

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

RECEIVED

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

APPLICATION FOR PERMIT TO DRILL OR REENTER

MAR 26 2010

|                                                                                                                                                                                                               |  |                                                                                                                   |  |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|-------------------------------------------------------------------------------------------------------------------|--|
| 1a. Type of Work<br><input checked="" type="checkbox"/> DRILL <input type="checkbox"/> REENTER                                                                                                                |  | Bureau of Land Management<br>Farmington Field Office                                                              |  |
| 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 <input type="checkbox"/> Multiple Zone |  | 6. If Indian, Allottee or Tribe Name<br>USA NMNM 28812                                                            |  |
| 2. Name of Operator<br>Energen Resources Corporation                                                                                                                                                          |  | 7. Unit or CA Agreement Name and No.<br>NMNM-99463                                                                |  |
| 3a. Address<br>2010 Afton Place Farmington, New Mexico 87401                                                                                                                                                  |  | 8. Lease Name and Well No.<br>Carracas 14B #2H                                                                    |  |
| 3b. Phone No. (include area code)<br>(505)325-6800                                                                                                                                                            |  | 9. API Well No.<br>30-039-30962                                                                                   |  |
| 4. Location of Well (Report location clearly and in accordance with any State requirements)*<br>At surface 1637' FNL, 1852' FEL Sec 15 32N 4W<br>At proposed prod. zone 200' FNL, 100' FEL Sec 14-32N-4W      |  | 10. Field and Pool, or Exploratory 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. 15 T 32N R 4W                                            |  |
| 15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drg. unit line, if any)<br>1637'                                                                                 |  | 12. County or Parish<br>Rio Arriba                                                                                |  |
| 16. No. of Acres in lease<br>2522, 12                                                                                                                                                                         |  | 13. State<br>NM                                                                                                   |  |
| 17. Spacing Unit dedicated to this well<br>320 N/2 Sec. 14                                                                                                                                                    |  | 18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft.<br>65' |  |
| 19. Proposed Depth<br>9973' MD                                                                                                                                                                                |  | 20. BLM/BIA Bond No. on file                                                                                      |  |
| 21. Elevations (Show whether DF, KDB, RT, GL, etc.)<br>6536' GL                                                                                                                                               |  | 22. Approximate date work will start*<br>04/01/2010                                                               |  |
| 23. Estimated duration<br>30 days                                                                                                                                                                             |  | 24. Attachments<br>DIST. 3                                                                                        |  |

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.
2. A Drilling Plan.
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).

4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above).
5. Operator certification.
6. Such other site specific information and/or plans as may be required by the BLM

RCVD MAY 7 '10

OIL CONS. DIV.

|                             |                                       |                    |
|-----------------------------|---------------------------------------|--------------------|
| 25. Signature<br>           | Name (Printed/Typed)<br>Stephen Byers | Date<br>03/22/2010 |
| Title<br>Drilling Engineer  |                                       |                    |
| Approved by (Signature)<br> | Name (Printed/Typed)<br>A. E. N.      | Date<br>5/5/2010   |
| Title<br>AFN                |                                       |                    |
| Office<br>FEO               |                                       |                    |

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)

NOTIFY AZTEC OCD 24 HRS.  
PRIOR TO CASING & CEMENT

\*(Instructions on page 2)

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

Hold C104  
for Directional Survey  
and "As Drilled" plat

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

HOLD C104 FOR

NMOC

Carracas

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

MAY 13 2010

DISTRICT I  
1825 N. French Dr., Hobbs, N.M. 88240

State of New Mexico  
Energy, Minerals & Natural Resources Department

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. MAR 26 2010  
Santa Fe, NM 87505

RECEIVED

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><b>30-039-30962</b> | Pool Code<br><b>71629</b>                             | Pool Name<br><b>BASIN FRUITLAND COAL</b> |
| Property Code<br><b>35644</b>     | Property Name<br><b>CARRACAS 14 B</b>                 | Well Number<br><b>2 A</b>                |
| OGRID No.<br><b>162928</b>        | Operator Name<br><b>ENERGEN RESOURCES CORPORATION</b> | Elevation<br><b>6536'</b>                |

<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     |
|---------------|---------|----------|-------|---------|---------------|------------------|---------------|----------------|------------|
| G             | 15      | 32N      | 4W    |         | 1637'         | NORTH            | 1852'         | EAST           | RIO ARRIBA |

