OCD-ARTESIA

Form 3160-5
(February 2005)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

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.*

5. Lease Serial No.
NMNM-112269

6. If Indian, Allottee or Tribe Name

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

1. Type of Well
☐ Oil Well ☑ Gas Well ☐ Other

RECEIVED
MAY 27 2010
NMOCD ARTESIA

8. Well Name and No.
Serrano 29 Federal 1

2. Name of Operator
Devon Energy Production Co., LP

9. API Well No.
30-015- 37763

3a. Address
20 North Broadway
OKC, OK 73102

3b. Phone No. *(include area code)*
(405)-552-7802

10. Field and Pool or Exploratory Area
Wolfcamp (oil)

4. Location of Well *(Footage, Sec., T.,R.,M., or Survey Description)*
SENE 1980' FNL & 660' FEL
Sec 29-T24SS-R27E

11. Country or Parish, State
Eddy County, NM

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
	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Subsequent Report	☐ Casing Repair	☐ New Construction	☐ Recomplete	☑ Other APD changes: change from vertical to horizontal well
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
☐ Final Abandonment Notice	☐ 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 recomplete 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 recompletion 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.)

Devon Energy Production Company, LP respectfully submits the following changes to the drilling program, initial permit approved 04/01/2010.

Attached is the following for your review:

* Revised C-102; denoting penetration point & bottomhole location
* Revised Drilling Program
* Directional Survey
* Cementing Report

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

Title Sr. Staff Engineering Technician

Signature

Date 03/03/2010

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by

Title

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

APPROVED
/s/ Roger Hall
MAY 19 2010
Petroleum Engineer
BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

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)

SERANO 29 FED #1 SEC 29-24S-27E APD DATA

NOTE: NO RUSTLER AT THIS WELLSITE.
THE SALADO IS AT THE SURFACE
THIS WELL WILL BE DRILLED WITH A PILOT HOLE (PH)

Casing Program

Hole Size	Hole Interval	OD Csg	Casing Interval	Wt	Collar	Grade
26"	0' – 90'	20"	0' – 90'	94#	STC	H-40
17 1/2"	90' - 3100'	13 3/8"	0' – 3100'	68#	LTC	K-55
12 1/4"	3100' – 8,800'	9 5/8"	0' – 8,800'	40#	LTC	P-110EC
8 ¾"	8800'-11000' PH	5 ½"				
8 3/4"	11,000' – 14,500'	5 1/2"	0' – 14,500'	23#	Vam Top	ECP-110

Design Parameter Factors:

Casing Size	Collapse Design Factor	Burst Design Factor	Tension Design Factor
20"	12.3	36.4	68.6
13 3/8"	1.21	2.14	3.2
9 5/8"	1.82	2.11	2.40
5 ½"	2.02	2.06	1.46

The Collapse SF for the 9 5/8 is derived using a 9 lb fluid gradient behind the casing and a minimum of a 9 lb fluid gradient in the casing. This casing will not be evacuated.

Mud Program

Depth	Mud Wt.	Visc	Fluid Loss	Type System
0' – 90'	8.4 – 8.8	32 – 34	N/C	FW/Gel
90' – 3,100'	9.7 – 10.0	28 – 30	N/C	Brine
3,100' – 8,800'	9.0 – 9.3	28-30	NC -40	Fresh
8,800' – 12,500'	9.5 – 14.0	32 – 40		Oil Base

BOP DESIGN: Will consist of a (10M psi system) triple ram type (10M psi WP) preventor and a bag-type (Hydril) preventor (10M psi WP) and a rotation head. All units will be hydraulically operated and the ram type preventor will be equipped with blind rams on top and 5" drill pipe rams on bottom. A 3M Annular BOP will be installed on the 20" surface casing and utilized continuously until total depth (~3100') is reached. The mentioned 10M preventer will be installed on the 13 3/8" casing. All BOP's will be tested with independent testers before drilling out the associated casing shoes. Prior to drilling out the 13 3/8" casing shoe, the BOP's and Hydril will be tested as per BLM Drilling Operations Order #2.

Pipe rams will be operated and checked each 24-hour period and each time the drill pipe is out of the hole. These functional tests will be documented on the daily driller's log. A 2" kill line and 3" choke line will be incorporated in the drilling spool below the ram-type BOP. Other accessory BOP equipment will include a Kelly cock, floor safety valve, choke lines and choke manifold having 10000 psi WP rating.

CEMENTING PROGRAM and WHIPSTOCK PROGRAM

Cement plug for the Pilot Hole:
Plug Geometry:

Plug 10,100' to 11,000' 385 sacks Class H +R-3, Yield 1.18 cuft/sk

An 8 ¾" Open Hole Whipstock with a packer type anchor will be set @ ~10,000' after the cement plug has been set. Directional tools will be run and KOP will be ~10,300'. The lateral will be drilled from ~11,000' MD to 14,500' MD.

20" Surface	225 sacks Premium Plus C Cement + 2% bwoc Calcium Chloride + 0.125 lbs/sack Cello Flake + 56.3% Fresh Water Yield: 1.35 cf/sack.
13 3/8" Intermediate	Lead: 2165 sacks (35:65) Poz (Fly Ash):Premium Plus C Cement + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 6% bwoc Bentonite + 107.8% Fresh Water Yield: 2.04 cf/sack. TOC @ surface. Tail: 300 sacks (60:40) Poz (Fly Ash):Premium Plus C Cement + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 0.4% bwoc Sodium Metasilicate + 4% bwoc MPA-5 + 64.7% Fresh Water Yield: 1.37 cf/sack.
9 5/8" Intermediate	2 Stage with DV Tool @ 4200' Stage 1 Lead: 895 sacks 35/65 Poz + 0.35% bwoc R-3 + 0.4% bwoc CD-32 + 1.4% bwoc FL-62 + 0.1% bwoc ASA-301 + 0.2% bwoc Sodium Metasilicate + 20 lbs/sack ASCA-1 + 52.9% Fresh Water Yield: 1.95 cf/sack. Tail: 795 sacks Super C + 0.1% bwoc ASA-301 + 0.2% bwoc Sodium Metasilicate + 20 lbs/sack ASCA-1 + 52 Yield: 1.56 Stage 2 Lead: 735 sacks (35:65) Poz (Fly Ash):Premium Plus C Cement + 1% bwow Sodium Chloride + 0.4% bwoc R-3 + 0.125 lbs/sack Cello Flake + 6% bwoc Bentonite + 0.4% bwoc FL-52A + 103.1% Fresh Water Yield: 2.04 cf/sack. Tail: 200 sacks (60:40) Poz (Fly Ash):Premium Plus C Cement + 1% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 0.75% bwoc BA-10A + 4% bwoc MPA-5 + 63.1% Fresh Water Yield: 1.38 cf/sk
5 ½" Production	Lead: 325 sacks (35:65) Poz (Fly Ash):Class H Cement + 1% bwow Sodium Flake + 6% bwoc Bentonite + 0.4% bwoc FL-52A + 103.2% FW Yield: 1.99 cuft/sk Tail: 1330 sacks (15:61:11) Poz (Fly Ash):Class C Cement:CSE-2 + 1% 0.4% bwoc CD-32 + 2 lbs/sack LCM-1 + 0.6% bwoc FL-25 + 0.6% bwoc FL-52A + 73.3% Fresh Water Yield: 1.29 cuft/sk

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 and Natural Resources Department

OIL CONSERVATION DIVISION

1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

Form C-102
Revised October 15, 2009

Submit one copy to appropriate District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
		WILDCAT; MORROW (GAS)

Property Code	Property Name	Well Number
	SERRANO "29" FEDERAL	1H

OGRID No.	Operator Name	Elevation
6137	DEVON ENERGY PRODUCTION COMPANY, L.P.	3340'

