

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

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

RECEIVED

APPLICATION FOR PERMIT TO DRILL OR REENTER

|                                                                                                                                                                                                   |  |                                                                                                                   |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------|--|
| 1a. Type of Work<br><input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER                                                                                                    |  | 5. Lease Serial No.<br>USA NMNM 29760                                                                             |  |
| 1b. Type of Well<br><input type="checkbox"/> Oil Well <input checked="" type="checkbox"/> Gas Well <input type="checkbox"/> Other <input type="checkbox"/> Single Zone                            |  | 6. If Indian, Allottee or Tribe Name                                                                              |  |
| 2. Name of Operator<br>Energen Resources Corporation                                                                                                                                              |  | 7. Unit or CA Agreement Name and No.<br>NMNM799459                                                                |  |
| 3a. Address<br>2010 Afton Place Farmington, New Mexico 87401                                                                                                                                      |  | 8. Lease Name and Well No.<br>Carracas 14A #16                                                                    |  |
| 3b. Phone No. (include area code)<br>(505)325-6800                                                                                                                                                |  | 9. API Well No.<br>30-039-30842                                                                                   |  |
| 4. Location of Well (Report location clearly and in accordance with any State requirements)*<br>At surface 762' FSL, 1718' FWL<br>At proposed prod. zone 1100' FSL, 100' FWL (Sec. 14 - 32N - 5W) |  | 10. Field and Pool, or Exploratory<br>Basin Fruitland Coal                                                        |  |
| 14. Distance in miles and direction from nearest town or post office*<br>9 miles from Arboles                                                                                                     |  | 11. Sec., T., R., M., or Blk. and Survey or Area<br>Sec. 13 T 32N R 5W                                            |  |
| 15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drg. unit line, if any)<br>762'                                                                      |  | 12. County or Parish<br>Rio Arriba                                                                                |  |
| 16. No. of Acres in lease<br>1440.81                                                                                                                                                              |  | 13. State<br>NM                                                                                                   |  |
| 17. Spacing Unit dedicated to this well<br>320 S/2 Sec. 14                                                                                                                                        |  | 18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.<br>75' |  |
| 19. Proposed Depth<br>10257' MD                                                                                                                                                                   |  | 20. BLM/BIA Bond No. on file                                                                                      |  |
| 21. Elevations (Show whether DF, KDB, RT, GL, etc.)<br>7408' GL                                                                                                                                   |  | 22. Approximate date work will start*<br>04/01/2010                                                               |  |
| 23. Estimated duration<br>30 days                                                                                                                                                                 |  | 24. Attachments<br>RCVD JUN 30 '10                                                                                |  |

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, must be attached to this form:

- |                                                                                                                                                |                                                                                                 |
|------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------|
| 1. Well plat certified by a registered surveyor.                                                                                               | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan.                                                                                                                            | 5. Operator certification.                                                                      |
| 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office). | 6. Such other site specific information and/or plans as may be required by the BLM              |

OIL CONS. DIV.

DIST. 3

|                                               |                                       |                    |
|-----------------------------------------------|---------------------------------------|--------------------|
| 25. Signature<br><i>Stephen Byers</i>         | Name (Printed/Typed)<br>Stephen Byers | Date<br>11/09/2009 |
| Title<br>Drilling Engineer                    |                                       |                    |
| Approved by (Signature)<br><i>[Signature]</i> | Name (Printed/Typed)                  | Date<br>6/23/2010  |
| Title<br>AFM                                  | Office<br>FFO                         |                    |

Application approval 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.  
Conditions of approval, if any, are attached.

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make 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.

(Continued on page 2)

Hold C104

for Directional Survey  
and "As Drilled" plat

This action is subject to technical and procedural review pursuant to 43 CFR 3165.3 and appeal pursuant to 43 CFR 3165.4

SEE ATTACHED FOR PRIOR TO CASING & CEMENT  
CONDITIONS OF APPROVAL

HOLD C104 FOR

Status change to  
Barren 14A# 13  
NMCCD

DRILLING OPERATIONS AUTHORIZED ARE  
SUBJECT TO COMPLIANCE WITH ATTACHED  
"GENERAL REQUIREMENTS".

JUL 06 2010

NOTIFY AZTEC OGD 24 HRS.