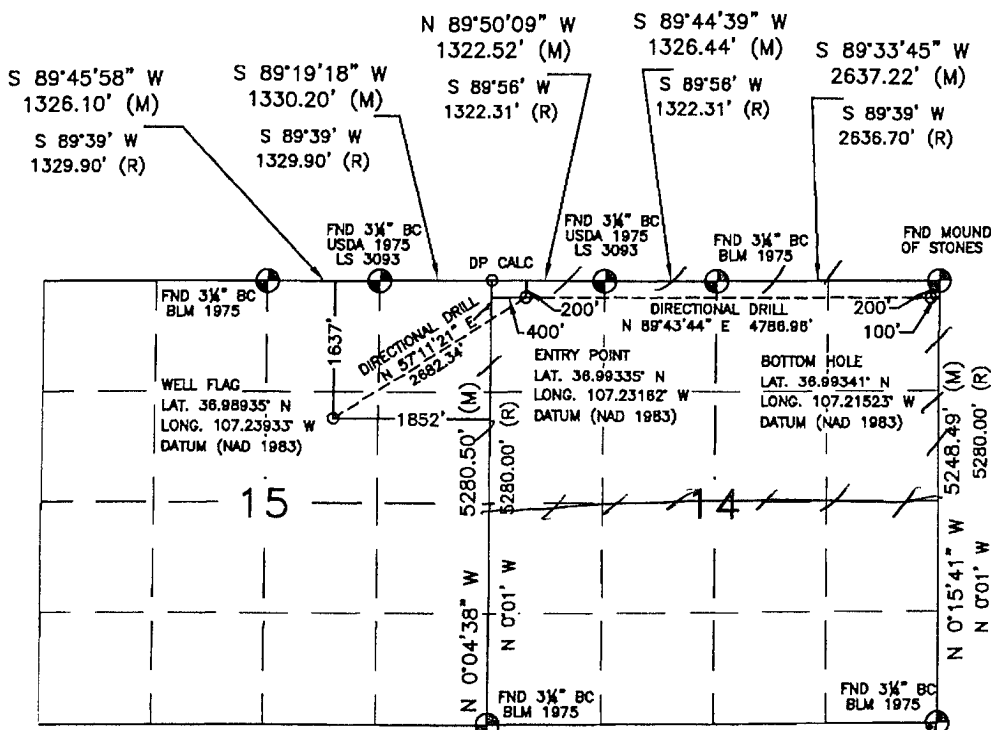
<sup>11</sup> Bottom Hole Location If Different From Surface

| 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      | 4W    |         | 200'          | NORTH            | 100'          | EAST           | RIO ARRIBA |

|                                           |                 |                    |                             |
|-------------------------------------------|-----------------|--------------------|-----------------------------|
| Dedicated Acres<br><b>320 N/2 Sec. 14</b> | Joint or Infill | Consolidation Code | Order No.<br><b>R-13119</b> |
|-------------------------------------------|-----------------|--------------------|-----------------------------|

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



<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 or a compulsory pooling order heretofore entered by the division.

Signature: *Stephen Byers* Date: **3-22-10**

Printed Name: **Stephen Byers**

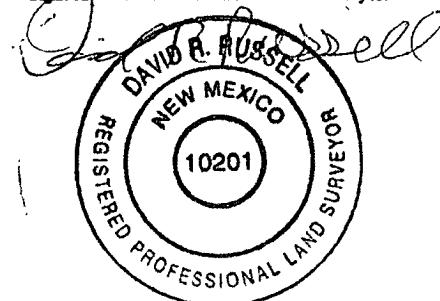
<sup>18</sup> SURVEYOR CERTIFICATION

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.

