

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

RECEIVED

AUG 25 2010

1. Type of Well

☐ Oil Well ☒ Gas Well ☐ Other

2. Name of Operator

Energen Resources Corporation

Farmington Field Office
Bureau of Land Management

3a. Address

2010 Afton Place, Farmington, NM 87401

3b. Phone No. (include area code)

(505) 325-6800

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

SHL: (B) Sec.16, T32N, R5W 71'FNL & 2252'FEL
Entry Point: Sec. 16, T32N, R5W 760'FNL 800'FEL
BHL: (P) Sec.16, T32N, R5W 110'FSL & 600'FEL

5. Lease Serial No.

USA NMNM 90463

6. If Indian, Allottee or Tribe Name

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

8. Well Name and No.

Carracas 16A # 2

9. API Well No

30-039-30822

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

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

Energen Resources would like to make the following change to the Carracas 16A #2. The changes will be pertaining to the landing point of the 7" int. casing and the BHL:

- * Change kick-off point to 2450'MD
- * Change int. casing setting measured depth (MD) TD to 4972'MD, 3723'TVD and cement with 510 sks lead followed by 100 sks tail.
- * Change the TD of the well to 9374'MD, 3723'TVD and run the 4 1/2" liner to this depth with a new liner top of 4872'MD.
- * Change the bottom hole footage location to 110'FSL 600'FEL

RCVD AUG 30 '10
OIL CONS. DIV.
DIST. 3

Attached is a revised directional drilling and operations plan and C-102(well plat).

The changes made in the previous sundry for this well reflect NMOCD approval for order no. R-13119 Carracas Canyon. However, due to close proximity to a nearby wellbore, the BHL has been moved farther away from the east line (as shown in the attached C-102).

Hold C104

for Directional Survey
and "As Drilled" plat

CONDITIONS OF APPROVAL

Adhere to previously issued stipulations.

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

Stephen Byers

Title Drilling Engineer

Signature

Date 8/20/2010

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Title

Pct. Eng.

Date

8/26/10

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.

NMOCD

DISTRICT I
1625 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

OIL CONSERVATION DIVISION

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

Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number		*Pool Code 71629	*Pool Name BASIN FRIUTLAND COAL
*Property Code 35654	*Property Name CARRACAS 16A		*Well Number 2H
*OGRID No. 162928	*Operator Name ENERGEN RESOURCES CORPORATION		*Elevation 7212'

¹⁰ Surface Location

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
B	16	32N	5W		71'	NORTH	2252'	EAST	RIO ARriba

¹¹ 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
P	16	32N	5W		110'	SOUTH	600'	EAST	RIO ARriba

12 Dedicated Acres	13 Joint or Infill	14 Consolidation Code	15 Order No.

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

16

OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

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.

Stephen Byers 8-23-10
Signature Date

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.

NOVEMBER 24, 2008
Date of Survey

Signature and Seal of Professional Surveyor:

David Russell

DAVID R. RUSSELL
REGISTERED PROFESSIONAL LAND SURVEYOR
NEW MEXICO
10201

DAVID RUSSELL
Certificate Number 10201

16

2252'

N 89°55'35" W 2643.41' (M)

FND 2.5" BC
GLO 1924

N 89°58' W 2643.30' (R) FND 2.5" BC
GLO 1924

SURFACE LOCATION
LAT. 36.98727° N
LONG. 107.36646° W
DATUM (NAD 1983)

DIRECTIONAL DRILL
S 18°35'57" E
4687.14'

ENTRY POINT
LAT. 36.98538° N
LONG. 107.36149° W
DATUM (NAD 1983)

800'

DIRECTIONAL DRILL
S 02°38'03" E
4404.05'

5280.00' (R) 5267.68' (M)

W 0°05'51.00" N
W 0°02'01.00" N

600'

110'

