

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

FORM APPROVED  
OMB No. 1004-0136  
Expires January 31, 2004

5. Lease Serial No.

NMSF-0078770

6. If Indian, Allottee or Tribe Name

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

Rosa Unit

8. Lease Name and Well No.

378

9. API Well No.

30-039-30410

10. Field and Pool, or Exploratory

Basin Fruitland Coal

11. Sec., T., R., M., or Blk. and Survey or Area

6 Section 27, 31N R.5W

12. County or Parish

Rio Arriba

13. State

NM

1a. Type of Work: ☒ DRILL

☐ REENTER

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

☒ Single Zone

☐ Multiple Zone

2. Name of Operator

Williams Production Company, LLC

3a. Address

P.O. Box 640 Aztec, NM 87410

3b. Phone No. (include area code)

505/634-2208

4. Location of Well (Report location clearly and in accordance with any State requirements. \*)

At surface 2060' FNL & 1945' FEL G

At proposed prod. zone 1650' FNL & 990' FEL H

14. Distance in miles and direction from nearest town or post office\*

approximately 32 miles northeast of Blanco, New Mexico

15. Distance from proposed\*

location to nearest property or lease line, ft.

(Also to nearest drig. unit line, if any)

990'

18. Distance from proposed location\*

to nearest well, drilling, completed, applied for, on this lease, ft.

3500'

21. Elevations (Show whether DF, KDB, RT, GL, etc.)

6,511' GR

16. No. of Acres in lease

2,560.00

19. Proposed Depth

3,700' TMD

17. Spacing Unit dedicated to this well

320.0 (E/2)

20. BLM/BIA Bond No. on file

UT08-99

23. Estimated duration

1 month

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No.1, shall 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 shall 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 authorized officer.

25. Signature

Name (Printed/Typed)

Date

Larry Higgins

10-23-07

Title

Drilling COM

Approved by (Signature)

Name (Printed/Typed)

Date

Office

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.

\*(Instructions on reverse)

Williams Exploration and Production Company, LLC, proposes to drill a directional well to develop the Basin Fruitland Coal formation at the above described location in accordance with the attached drilling and surface use plans.

The surface is under jurisdiction of the Carson National Forest, Jicarilla Ranger District.

This location has been archaeologically surveyed La Plata Archaeological Consultants. Copies of their report have been submitted directly to the CNF/JRD.

An access road of 2650' is needed, for this location. A pipeline tie of 3022.2 feet would be required for this location. Williams Field Services has filed a pipeline route plan for the associated pipeline. The pipeline would be owned and operated by Williams Field Services.

Hold C104

for Directional Survey  
and "As Drilled" plat

NMOC

JUN 03 2008

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

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

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

District I  
PO Box 1980, Hobbs, NM 88241-1980

District II  
PO Drawer DD, Artesia, NM 88211-0719

District III  
1000 Rio Brazos Rd., Aztec, NM 87410

District IV  
PO Box 2088, Santa Fe, NM 87504-2088

State of New Mexico  
Energy, Minerals & Natural Resources Department

OIL CONSERVATION DIVISION  
PO Box 2088  
Santa Fe, NM 87504-2088

Form C-102

Revised February 21, 1994

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

RECEIVED

OCT 23 2007

Bureau of Land Management  
Farmington Field Office  
AMENDED REPORT

### WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number 36039-30410		*Pool Code 71629	*Pool Name BASIN FRUITLAND COAL
*Property Code 17033	*Property Name ROSA UNIT		*Well Number 378
*GRID No 120782	*Operator Name WILLIAMS PRODUCTION COMPANY		*Elevation 6511'

#### 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
G	27	31N	5W		2060	NORTH	1945	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
H	27	31N	5W		1650	NORTH	990	EAST	RIO ARriba

12 Dedicated Acres 320.0 Acres - (E/2)	13 Joint or Infill	14 Consolidation Code	15 Order No.
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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

<div>16</div> <div>27</div> <div>LEASE SF-078770</div>	<div>17 OPERATOR CERTIFICATION</div> <p>I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief</p> <p><i>Larry Higgins</i> Signature</p> <p>Larry Higgins Printed Name</p> <p>DRILLING COM Title</p> <p>10-23-07 Date</p>
	<div>18 SURVEYOR CERTIFICATION</div> <p>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</p> <p>Survey Date: NOVEMBER 10, 2005</p> <p>Signature and Seal of Professional Surveyor</p> <div><p>JASON C. EDWARDS NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR 15269</p></div> <p>JASON C. EDWARDS Certificate Number 15269</p>

Submit 3 Copies To Appropriate District  
Office  
District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
1301 W. Grand Ave., Artesia, NM 88210  
District III  
1000 Rio Brazos Rd., Aztec, NM 87410  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM  
87505

State of New Mexico  
Energy, Minerals and Natural Resources

Form C-103  
May 27, 2004

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

WELL API NO. <b>30-039-30410</b>	
5. Indicate Type of Lease FEDERAL <input checked="" type="checkbox"/> STATE <input type="checkbox"/> FEE <input type="checkbox"/>	
6. State Oil & Gas Lease No. SF-078770	
7. Lease Name or Unit Agreement Name Rosa Unit	
8. Well Number	378
9. OGRID Number	120782
Basin Fruitland Coal	

