

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-078891

6. If Indian, Allottee or Tribe Name

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

Rosa Unit

8. Lease Name and Well No.

388A

9. API Well No.

30-039-29966

10. Field and Pool, or Exploratory

Basin Fruitland Coal

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

F Section 1. 31N. 4W

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) 634-4208

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

At surface 2670' FNL & 2430' FWL

At proposed prod. zone 760' FSL & 760' FEL Lot 7/p

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

approximately 35 miles northeast of Navajo City, New Mexico

15. Distance from proposed\* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any)

760'

16. No. of Acres in lease

1965.72

17. Spacing Unit dedicated to this well

331.82 (E/2)

18. Distance from proposed\* location to nearest well, drilling, completed, applied for, on this lease, ft.

50'

19. Proposed Depth

6,566'

20. BLM/BIA Bond No. on file

UT0847

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

7,007' GR

22. Approximate date work will start\*

August 1, 2006

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

Title

Larry Higgins

6-20-06

Drilling COM

Approved by (Signature)

Name (Printed/Typed)

Date

Title

Office

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.

\*(Instructions on reverse)

Williams Exploration and Production Company, LLC, proposes to drill a 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.

This location would be twinned with the proposed Rosa Unit Nos. 280A and 388 wells. The access road would be the same as for the Rosa Unit No. 280A well. A 74.80-foot pipeline tie would be required for this location. Williams Four Corners has filed a pipeline route plan for the associated pipeline. The pipeline would be owned and operated by Williams Four Corners, LLC.

NOTIFY AZTEC OCD 24 HRS.

PRIOR TO CASING & CEMENT

NMOCD

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

HOLD 0104 FOR directional survey & as drilled C-102

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

8 9-17-07

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

☐ AMENDED REPORT

### WELL LOCATION AND ACREAGE DEDICATION PLAT

*API Number <b>30-039-29966</b>		*Pool Code <b>71629</b>	*Pool Name <b>BASIN FRUITLAND COAL</b>
*Property Code <b>17033</b>	*Property Name <b>ROSA UNIT</b>		*Well Number <b>388A</b>
*GRID No. <b>120782</b>	*Operator Name <b>WILLIAMS PRODUCTION COMPANY</b>		*Elevation <b>7007'</b>

#### <sup>10</sup> Surface Location

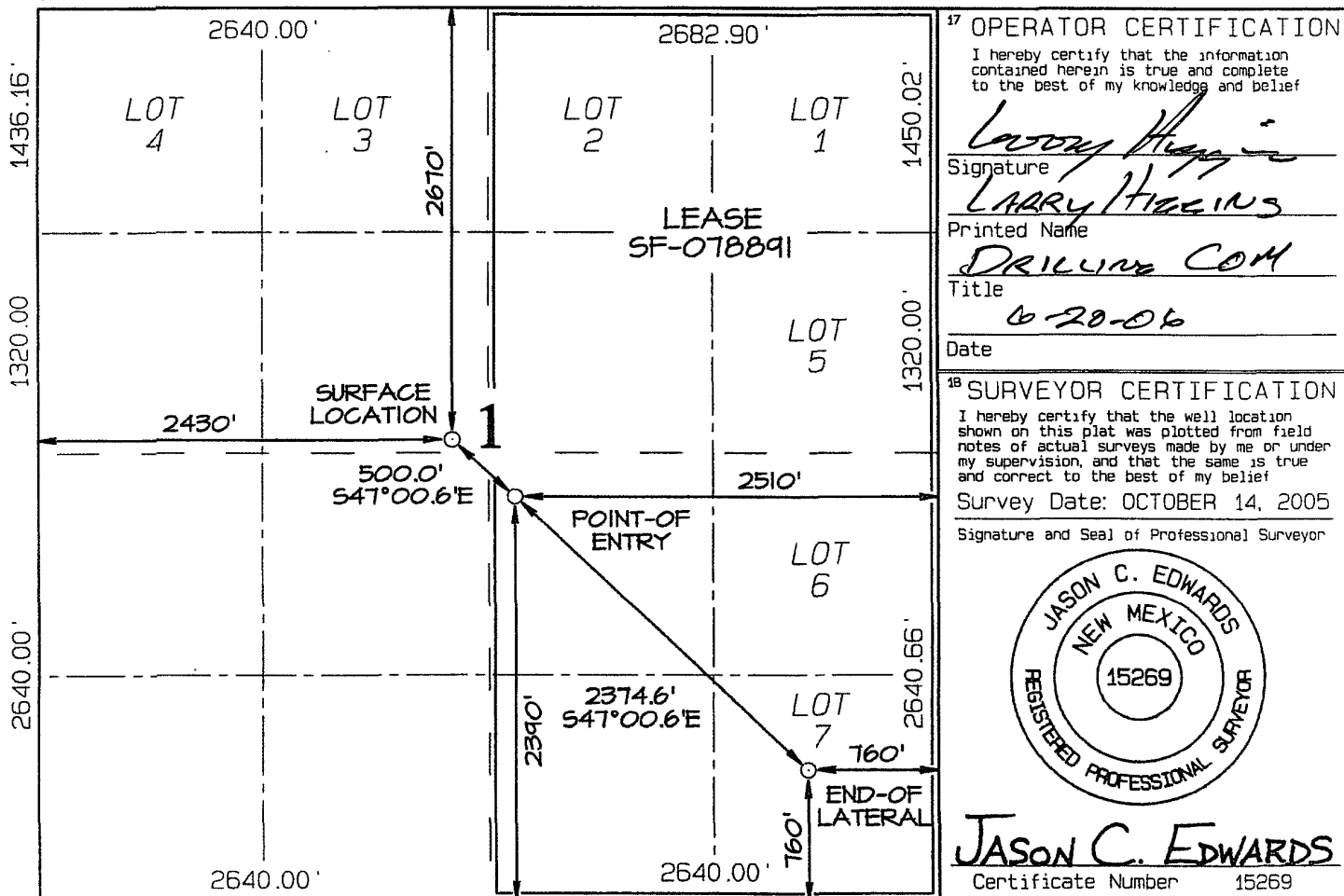
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
F	1	31N	4W		2670	NORTH	2430	WEST	RIO ARriba

