

30-039-26475

## Energen Resources

Carson Nat'l Forest: S19, T32N, R4W

Carracas Mesa

Carracas 19 B #4

Carracas 19 B #4 Sidetrack

Plan: Final Survey

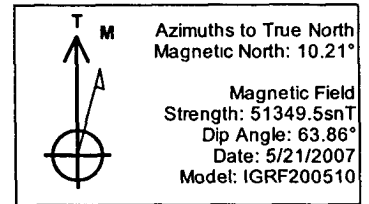
## Energen Resources

21 May, 2007

BHL 2540/N 807/W Md 5228 TVD 4100  
EntiaCoal 1560/N 841/W Md 427 TVD 4100  
RCVD OCT 30 '07  
DIST. 3

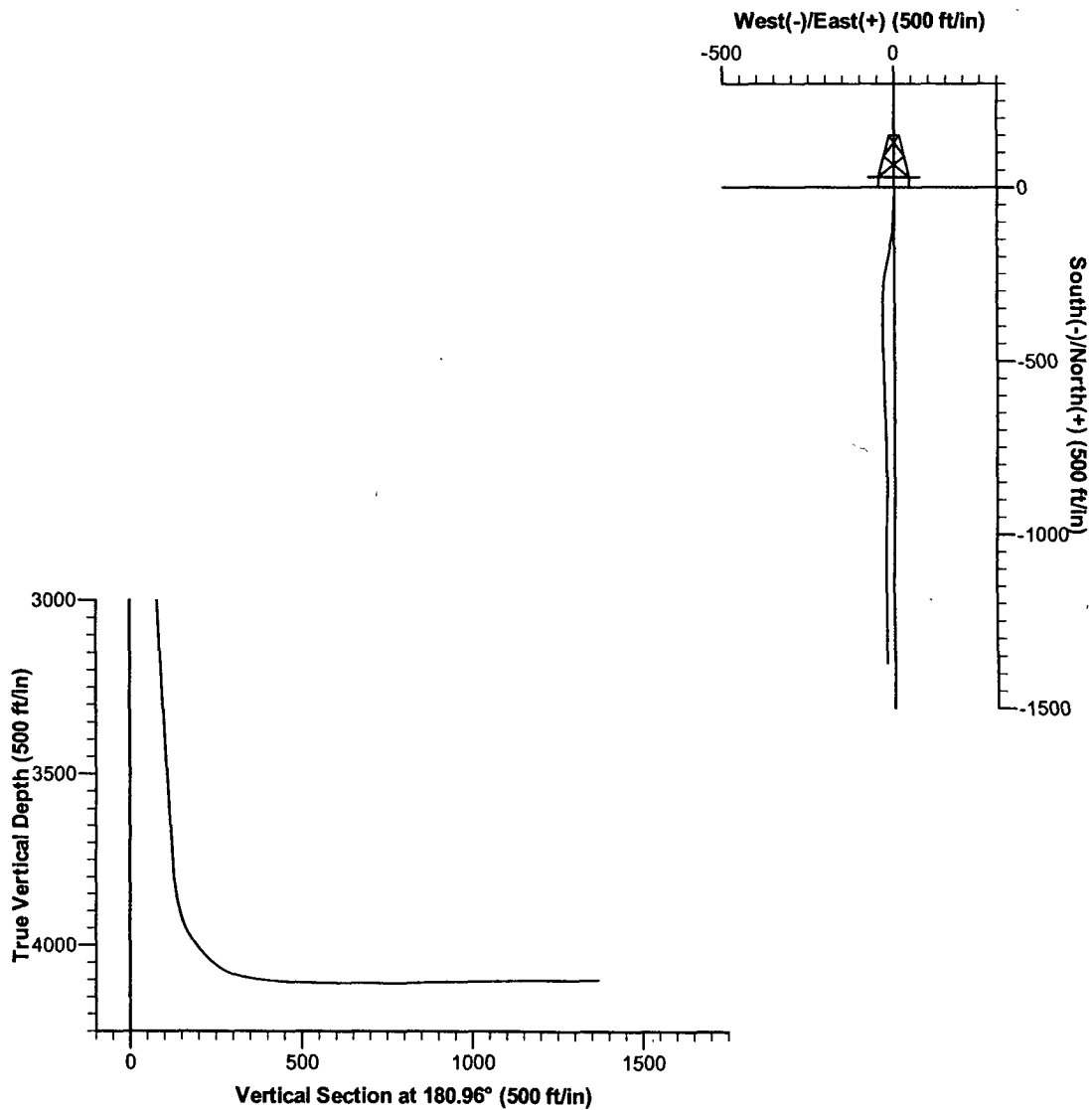


**Project:** Carson Nat'l Forest: S19, T32N, R4W  
**Site:** Carracas Mesa  
**Well:** Carracas 19 B #4  
**Wellbore:** Carracas 19 B #4 Sidetrack  
**Plan:** Final Survey (Carracas 19 B #4/Carracas 19 B #4 Sidetrack)



| PROJECT DETAILS: Carson Nat'l Forest: S19, T32N, R4W |                           |
|------------------------------------------------------|---------------------------|
| Geodetic System:                                     | US State Plane 1983       |
| Datum:                                               | North American Datum 1983 |
| Ellipsoid:                                           | GRS 1980                  |
| Zone:                                                | New Mexico Western Zone   |
| System Datum: Mean Sea Level                         |                           |

| SURFACE LOCATION |            |
|------------------|------------|
| Easting:         | 2878387.80 |
| Northing:        | 2175094.15 |



# Energen

## Energen Resources - Survey



|                                                     |                                                           |
|-----------------------------------------------------|-----------------------------------------------------------|
| <b>Company:</b> Energen Resources                   | <b>Local Co-ordinate Reference:</b> Well Carracas 19 B #4 |
| <b>Project:</b> Carson Nat'l Forest: S19, T32N, R4W | <b>TVD Reference:</b> KB @ 7416.0ft (Drilling Rig)        |
| <b>Site:</b> Carracas Mesa                          | <b>MD Reference:</b> KB @ 7416.0ft (Drilling Rig)         |