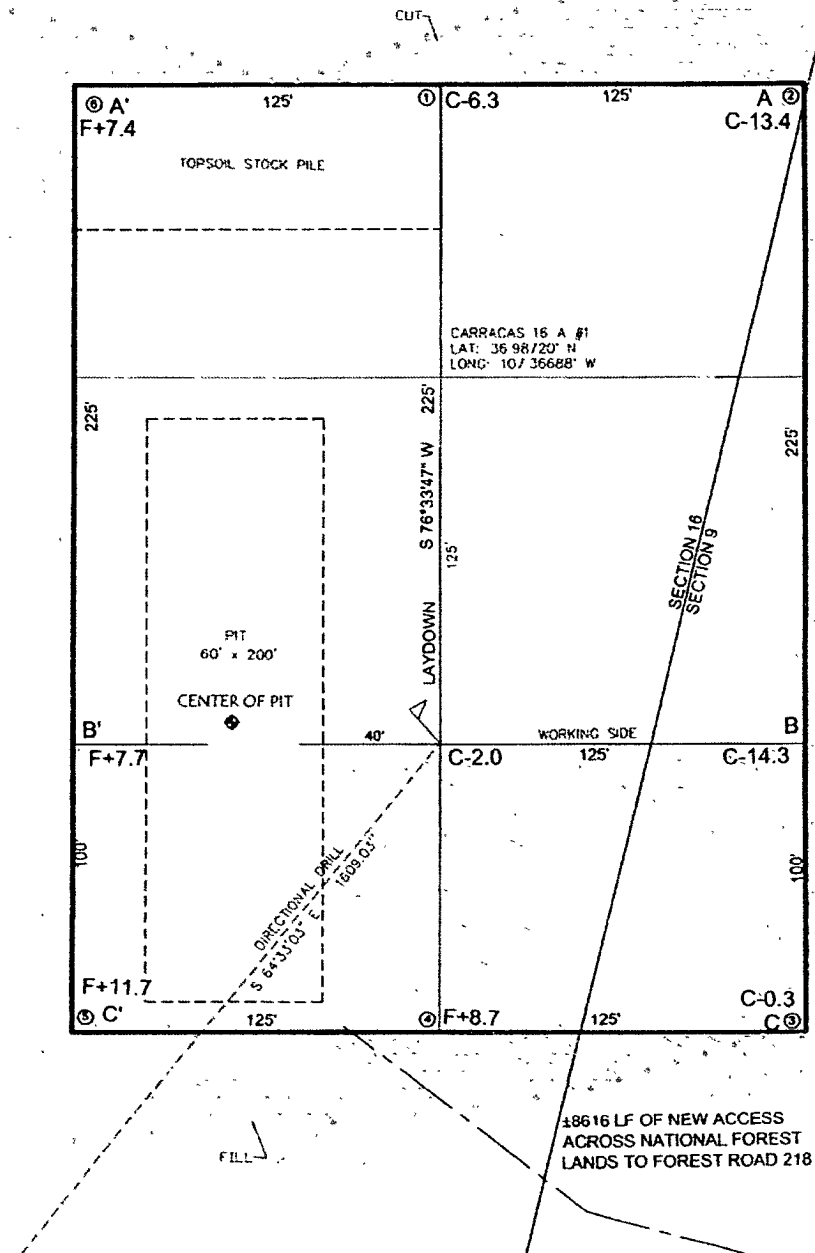
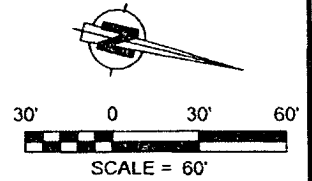
FND 2.5" BC
GLO 1924

BOTTOM HOLE
LAT. 36.97330° N
LONG. 107.36079° W
DATUM (NAD 1983)

ENERGEN RESOURCES CORPORATION

WELL FLAG
 LATITUDE: 36.98727° N
 LONGITUDE: 107.36646° W
 DATUM: NAD 83
CENTER OF PIT
 LATITUDE: 36.98709° N
 LONGITUDE: 107.36647° W
 ELEVATION: 7208.4'
 DATUM: NAD 83 & NAVD88

CARRACAS 16A #2H
 71' FNL & 2252' FEL
 LOCATED IN THE NW/4 NE/4 OF SECTION 16,
 T32N, R5W, N.M.P.M.,
 RIO ARriba COUNTY, NEW MEXICO
 GROUND ELEVATION: 7222', NAVD 88
 FINISHED PAD ELEVATION: 7220.4', NAVD 88



