STATE OF NEW MEXICO



ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

2040 S. PACHECO SANTA FE, NEW MEXICO 87505 (505) 827-7131

April 16, 1997

Texaco Exploration and Production, Inc. P. O. Box 3109
Midland, Texas 79702
Attention: C. Wade Howard

Administrative Order DD-168(H) High Angle/Horizontal

Dear Mr. Howard:

Reference is made to your application dated February 27, 1997 for authorization to initiate a high angle/horizontal directionally drilling project in the North Vacuum-Abo Pool within Texaco's North Vacuum Abo West Unit/North Vacuum Abo West Unit Waterflood Project Area in portions of Sections 15, 21, 22, 27, 28, 33, and 34, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico.

The Division Director Finds That:

(1) The application of Texaco Exploration and Production, Inc. ("Texaco") as operator of the following described North Vacuum Abo West Unit ("project area") in Lea County, New Mexico (approved by Division Order No. R-6822, dated November 18, 1981) has been duly filed under the provisions of Rule 111.D and E of the General Rules and Regulations of the New Mexico Oil Conservation Division ("Division"), revised by Division Order No. R-10388, issued by the Oil Conservation Commission in Case 11,274 on June 13, 1995;

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM

Section 15:

W/2

Section 21:

S/2 NE/4, S/2 SW/4, and SE/4

Section 22:

W/2

Section 27:

W/2

Section 28:

N/2 and SE/4

Section 33:

N/2 SE/4

Section 34:

N/2 NW/4, SW/4 NW/4, and NW/4 SW/4;

- (2) The proposed high angle/horizontal directionally drilling project is within the applicant's North Vacuum Abo West Unit Waterflood Project Area (established by Division Order No. R-6857, as amended) and as such Division General Rule 701.G(4) applies, which states that wells within waterflood project areas are not subject to an oil allowable;
- (3) The North Vacuum-Abo Pool is subject to the "Special Rules and Regulations for the North Vacuum-Abo (Oil) Pool", as promulgated by Division Order No. R-2421, as amended, which provides for 80-acre oil spacing and proration units, or drilling units, and requires that wells be located within a 200 foot radius of the center of a governmental quarter-quarter section or lot, provided that the first well on the 80-acre unit is located in either the NW/4 or SE/4 of a governmental quarter section;
- (4) Texaco is seeking to initiate a high angle/horizontal directional drilling project within this portion of the North Vacuum-Abo Pool, which is a heterogeneous reservoir where vertical segregation is common, in an attempt to drain laterally discontinuous lenses that would not otherwise be exploited without dense vertical well spacing [see files for Division Administrative Orders DD-153(H) and DD-154(H];
- (5) It is Texaco's intent at this time to drill its North Vacuum Abo West Unit Well No. 29 at a surface location 2080 feet from the North line and 660 feet from the West line (Unit E) of Section 22, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico and to drill multiple laterals off of the vertical wellbore within the unitized Abo formation in such a manner that causes the drainholes to traverse section, quarter section, and quarter-quarter section lines within the project area;
- (6) The applicable drilling window or "producing area" for said wellbore should include that area within the above-described Unit provided that the horizonal or producing portion of any drainhole shall be located no closer than 560 feet from the outer boundary of the above-described "project area"
- (7) It appears the applicant has satisfied all of the appropriate requirements prescribed in said Rule 111.D and E, the subject application should be approved and the well should be governed by the provisions contained within this order and all other applicable provisions of Division General Rule 111.



Administrative Order DD-168(H) Texaco Exploration & Production, Inc. April 16, 1997 Page 3

IT IS THEREFORE ORDERED THAT:

(1) Texaco Exploration and Production, Inc. ("Texaco") is hereby authorized to initiate a high angle/horizontal directional drilling project in the North Vacuum-Abo Pool within its North Vacuum Abo West Unit/North Vacuum Abo West Unit Waterflood Project Area comprising the following described "project area" in Lea County, New Mexico;

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM

Section 15:

W/2

Section 21:

S/2 NE/4, S/2 SW/4, and SE/4

Section 22:

W/2

Section 27:

W/2

Section 28: Section 33:

N/2 and SE/4 N/2 SE/4

Section 34:

N/2 NW/4, SW/4 NW/4, and NW/4 SW/4;

(2) Texaco is further authorized to proceed with their initial plans to drill the North Vacuum Abo West Unit Well No. 29 at a surface location 2080 feet from the North line and 660 feet from the West line (Unit E) of Section 22, Township 17 South, Range 34 East, NMPM, Lea County, New Mexico and to drill multiple laterals off of the vertical wellbore within the unitized Abo formation:

<u>PROVIDED HOWEVER THAT</u> any drainhole drilled from said well may traverse section, quarter section, and quarter-quarter section lines within the project area provided that the horizonal or producing portion of any drainhole shall be located no closer than 560 feet from the outer boundary of the above-described "project area".

<u>PROVIDED FURTHER THAT</u> the applicant shall determine the actual location of the kick-off points in said well prior to commencing directional drilling operations. Also, the applicant shall conduct a directional survey on the lateral portion of any horizontal wellbore during or after completion of drilling operations.

- (3) The applicant shall notify the supervisor of the Hobbs District office of the Division of the date and time said wellbore surveys are to be conducted so that they may be witnessed. The applicant shall further provide a copy of said wellbore surveys to the Santa Fe and Hobbs offices of the Division upon completion.
- (4) The operator shall comply with all requirements and conditions set forth in Division General Rule 111.E(2) and any applicable requirements in 111.D and F.

Administrative Order DD-168(H) Texaco Exploration & Production, Inc. April 16, 1997 Page 4

- (5) Form C-105 shall be filed in accordance with Division Rule 1105 and the operator shall indicate thereon true vertical depth (TVD) in addition to measured depths (MVD).
- (6) Jurisdiction of this cause is retained for the entry of such further orders as the Division may deem necessary.