JULY 15, 2009

Date of Survey

Signature and Seal of Professional Surveyor:



DAVID RUSSELL

Certificate Number

10201

3/22/2010



### OPERATIONS PLAN

WELL NAME.....Carracas 14B #2  
JOB TYPE.....Horizontal OPE FTC  
DEPT.....Drilling and Completions  
PREPARED BY.....Stephen Byers

### GENERAL INFORMATION

|                      |                             |
|----------------------|-----------------------------|
| Surface Location     | 1637' FNL 1852' FEL         |
| S-T-R                | (G) Sec. 15, T32N, R04W     |
| Bottom Hole Location | 200' FNL 100' FEL           |
| S-T-R                | (A) Sec. 14, T32N, R04W     |
| County, State        | Rio Arriba, New Mexico      |
| Elevations           | 6536' GL                    |
| Total Depth          | 9973' +/- (MD); 3077' (TVD) |
| Formation Objective  | Basin Fruitland Coal        |

### FORMATION TOPS

|                  |                         |
|------------------|-------------------------|
| San Jose         | Surface                 |
| Nacimiento       | 1525' (TVD)             |
| Ojo Alamo Ss     | 2775' (TVD)             |
| Kirtland Sh      | 2945' (TVD)             |
| Fruitland Fm     | 3009' (TVD) 3455'MD     |
| Top Target Coal  | 3071' (TVD) 3730'MD     |
| Base Target Coal | 3083' (TVD)             |
| Total Depth      | 3077' (TVD); 9973' (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 8.4 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 1600' TVD with 3.86°/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: 2871' TVD, 3125' MD to TD

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

3/22/2010

**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           | 5186      | 8-3/4"   | 7"     | 23 lb/ft   | J-55 LT&C |
| TVD          | 0           | 3077      |          |        |            |           |
| Prod. Liner  | 5086        | 9973      | 6-1/4"   | 4-1/2" | 11.6 lb/ft | J-55 LT&C |
| TVD          | 3075        | 3077      |          |        |            |           |
| Tubing       | 0           | 4900      | 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 624 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). (1,382 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**

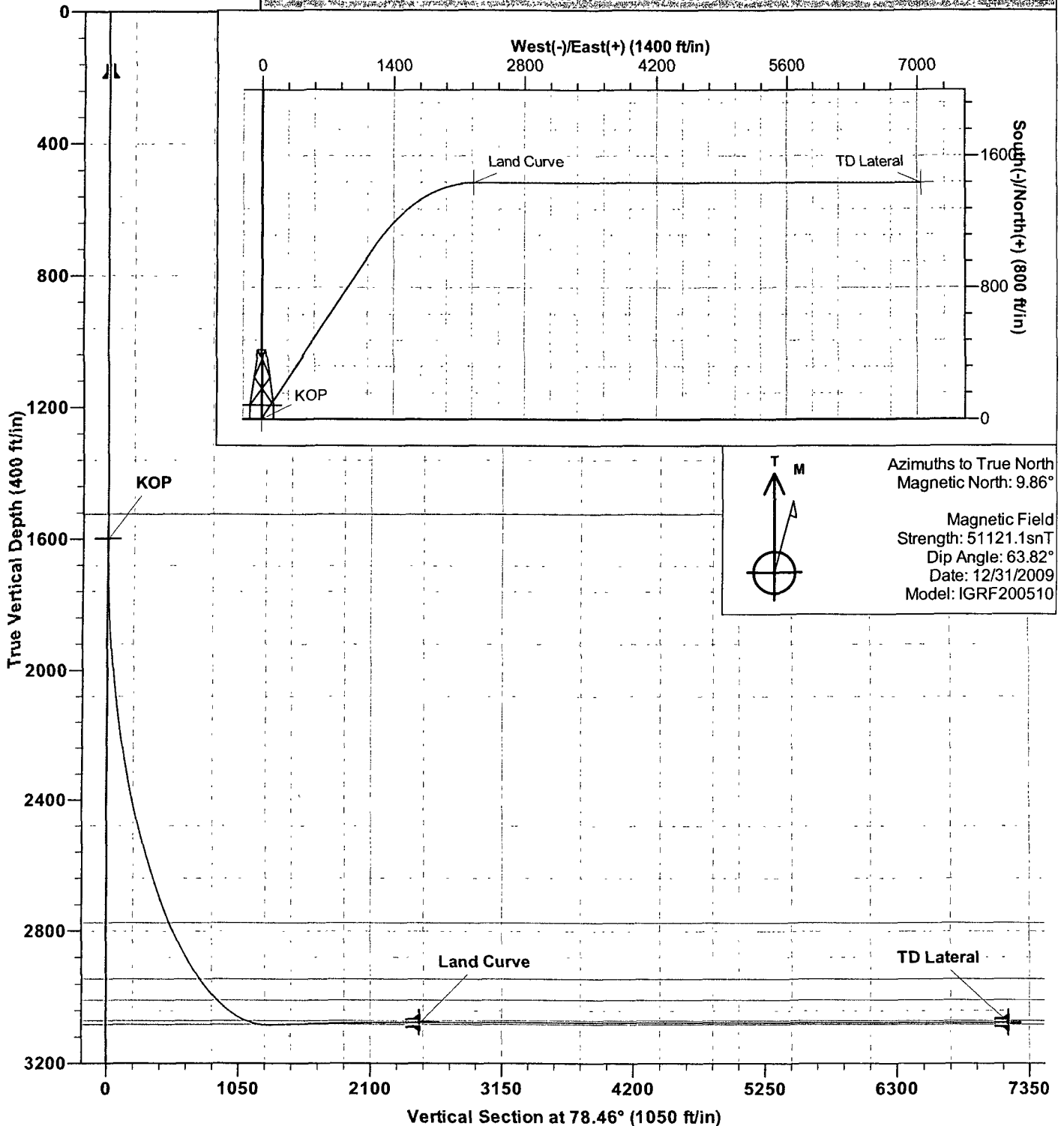
If cement does not circulate, run temperature survey in 8 hrs. to determine TOC.