Surface Location

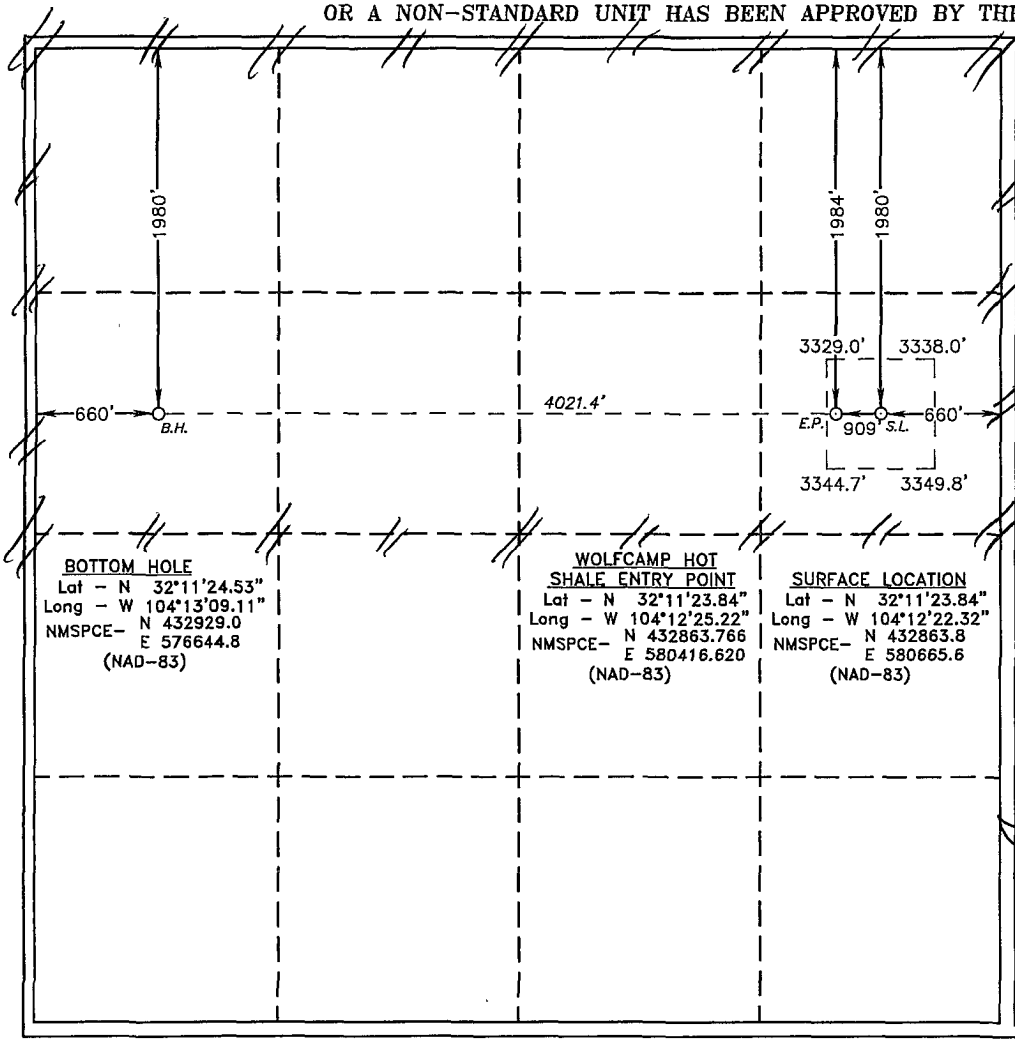
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	29	24 S	27 E		1980	NORTH	660	EAST	EDDY

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
E	29	24 S	27 E		1980	NORTH	660	WEST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
320			

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



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.

/S/ 03/03/2010
Signature Date

STEPHANIE A. YSASAGA
Printed Name

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 supervison, and that the same is true and correct to the best of my belief.

DECEMBER 10, 2009
Date Surveyed

Signature & Seal of Professional Surveyor

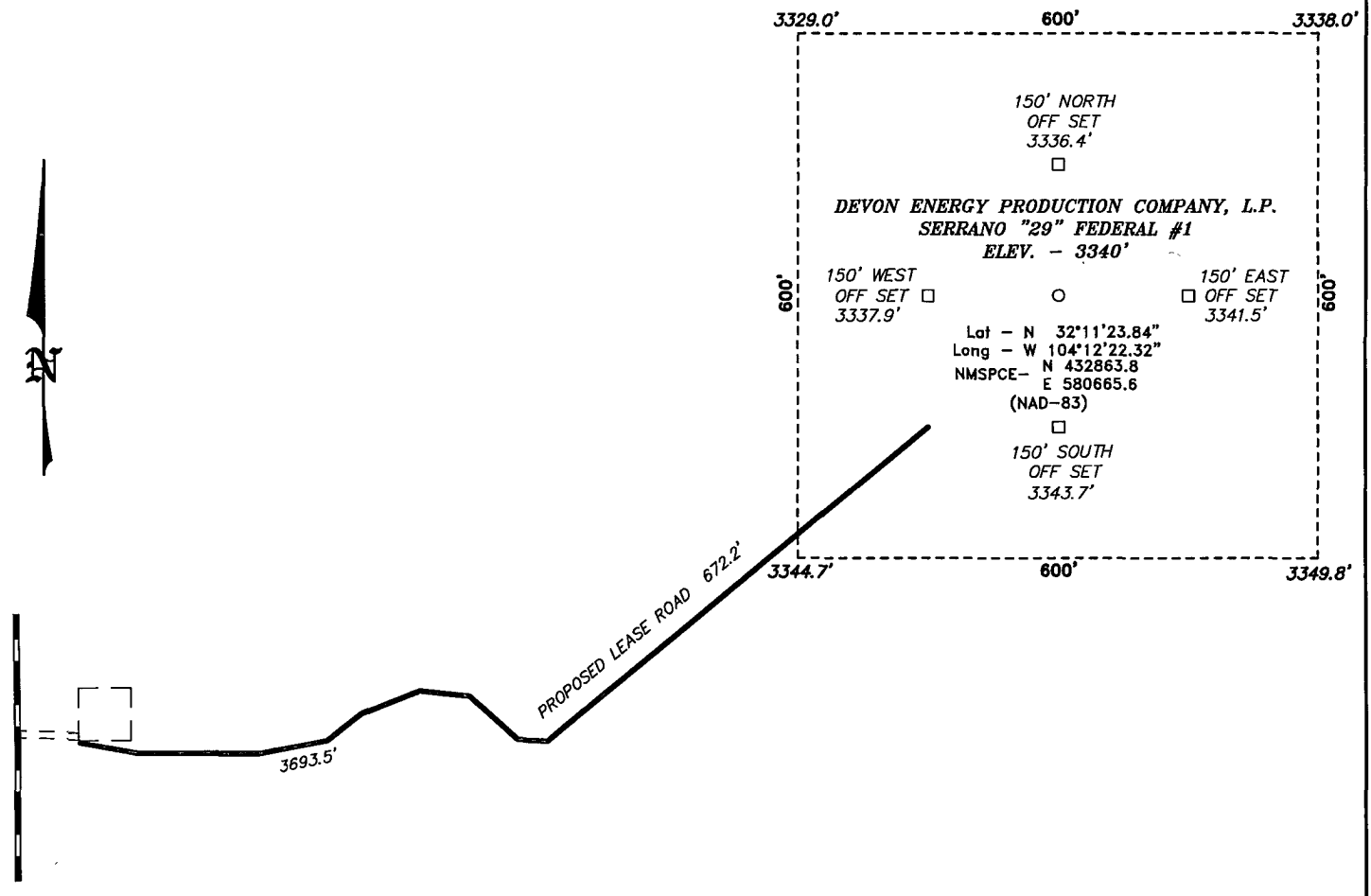
NEW MEXICO — GARY L. JONES — No. 7977 — REGISTERED PROFESSIONAL SURVEYOR

Certificate No. Gary L. Jones 7977

BASIN SURVEYS

SECTION 29, TOWNSHIP 24 SOUTH, RANGE 27 EAST, N.M.P.M.,

EDDY COUNTY, **NEW MEXICO.**



200 0 200 400 FEET

SCALE: 1" = 200'

Directions to Location:

FROM THE JUNCTION OF BLACK RIVER AND JOHN D FOREHAND, GO SOUTH ON JOHN D FOREHAND FOR 1.5 MILES TO OLD LEASE ROAD, AND PROPOSED LEASE ROAD.