<b>SUNDRY NOTICES AND REPORTS ON WELLS</b> (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)	
1. Type of Well: Oil Well <input type="checkbox"/> Gas Well <input checked="" type="checkbox"/> Other	
2. Name of Operator Williams Production Company, LLC	
3. Address of Operator P.O. Box 640 Aztec, NM 87410	
4. Well Location Unit Letter G: 2060 feet from the north line and 1945 feet from the east line Section 27 Township 31N Range 05W NMPM County Rio Arriba	
11. Elevation (Show whether DR, RKB, RT, GR, etc.) 6,511' GR	
Pit or Below-grade Tank Application <input checked="" type="checkbox"/> or Closure <input type="checkbox"/>	
Pit type <u>  </u> reserve <u>  </u> Depth to Groundwater <u>  </u> >100' Distance from nearest fresh water well <u>  </u> >1,000' Distance from nearest surface water <u>  </u> >1,000'	
Pit Liner Thickness: 12 mil Below-Grade Tank: Volume <u>  </u> bbls; Construction Material <u>  </u>	

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

<b>NOTICE OF INTENTION TO:</b>		<b>SUBSEQUENT REPORT OF:</b>	
PERFORM REMEDIAL WORK <input type="checkbox"/>	PLUG AND ABANDON <input type="checkbox"/>	REMEDIAL WORK <input type="checkbox"/>	ALTERING CASING <input type="checkbox"/>
TEMPORARILY ABANDON <input type="checkbox"/>	CHANGE PLANS <input type="checkbox"/>	COMMENCE DRILLING OPNS. <input type="checkbox"/>	P AND A <input type="checkbox"/>
PULL OR ALTER CASING <input type="checkbox"/>	MULTIPLE COMPL <input type="checkbox"/>	CASING/CEMENT JOB <input type="checkbox"/>	
OTHER: <input type="checkbox"/>		OTHER: <input type="checkbox"/>	

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 1103. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

Drilling/Completion pit to be located approximately 50 to 75 feet from well head. Pit multi-use drilling and completion to avoid additional site disturbance and pit will be considered out of service once production tubing set. Pit to be constructed, operated and closed in accordance with NMOCD guidelines and Williams' procedures.

I hereby certify that the information above is true and complete to the best of my knowledge and belief. I further certify that any pit or below-grade tank has been/will be constructed or closed according to NMOCD guidelines ☒, a general permit ☐ or an (attached) alternative OCD-approved plan ☐.

SIGNATURE Larry Higgins TITLE    Drilling COM    DATE 10-23-07

Type or print name Larry Higgins E-mail address: larry.higgins@williams.com Telephone No. (505) 634-4208

**For State Use Only**

APPROVED BY: [Signature] TITLE Deputy Oil & Gas Inspector, District #3 DATE JUN 03 2008  
Conditions of Approval (if any):



## **WILLIAMS PRODUCTION COMPANY**

### **Operations Plan**

*(Note: This procedure will be adjusted on site based upon actual conditions)*

**DATE:** 1/16/2007

**WELLNAME:** Rosa Unit #378      **FIELD:** Basin Fruitland Coal

**BH LOCATION:** SENE Sec. 27-T31N-5W      **SURFACE:** USFS

**SURF LOCATION:** SWNE Sec 27-31N-5W      **MINERALS:** BLM  
Rio Arriba, NM

**ELEVATION:** 6,511' GR      **LEASE #** SF-078770

**TOTAL DEPTH:** 3,700'

I. **GEOLOGY:** Surface formation - San Jose

A. **FORMATION TOPS:** ( KB)

NAME		TVD	MD		NAME		TVD	MD
San Jose		Surface	Surface		Top Coal		3,260	3,392
Nacimiento		1,425	1,275		Bottom Coal		3,355	3,537
Ojo Alamo		2,660	2,744		Pictured Cliffs		3,355	3,537
Kirtland		2,770	2,886		TD		3,455	3,638
Fruitland		3,140	3,287					

B. **LOGGING PROGRAM:** none

C. **NATURAL GAUGES:** Gauge any noticeable increases in gas flow. Record all gauges in Tour book and on morning reports.

D. **MUD LOGGING PRORAM:** Mud logger will be on location at drill out below 7" casing to TD. Mud Logger to pick TD

II. **DRILLING**

A. **MUD PROGRAM:** Clear water with benex to 7" casing point. Treat for lost circulation as necessary. Expect 100% returns prior to cementing. Notify Engineering of any mud losses. If coal is detected before 3,484', **DO NOT** drill deeper until Engineering is contacted.

