

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB NO. 1004-0137  
Expires July 31, 2010

**SUNDRY NOTICES AND REPORTS ON WELLS**

**Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.**

**SUBMIT IN TRIPLICATE - Other instructions on page 2**

1. Type of Well  
☐ Oil Well ☒ Gas Well ☐ Other

NOV 30 2010

2. Name of Operator  
Energen Resources Corporation

Farmington Field Office  
Bureau of Land Management

3a. Address  
2010 Afton Place, Farmington, NM 87401

3b. Phone No. (include area code)  
505-325-6800

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

SHL: 1045 FNL, 480 FEL ; Sec.15-T32N-R05W

BHL: 300 FNL, 1200 FEL ; Sec.14-T32N-R05W

5. Lease Serial No.

USA NMNM 30351

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

8. Well Name and No.

Carracas Unit 119

9. API Well No.

30-039-30844

10. Field and Pool, or Exploratory Area  
Basin Fruitland Coal

11. County or Parish, State

Rio Arriba NM

**12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA**

| TYPE OF SUBMISSION                                   | TYPE OF ACTION                                   |                                           |                                                    |                                         |
|------------------------------------------------------|--------------------------------------------------|-------------------------------------------|----------------------------------------------------|-----------------------------------------|
| <input checked="" type="checkbox"/> Notice of Intent | <input type="checkbox"/> Acidize                 | <input type="checkbox"/> Deepen           | <input type="checkbox"/> Production (Start/Resume) | <input type="checkbox"/> Water Shut-Off |
| <input type="checkbox"/> Subsequent Report           | <input type="checkbox"/> Alter Casing            | <input type="checkbox"/> Fracture Treat   | <input type="checkbox"/> Reclamation               | <input type="checkbox"/> Well Integrity |
| <input type="checkbox"/> Final Abandonment Notice    | <input type="checkbox"/> Casing Repair           | <input type="checkbox"/> New Construction | <input type="checkbox"/> Recomplete                | <input type="checkbox"/> Other          |
|                                                      | <input checked="" type="checkbox"/> Change Plans | <input type="checkbox"/> Plug and Abandon | <input type="checkbox"/> Temporarily Abandon       |                                         |
|                                                      | <input type="checkbox"/> Convert to Injection    | <input type="checkbox"/> Plug Back        | <input type="checkbox"/> Water Disposal            |                                         |

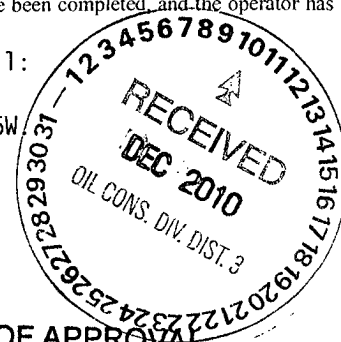
13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed and the operator has determined that the final site is ready for final inspection.)

Energen Resources plans to make the following changes to the Carracas Unit #119 well:

\* The BHL will change from 200 FNL, 400 FEL to 300 FNL, 1200 FEL in Sec.14-T32N-R05W.

\* An entry point of 900 FNL, 100 FWL will be added in Sec.14-T32N-R05W.

Please see attached directional plan and revised C-102.



**CONDITIONS OF APPROVAL**  
Adhere to previously issued stipulations.

14. I hereby certify that the foregoing is true and correct  
Name (Printed/Typed)

Stephen Byers

Title Drilling Engineer

Signature

Date 11/29/2010

**THIS SPACE FOR FEDERAL OR STATE OFFICE USE**

Approved by

Troy L. Salyers

Title

Petroleum Engineer

Date

12/8/2010

Office

FEO

Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Title 18 U.S.C. Section 1001, and Title 43 U.S.C. Section 1212, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

NMOCD

DISTRICT I  
1635 N. French Dr., Hobbs, N.M. 88240

State of New Mexico  
Energy, Minerals & Natural Resources Department

Form C-102  
Revised July 10, 2010

DISTRICT II  
1301 W. Grand Avenue, Artesia, N.M. 88210

Submit one copy to appropriate  
District Office

DISTRICT III  
1000 Rio Brazos Rd., Aztec, N.M. 87410

OIL CONSERVATION DIVISION  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

DISTRICT IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

|                                         |                                                             |                                              |
|-----------------------------------------|-------------------------------------------------------------|----------------------------------------------|
| <sup>1</sup> API Number<br>30-039-30844 | <sup>2</sup> Pool Code<br>71629                             | <sup>3</sup> Pool Name<br>BASIN FUTLAND COAL |
| <sup>4</sup> Property Code<br>32932     | <sup>5</sup> Property Name<br>CARRACAS UNIT                 | <sup>6</sup> Well Number<br>119              |
| <sup>7</sup> GRID No.<br>162928         | <sup>8</sup> Operator Name<br>ENERGEN RESOURCES CORPORATION | <sup>9</sup> Elevation<br>7533'              |

