,951.9  | -812.5   | -823.2 | 804.3    | 8.82        | 5.07        | -7.47       |
| 4,626.0                                | 78.93       | 176.93  | 3,960.0  | -849.6   | -821.7 | 841.4    | 7.69        | 6.64        | -3.96       |
| Top of Coal - 4626.00'MD / 3960.00'TVD |             |         |          |          |        |          |             |             |             |
| 4,633.0                                | 79.40       | 176.66  | 3,961.4  | -856.5   | -821.3 | 848.3    | 7.69        | 6.65        | -3.92       |
| 4,678.0                                | 82.92       | 175.46  | 3,968.3  | -900.8   | -818.2 | 892.7    | 8.25        | 7.82        | -2.67       |
| 4,723.0                                | 86.97       | 175.00  | 3,972.2  | -945.5   | -814.5 | 937.4    | 9.06        | 9.00        | -1.02       |
| 4,768.0                                | 90.48       | 173.42  | 3,973.2  | -990.3   | -809.9 | 982.2    | 8.55        | 7.80        | -3.51       |
| 4,803.0                                | 90.31       | 170.83  | 3,973.0  | -1,024.9 | -805.2 | 1,016.9  | 7.42        | -0.49       | -7.40       |
| 4,872.0                                | 90.13       | 168.66  | 3,972.7  | -1,092.8 | -792.9 | 1,084.9  | 3.16        | -0.26       | -3.14       |
| 4,903.0                                | 88.81       | 167.64  | 3,973.0  | -1,123.2 | -786.5 | 1,115.3  | 5.38        | -4.26       | -3.29       |
| 4,935.0                                | 88.37       | 166.33  | 3,973.8  | -1,154.3 | -779.3 | 1,146.5  | 4.32        | -1.38       | -4.09       |
| 4,967.0                                | 88.72       | 165.84  | 3,974.6  | -1,185.4 | -771.6 | 1,177.6  | 1.88        | 1.09        | -1.53       |
| 4,999.0                                | 88.99       | 166.01  | 3,975.3  | -1,216.4 | -763.8 | 1,208.7  | 1.00        | 0.84        | 0.53        |
| 5,031.0                                | 88.72       | 166.73  | 3,975.9  | -1,247.5 | -756.3 | 1,239.9  | 2.40        | -0.64       | 2.25        |
| 5,062.0                                | 88.64       | 166.57  | 3,976.6  | -1,277.7 | -749.1 | 1,270.1  | 0.58        | -0.26       | -0.52       |
| 5,094.0                                | 88.64       | 167.36  | 3,977.4  | -1,308.8 | -741.9 | 1,301.4  | 2.47        | 0.00        | 2.47        |
| 5,126.0                                | 89.08       | 168.53  | 3,978.0  | -1,340.1 | -735.2 | 1,332.7  | 3.91        | 1.38        | 3.66        |
| 5,158.0                                | 88.99       | 168.41  | 3,978.5  | -1,371.5 | -728.8 | 1,364.1  | 0.47        | -0.28       | -0.38       |
| 5,189.0                                | 89.60       | 167.79  | 3,978.9  | -1,401.8 | -722.4 | 1,394.5  | 2.81        | 1.97        | -2.00       |
| 5,221.0                                | 90.04       | 167.82  | 3,979.0  | -1,433.1 | -715.7 | 1,425.9  | 1.38        | 1.38        | 0.09        |
| 5,253.0                                | 91.19       | 167.84  | 3,978.7  | -1,464.3 | -708.9 | 1,457.2  | 3.59        | 3.59        | 0.06        |

# Survey Report

Company: Energen Resources  
 Project: Rio Arriba County  
 Site: Carracas  
 Well: Carracas 31B #16  
 Wellbore: OH  
 Design: OH

Local Co-ordinate Reference: Well Carracas 31B #16  
 TVD Reference: RKStcGL-15' @ 7262.0usft (Original Well Elev)  
 MD Reference: RKStcGL-15' @ 7262.0usft (Original Well Elev)  
 North Reference: True  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