**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   | 1600.0 | 0.00  | 0.00  | 1600.0 | 0.0    | 0.0    | 0.00 | 0.00  | 0.0    | KOP        |
| 3   | 3948.8 | 90.64 | 48.76 | 3084.6 | 989.7  | 1128.9 | 3.86 | 48.76 | 1304.1 |            |
| 4   | 4014.3 | 90.64 | 48.76 | 3083.9 | 1032.9 | 1178.2 | 0.00 | 0.00  | 1361.0 |            |
| 5   | 5186.9 | 90.00 | 90.00 | 3077.0 | 1437.0 | 2252.0 | 3.52 | 90.73 | 2493.9 | Land Curve |
| 6   | 9973.0 | 90.00 | 90.00 | 3077.0 | 1437.0 | 7038.2 | 0.00 | 0.00  | 7183.4 | TD Lateral |



# Energen

## DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec 15-T32N-R4W  
**Site:** Salada Canyon  
**Well:** Carracas 14B #2  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #1

**Local Co-ordinate Reference:** Well Carracas 14B #2  
**TVD Reference:** KB @ 6551.0ft (KB)  
**MD Reference:** KB @ 6551.0ft (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) |
|------------|-------------|------------|------------|--------------------|-------------|-------------|----------------|
| 4,200.0    | 3,081.9     | 90.55      | 55.29      | -0.05              | 1,147.1     | 1,324.4     | 1,527.1        |
| 4,300.0    | 3,081.0     | 90.50      | 58.81      | -0.05              | 1,201.5     | 1,408.3     | 1,620.2        |
| 4,400.0    | 3,080.2     | 90.45      | 62.32      | -0.05              | 1,250.6     | 1,495.4     | 1,715.3        |
| 4,500.0    | 3,079.4     | 90.40      | 65.84      | -0.05              | 1,294.3     | 1,585.3     | 1,812.2        |
| 4,600.0    | 3,078.8     | 90.34      | 69.36      | -0.06              | 1,332.4     | 1,677.8     | 1,910.4        |
| 4,700.0    | 3,078.2     | 90.29      | 72.88      | -0.06              | 1,364.8     | 1,772.4     | 2,009.5        |
| 4,800.0    | 3,077.8     | 90.23      | 76.39      | -0.06              | 1,391.3     | 1,868.8     | 2,109.3        |
| 4,900.0    | 3,077.4     | 90.17      | 79.91      | -0.06              | 1,411.8     | 1,966.6     | 2,209.3        |
| 5,000.0    | 3,077.2     | 90.11      | 83.43      | -0.06              | 1,426.3     | 2,065.5     | 2,309.1        |
| 5,100.0    | 3,077.0     | 90.05      | 86.94      | -0.06              | 1,434.7     | 2,165.2     | 2,408.4        |
| 5,186.9    | 3,077.0     | 90.00      | 90.00      | -0.06              | 1,437.0     | 2,252.0     | 2,493.9        |
| Land Curve |             |            |            |                    |             |             |                |
| 5,200.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 2,265.1     | 2,506.8        |
| 5,300.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 2,365.1     | 2,604.8        |
| 5,400.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 2,465.1     | 2,702.8        |
| 5,500.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 2,565.1     | 2,800.8        |
| 5,600.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 2,665.1     | 2,898.7        |
| 5,700.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 2,765.1     | 2,996.7        |
| 5,800.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 2,865.1     | 3,094.7        |
| 5,900.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 2,965.1     | 3,192.7        |
| 6,000.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 3,065.1     | 3,290.6        |
| 6,100.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 3,165.1     | 3,388.6        |
| 6,200.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 3,265.1     | 3,486.6        |
| 6,300.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 3,365.1     | 3,584.6        |
| 6,400.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 3,465.1     | 3,682.6        |
| 6,500.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 3,565.1     | 3,780.5        |
| 6,600.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 3,665.1     | 3,878.5        |
| 6,700.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 3,765.1     | 3,976.5        |
| 6,800.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 3,865.1     | 4,074.5        |
| 6,900.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 3,965.1     | 4,172.5        |
| 7,000.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 4,065.1     | 4,270.4        |
| 7,100.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 4,165.1     | 4,368.4        |
| 7,200.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 4,265.1     | 4,466.4        |
| 7,300.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 4,365.1     | 4,564.4        |
| 7,400.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 4,465.1     | 4,662.3        |
| 7,500.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 4,565.1     | 4,760.3        |
| 7,600.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 4,665.1     | 4,858.3        |
| 7,700.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 4,765.1     | 4,956.3        |
| 7,800.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 4,865.1     | 5,054.3        |
| 7,900.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 4,965.1     | 5,152.2        |
| 8,000.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 5,065.1     | 5,250.2        |
| 8,100.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 5,165.1     | 5,348.2        |
| 8,200.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 5,265.1     | 5,446.2        |
| 8,300.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 5,365.1     | 5,544.2        |
| 8,400.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 5,465.1     | 5,642.1        |