<sup>10</sup> Surface Location

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County     |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|------------|
| A             | 15      | 32N      | 5W    |         | 1045'         | NORTH            | 480'          | EAST           | RIO ARRIBA |

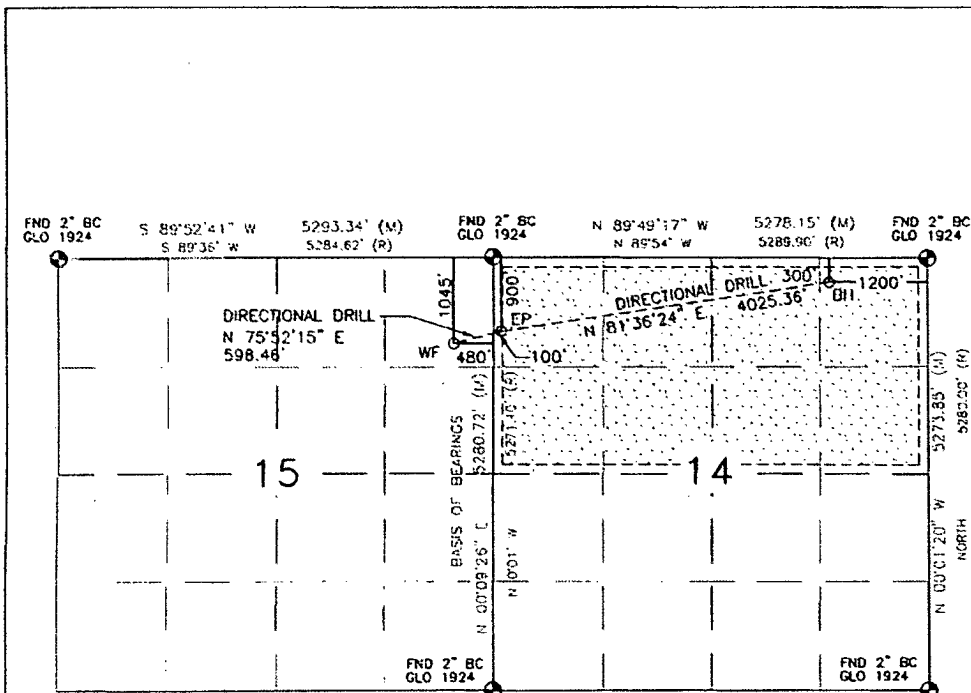
<sup>11</sup> Bottom Hole Location If Different From Surface

| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County     |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|------------|
| A             | 14      | 32N      | 5W    |         | 300'          | NORTH            | 1200'         | EAST           | RIO ARRIBA |

|                                                     |                               |                                  |                                    |
|-----------------------------------------------------|-------------------------------|----------------------------------|------------------------------------|
| <sup>12</sup> Dedicated Acres<br>320.00 ACRES - N/2 | <sup>13</sup> Joint or Infill | <sup>14</sup> Consolidation Code | <sup>15</sup> Order No.<br>R-13119 |
|-----------------------------------------------------|-------------------------------|----------------------------------|------------------------------------|

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

16



WELL FLAG  
LAT. 36.98462° N  
LONG. 107.34229° W  
DATUM (NAD 1983)

ENTRY POINT  
LAT. 36.98502° N  
LONG. 107.34030° W  
DATUM (NAD 1983)

BOTTOM HOLE  
LAT. 36.98664° N  
LONG. 107.32668° W  
DATUM (NAD 1983)

<sup>17</sup> OPERATOR CERTIFICATION

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 or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

*Stephen Byers* 11/29/10  
Signature Date

*Stephen Byers*  
Printed Name

*sbyers@energen.com*  
E-mail Address

<sup>18</sup> SURVEYOR CERTIFICATION

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.