#### <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
P	1	31N	4W	<b>(7)</b>	760	SOUTH	760	EAST	RIO ARriba

<sup>12</sup> Dedicated Acres <b>331.82 Acres - (E/2)</b>	<sup>13</sup> Joint or Infill	<sup>14</sup> Consolidation Code	<sup>15</sup> 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



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>30-039-29966</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-078891	
7. Lease Name or Unit Agreement Name Rosa Unit	
8. Well Number	388A
9. OGRID Number	120782
Basin Fruitland Coal	

Pit or Below-grade Tank Application ☒ or Closure ☐

Pit type    reserve    Depth to Groundwater    >100' Distance from nearest fresh water well    >1,000' Distance from nearest surface water    >1,000'

Pit Liner Thickness: 12 mil Below-Grade Tank: Volume    bbls; Construction Material   

**SUNDRY NOTICES AND REPORTS ON WELLS**  
(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 ☐ Gas Well ☒ 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 F: 2670 feet from the north line and 2430 feet from the west line  
Section 1 Township 31N Range 4W NMPM County Rio Arriba

11. Elevation (Show whether DR, RKB, RT, GR, etc.)  
7,007' GR

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

NOTICE OF INTENTION TO:		SUBSEQUENT REPORT OF:	
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 checked="" 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.

The proposed Rosa Unit 388A will be twinned with the Rosa Unit Nos. 280A and 388 wells, and a single reserve pit will serve all three wells.

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 6-20-06

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, DATE SEP 17 2007  
Conditions of Approval (if any): District #3



## **WILLIAMS PRODUCTION COMPANY**

### **Operations Plan**

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

**DATE:** 5/19/2006

**WELLNAME:** Rosa Unit #388A      **FIELD:** Basin Fruitland Coal

**BH LOCATION:** SESE Sec. 1-T31N-4W      **SURFACE:** USFS

**SURF LOCATION:** SENW Sec 1-31N-4W  
Rio Arriba, NM      **MINERALS:** BLM

**ELEVATION:** 7,007' GR      **LEASE #** SF-078891

**TOTAL DEPTH:** 6,566'

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

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

NAME		TVD	MD		NAME		TVD	MD
San Jose		Surface	Surface		Top Coal		3,861	3,984
Nacimiento		2,081	2,081		Top Target Coal		3,901	4,295
Ojo Alamo		3,351	3,351		Bottom Target Coal		3,916	4,305
Kirtland		3,451	3,451		TD		3,916	6,566
Fruitland		3,721	3,746					

**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 from 500' above Ojo Alamo to TD of intermediate casing. Then from drillout of intermediate casing to 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 4,152', **DO NOT** drill deeper until Engineering is contacted.

