

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

RECEIVED

JUL 05 2011

FORM APPROVED
OMB No 1004-0137
Expires March 31, 2007

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.

1. Type of Well

☐ Oil Well ☒ Gas Well ☐ Other

2. Name of Operator

Williams Production Company, LLC

3a Address

PO Box 640 Aztec, NM 87410

3b Phone No. (include area code)

505-634-4206

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

Sur. 1830' FNL & 1015' FEL, BHL 725' FSL & 2290' FEL, section 36, T31N, R5W

5. Lease Serial No.

SF-078768

Farmington Field Office
Bureau of Land Management

6. If Indian, Allottee or Tribe Name

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

8. Well Name and No.
Rosa 406

9. API Well No.
30-039-30912

10. Field and Pool or Exploratory Area
Basin Fruitland Coal

11. Country or Parish, State
Rio Arriba

12 CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☐ Other Temp Pit Notification
	☒ 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 must 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 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has determined that the site is ready for final inspection.)

Williams Production wishes to change this well from a vertical cavitated completion to a horizontal completion. A revised C-102, directional plan and operation plan are attached.

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

CONDITIONS OF APPROVAL
Adhere to previously issued stipulations.

Hold C104
if Directional Survey
or "As Drilled" plat

14. I hereby certify that the foregoing is true and correct

Name (Printed/Typed)

Larry Higgins

Title Permit Supervisor

Signature

Larry Higgins

Date 7/5/11

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Troy L. Salvers

Title PE

Date 7/12/2011

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, 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 page 2)

NMOCD *A*

Hold C104

for Directional Survey
and "As Drilled" plat

7/14/11

District I
1625 N. French Dr., Hobbs, NM 88240

District II
1301 W. Grand Avenue, 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 & Natural Resources Department

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

Form C-102
Revised October 12, 2005
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 30-039-30912		*Pool Code 71629		*Pool Name BASIN FRUITLAND COAL	
*Property Code 17033		*Property Name ROSA UNIT			*Well Number 406
*GRID No. 120782		*Operator Name WILLIAMS PRODUCTION COMPANY			*Elevation 6599'

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
H	36	31N	5W		1830	NORTH	1015	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
0	36	31N	5W		725	SOUTH	2290	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

16	5280.00' SURFACE LOCATION LAT: 36.85833°N LONG: 107.30740°W DATUM: NAD1927 LAT: 36.85834°N LONG: 107.30800°W DATUM: NAD1983	5280.00' 36 5280.00' 2640.00' 2640.00' 725' 2290' 524°53.7'W 400.0' 524°53.7'W 2600.2' LEASE SF-078768	2190' 1830' 1015' 1185'	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 of such a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <i>Larry Higgins</i> 7-5-11 Signature Date LARRY HIGGINS Printed Name
	POINT-OF-ENTRY LAT: 36.85734°N LONG: 107.30799°W DATUM: NAD1927 LAT: 36.85735°N LONG: 107.30859°W DATUM: NAD1983			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. Date of Revisions: JUNE 27, 2011 Date of Survey: JULY 3, 2009 Signature and Seal of Professional Surveyor
	END-OF-LATERAL LAT: 36.85088°N LONG: 107.31177°W DATUM: NAD1927 LAT: 36.85089°N LONG: 107.31237°W DATUM: NAD1983			JASON C. EDWARDS NEW MEXICO REGISTERED PROFESSIONAL SURVEYOR 15269 JASON C. EDWARDS Certificate Number 15269



WILLIAMS PRODUCTION COMPANY

Operations Plan

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

DATE: 7/5/2011

WELLNAME: Rosa Unit #406 **FIELD:** Basin Fruitland Coal

BH LOCATION: SWNE Sec. 31-T31N-4W **SURFACE:** USFS
Rio Arriba, NM

ELEVATION: 6,599' GR **MINERALS:** BLM

TOTAL DEPTH: 6,245' **LEASE #** SF-078768

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

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

NAME		TVD	MD		NAME		TVD	MD
San Jose		Surface	Surface		Top Target Coal		3,387	3,617
Nacimiento		1,426	1,429		Bottom Target Coal		3,402	
Ojo Alamo		2,764	2,764		Base Coal		3,429	
Kirtland		2,924	2,924		Picture Cliffs		3,429	
Fruitland		3,254	3,279		TD		3,387	6,245