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

Form C-102  
Revised October 12, 2005

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

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

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

OIL CONSERVATION DIVISION

1220 South St. Francis Dr.  
Santa Fe, NM 87505

NOV 12 2009 Submit

Submit to Appropriate District Office

State Lease - 4 Copies

Fee Lease - 3 Copies

Bureau of Land Management  
Farmington Field Office

☐ AMENDED REPORT

## WELL LOCATION AND ACREAGE DEDICATION PLAT

|                             |                                                 |                     |                                    |
|-----------------------------|-------------------------------------------------|---------------------|------------------------------------|
| *API Number<br>30-039-30842 |                                                 | *Pool Code<br>71629 | *Pool Name<br>BASIN FRUITLAND COAL |
| *Property Code<br>35653     | *Property Name<br>CARRACAS 14 A                 |                     | *Well Number<br>16                 |
| *UGRID No.<br>162928        | *Operator Name<br>ENERGEN RESOURCES CORPORATION |                     | *Elevation<br>7408'                |

<sup>10</sup> Surface Location

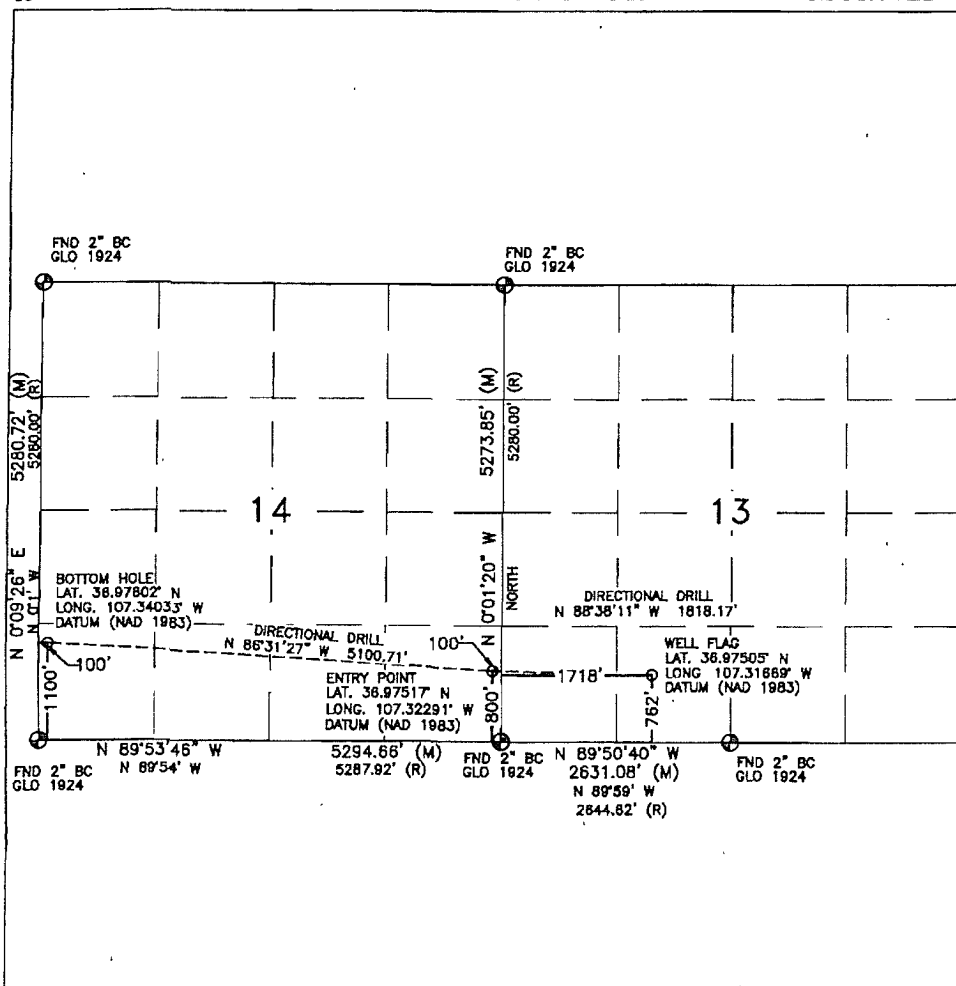
|               |         |          |       |         |               |                  |               |                |            |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|------------|
| UL or lot no. | Section | Township | Range | Lot Idn | Feet from the | North/South line | Feet from the | East/West line | County     |
| N             | 13      | 32N      | 5W    |         | 762'          | SOUTH            | 1718'         | WEST           | RIO ARriba |