JUNE 23, 2008

Date of Survey

Signature and Seal of Professional Surveyor:

*David Russell*  
DAVID RUSSELL  
REGISTERED PROFESSIONAL LAND SURVEYOR  
NEW MEXICO

Certificate Number 10201



# **Energen Resources Corp.**

**Carson National Forest Sec 15-T32N-R05W**

**Carracas Mesa**

**Carracas Unit #119**

**Horizontal OPE FTC**

**Plan: Plan #2**

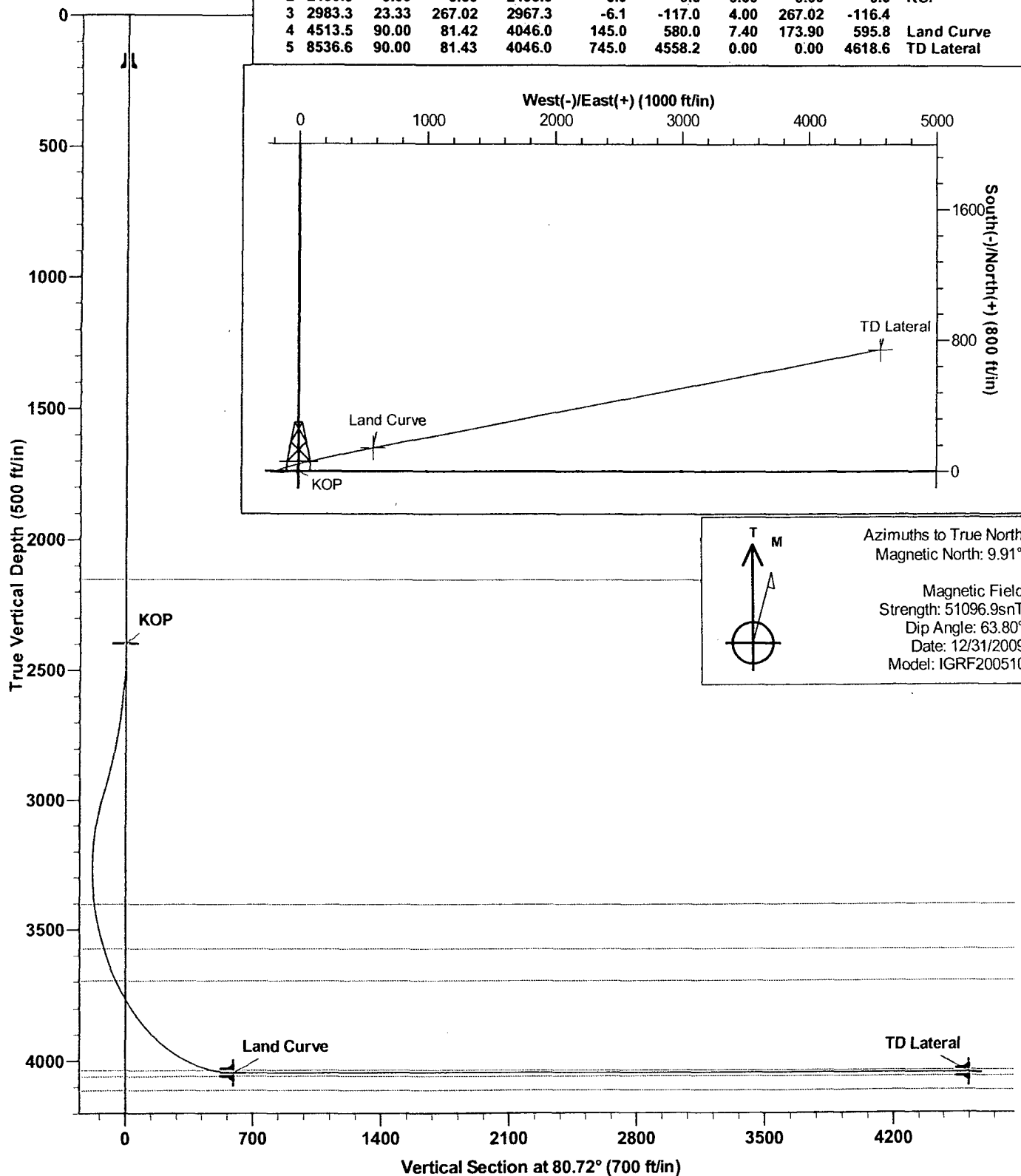
## **DIRECTIONAL PLAN**

**25 October, 2010**

Prepared By: Stephen Byers

SECTION DETAILS

| Sec | MD     | Inc   | Azi    | TVD    | +N/-S | +E/-W  | DLeg | TFace  | VSec   | Target     |
|-----|--------|-------|--------|--------|-------|--------|------|--------|--------|------------|
| 1   | 0.0    | 0.00  | 0.00   | 0.0    | 0.0   | 0.0    | 0.00 | 0.00   | 0.0    |            |
| 2   | 2400.0 | 0.00  | 0.00   | 2400.0 | 0.0   | 0.0    | 0.00 | 0.00   | 0.0    | KOP        |
| 3   | 2983.3 | 23.33 | 267.02 | 2967.3 | -6.1  | -117.0 | 4.00 | 267.02 | -116.4 |            |
| 4   | 4513.5 | 90.00 | 81.42  | 4046.0 | 145.0 | 580.0  | 7.40 | 173.90 | 595.8  | Land Curve |
| 5   | 8536.6 | 90.00 | 81.43  | 4046.0 | 745.0 | 4558.2 | 0.00 | 0.00   | 4618.6 | TD Lateral |



# Energen

## DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec 15-T32N-R05W  
**Site:** Carracas Mesa  
**Well:** Carracas Unit #119  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #2

**Local Co-ordinate Reference:** Well Carracas Unit #119  
**TVD Reference:** KB @ 7546.0ft (KB)  
**MD Reference:** KB @ 7546.0ft (KB)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 2003.16 Single User Db

|                    |                                         |                      |                |
|--------------------|-----------------------------------------|----------------------|----------------|
| <b>Project</b>     | Carson National Forest Sec 15-T32N-R05W |                      |                |
| <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 Central Zone                 |                      |                |

|                              |               |                          |                   |
|------------------------------|---------------|--------------------------|-------------------|
| <b>Site</b>                  | Carracas Mesa |                          |                   |
| <b>Site Position:</b>        |               | <b>Northing:</b>         | 2,179,526.75 ft   |
| <b>From:</b>                 | Lat/Long      | <b>Easting:</b>          | 1,321,394.81 ft   |
| <b>Position Uncertainty:</b> | 0.0 ft        | <b>Slot Radius:</b>      | "                 |
|                              |               | <b>Latitude:</b>         | 36° 59' 4.632 N   |
|                              |               | <b>Longitude:</b>        | 107° 20' 32.244 W |
