

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENTFORM 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

## 2. Name of Operator

Energen Resources Corporation

## 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: 762 FSL, 1718 FWL ; Sec. 13-T32N-R5W

BHL: 1100 FSL, 100 FWL ; Sec. 14-T32N-R5W

## 5. Lease Serial No.

USA NMNM 059704 29760

## 6. If Indian, Allottee or Tribe Name

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

## 8. Well Name and No.

Carracas 14A 16

## 9. API Well No.

30-039-30842

## 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

☒ Notice of Intent☐ Subsequent Report☐ Final Abandonment Notice

## TYPE OF ACTION

☐ Acidize☐ Alter Casing☐ Casing Repair☒ Change Plans☐ Convert to Injection☐ Deepen☐ Fracture Treat☐ New Construction☐ Plug and Abandon☐ Plug Back☐ Production (Start/Resume)☐ Reclamation☐ Recomplete☐ Temporarily Abandon☐ Water Disposal☐ Water Shut-Off☐ Well Integrity☐ Other

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 14A #16 well:

\* Due to a change made in the directional design of the Carracas 14A #16, several changes have occurred:

- The total depth of the well has now changed from 10,253'MD to 10,228'MD.
- This has also caused the intermediate casing setting depth to change from 5150'MD to 5125'MD.
- Similarly, the liner setting depth has also changed from 10,253'MD to 10,228'MD.
- The kick off point (KOP) has also changed from 2450'TVD to 2400'TVD.

\* Due to the changes in the intermediate 7" casing setting depth, the cement volumes have also been adjusted.

\* See the attached Operations plan for new cement volumes.

\* A new directional plan and operations plan has been attached for review.

RCVD AUG 1 '11

OIL CONS. DIV.  
DIST. 3

## CONDITIONS OF APPROVAL

Adhere to previously issued stipulations.

BLM'S APPROVAL OR ACCEPTANCE OF THIS  
ACTION DOES NOT RELIEVE THE LESSEE AND  
OPERATOR FROM OBTAINING ANY OTHER  
AUTHORIZATION REQUIRED FOR OPERATIONS  
ON FEDERAL AND INDIAN LANDS

## 14. I hereby certify that the foregoing is true and correct

Name (Printed/Typed)

Stephen Byers

Title Drilling Engineer

Signature

Date 7/21/2011

## THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Troy L. Salvers

Title

Petroleum Engineer

Date

7/26/2011

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.

Office

FFO

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.

7/21/2011



### OPERATIONS PLAN

**WELL NAME**.....Carracas 14A #16  
**JOB TYPE**.....Horizontal OPE FTC  
**DEPT**.....Drilling and Completions  
**PREPARED BY**.....Stephen Byers

### GENERAL INFORMATION

|                      |                              |
|----------------------|------------------------------|
| Surface Location     | 762 FSL 1718 FWL             |
| S-T-R                | (N) Sec. 13, T32N, R05W      |
| Bottom Hole Location | 1100 FSL 100 FWL             |
| S-T-R                | (M) Sec. 14, T32N, R05W      |
| County, State        | Rio Arriba, New Mexico       |
| Elevations           | 7408' GL                     |
| Total Depth          | 10228' +/- (MD); 3993' (TVD) |
| Formation Objective  | Basin Fruitland Coal         |

### FORMATION TOPS

|                  |                          |
|------------------|--------------------------|
| San Jose         | Surface                  |
| Nacimiento       | 2035' (TVD)              |
| Ojo Alamo Ss     | 3284' (TVD)              |
| Kirtland Sh      | 3421' (TVD)              |
| Fruitland Fm     | 3874' (TVD) 4288'MD      |
| Top Target Coal  | 3983' (TVD) 4763'MD      |
| Base Target Coal | 4001' (TVD)              |
| Total Depth      | 3993' (TVD), 10228' (MD) |

### DRILLING

**Surface:** 12-1/4" wellbore will be drilled with a fresh water mud system (spud mud).

**Intermediate:** 8-3/4" wellbore will be drilled with a LSND mud system. Weighting materials will be drill cuttings and if needed barite. Mud density is expected to range from 8.8 ppg to 9.2 ppg.

**Production:** 6-1/4" wellbore will be drilled with QMax horizontal coal system, CBMax. Anticipated BHP can be as high as 1100 psi.