1 FOOT CONTOUR INTERVAL SHOWN
 SCALE: 1" = 60'
 JOB No.: ERG125_REV3
 DATE: 08/20/10



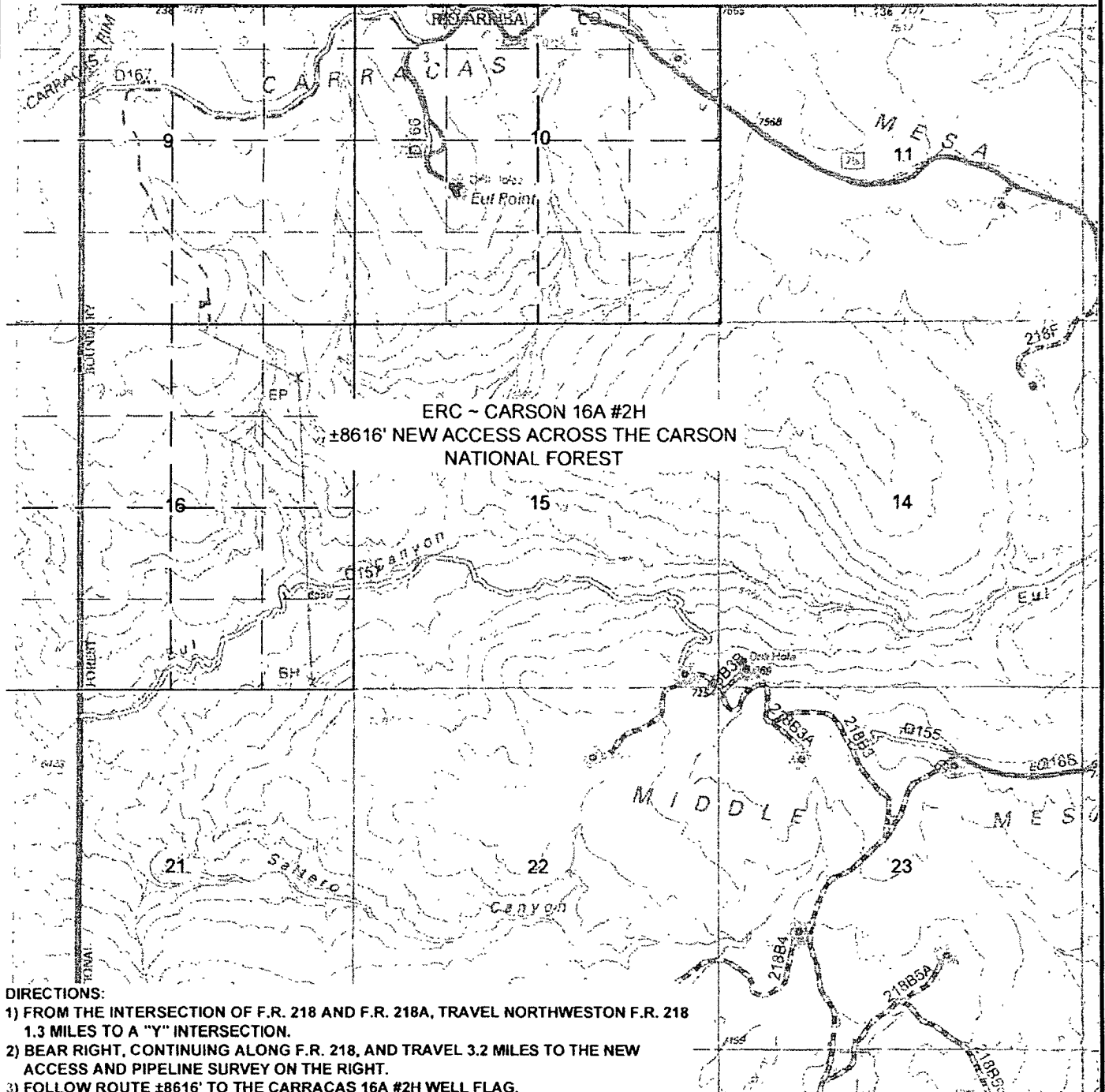
Russell Surveying
 1409 W. Aztec Blvd. #2
 Aztec, New Mexico 87410
 (505) 334-8637

FINISHED PAD ELEVATION: 7220.4', NAVD 88

Russell Surveying
1409 W. Aztec Blvd. #2
Aztec, New Mexico 87410
(505) 334-8637

ENERGEN RESOURCES CORPORATION

CARRACAS 16A #2H
71' FNL & 2252' FEL
LOCATED IN THE NW/4 NE/4 OF SECTION 16,
T32N, R5W, N.M.P.M.,
RIO ARRIBA COUNTY, NEW MEXICO
GROUND ELEVATION: 7222', NAVD 88
±8616' OF NEW ACCESS ACROSS
CARSON NATIONAL FOREST



U.S.G.S. QUAD: BANCOS MESA
SCALE: 1" = 2000' (1:24,000)
JOB No.: ERG125_REV3
DATE: 08/20/10

NEW OR RECONSTRUCTED ROADS MUST MEET
SMA DESIGN STANDARDS
INSTALL CULVERTS AS NEEDED



Russell Surveying
1409 W. Aztec Blvd. #2
Aztec, New Mexico 87410
(505) 334-8637

8/20/2010



OPERATIONS PLAN

WELL NAME.....Carracas 16A #2
JOB TYPE.....Horizontal OPE FTC
DEPT.....Drilling and Completions
PREPARED BY.....Stephen Byers

GENERAL INFORMATION

Surface Location	71 FNL 2252 FEL
S-T-R	(B) Sec.16, T32N, R05W
Bottom Hole Location	110 FSL 600 FEL
S-T-R	(P) Sec.16, T32N, R05W
County, State	Rio Arriba, New Mexico
Elevations	7212' GL
Total Depth	9374' +/- (MD); 3723' (TVD)
Formation Objective	Basin Fruitland Coal

FORMATION TOPS

San Jose	Surface
Nacimiento	1867' (TVD)
Ojo Alamo Ss	3067' (TVD)
Kirtland Sh	3214' (TVD)
Fruitland Fm	3577' (TVD) 4175'MD
Top Target Coal	3712' (TVD) 4761'MD
Base Target Coal	3735' (TVD)
Total Depth	3723' (TVD), 9374' (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: 6-1/8" 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 2450' TVD with 6.94°/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: 3514' TVD, 4000' MD to TD