**B. DRILLING FLUID:** Horizontal section will be drilled with Calcium Chloride 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:**

<u>CASING TYPE</u>	<u>HOLE SIZE</u>	<u>DEPTH (MD)</u>	<u>CASING SIZE</u>	<u>WT. &amp; GRADE</u>
Surface	12-1/4"	+/- 300'	9-5/8"	36# K-55
Intermediate	8-3/4"	+/- 4,152'	7"	20# K-55
Prod. Liner	6-1/4"	+/- 3,319' - 6,566	4-1/2"	10.5# K-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:** 4-1/2" & 5-1/2" whirler type cement nose guide shoe with a latch collar on top of 20' bottom joint. Place marker joint above 5,400'. Place centralizers as needed across selected production intervals.

#### 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 **120% excess** to circulate the surface. WOC 12 hours. Total volume = 224 cu.ft. Test to 1500#.
2. **INTERMEDIATE:** Lead - 510 sx (1,059 cu.ft.) of "Type III" 65/35 poz 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 - 100 sx (139cu.ft.) of "Type III" with 1/4# cello-flake/sk, and 1% CaCl<sub>2</sub> (Yield = 1.4 cu.ft./sk, Weight = 14.5#/gal.). Use **120% excess in Lead Slurry** to circulate to surface. **No excess in Tail Slurry.** Total volume = 1,198 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

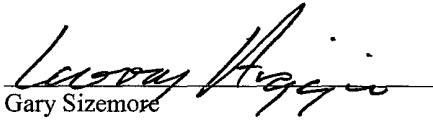
1. Pressure test 7" casing to 3300# for 15 minutes.

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 388A  
Section 1 T31N R 4W  
2670' FNL & 2430' FWL  
RIO ARriba COUNTY, NM