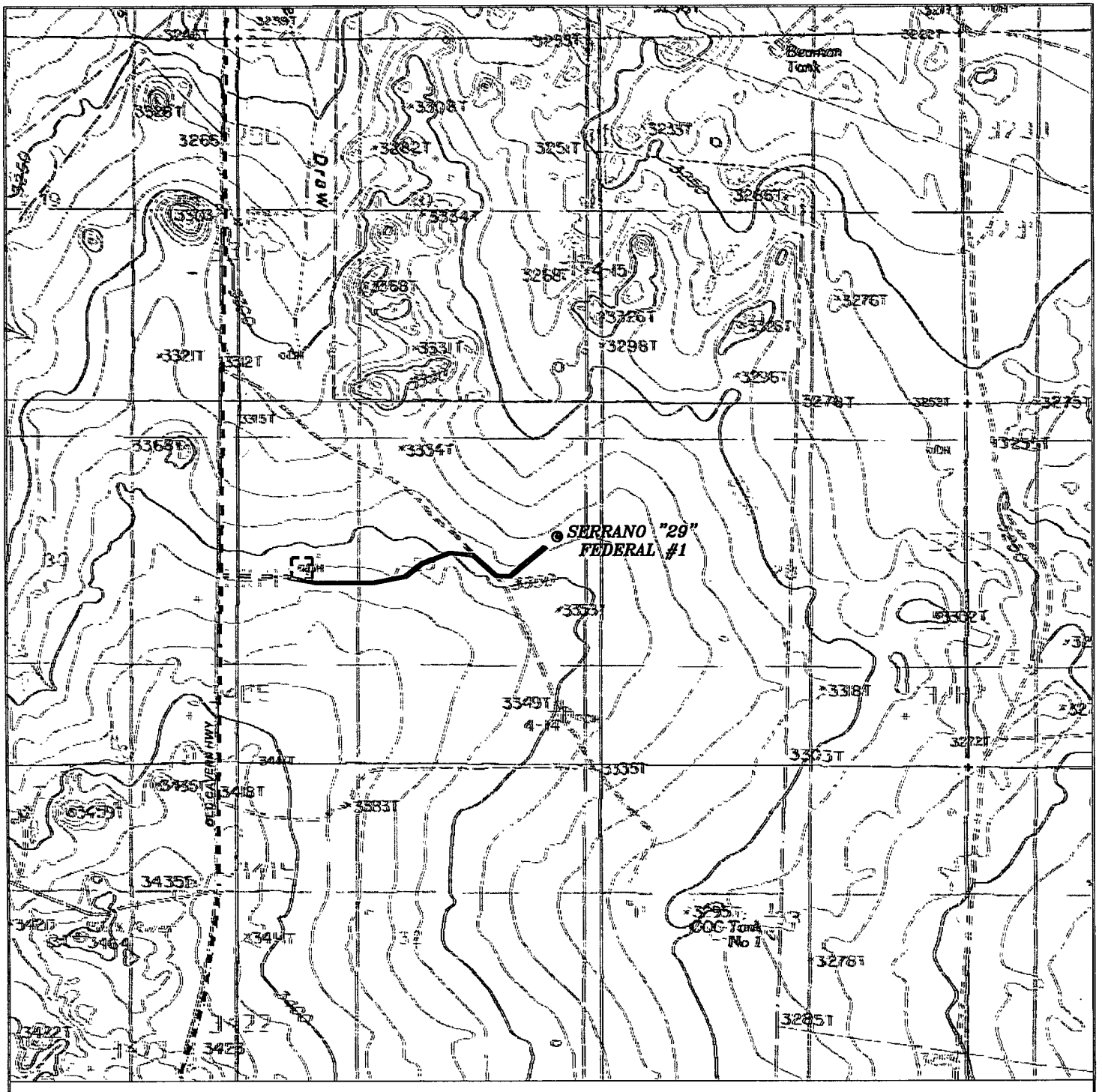
DEVON ENERGY PRODUCTION COMPANY, L.P.

REF: SERRANO "29" FEDERAL #1 / WELL PAD TOPO

THE SERRANO "29" FEDERAL #1 LOCATED 1980' FROM THE NORTH LINE AND 660' FROM THE EAST LINE OF SECTION 29, TOWNSHIP 24 SOUTH, RANGE 27 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO.

BASIN SURVEYS P.O. BOX 1786 - HOBBS, NEW MEXICO

W.O. Number: 22045-22323	Drawn By: J. SMALL	Survey Date: 12-10-2009	Sheet 1 of 1 Sheets
Date: 12-11-2009	Disk: JMS 22045-22323		



SERRANO "29" FEDERAL #1

Located 1980' FNL and 660' FEL
Section 29, Township 24 South, Range 27 East,
N.M.P.M., Eddy County, New Mexico.

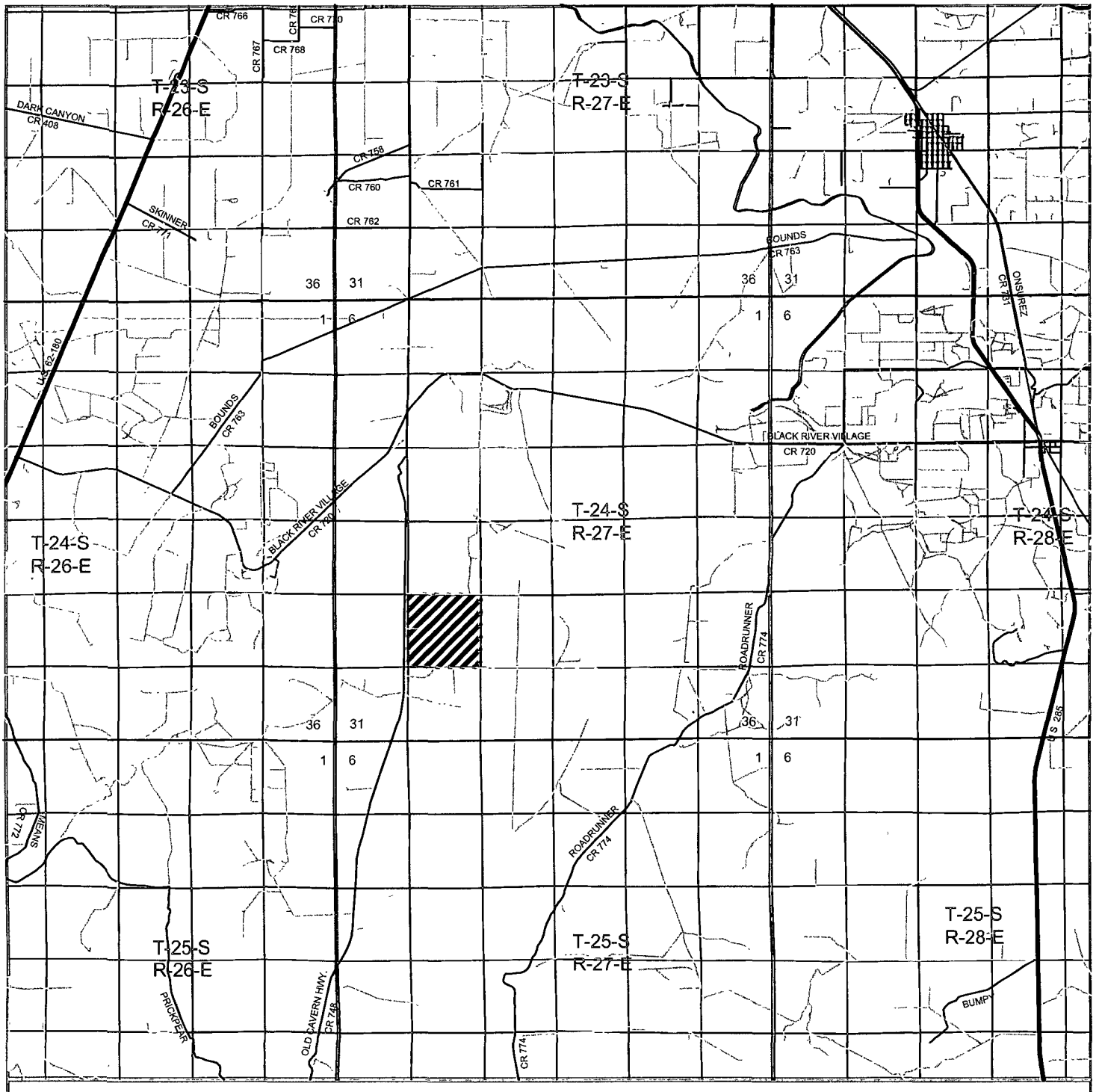
Basin Surveys
focused on excellence in the oilfield

P.O. Box 1786
1120 N. West County Rd.
Hobbs, New Mexico 88241
(575) 393-7316 - Office
(575) 392-2206 - Fax
basinsurveys.com

W.O. Number:	JMS 22045-323
Survey Date:	12-10-2009
Scale:	1" = 2000'
Date:	12-11-2009

N

DEVON ENERGY PRODUCTION COMPANY, L.P.