# Energen

## DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec 15-T32N-R4W  
**Site:** Salada Canyon  
**Well:** Carracas 14B #2  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #1

**Local Co-ordinate Reference:** Well Carracas 14B #2  
**TVD Reference:** KB @ 6551.0ft (KB)  
**MD Reference:** KB @ 6551.0ft (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) |
|------------|-------------|------------|------------|--------------------|-------------|-------------|----------------|
| 8,500.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 5,565.1     | 5,740.1        |
| 8,600.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 5,665.1     | 5,838.1        |
| 8,700.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 5,765.1     | 5,936.1        |
| 8,800.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 5,865.1     | 6,034.0        |
| 8,900.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 5,965.1     | 6,132.0        |
| 9,000.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 6,065.1     | 6,230.0        |
| 9,100.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 6,165.1     | 6,328.0        |
| 9,200.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 6,265.1     | 6,426.0        |
| 9,300.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 6,365.1     | 6,523.9        |
| 9,400.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 6,465.1     | 6,621.9        |
| 9,500.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 6,565.1     | 6,719.9        |
| 9,600.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 6,665.1     | 6,817.9        |
| 9,700.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 6,765.1     | 6,915.9        |
| 9,800.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 6,865.1     | 7,013.8        |
| 9,900.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 6,965.1     | 7,111.8        |
| 9,973.0    | 3,077.0     | 90.00      | 90.00      | 0.00               | 1,437.0     | 7,038.2     | 7,183.4        |

TD Lateral

# Energen DIRECTIONAL PLAN

**Company:** Energen Resources  
**Project:** Carson National Forest Sec 15-T32N-R4W  
**Site:** Salada Canyon  
**Well:** Carracas 14B #2  
**Wellbore:** Horizontal OPE FTC  
**Design:** Plan #1

**Local Co-ordinate Reference:** Well Carracas 14B #2  
**TVD Reference:** KB @ 6551.0ft (KB)  
**MD Reference:** KB @ 6551.0ft (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         |
| Land Curve<br>- plan hits target<br>- Point | 0.00             | 0.00            | 3,077.0     | 1,437.0       | 2,252.0       | 2,182,333.68     | 1,353,751.61    | 36° 59' 35.867 N | 107° 13' 53.829 W |
| TD Lateral<br>- plan hits target<br>- Point | 0.00             | 0.00            | 3,077.0     | 1,437.0       | 7,038.2       | 2,182,283.95     | 1,358,537.53    | 36° 59' 35.860 N | 107° 12' 54.833 W |
| KOP<br>- plan hits target<br>- Point        | 0.00             | 0.00            | 1,600.0     | 0.0           | 0.0           | 2,180,920.16     | 1,351,484.80    | 36° 59' 21.660 N | 107° 14' 21.588 W |