B. **DRILLING FLUID:** Coal section will be drilled with Fruitland Coal water.

- C. **BOP TESTING:** While drill pipe is in use, the pipe rams and the blind rams will be function tested once each trip. The anticipated reservoir is expected to be less than 1300 psi, so the BOPE will be tested to **250 psi (Low) for 5 minutes** and **1500 psi (High) for 10 minutes**. Utilize a BOPE Testing Unit with a recording chart and appropriate test plug for testing. The drum brakes will be inspected and tested each tour. **All tests and inspections will be recorded in the tour book as to time and results.**

### III. **MATERIALS**

#### A. **CASING PROGRAM:**

CASING TYPE	OH SIZE (IN)	DEPTH (MD) (FT)	CASING SIZE (IN)	WEIGHT(LB)	GRADE
Surface	12 1/4	300	9 5/8	36	K-55
Intermediate	8 3/4	3,484	7	20	K-55
Liner	6 1/4	3,384   3,599	5 1/2	15.5	J-55

#### B. **FLOAT EQUIPMENT:**

1. **SURFACE CASING:** 9-5/8" notched regular pattern guide shoe. Run (1) standard centralizer on each of the bottom (4) joints of Surface Casing.
2. **INTERMEDIATE CASING:** 7" cement nose guide shoe with a self-fill insert float. Place float collar one joint above the shoe. Install (1) Turbulent centralizer on each of the bottom (3) joints and one standard centralizer every (3) joints to 2,500 ft. Run (1) Turbulent centralizer at 2,700 ft., 2,500 ft., 2,300ft., 2,000ft., 1,500 ft., and 1,000 ft. (**NTL-FRA 90-1**).
3. **PRODUCTION LINER / CASING:** 5-1/2" whirler type cement nose guide shoe

#### C. **CEMENTING:**

*(Note: Volumes may be adjusted onsite due to actual conditions)*

1. **SURFACE:** Use 160 sx (224 cu.ft.) of "Type III" with 2% CaCl<sub>2</sub> and 1/4# of cello-flake/sk (Yield = 1.41 cu.ft./sk, Weight = 14.5 #/gal.). Use **100% excess** to circulate the surface. WOC 12 hours. Total volume = ~~206 cu.ft.~~ <sup>224 FT</sup> Test to 1500#. **minimum = 600 psi**
2. **INTERMEDIATE:** Lead - 435 sx (907 cu.ft.) of "Premium Light" with 8% gel, 1% CaCl<sub>2</sub> and 1/4# cello-flake/sk (Yield = 2.09 cu.ft./sk, Weight = 12.1 #/gal.). Tail - 50 sx (70cu.ft.) of "Type III" with 1/4# cello-flake/sk (Yield = 1.4 cu.ft./sk, Weight = 14.5#/gal.). Use **100% excess in Lead Slurry** to circulate to surface. **No excess in Tail Slurry**. Total volume = 977 cu.ft. Bump Plug to 1,500 psi. Notify engineering if cement is not circulated to surface.
3. **PRODUCTION LINER:** Open hole completion. No cement.

IV. **COMPLETION**

A. **PRESSURE TEST**


1. Pressure test 7" casing to 1500# for 30 minutes.

B. **STIMULATION**

1. Cavitate well with reciprocation and rotation. Surge wells with water and air and then flow back. Cavitate for 2 to 3 weeks. Maximum pressure not expected to exceed 2,000 psi.

C. **RUNNING TUBING**

1. Fruitland Coal: Run 2-7/8", 6.5#, J-55, EUE tubing with a SN on top of bottom joint. Land tubing approximately 50' above TD.

  
for Gary Sizemore  
Sr. Drilling Engineer



Rosa Unit 378  
Sect. 27 T31N R05W  
2060' FNL & 1945' FEL  
Rio Arriba County, NM  
Plan 1