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Hobbs, New Mexico 88241
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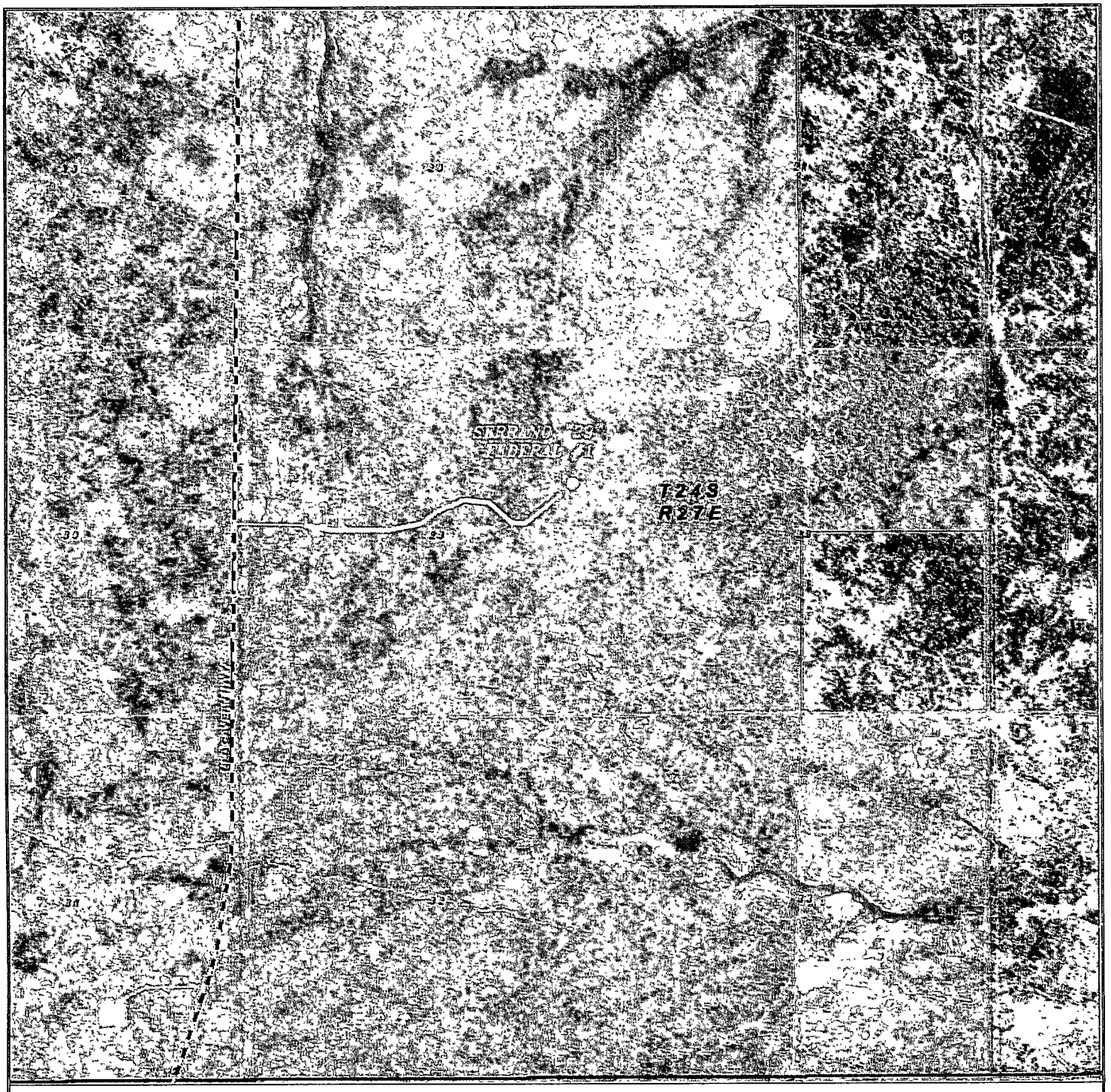
(575) 392-2206 – Fax
basinsurveys.com

W.O. Number:	JMS 22045
Survey Date:	12-10-2009
Scale:	1" = 2 Miles
Date:	12-11-2009

N

DEVON ENERGY PRODUCTION COMPANY, L.P.



SERRANO "29" FEDERAL #1
Located 1980' FNL and 660' FEL
Section 29, Township 24 South, Range 27 East,
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basinsurveys.com

W.O. Number: JMS 22045-323

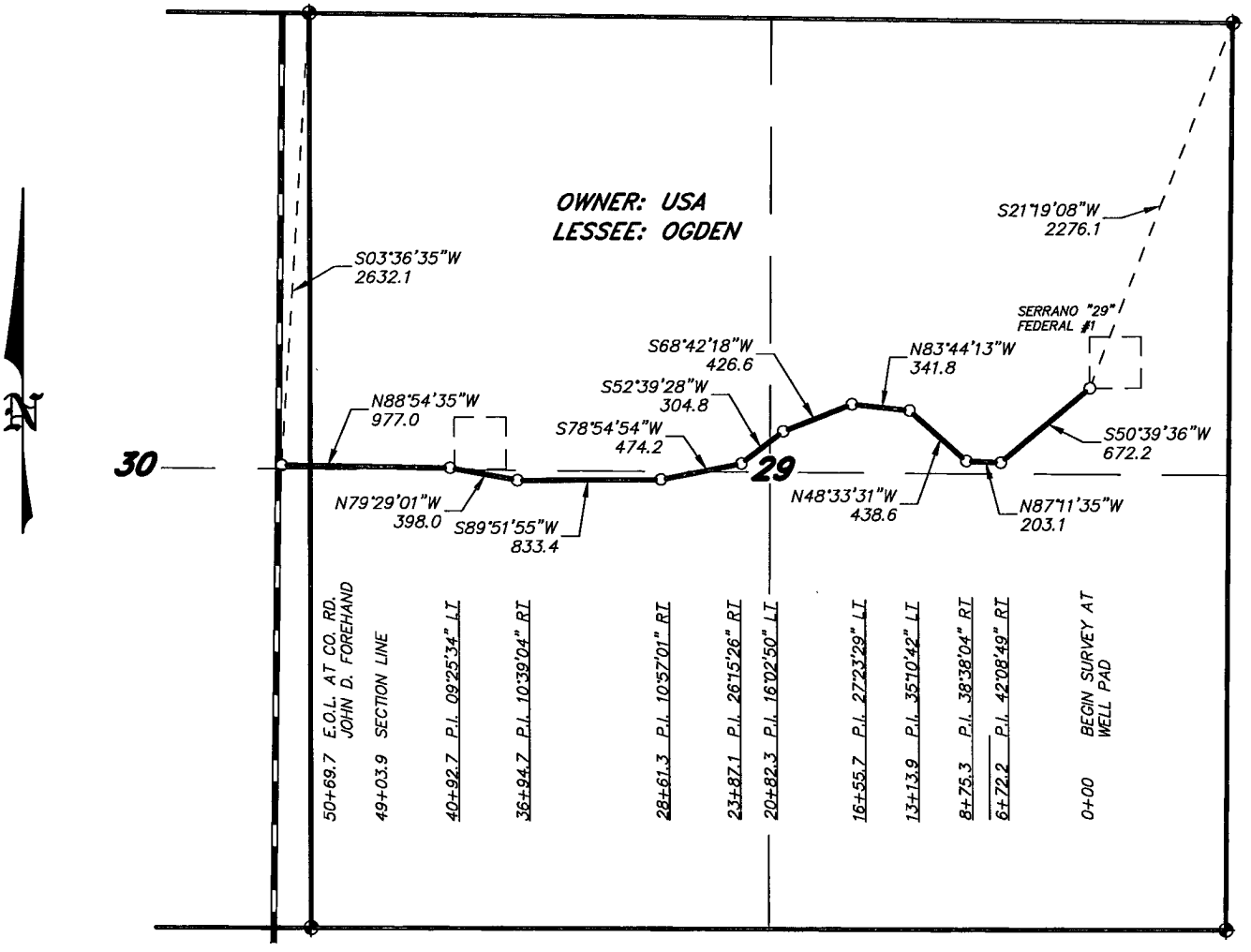
Scale: 1" = 2000'

YELLOW TINT - USA LAND
BLUE TINT - STATE LAND
NATURAL COLOR - FEE LAND

N

DEVON ENERGY PRODUCTION COMPANY, L.P.

SECTIONS 29&30, TOWNSHIP 24 SOUTH, RANGE 27 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO.



LEGAL DESCRIPTION

A STRIP OF LAND 30.0 FEET WIDE, LOCATED IN SECTIONS 29&30, TOWNSHIP 24 SOUTH, RANGE 27 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO AND BEING 15.0 FEET LEFT AND RIGHT OF THE ABOVE PLATTED CENTERLINE SURVEY.

SECTION 29 =	4903.9 FEET =	297.20 RODS =	0.93 MILES =	3.38 ACRES
SECTION 30 =	165.8 FEET =	10.05 RODS =	0.03 MILES =	0.11 ACRES
TOTAL	= 5069.7 FEET =	307.25 RODS =	0.96 MILES =	3.49 ACRES

I HEREBY CERTIFY THAT THIS PLAT WAS PREPARED FROM FIELD NOTES OF AN ACTUAL SURVEY AND MEETS OR EXCEEDS ALL REQUIREMENTS FOR LAND SURVEYS AS SPECIFIED BY THIS STATE.

GARY L. JONES — NEW MEXICO No. 7977 — TEXAS P.L.S. No. 5074

1000 0 1000 2000 FEET

BASIN SURVEYS P.O. BOX 1786 – HOBBS, NEW MEXICO

DEVON ENERGY PRODUCTION COMPANY, L.P.

REF: PROPOSED LEASE ROAD TO THE SERRANO "29" FEDERAL 1

A LEASE ROAD CROSSING USA LAND IN SECTIONS 29&30, TOWNSHIP 24 SOUTH, RANGE 27 EAST, N.M.P.M., EDDY COUNTY, NEW MEXICO.