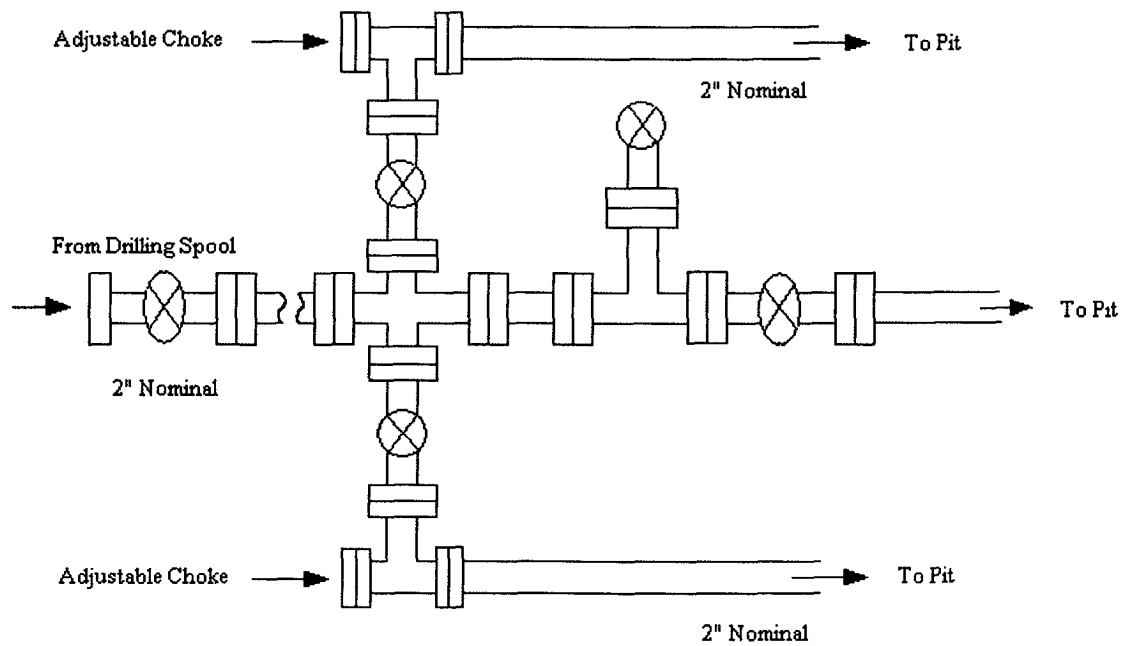
| Casing Points          |                        |              |                        |                      |  |
|------------------------|------------------------|--------------|------------------------|----------------------|--|
| Measured Depth<br>(ft) | Vertical Depth<br>(ft) | Name         | Casing Diameter<br>(") | Hole Diameter<br>(") |  |
| 200.0                  | 200.0                  | Surface      | 9-5/8                  | 12-1/4               |  |
| 5,186.0                | 3,077.0                | Intermediate | 7                      | 8-3/4                |  |
| 9,973.0                | 3,077.0                | Liner        | 4-1/2                  | 6-1/4                |  |

| Formations             |                        |                  |           |            |                      |
|------------------------|------------------------|------------------|-----------|------------|----------------------|
| Measured Depth<br>(ft) | Vertical Depth<br>(ft) | Name             | Lithology | Dip<br>(°) | Dip Direction<br>(°) |
| 1,525.0                | 1,525.0                | Nacimiento       |           | 0.00       |                      |
| 3,455.9                | 3,009.0                | Fruitland Fm     |           | 0.00       |                      |
| 3,282.9                | 2,945.0                | Kirtland Sh      |           | 0.00       |                      |
| 3,730.0                | 3,071.0                | Top Target Coal  |           | 0.00       |                      |
| 2,955.7                | 2,775.0                | Ojo Alamo SS     |           | 0.00       |                      |
| 3,860.2                | 3,083.0                | Base Target Coal |           | 0.00       |                      |

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



**Energen Resources Corporation**  
Typical 2000 psi Choke Manifold Configuration



Choke manifold installed from surface to TD

## Energen Resources Corporation

### Typical BOP Configuration for Gas Drilling