- **NOTE:** Well will be vertically drilled to 150' into Pictured Cliffs, logged through the PC, 7" csg will be run with shoe 150' into Pictured Cliffs. Cased hole whipstock will be set at KOP (300' above top of target coal). Well will be geosteered in lateral.
- B. **LOGGING PROGRAM:** HRI/SDL/DSN from pilot hole TD to surface csg. MWD Gamma Ray in curve and lateral.
- C. **NATURAL GAUGES:** Gauge any noticeable increases in gas flow. Record all gauges in Tour book and on morning reports.
- D. **MUD LOGGING PROGRAM:** Mud logger will be on location from 500' to TD of intermediate casing. Then from mill out of intermediate casing to TD.

II. **DRILLING**

- A. **MUD PROGRAM:** Clear water with benex to 7" casing point. Convert to a LSND mud to log and run pipe. Treat for lost circulation as necessary. Obtain 100% returns prior to cementing. Notify Engineering of any mud losses.
- B. **DRILLING FLUID:** Horizontal section will be drilled with produced 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. & GRADE</u>
Surface	12-1/4"	+/- 300'	9-5/8"	36# K-55
Intermediate	8-3/4"	+/- 3,579'	7"	23# K-55
Prod. Liner	6-1/4"	+/- 3,000' - 6,245'	4-1/2"	11.6# K-55

Note: Intermediate casing is set ~~100'~~^{150'} into Pictured Cliffs in the pilot hole. Production liner is 4-1/2" 11.6# Pre-perforated K-55 and the liner will be set with liner hanger 5-10' outside of the window.

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: No centralization

C. CEMENTING:

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

1. SURFACE: Slurry: 150sx (269.4 cu.ft.) of "Type III" + 2% Cal-Seal 60 + ¼ # of poly-e-flake/sk + 0.3% Versaset + 2% Econolite + 6% Salt (Yield = 1.796 cu.ft./sk, Weight = 13.5 #/gal.). The 100% excess should circulate cement to the surface. WOC 12 hours. Test csg to 600psi.
2. INTERMEDIATE: Lead - 340 sx (928.2 cu.ft.) of "EXTENDACEM" + 5 #/sk pheno-seal + 5% Cal-Seal 60 (Yield = 2.723 cu.ft./sk, Weight = 11.5 #/gal.). Tail - 100 sx (117.8cu.ft.) of Premium cement + 0.125 #/sk Poly-E-Flake, (Yield = 1.178 cu.ft./sk, Weight = 15.6#/gal.). Total volume = 1046 cu.ft. Bump Plug to 1,500 psi. Notify engineering if cement is not circulated to surface. WOC 12 hours. Csg will be tested to 1500psi at completion.
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. No stimulation

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 PBTD of 7" casing.