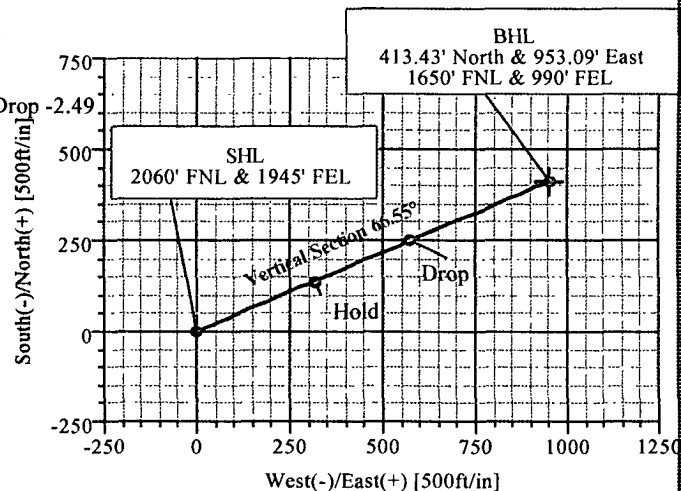
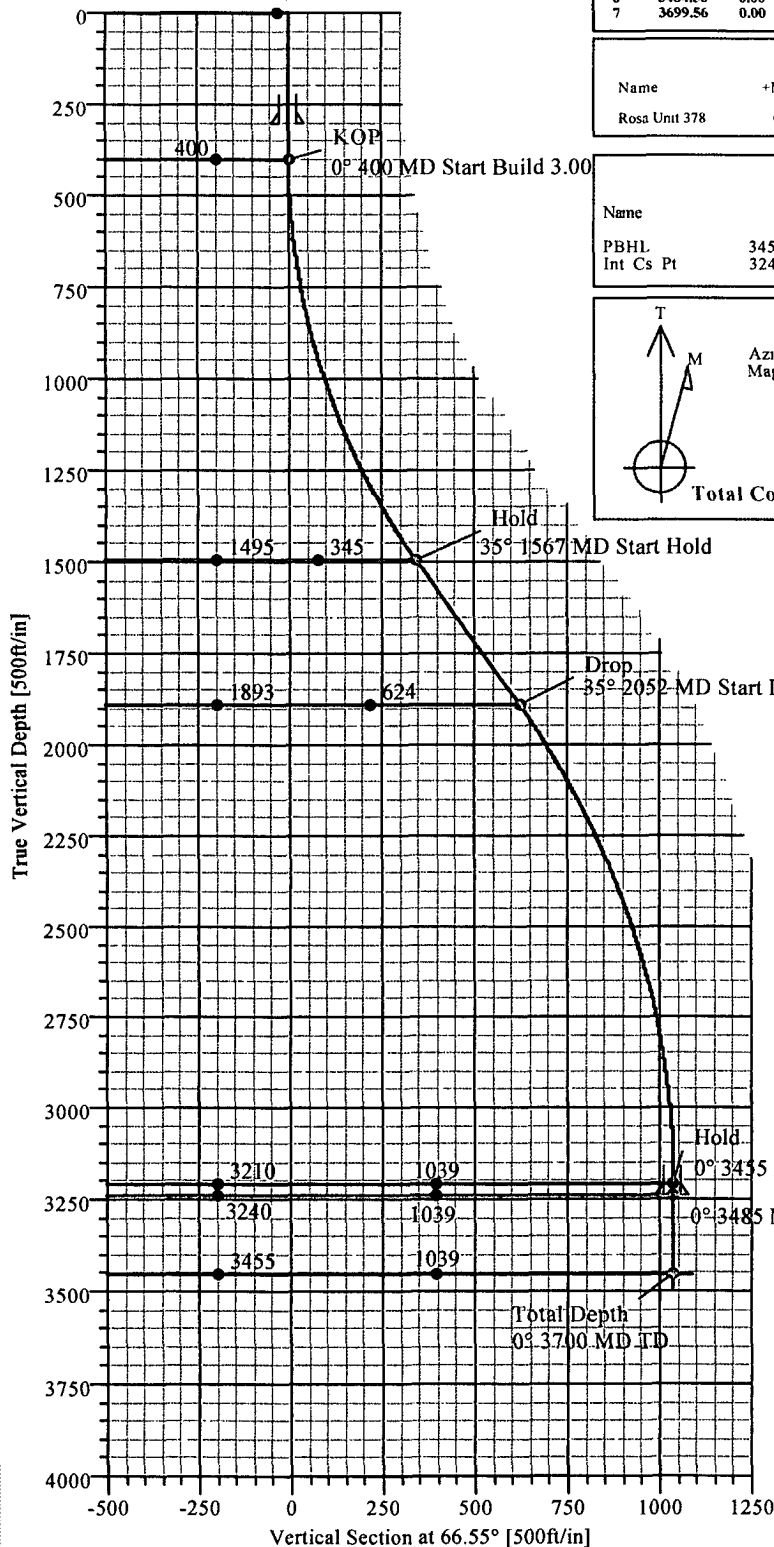
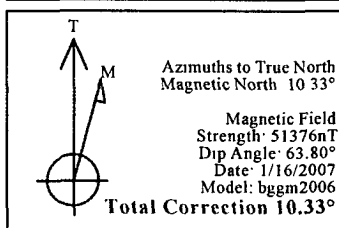
Weatherford®

KB ELEVATION: 6525'  
GR ELEVATION: 6511'

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	66.55	0.00	0.00	0.00	0.00	0.00	0.00	
2	400.00	0.00	66.55	400.00	0.00	0.00	0.00	0.00	0.00	
3	1566.67	35.00	66.55	1495.45	137.45	316.87	3.00	66.55	345.39	
4	2051.64	35.00	66.55	1892.71	248.15	572.06	0.00	0.00	623.56	
5	3454.56	0.00	66.55	3210.00	413.43	953.09	2.49	180.00	1038.90	
6	3484.56	0.00	66.55	3240.00	413.43	953.09	0.00	0.00	1038.90	Int. Cs. Pt.
7	3699.56	0.00	66.55	3455.00	413.43	953.09	0.00	66.55	1038.90	PBHL

WELL DETAILS						
Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Rosa Unit 378	0.00	0.00	2137153.32	2865272.53	36°52'19.740N	107°20'50.136W

TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL	3455.00	413.43	953.09	2137571.60	2866223.51	Circle (Radius: 50)
Int Cs Pt	3240.00	413.43	953.09	2137571.60	2866223.51	Point