| <b>Well:</b> Carracas 19 B #4                       | <b>North Reference:</b> True                              |
| <b>Wellbore:</b> Carracas 19 B #4 Sidetrack         | <b>Survey Calculation Method:</b> Minimum Curvature       |
| <b>Design:</b> Final Survey                         | <b>Database:</b> EDM 2003.16 Single User Db               |

**Project:** Carson Nat'l Forest: S19, T32N, R4W

|                                             |                                     |
|---------------------------------------------|-------------------------------------|
| <b>Map System:</b> US State Plane 1983      | <b>System Datum:</b> Mean Sea Level |
| <b>Geo Datum:</b> North American Datum 1983 |                                     |
| <b>Map Zone:</b> New Mexico Western Zone    |                                     |

**Site:** Carracas Mesa

|                                     |                                  |                                    |
|-------------------------------------|----------------------------------|------------------------------------|
| <b>Site Position:</b>               | <b>Northing:</b> 2,175,094.15 ft | <b>Latitude:</b> 36° 58' 34.248 N  |
| <b>From:</b> Lat/Long               | <b>Easting:</b> 2,878,387.80 ft  | <b>Longitude:</b> 107° 18' 6.048 W |
| <b>Position Uncertainty:</b> 0.0 ft | <b>Slot Radius:</b> "            | <b>Grid Convergence:</b> 0.32 °    |

**Well:** Carracas 19 B #4

|                                    |                                       |                                    |
|------------------------------------|---------------------------------------|------------------------------------|
| <b>Well Position</b> +N/-S 0.0 ft  | <b>Northing:</b> 2,175,094.15 ft      | <b>Latitude:</b> 36° 58' 34.248 N  |
| +E/-W 0.0 ft                       | <b>Easting:</b> 2,878,387.80 ft       | <b>Longitude:</b> 107° 18' 6.048 W |
| <b>Position Uncertainty</b> 0.0 ft | <b>Wellhead Elevation:</b> 7,401.0 ft | <b>Ground Level:</b> 7,401.0 ft    |