Larry Higgins



Williams Energy

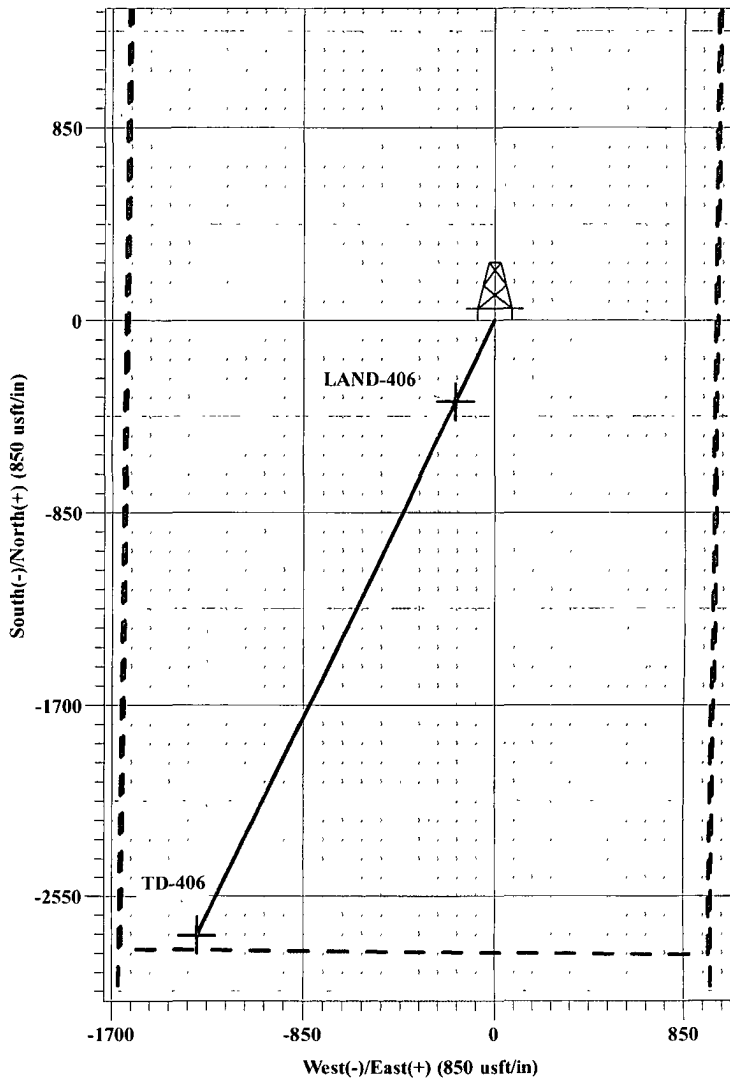
Rosa Unit #406
Sec36 T31N-R5W - #406
Rio Arriba Co. NM
GL: 6599' KB: 14'



A Schlumberger Company

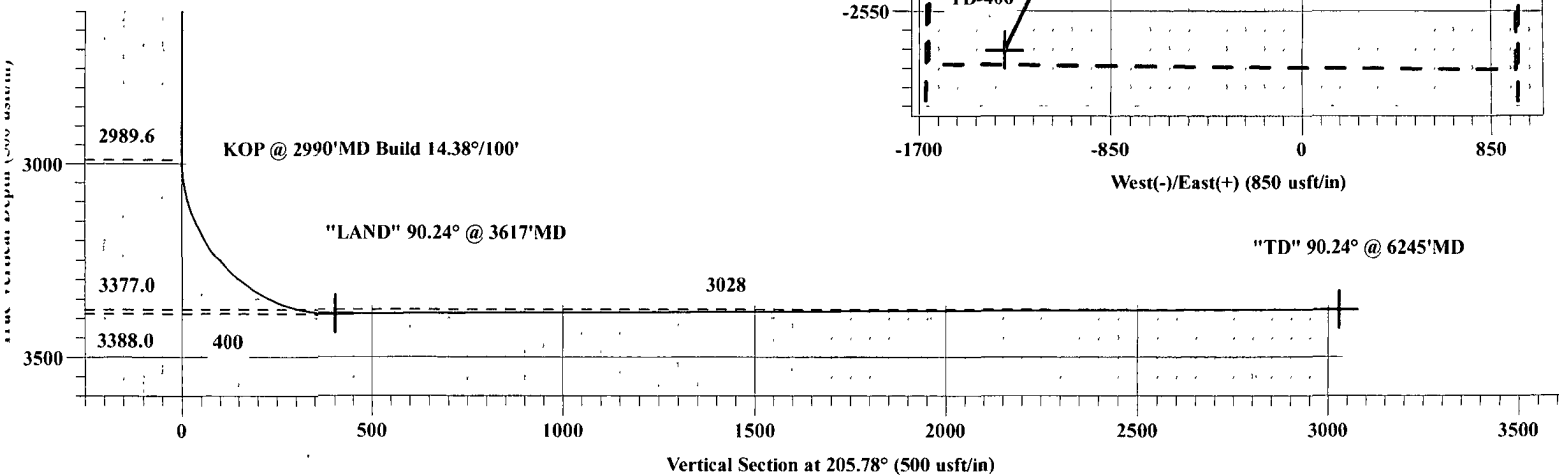
WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N-S	+E-W	Northing	Easting	Shape
TD-406	3377.0	-2726.9	-1317.3	2130645.05	189334.22	Point
LAND-406	3388.0	-360.3	-174.0	2133011.61	190477.51	Point