**Projected KOP is 2400' TVD with 3.61°/100' doglegs.**

#### **Blowout Control Specifications:**

A 3000 psi minimum double ram or annulus BOP stack will be used following nipple up of casing head. A 2" nominal, 2000 psi minimum choke manifold will also be used. An upper Kelly Cock valve handle and drill string valve should be available to fit each drill string and be available on the rig floor during drilling operations. **Pressure test BOP to 250 psi for 15 min and 2000 psi for 15 min.**

#### **Logging Program:**

Open hole logs: None

Mudlogs: From Surface Casing @ 200' to TD.

Surveys: Surface to KOP every 500' and a minimum of every 200' for directional.

7/21/2011

**CASING, TUBING & CASING EQUIPMENT**

| String              | Start Depth  | End Depth     | Wellbore | Size   | Wt         | Grade     |
|---------------------|--------------|---------------|----------|--------|------------|-----------|
| Surface             | 0            | 200           | 12-1/4"  | 9-5/8" | 32.3 lb/ft | H-40 ST&C |
| Intermediate<br>TVD | 0<br>0       | 5125<br>3993  | 8-3/4"   | 7"     | 23 lb/ft   | J-55 LT&C |
| Prod. Liner<br>TVD  | 5025<br>3991 | 10228<br>3993 | 6-1/4"   | 4-1/2" | 11.6 lb/ft | J-55 LT&C |
| Tubing              | 0            | 4600          | none     | 2-3/8" | 4.7 lb/ft  | J-55      |

**Surface Casing:** Texas Pattern Guide Shoe on bottom of first joint and an insert float valve on top of first joint. Casing centralization with a minimum of 3 standard bow spring centralizers to achieve optimal standoff.

**Intermediate Casing:** Self fill float shoe with self fill float collar on bottom and top of first joint. Casing centralization with double bow spring and centralizers to optimize standoff.

**Production Liner:** Bull nose guide shoe on bottom of first joint, H-Latch liner drop off tool on top of last joint.

**WELLHEAD**

11" 3000 x 9 5/8" weld/slip on casing head. 9 5/8" x 7" x 2 3/8" 3000 psi Flanged Wellhead .

**CEMENTING**

**Surface Casing:** 107 sks Type V with 2.0 % CaCl<sub>2</sub> and ¼ #/sk Flocele (15.6 ppg, 1.18 ft<sup>3</sup>/sk 125 ft<sup>3</sup> of slurry, 100% excess to circulate to surface). WOC 12 hours. Pressure test surface casing to 750 psi for 30 min.

**Intermediate Casing:** Depending on wellbore conditions, cement may consist of 531 sks PRB II with 5 #/sk Gilsonite, and ¼ #/sk Flocele (12.3 ppg, 2.24 ft<sup>3</sup>/sk) and a tail of 100 sks PRB II with 5#/sk Gilsonite and ¼ #/sk Flocele (13.5 ppg, 1.81 ft<sup>3</sup>/sk). (1,370 ft<sup>3</sup> of slurry, 100% excess lead to circulate to surface). WOC 12 hours. Test casing to 1500 psi for 30 min.

**Production Liner:** NO CEMENT, Open Hole Completion

**Set slips with full string weight**

If cement does not circulate, run temperature survey in 8 hrs. to determine TOC.

**OTHER INFORMATION**

- 1) This well will be an open hole completion lined with an uncemented pre-drilled liner.
- 2) If lost circulation is encountered, sufficient LCM will be added to the mud system to maintain well control. The intermediate string may need to be cemented in multiple stages with a slurry design deviated from that listed above.
- 3) If high reservoir pressures or water flows are encountered slurry design may need to be deviated to from those listed above to satisfy wellbore and formation conditions.
- 4) No abnormal temperatures or pressures are anticipated.
- 5) This gas is dedicated.