W.O. Number: 22323	Drawn By: J. M. SMALL		
Date: 02-10-2010	Disk: JMS 22323	Survey Date: 02-06-2010	Sheet 1 of 1 Sheets

devon

Devon Energy

Eddy Co., New Mexico (Nad 83)
Serrano 29 Fed #1H
Serrano 29 Fed #1H

Lateral #1

Plan: Design #2

Standard Planning Report

23 January, 2010

CUDD
DRILLING & MEASUREMENT
SERVICES

Database:	EDM 2003.21 Single User Db	**Local Co-ordinate Reference:**	Site Serrano 29 Fed #1H
Company:	Devon Energy	**TVD Reference:**	WELL @ 3360.00ft (Original Well Elev)
Project:	Eddy Co., New Mexico (Nad 83)	**MD Reference:**	WELL @ 3360.00ft (Original Well Elev)
Site:	Serrano 29 Fed #1H	**North Reference:**	Grid
Well:	Serrano 29 Fed #1H	**Survey Calculation Method:**	Minimum Curvature
Wellbore:	Lateral #1		
Design:	Design #2		

Project	Eddy Co., New Mexico (Nad 83)		
Map System:	US State Plane 1983	**System Datum:**	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Serrano 29 Fed #1H, Sec29, T-24S, R-27E				
Site Position:		**Northing:**	437,918.85 ft	**Latitude:**	32° 12' 14.000 N
From:	Lat/Long	**Easting:**	566,940.68 ft	**Longitude:**	104° 15' 2.000 W
Position Uncertainty:	0.00 ft	**Slot Radius:**	"	**Grid Convergence:**	0.04 °

Well	Serrano 29 Fed #1H					
Well Position	**+N/-S**	0.00 ft	**Northing:**	437,918.85 ft	**Latitude:**	32° 12' 14.000 N
	+E/-W	0.00 ft	**Easting:**	566,940.68 ft	**Longitude:**	104° 15' 2.000 W
Position Uncertainty		0.00 ft	**Wellhead Elevation:**	3,360.00 ft	**Ground Level:**	3,340.00 ft

Wellbore	Lateral #1

Magnetics	**Model Name**	**Sample Date**	**Declination (°)**	**Dip Angle (°)**	**Field Strength (nT)**
	IGRF200510	01/23/10	8.05	60.10	48,698

Design	Design #2

Audit Notes:					
Version:		**Phase:**	PLAN	**Tie On Depth:**	0.00
Vertical Section:	**Depth From (TVD) (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Direction (°)**	
	0.00	0.00	0.00	270.00	

Plan Sections										
Measured Depth (ft)	**Inclination (°)**	**Azimuth (°)**	**Vertical Depth (ft)**	**+N/-S (ft)**	**+E/-W (ft)**	**Dogleg Rate (°/100ft)**	**Build Rate (°/100ft)**	**Turn Rate (°/100ft)**	**TFO (°)**	**Target**
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
10,147.04	0.00	0.00	10,147.04	0.00	0.00	0.00	0.00	0.00	0.00	
11,047.04	90.00	270.00	10,720.60	0.00	-572.96	10.00	10.00	0.00	270.00	
14,434.08	90.00	270.00	10,720.60	0.00	-3,960.00	0.00	0.00	0.00	0.00	PBHL - TD (S29F#1H

Database:	EDM 2003.21 Single User Db	Local Co-ordinate Reference:	Site Serrano 29 Fed #1H
Company:	Devon Energy	TVD Reference:	WELL @ 3360.00ft (Original Well Elev)
Project:	Eddy Co., New Mexico (Nad 83)	MD Reference:	WELL @ 3360.00ft (Original Well Elev)
Site:	Serrano 29 Fed #1H	North Reference:	Grid
Well:	Serrano 29 Fed #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Lateral #1		
Design:	Design #2		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
8,978.00	0.00	0.00	8,978.00	0.00	0.00	0.00	0.00	0.00	0.00
Wolfcamp									
9,851.00	0.00	0.00	9,851.00	0.00	0.00	0.00	0 00	0.00	0.00
Wolfcamp Hot Shale Top									
10,147.00	0.00	0.00	10,147.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP - Build 10°/100'									
10,147.04	0.00	0.00	10,147.04	0.00	0.00	0.00	0.00	0.00	0.00
10,218.18	7.11	270.00	10,218.00	0.00	-4.41	4.41	10.00	10.00	0.00
Wolfcamp Hot Shale Btm									
10,703.40	55.64	270.00	10,620.00	0.00	-249.55	249.55	10.00	10.00	0.00
Penn Shale									
11,047.00	90.00	270.00	10,720.00	0.00	-572.92	572.92	10.00	10.00	0.00
EOC - Hold I:90° @ A:270°									
11,047.04	90.00	270.00	10,720.00	0.00	-572.96	572.96	10.00	10.00	0.00
14,434.08	90.00	270.00	10,720.00	0.00	-3,960.00	3,960.00	0.00	0.00	0.00
PBHL - TD (S29F#1H)									

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
8,978.00	8,978.00	Wolfcamp		0.00	
9,851.00	9,851.00	Wolfcamp Hot Shale Top		0.00	
10,218.18	10,218.00	Wolfcamp Hot Shale Btm		0.00	
10,703.40	10,620.00	Penn Shale		0.00	
	10,867.00	Strawn		0.00	

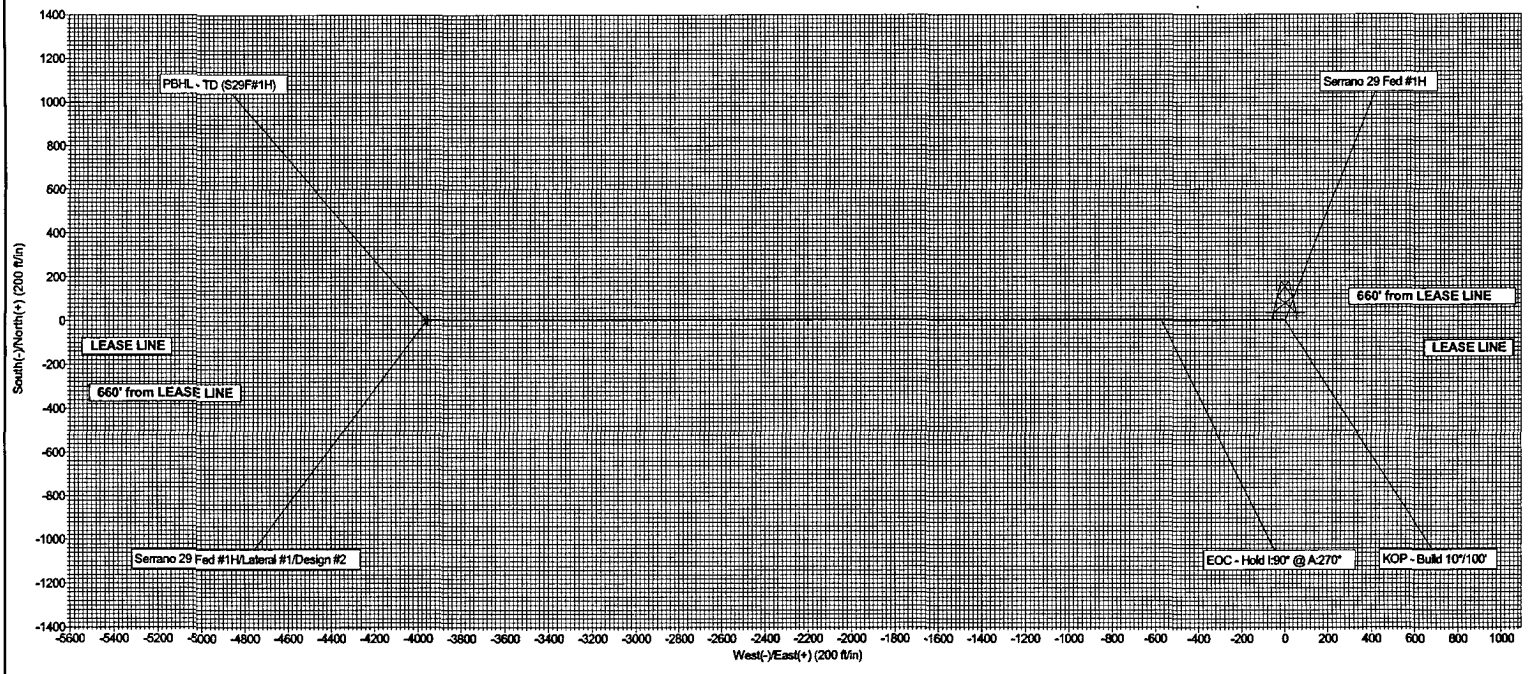
Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates +N/-S (ft)	Local Coordinates +E/-W (ft)	Comment
10,147.00	10,147.00	0.00	0.00	KOP - Build 10°/100'
11,047.00	10,720.00	0.00	-572.92	EOC - Hold I:90° @ A:270°

devon

Project: Eddy Co , New Mexico (Nad 83)
Site: Serrano 29 Fed #1H
Well: Serrano 29 Fed #1H
Wellbore: Lateral #1
Design: Design #2

EUDD DRILLING & MEASUREMENT SERVICES



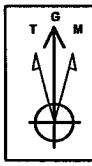
ANNOTATIONS		
TVD	MD	Annotation
10147 00	10147 00	KOP - Build 10°/100'
10720 00	11047 00	EOC - Hold I:90° @ A:270°

WELLBORE TARGET DETAILS (MAP CO-ORDINATES AND LAT/LONG)								
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape
PBHL - TD (S29F#1H)	10720 00	0 00	-3960 00	437918.85	562980 69	32° 12' 14 028 N	104° 15' 48 091 W	Point