WELL DETAILS: Rosa Unit #406

		6599.0		
Northing	Easting	Latitude	Longitude	
2133371.91	190651.51	36° 51' 30.000 N	107° 18' 26.639 W	



SECTION DETAILS

MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	Vsect	Target
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.0	
2989.6	0.00	0.00	2989.6	0.0	0.0	0.00	0.00	0.0	
3617.1	90.24	205.78	3388.0	-360.3	-174.0	14.38	205.78	400.1	
6245.4	90.24	205.78	3377.0	-2726.9	-1317.3	0.00	0.00	3028.4	TD-406

Plan: Design #1 (Rosa Unit #406/Wellbore #1)

6/20/2011

Williams Energy

Rio Arriba Co. NM

Sec36 T31N-R5W - #406

Rosa Unit #406

Wellbore #1

Plan: Design #1

Standard Planning Report

29 June, 2011

Planning Report

Database:	EDM 5000 1 Single User-Db	Local Co-ordinate Reference:	Site Sec36 T31N-R5W - #406
Company:	Williams Energy	TVD Reference:	WELL @ 6613 0usft (Original Well Elev)
Project:	Rio Arriba Co NM	MD Reference:	WELL @ 6613 0usft (Original Well Elev)
Site:	Sec36.T31N-R5W - #406	North Reference:	Grid
Well:	Rosa Unit #406	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project:	Rio Arriba Co NM	System Datum:	Mean Sea Level
Map System:	US State Plane 1927 (Exact solution)		
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico Central 3002		

Site:	Sec36.T31N-R5W - #406		
Site Position:		Northing:	2,133,371 91 usft
From:	Lat/Long	Easting:	190,651 52 usft
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16 "
		Latitude:	36° 51' 30 000 N
		Longitude:	107° 18' 26 639 W
		Grid Convergence:	-0 63 °

Well	Rosa Unit #406					
Well Position	+N/-S	0 0 usft	Northing:	2,133,371 91 usft	Latitude:	36° 51' 30.000 N
	+E/-W	0 0 usft	Easting:	190,651 52 usft	Longitude:	107° 18' 26 639 W
Position Uncertainty		0 0 usft	Wellhead Elevation:		Ground Level:	6,599 0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	06/28/11	9 71	63 65	50,858

Design:		Design #1		
Audit Notes:				
Version:	Phase:	PROTOTYPE		Tie On Depth: 0 0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0 0	0 0	0 0	205 78

Plan Sections										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	(usft)	(usft)	Rate	Rate	Rate	(°)	
(usft)			(usft)			(°/100usft)	(°/100usft)	(°/100usft)		
0 0	0 00	0 00	0 0	0 0	0 0	0 00	0 00	0 00	0 00	
2,989 6	0 00	0 00	2,989 6	0 0	0 0	0 00	0 00	0 00	0 00	
3,617 1	90 24	205 78	3,388 0	-360 3	-174 0	14 38	14 38	0 00	205 78	
6,245 4	90 24	205.78	3,377 0	-2,726 9	-1,317 3	0 00	0 00	0 00	0 00	TD-406