# **ENERGEN**

## **R E S O U R C E S**

### **Energen Resources Corp.**

**Carson National Forest Sec. 13-T32N-R05W**

**Carracas Mesa**

**Carracas 14A #16**

**Horizontal OPE FTC**

**Plan: Plan #3**

### **DIRECTIONAL PLAN**

**20 July, 2011**

Prepared By: Stephen Byers



Project: Carson National Forest Sec. 13-T32N-R05W  
Site: Carracas Mesa  
Well: Carracas 14A #16  
Wellbore: Horizontal OPE FTC  
Design: Plan #3

PROJECT DETAILS:

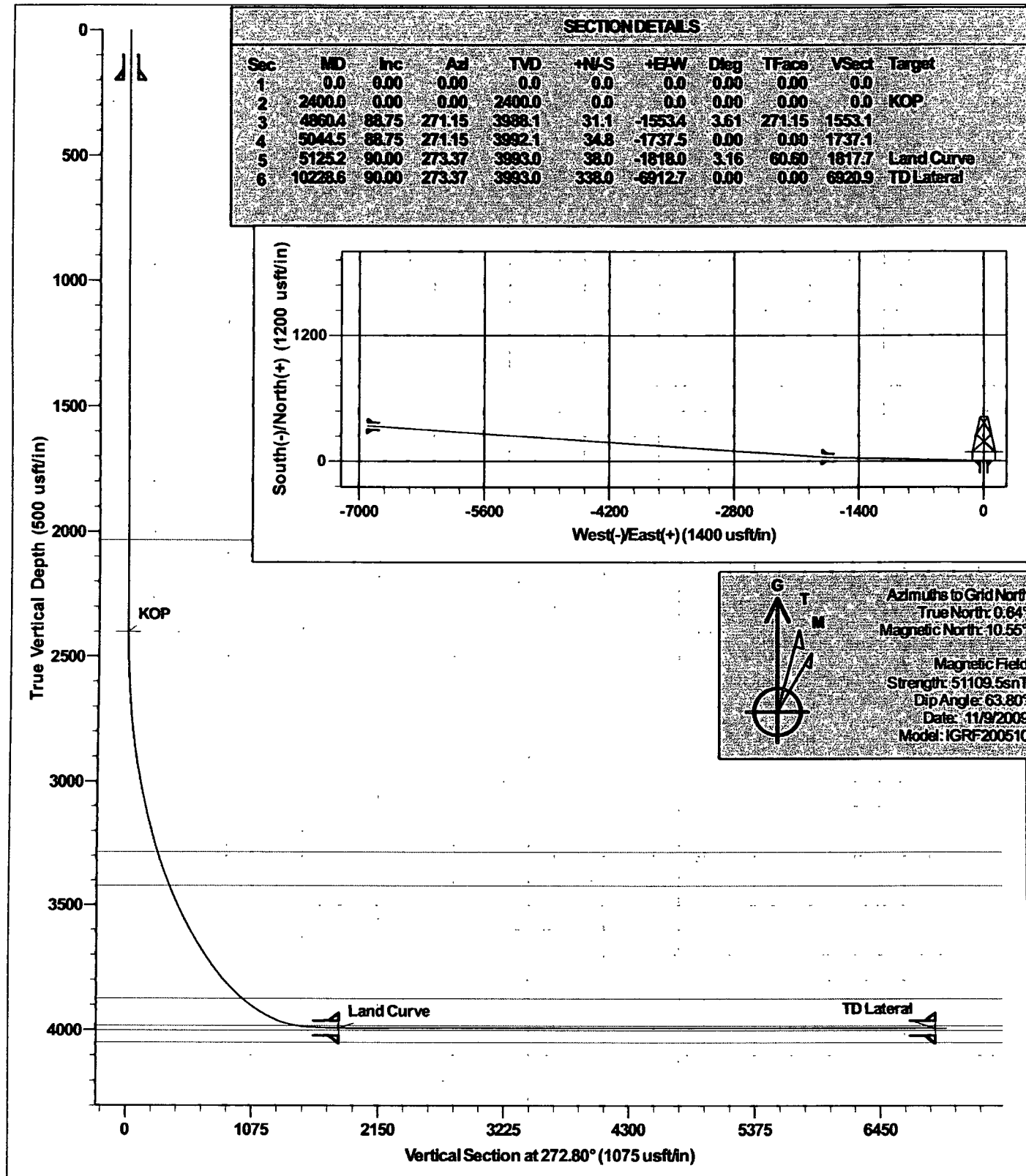
Carson National Forest Sec. 13-T32N-R05W