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

WILLIAM J. LEMAY

Director

SEAL

cc: Oil Conservation Division - Hobbs
New Mexico State Land Office - Santa Fe

DD-TEX. HS

Ru: 3-6-97 Susp: 3-26-97 Released: 4-16-97

April 15, 1997

Texaco Exploration and Production, Inc. P. O. Box 3109
Midland, Texas 79702

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High Angle/Horizontal

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4-16

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W/2

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N/2 and SE/4

Section 33:

N/2 SE/4

Section 34:

N/2 NW/4, SW/4 NW/4, and NW/4 SW/4;

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DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO OIL CONSERVATION DIVISION

WILLIAM J. LEMAY Director

SEAL

cc: Oil Conservation Division - Hobbs

New Mexico State Land Office - Santa Fe

ABOVE THIS LINE POR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

ADMINISTRATIVE APPLICATION COVERSHEET

THIS COVERSHEET IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS

Application Acr	onyms:	-43 MG	, 1 Also Otsoude:		
	[NSP-Non-Standard Proration U				
	[DD-Directional Drilling]				
	[DHC-Downhole Commingling] [CTB-Lease				
	[PC-Pool Commingling] [OLS - Off-Leas				
	[WFX-Waterflood Expansion] [PI)]
	[SWD-Salt Water Disposal]				_
	[EOR-Qualified Enhanced Oil Recovery Certi	fication]	[PPR-Positiv	e Production	Response]
	•			THE PERSON NAMED IN COLUMN TWO IS NOT THE OWNER, THE OW	***************************************
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[1]		PLICATION - Check Those Which Apply for [A] Location - Spacing Unit - Directional Drilling □ NSL ☑ NSP ☑ DD □ SD MAR - 6 1997
	Check [B]	One Only for [B] or [C] Commingling - Storage - Measurement DHC CTB PC CONSERVATION DIVISION OLD OLM
	[C]	Injection - Disposal - Pressure Increase - Enhanced Oil Recovery WFX PMX SWD IPI EOR PPR
[2]	NOTIFICATI [A]	ON REQUIRED TO: - Check Those Which Apply, or Does Not Apply Working, Royalty or Overriding Royalty Interest Owners
	[B]	☑ Offset Operators, Leaseholders or Surface Owner
	[C]	☐ Application is One Which Requires Published Legal Notice
	[D]	Notification and/or Concurrent Approval by BLM or SLO U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office
	[E]	A For all of the above, Proof of Notification or Publication is Attached, and/or,
	[F]	☐ Waivers are Attached

[3] INFORMATION / DATA SUBMITTED IS COMPLETE - Statement of Understanding

I hereby certify that I, or personnel under my supervision, have read and complied with all applicable Rules and Regulations of the Oil Conservation Division. Further, I assert that the attached application for administrative approval is accurate and complete to the best of my knowledge and where applicable, verify that all interest (WI, RI, ORRI) is common. I further verify that all applicable API Numbers are included. I understand that any omission of data, information or notification is cause to have the application package returned with no action taken.

Note: Statement must be completed by an individual with supervisory capacity.

C. WADE HOWARD	
Print or Type Name	

Signature

ENGINEER ASSISTANT

3/4/97 Date

DD



Texaco Exploration and Production Inc

500 North Loraine Midland TX 79701 P O Box 3109 Midland TX 79702

February 27, 1997

GOV - STATE AND LOCAL GOVERNMENTS
Directional Drilling - Horizontal
Non-Standard Proration Unit
North Vacuum Abo West Unit Well No. 29
Vacuum Abo, North Field
Lea County, New Mexico

State of New Mexico Energy and Minerals Department Oil Conservation Division 2040 South Pacheco Santa Fe, New Mexico 87505

Attention: Mr. Michael E. Stogner

Gentlemen:

Administrative approval, Rule 104.D, and Rule 111.D, is requested to directionally drill a dual lateral horizontal well in a non-standard proration unit in the Abo formation.

The North Vacuum Abo West Unit is a candidate for horizontal wells due to the heterogeneous nature of the reservoir. This Unit was designated a "Project Area" for horizontal drilling in 1996 (see Administrative Orders DD-153H and DD-154H). We have completed one successful horizontal well in this Unit (Well No. 26) and are currently drilling a second horizontal well (No. 27).

Attached for your information is a copy of our directional plans, a type log section, and Form C-102.

The "affected" offset operator to this well has been notified of this request. (See attached offset operator's list and certified mail receipts.)

Any questions concerning this request should be directed to me at (915) 688-4606.

Yours very truly,

c. Wade Horson

C. W. Howard Engineer's Assistant

CWH:

CC: NMOCD, P. O. Box 1980, Hobbs, NM 88240 Attachments

DISTRICT 1 P. O. Box 1980, Hobbs, NM 88240

DISTRICT III

DISTRICT II P. O. Drawer DD, Arteela, NM 88210

1000 Rio Brazos Rd., Aztec, NM 87410
DISTRICT IV

DISTRICT IV P. O. Box 2088, Santo Fe, NM 87504-2088 State of New Mexico
Energy, Minerals and Natural Resources Department

OIL CONSERVATION DIVISION

PO Box 2088 Santa Fe, NM 87504-2088 Form C-102 Revised February 10, 1994

Instructions on back

Submit to Appropriate District Office

State Lease-4 copies Fee Lease-3 copies

☐ AMENDED REPORT

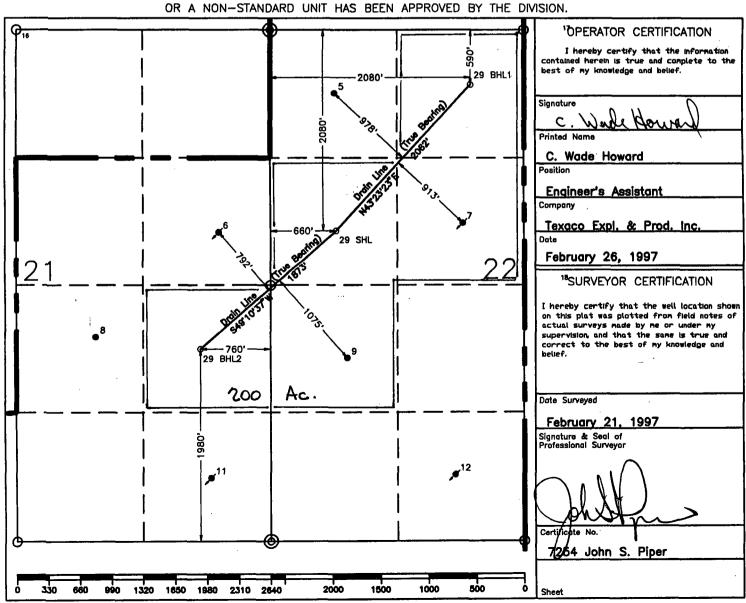
WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Numi	ber	² Pool Code G1760	Vacuum Abo, North	<u> </u>
Property Code			Property Name cuum Abo West Unit	⁸ Well Number 29
'OGRID No. 22351			Operator Norms RATION & PRODUCTION, INC.	⁹ Elevation 4057'

Surface Location

It from the North/South line UL or lot no. Section Township Range Lot Idn Feet from the East/West line Feet from the County 34-E 17-S Ε 22 2080' 660' North West Lea Bottom Hole Location If Different From Surface UL or lat no. Section Range Lot Idn North/South line Feet from the East/West line Township Feet from the County L1 C/L2 I North/South 2080'/760' West/East 22/21 590'/1980' 17-S Lea 34-E 12Dedicated Acres ¹³Joint or Infill 14Consolidation Code ⁵Order No. 200

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.