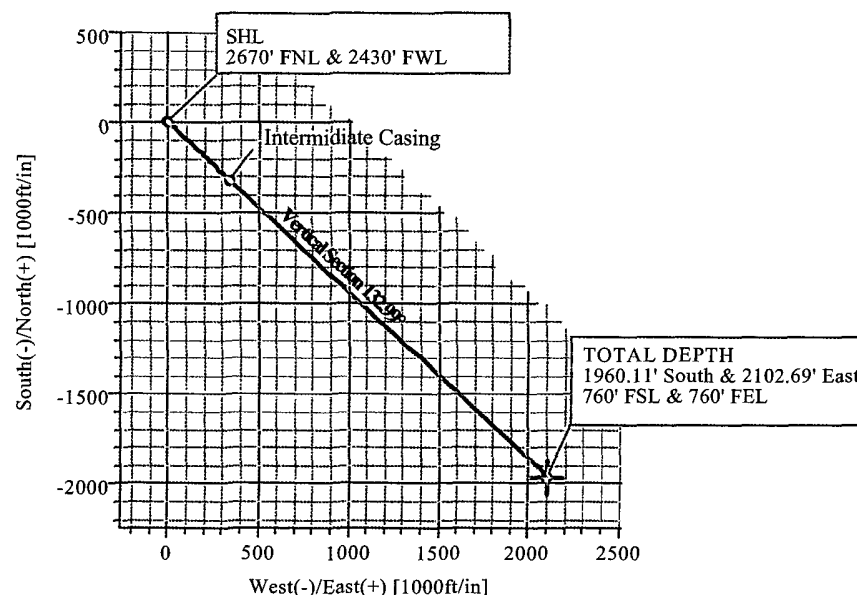


Weatherford

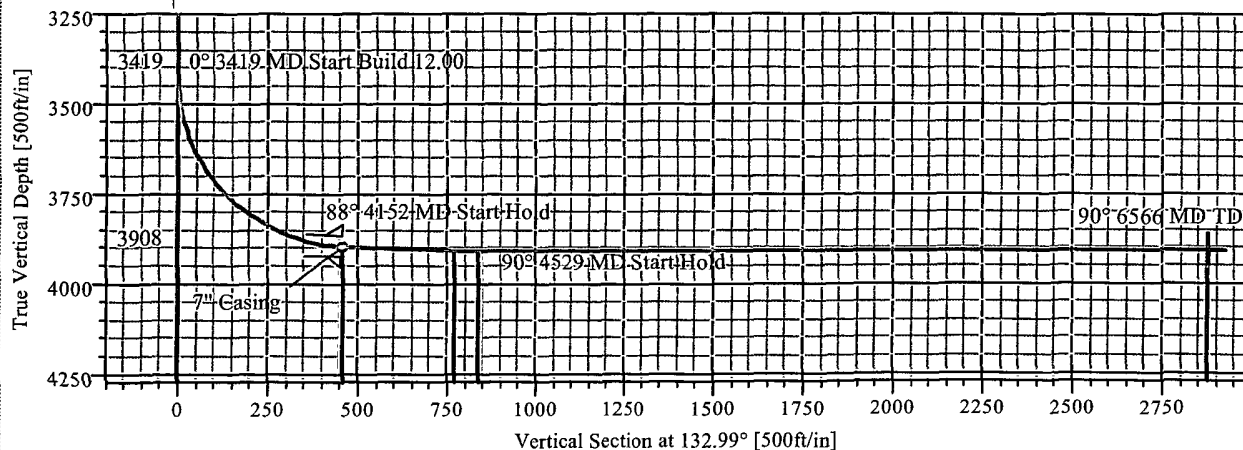
SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0.00	0.00	132.99	0.00	0.00	0.00	0.00	0.00	0.00	
2	3418.83	0.00	132.99	3418.83	0.00	0.00	0.00	132.99	0.00	
3	4152.16	88.00	132.99	3896.00	-314.21	337.06	12.00	132.99	460.80	
4	4462.56	88.00	132.99	3906.84	-525.73	563.97	0.00	0.00	771.01	
5	4529.22	90.00	132.99	3908.00	-571.17	612.72	3.00	0.00	837.66	
6	6566.16	90.00	132.99	3908.00	-1960.11	2102.69	0.00	0.00	2874.60	BHL

WELL DETAILS						
Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
Rosa Unit 388A	0.00	0.00	2158049.31	2906179.34	36°55'44.000N	107°12'25.000W

TARGET DETAILS						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
BHL	3908.00	-1960.11	2102.69	2156103.06	2908294.86	Point



KB ELEVATION: 7021'  
GR ELEVATION: 7007'



Azimuths to True North  
Magnetic North: 10.30°

Magnetic Field  
Strength: 51493nT  
Dip Angle: 63.86°  
Date: 5/10/2006  
Model: igrf2005

Total Correction 10.30°

FORMATION TOP DETAILS			
No.	TVDPath	MDPath	Formation
1	2081.00	2081.00	Nacimiento
2	3351.00	3351.00	Ojo Alamo
3	3451.00	3451.02	Kirtland
4	3721.00	3746.01	Fruitland
5	3861.00	3984.09	Top Coal Interval
6	3901.00	4295.32	Top Target Coal

Plan Plan #1 (Rosa Unit 388A)  
Created By Jose Perez Date: 5/10/2006  
Weatherford Drilling Services  
3611 Plaza East Court  
Granbury TX 76049  
(817) 573 8500 MAIN  
(817) 573 8001 FAX