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

8/20/2010

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	4972	8-3/4"	7"	23 lb/ft	J-55 LT&C
TVD	0	3723				
Prod. Liner	4872	9374	6-1/8"	4-1/2"	11.6 lb/ft	J-55 LT&C
TVD	3721	3723				
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: 106 sks Type V with 2.0 % CaCl₂ and ¼ #/sk Flocele (15.6 ppg, 1.18 ft³/sk 125 ft³ 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 510 sks PRB II with 5 #/sk Gilsonite, and ¼ #/sk Flocele (12.3 ppg, 2.24 ft³/sk) and a tail of 100 sks PRB II with ¼ #/sk Flocele and 5#/sk Gilsonite (13.5 ppg, 1.81 ft³/sk). (1323 ft³ 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.



Energen Resources Corp.

**Carson National Forest Sec.16-T32N-R5W
Carracas Mesa
Carracas 16A #2
Wellbore #1**

Plan: Plan #4

DIRECTIONAL PLAN

13 August, 2010

SECTION DETAILS

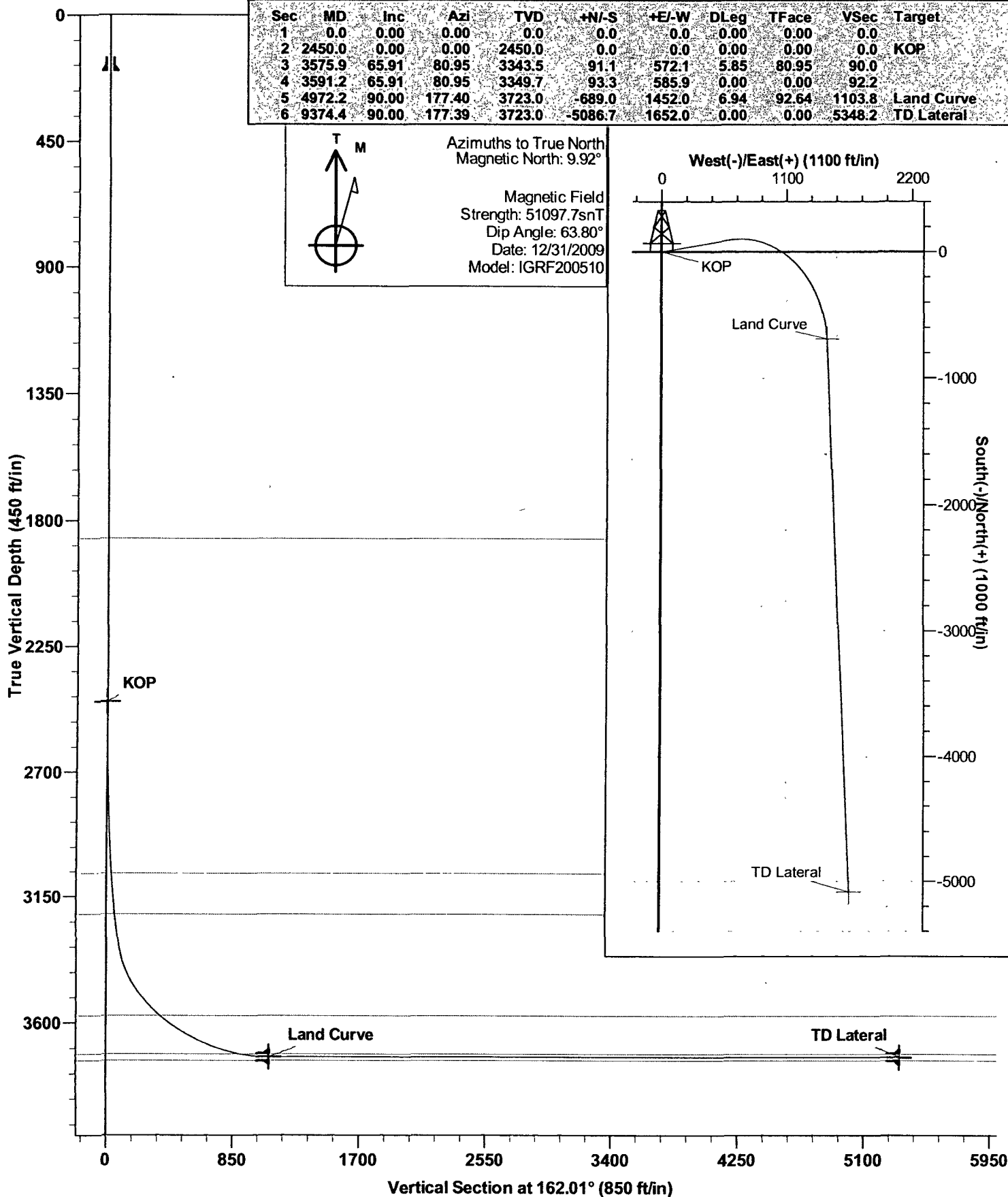
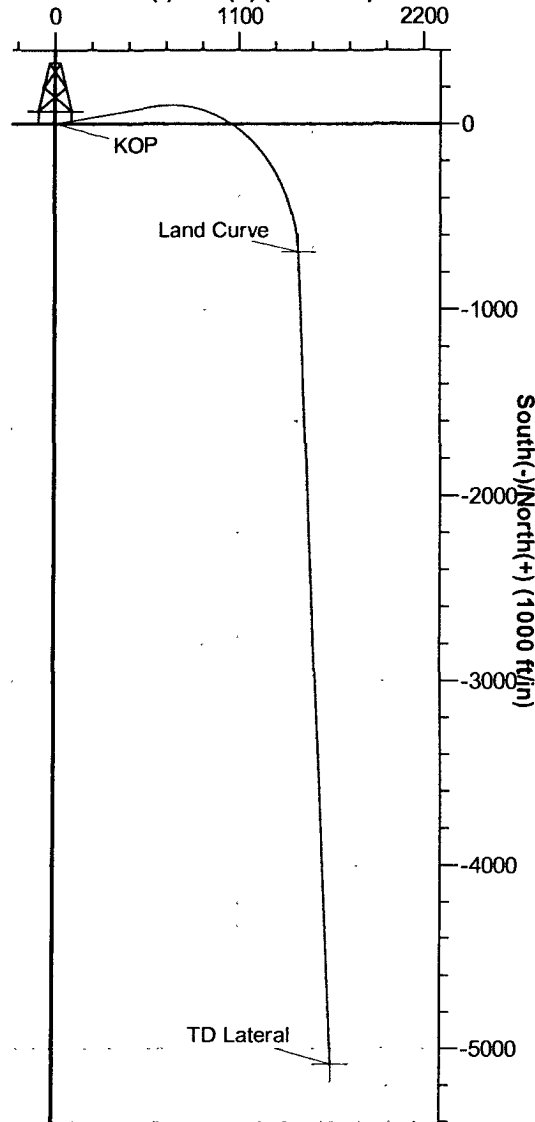
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2	2450.0	0.00	0.00	2450.0	0.0	0.0	0.00	0.00	0.0	KOP
3	3575.9	65.91	80.95	3343.5	91.1	572.1	5.85	80.95	90.0	
4	3591.2	65.91	80.95	3349.7	93.3	585.9	0.00	0.00	92.2	
5	4972.2	90.00	177.40	3723.0	-689.0	1452.0	6.94	92.64	1103.8	Land Curve
6	9374.4	90.00	177.39	3723.0	-5086.7	1652.0	0.00	0.00	5348.2	TD Lateral