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

|                                                      |               |                 |                               |         |                                  |                           |                                    |                        |                      |
|------------------------------------------------------|---------------|-----------------|-------------------------------|---------|----------------------------------|---------------------------|------------------------------------|------------------------|----------------------|
| UL or lot no.<br>M                                   | Section<br>14 | Township<br>32N | Range<br>5W                   | Lot Idn | Feet from the<br>1100'           | North/South line<br>SOUTH | Feet from the<br>100'              | East/West line<br>WEST | County<br>RIO ARRIBA |
| <sup>13</sup> Dedicated Acres<br>5/3 320 (14-32N-5W) |               |                 | <sup>14</sup> Joint or Infill |         | <sup>15</sup> Consolidation Code |                           | <sup>16</sup> Order No.<br>B-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

18



## 17 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 or a compulsory pooling order heretofore entered by the division.

Signature Stephen L. Davis Date 11-9-09

Stephen Byers  
Printed Name

## 18 SURVEYOR CERTIFICATION

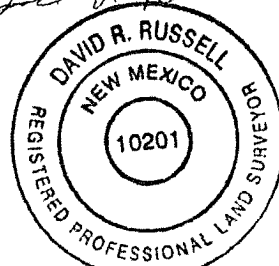
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

JUNE 11, 2009

Date of Survey \_\_\_\_\_

Signature and Seal of Professional Surveyor.

Bill Russell



DAVID RUSSELL

**Certificate Number**

10201

11/9/2009

**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          | 10257' +/- (MD); 3960' (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) 4284' MD            |
| Top Target Coal    | 3951' (TVD) 4606' MD            |
| Base Target Coal   | 3969' (TVD)                     |
| <b>Total Depth</b> | <b>3960' (TVD), 10257' (MD)</b> |

**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 8.4 ppg to 9.0 ppg.

**Production:** 6-1/4" wellbore will be drilled with a fresh water or brine water system depending on reservoir characteristics. Anticipated BHP can be as high as 1100 psi.

**Projected KOP is 1900' TVD with 3.91°/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: 3751' TVD, 4406' MD to TD

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

11/9/2009

**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 | 0           | 5153      | 8-3/4"   | 7"     | 23 lb/ft   | J-55 LT&C |
| TVD          | 0           | 3960      |          |        |            |           |
| Prod. Liner  | 5053        | 10257     | 6-1/4"   | 4-1/2" | 11.6 lb/ft | J-55 LT&C |
| TVD          | 3958        | 3960      |          |        |            |           |
| Tubing       | 0           | 4853      | 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:** 125 sks Type V with 2.0 % CaCl<sub>2</sub> and ¼ #/sk Flocele (15.6 ppg, 1.18 ft<sup>3</sup>/sk 148 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 619 sks 65/35 with 6.0 % Bentonite, 2.0 % CaCl<sub>2</sub>, 10 #/sk Gilsonite, and ½ #/sk Flocele (12.3 ppg, 1.93 ft<sup>3</sup>/sk) and a tail of 150 sks Class G with ¼ #/sk Flocele (15.6 ppg, 1.18 ft<sup>3</sup>/sk). (1,383 ft<sup>3</sup> of slurry, 100% excess to circulate to surface). WOC 12 hours. Test casing to 1200 psi for 30 min.