Geodetic System: US State Plane 1983

Datum: North American Datum 1983

Ellipsoid: GRS 1980

Zone: New Mexico Central Zone



# Energen DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec. 13-T32N-R05W  
**Site:** Carracas Mesa  
**Well:** Carracas 14A #16  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #3

**Local Co-ordinate Reference:** Site Carracas Mesa  
**TVD Reference:** KB @ 7423.0usft (KB)  
**MD Reference:** KB @ 7423.0usft (KB)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 Single User Db

|                    |                                          |                      |                |
|--------------------|------------------------------------------|----------------------|----------------|
| <b>Project</b>     | Carson National Forest Sec. 13-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>         | 2,175,957.75 usft |
| <b>From:</b>                 | Lat/Long      | <b>Easting:</b>          | 1,328,832.95 usft |
| <b>Position Uncertainty:</b> | 0.0 usft      | <b>Slot Radius:</b>      | 13-3/16"          |
|                              |               | <b>Latitude:</b>         | 36° 58' 30.180 N  |
|                              |               | <b>Longitude:</b>        | 107° 19' 0.084 W  |
|                              |               | <b>Grid Convergence:</b> | -0.64 °           |

|                             |                  |                            |                                    |
|-----------------------------|------------------|----------------------------|------------------------------------|
| <b>Well</b>                 | Carracas 14A #16 |                            |                                    |
| <b>Well Position</b>        | +N/-S            | 0.0 usft                   | <b>Northing:</b> 2,175,957.75 usft |
|                             | +E/-W            | 0.0 usft                   | <b>Easting:</b> 1,328,832.95 usft  |
| <b>Position Uncertainty</b> | 0.0 usft         | <b>Wellhead Elevation:</b> | 7,408.0 usft                       |
|                             |                  | <b>Latitude:</b>           | 36° 58' 30.180 N                   |
|                             |                  | <b>Longitude:</b>          | 107° 19' 0.084 W                   |
|                             |                  | <b>Ground Level:</b>       | 7,408.0 usft                       |

|                  |                    |                    |                    |                  |                       |
|------------------|--------------------|--------------------|--------------------|------------------|-----------------------|
| <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</b> |
|                  | IGRF200510         | 11/9/2009          | (°)                | (°)              | (nT)                  |
|                  |                    |                    | 9.91               | 63.80            | 51,110                |

|                          |                         |              |                      |                  |
|--------------------------|-------------------------|--------------|----------------------|------------------|
| <b>Design</b>            | Plan #3                 |              |                      |                  |
| <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)</b> | <b>+N/-S</b> | <b>+E/-W</b>         | <b>Direction</b> |
|                          | (usft)                  | (usft)       | (usft)               | (°)              |
|                          | 0.0                     | 0.0          | 0.0                  | 272.80           |

|                            |                |                              |                  |                    |
|----------------------------|----------------|------------------------------|------------------|--------------------|
| <b>Survey Tool Program</b> | Data 7/20/2011 |                              |                  |                    |
| <b>From</b>                | <b>To</b>      | <b>Survey (Wellbore)</b>     | <b>Tool Name</b> | <b>Description</b> |
| (usft)                     | (usft)         |                              |                  |                    |
| 0.0                        | 10,228.6       | Plan #3 (Horizontal OPE FTC) | MWD              | MWD - Standard     |

|                       |            |            |            |             |            |            |               |
|-----------------------|------------|------------|------------|-------------|------------|------------|---------------|
| <b>Planned Survey</b> |            |            |            |             |            |            |               |
| <b>MD</b>             | <b>TVD</b> | <b>Inc</b> | <b>Azi</b> | <b>Buid</b> | <b>N/S</b> | <b>E/W</b> | <b>V. Sec</b> |
| (usft)                | (usft)     | (°)        | (°)        | (°/100usft) | (usft)     | (usft)     | (usft)        |
| 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. 13-T32N-R05W  
**Site:** Carracas Mesa  
**Well:** Carracas 14A #16  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #3

**Local Co-ordinate Reference:** Site Carracas Mesa  
**TVD Reference:** KB @ 7423.0usft (KB)  
**MD Reference:** KB @ 7423.0usft (KB)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 Single User Db