Azimuths to True North
Magnetic North: 9.92°

Magnetic Field
Strength: 51097.7snT
Dip Angle: 63.80°
Date: 12/31/2009
Model: IGRF200510

West(-)/East(+) (1100 ft/in)



Energen

DIRECTIONAL PLAN

Company: Energen Resources
Project: Carson National Forest Sec. 16-T32N-R5W
Site: Carracas Mesa
Well: Carracas 16A #2
Wellbore: Wellbore #1
Design: Plan #4

Local Co-ordinate Reference: Well Carracas 16A #2
TVD Reference: KB @ 7227.0ft (Drilling Rig KB)
MD Reference: KB @ 7227.0ft (Drilling Rig KB)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Project Carson National Forest Sec. 16-T32N-R5W

Map System: US State Plane 1983
Geo Datum: North American Datum 1983
Map Zone: New Mexico Central Zone

System Datum: Mean Sea Level

Site Carracas Mesa

Site Position:		Northing:	2,180,573.44 ft	Latitude:	36° 59' 14.172 N
From:	Lat/Long	Easting:	1,314,346.62 ft	Longitude:	107° 21' 59.256 W
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	-0.67 °

Well Carracas 16A #2

Well Position	+N/-S	0.0 ft	Northing:	2,180,573.44 ft	Latitude:	36° 59' 14.172 N
	+E/-W	0.0 ft	Easting:	1,314,346.62 ft	Longitude:	107° 21' 59.256 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	7,212.0 ft	Ground Level:	7,212.0 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	12/31/2009	9.92	63.80	51,098

Design Plan #4

Audit Notes:

Version: **Phase:** PROTOTYPE **Tie On Depth:** 0.0

Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	162.01

Survey Tool Program **Date:** 8/13/2010

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
0.0	9,374.4	Plan #4 (Wellbore #1)	MWD	MWD - Standard

Planned Survey

MD (ft)	TVD (ft)	Inc (°)	Azi (°)	Build (°/100ft)	N/S (ft)	E/W (ft)	V. Sec (ft)
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.16-T32N-R5W
Site: Carracas Mesa
Well: Carracas 16A #2
Wellbore: Wellbore #1
Design: Plan #4

Local Co-ordinate Reference: Well Carracas 16A #2
TVD Reference: KB @ 7227.0ft (Drilling Rig KB)
MD Reference: KB @ 7227.0ft (Drilling Rig KB)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Planned Survey