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

**Set slips with full string weight**

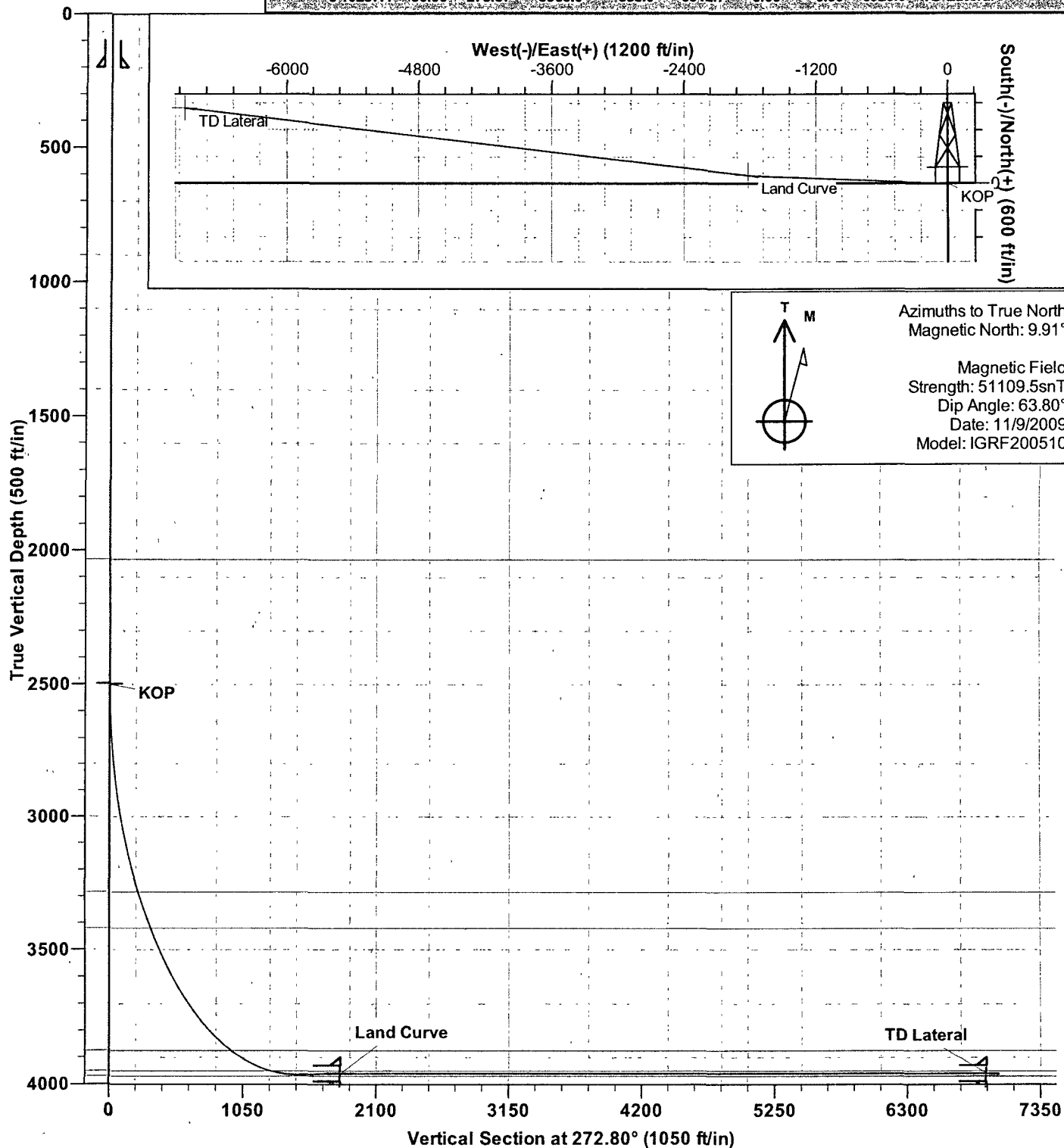
If cement does not circulate, run temperature survey in 8 hrs. to determine TOC.

**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.

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   | 2500.0  | 0.00  | 0.00   | 2500.0 | 0.0   | 0.0     | 0.00 | 0.00   | 0.0    | KOP        |
| 3   | 4816.5  | 90.68 | 271.15 | 3963.6 | 29.8  | -1480.7 | 3.91 | 271.15 | 1480.4 |            |
| 4   | 5080.2  | 90.68 | 271.15 | 3960.4 | 35.1  | -1744.4 | 0.00 | 0.00   | 1744.0 |            |
| 5   | 5153.9  | 90.00 | 273.37 | 3960.0 | 38.0  | -1818.0 | 3.15 | 107.02 | 1817.7 | Land Curve |
| 6   | 10257.4 | 90.00 | 273.37 | 3960.0 | 338.0 | -6912.7 | 0.00 | 0.00   | 6920.9 | TD Lateral |