|                              |               | <b>Grid Convergence:</b> | -0.66 °           |

|                             |                    |                            |                                  |
|-----------------------------|--------------------|----------------------------|----------------------------------|
| <b>Well</b>                 | Carracas Unit #119 |                            |                                  |
| <b>Well Position</b>        | <b>+N/-S</b>       | 0.0 ft                     | <b>Northing:</b> 2,179,526.75 ft |
|                             | <b>+E/-W</b>       | 0.0 ft                     | <b>Easting:</b> 1,321,394.81 ft  |
| <b>Position Uncertainty</b> | 0.0 ft             | <b>Wellhead Elevation:</b> | 7,533.0 ft                       |
|                             |                    | <b>Latitude:</b>           | 36° 59' 4.632 N                  |
|                             |                    | <b>Longitude:</b>          | 107° 20' 32.244 W                |
|                             |                    | <b>Ground Level:</b>       | 7,533.0 ft                       |

|                  |                    |                    |                        |                      |                            |
|------------------|--------------------|--------------------|------------------------|----------------------|----------------------------|
| <b>Wellbore</b>  | Horizontal OPE FTC |                    |                        |                      |                            |
| <b>Magnetics</b> | <b>Model Name</b>  | <b>Sample Date</b> | <b>Declination (°)</b> | <b>Dip Angle (°)</b> | <b>Field Strength (nT)</b> |
|                  | IGRF200510         | 12/31/2009         | 9.91                   | 63.80                | 51,097                     |

|                          |                              |                   |                      |                      |
|--------------------------|------------------------------|-------------------|----------------------|----------------------|
| <b>Design</b>            | Plan #2                      |                   |                      |                      |
| <b>Audit Notes:</b>      |                              |                   |                      |                      |
| <b>Version:</b>          | <b>Phase:</b>                | PROTOTYPE         | <b>Tie On Depth:</b> | 0.0                  |
| <b>Vertical Section:</b> | <b>Depth From (TVD) (ft)</b> | <b>+N/-S (ft)</b> | <b>+E/-W (ft)</b>    | <b>Direction (°)</b> |
|                          | 0.0                          | 0.0               | 0.0                  | 80.72                |