Texaco Exploration and Production Inc

500 North Loraine Midland TX 79701 P O Box 3109 Midland TX 79702

February 27, 1997

GOV - STATE AND LOCAL GOVERNMENTS

Directional Drilling - Horizontal

Non-Standard Location

North Vacuum Abo West Unit Well No. 29

Sec. 22, T-17-S, R-34-E

Lea County, New Mexico

TO THE OFFSET OPERATORS:

Gentlemen:

As an offset operator to the captioned unit, you are being furnished with a copy of our Application to directionally drill a horizontal well. If you have no objection, please sign the waiver at the bottom of this letter and return in the enclosed envelope.

Any questions concerning this request should be directed to me at (915) 688-4606.

Yours very truly,

Guerrah elew.

C. W. Howard
Engineer's Assistant

CWH: cwh

File

WAIVER APPROVED:

BY:
DATE:

OFFSET OPERATOR'S LIST North Vacuum Abo West Unit Well No. 29 LEA COUNTY, NEW MEXICO

Mobil Exploration and Producing US Inc. P. O. Box 633 Midland, Texas 79702

Mack Energy Corporation P. O. Box 1767 Artesia, NM 88211

Chevron USA Inc. P. O. Box 1150 Midland, Texas 79702

Phillips Petroleum Company 4001 Penbrook Odessa, Texas 79762

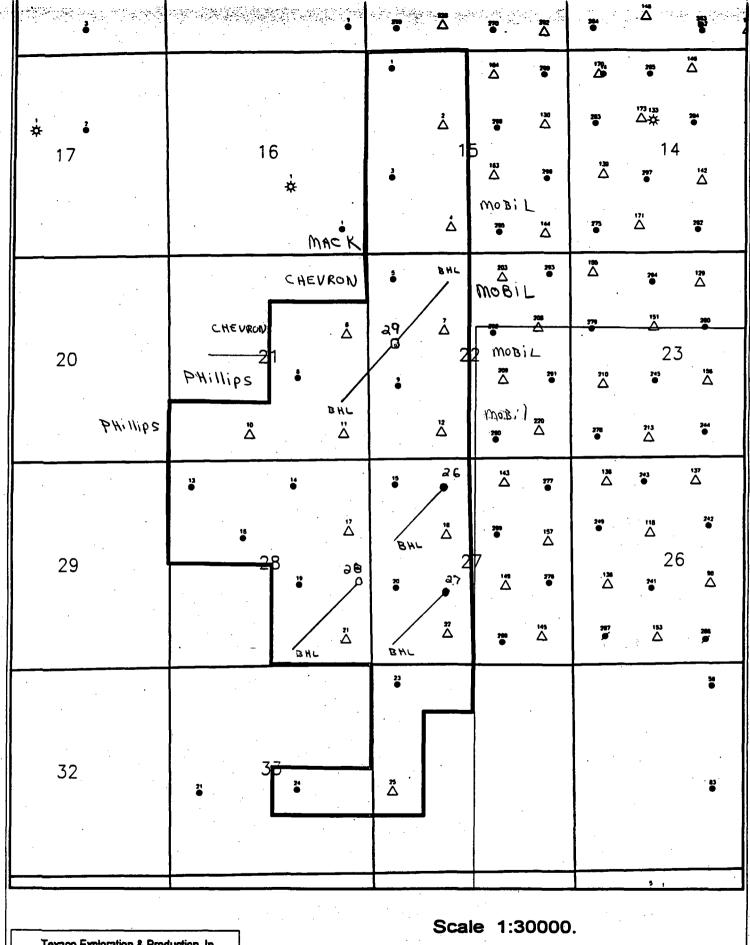
ENDER:		I also wish to receive the
Complete items 1 and/or 2 for additional services.		following services (for an extra 5 fee): 1. Addressee's Address
Complete items 3, and 4a & b. Print your name and address on the reverse of this form so the	et we can	fee):
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Attach this form to the front of the manpices,		<u> </u>
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Write "Return Receipt Requested" on the mailpiece below the The Return Receipt will show to whom the article was delivered		Culisuit postitionia
elivered.	1 4a. Ar	
3. Article Addressed to:	P 32	29 313 829 불
Mobil Exploration and Producing Inc.	45 Sc	rvice Type
P. O. Box 633	4b. 3e	1 leaved
P. U. BOX 033	AA V	tified □ COD -
Midland, TX 79702	AA CO	press Mail XX Return Receipt for Merchandise
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	- 	tified COD Tress Mail XX Return Receipt for Merchandise te of Deliver MAR 0 3 1997 dressee's Address (Only if requested difee is paid)
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5, Signature trans		- ,
	7	
6. Signature (Agent)	}	
PS Form 3811, December 1991	252-714	DOMESTIC RETURN RECEIPT
SENDER: • Complete items 1 and/or 2 for additional services.		I also wish to receive the
SENDER: • Complete items 1 and/or 2 for additional services.	n so that we	following services (for an extra
SENDER: • Complete items 1 and/or 2 for additional services. • Complete items 3, and 4a & b. • Print your name and address on the reverse of this form return this card to you. • Attach this form to the front of the mailpiece, or on the does not nermit.		following services (for an extra fee):
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SENDER: Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b. Print your name and address on the reverse of this form return this card to you. Attach this form to the front of the mailpiece, or on the does not permit. Write "Return Receipt Requested" on the mailpiece below the The Return Receipt will show to whom the article was delivered. Article Addressed to: Mack Energy Corporation P. O. Box 1767 Artesia NM 88211	the article novered and the	following services (for an extra fee): 1. Addressee's Address 2. Restricted Delivery Consult postmaster for fee. Article Number P 329 313 830 Service Type Registered Insured
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SENDER: • Complete items 1 and/or 2 for additional services						
9. Complete items 4 and 11						
Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b.	l also wish to receive					
 Print your name and address on the reverse of this form so 	that we can fee):	extra				
 Attach this form to the front of the mailpiece, or on the ha 	1					
does not permit. Write "Return Receipt Requested" on the mailpiece below the	erticle sumber					
the Neturn Receipt will show to whom the article was delivered.	d and the date Consult postmaster for fee.	1				
3. Article Addressed to:	4a. Article Number					
Chevron USA Inc.	P 329 313 831					
	4b. Service Type					
P. O. Box 1150	Registered Insured					
Midland, TX 79702	XX Certified					
	Express Mail XX Return Receipt	for				
	7. Date of Delivery					
	FEB 28 1997					
5. Signature (Addressee)	8. Addressee's Address (Only if requi					
	and fee is paid)	estec				
6. Signature (Agency						
	1111111 11111 111 111 111					
PS Form 3811, December 1991 +U.S. GPO: 1993-	52-714 DOMESTIC RETURN RECI					
	I also wish to receive t	the				
Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b.	l also wish to receive to following services (for an ex					
Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b. Print your name and address on the reverse of this form so t	l also wish to receive to following services (for an ex					
Complete items 1 and/or 2 for additional services. Complete items 3, and 4e & b. Print your name and address on the reverse of this form so teturn this card to you. Attach this form to the front of the mailpiece, or on the back	l also wish to receive to following services (for an extended)					
Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b. Print your name and address on the reverse of this form so teturn this card to you. Attach this form to the front of the mailpiece, or on the backoes not permit. Write "Return Receipt Requested" on the mailpiece below the a	l also wish to receive to following services (for an extended): if space 1. Addressee's Addresseticle number 2. Restricted Delivery					
Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b. Print your name and address on the reverse of this form so teturn this card to you. Attach this form to the front of the mailpiece, or on the backoes not permit. Write "Return Receipt Requested" on the mailpiece below the a The Return Receipt will show to whom the article was delivered	l also wish to receive to following services (for an extended): if space 1. Addressee's Addresseticle number 2. Restricted Delivery					
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Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b. Print your name and address on the reverse of this form so teturn this card to you. Attach this form to the front of the mailpiece, or on the backoes not permit. Write "Return Receipt Requested" on the mailpiece below the a The Return Receipt will show to whom the article was delivered elivered. 3. Article Addressed to: Phillips Petroleum Company 4001 Penbrook	I also wish to receive to following services (for an extension fee): 1. Addressee's Addresser of the date 4a. Article Number P 329 313 832	tra				
Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b. Print your name and address on the reverse of this form so teturn this card to you. Attach this form to the front of the mailpiece, or on the backloss not permit. Write "Return Receipt Requested" on the mailpiece below the attack the receipt will show to whom the article was delivered letivered. 3. Article Addressed to: Phillips Petroleum Company	I also wish to receive to following services (for an expense of see): 1. Addressee's Addresset of see of see: 2. Restricted Delivery Consult postmaster for fee. 4a. Article Number P 329 313 832 4b. Service Type					
Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b. Print your name and address on the reverse of this form so teturn this card to you. Attach this form to the front of the mailpiece, or on the backoes not permit. Write "Return Receipt Requested" on the mailpiece below the a The Return Receipt will show to whom the article was delivered elivered. 3. Article Addressed to: Phillips Petroleum Company 4001 Penbrook	I also wish to receive to following services (for an extenticle number and the date) 1. Addressee's Addresser's A	ss				
Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b. Print your name and address on the reverse of this form so the seturn this card to you. Attach this form to the front of the mailpiece, or on the backloses not permit. Write "Return Receipt Requested" on the mailpiece below the attract Receipt will show to whom the article was delivered letivered. 3. Article Addressed to: Phillips Petroleum Company 4001 Penbrook	I also wish to receive following services (for an exfee): 1. Addressee's Addresserticle number. 2. Restricted Delivery. Consult postmaster for fee. 4a. Article Number P 329 313 832 4b. Service Type Registered Insured XX Certified COD Express Mail XX Return Receipt Merchandise	ss				
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Complete items 1 and/or 2 for additional services. Complete items 3, and 4a & b. Print your name and address on the reverse of this form so teturn this card to you. Attach this form to the front of the mailpiece, or on the backoes not permit. Write "Return Receipt Requested" on the mailpiece below the attack was delivered the services. 3. Article Addressed to: Phillips Petroleum Company 4001 Penbrook Odessa, TX 79762	I also wish to receive following services (for an exfee): 1. Addressee's Addresserticle number. 2. Restricted Delivery Consult postmaster for fee. 4a. Article Number P 329 313 832 4b. Service Type Registered Insured XX Certified COD Express Mail XX Return Receipt Merchandise 7. Date of Delivery	for				
Phillips Petroleum Company 4001 Penbrook	I also wish to receive following services (for an exfee): 1. Addressee's Addresser's Addr	for				