# Weatherford Drilling Services

## Planning Report

<b>Company:</b> WILLIAMS PRODUCTION <b>Field:</b> Rio Arriba County (NAD 83) <b>Site:</b> Rosa Unit 388A <b>Well:</b> Rosa Unit 388A <b>Wellpath:</b> 1	<b>Date:</b> 5/10/2006 <b>Co-ordinate(NE) Reference:</b> Site: Rosa Unit 388A, True North <b>Vertical (TVD) Reference:</b> SITE 7021.0 <b>Section (VS) Reference:</b> Well (0.00N:0.00E:132.99Azi) <b>Plan:</b> Plan #1
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### Survey

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
5000.00	90.00	132.99	3908.00	-892.18	957.08	1308.44	0.00	0.00	0.00	
5100.00	90.00	132.99	3908.00	-960.37	1030.23	1408.44	0.00	0.00	0.00	
5200.00	90.00	132.99	3908.00	-1028.56	1103.38	1508.44	0.00	0.00	0.00	
5300.00	90.00	132.99	3908.00	-1096.75	1176.53	1608.44	0.00	0.00	0.00	
5400.00	90.00	132.99	3908.00	-1164.93	1249.67	1708.44	0.00	0.00	0.00	
5500.00	90.00	132.99	3908.00	-1233.12	1322.82	1808.44	0.00	0.00	0.00	
5600.00	90.00	132.99	3908.00	-1301.31	1395.97	1908.44	0.00	0.00	0.00	
5700.00	90.00	132.99	3908.00	-1369.49	1469.12	2008.44	0.00	0.00	0.00	
5800.00	90.00	132.99	3908.00	-1437.68	1542.26	2108.44	0.00	0.00	0.00	
5900.00	90.00	132.99	3908.00	-1505.87	1615.41	2208.44	0.00	0.00	0.00	
6000.00	90.00	132.99	3908.00	-1574.05	1688.56	2308.44	0.00	0.00	0.00	
6100.00	90.00	132.99	3908.00	-1642.24	1761.70	2408.44	0.00	0.00	0.00	
6200.00	90.00	132.99	3908.00	-1710.43	1834.85	2508.44	0.00	0.00	0.00	
6300.00	90.00	132.99	3908.00	-1778.62	1908.00	2608.44	0.00	0.00	0.00	
6400.00	90.00	132.99	3908.00	-1846.80	1981.15	2708.44	0.00	0.00	0.00	
6500.00	90.00	132.99	3908.00	-1914.99	2054.29	2808.44	0.00	0.00	0.00	
6566.16	90.00	132.99	3908.00	-1960.11	2102.69	2874.60	0.00	0.00	0.00	BHL