MD (ft)	TVD (ft)	Inc (°)	Azi (°)	Build (°/100ft)	N/S (ft)	E/W (ft)	V. Sec (ft)
1,200.0	1,200.0	0.00	0.00	0.00	0.0	0.0	0.0
1,300.0	1,300.0	0.00	0.00	0.00	0.0	0.0	0.0
1,400.0	1,400.0	0.00	0.00	0.00	0.0	0.0	0.0
1,500.0	1,500.0	0.00	0.00	0.00	0.0	0.0	0.0
1,600.0	1,600.0	0.00	0.00	0.00	0.0	0.0	0.0
1,700.0	1,700.0	0.00	0.00	0.00	0.0	0.0	0.0
1,800.0	1,800.0	0.00	0.00	0.00	0.0	0.0	0.0
1,867.0	1,867.0	0.00	0.00	0.00	0.0	0.0	0.0
Nacimiento							
1,900.0	1,900.0	0.00	0.00	0.00	0.0	0.0	0.0
2,000.0	2,000.0	0.00	0.00	0.00	0.0	0.0	0.0
2,100.0	2,100.0	0.00	0.00	0.00	0.0	0.0	0.0
2,200.0	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
2,450.0	2,450.0	0.00	0.00	0.00	0.0	0.0	0.0
KOP							
2,500.0	2,500.0	2.93	80.95	5.85	0.2	1.3	0.2
2,550.0	2,549.8	5.85	80.95	5.85	0.8	5.0	0.8
2,600.0	2,599.4	8.78	80.95	5.85	1.8	11.3	1.8
2,650.0	2,648.6	11.71	80.95	5.85	3.2	20.1	3.2
2,700.0	2,697.3	14.64	80.95	5.85	5.0	31.4	4.9
2,750.0	2,745.3	17.56	80.95	5.85	7.2	45.1	7.1
2,800.0	2,792.6	20.49	80.95	5.85	9.7	61.1	9.6
2,850.0	2,839.0	23.42	80.95	5.85	12.7	79.6	12.5
2,900.0	2,884.3	26.35	80.95	5.85	16.0	100.4	15.8
2,950.0	2,928.5	29.27	80.95	5.85	19.7	123.4	19.4
3,000.0	2,971.5	32.20	80.95	5.85	23.7	148.6	23.4
3,050.0	3,013.1	35.13	80.95	5.85	28.0	176.0	27.7
3,100.0	3,053.3	38.05	80.95	5.85	32.7	205.4	32.3
3,117.6	3,067.0	39.08	80.95	5.85	34.5	216.3	34.0
Ojo Alamo SS							
3,150.0	3,091.8	40.98	80.95	5.85	37.7	236.9	37.3
3,200.0	3,128.7	43.91	80.95	5.85	43.0	270.2	42.5
3,250.0	3,163.8	46.84	80.95	5.85	48.6	305.3	48.0
3,300.0	3,197.1	49.76	80.95	5.85	54.5	342.2	53.8
3,326.6	3,214.0	51.32	80.95	5.85	57.7	362.5	57.0
Kirtland Sh							
3,350.0	3,228.4	52.69	80.95	5.85	60.6	380.7	59.9
3,400.0	3,257.7	55.62	80.95	5.85	67.0	420.7	66.2
3,450.0	3,284.8	58.54	80.95	5.85	73.6	462.1	72.7
3,500.0	3,309.8	61.47	80.95	5.85	80.4	504.9	79.5
3,550.0	3,332.6	64.40	80.95	5.85	87.4	548.9	86.4
3,575.9	3,343.5	65.91	80.95	5.85	91.1	572.1	90.0
3,591.2	3,349.7	65.91	80.95	0.00	93.3	585.9	92.2

Energen

DIRECTIONAL PLAN

Company: Energen Resources
Project: Carson National Forest Sec.16-T32N-R5W
Site: Carracas Mesa
Well: Carracas 16A #2
Wellbore: Wellbore #1
Design: Plan #4

Local Co-ordinate Reference: Well Carracas 16A #2
TVD Reference: KB @ 7227.0ft (Drilling Rig KB)
MD Reference: KB @ 7227.0ft (Drilling Rig KB)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Planned Survey