# 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:** Preliminary Plan #1

**Local Co-ordinate Reference:** Well Carracas 14A #16  
**TVD Reference:** KB @ 7423.0ft (KB)  
**MD Reference:** KB @ 7423.0ft (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) |
|------------|-------------|------------|------------|--------------------|-------------|-------------|----------------|
| 4,606.4    | 3,951.0     | 82.46      | 271.15     | 3.91               | 25.6        | -1,271.3    | 1,271.0        |

### Top Target Coal

|         |         |       |        |       |      |          |         |
|---------|---------|-------|--------|-------|------|----------|---------|
| 4,700.0 | 3,960.3 | 86.12 | 271.15 | 3.91  | 27.4 | -1,364.3 | 1,364.1 |
| 4,800.0 | 3,963.7 | 90.03 | 271.15 | 3.91  | 29.5 | -1,464.2 | 1,463.9 |
| 4,816.5 | 3,963.6 | 90.68 | 271.15 | 3.91  | 29.8 | -1,480.7 | 1,480.4 |
| 4,900.0 | 3,962.6 | 90.68 | 271.15 | 0.00  | 31.5 | -1,564.2 | 1,563.9 |
| 5,000.0 | 3,961.4 | 90.68 | 271.15 | 0.00  | 33.5 | -1,664.2 | 1,663.8 |
| 5,080.2 | 3,960.4 | 90.68 | 271.15 | 0.00  | 35.1 | -1,744.4 | 1,744.0 |
| 5,100.0 | 3,960.2 | 90.50 | 271.75 | -0.92 | 35.6 | -1,764.2 | 1,763.8 |
| 5,153.9 | 3,960.0 | 90.00 | 273.37 | -0.92 | 38.0 | -1,818.0 | 1,817.7 |

### Land Curve

|         |         |       |        |      |       |          |         |
|---------|---------|-------|--------|------|-------|----------|---------|
| 5,200.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 40.7  | -1,864.0 | 1,863.8 |
| 5,300.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 46.6  | -1,963.9 | 1,963.8 |
| 5,400.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 52.5  | -2,063.7 | 2,063.8 |
| 5,500.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 58.3  | -2,163.5 | 2,163.8 |
| 5,600.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 64.2  | -2,263.3 | 2,263.8 |
| 5,700.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 70.1  | -2,363.2 | 2,363.8 |
| 5,800.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 76.0  | -2,463.0 | 2,463.8 |
| 5,900.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 81.9  | -2,562.8 | 2,563.8 |
| 6,000.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 87.7  | -2,662.6 | 2,663.8 |
| 6,100.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 93.6  | -2,762.5 | 2,763.7 |
| 6,200.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 99.5  | -2,862.3 | 2,863.7 |
| 6,300.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 105.4 | -2,962.1 | 2,963.7 |
| 6,400.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 111.3 | -3,062.0 | 3,063.7 |
| 6,500.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 117.1 | -3,161.8 | 3,163.7 |
| 6,600.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 123.0 | -3,261.6 | 3,263.7 |
| 6,700.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 128.9 | -3,361.4 | 3,363.7 |
| 6,800.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 134.8 | -3,461.3 | 3,463.7 |
| 6,900.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 140.6 | -3,561.1 | 3,563.7 |
| 7,000.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 146.5 | -3,660.9 | 3,663.7 |
| 7,100.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 152.4 | -3,760.7 | 3,763.7 |
| 7,200.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 158.3 | -3,860.6 | 3,863.7 |
| 7,300.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 164.2 | -3,960.4 | 3,963.7 |
| 7,400.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 170.0 | -4,060.2 | 4,063.7 |
| 7,500.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 175.9 | -4,160.1 | 4,163.7 |
| 7,600.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 181.8 | -4,259.9 | 4,263.7 |
| 7,700.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 187.7 | -4,359.7 | 4,363.7 |
| 7,800.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 193.5 | -4,459.5 | 4,463.7 |
| 7,900.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 199.4 | -4,559.4 | 4,563.7 |
| 8,000.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 205.3 | -4,659.2 | 4,663.7 |
| 8,100.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 211.2 | -4,759.0 | 4,763.6 |
| 8,200.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 217.1 | -4,858.8 | 4,863.6 |
| 8,300.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 222.9 | -4,958.7 | 4,963.6 |
| 8,400.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 228.8 | -5,058.5 | 5,063.6 |
| 8,500.0 | 3,960.0 | 90.00 | 273.37 | 0.00 | 234.7 | -5,158.3 | 5,163.6 |