## Survey

| Measured        |                    |                | Vertical        |                |                | Vertical          |                     |                     | Dogleg              |                     | Build               |                     | Turn                |                     |
|-----------------|--------------------|----------------|-----------------|----------------|----------------|-------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|---------------------|
| Depth<br>(usft) | Inclination<br>(°) | Azimuth<br>(°) | Depth<br>(usft) | +N-S<br>(usft) | +E-W<br>(usft) | Section<br>(usft) | Rate<br>(°/100usft) | Rate<br>(°/100usft) | Rate<br>(°/100usft) | Rate<br>(°/100usft) | Rate<br>(°/100usft) | Rate<br>(°/100usft) | Rate<br>(°/100usft) | Rate<br>(°/100usft) |
| 5,285.0         | 91.01              | 167.35         | 3,978.1         | -1,495.6       | -702.1         | 1,488.5           | 1.63                | -0.56               | -1.53               |                     |                     |                     |                     |                     |
| 5,316.0         | 91.10              | 168.53         | 3,977.5         | -1,525.9       | -695.6         | 1,518.9           | 3.82                | 0.29                | 3.81                |                     |                     |                     |                     |                     |
| 5,348.0         | 89.87              | 168.97         | 3,977.2         | -1,557.3       | -689.4         | 1,550.3           | 4.08                | -3.84               | 1.38                |                     |                     |                     |                     |                     |
| 5,380.0         | 89.16              | 169.02         | 3,977.5         | -1,588.7       | -683.2         | 1,581.8           | 2.22                | -2.22               | 0.16                |                     |                     |                     |                     |                     |
| 5,412.0         | 88.90              | 168.80         | 3,978.0         | -1,620.1       | -677.1         | 1,613.3           | 1.06                | -0.81               | -0.69               |                     |                     |                     |                     |                     |
| 5,444.0         | 89.25              | 168.13         | 3,978.6         | -1,651.4       | -670.7         | 1,644.7           | 2.36                | 1.09                | -2.09               |                     |                     |                     |                     |                     |
| 5,476.0         | 89.87              | 168.28         | 3,978.8         | -1,682.8       | -664.1         | 1,676.1           | 1.99                | 1.94                | 0.47                |                     |                     |                     |                     |                     |
| 5,507.0         | 90.04              | 168.52         | 3,978.8         | -1,713.1       | -657.9         | 1,706.5           | 0.95                | 0.55                | 0.77                |                     |                     |                     |                     |                     |
| 5,539.0         | 90.04              | 168.26         | 3,978.8         | -1,744.5       | -651.5         | 1,737.9           | 0.81                | 0.00                | -0.81               |                     |                     |                     |                     |                     |
| 5,570.0         | 90.22              | 167.93         | 3,978.7         | -1,774.8       | -645.1         | 1,768.3           | 1.21                | 0.58                | -1.06               |                     |                     |                     |                     |                     |
| 5,602.0         | 89.08              | 168.94         | 3,978.9         | -1,806.2       | -638.7         | 1,799.7           | 4.76                | -3.56               | 3.16                |                     |                     |                     |                     |                     |
| 5,634.0         | 89.16              | 169.48         | 3,979.4         | -1,837.6       | -632.7         | 1,831.2           | 1.71                | 0.25                | 1.69                |                     |                     |                     |                     |                     |
| 5,666.0         | 88.64              | 169.86         | 3,980.0         | -1,869.1       | -626.9         | 1,862.7           | 2.01                | -1.63               | 1.19                |                     |                     |                     |                     |                     |
| 5,698.0         | 88.64              | 170.17         | 3,980.8         | -1,900.6       | -621.4         | 1,894.3           | 0.97                | 0.00                | 0.97                |                     |                     |                     |                     |                     |
| 5,729.0         | 88.20              | 170.47         | 3,981.7         | -1,931.1       | -616.2         | 1,924.9           | 1.72                | -1.42               | 0.97                |                     |                     |                     |                     |                     |
| 5,761.0         | 88.37              | 170.79         | 3,982.6         | -1,962.7       | -611.0         | 1,956.5           | 1.13                | 0.53                | 1.00                |                     |                     |                     |                     |                     |
| 5,793.0         | 88.37              | 170.43         | 3,983.5         | -1,994.2       | -605.8         | 1,988.1           | 1.12                | 0.00                | -1.13               |                     |                     |                     |                     |                     |
| 5,824.0         | 88.29              | 170.73         | 3,984.4         | -2,024.8       | -600.7         | 2,018.7           | 1.00                | -0.26               | 0.97                |                     |                     |                     |                     |                     |
| 5,856.0         | 88.37              | 170.65         | 3,985.4         | -2,056.4       | -595.5         | 2,050.3           | 0.35                | 0.25                | -0.25               |                     |                     |                     |                     |                     |
| 5,888.0         | 88.55              | 170.34         | 3,986.2         | -2,087.9       | -590.2         | 2,081.9           | 1.12                | 0.56                | -0.97               |                     |                     |                     |                     |                     |
| 5,919.0         | 88.90              | 170.01         | 3,986.9         | -2,118.5       | -584.9         | 2,112.5           | 1.55                | 1.13                | -1.06               |                     |                     |                     |                     |                     |