MD (ft)	TVD (ft)	Inc (°)	Azi (°)	Build (°/100ft)	N/S (ft)	E/W (ft)	V. Sec (ft)
3,600.0	3,353.3	65.89	81.62	-0.30	94.6	593.8	93.5
3,650.0	3,373.8	65.79	85.42	-0.19	99.7	639.1	102.6
3,700.0	3,394.3	65.79	89.23	0.00	101.8	684.7	114.6
3,750.0	3,414.8	65.88	93.03	0.19	100.9	730.3	129.6
3,800.0	3,435.1	66.07	96.83	0.37	97.0	775.8	147.4
3,850.0	3,455.3	66.35	100.61	0.56	90.1	821.0	167.9
3,900.0	3,475.2	66.72	104.37	0.74	80.2	865.7	191.2
3,950.0	3,494.8	67.18	108.11	0.92	67.3	909.9	217.0
4,000.0	3,514.0	67.72	111.82	1.09	51.5	953.3	245.4
4,050.0	3,532.7	68.35	115.50	1.26	32.9	995.7	276.3
4,100.0	3,550.8	69.07	119.15	1.42	11.5	1,037.1	309.4
4,150.0	3,568.4	69.85	122.76	1.57	-12.5	1,077.3	344.7
4,175.2	3,577.0	70.28	124.57	1.69	-25.7	1,097.0	363.3
Fruitland Fm							
4,200.0	3,585.3	70.71	126.33	1.76	-39.2	1,116.0	382.0
4,250.0	3,601.4	71.64	129.87	1.86	-68.4	1,153.3	421.3
4,300.0	3,616.7	72.63	133.36	1.99	-100.0	1,188.8	462.4
4,350.0	3,631.2	73.69	136.82	2.11	-133.9	1,222.6	505.0
4,400.0	3,644.8	74.80	140.24	2.22	-170.0	1,254.5	549.2
4,450.0	3,657.4	75.96	143.62	2.32	-208.1	1,284.3	594.6
4,500.0	3,669.1	77.16	146.97	2.41	-248.0	1,312.0	641.2
4,550.0	3,679.6	78.41	150.28	2.50	-289.8	1,337.4	688.7
4,600.0	3,689.1	79.70	153.57	2.57	-333.1	1,360.5	737.0
4,650.0	3,697.5	81.02	156.83	2.64	-377.8	1,381.2	786.0
4,700.0	3,704.7	82.36	160.06	2.69	-423.8	1,399.3	835.3
4,750.0	3,710.8	83.73	163.27	2.74	-470.9	1,414.9	885.0
4,761.3	3,712.0	84.05	163.99	2.77	-481.7	1,418.1	896.2
Top Target Coal							
4,800.0	3,715.7	85.12	166.47	2.78	-519.0	1,427.9	934.6
4,850.0	3,719.3	86.53	169.65	2.81	-567.7	1,438.2	984.2
4,900.0	3,721.7	87.95	172.83	2.83	-617.1	1,445.9	1,033.5
4,950.0	3,722.9	89.37	175.99	2.84	-666.8	1,450.7	1,082.3
4,972.2	3,723.0	90.00	177.40	2.85	-689.0	1,452.0	1,103.8
Land Curve							
5,000.0	3,723.0	90.00	177.40	0.00	-716.8	1,453.3	1,130.6
5,100.0	3,723.0	90.00	177.40	0.00	-816.7	1,457.8	1,227.0
5,200.0	3,723.0	90.00	177.40	0.00	-916.6	1,462.3	1,323.4
5,300.0	3,723.0	90.00	177.40	0.00	-1,016.5	1,466.9	1,419.8
5,400.0	3,723.0	90.00	177.40	0.00	-1,116.3	1,471.4	1,516.3
5,500.0	3,723.0	90.00	177.40	0.00	-1,216.2	1,475.9	1,612.7
5,600.0	3,723.0	90.00	177.40	0.00	-1,316.1	1,480.5	1,709.1
5,700.0	3,723.0	90.00	177.40	0.00	-1,416.0	1,485.0	1,805.5
5,800.0	3,723.0	90.00	177.40	0.00	-1,515.9	1,489.6	1,901.9
5,900.0	3,723.0	90.00	177.40	0.00	-1,615.8	1,494.1	1,998.3
6,000.0	3,723.0	90.00	177.40	0.00	-1,715.7	1,498.6	2,094.7

Energen

DIRECTIONAL PLAN

Company: Energen Resources
Project: Carson National Forest Sec.16-T32N-R5W
Site: Carracas Mesa
Well: Carracas 16A #2
Wellbore: Wellbore #1
Design: Plan #4

Local Co-ordinate Reference: Well Carracas 16A #2
TVD Reference: KB @ 7227.0ft (Drilling Rig KB)
MD Reference: KB @ 7227.0ft (Drilling Rig KB)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Planned Survey