**Wellbore:** Carracas 19 B #4 Sidetrack

| Magnetics | Model Name | Sample Date | Declination<br>(°) | Dip Angle<br>(°) | Field Strength<br>(nT) |
|-----------|------------|-------------|--------------------|------------------|------------------------|
|           | IGRF200510 | 5/21/2007   | 10.21              | 63.86            | 51,350                 |

**Design:** Final Survey

**Audit Notes:**

|                 |                         |                          |
|-----------------|-------------------------|--------------------------|
| <b>Version:</b> | <b>Phase:</b> PROTOTYPE | <b>Tie On Depth:</b> 0.0 |
|-----------------|-------------------------|--------------------------|

| Vertical Section: | Depth From (TVD)<br>(ft) | +N/-S<br>(ft) | +E/-W<br>(ft) | Direction<br>(°) |
|-------------------|--------------------------|---------------|---------------|------------------|
|                   | 0.0                      | 0.0           | 0.0           | 180.96           |

**Survey Tool Program** Date: 5/21/2007

| From<br>(ft) | To<br>(ft) | Survey (Wellbore)                         | Tool Name | Description    |
|--------------|------------|-------------------------------------------|-----------|----------------|
| 0.0          | 5,228.0    | Final Survey (Carracas 19 B #4 Sidetrack) | MWD       | MWD - Standard |

**Planned Survey:**

| MD<br>(ft) | TVD<br>(ft) | Inc<br>(°) | Azi<br>(°) | V. Sec<br>(ft) | N/S<br>(ft) | E/W<br>(ft) |
|------------|-------------|------------|------------|----------------|-------------|-------------|
| 3,800.0    | 3,797.1     | 3.87       | 182.36     | 128.2          | -128.2      | -5.3        |
| 3,850.0    | 3,846.8     | 9.22       | 188.37     | 133.9          | -133.8      | -5.9        |
| 3,900.0    | 3,895.7     | 14.59      | 189.97     | 144.1          | -144.0      | -7.6        |
| 3,936.8    | 3,930.9     | 18.55      | 190.57     | 154.5          | -154.3      | -9.5        |
| 3,940.0    | 3,934.0     | 19.63      | 191.16     | 155.5          | -155.4      | -9.7        |
| 3,950.0    | 3,943.3     | 23.01      | 192.66     | 159.1          | -158.9      | -10.4       |
| 3,953.0    | 3,946.0     | 24.01      | 193.03     | 160.2          | -160.1      | -10.7       |
| 3,960.0    | 3,952.4     | 25.84      | 192.10     | 163.1          | -163.0      | -11.3       |
| 3,980.0    | 3,970.0     | 31.05      | 190.03     | 172.5          | -172.3      | -13.2       |
| 3,984.0    | 3,973.4     | 32.10      | 189.69     | 174.6          | -174.4      | -13.5       |
| 4,000.0    | 3,986.7     | 35.19      | 189.06     | 183.3          | -183.1      | -15.0       |
| 4,015.3    | 3,998.9     | 38.16      | 188.55     | 192.4          | -192.1      | -16.4       |

# Energen

## Energen Resources - Survey



**Company:** Energen Resources  
**Project:** Carson Nat'l Forest: S19, T32N, R4W  
**Site:** Carracas Mesa  
**Well:** Carracas 19 B #4  
**Wellbore:** Carracas 19 B #4 Sidetrack  
**Design:** Final Survey

**Local Co-ordinate Reference:** Well Carracas 19 B #4  
**TVD Reference:** KB @ 7416.0ft (Drilling Rig)  
**MD Reference:** KB @ 7416.0ft (Drilling Rig)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 2003.16 Single User Db