| 5,951.0         | 89.52              | 169.72         | 3,987.3         | -2,150.0       | -579.3         | 2,144.1           | 2.14                | 1.94                | -0.91               |                     |                     |                     |                     |                     |
| 5,983.0         | 89.52              | 169.66         | 3,987.6         | -2,181.4       | -573.6         | 2,175.6           | 0.19                | 0.00                | -0.19               |                     |                     |                     |                     |                     |
| 6,015.0         | 89.25              | 170.49         | 3,988.0         | -2,213.0       | -568.1         | 2,207.2           | 2.73                | -0.84               | 2.59                |                     |                     |                     |                     |                     |
| 6,047.0         | 89.43              | 170.72         | 3,988.3         | -2,244.5       | -562.8         | 2,238.8           | 0.91                | 0.56                | 0.72                |                     |                     |                     |                     |                     |
| 6,078.0         | 89.78              | 171.08         | 3,988.5         | -2,275.1       | -557.9         | 2,269.5           | 1.62                | 1.13                | 1.16                |                     |                     |                     |                     |                     |
| 6,110.0         | 89.96              | 170.58         | 3,988.6         | -2,306.7       | -552.8         | 2,301.1           | 1.66                | 0.56                | -1.56               |                     |                     |                     |                     |                     |
| 6,142.0         | 89.96              | 170.25         | 3,988.6         | -2,338.3       | -547.5         | 2,332.7           | 1.03                | 0.00                | -1.03               |                     |                     |                     |                     |                     |
| 6,172.0         | 89.96              | 170.24         | 3,988.7         | -2,367.8       | -542.4         | 2,362.3           | 0.03                | 0.00                | -0.03               |                     |                     |                     |                     |                     |
| 6,202.0         | 89.78              | 170.03         | 3,988.7         | -2,397.4       | -537.3         | 2,391.9           | 0.92                | -0.60               | -0.70               |                     |                     |                     |                     |                     |
| 6,232.0         | 88.81              | 170.74         | 3,989.1         | -2,427.0       | -532.3         | 2,421.6           | 4.01                | -3.23               | 2.37                |                     |                     |                     |                     |                     |
| 6,263.0         | 88.29              | 171.30         | 3,989.9         | -2,457.6       | -527.4         | 2,452.2           | 2.46                | -1.68               | 1.81                |                     |                     |                     |                     |                     |
| 6,294.0         | 87.93              | 171.60         | 3,990.9         | -2,488.2       | -522.8         | 2,482.9           | 1.51                | -1.16               | 0.97                |                     |                     |                     |                     |                     |
| 6,324.0         | 88.55              | 170.97         | 3,991.8         | -2,517.9       | -518.3         | 2,512.6           | 2.95                | 2.07                | -2.10               |                     |                     |                     |                     |                     |
| 6,355.0         | 88.72              | 170.31         | 3,992.6         | -2,548.4       | -513.3         | 2,543.2           | 2.20                | 0.55                | -2.13               |                     |                     |                     |                     |                     |
| 6,386.0         | 88.64              | 169.87         | 3,993.3         | -2,579.0       | -507.9         | 2,573.8           | 1.44                | -0.26               | -1.42               |                     |                     |                     |                     |                     |
| 6,417.0         | 88.55              | 170.11         | 3,994.0         | -2,609.5       | -502.5         | 2,604.4           | 0.83                | -0.29               | 0.77                |                     |                     |                     |                     |                     |
| 6,447.0         | 88.81              | 169.49         | 3,994.7         | -2,639.0       | -497.2         | 2,633.9           | 2.24                | 0.87                | -2.07               |                     |                     |                     |                     |                     |
| 6,478.0         | 88.55              | 169.29         | 3,995.4         | -2,669.5       | -491.5         | 2,664.4           | 1.06                | -0.84               | -0.65               |                     |                     |                     |                     |                     |
| 6,508.0         | 88.29              | 169.03         | 3,996.3         | -2,699.9       | -485.9         | 2,694.0           | 1.23                | -0.87               | -0.87               |                     |                     |                     |                     |                     |
| 6,539.0         | 88.20              | 169.05         | 3,997.2         | -2,729.3       | -480.0         | 2,724.4           | 0.30                | -0.29               | 0.06                |                     |                     |                     |                     |                     |
| 6,570.0         | 88.29              | 169.21         | 3,998.2         | -2,759.8       | -474.1         | 2,754.9           | 0.59                | 0.29                | 0.52                |                     |                     |                     |                     |                     |
| 6,599.0         | 88.37              | 169.37         | 3,999.0         | -2,788.3       | -468.8         | 2,783.5           | 0.62                | 0.28                | 0.55                |                     |                     |                     |                     |                     |
| 6,630.0         | 88.55              | 168.72         | 3,999.8         | -2,818.7       | -462.9         | 2,813.9           | 2.17                | 0.58                | -2.10               |                     |                     |                     |                     |                     |