## Planned Survey

| MD<br>(usft)        | TVD<br>(usft) | Inc<br>(°) | Azi<br>(°) | Build<br>(°/100usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) |
|---------------------|---------------|------------|------------|----------------------|---------------|---------------|------------------|
| 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              |
| 2,035.0             | 2,035.0       | 0.00       | 0.00       | 0.00                 | 0.0           | 0.0           | 0.0              |
| <b>Nacimiento</b>   |               |            |            |                      |               |               |                  |
| 2,100.0             | 2,100.0       | 0.00       | 0.00       | 0.00                 | 0.0           | 0.0           | 0.0              |
| 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              |
| <b>KOP</b>          |               |            |            |                      |               |               |                  |
| 2,500.0             | 2,499.9       | 3.61       | 271.15     | 3.61                 | 0.1           | -3.1          | 3.1              |
| 2,600.0             | 2,599.5       | 7.21       | 271.15     | 3.61                 | 0.3           | -12.6         | 12.6             |
| 2,700.0             | 2,698.2       | 10.82      | 271.15     | 3.61                 | 0.6           | -28.2         | 28.2             |
| 2,800.0             | 2,795.8       | 14.43      | 271.15     | 3.61                 | 1.0           | -50.1         | 50.1             |
| 2,900.0             | 2,891.8       | 18.03      | 271.15     | 3.61                 | 1.6           | -78.0         | 78.0             |
| 3,000.0             | 2,985.8       | 21.64      | 271.15     | 3.61                 | 2.2           | -112.0        | 111.9            |
| 3,100.0             | 3,077.6       | 25.25      | 271.15     | 3.61                 | 3.0           | -151.7        | 151.7            |
| 3,200.0             | 3,166.6       | 28.86      | 271.15     | 3.61                 | 4.0           | -197.2        | 197.1            |
| 3,300.0             | 3,252.6       | 32.46      | 271.15     | 3.61                 | 5.0           | -248.2        | 248.1            |
| 3,337.5             | 3,284.0       | 33.81      | 271.15     | 3.61                 | 5.4           | -268.6        | 268.6            |
| <b>Ojo Alamo SS</b> |               |            |            |                      |               |               |                  |
| 3,400.0             | 3,335.2       | 36.07      | 271.15     | 3.61                 | 6.1           | -304.4        | 304.4            |
| 3,500.0             | 3,414.2       | 39.68      | 271.15     | 3.61                 | 7.3           | -365.8        | 365.7            |
| 3,508.9             | 3,421.0       | 40.00      | 271.15     | 3.61                 | 7.4           | -371.5        | 371.4            |
| <b>Kirtland Sh</b>  |               |            |            |                      |               |               |                  |
| 3,600.0             | 3,489.1       | 43.28      | 271.15     | 3.61                 | 8.7           | -432.0        | 431.9            |
| 3,700.0             | 3,559.7       | 46.89      | 271.15     | 3.61                 | 10.1          | -502.8        | 502.7            |
| 3,800.0             | 3,625.7       | 50.50      | 271.15     | 3.61                 | 11.6          | -577.9        | 577.8            |
| 3,900.0             | 3,686.8       | 54.10      | 271.15     | 3.61                 | 13.2          | -657.0        | 656.9            |
| 4,000.0             | 3,742.8       | 57.71      | 271.15     | 3.61                 | 14.8          | -739.8        | 739.6            |
| 4,100.0             | 3,793.6       | 61.32      | 271.15     | 3.61                 | 16.6          | -825.9        | 825.8            |
| 4,200.0             | 3,838.8       | 64.93      | 271.15     | 3.61                 | 18.3          | -915.1        | 914.9            |
| 4,288.4             | 3,874.0       | 68.12      | 271.15     | 3.61                 | 20.0          | -996.2        | 996.0            |
| <b>Fruitland Fm</b> |               |            |            |                      |               |               |                  |
| 4,300.0             | 3,878.3       | 68.53      | 271.15     | 3.61                 | 20.2          | -1,006.9      | 1,006.7          |
| 4,400.0             | 3,911.9       | 72.14      | 271.15     | 3.61                 | 22.1          | -1,101.1      | 1,100.8          |
| 4,500.0             | 3,939.6       | 75.75      | 271.15     | 3.61                 | 24.0          | -1,197.1      | 1,196.9          |
| 4,600.0             | 3,961.1       | 79.35      | 271.15     | 3.61                 | 25.9          | -1,294.7      | 1,294.5          |
| 4,700.0             | 3,976.5       | 82.96      | 271.15     | 3.61                 | 27.9          | -1,393.5      | 1,393.2          |