|                            |                 |                              |                  |                    |
|----------------------------|-----------------|------------------------------|------------------|--------------------|
| <b>Survey Tool Program</b> | Date 10/25/2010 |                              |                  |                    |
| <b>From (ft)</b>           | <b>To (ft)</b>  | <b>Survey (Wellbore)</b>     | <b>Tool Name</b> | <b>Description</b> |
| 0.0                        | 8,536.6         | Plan #2 (Horizontal OPE FTC) | MWD              | MWD - Standard     |

|                       |                 |                |                |                        |                 |                 |                    |
|-----------------------|-----------------|----------------|----------------|------------------------|-----------------|-----------------|--------------------|
| <b>Planned Survey</b> |                 |                |                |                        |                 |                 |                    |
| <b>MD (ft)</b>        | <b>TVD (ft)</b> | <b>Inc (°)</b> | <b>Azi (°)</b> | <b>Build (°/100ft)</b> | <b>N/S (ft)</b> | <b>E/W (ft)</b> | <b>V. Sec (ft)</b> |
| 0.0                   | 0.0             | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 100.0                 | 100.0           | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 200.0                 | 200.0           | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 300.0                 | 300.0           | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 400.0                 | 400.0           | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 500.0                 | 500.0           | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 600.0                 | 600.0           | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 700.0                 | 700.0           | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 800.0                 | 800.0           | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 900.0                 | 900.0           | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 1,000.0               | 1,000.0         | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |
| 1,100.0               | 1,100.0         | 0.00           | 0.00           | 0.00                   | 0.0             | 0.0             | 0.0                |

# Energen

## DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec 15-T32N-R05W  
**Site:** Carracas Mesa  
**Well:** Carracas Unit #119  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #2

**Local Co-ordinate Reference:** Well Carracas Unit #119  
**TVD Reference:** KB @ 7546.0ft (KB)  
**MD Reference:** KB @ 7546.0ft (KB)  
**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>(°) | Build<br>(°/100ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) |
|--------------|-------------|------------|------------|--------------------|-------------|-------------|----------------|
| 1,200.0      | 1,200.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 1,300.0      | 1,300.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 1,400.0      | 1,400.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 1,500.0      | 1,500.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 1,600.0      | 1,600.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 1,700.0      | 1,700.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 1,800.0      | 1,800.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 1,900.0      | 1,900.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 2,000.0      | 2,000.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 2,100.0      | 2,100.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 2,152.0      | 2,152.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| Nacimiento   |             |            |            |                    |             |             |                |