Planning Report

Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Site Sec36 T31N-R5W - #406.
Company:	Williams Energy	TVD Reference:	WELL @ 6613 0usft (Original Well Elev)
Project:	Rio Arriba Co. NM	MD Reference:	WELL @ 6613 0usft (Original Well Elev)
Site:	Sec36 T31N-R5W - #406	North Reference:	Grnd
Well:	Rosa Unit #406	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,989.6	0.00	0.00	2,989.6	0.0	0.0	0.0	0.00	0.00	0.00
KOP @ 2990' MD Build 14.38°/100'									
3,000.0	1.50	205.78	3,000.0	-0.1	-0.1	0.1	14.38	14.38	0.00
3,025.0	5.09	205.78	3,025.0	-1.4	-0.7	1.6	14.38	14.38	0.00
3,050.0	8.69	205.78	3,049.8	-4.1	-2.0	4.6	14.38	14.38	0.00
3,075.0	12.28	205.78	3,074.3	-8.2	-4.0	9.1	14.38	14.38	0.00
3,100.0	15.88	205.78	3,098.6	-13.7	-6.6	15.2	14.38	14.38	0.00
3,125.0	19.47	205.78	3,122.4	-20.5	-9.9	22.8	14.38	14.38	0.00
3,150.0	23.07	205.78	3,145.7	-28.7	-13.9	31.9	14.38	14.38	0.00
3,175.0	26.66	205.78	3,168.4	-38.2	-18.4	42.4	14.38	14.38	0.00
3,200.0	30.26	205.78	3,190.4	-48.9	-23.6	54.3	14.38	14.38	0.00
3,225.0	33.85	205.78	3,211.5	-60.8	-29.4	67.6	14.38	14.38	0.00
3,250.0	37.45	205.78	3,231.8	-73.9	-35.7	82.1	14.38	14.38	0.00
3,275.0	41.04	205.78	3,251.2	-88.2	-42.6	97.9	14.38	14.38	0.00
3,300.0	44.64	205.78	3,269.5	-103.5	-50.0	114.9	14.38	14.38	0.00
3,325.0	48.23	205.78	3,286.8	-119.8	-57.9	133.0	14.38	14.38	0.00
3,350.0	51.83	205.78	3,302.8	-137.0	-66.2	152.2	14.38	14.38	0.00
3,375.0	55.42	205.78	3,317.6	-155.2	-75.0	172.3	14.38	14.38	0.00
3,400.0	59.02	205.78	3,331.2	-174.1	-84.1	193.3	14.38	14.38	0.00
3,425.0	62.61	205.78	3,343.4	-193.7	-93.6	215.2	14.38	14.38	0.00
3,450.0	66.21	205.78	3,354.2	-214.0	-103.4	237.7	14.38	14.38	0.00
3,475.0	69.80	205.78	3,363.5	-234.9	-113.5	260.9	14.38	14.38	0.00
3,500.0	73.40	205.78	3,371.4	-256.3	-123.8	284.6	14.38	14.38	0.00
3,525.0	76.99	205.78	3,377.8	-278.0	-134.3	308.8	14.38	14.38	0.00
3,550.0	80.59	205.78	3,382.7	-300.1	-145.0	333.3	14.38	14.38	0.00
3,575.0	84.18	205.78	3,386.0	-322.4	-155.8	358.1	14.38	14.38	0.00
3,600.0	87.78	205.78	3,387.7	-344.9	-166.6	383.0	14.38	14.38	0.00
3,617.1	90.24	205.78	3,388.0	-360.3	-174.0	400.1	14.38	14.38	0.00
"LAND" 90.24° @ 3617' MD									
3,700.0	90.24	205.78	3,387.7	-434.9	-210.1	483.0	0.00	0.00	0.00
3,800.0	90.24	205.78	3,387.2	-525.0	-253.6	583.0	0.00	0.00	0.00
3,900.0	90.24	205.78	3,386.8	-615.0	-297.1	683.0	0.00	0.00	0.00
4,000.0	90.24	205.78	3,386.4	-705.0	-340.6	783.0	0.00	0.00	0.00
4,100.0	90.24	205.78	3,386.0	-795.1	-384.1	883.0	0.00	0.00	0.00
4,200.0	90.24	205.78	3,385.6	-885.1	-427.6	983.0	0.00	0.00	0.00
4,300.0	90.24	205.78	3,385.1	-975.2	-471.1	1,083.0	0.00	0.00	0.00
4,400.0	90.24	205.78	3,384.7	-1,065.2	-514.6	1,183.0	0.00	0.00	0.00
4,500.0	90.24	205.78	3,384.3	-1,155.3	-558.1	1,283.0	0.00	0.00	0.00
4,600.0	90.24	205.78	3,383.9	-1,245.3	-601.6	1,383.0	0.00	0.00	0.00
4,700.0	90.24	205.78	3,383.5	-1,335.3	-645.1	1,483.0	0.00	0.00	0.00
4,800.0	90.24	205.78	3,383.1	-1,425.4	-688.6	1,583.0	0.00	0.00	0.00
4,900.0	90.24	205.78	3,382.6	-1,515.4	-732.1	1,683.0	0.00	0.00	0.00
5,000.0	90.24	205.78	3,382.2	-1,605.5	-775.6	1,783.0	0.00	0.00	0.00
5,100.0	90.24	205.78	3,381.8	-1,695.5	-819.1	1,883.0	0.00	0.00	0.00
5,200.0	90.24	205.78	3,381.4	-1,785.6	-862.6	1,983.0	0.00	0.00	0.00
5,300.0	90.24	205.78	3,381.0	-1,875.6	-906.1	2,083.0	0.00	0.00	0.00
5,400.0	90.24	205.78	3,380.5	-1,965.6	-949.6	2,183.0	0.00	0.00	0.00
5,500.0	90.24	205.78	3,380.1	-2,055.7	-993.1	2,283.0	0.00	0.00	0.00
5,600.0	90.24	205.78	3,379.7	-2,145.7	-1,036.6	2,383.0	0.00	0.00	0.00
5,700.0	90.24	205.78	3,379.3	-2,235.8	-1,080.1	2,483.0	0.00	0.00	0.00
5,800.0	90.24	205.78	3,378.9	-2,325.8	-1,123.6	2,583.0	0.00	0.00	0.00
5,900.0	90.24	205.78	3,378.4	-2,415.9	-1,167.1	2,683.0	0.00	0.00	0.00
6,000.0	90.24	205.78	3,378.0	-2,505.9	-1,210.5	2,783.0	0.00	0.00	0.00
6,100.0	90.24	205.78	3,377.6	-2,595.9	-1,254.0	2,883.0	0.00	0.00	0.00