### Planned Survey

| MD<br>(ft) | TVD<br>(ft) | Inc<br>(°) | Azi<br>(°) | V. Sec<br>(ft) | N/S<br>(ft) | E/W<br>(ft) |
|------------|-------------|------------|------------|----------------|-------------|-------------|
| 4,025.0    | 4,006.5     | 39.52      | 189.30     | 198.4          | -198.1      | -17.3       |
| 4,046.5    | 4,022.7     | 42.56      | 190.83     | 212.3          | -212.0      | -19.8       |
| 4,050.0    | 4,025.3     | 43.14      | 190.95     | 214.7          | -214.4      | -20.2       |
| 4,075.0    | 4,042.9     | 47.30      | 191.71     | 232.1          | -231.8      | -23.7       |
| 4,078.2    | 4,045.1     | 47.84      | 191.80     | 234.5          | -234.1      | -24.2       |
| 4,080.0    | 4,046.3     | 48.37      | 191.63     | 235.8          | -235.4      | -24.5       |
| 4,090.0    | 4,052.7     | 51.39      | 190.73     | 243.3          | -242.9      | -25.9       |
| 4,100.0    | 4,058.7     | 54.41      | 189.89     | 251.2          | -250.8      | -27.4       |
| 4,109.4    | 4,064.0     | 57.24      | 189.17     | 258.8          | -258.4      | -28.7       |
| 4,120.0    | 4,069.5     | 60.52      | 186.90     | 267.9          | -267.4      | -29.9       |
| 4,130.0    | 4,074.2     | 63.63      | 184.91     | 276.7          | -276.2      | -30.8       |
| 4,140.5    | 4,078.5     | 66.92      | 182.93     | 286.2          | -285.7      | -31.5       |
| 4,160.0    | 4,085.4     | 72.26      | 183.09     | 304.5          | -304.0      | -32.4       |
| 4,171.9    | 4,088.7     | 75.53      | 183.19     | 315.9          | -315.4      | -33.1       |
| 4,175.0    | 4,089.4     | 76.09      | 183.01     | 318.9          | -318.4      | -33.2       |
| 4,200.0    | 4,094.4     | 80.69      | 181.54     | 343.4          | -342.8      | -34.2       |
| 4,203.5    | 4,095.0     | 81.34      | 181.34     | 346.8          | -346.3      | -34.3       |
| 4,234.3    | 4,099.3     | 82.57      | 179.59     | 377.3          | -376.8      | -34.5       |
| 4,250.0    | 4,101.2     | 83.59      | 179.37     | 392.9          | -392.4      | -34.4       |
| 4,265.4    | 4,102.8     | 84.59      | 179.15     | 408.2          | -407.7      | -34.2       |
| 4,297.0    | 4,104.8     | 87.93      | 179.06     | 439.7          | -439.2      | -33.7       |
| 4,300.0    | 4,104.9     | 87.92      | 179.03     | 442.7          | -442.2      | -33.7       |
| 4,329.0    | 4,106.0     | 87.85      | 178.79     | 471.7          | -471.2      | -33.1       |
| 4,361.0    | 4,107.4     | 87.23      | 178.97     | 503.6          | -503.1      | -32.5       |
| 4,392.0    | 4,109.0     | 86.88      | 178.79     | 534.6          | -534.1      | -31.9       |
| 4,400.0    | 4,109.4     | 87.56      | 178.61     | 542.5          | -542.1      | -31.7       |
| 4,423.0    | 4,110.0     | 89.52      | 178.09     | 565.5          | -565.1      | -31.0       |
| 4,455.0    | 4,109.9     | 90.84      | 178.00     | 597.5          | -597.0      | -29.9       |
| 4,486.0    | 4,109.3     | 91.10      | 177.12     | 628.4          | -628.0      | -28.6       |
| 4,500.0    | 4,109.1     | 90.52      | 177.28     | 642.4          | -642.0      | -27.9       |
| 4,518.0    | 4,109.1     | 89.78      | 177.48     | 660.3          | -660.0      | -27.1       |
| 4,549.0    | 4,109.3     | 89.60      | 177.56     | 691.3          | -690.9      | -25.8       |
| 4,581.0    | 4,109.6     | 89.08      | 177.91     | 723.2          | -722.9      | -24.5       |
| 4,600.0    | 4,110.0     | 88.81      | 178.13     | 742.2          | -741.9      | -23.8       |
| 4,612.0    | 4,110.2     | 88.64      | 178.27     | 754.2          | -753.9      | -23.5       |
| 4,644.0    | 4,110.1     | 91.71      | 179.32     | 786.2          | -785.9      | -22.8       |
| 4,675.0    | 4,109.4     | 91.19      | 179.59     | 817.1          | -816.9      | -22.5       |
| 4,707.0    | 4,108.5     | 91.89      | 180.29     | 849.1          | -848.9      | -22.5       |
| 4,738.0    | 4,107.3     | 92.42      | 180.64     | 880.1          | -879.8      | -22.7       |
| 4,770.0    | 4,106.2     | 91.54      | 180.55     | 912.1          | -911.8      | -23.1       |
| 4,801.0    | 4,105.7     | 90.31      | 179.85     | 943.1          | -942.8      | -23.2       |
| 4,832.0    | 4,105.7     | 89.96      | 180.20     | 974.1          | -973.8      | -23.2       |
| 4,864.0    | 4,105.6     | 90.13      | 180.29     | 1,006.1        | -1,005.8    | -23.3       |
| 4,895.0    | 4,105.1     | 91.89      | 179.85     | 1,037.1        | -1,036.8    | -23.4       |