# Survey Report

Company: Energen Resources  
 Project: Rio Arriba County  
 Site: Carracas  
 Well: Carracas 31B #16  
 Wellbore: OH  
 Design: OH

Local Co-ordinate Reference: Well Carracas 31B #16  
 TVD Reference: RKBtoGL-15' @ 7262.0usft (Original Well Elev)  
 MD Reference: RKBtoGL-15' @ 7262.0usft (Original Well Elev)  
 North Reference: True  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

## Survey

| Measured |             |         | Vertical |          |        | Vertical | Dogleg      | Build       | Turn        |
|----------|-------------|---------|----------|----------|--------|----------|-------------|-------------|-------------|
| Depth    | Inclination | Azimuth | Depth    | +N/-S    | +E/-W  | Section  | Rate        | Rate        | Rate        |
| (usft)   | (°)         | (°)     | (usft)   | (usft)   | (usft) | (usft)   | (°/100usft) | (°/100usft) | (°/100usft) |
| 6,661.0  | 89.08       | 169.18  | 4,000.5  | -2,849.1 | -456.9 | 2,844.4  | 2.26        | 1.71        | 1.48        |
| 6,691.0  | 89.69       | 169.37  | 4,000.8  | -2,878.6 | -451.3 | 2,873.9  | 2.13        | 2.03        | 0.63        |
| 6,722.0  | 89.78       | 169.90  | 4,001.0  | -2,909.1 | -445.8 | 2,904.5  | 1.73        | 0.29        | 1.71        |
| 6,752.0  | 89.96       | 170.59  | 4,001.0  | -2,938.6 | -440.7 | 2,934.1  | 2.38        | 0.60        | 2.30        |
| 6,781.0  | 89.52       | 170.13  | 4,001.2  | -2,967.2 | -435.8 | 2,962.7  | 2.19        | -1.52       | -1.59       |
| 6,812.0  | 89.87       | 169.10  | 4,001.3  | -2,997.7 | -430.2 | 2,993.3  | 3.51        | 1.13        | -3.32       |
| 6,843.0  | 91.10       | 169.04  | 4,001.1  | -3,028.1 | -424.4 | 3,023.8  | 3.97        | 3.97        | -0.19       |
| 6,873.0  | 92.15       | 169.57  | 4,000.2  | -3,057.6 | -418.8 | 3,053.3  | 3.92        | 3.50        | 1.77        |
| 6,904.0  | 93.30       | 170.26  | 3,998.7  | -3,088.1 | -413.4 | 3,083.8  | 4.32        | 3.71        | 2.23        |
| 6,934.0  | 93.47       | 170.82  | 3,997.0  | -3,117.6 | -408.4 | 3,113.4  | 1.95        | 0.57        | 1.87        |
| 6,964.0  | 93.03       | 170.65  | 3,995.3  | -3,147.2 | -403.6 | 3,143.0  | 1.57        | -1.47       | -0.57       |
| 6,995.0  | 92.07       | 170.46  | 3,993.9  | -3,177.8 | -398.5 | 3,173.6  | 3.16        | -3.10       | -0.61       |
| 7,025.0  | 91.71       | 169.68  | 3,992.9  | -3,207.3 | -393.4 | 3,203.2  | 2.86        | -1.20       | -2.60       |
| 7,056.0  | 90.75       | 168.48  | 3,992.2  | -3,237.7 | -387.5 | 3,233.7  | 4.96        | -3.10       | -3.87       |
| 7,086.0  | 89.78       | 167.07  | 3,992.1  | -3,267.0 | -381.1 | 3,263.1  | 5.70        | -3.23       | -4.70       |
| 7,117.0  | 89.69       | 167.09  | 3,992.2  | -3,297.2 | -374.2 | 3,293.4  | 0.30        | -0.29       | 0.06        |
| 7,147.0  | 89.43       | 167.05  | 3,992.5  | -3,326.5 | -367.5 | 3,322.7  | 0.88        | -0.87       | -0.13       |
| 7,176.0  | 89.16       | 166.33  | 3,992.8  | -3,354.7 | -360.8 | 3,351.0  | 2.65        | -0.93       | -2.48       |