Planning Report

Database:	EDM 5000 1 Single User Db	Local Co-ordinate Reference:	Site Sec36 T31N-R5W - #406
Company:	Williams Energy	TVD Reference:	WELL @ 6613 0usft (Original Well Elev)
Project:	Rio Arriba Co. NM	MD Reference:	WELL @ 6613 0usft (Original Well Elev)
Site:	Sec36 T31N-R5W - #406	North Reference:	Grnd
Well:	Rosa Unit #406	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,200 0	90 24	205 78	3,377 2	-2,686 0	-1,297 5	2,983 0	0 00	0 00	0 00
6,245 4	90 24	205 78	3,377 0	-2,726 9	-1,317 3	3,028 4	0 00	0 00	0 00
"TD" 90.24° @ 6245'MD									

Design Targets									
Target Name	hit/miss target	Dip Angle	Dip Dir	TVD	+N/-S	+E/-W	Northing	Easting	
Shape		(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	
									Latitude Longitude
TD-406		0 00	360 00	3,377 0	-2,726 9	-1,317 3	2,130,645 05	189,334 23	36° 51' 2 894 N 107° 18' 42 473 W
- plan hits target center									
- Point									
LAND-406		0 00	0 00	3,388 0	-360 3	-174 0	2,133,011 61	190,477 52	36° 51' 26 418 N 107° 18' 28 730 W
- plan hits target center									
- Point									

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
2,989 6	2,989 6	0 0	0 0	KOP @ 2990'MD Build 14 38°/100'	
3,617 1	3,388 0	-360 3	-174 0	"LAND" 90 24° @ 3617'MD	
6,245 4	3,377 0	-2,726 9	-1,317 3	"TD" 90 24° @ 6245'MD	