FORMATION TOP DETAILS			
No	TVDPath	MDPath	Formation
1	1425.00	1481.95	Nacimiento
2	2660.00	2899.16	Ojo Alamo
3	2770.00	3011.82	Kirtland
4	3140.00	3384.55	Fruitland
5	3260.00	3504.56	Top Coal
6	3355.00	3599.56	Base Coal
7	3355.00	3599.56	Pictured Cliffs

Plan Plan #1 (Rosa Unit 378)

Created By: Jose Perez Date: 01/16/07  
Weatherford Drilling Services  
11943 FM 529  
Houston TX USA 77041  
(713) 896 8194 MAIN  
(713) 896 0498 FAX



# Weatherford Drilling Services

## Directional Plan Report



Weatherford

Company:	WILLIAMS PRODUCTION	Date:	1/16/2007	Time:	12:17:27	Page:	3
Field:	Rio Arriba County (NAD 83)	Co-ordinate(NE) Reference:	Site: Rosa Unit 378, True North				
Site:	Rosa Unit 378	Vertical (TVD) Reference:	SITE 6525.0				
Well:	Rosa Unit 378	Section (VS) Reference:	Well (0.00N,0.00E,66.55Azi)				
Wellpath:	1	Survey Calculation Method:	Minimum Curvature Db: Sybase				

### Formations

MD ft	TVD ft	Formations	Lithology	Dip Angle deg	Dip Direction deg
1481.95	1425.00	Nacimiento		0.00	0.00
2899.16	2660.00	Ojo Alamo		0.00	0.00
3011.82	2770.00	Kirtland		0.00	0.00
3384.55	3140.00	Fruitland		0.00	0.00
3504.56	3260.00	Top Coal		0.00	0.00
3599.56	3355.00	Base Coal		0.00	0.00
3599.56	3355.00	Pictured Cliffs		0.00	0.00

### Casing Points

MD ft	TVD ft	Diameter in	Hole Size in	Name
300.00	300.00	9.625	12.250	9 5/8"
3484.56	3240.00	7.000	8.500	7"





## **DIRECTIONAL WELL INFORMATION SHEET**

**DATE:** 1/15/2007

**Attention:** Jose Perez / Rod Middleton

**From:** Gary Sizemore

**Company:** Weatherford

**Company:** Williams Production

**Telephone #:** 432-561-8892

**Telephone #:** 918-573-8776

**Fax #:** 432-561-8895

**Fax #:** 918-573-4839  
918-573-1298

**WELL INFO:** ROSA UNIT # 378 FC  
Rig KB: 14 ft.

9-5/8 in. Surface Casing will be set @ +/- 300 ft. Estimated KOP is 400 ft. (TVD). Drill 8-3/4 in. "S" shaped wellbore to a (TVD) of 3,240 ft. Have wellbore at less than 3 degrees angle at 3,240 ft. TVD. 7 in. Intermediate Casing will be set at this point and Rig moved off. Please place Formation Names at corresponding TVD's on the Survey listing sheets. 50 ft. dia. target Cylinder @ TD.