| 7,207.0  | 89.16       | 166.56  | 3,993.3  | -3,384.8 | -353.6 | 3,381.2  | 0.74        | 0.00        | 0.74        |
| 7,237.0  | 89.34       | 167.09  | 3,993.7  | -3,414.0 | -346.7 | 3,410.4  | 1.87        | 0.60        | 1.77        |
| 7,268.0  | 89.43       | 167.42  | 3,994.0  | -3,444.3 | -339.9 | 3,440.7  | 1.10        | 0.29        | 1.06        |
| 7,298.0  | 89.08       | 167.31  | 3,994.4  | -3,473.6 | -333.3 | 3,470.1  | 1.22        | -1.17       | -0.37       |
| 7,328.0  | 89.08       | 168.00  | 3,994.9  | -3,502.9 | -326.9 | 3,499.4  | 2.30        | 0.00        | 2.30        |
| 7,359.0  | 88.99       | 168.33  | 3,995.4  | -3,533.2 | -320.6 | 3,529.8  | 1.10        | -0.29       | 1.06        |
| 7,390.0  | 89.43       | 168.90  | 3,995.8  | -3,563.6 | -314.4 | 3,560.3  | 2.32        | 1.42        | 1.84        |
| 7,421.0  | 89.60       | 169.04  | 3,996.1  | -3,594.0 | -308.5 | 3,590.8  | 0.71        | 0.55        | 0.45        |
| 7,451.0  | 89.43       | 169.15  | 3,996.3  | -3,623.5 | -302.8 | 3,620.3  | 0.67        | -0.57       | 0.37        |
| 7,482.0  | 89.43       | 168.65  | 3,996.6  | -3,653.9 | -296.9 | 3,650.7  | 1.61        | 0.00        | -1.61       |
| 7,513.0  | 89.34       | 169.35  | 3,997.0  | -3,684.3 | -291.0 | 3,681.2  | 2.28        | -0.29       | 2.26        |
| 7,543.0  | 89.16       | 169.20  | 3,997.4  | -3,713.8 | -285.4 | 3,710.8  | 0.78        | -0.60       | -0.50       |
| 7,574.0  | 89.96       | 169.57  | 3,997.6  | -3,744.3 | -279.7 | 3,741.3  | 2.84        | 2.58        | 1.19        |
| 7,604.0  | 90.75       | 170.48  | 3,997.4  | -3,773.8 | -274.5 | 3,770.9  | 4.02        | 2.63        | 3.03        |
| 7,634.0  | 90.31       | 170.62  | 3,997.1  | -3,803.4 | -269.5 | 3,800.5  | 1.54        | -1.47       | 0.47        |
| 7,664.0  | 89.87       | 170.46  | 3,997.1  | -3,833.0 | -264.6 | 3,830.2  | 1.56        | -1.47       | -0.53       |
| 7,695.0  | 90.22       | 170.22  | 3,997.1  | -3,863.5 | -259.4 | 3,860.8  | 1.37        | 1.13        | -0.77       |
| 7,726.0  | 90.66       | 170.67  | 3,996.8  | -3,894.1 | -254.3 | 3,891.4  | 2.03        | 1.42        | 1.45        |
| 7,756.0  | 90.13       | 170.59  | 3,996.6  | -3,923.7 | -249.4 | 3,921.0  | 1.79        | -1.77       | -0.27       |
| 7,785.0  | 90.40       | 170.24  | 3,996.5  | -3,952.3 | -244.5 | 3,949.7  | 1.52        | 0.93        | -1.21       |
| 7,816.0  | 90.92       | 170.47  | 3,996.1  | -3,982.9 | -239.4 | 3,980.3  | 1.83        | 1.68        | 0.74        |
| 7,847.0  | 90.66       | 170.58  | 3,995.7  | -4,013.4 | -234.2 | 4,010.9  | 0.91        | -0.84       | 0.35        |
| 7,878.0  | 90.92       | 170.69  | 3,995.3  | -4,044.0 | -229.2 | 4,041.5  | 0.91        | 0.84        | 0.35        |
| 7,909.0  | 90.84       | 170.56  | 3,994.8  | -4,074.6 | -224.2 | 4,072.2  | 0.49        | -0.26       | -0.42       |
| 7,940.0  | 89.34       | 170.47  | 3,994.8  | -4,105.2 | -219.0 | 4,102.8  | 4.85        | -4.84       | -0.29       |