### Targets

Name	Description Dip.	Dir.	TVD ft	+N/-S ft	+E/-W ft	Map Northing ft	Map Easting ft	Latitude Deg Min Sec			Longitude Deg Min Sec		
BHL			3908.00	-1960.11	2102.69	2156103.06	2908294.86	36	55	24.618 N	107	11	59.104 W

### Formations

MD ft	TVD ft	Formations	Lithology	Dip Angle deg	Dip Direction deg
2081.00	2081.00	Nacimiento		0.00	0.00
3351.00	3351.00	Ojo Alamo		0.00	0.00
3451.02	3451.00	Kirtland		0.00	0.00
3746.01	3721.00	Fruitland		0.00	0.00
3984.09	3861.00	Top Coal Interval		0.00	0.00
4295.32	3901.00	Top Target Coal		0.00	0.00
	0.00	Base Target Coal		0.00	0.00

### Annotation

MD ft	TVD ft	
4152.05	3896.00	Intermediate Casing



## GEOLOGIC PROGNOSIS

Company: **Williams Production Company. LLC**  
Project: **2006 Drilling Plan (Fruitland Fm. Coal)**  
Area: **Rosa Unit**

Operator: **Williams Production Company. LLC**  
Well Name: **Rosa Unit No. 388A (Kfc-Horizontal)**  
Location: **SENW 01-31N-04W**  
Footage: **2670' FNL & 2430' FWL**  
County/State: **Rio Arriba/New Mexico**

Surveyed GL: 7007 Est: (14') KB: 7021

<b><u>Formation</u></b>	<b><u>Thickness</u></b>	<b><u>TVD</u></b>	<b><u>Struct. Elev.</u></b>
San Jose Fm.	2081	Surface	7007
Nacimiento Fm.	1270	2081	4940
Ojo Alamo Ss.	100	3351	3670
Kirtland Sh.	270	3451	3570
Fruitland Fm.	140	3721	3300
Top Coal Interval	40	3861	3160
Int. Csg. Depth	0	<b><u>3901</u></b>	3120
Top Target Coal	15	3901	<b><u>3120</u></b>
Base Target Coal	0	3916	3105
<b><u>Total Depth</u></b>	NA	<b><u>3916</u></b>	3105

**Mud Log:** Mud log (5"=100') from **500'** above Ojo Alamo Ss. to TD  
(Mud Logger to pick intermediate casing point and TD)