# 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:** Preliminary Plan #1

**Local Co-ordinate Reference:** Well Carracas 14A #16  
**TVD Reference:** KB @ 7423.0ft (KB)  
**MD Reference:** KB @ 7423.0ft (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) |
|------------|-------------|------------|------------|--------------------|-------------|-------------|----------------|
| 8,600.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 240.6       | -5,258.1    | 5,263.6        |
| 8,700.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 246.5       | -5,358.0    | 5,363.6        |
| 8,800.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 252.3       | -5,457.8    | 5,463.6        |
| 8,900.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 258.2       | -5,557.6    | 5,563.6        |
| 9,000.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 264.1       | -5,657.5    | 5,663.6        |
| 9,100.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 270.0       | -5,757.3    | 5,763.6        |
| 9,200.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 275.8       | -5,857.1    | 5,863.6        |
| 9,300.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 281.7       | -5,956.9    | 5,963.6        |
| 9,400.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 287.6       | -6,056.8    | 6,063.6        |
| 9,500.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 293.5       | -6,156.6    | 6,163.6        |
| 9,600.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 299.4       | -6,256.4    | 6,263.6        |
| 9,700.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 305.2       | -6,356.2    | 6,363.6        |
| 9,800.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 311.1       | -6,456.1    | 6,463.6        |
| 9,900.0    | 3,960.0     | 90.00      | 273.37     | 0.00               | 317.0       | -6,555.9    | 6,563.6        |
| 10,000.0   | 3,960.0     | 90.00      | 273.37     | 0.00               | 322.9       | -6,655.7    | 6,663.6        |
| 10,100.0   | 3,960.0     | 90.00      | 273.37     | 0.00               | 328.8       | -6,755.6    | 6,763.5        |
| 10,200.0   | 3,960.0     | 90.00      | 273.37     | 0.00               | 334.6       | -6,855.4    | 6,863.5        |
| 10,257.4   | 3,960.0     | 90.00      | 273.37     | 0.00               | 338.0       | -6,912.7    | 6,920.9        |

TD Lateral

# 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:** Preliminary Plan #1

**Local Co-ordinate Reference:** Well Carracas 14A #16  
**TVD Reference:** KB @ 7423.0ft (KB)  
**MD Reference:** KB @ 7423.0ft (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         |
|---------------------------------------------|------------------|-----------------|-------------|---------------|---------------|------------------|-----------------|------------------|-------------------|
| KOP<br>- plan hits target<br>- Point        | 0.00             | 0.00            | 2,500.0     | 0.0           | 0.0           | 2,175,957.75     | 1,328,832.95    | 36° 58' 30.180 N | 107° 19' 0.084 W  |
| TD Lateral<br>- plan hits target<br>- Point | 0.00             | 0.00            | 3,960.0     | 338.0         | -6,912.7      | 2,176,373.15     | 1,321,924.51    | 36° 58' 33.513 N | 107° 20' 25.271 W |
| Land Curve<br>- plan hits target<br>- Point | 0.00             | 0.00            | 3,960.0     | 38.0          | -1,818.0      | 2,176,016.11     | 1,327,015.49    | 36° 58' 30.555 N | 107° 19' 22.488 W |

### Casing Points

| Measured Depth<br>(ft) | Vertical Depth<br>(ft) | Name         | Casing Diameter<br>(") | Hole Diameter<br>(") |
|------------------------|------------------------|--------------|------------------------|----------------------|
| 200.0                  | 200.0                  | Surface      | 9-5/8                  | 12-1/4               |
| 5,153.0                | 3,960.0                | Intermediate | 7                      | 8-3/4                |
| 10,257.0               | 3,960.0                | Liner        | 4-1/2                  | 6-1/4                |