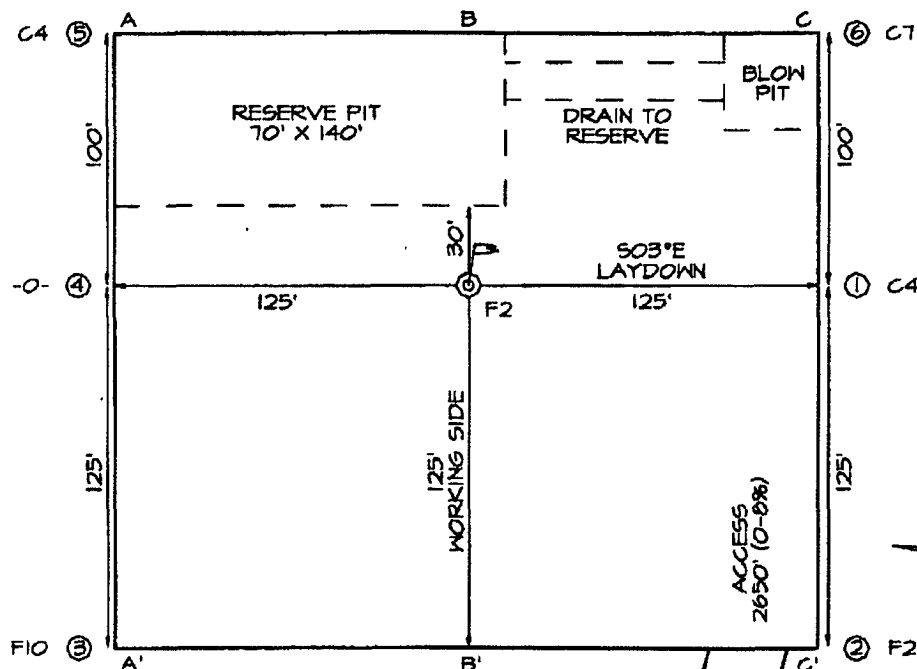
### **ATTACHMENTS:**

- (1) Section Staking Plat
- (2) Well-Pad Plat
- (3) Formation Tops List

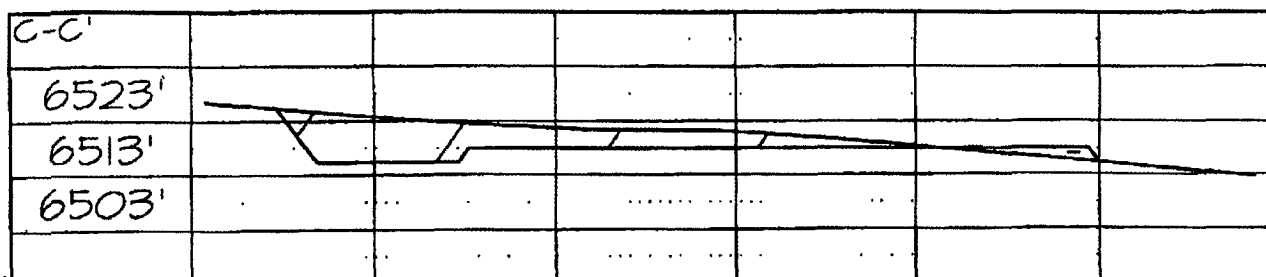
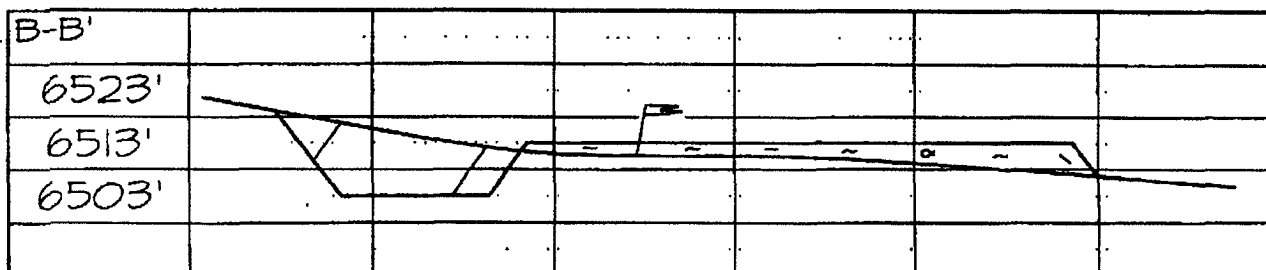
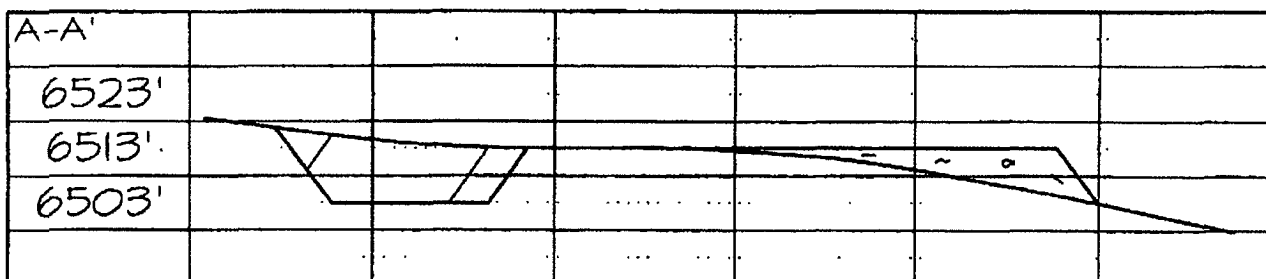
***Any questions, please give me a call.***

**Gary Sizemore**

**WILLIAMS PRODUCTION COMPANY ROSA UNIT #378**  
**2060' FNL & 1945' FEL, SECTION 27, T31N, R5W, NMPM**  
**RIO ARriba COUNTY, NEW MEXICO ELEVATION: 6511'**



**LATITUDE: 36.87215° N**  
**LONGITUDE: 107.34726° W**  
 DATUM: NAD83



## **GEOLOGIC PROGNOSIS**

Company: **Williams Production Company. LLC**  
Project: **2007 Drilling Plan (Fruitland Fm. Coal)**  
Area: **Rosa Unit**

Operator: **Williams Production Company. LLC**  
Well Name: **Rosa Unit No. 378 (Kfc-Directional)**  
Location: **SWNE 27-31N-05W**  
Footage: **2060' FNL & 1945' FEL**  
County/State: **Rio Arriba/New Mexico**

Surveyed GL: 6511 Est: (14') KB: 6525

<b><u>Formation</u></b>	<b><u>Thickness</u></b>	<b><u>TVD</u></b>	<b><u>Struct. Elev.</u></b>
San Jose Fm.	1425	Surface	6511
Nacimiento Fm.	1235	1425	5100
Ojo Alamo Ss.	110	2660	3865
Kirtland Sh.	370	2770	3755
Fruitland Fm.	100	3140	3385
<b><u>Int. Csg. Depth</u></b>	20	<b><u>3240</u></b>	3285
Top Coal Interval	95	3260	<b><u>3265</u></b>
Base Coal Interval	0	3355	3170
Pictured Cliffs Ss.	100	3355	3170
<b><u>Total Depth</u></b>	NA	<b><u>3455</u></b>	3070