| 2,200.0      | 2,200.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 2,300.0      | 2,300.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| 2,400.0      | 2,400.0     | 0.00       | 0.00       | 0.00               | 0.0         | 0.0         | 0.0            |
| KOP          |             |            |            |                    |             |             |                |
| 2,500.0      | 2,499.9     | 4.00       | 267.02     | 4.00               | -0.2        | -3.5        | -3.5           |
| 2,600.0      | 2,599.4     | 8.00       | 267.02     | 4.00               | -0.7        | -13.9       | -13.9          |
| 2,700.0      | 2,697.8     | 12.00      | 267.02     | 4.00               | -1.6        | -31.3       | -31.1          |
| 2,800.0      | 2,794.8     | 16.00      | 267.02     | 4.00               | -2.9        | -55.4       | -55.2          |
| 2,900.0      | 2,889.9     | 20.00      | 267.02     | 4.00               | -4.5        | -86.3       | -85.9          |
| 2,983.3      | 2,967.3     | 23.33      | 267.02     | 4.00               | -6.1        | -117.0      | -116.4         |
| 3,000.0      | 2,982.7     | 22.10      | 267.37     | -7.35              | -6.4        | -123.4      | -122.8         |
| 3,050.0      | 3,029.6     | 18.43      | 268.68     | -7.34              | -7.0        | -140.7      | -140.0         |
| 3,100.0      | 3,077.5     | 14.77      | 270.61     | -7.32              | -7.1        | -155.0      | -154.1         |
| 3,150.0      | 3,126.2     | 11.14      | 273.76     | -7.26              | -6.7        | -166.2      | -165.1         |
| 3,200.0      | 3,175.6     | 7.57       | 279.88     | -7.14              | -5.9        | -174.3      | -172.9         |
| 3,250.0      | 3,225.3     | 4.23       | 296.08     | -6.68              | -4.5        | -179.2      | -177.6         |
| 3,300.0      | 3,275.2     | 2.42       | 356.60     | -3.63              | -2.6        | -180.9      | -178.9         |
| 3,350.0      | 3,325.1     | 4.60       | 49.86      | 4.36               | -0.3        | -179.4      | -177.1         |
| 3,400.0      | 3,374.8     | 7.99       | 63.96      | 6.78               | 2.5         | -174.8      | -172.1         |
| 3,427.5      | 3,402.0     | 9.95       | 67.53      | 7.12               | 4.3         | -170.9      | -167.9         |
| Ojo Alamo SS |             |            |            |                    |             |             |                |
| 3,450.0      | 3,424.1     | 11.57      | 69.55      | 7.21               | 5.8         | -166.9      | -163.8         |
| 3,500.0      | 3,472.7     | 15.20      | 72.51      | 7.27               | 9.5         | -156.0      | -152.4         |
| 3,550.0      | 3,520.5     | 18.86      | 74.34      | 7.32               | 13.7        | -142.0      | -137.9         |
| 3,600.0      | 3,567.3     | 22.54      | 75.60      | 7.35               | 18.3        | -124.9      | -120.3         |
| 3,608.4      | 3,575.0     | 23.15      | 75.77      | 7.36               | 19.1        | -121.7      | -117.1         |
| Kirtland Sh  |             |            |            |                    |             |             |                |
| 3,650.0      | 3,612.8     | 26.22      | 76.52      | 7.36               | 23.2        | -104.9      | -99.7          |
| 3,700.0      | 3,656.9     | 29.90      | 77.22      | 7.37               | 28.6        | -82.0       | -76.3          |
| 3,745.9      | 3,696.0     | 33.28      | 77.74      | 7.37               | 33.8        | -58.5       | -52.3          |
| Fruitland Fm |             |            |            |                    |             |             |                |
| 3,750.0      | 3,699.5     | 33.59      | 77.79      | 7.38               | 34.2        | -56.3       | -50.0          |
| 3,800.0      | 3,740.2     | 37.28      | 78.25      | 7.38               | 40.3        | -27.9       | -21.1          |