# Survey Report

Company: Energen Resources  
 Project: Rio Arriba County  
 Site: Carracas  
 Well: Carracas 31B #16  
 Wellbore: OH  
 Design: OH

Local Co-ordinate Reference: Well Carracas 31B #16  
 TVD Reference: RKBtoGL-15' @ 7262 0usft (Original Well Elev)  
 MD Reference: RKBtoGL-15' @ 7262 0usft (Original Well Elev)  
 North Reference: True  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

## Survey

| Measured                     |                    |                | Vertical        |                 |                 | Vertical          |                     |                     | Dogleg              | Build | Turn |
|------------------------------|--------------------|----------------|-----------------|-----------------|-----------------|-------------------|---------------------|---------------------|---------------------|-------|------|
| Depth<br>(usft)              | Inclination<br>(°) | Azimuth<br>(°) | Depth<br>(usft) | +N/-S<br>(usft) | +E/-W<br>(usft) | Section<br>(usft) | Rate<br>(°/100usft) | Rate<br>(°/100usft) | Rate<br>(°/100usft) |       |      |
| 7,970.0                      | 88.29              | 170.20         | 3,995.4         | -4,134.7        | -214.0          | 4,132.4           | 3.61                | -3.50               | -0.90               |       |      |
| 8,023.0                      | 88.29              | 170.20         | 3,997.0         | -4,186.9        | -205.0          | 4,184.7           | 0.00                | 0.00                | 0.00                |       |      |
| BHL-8023.00'MD / 3997.00'TVD |                    |                |                 |                 |                 |                   |                     |                     |                     |       |      |

## Design Annotations

| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Local Coordinates |                 | Comment                                |
|-----------------------------|-----------------------------|-------------------|-----------------|----------------------------------------|
|                             |                             | +N/-S<br>(usft)   | +E/-W<br>(usft) |                                        |
| 4,626.0                     | 3,960.0                     | 849.6             | 821.7           | Top of Coal - 4626.00'MD / 3960.00'TVD |
| 8,023.0                     | 3,997.0                     | -4,186.9          | -205.0          | BHL-8023.00'MD / 3997.00'TVD           |

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