MD (ft)	TVD (ft)	Inc (°)	Azi (°)	Build (°/100ft)	N/S (ft)	E/W (ft)	V. Sec (ft)
6,100.0	3,723.0	90.00	177.40	0.00	-1,815.6	1,503.2	2,191.2
6,200.0	3,723.0	90.00	177.40	0.00	-1,915.5	1,507.7	2,287.6
6,300.0	3,723.0	90.00	177.40	0.00	-2,015.4	1,512.2	2,384.0
6,400.0	3,723.0	90.00	177.40	0.00	-2,115.3	1,516.8	2,480.4
6,500.0	3,723.0	90.00	177.40	0.00	-2,215.2	1,521.3	2,576.8
6,600.0	3,723.0	90.00	177.40	0.00	-2,315.1	1,525.8	2,673.2
6,700.0	3,723.0	90.00	177.40	0.00	-2,415.0	1,530.4	2,769.6
6,800.0	3,722.9	90.00	177.40	0.00	-2,514.9	1,534.9	2,866.0
6,900.0	3,722.9	90.00	177.40	0.00	-2,614.8	1,539.5	2,962.5
7,000.0	3,722.9	90.00	177.40	0.00	-2,714.7	1,544.0	3,058.9
7,100.0	3,722.9	90.00	177.40	0.00	-2,814.6	1,548.5	3,155.3
7,200.0	3,722.9	90.00	177.40	0.00	-2,914.5	1,553.1	3,251.7
7,300.0	3,722.9	90.00	177.40	0.00	-3,014.4	1,557.6	3,348.1
7,400.0	3,722.9	90.00	177.40	0.00	-3,114.3	1,562.1	3,444.5
7,500.0	3,722.9	90.00	177.40	0.00	-3,214.2	1,566.7	3,540.9
7,600.0	3,722.9	90.00	177.40	0.00	-3,314.1	1,571.2	3,637.3
7,700.0	3,722.9	90.00	177.40	0.00	-3,414.0	1,575.7	3,733.8
7,800.0	3,722.9	90.01	177.40	0.00	-3,513.9	1,580.3	3,830.2
7,900.0	3,722.9	90.01	177.40	0.00	-3,613.8	1,584.8	3,926.6
8,000.0	3,722.9	90.01	177.40	0.00	-3,713.7	1,589.3	4,023.0
8,100.0	3,722.8	90.01	177.40	0.00	-3,813.6	1,593.9	4,119.4
8,200.0	3,722.8	90.01	177.40	0.00	-3,913.5	1,598.4	4,215.8
8,300.0	3,722.8	90.01	177.40	0.00	-4,013.4	1,603.0	4,312.2
8,400.0	3,722.8	90.01	177.40	0.00	-4,113.3	1,607.5	4,408.7
8,500.0	3,722.8	90.01	177.40	0.00	-4,213.2	1,612.0	4,505.1
8,600.0	3,722.8	90.01	177.40	0.00	-4,313.1	1,616.6	4,601.5
8,700.0	3,722.8	90.01	177.40	0.00	-4,413.0	1,621.1	4,697.9
8,800.0	3,722.8	90.01	177.40	0.00	-4,512.8	1,625.6	4,794.3
8,900.0	3,722.8	90.01	177.40	0.00	-4,612.7	1,630.2	4,890.7
9,000.0	3,722.7	90.01	177.40	0.00	-4,712.6	1,634.7	4,987.1
9,100.0	3,722.7	90.01	177.40	0.00	-4,812.5	1,639.2	5,083.5
9,200.0	3,722.7	90.01	177.40	0.00	-4,912.4	1,643.8	5,180.0
9,300.0	3,722.7	90.01	177.40	0.00	-5,012.3	1,648.3	5,276.4
9,374.4	3,723.0	90.00	177.39	-0.01	-5,086.7	1,652.0	5,348.2

TD Lateral

Energen

DIRECTIONAL PLAN

Company: Energen Resources
Project: Carson National Forest Sec.16-T32N-R5W
Site: Carracas Mesa
Well: Carracas 16A #2
Wellbore: Wellbore #1
Design: Plan #4

Local Co-ordinate Reference: Well Carracas 16A #2
TVD Reference: KB @ 7227.0ft (Drilling Rig KB)
MD Reference: KB @ 7227.0ft (Drilling Rig KB)
North Reference: True
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.16 Single User Db

Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
Land Curve - plan hits target - Point	0.00	0.00	3,723.0	-689.0	1,452.0	2,179,867.46	1,315,790.44	36° 59' 7.359 N	107° 21' 41.360 W
KOP - plan hits target - Point	0.00	0.00	2,450.0	0.0	0.0	2,180,573.44	1,314,346.62	36° 59' 14.172 N	107° 21' 59.256 W
TD Lateral - plan hits target - Point	0.00	0.00	3,723.0	-5,086.7	1,652.0	2,175,467.74	1,315,938.86	36° 58' 23.878 N	107° 21' 38.899 W

Casing Points

Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (")	Hole Diameter (")
200.0	200.0	Surface	9-5/8	12-1/4
4,972.0	3,723.0	Intermediate	7	8-3/4
9,374.0	3,722.7	Liner	4-1/2	6-1/4

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,326.6	3,214.0	Kirtland Sh		0.00	
4,175.2	3,577.0	Fruitland Fm		0.00	
1,867.0	1,867.0	Nacimiento		0.00	
	3,735.0	Base Target Coal		0.00	
4,761.3	3,712.0	Top Target Coal		0.00	
3,117.6	3,067.0	Ojo Alamo SS		0.00	

Checked By: _____ Approved By: _____ Date: _____