# Energen DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec 15-T32N-R05W  
**Site:** Carracas Mesa  
**Well:** Carracas Unit #119  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #2

**Local Co-ordinate Reference:** Well Carracas Unit #119  
**TVD Reference:** KB @ 7546.0ft (KB)  
**MD Reference:** KB @ 7546.0ft (KB)  
**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>(°) | Build<br>(°/100ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) |
|------------------------|-------------|------------|------------|--------------------|-------------|-------------|----------------|
| 3,850.0                | 3,779.0     | 40.97      | 78.64      | 7.38               | 46.6        | 3.0         | 10.5           |
| 3,900.0                | 3,815.6     | 44.66      | 78.98      | 7.38               | 53.2        | 36.3        | 44.4           |
| 3,950.0                | 3,850.1     | 48.35      | 79.27      | 7.39               | 60.0        | 71.9        | 80.7           |
| 4,000.0                | 3,882.1     | 52.05      | 79.54      | 7.39               | 67.1        | 109.7       | 119.1          |
| 4,050.0                | 3,911.5     | 55.74      | 79.78      | 7.39               | 74.3        | 149.4       | 159.5          |
| 4,100.0                | 3,938.3     | 59.44      | 80.00      | 7.39               | 81.7        | 191.0       | 201.7          |
| 4,150.0                | 3,962.3     | 63.13      | 80.20      | 7.39               | 89.3        | 234.2       | 245.5          |
| 4,200.0                | 3,983.5     | 66.83      | 80.39      | 7.39               | 96.9        | 278.8       | 290.8          |
| 4,250.0                | 4,001.6     | 70.52      | 80.57      | 7.39               | 104.6       | 324.7       | 337.4          |
| 4,300.0                | 4,016.8     | 74.22      | 80.74      | 7.39               | 112.3       | 371.8       | 385.0          |
| 4,350.0                | 4,028.8     | 77.92      | 80.90      | 7.39               | 120.1       | 419.6       | 433.5          |
| 4,388.8                | 4,036.0     | 80.79      | 81.03      | 7.39               | 126.1       | 457.3       | 471.7          |
| <b>Top Target Coal</b> |             |            |            |                    |             |             |                |
| 4,400.0                | 4,037.7     | 81.61      | 81.06      | 7.39               | 127.8       | 468.2       | 482.7          |
| 4,450.0                | 4,043.4     | 85.31      | 81.22      | 7.39               | 135.4       | 517.3       | 532.4          |
| 4,500.0                | 4,045.9     | 89.00      | 81.38      | 7.39               | 143.0       | 566.7       | 582.3          |
| 4,513.5                | 4,046.0     | 90.00      | 81.42      | 7.39               | 145.0       | 580.0       | 595.8          |
| <b>Land Curve</b>      |             |            |            |                    |             |             |                |
| 4,600.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 157.9       | 665.5       | 682.3          |
| 4,700.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 172.8       | 764.4       | 782.3          |
| 4,800.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 187.7       | 863.3       | 882.3          |
| 4,900.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 202.7       | 962.2       | 982.3          |
| 5,000.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 217.6       | 1,061.1     | 1,082.3        |
| 5,100.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 232.5       | 1,159.9     | 1,182.3        |
| 5,200.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 247.4       | 1,258.8     | 1,282.3        |
| 5,300.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 262.3       | 1,357.7     | 1,382.2        |
| 5,400.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 277.3       | 1,456.6     | 1,482.2        |
| 5,500.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 292.2       | 1,555.5     | 1,582.2        |
| 5,600.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 307.1       | 1,654.4     | 1,682.2        |
| 5,700.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 322.0       | 1,753.2     | 1,782.2        |
| 5,800.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 336.9       | 1,852.1     | 1,882.2        |
| 5,900.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 351.9       | 1,951.0     | 1,982.2        |
| 6,000.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 366.8       | 2,049.9     | 2,082.2        |
| 6,100.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 381.7       | 2,148.8     | 2,182.2        |
| 6,200.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 396.6       | 2,247.6     | 2,282.2        |
| 6,300.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 411.5       | 2,346.5     | 2,382.2        |
| 6,400.0                | 4,046.0     | 90.00      | 81.42      | 0.00               | 426.4       | 2,445.4     | 2,482.2        |
| 6,500.0                | 4,045.9     | 90.00      | 81.42      | 0.00               | 441.4       | 2,544.3     | 2,582.2        |
| 6,600.0                | 4,045.9     | 90.00      | 81.42      | 0.00               | 456.3       | 2,643.2     | 2,682.2        |
| 6,700.0                | 4,045.9     | 90.00      | 81.42      | 0.00               | 471.2       | 2,742.0     | 2,782.1        |
| 6,800.0                | 4,045.9     | 90.00      | 81.42      | 0.00               | 486.1       | 2,840.9     | 2,882.1        |
| 6,900.0                | 4,045.9     | 90.00      | 81.42      | 0.00               | 501.0       | 2,939.8     | 2,982.1        |
| 7,000.0                | 4,045.9     | 90.00      | 81.42      | 0.00               | 516.0       | 3,038.7     | 3,082.1        |
| 7,100.0                | 4,045.9     | 90.00      | 81.42      | 0.00               | 530.9       | 3,137.6     | 3,182.1        |
| 7,200.0                | 4,045.9     | 90.00      | 81.42      | 0.00               | 545.8       | 3,236.4     | 3,282.1        |

# Energen

## DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec 15-T32N-R05W  
**Site:** Carracas Mesa  
**Well:** Carracas Unit #119  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #2