# Energen

## DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec. 13-T32N-R05W  
**Site:** Carracas Mesa  
**Well:** Carracas 14A #16  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #3

**Local Co-ordinate Reference:** Site Carracas Mesa  
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**MD Reference:** KB @ 7423.0usft (KB)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 Single User Db

### Planned Survey

| MD<br>(usft)           | TVD<br>(usft) | Inc<br>(°) | Azi<br>(°) | Build<br>(°/100usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) |
|------------------------|---------------|------------|------------|----------------------|---------------|---------------|------------------|
| 4,763.3                | 3,983.0       | 85.24      | 271.15     | 3.61                 | 29.2          | -1,456.4      | 1,456.1          |
| <b>Top Target Coal</b> |               |            |            |                      |               |               |                  |
| 4,800.0                | 3,985.6       | 86.57      | 271.15     | 3.61                 | 29.9          | -1,493.1      | 1,492.7          |
| 4,860.4                | 3,988.1       | 88.75      | 271.15     | 3.61                 | 31.1          | -1,553.4      | 1,553.1          |
| 4,900.0                | 3,989.0       | 88.75      | 271.15     | 0.00                 | 31.9          | -1,593.0      | 1,592.6          |
| 5,000.0                | 3,991.1       | 88.75      | 271.15     | 0.00                 | 33.9          | -1,692.9      | 1,692.6          |
| 5,044.5                | 3,992.1       | 88.75      | 271.15     | 0.00                 | 34.8          | -1,737.5      | 1,737.1          |
| 5,100.0                | 3,992.9       | 89.61      | 272.68     | 1.55                 | 36.7          | -1,792.9      | 1,792.5          |
| 5,125.2                | 3,993.0       | 90.00      | 273.37     | 1.55                 | 38.0          | -1,818.0      | 1,817.7          |
| <b>Land Curve</b>      |               |            |            |                      |               |               |                  |
| 5,200.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 42.4          | -1,892.7      | 1,892.5          |
| 5,300.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 48.3          | -1,992.5      | 1,992.5          |
| 5,400.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 54.2          | -2,092.4      | 2,092.5          |
| 5,500.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 60.0          | -2,192.2      | 2,192.5          |
| 5,600.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 65.9          | -2,292.0      | 2,292.5          |
| 5,700.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 71.8          | -2,391.8      | 2,392.5          |
| 5,800.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 77.7          | -2,491.7      | 2,492.5          |
| 5,900.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 83.5          | -2,591.5      | 2,592.5          |
| 6,000.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 89.4          | -2,691.3      | 2,692.5          |
| 6,100.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 95.3          | -2,791.2      | 2,792.5          |
| 6,200.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 101.2         | -2,891.0      | 2,892.5          |
| 6,300.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 107.1         | -2,990.8      | 2,992.5          |
| 6,400.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 112.9         | -3,090.6      | 3,092.5          |
| 6,500.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 118.8         | -3,190.5      | 3,192.5          |
| 6,600.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 124.7         | -3,290.3      | 3,292.5          |
| 6,700.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 130.6         | -3,390.1      | 3,392.4          |
| 6,800.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 136.5         | -3,489.9      | 3,492.4          |
| 6,900.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 142.3         | -3,589.8      | 3,592.4          |
| 7,000.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 148.2         | -3,689.6      | 3,692.4          |
| 7,100.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 154.1         | -3,789.4      | 3,792.4          |
| 7,200.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 160.0         | -3,889.3      | 3,892.4          |
| 7,300.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 165.8         | -3,989.1      | 3,992.4          |
| 7,400.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 171.7         | -4,088.9      | 4,092.4          |
| 7,500.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 177.6         | -4,188.7      | 4,192.4          |
| 7,600.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 183.5         | -4,288.6      | 4,292.4          |
| 7,700.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 189.4         | -4,388.4      | 4,392.4          |
| 7,800.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 195.2         | -4,488.2      | 4,492.4          |
| 7,900.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 201.1         | -4,588.0      | 4,592.4          |
| 8,000.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 207.0         | -4,687.9      | 4,692.4          |
| 8,100.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 212.9         | -4,787.7      | 4,792.4          |
| 8,200.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 218.8         | -4,887.5      | 4,892.4          |
| 8,300.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 224.6         | -4,987.4      | 4,992.4          |
| 8,400.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 230.5         | -5,087.2      | 5,092.4          |
| 8,500.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 236.4         | -5,187.0      | 5,192.4          |
| 8,600.0                | 3,993.0       | 90.00      | 273.37     | 0.00                 | 242.3         | -5,286.8      | 5,292.4          |