**Mechanical Logs:** None

**Correlation Logs:** Rosa Unit No. 280 (NESW 01-31N-04W)  
Carracas Unit 36B No. 15 (SWSE 36-32N-04W)

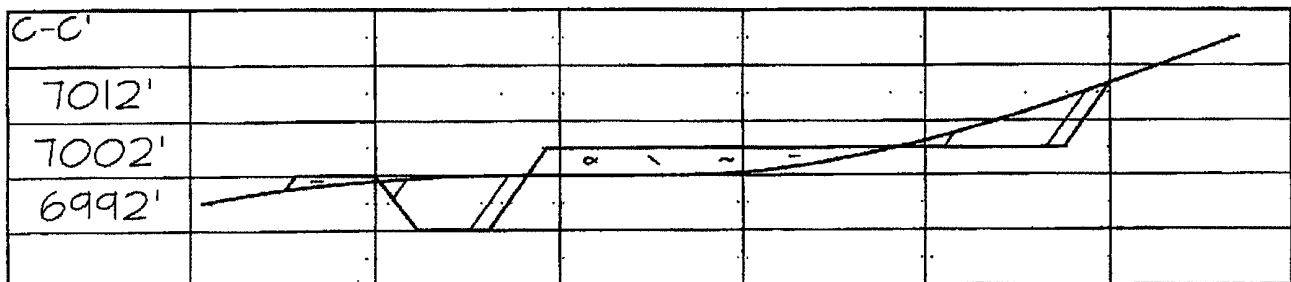
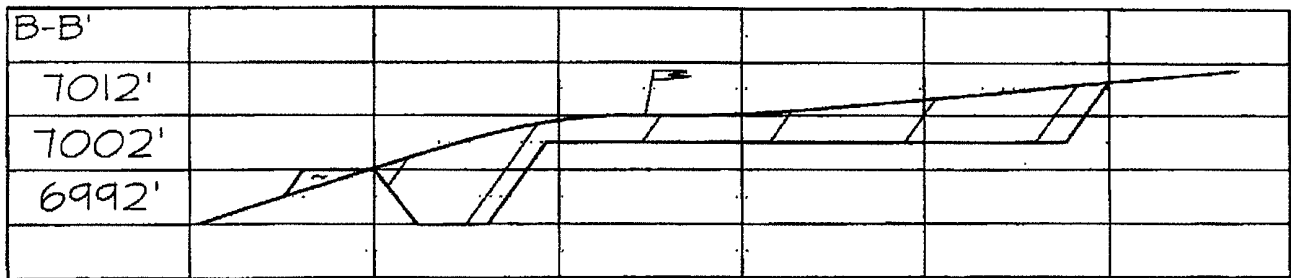
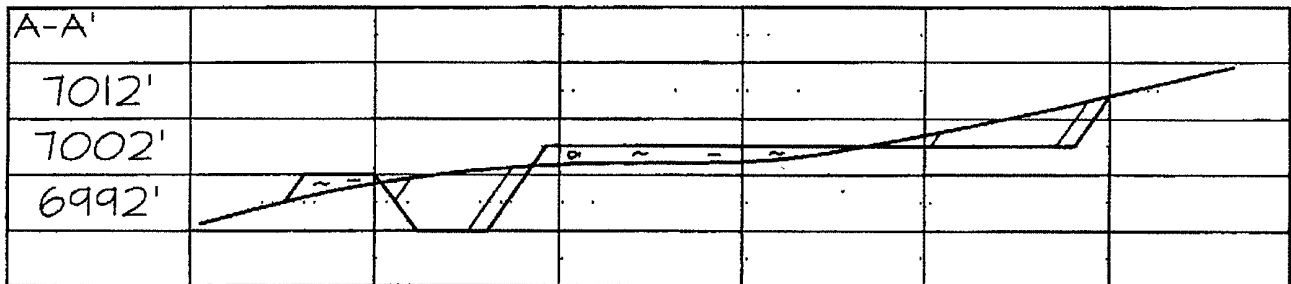
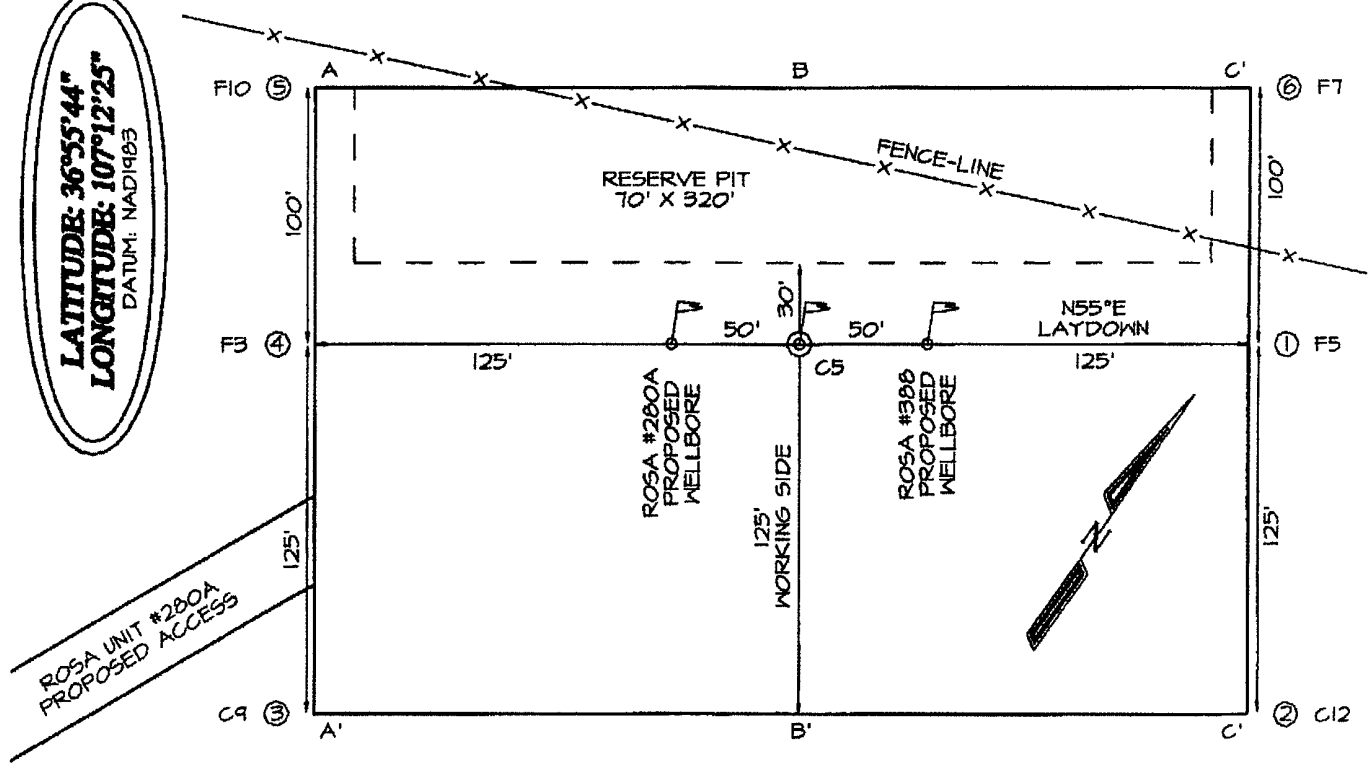
**Notes:** The Rosa Unit No. 388A will be horizontally drilled to a  
BHL 0760' FSL & 0760' FEL 01-31N-04W.