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	
2	10147 04	0 00	0 00	10147 04	0 00	0 00	0.00	0 00	0 00	
3	11047 04	90 00	270 00	10720 00	0 00	-572.96	10 00	270 00	572 96	
4	14434 08	90 00	270 00	10720 00	0 00	-3960 00	0 00	0 00	3960.00	PBHL - TD (S29F#1H)

WELL DETAILS: Serrano 29 Fed #1H						
Ground Level: 3340.00						
WELL @ 3360 00ft (Orginal Well Elev)						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0 00	0 00	437918.85	566940 68	32° 12' 14 000 N	104° 15' 2 000 W	

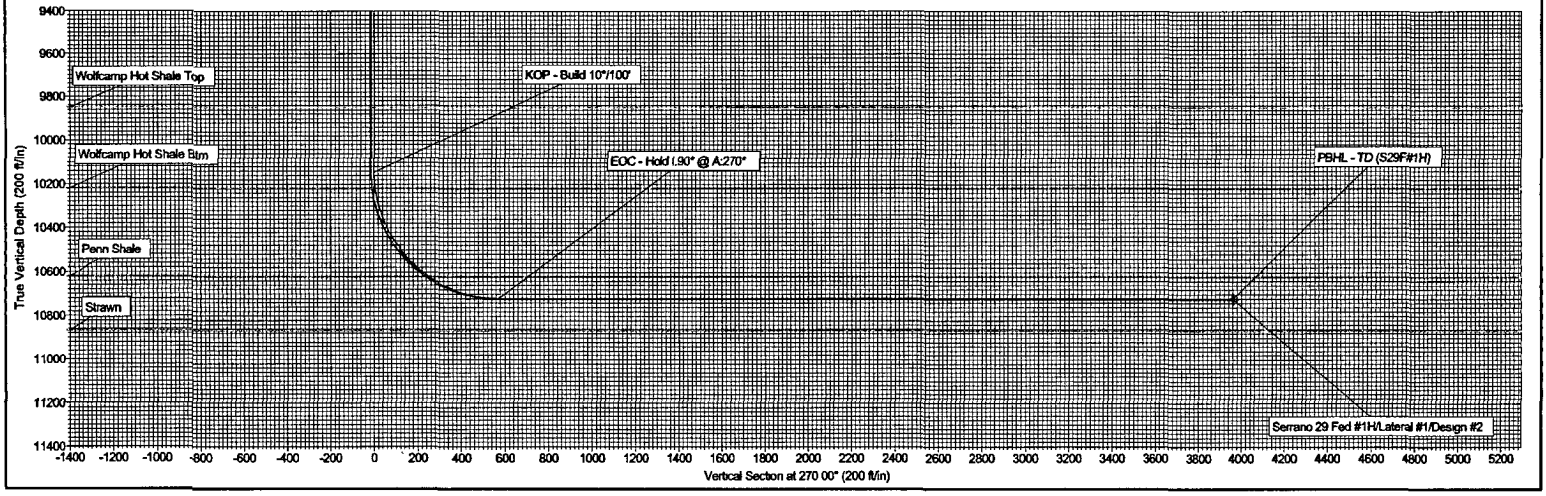
PROJECT DETAILS: Eddy Co , New Mexico (Nad 83)	
Geodetic System:	US State Plane 1983
Datum:	North American Datum 1983
Ellipsoid:	GRS 1980
Zone:	New Mexico Eastern Zone
System Datum:	Mean Sea Level



Azimuths to Grid North
True North: -0 04°
Magnetic North: 8 00°

Magnetic Field
Strength: 48698 2snT
Dip Angle: 60 10°
Date: 01/23/2010
Model: IGRF200510

Plan: Design #2 (Serrano 29 Fed #1H/Lateral #1)			
Created By: Mike Starkey		Date: 13:58, January 23 2010	
Checked:		Date:	
Reviewed:		Date:	
Approved:		Date:	



Proposal No: 215855447C

Devon Energy Corp
Serano 29 Federal #1

Sec. 29-24S-27E
Eddy County, New Mexico
February 23, 2010

Well Recommendation

Prepared for:
Pat Brown
Drilling Engineer
Oklahoma City, Oklahoma
Bus Phone: (405) 228-8511

Prepared by:
John Parks
Region Technical Rep.
Oklahoma City, Oklahoma
Bus Phone: (405) 228-4302

THE BLUE WELLBORE℠
Makes better wells

Service Point:
Artesia
Bus Phone: (505) 746-3140
Fax: (505) 746-2293

Service Representatives:
Larry Johnson
Senior Sales Rep
Artesia, New Mexico

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Surface Casing
Date: February 23, 2010

Proposal No: 215855447C

JOB AT A GLANCE

Depth (TVD)	90 ft
Depth (MD)	90 ft
Hole Size	26 in
Casing Size/Weight :	20 in, 94 lbs/ft
Pump Via	20" O.D. (19.124" .I.D) 94 #
Total Mix Water Required	1,429 gals
Spacer	
Fresh Water	10 bbls
Density	8.3 ppg
Cement Slurry	
Class C	225 sacks
Density	14.8 ppg
Yield	1.35 cf/sack
Displacement	
Mud	32 bbls
Density	8.8 ppg

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Surface Casing
Date: February 23, 2010

Proposal No: 215855447C

WELL DATA

ANNULAR GEOMETRY

ANNULAR I.D. (in)	DEPTH(ft)	
	MEASURED	TRUE VERTICAL
26.000 HOLE	90	90

SUSPENDED PIPES

DIAMETER (in)		WEIGHT	DEPTH(ft)	
O.D.	I.D.	(lbs/ft)	MEASURED	TRUE VERTICAL
20.000	19.124	94	90	90

Mud Density	8.80 ppg
Est. Static Temp.	80 ° F
Est. Circ. Temp.	80 ° F

VOLUME CALCULATIONS

90 ft	x	1.5053 cf/ft	with	125 % excess	=	304.8 cf
				TOTAL SLURRY VOLUME	=	304.8 cf
					=	54 bbls

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Surface Casing
Date: February 23, 2010

Proposal No: 215855447C

FLUID SPECIFICATIONS

Spacer 10.0 bbls Fresh Water @ 8.34 ppg

FLUID	VOLUME CU-FT	VOLUME FACTOR	AMOUNT AND TYPE OF CEMENT
Cement Slurry	305	/ 1.35	= 225 sacks Class C Cement + 2% bwoc Calcium Chloride + 0.125 lbs/sack Cello Flake + 56.3% Fresh Water

Displacement 32.0 bbls Mud @ 8.8 ppg

CEMENT PROPERTIES

	SLURRY NO. 1
Slurry Weight (ppg)	14.80
Slurry Yield (cf/sack)	1.35
Amount of Mix Water (gps)	6.35
Estimated Pumping Time - 70 BC (HH:MM)	2:30
COMPRESSIVE STRENGTH	
8 hrs @ 80 ° F (psi)	500
12 hrs @ 80 ° F (psi)	1150
24 hrs @ 80 ° F (psi)	2100
72 hrs @ 80 ° F (psi)	2700

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Intermediate Casing
Date: February 23, 2010

Proposal No: 215855447C

JOB AT A GLANCE

Depth (TVD)	3,100 ft
Depth (MD)	3,100 ft
Hole Size	17.5 in
Casing Size/Weight :	13 3/8in, 61 lbs/ft
Pump Via	13 3/8" O.D. (12.515" .I.D) 61 #
Total Mix Water Required	26,257 gals
Spacer	
Fresh Water	20 bbls
Density	8.3 ppg
Lead Slurry	
35:65:6 Poz:Class C	2,165 sacks
Density	12.5 ppg
Yield	2.04 cf/sack
Tail Slurry	
60:40 Poz:Class C (MPA)	300 sacks
Density	13.8 ppg
Yield	1.37 cf/sack
Displacement	
Mud	466 bbls
Density	10.0 ppg

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Intermediate Casing
Date: February 23, 2010

Proposal No: 215855447C

WELL DATA

ANNULAR GEOMETRY

ANNULAR I.D. (in)	DEPTH(ft)	
	MEASURED	TRUE VERTICAL
19.124 CASING	90	90
17.500 HOLE	3,100	3,100

SUSPENDED PIPES

DIAMETER (in)		WEIGHT	DEPTH(ft)	
O.D.	I.D.	(lbs/ft)	MEASURED	TRUE VERTICAL
13.375	12.515	61	3,100	3,100

Float Collar set @	3,060 ft
Mud Density	10.00 ppg
Est. Static Temp.	108 ° F
Est. Circ. Temp.	95 ° F

VOLUME CALCULATIONS

90 ft	x	1.0190 cf/ft	with	0 % excess	=	91.7 cf
2,768 ft	x	0.6946 cf/ft	with	125 % excess	=	4326.6 cf
242 ft	x	0.6946 cf/ft	with	125 % excess	=	377.8 cf
40 ft	x	0.8543 cf/ft	with	0 % excess	=	34.2 cf (inside pipe)
				TOTAL SLURRY VOLUME	=	4830.3 cf
					=	861 bbls

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Intermediate Casing
Date: February 23, 2010