# Energen

## DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec. 13-T32N-R05W  
**Site:** Carracas Mesa  
**Well:** Carracas 14A #16  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #3

**Local Co-ordinate Reference:** Site Carracas Mesa  
**TVD Reference:** KB @ 7423.0usft (KB)  
**MD Reference:** KB @ 7423.0usft (KB)  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 Single User Db

### Planned Survey

| MD<br>(usft) | TVD<br>(usft) | Inc<br>(°) | Azi<br>(°) | Build<br>(°/100usft) | N/S<br>(usft) | E/W<br>(usft) | V. Sec<br>(usft) |
|--------------|---------------|------------|------------|----------------------|---------------|---------------|------------------|
| 8,700.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 248.1         | -5,386.7      | 5,392.3          |
| 8,800.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 254.0         | -5,486.5      | 5,492.3          |
| 8,900.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 259.9         | -5,586.3      | 5,592.3          |
| 9,000.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 265.8         | -5,686.1      | 5,692.3          |
| 9,100.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 271.7         | -5,786.0      | 5,792.3          |
| 9,200.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 277.5         | -5,885.8      | 5,892.3          |
| 9,300.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 283.4         | -5,985.6      | 5,992.3          |
| 9,400.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 289.3         | -6,085.4      | 6,092.3          |
| 9,500.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 295.2         | -6,185.3      | 6,192.3          |
| 9,600.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 301.0         | -6,285.1      | 6,292.3          |
| 9,700.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 306.9         | -6,384.9      | 6,392.3          |
| 9,800.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 312.8         | -6,484.8      | 6,492.3          |
| 9,900.0      | 3,993.0       | 90.00      | 273.37     | 0.00                 | 318.7         | -6,584.6      | 6,592.3          |
| 10,000.0     | 3,993.0       | 90.00      | 273.37     | 0.00                 | 324.6         | -6,684.4      | 6,692.3          |
| 10,100.0     | 3,993.0       | 90.00      | 273.37     | 0.00                 | 330.4         | -6,784.2      | 6,792.3          |
| 10,200.0     | 3,993.0       | 90.00      | 273.37     | 0.00                 | 336.3         | -6,884.1      | 6,892.3          |
| 10,228.6     | 3,993.0       | 90.00      | 273.37     | 0.00                 | 338.0         | -6,912.7      | 6,920.9          |

TD Lateral

### Casing Points

| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Name         | Casing<br>Diameter<br>(") | Hole<br>Diameter<br>(") |
|-----------------------------|-----------------------------|--------------|---------------------------|-------------------------|
| 200.0                       | 200.0                       | Surface      | 9-5/8                     | 12-1/4                  |
| 5,125.0                     | 3,993.0                     | Intermediate | 7                         | 8-3/4                   |
| 10,228.0                    | 3,993.0                     | Liner        | 4-1/2                     | 6-1/4                   |

### Formations

| Measured<br>Depth<br>(usft) | Vertical<br>Depth<br>(usft) | Name            | Lithology | Dip<br>(°) | Dip<br>Direction<br>(°) |
|-----------------------------|-----------------------------|-----------------|-----------|------------|-------------------------|
| 3,337.5                     | 3,284.0                     | Ojo Alamo SS    |           | 0.00       |                         |
| 3,508.9                     | 3,421.0                     | Kirtland Sh     |           | 0.00       |                         |
| 2,035.0                     | 2,035.0                     | Nacimiento      |           | 0.00       |                         |
| 4,763.3                     | 3,983.0                     | Top Target Coal |           | 0.00       |                         |
| 4,288.4                     | 3,874.0                     | Fruitland Fm    |           | 0.00       |                         |

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