±U.S. GPO: 1993—352-714

PS Form **3811**, December 1991



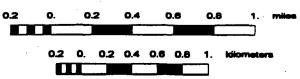
Texaco Exploration & Production, In

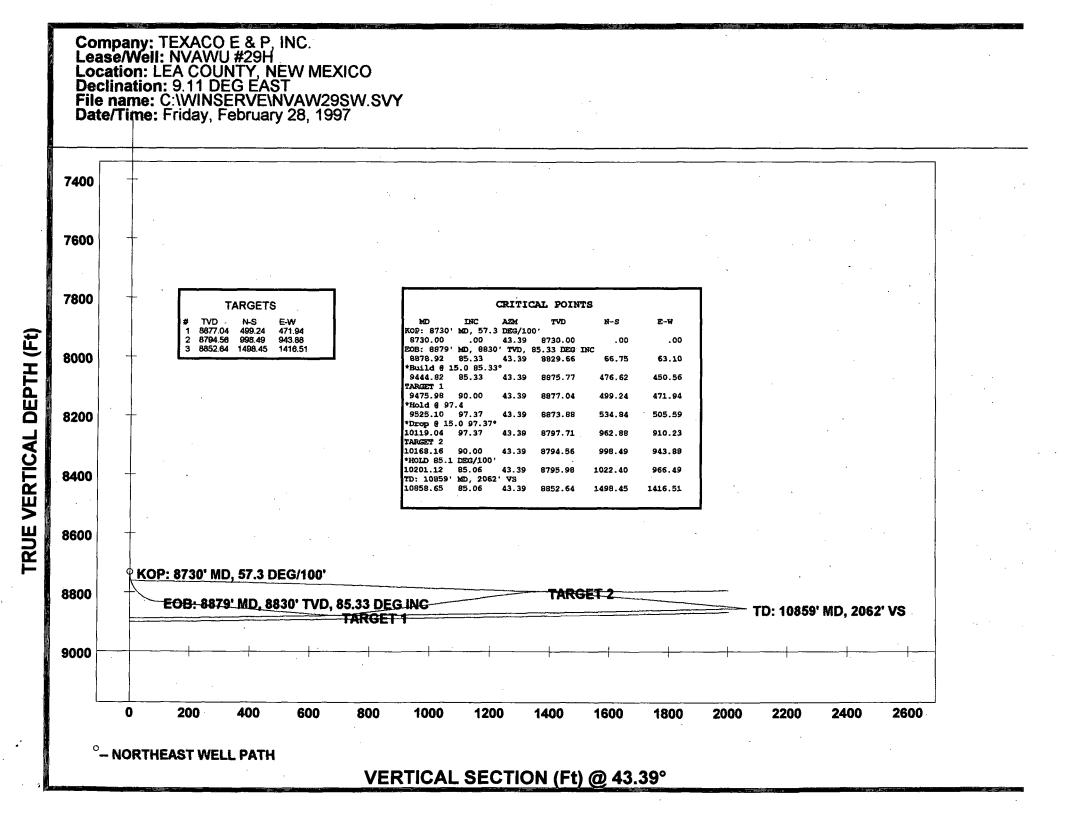
WELL No. 29

North Vacuum Abo West Unit
Base Map, Wells > 8,000' TD

Proces

Scale 1.30000.







Job Number: P97-102

Company: TEXACO E & P, INC.

Lease/Well: NVAWU #29H

Location: LEA COUNTY, NEW MEXICO

Rig Name:

State/Country:

Declination: 9.11 DEG EAST

Grid:

File name: C:\WINSERVE\NVAW29NE.SVY

Date/Time: 28-Feb-97 / 06:06

Curve Name: PROPOSED WELL PATH

Phoenix Drilling Services, Inc.

WINSERVE SURVEY CALCULATIONS

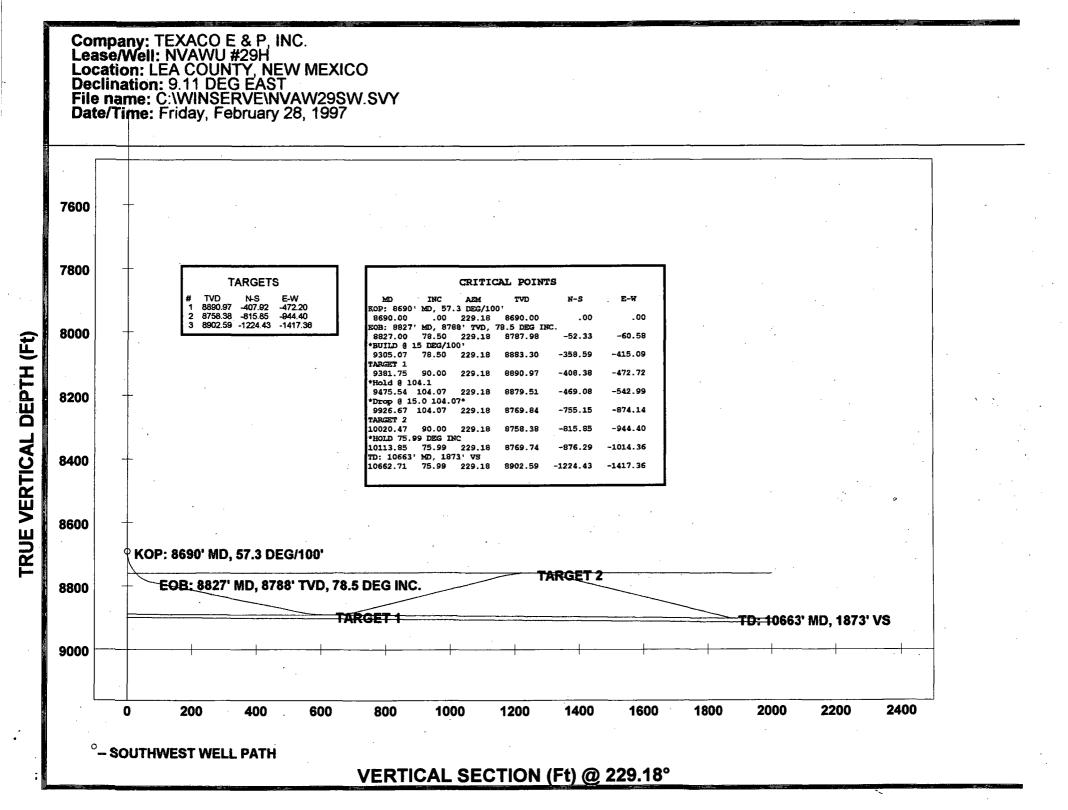
Minimum Curvature Method Vertical Section Plane 43.39

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	C L (Distance FT	OSURE Direction Deg	Dogleg Severity Deg/100
KOP: 873	0' MD. 57.	3 DEG/100'			_					
8730.00	.00	43.39	8730.00	4656.00	.00	.00	.00	.00	.00	.00
8740.00	5.73	43.39	8739.98	4665.98	.36	.34	.50	.50	43.39	57.30
8750.00	11.46	43.39	8749.87	4675.87	1.45	1.37	1.99	1.99	43.39	57.30
8760.00	17.19	43.39	8759.55	4685.55	3.25	3.07	4.47	4.47	43.39	57.30
8770.00	22.92	43.39	8768.94	4694.94	5.74	5.42	7.89	7.89	43.39	57.30
8780.00	28.65	43.39	8777.94	4703.94	8.90	8.41	12.24	12.24	43.39	57.30
8790.00	34.38	43.39	8786.46	4712.46	12.69	12.00	17.47	17.47	43.39	57.30
8800.00	40.11	43.39	8794.42	4720.42	17.09	16.16	23.52	23.52	43.39	57.30
8810.00	45.84	43.39	8801.73	4727.73	22.04	20.84	30.33	30.33	43.39	57.30
8820.00	51.57	43.39	8808.33	4734.33	27.50	26.00	37.84	37.84	43.39	57.30
8830.00	57.30	43.39	8814.14	4740.14	33.41	31.58	45.97	45.97	43.39	57.30
8840.00	63.03	43.39	8819.12	4745.12	39.71	37.54	54.64	54.64	43.39	57.30
8850.00	68.76	43.39	8823.20	4749.20	46.34	43.81	63.77	63.77	43.39	57.30