Proposal No: 215855447C

FLUID SPECIFICATIONS

Spacer 20.0 bbls Fresh Water @ 8.34 ppg

FLUID	VOLUME CU-FT	VOLUME FACTOR	AMOUNT AND TYPE OF CEMENT
Lead Slurry	4418	/ 2.04	= 2165 sacks (35:65) Poz (Fly Ash):Class C Cement + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 6% bwoc Bentonite + 0.4% bwoc FL-52A + 107.7% Fresh Water
Tail Slurry	412	/ 1.37	= 300 sacks (60:40) Poz (Fly Ash):Class C Cement + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 0.1% bwoc Sodium Metasilicate + 4% bwoc MPA-5 + 65.4% Fresh Water

Displacement 465.6 bbls Mud @ 10 ppg

CEMENT PROPERTIES

	SLURRY NO. 1	SLURRY NO. 2
Slurry Weight (ppg)	12.50	13.80
Slurry Yield (cf/sack)	2.04	1.37
Amount of Mix Water (gps)	11.24	6.43
Estimated Pumping Time - 70 BC (HH:MM)	5:00	3:30
COMPRESSIVE STRENGTH		
8 hrs @ 107 ° F (psi)		800
12 hrs @ 107 ° F (psi)	325	1549
17 hrs @ 107 ° F (psi)	500	
24 hrs @ 107 ° F (psi)	637	2400

ACTUAL CEMENT VOLUME MAY VARY BASED ON FLUID CALIPER.

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Production Casing
Date: February 23, 2010

Proposal No: 215855447C

JOB AT A GLANCE

Depth (TVD)	8,800 ft
Depth (MD)	8,800 ft
Hole Size	12.25 in
Casing Size/Weight :	9 5/8 in, 40 lbs/ft
Pump Via	9 5/8" O.D. (8.835" .I.D) 40 #
Total Mix Water Required	24,799 gals
Stage No: 1	**Float Collar set @** 8,760 ft
Spacer	
Fresh Water	10 bbls
Density	8.3 ppg
Spacer	
Surebond III	1,000 gals
Density	9.4 ppg
Spacer	
Fresh Water	10 bbls
Density	8.3 ppg
Lead Slurry	
35:65:6 Poz:Class H:Gel	895 sacks
Density	12.5 ppg
Yield	1.96 cf/sack
Tail Slurry	
Super C Modified	735 sacks
Density	13.3 ppg
Yield	1.56 cf/sack
Displacement	
Displacement Fluid	664 bbls

JOB AT A GLANCE (Continued)

Stage No: 2 **Stage Collar set @** 4,200 ft

Spacer	
Fresh Water	20 bbls
Density	8.3 ppg
Lead Slurry	
35:65:6 Poz:Class C:Gel	735 sacks
Density	12.5 ppg
Yield	2.04 cf/sack
Tail Slurry	
60:40 Poz:Class C (MPA)	200 sacks
Density	13.8 ppg
Yield	1.38 cf/sack
Displacement	
Displacement Fluid	318 bbls

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Production Casing
Date: February 23, 2010

Proposal No: 215855447C

WELL DATA

ANNULAR GEOMETRY

ANNULAR I.D. (in)	DEPTH(ft)	
	MEASURED	TRUE VERTICAL
12.515 CASING	3,100	3,100
12.250 HOLE	8,800	8,800

SUSPENDED PIPES

DIAMETER (in)		WEIGHT	DEPTH(ft)	
O.D.	I.D.	(lbs/ft)	MEASURED	TRUE VERTICAL
9.625	8.835	40	8,800	8,800

STAGE: 1

Float Collar set @	8,760 ft
Mud Density	9.30 ppg
Est. Static Temp.	168 ° F
Est. Circ. Temp.	134 ° F

VOLUME CALCULATIONS

2,800 ft	x	0.3132 cf/ft	with	100 % excess	=	1753.9 cf
1,800 ft	x	0.3132 cf/ft	with	100 % excess	=	1127.5 cf
40 ft	x	0.4257 cf/ft	with	0 % excess	=	17.0 cf (inside pipe)
				TOTAL SLURRY VOLUME	=	2898.4 cf
					=	517 bbls

STAGE: 2

Stage Collar set @	4,200 ft
Mud Density	9.30 ppg
Est. Static Temp.	114 ° F
Est. Circ. Temp.	100 ° F

VOLUME CALCULATIONS

3,100 ft	x	0.3490 cf/ft	with	0 % excess	=	1081.8 cf
661 ft	x	0.3132 cf/ft	with	100 % excess	=	413.9 cf
439 ft	x	0.3132 cf/ft	with	100 % excess	=	275.1 cf
				TOTAL SLURRY VOLUME	=	1770.9 cf
					=	316 bbls

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Production Casing
Date: February 23, 2010

Proposal No: 215855447C

FLUID SPECIFICATIONS

STAGE NO.: 1

Spacer	10.0 bbls Fresh Water @ 8.34 ppg
Spacer	1,000.0 gals Surebond III @ 9.35 ppg
Spacer	10.0 bbls Fresh Water @ 8.34 ppg

FLUID	VOLUME CU-FT		VOLUME FACTOR	AMOUNT AND TYPE OF CEMENT
Lead Slurry	1754	/	1.96	= 895 sacks (35:65) Poz (Fly Ash):Class H Cement + 1% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 6% bwoc Bentonite + 0.4% bwoc FL-52A + 103.2% Fresh Water
Tail Slurry	1145	/	1.56	= 735 sacks (15:61:11) Poz (Fly Ash):Class C Cement:CSE-2 + 1% bwow Potassium Chloride + 0.75% bwoc EC-1 + 0.125 lbs/sack Cello Flake + 0.4% bwoc CD-32 + 2 lbs/sack LCM-1 + 0.6% bwoc FL-25 + 0.6% bwoc FL-52A + 73.3% Fresh Water
Displacement	664.2 bbls Displacement Fluid			

CEMENT PROPERTIES

	SLURRY NO. 1	SLURRY NO. 2
Slurry Weight (ppg)	12.50	13.30
Slurry Yield (cf/sack)	1.96	1.56
Amount of Mix Water (gps)	10.76	7.65
Estimated Pumping Time - 70 BC (HH:MM)	5:30	4:30
Free Water (mls) @ ° F @ 90 ° angle		0.0
Fluid Loss (cc/30min) at 1000 psi and ° F		50.0
COMPRESSIVE STRENGTH		
12 hrs @ 167 ° F (psi)	350	900
24 hrs @ 167 ° F (psi)	700	2100
72 hrs @ 167 ° F (psi)	1000	2600

FLUID SPECIFICATIONS (Continued)

STAGE NO.: 2

Spacer				20.0 bbls Fresh Water @ 8.34 ppg
Lead Slurry	1496	/ 2.04	=	735 sacks (35:65) Poz (Fly Ash):Class C Cement + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 6% bwoc Bentonite + 0.4% bwoc FL-52A + 107.7% Fresh Water
Tail Slurry	275	/ 1.38	=	200 sacks (60:40) Poz (Fly Ash):Class C Cement + 5% bwow Sodium Chloride + 0.125 lbs/sack Cello Flake + 0.3% bwoc Sodium Metasilicate + 4% bwoc MPA-5 + 65.5% Fresh Water
Displacement				318.5 bbls Displacement Fluid

CEMENT PROPERTIES

	SLURRY NO. 1	SLURRY NO. 2
Slurry Weight (ppg)	12.50	13.80
Slurry Yield (cf/sack)	2.04	1.38
Amount of Mix Water (gps)	11.24	6.44
Estimated Pumping Time - 70 BC (HH:MM)	4:00	2:30
Free Water (mls) @ ° F @ 90 ° angle		
Fluid Loss (cc/30min) at 1000 psi and ° F		
COMPRESSIVE STRENGTH		
12 hrs @ 106 ° F (psi)	350	
17 hrs @ 106 ° F (psi)	500	
24 hrs @ 106 ° F (psi)	650	
12 hrs @ 121 ° F (psi)		1700
24 hrs @ 121 ° F (psi)		2500

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Long String
Date: February 23, 2010

Proposal No: 215855447C

JOB AT A GLANCE

Depth (TVD)	10,720 ft
Depth (MD)	14,500 ft
Hole Size	8.75 in
Casing Size/Weight :	5 1/2 in, 23 lbs/ft
Pump Via	5 1/2" O.D. (4.670" .I.D) 23 #
Total Mix Water Required	11,248 gals
Spacer	
MCS-3	50 bbls
Density	12.0 ppg
Lead Slurry	
35:65:6 Poz:Class H	325 sacks
Density	12.5 ppg
Yield	1.99 cf/sack
Tail Slurry	
50:50:2 Poz:Class H	1,330 sacks
Density	14.2 ppg
Yield	1.29 cf/sack
Displacement	
Displacement Fluid	306 bbls

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Long String
Date: February 23, 2010