**Local Co-ordinate Reference:** Well Carracas Unit #119  
**TVD Reference:** KB @ 7546.0ft (KB)  
**MD Reference:** KB @ 7546.0ft (KB)  
**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>(°) | Build<br>(°/100ft) | N/S<br>(ft) | E/W<br>(ft) | V. Sec<br>(ft) |
|------------|-------------|------------|------------|--------------------|-------------|-------------|----------------|
| 7,300.0    | 4,045.9     | 90.00      | 81.42      | 0.00               | 560.7       | 3,335.3     | 3,382.1        |
| 7,400.0    | 4,045.9     | 90.00      | 81.42      | 0.00               | 575.6       | 3,434.2     | 3,482.1        |
| 7,500.0    | 4,045.9     | 90.00      | 81.42      | 0.00               | 590.6       | 3,533.1     | 3,582.1        |
| 7,600.0    | 4,045.9     | 90.00      | 81.42      | 0.00               | 605.5       | 3,632.0     | 3,682.1        |
| 7,700.0    | 4,045.9     | 90.00      | 81.42      | 0.00               | 620.4       | 3,730.9     | 3,782.1        |
| 7,800.0    | 4,045.9     | 90.01      | 81.42      | 0.00               | 635.3       | 3,829.7     | 3,882.1        |
| 7,900.0    | 4,045.8     | 90.01      | 81.42      | 0.00               | 650.2       | 3,928.6     | 3,982.1        |
| 8,000.0    | 4,045.8     | 90.01      | 81.42      | 0.00               | 665.2       | 4,027.5     | 4,082.0        |
| 8,100.0    | 4,045.8     | 90.01      | 81.42      | 0.00               | 680.1       | 4,126.4     | 4,182.0        |
| 8,200.0    | 4,045.8     | 90.01      | 81.42      | 0.00               | 695.0       | 4,225.3     | 4,282.0        |
| 8,300.0    | 4,045.8     | 90.01      | 81.42      | 0.00               | 709.9       | 4,324.1     | 4,382.0        |
| 8,400.0    | 4,045.8     | 90.01      | 81.42      | 0.00               | 724.8       | 4,423.0     | 4,482.0        |
| 8,500.0    | 4,045.8     | 90.01      | 81.42      | 0.00               | 739.7       | 4,521.9     | 4,582.0        |
| 8,536.6    | 4,046.0     | 90.00      | 81.43      | -0.02              | 745.0       | 4,558.2     | 4,618.6        |

TD Lateral



# Energen

## DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec 15-T32N-R05W  
**Site:** Carracas Mesa  
**Well:** Carracas Unit #119  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #2

**Local Co-ordinate Reference:** Well Carracas Unit #119  
**TVD Reference:** KB @ 7546.0ft (KB)  
**MD Reference:** KB @ 7546.0ft (KB)  
**North Reference:** True  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 2003.16 Single User Db

### Targets

| Target Name<br>- hit/miss target<br>- Shape | Dip Angle<br>(°) | Dip Dir.<br>(°) | TVD<br>(ft) | +N/-S<br>(ft) | +E/-W<br>(ft) | Northing<br>(ft) | Easting<br>(ft) | Latitude         | Longitude         |
|---------------------------------------------|------------------|-----------------|-------------|---------------|---------------|------------------|-----------------|------------------|-------------------|
| TD Lateral<br>- plan hits target<br>- Point | 0.00             | 0.00            | 4,046.0     | 745.0         | 4,558.2       | 2,180,219.42     | 1,325,961.21    | 36° 59' 11.994 N | 107° 19' 36.065 W |
| Land Curve<br>- plan hits target<br>- Point | 0.00             | 0.00            | 4,046.0     | 145.0         | 580.0         | 2,179,665.09     | 1,321,976.44    | 36° 59' 6.066 N  | 107° 20' 25.096 W |
| KOP<br>- plan hits target<br>- Point        | 0.00             | 0.00            | 2,400.0     | 0.0           | 0.0           | 2,179,526.75     | 1,321,394.81    | 36° 59' 4.632 N  | 107° 20' 32.244 W |

### Casing Points

| Measured<br>Depth<br>(ft) | Vertical<br>Depth<br>(ft) | Name         | Casing<br>Diameter<br>(") | Hole<br>Diameter<br>(") |
|---------------------------|---------------------------|--------------|---------------------------|-------------------------|
| 200.0                     | 200.0                     | Surface      | 9-5/8                     | 12-1/4                  |
| 4,513.0                   | 4,046.0                   | Intermediate | 7                         | 8-3/4                   |
| 8,536.0                   | 4,045.8                   | Liner        | 4-1/2                     | 6-1/4                   |

### Formations

| Measured<br>Depth<br>(ft) | Vertical<br>Depth<br>(ft) | Name             | Lithology | Dip<br>(°) | Dip<br>Direction<br>(°) |
|---------------------------|---------------------------|------------------|-----------|------------|-------------------------|
| 2,152.0                   | 2,152.0                   | Nacimiento       |           | 0.00       |                         |
|                           | 4,060.0                   | Base Target Coal |           | 0.00       |                         |
|                           | 4,114.0                   | Pictured Cliffs  |           | 0.00       |                         |
| 4,388.8                   | 4,036.0                   | Top Target Coal  |           | 0.00       |                         |
| 3,608.4                   | 3,575.0                   | Kirtland Sh      |           | 0.00       |                         |
| 3,427.5                   | 3,402.0                   | Ojo Alamo SS     |           | 0.00       |                         |
| 3,745.9                   | 3,696.0                   | Fruitland Fm     |           | 0.00       |                         |

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