**Mud Log** Mud log (5"=100') from intermediate casing to TD  
(Mud Logger to pick TD)

**Mechanical Logs:** None

**Correlation Logs:** Rosa Unit No. 132 (SWSW 22-31N-05W)

**Notes:** This well will be directionally drilled to a BHL  
1650' FNL & 0990' FEL 27-31N-05W

No log control in quarter section

## GENERAL ROSA DRILLING PLAN

### Rosa Unit boundaries:

T31N, R4W: all except sections 32-36

T31N, R5W: all except sections 1 & 2

T31N, R6W: all except sections 6,7,18,20, & 27-36

T32N, R6W: sections 32-36

FORMATION	LITHOLOGY	WATER	GAS	OIL/COND	OVER-PRES	LOST CIRC
Nacimiento	Interbedded shales, siltstones and sandstones	Possible	Possible	No	No	No
Ojo Alamo	Sandstone and conglomerates with lenses of shale	Fresh	No	No	No	No
Kirtland	Shale w/interbedded sandstones	No	Possible	No	No	No
Fruitland	Inter, SS, SiltSt, SH & Coals w/carb. SS, SiltSt, SH	Yes	Yes	No	Possible	Possible
Pictured Cliffs	Massive Sandstone w/thin interbedded shales	Possible	Yes	Possible	No	Possible
Lewis	Shale w/thin interbedded sandstones and siltstones	No	Possible	No	No	No
Cliff House	Transgressive sandstones	Possible	Yes	No	No	No
Menefee	Sandstones, carb shales and coal	Possible	Yes	No	No	No
Point Lookout	Regressive coastal barrier sandstone	Possible	Yes	Possible	No	Yes
Mancos	Marine shale and interbedded sandstone	No	Possible	Possible	No	Possible
Upr Dakota	Marine sand and shales	No	Yes	Possible	No	Possible
Lwr Dakota	Fluvial sands, shales, & coal	Possible	Yes	Possible	No	Possible

## DRILLING

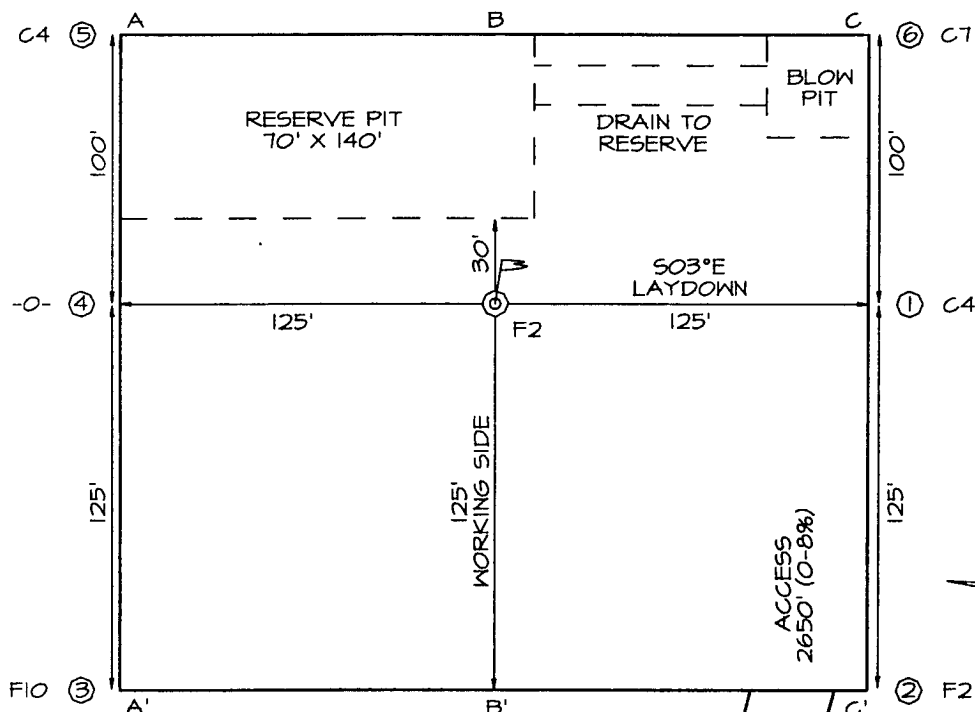
### Potential Hazards:

1. There are no overpressured zones expected in this well.
2. No H<sub>2</sub>S zones will be penetrated while drilling this well.