Proposal No: 215855447C

WELL DATA

ANNULAR GEOMETRY

ANNULAR I.D. (in)	DEPTH(ft)	
	MEASURED	TRUE VERTICAL
8.835 CASING	8,800	8,800
8.750 HOLE	14,500	10,720

SUSPENDED PIPES

DIAMETER (in)		WEIGHT	DEPTH(ft)	
O.D.	I.D.	(lbs/ft)	MEASURED	TRUE VERTICAL
5.500	4.670	23	14,500	10,720

Float Collar set @	14,460 ft
Mud Density	11.00 ppg
Mud Type	Oil Based
Est. Static Temp.	166 ° F
Est. Circ. Temp.	166 ° F

VOLUME CALCULATIONS

500 ft	x	0.2607 cf/ft	with	0 % excess	=	130.4 cf
1,200 ft	x	0.2526 cf/ft	with	70 % excess	=	515.9 cf
4,500 ft	x	0.2526 cf/ft	with	50 % excess	=	1705.0 cf
40 ft	x	0.1189 cf/ft	with	0 % excess	=	4.8 cf (inside pipe)
				TOTAL SLURRY VOLUME	=	2356.0 cf
					=	420 bbls

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Long String
Date: February 23, 2010

Proposal No: 215855447C

FLUID SPECIFICATIONS

Spacer — 50.0 bbls MCS-3 + 16.5 lbs/bbl Bentonite + 183 lbs/bbl Barite, Bulk + 2 gal/bbl SS-2 @ 12 ppg

FLUID	VOLUME CU-FT		VOLUME FACTOR		AMOUNT AND TYPE OF CEMENT
Lead Slurry	646	/	1.99	=	325 sacks (35:65) Poz (Fly Ash):Class H Cement + 0.6% bwoc FL-52A + 0.25% bwoc R-3 + 6% bwoc Bentonite + 2% bwow Sodium Chloride + 0.3% bwoc ASA-301 + 104.4% Fresh Water
Tail Slurry	1710	/	1.29	=	1330 sacks (50:50) Poz (Fly Ash):Class H Cement + 2% bwoc Bentonite + 0.5% bwoc FL-52A + 0.5% bwoc FL-25 + 0.2% bwoc CD-32 + 0.3% bwoc Sodium Metasilicate + 3% bwow Sodium Chloride + 57.5% Fresh Water

Displacement — 306.3 bbls Displacement Fluid

CEMENT PROPERTIES

	SLURRY NO. 1	SLURRY NO. 2
Slurry Weight (ppg)	12.50	14.20
Slurry Yield (cf/sack)	1.99	1.29
Amount of Mix Water (gps)	10.89	5.80
Estimated Pumping Time - 70 BC (HH:MM)	5:00	4:00
Free Water (mls) @ 178 ° F @ 90 ° angle		0.0
Fluid Loss (cc/30min) at 1000 psi and 178 ° F		50.0
COMPRESSIVE STRENGTH		
12 hrs @ 166 ° F (psi)	180	250
24 hrs @ 166 ° F (psi)	600	1400
72 hrs @ 166 ° F (psi)	850	1900

CEMENT VOLUMES WILL VARY BASED ON CALIPER.

TEST SPACER SYSTEM WITH OIL BASED MUD.

BATCH MIX SPACER SYSTEM.

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Plug Back
Date: February 23, 2010

Proposal No: 215855447C

JOB AT A GLANCE

Depth (TVD)	11,000 ft
Depth (MD)	11,000 ft
Hole Size	8.75 in
Casing Size/Weight :	9 5/8 in, 40 lbs/ft
Pump Via	Casing 4 1/2" O.D. (3.920" .I.D) 13.5 #
Total Mix Water Required	2,013 gals
Spacer	
Mud Clean II	15 bbls
Cement Slurry	
Class H	385 sacks
Density	15.6 ppg
Yield	1.18 cf/sack

Operator Name: Devon Energy Corp
Well Name: Serano 29 Federal #1
Job Description: Plug Back
Date: February 23, 2010

Proposal No: 215855447C

FLUID SPECIFICATIONS

Spacer = 15.0 bbls Mud Clean II

PLUG NO.	VOLUME CU-FT		VOLUME FACTOR	AMOUNT AND TYPE OF CEMENT
1	454	/	1.18	= 385 sacks Class H Cement + 0.15% bwoc R-3 + 46.4% Fresh Water

CEMENT PROPERTIES

	PLUG NO. 1
Slurry Weight (ppg)	15.60
Slurry Yield (cf/sack)	1.18
Amount of Mix Water (gps)	5.23
Estimated Pumping Time - 70 BC (HH:MM)	4:00
COMPRESSIVE STRENGTH	
12 hrs @ 168 ° F (psi)	1500
24 hrs @ 168 ° F (psi)	2700
72 hrs @ 168 ° F (psi)	3500

PLUG GEOMETRY

	PLUG TOP		PLUG BOTTOM	
1	10100 ft	to	11000 ft	with 8.75 inch Open Hole PDSqT = 145 ° F PDST = 168 ° F

PLUG - 10,100' - 11,000'

PUMP 385 SACK PLUG (20% EXCESS OVER TRUE HOLE).

PECOS DISTRICT
CONDITIONS OF APPROVAL

OPERATOR'S NAME:	**Devon Energy Production Company, LP**
LEASE NO.:	**NMNM112269**
WELL NAME & NO.:	**Serrano 29 Federal #1**
SURFACE HOLE FOOTAGE:	**1980' FNL & 660' FEL**
BOTTOM HOLE FOOTAGE	**1980' FNL & 660' FWL**
LOCATION:	**Section 29, T. 24 S., R 27 E., NMPM**
COUNTY:	**Eddy County, New Mexico**

I. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified a minimum of 4 hours in advance for a representative to witness:

a. Spudding well
b. Setting and/or Cementing of all casing strings
c. BOPE tests

☒ **Eddy County**
Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220, (575) 361-2822

1. **Although Hydrogen Sulfide has not been reported in this section, it is always a possible hazard. It has been reported in the Township to the north. If Hydrogen Sulfide is encountered, please report measured amounts and formations to the BLM.**

2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.

3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.

4. **The record of the drilling rate along with the CAL/GR/N well log run from TD to surface will be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.**

B. CASING

Changes to the approved APD casing and cement program require submitting a sundry and receiving approval prior to work. Failure to obtain approval prior to work will result in an Incident of Non-Compliance being issued.

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) time for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

Medium cave/karst
Possible lost circulation in the Chinle and Delaware Formation.
Possible high pressure gas in the Wolfcamp formation and the Pennsylvanian section.

1. The **20** inch surface casing shall be set at **approximately 90 feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt)** and cemented to the surface.

    a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.

    b. Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.

    c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.

d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The minimum required fill of cement behind the **13-3/8** inch intermediate casing is:

   ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

Formation below the 13-3/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe (not the mud weight required to prevent dissolving the salt formation) and the mud weight for the bottom of the next hole segment. Report results to BLM office.

9-5/8" casing to be kept liquid filled while running in hole.

3. The minimum required fill of cement behind the **9-5/8** inch second intermediate casing is:

   a. First stage to DV tool, cement shall:

      ☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job.

   b. Second stage above DV tool, cement shall:

      ☒ Cement to surface. If cement does not circulate, contact the appropriate BLM office. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

Formation below the 9-5/8" shoe to be tested according to Onshore Order 2.III.B.1.i. Test to be done as a mud equivalency test using the mud weight necessary for the pore pressure of the formation below the shoe and the mud weight for the bottom of the hole. Report results to BLM office.

Pilot hole plug method is approved as written. Plug must be tagged.

Centralizers required on horizontal leg, must be type for horizontal service and minimum of one every other joint.

4. The minimum required fill of cement behind the **5-1/2** inch production casing is:

   ☒ Cement should tie-back at least 4800 feet into previous casing string. Operator shall provide method of verification. **Additional cement may be required as the excess cement calculates to be negative 11%.**

5. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.

2. **Variance approved to use flex line with serial number 34128 from BOP to choke manifold. Check condition of 3" flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to manufacturer's requirements. Anchor requirements from manufacturer are to be onsite for review.**

3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.

    a. **For surface casing only:** If the BOP/BOPE is to be tested against casing, the wait on cement (WOC) time for that casing is to be met (see WOC statement at start of casing section). Independent service company required.

4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **13-3/8** inch intermediate casing shoe shall be **10000 (10M)** psi. **10M system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.**

5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.

    a. Casing cut-off and BOP installation will not be initiated until the cement has had a minimum of 8 hours setup time for a water basin. The casing shall remain stationary and under pressure for at least eight hours after the operator places the cement. In the potash area, the minimum time is 12 hours and the casing shall remain stationary and under pressure during this time period. Casing shall be under pressure if the operator uses some acceptable means of holding pressure or if the operator employs one or more float valves to hold the cement in place. Testing the BOP/BOPE against a plug can commence after meeting the above conditions plus the BOP installation time.

    b. The tests shall be done by an independent service company using a test plug.

c. The results of the test shall be reported to the appropriate BLM office.

d. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**

e. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug.

f. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the **Wolfcamp** formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per Onshore Order No. 2.

D. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the **Wolfcamp** formation, and shall be used until production casing is run and cemented.

E. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

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