Measured Depth FT	inci Angle Deg	Drift Direction Deg	True Vertical Depth	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	C L C Distance FT	SURE Direction Deg	Dogleg Severity Deg/100
8860.00	74.49	43.39	8826.35	4752.35	53.23	50.32	73.25	73.25	43.39	57.30
8870.00	80.22	43.39	8828.54	4754.54	60.32	57.02	83.01	83.01	43.39	57.30
EOB: 887	79' MD, 883	30' TVD, 85.3	33 DEG INC	•						
8878.92	85.33	43.39	8829.66	4755.66	66.75	63.10	91.85	91.85	43.39	57.29
8979.11	85.33	43.39	8837.82	4763.82	139.32	131.70	191.71	191.71	43.39	.00
9079.11	85.33	43.39	8845.97	4771.97	211.74	200.16	291.38	291.38	43.39	.00
9179.11	85.33	43.39	8854.12	4780.12	284.17	268.63	391.05	391.05	43.39	.00
9279.11	85.33	43.39	8862.27	4788.27	356.60	337.10	490.71	490.71	43.39	.00
9379.11	85.33	43.39	8870.41	4796.41	429.03	405.57	590.38	590.38	43.39	.00
Build @	15.0 85.33°)								
9444.82	85.33	43.39	8875.77	4801.77	476.62	450.56	655.87	655.87	43.39	.00
9445.98	85.50	43.39	8875.86	4801.86	477.46	451.35	657.03	657.03	43.39	15.00
9455.98	87.00	43.39	8876.51	4802.51	484.71	458.21	667.01	667.01	43.39	15.00
9465.98	88.50	43.39	8876.91	4802.91	491.97	465.07	677.00	677.00	43.39	15.00
TARGET	1									
9475.98	90.00	43.39	8877.04	4803.04	499.24	471.94	687.00	687.00	43.39	15.00
9485.98	91.50	43.39	8876.91	4802.91	506.51	478.81	697.00	697.00	43.39	15.00
9495.98	93.00	43.39	8876.51	4802.51	513.77	485.67	706.99	706.99	43.39	15.00
9505.98	94.50	43.39	8875.86	4801.86	521.02	492.53	716.97	716.97	43.39	15.00
9515.98	96.00	43.39	8874.95	4800.95	528.25	499.37	726.93	726.93	43.39	15.00
Hold @ 9	7.4				 					
9525.10	97.37	43.39	8873.88	4799.88	534.84	505.59	735.99	735.99	43.39	15.00
9625.10	97.37	43.39	8861.06	4787.06	606.91	573.72	835.16	835.16	43.39	.00
9725.10	97.37	43.39	8848.23	4774.23	678.98	641.85	934.34	934.34	43.39	.00
9825.10	97.37	43.39	8835.41	4761.41	751.05	709.98	1033.51	1033.51	43.39	.00
9925.10	97.37	43.39	8822.58	4748.58	823.12	778.11	1132.68	1132.68	43.39	.00
10025.10	97.37	43.39	8809.76	4735.76	895.19	846.23	1231.86	1231.86	43.39	.00
Drop @ 1	5.0 97.37°									
10119.04	97.37	43.39	8797.71	4723.71	962.88	910.23	1325.01	1325.01	43.39	.00
10119.11	97.36	43.39	8797.70	4723.70	962.93	910.27	1325.08	1325.08	43.39	15.00
10128.16	96.00	43.39	8796.65	4722.65	969.47	916.45	1334.08	1334.08	43.39	15.00

Page 2

Measured	inci	Drift	True	Subsea				CLOSURE		Dogleg
Depth FT	Angle Deg	Direction Deg	Vertical Depth	TVD FT	N-S FT	E-W FT	Section FT	Distance FT	Direction Deg	Severity Deg/100
10138.16	94.50	43.39	8795.73	4721.73	976.71	923.29	1344.03	1344.03	43.39	15.00
10148.16	93.00	43.39	8795.08	4721.08	983.96	930.15	1354.01	1354.01	43.39	15.00
10158.16	91.50	43.39	8794.69	4720.69	991.22	937.01	1364.00	1364.00	43.39	15.00
TARGET	2									
10168.16	90.00	43.39	8794.56	4720.56	998.49	943.88	1374.00	1374.00	43.39	15.00
10178.16	88.50	43.39	8794.69	4720.69	1005.75	950.75	1384.00	1384.00	43.39	15.00
10188.16	87.00	43.39	8795.08	4721.08	1013.01	957.61	1393.99	1393.99	43.39	15.00
10198.16	<u>85.50</u>	43.39	<u>8795.73</u>	4721.73	1020.26	964.47	1403.97	1403.97	43.39	<u>15.00</u>
HOLD 85	.1 DEG/10	0'								
10201.12	85.06	43.39	8795.98	4721.98	1022.40	966.49	1406.92	1406.92	43.39	15.00
10301.12	85.06	43.39	8804.59	4730.59	1094.80	1034.93	1506.55	1506.55	43.39	.00
10401.12	85.06 °	43.39	8813.21	4739.21	1167.20	1103.37	1606.17	1606.17	43.39	.00
10501.12	85.06	43.39	8821.83	4747.83	1239.60	1171.81	1705.80	1705.80	43.39	.00
10601.12	85.06	43.39	8830.44	4756.44	1312.00	1240.25	1805.43	1805.43	43.39	.00
10701.12	85.06	43.39	8839.06	4765.06	1384.40	1308.69	1905.06	1905.06	43.39	.00
10801.12	85.06	43.39	8847.68	4773.68	1456.80	1377.13	2004.69	2004.69	43.39	.00
TD: 1085					1,100,00					
10858.65	85.06	43.39	8852.64	4778.64	1498.45	1416.51	2062.00	2062.00	43.39	.00





Job Number: P97-102

Company: TEXACO E & P, INC.