### Formations

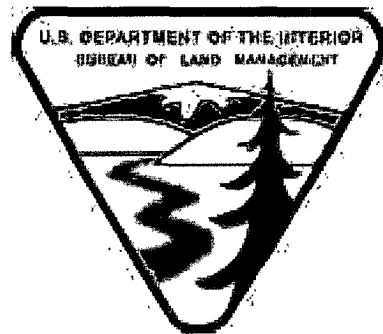
| Measured Depth<br>(ft) | Vertical Depth<br>(ft) | Name             | Lithology | Dip<br>(°) | Dip Direction<br>(°) |
|------------------------|------------------------|------------------|-----------|------------|----------------------|
| 4,284.1                | 3,874.0                | Fruitland Fm     |           | 0.00       |                      |
| 3,327.4                | 3,284.0                | Ojo Alamo SS     |           | 0.00       |                      |
| 4,606.4                | 3,951.0                | Top Target Coal  |           | 0.00       |                      |
|                        | 3,969.0                | Base Target Coal |           | 0.00       |                      |
| 3,496.1                | 3,421.0                | Kirtland Sh      |           | 0.00       |                      |
| 2,035.0                | 2,035.0                | Nacimiento       |           | 0.00       |                      |

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

## ***DRILLING CONDITIONS OF APPROVAL***

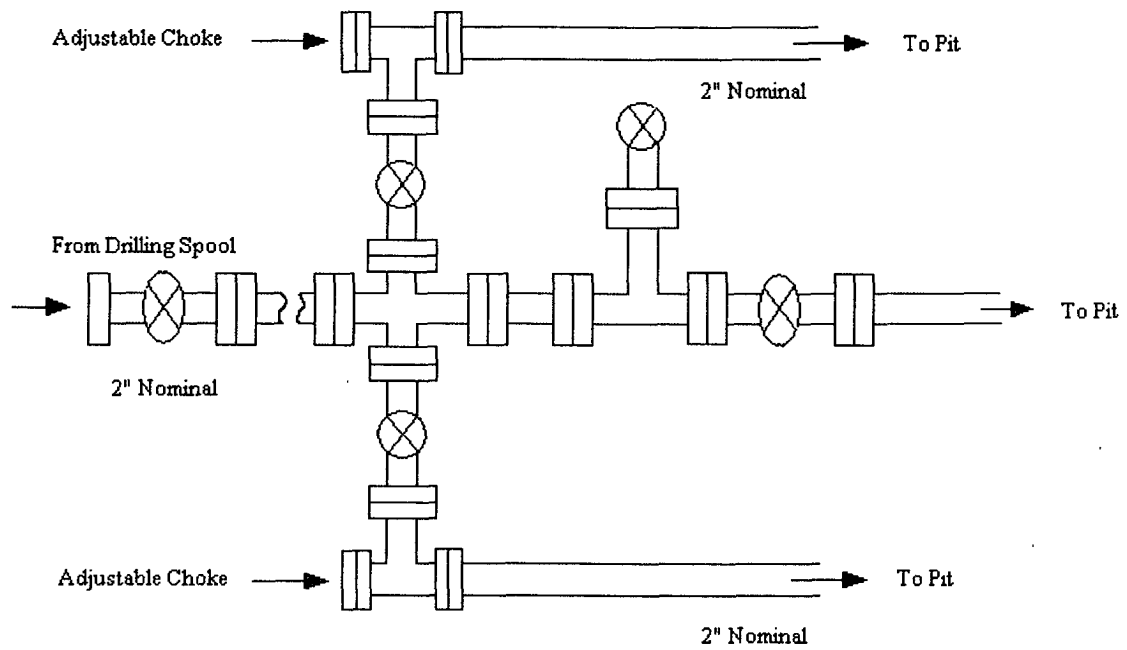
**Operator:** Energen Resources  
**Lease No.:** NMNM-29760  
**Well Name:** Carracas 14A #16  
**Well Location:** Sec.13, T32N, R5W; 762' FSL & 1718' FWL

**2) Pressure test the 7" intermediate casing string to a minimum of 1500 psi for 30 minutes with no more than a 10% pressure decline.**



After hour contact: Troy Salyers 505-360-9815

### Typical 2000 psi Choke Manifold Configuration



Choke manifold installed from surface to TD

## Energen Resources Corporation

### Typical BOP Configuration for Gas Drilling