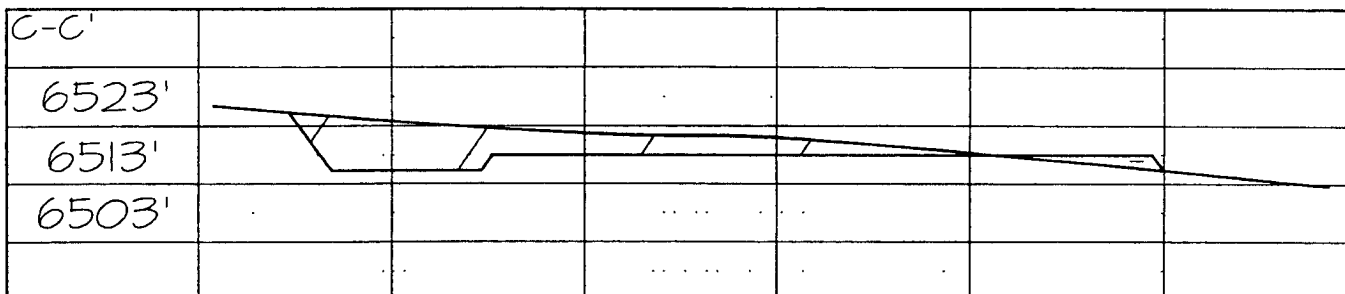
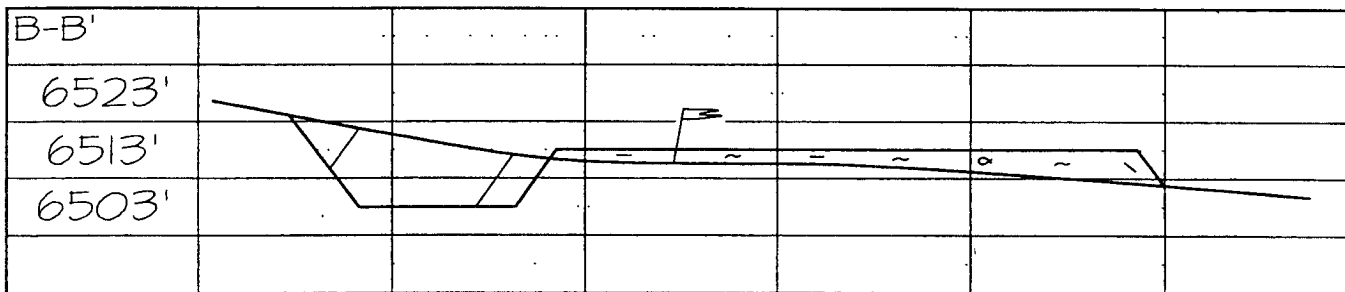
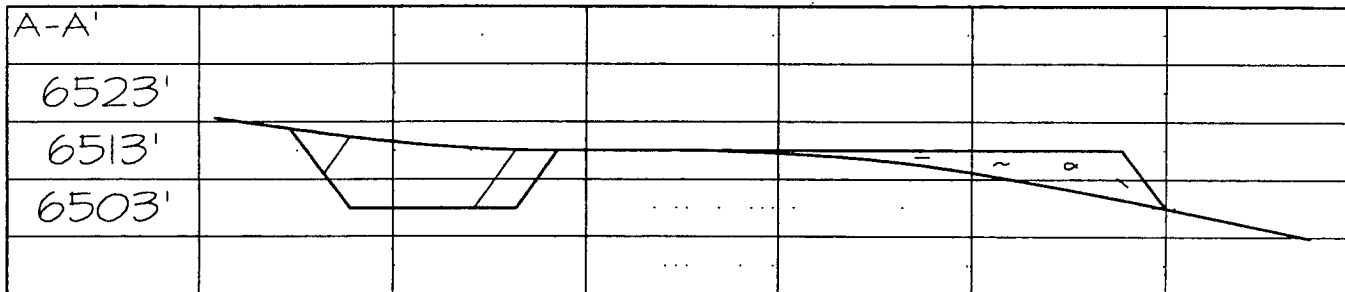
### Mud System:

1. Surface - The surface hole will be drilled with a low-solids, non-dispersed system with starch and lost circulation material as needed. Expected mud weights will be in the 8.4 to 9.0 lb per gal range. Viscosities will be in the 30 to 60 sec/qrt range as needed to remove drill cuttings.
2. Intermediate - The intermediate hole will be drilled with clear water and Benex to TD where the well will be mudded up to log and run casing. The mud system will be low-solids, non-dispersed with mud weights in the 9 to 10 lb per gal range as needed to control the well. Viscosities will be in the 45 to 55 range as needed to support any weight material. The weight material will consist of Barite.
3. Production - The well will be drilled using air from the intermediate casing point to TD. For Fruitland Coal wells, the coal section will be drilled with air/mist.

**WILLIAMS PRODUCTION COMPANY ROSA UNIT #378**  
**2060' FNL & 1945' FEL, SECTION 27, T31N, R5W, NMPM**  
**RIO ARriba COUNTY, NEW MEXICO ELEVATION: 6511'**



*PLAT #1*



# Well Control Equipment Schematic for 2M Service

Attachment to Drilling Technical Program

## Exhibit #1 Typical BOP setup

Location: San Juan Basin, New Mexico

Date: August 20, 2001

By: John Thompson (Walsh E&P)