Lease/Well: NVAWU #29H

Location: LEA COUNTY, NEW MEXICO

Rig Name:

State/Country:

Declination: 9.11 DEG EAST

Grid:

File name: C:\WINSERVE\NVAW29SW.SVY

Date/Time: 28-Feb-97 / 06:50

Curve Name: SOUTHWEST WELL PATH

Phoenix Drilling Services, Inc.

WINSERVE SURVEY CALCULATIONS

Minimum Curvature Method Vertical Section Plane 229.18

Measured Depth	inci Angle	Incl Drift Angle Direction		True Subsea Vertical TVD		E-W	Vertical Section	CLOSURE Distance Direction		Dogleg Severity
FT FT	Deg		Depth	FT	FŤ	FT	FT	FT	Deg	Deg/100
KOP: 869	0' MD, 57.	3 DEG/100'						•	<u></u>	
8690.00	.00	229.18	8690.00	4616.00	.00	.00	.00	.00	.00	.00
8700.00 8710.00	5.73 11.46	229.18 229.18	8699.98 8709.87	4625.98 4635.87	33 -1.30	38 -1.51	.50 1.99	.50 1.99	229.18 229.18	57.30 57.30
8720.00 8730.00	17.19 22.92	229.18 229.18	8719.55 8728.94	4645.55 4654.94	-2.92 -5.16	-3.38 -5.97	4.47 7.89	4.47 7.89	229.18 229.18	57.30 57.30
8740.00	28.65	229.18	8737.94	4663.94	-8.00	-9.26	12.24	12.24	229.18	57.30
8750.00 8760.00	34.38 40.11	229.18 229.18	8746.46 8754.42	4672.46 4680.42	-11.42 -15.37	-13.22 -17.80	17.47 23.52	17.47 23.52	229.18 229.18	57.30 57.30
8770.00 8780.00	45.84 51.57	229.18 229.18	8761.73 8768.33	4687.73 4694.33	-19.83 -24.74	-22.95 -28.64	30.33 37.84	30.33 37.84	229.18 229.18	57.30 57.30
8790.00	57.30	229.18	8774.14	4700.14	-30.05	-34.79	45.97	45.97	229.18	57.30
8800.00 8810.00	63.03 68.76	229.18 229.18	8779.12 8783.20	4705.12 4709.20	-35.72 -41.69	-41.35 -48.26	54.64 63.77	54.64 63.77	229.18 229.18	57.30 57.30

Measured Depth FT	inci Angle Deg	Drift Direction Deg	True Vertical Depth	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	C L C Distance FT	SURE Direction Deg	Dogleg Severity Deg/100
8820.00	74.49	229.18	8786.35	4712.35	-47.89	-55.43	73.25	73.25	229.18	57.30
EOB: 882	7' MD, 878	38' TVD. 78.	DEG INC.					•		
8827.00	78.50	229.18	8787.98	4713.98	-52.33	-60.58	80.06	80.06	229.18	57.30
8927.00	78.50	229.18	8807.92	4733.92	-116.40	-134.74	178.05	178.05	229.18	.00
9027.00	78.50	229.18	8827.86	4753.86	-180.46	-208.89	276.04	276.04	229.18	.00
9127.00	78.50	229.18	8847.80	4773.80	-244.52	-283.04	374.03	374.03	229.18	.00
9227.00	78.50	229.18	8867.74	4793.74	-308.58	-357.20	472.03	472.03	229.18	.00
9275.00	78.50	229.18	8877.31	4803.31	-339.32	-392.79	519.06	519.06	229.18	.00
BUILD @										
9305.07	78.50	229.18	8883.30	4809.30	-358.59	-415.09	548.53	548.53	229.18	.00
9315.07	80.00	229.18	8885.17	4811.17	-365.01	-422.53	558.36	558.36	229.18	15.00
9325.07	81.50	229.18	8886.78	4812.78	-371.47	-430.00	568.23	568.23	229.18	15.00
9335.07	83.00	229.18	8888.12	4814.12	-377.94	-437.49	578.14	578.14	229.18	15.00
9345.07	84.50	229.18	8889.21	4815.21	-384.44	-445.02	588.08	588.08	229.18 ,	15.00
9355.07	86.00	229.18	8890.04	4816.04	-390.96	-452.56	598.04	598.04	229.18	15.00
9365.07	87.50	229.18	8890.61	4816.61	-397.48	-460.11	608.03	608.03	229.18	15.00
9375.07	89.00	229.18	8890.91	4816.91	-404.02	-467.68	618.02	618.02	229.18	15.00
TARGET '	1							, '		
9381.75	90.00	229.18	8890.97	4816.97	-408.38	-472.72	624.69	624.69	229.18	15.00
9391.75	91.50	229.18	8890.84	4816.84	-414.91	-480.29	634.69	634.69	229.18	15.00
9401.75	93.00	229.18	8890.45	4816.45	-421.45	-487.85	644.68	644.68	229.18	15.00
9411.75	94.50	229.18	8889.79	4815.79	-427.97	-495.40	654.66	654.66	229.18	15.00
9421.75	96.00	229.18	8888.88	4814.88	-434.48	-502.94	664.62	664.62	229.18	15.00
9431.75	97.50	229.18	8887.70	4813.70	-440.97	-510.45	674.55	674.55	229.18	15.00
9441.75	99.00	229.18	8886.27	4812.27	-447.44	-517.94	684.45	684.45	229.18	15.00
9451.75	100.50	229.18	8884.58	4810.58	-453.88	-525.40	694.30	694.30	229.18	15.00
9461.75	102.00	229.18	8882.62	4808.62	-460.29	-532.82	704.11	704.11	229.18	15.00
9471.75	103.50	229.18	8880.42	4806.42	-466.67	-540.20	713.86	713.86	229.18	15.00
Hold @ 10	N 1			 						
9475.54	104.07	229.18	8879.51	4805.51	-469.08	-542.99	717.55	717.55	229.18	15.00