### Target coal in surrounding wells:

Rosa Unit No. 280 (3940'-3968')  
Rosa Unit No. 283 (4062'-4078')  
Carracas Unit No. 114 (3917'-3932')  
Carracas Unit 36B No. 11 (3969'-3985')  
Carracas Unit 36B No. 15 (3987'-4000')  
Jicarilla No. 31-3-6-2 (3697'-3714')  
Rosa Unit No. 86 (3913'-3929')

**WILLIAMS PRODUCTION COMPANY ROSA UNIT #388A**  
**2670' FNL & 2430' FWL, SECTION 1, T31N, R4W, NMPM**  
**RIO ARriba COUNTY, NEW MEXICO ELEVATION: 7007'**

**LATITUDE: 36°55'44"**  
**LONGITUDE: 107°12'25"**  
 DATUM: NAD1983



## 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 within interbedded shales	Possible	Yes	Possible	No	Possible
Lewis	Shale within 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.

# **WATKINS PRODUCTION Company, LLC** **Well Control Equipment Schematic for 2M Service**

Attachment to Drilling Technical Program

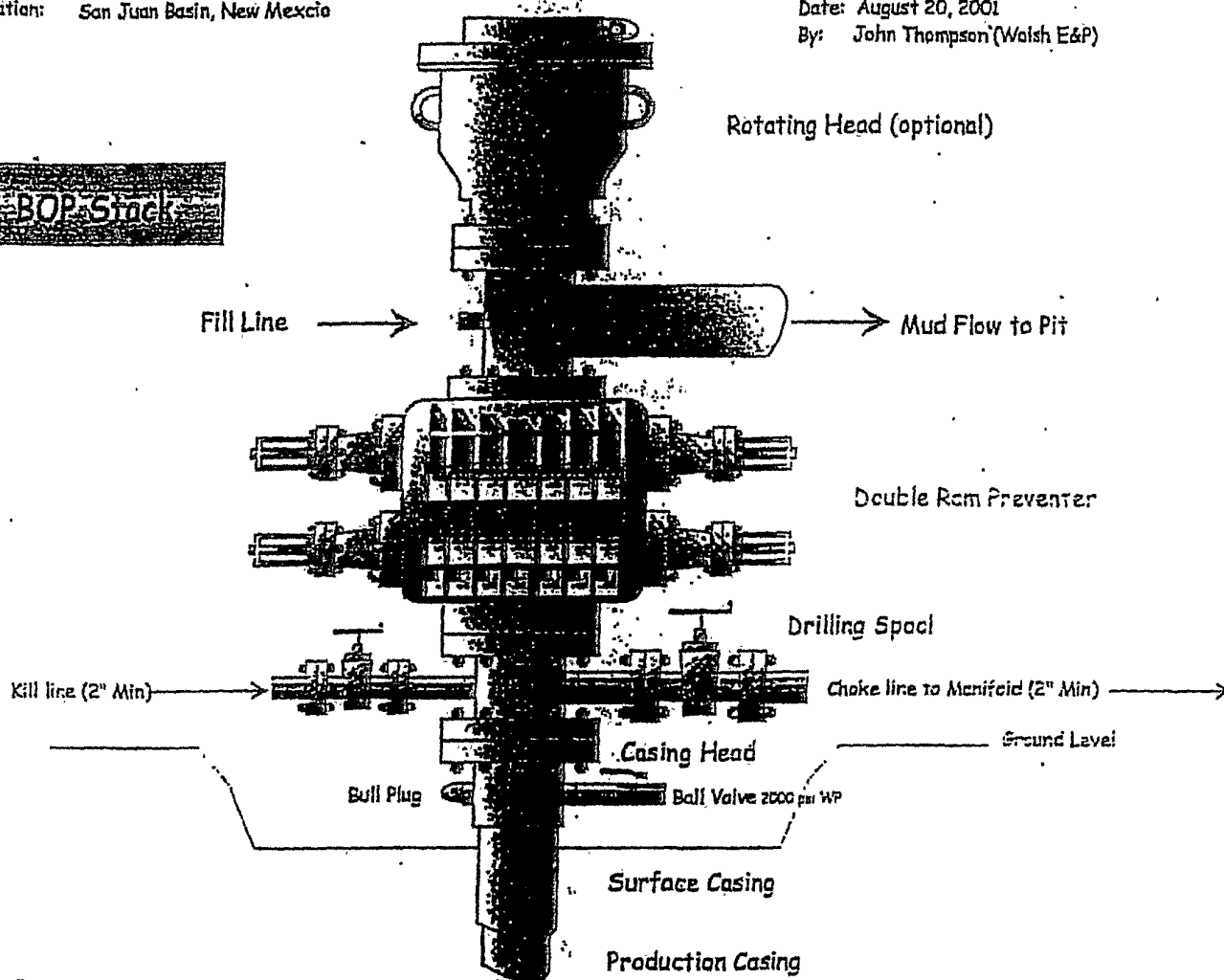
## **Typical BOP setup**

Location: San Juan Basin, New Mexico

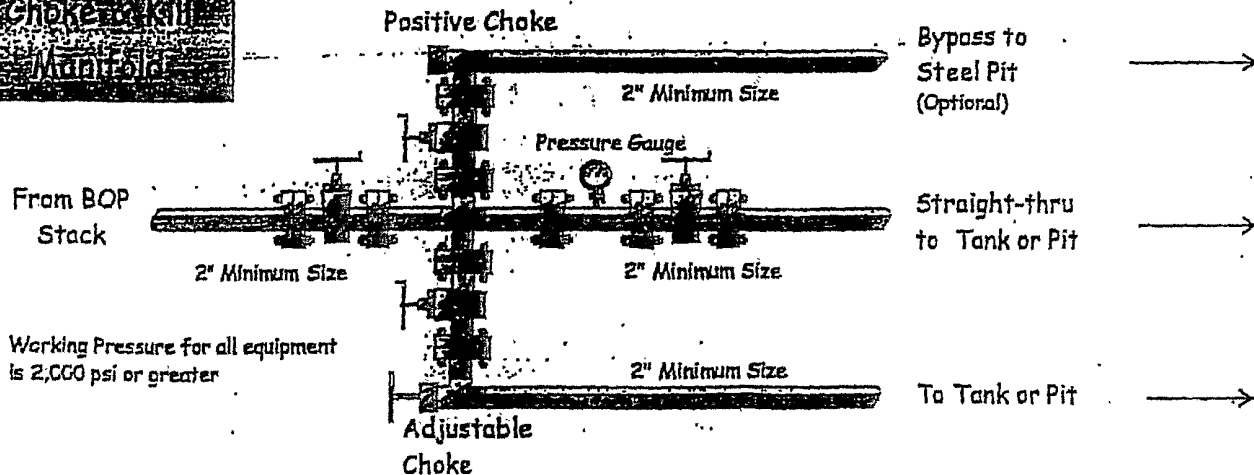
Date: August 20, 2001

By: John Thompson (Walsh E&P)

**BOP Stack**



**Choke & Kill Manifold**



Working Pressure for all equipment is 2,000 psi or greater