# Energen

## Energen Resources - Survey



**Company:** Energen Resources  
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**Site:** Carracas Mesa  
**Well:** Carracas 19 B #4  
**Wellbore:** Carracas 19 B #4 Sidetrack  
**Design:** Final Survey

**Local Co-ordinate Reference:** Well Carracas 19 B #4  
**TVD Reference:** KB @ 7416.0ft (Drilling Rig)  
**MD Reference:** KB @ 7416.0ft (Drilling Rig)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 2003.16 Single User Db

### Planned Survey

| MD<br>(ft) | TVD<br>(ft) | Inc<br>(°) | Azi<br>(°) | V. Sec<br>(ft) | N/S<br>(ft) | E/W<br>(ft) |
|------------|-------------|------------|------------|----------------|-------------|-------------|
| 4,900.0    | 4,104.9     | 91.84      | 179.89     | 1,042.0        | -1,041.8    | -23.3       |
| 4,927.0    | 4,104.1     | 91.54      | 180.11     | 1,069.0        | -1,068.8    | -23.3       |
| 4,958.0    | 4,103.2     | 91.71      | 180.02     | 1,100.0        | -1,099.8    | -23.4       |
| 4,989.0    | 4,102.3     | 91.63      | 179.50     | 1,131.0        | -1,130.8    | -23.2       |
| 5,000.0    | 4,102.0     | 91.47      | 179.56     | 1,142.0        | -1,141.8    | -23.2       |
| 5,020.0    | 4,101.6     | 91.19      | 179.67     | 1,162.0        | -1,161.8    | -23.0       |
| 5,051.0    | 4,101.2     | 90.04      | 178.88     | 1,193.0        | -1,192.7    | -22.6       |
| 5,083.0    | 4,101.2     | 90.04      | 179.41     | 1,224.9        | -1,224.7    | -22.2       |
| 5,100.0    | 4,101.2     | 89.81      | 179.64     | 1,241.9        | -1,241.7    | -22.0       |
| 5,115.0    | 4,101.3     | 89.60      | 179.85     | 1,256.9        | -1,256.7    | -21.9       |
| 5,146.0    | 4,101.5     | 89.87      | 180.20     | 1,287.9        | -1,287.7    | -22.0       |
| 5,150.0    | 4,101.5     | 90.09      | 180.28     | 1,291.9        | -1,291.7    | -22.0       |
| 5,178.0    | 4,101.0     | 91.63      | 180.82     | 1,319.9        | -1,319.7    | -22.2       |
| 5,190.0    | 4,100.7     | 91.54      | 180.82     | 1,331.9        | -1,331.7    | -22.4       |
| 5,200.0    | 4,100.4     | 91.54      | 180.82     | 1,341.9        | -1,341.7    | -22.6       |
| 5,228.0    | 4,099.7     | 91.54      | 180.82     | 1,369.9        | -1,369.7    | -23.0       |

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