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	C L C Distance FT	SURE Direction Deg	Dogleg Severity Deg/100
9575.54	104.07	229.18	8855.20	4781.20	-532.49	-616.40	814.55	814.55	229.18	.00
9675.54	104.07	229.18	8830.89	4756.89	-595.90	-689.80	911.55	911.55	229.18	.00
9775.54	104.07	229.18	8806.58	4732.58	-659.31	-763.20	1008.55	1008.55	229.18	.00
9875.54	104.07	229.18	8782.27	4708.27	-722.73	-836.60	1105.55	1105.55	229.18	.00
Drop @	15.0 104.07	10								
9926.67	104.07	229.18	8769.84	4695.84	-755.15	-874.14	1155.15	1155.15	229.18	.00
9926.69	104.07	229.18	8769.84	4695.84	-755.16	-874.15	1155.16	1155.16	229.18	15.00
9930.47	103.50	229.18	8768.94	4694.94	-757.56	-876.93	1158.83	1158.83	229.18	15.00
9940.47	102.00	229.18	8766.73	4692.73	-763.93	-884.31	1168.59	1168.59	229.18	15.00
9950.47	100.50	229.18	8764.78	4690.78	-770.35	-891.73	1178.39	1178.39	229.18	15.00
0000 47		000.40	. 0700 00	4000.00	770 70	222.42	4400.05	1400.05	000.40	45.00
9960.47 9970.47	99.00	229.18	8763.09	4689.09	-776.79	-899.19	1188.25	1188.25	229.18	15.00
	97.50	229.18	8761.65	4687.65	-783.26	-906.67	1198.14	1198.14	229.18	15.00
9980.47	96.00	229.18	8760.48	4686.48	-789.75	-914.19	1208.08	1208.08	229.18	15.00
9990.47	94.50	229.18	8759.56	4685.56	-796.26	-921.72	1218.03	1218.03	229.18	15.00
10000.47	93.00	229.18	8758.91	4684.91	-802.78	-929.28	1228.01	1228.01	229.18	15.00
10010.47	91.50	229.18	8758.52	4684.52	-809.31	-936.84	1238.00	1238.00	229.18	15.00
TARGET	2									
10020.47	90.00	229.18	8758.38	4684.38	-815.85	-944.40	1248.00	1248.00	229.18	15.00
10030.47	88.50	229.18	8758.52	4684.52	-822.39	-951.97	1258.00	1258.00	229.18	15.00
10040.47	87.00	229.18	8758.91	4684.91	-828.92	-959.53	1267.99	1267.99	229.18	15.00
10050.47	85.50	229.18	8759.56	4685.56	-835.44	-967.08	1277.97	1277.97	229.18	15.00
10060.47	84.00	229.18	8760.48	4686.48	-841.95	-974.62	1287.93	1287.93	229.18	15.00
10070.47	82.50	229.18	8761.65	4687.65	-848.44	-982.13	1297.86	1297.86	229.18	15.00
10080.47	81.00	229.18	8763.09	4689.09	-854.91	-989.62	1307.76	1307.76	229.18	15.00
10090.47	79.50	229.18	8764.78	4690.78	-861.36	-997.08	1317.61	1317.61	229.18	15.00
10100.47	78.00	229.18	8766.73	4692.73	-867.77	-1004.50	1327.42	1327.42	229.18	15.00
10110.47	76.50	229.18	8768.94	4694.94	-874.14	-1011.88	1337.17	1337.17	229.18	15.00
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	.99 DEG IN									
10113.85	75.99	229.18	8769.74	4695.74	-876.29	-1014.36	1340.45	1340.45	229.18	15.00
10213.85	75.99	229.18	8793.95	4719.95	-939.72	-1087.79	1437.48	1437.48	229.18	.00
10313.85	75.99	229.18	8818.15	4744.15	-1003.15	-1161.21	1534.51	1534.51	229.18	.00
10413.85	75.99	229.18	8842.35	4768.35	-1066.58	-1234.63	1631.53	1631.53	229.18	.00

Measured	Incl	Drift	True	Subsea			Vertical	CLOSURE		Dogleg
Depth FT	Angle Deg	Direction Deg	Vertical Depth	TVD FT	N-S FT	E-W FT	Section FT	Distance FT	Direction Deg	Severity Deg/100
10513.85 10613.85	75.99 75.99	229.18 229.18	8866.56 8890.76	4792.56 4816.76	-1130.00 -1193.43	-1308.06 -1381.48	1728.56 1825.59	1728.56 1825.59	229.18 229.18	.00 .00
TD: 1066	3' MD, 187	3' VS					· · · · · · · · · · · · · · · · · · ·	•		
10662.71	75.99	229.18	8902.59	4828.59	-1224.43	-1417.36	1873.00	1873.00	229.18	.00

ARONE THIS LINE FOR DIVISION LISE ONLY

NEW MEXICO OIL CONSERVATION DIVISION

- Engineering Bureau -

ADMINISTRATIVE APPLICATION COVERSHEET

THIS COVERBHEET IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS

Applic		DHC-D (PC	l] ownhole Col Pool Comm: WFX-W8] SW]	DD-Directions mmingling) hingling) [O aterflood Expa D-Salt Water	LS - Off-Lease ansion] {PM Disposal] [i	SD-Simulta Comminglin Storage) X-Pressure PI-Injection	neous Dedic ng] [PLC-Po [OLM-Off-L Maintenanc n Pressure Ir	ation) col/Lease Commi ease Measurem e Expansion)	ent)
[1]	TYPE (OF AP	PLICATION	ON - Check	Those Whi	ch Apply	for [A]	·	4
		[A]	Location -	Spacing Un NSP	nit - Directio	nal Drilli SD	ng		
		Check [B]	•	•	ge - Measure		OLS	OLM	·
	([C]	•	Disposal -	Pressure Inc	rease - Er		Recovery PPR	
[2]		ICAT [A]	_		: - Check Tl or Overridin		• • • •	Does Not A	Apply
	[[B]	🛚 Offset (Operators, L	easeholders	or Surfac	ce Owner		
	[[C]	☐ Applica	ntion is One	Which Req	uires Publ	lished Legal	Notice	·
	[[D]			Concurrent		•		·
	I	[E]	☑ For all	of the above	e, Proof of N	lotificatio	n or Publica	ation is Attache	d, and/or
	([F]	☐ Waiver	s are Attach	ed				
[3]	INFOR	MATI	ON / DAT	'A SUBMIT	TED IS C	OMPLET	ΓE - Statem	ent of Understa	anding
				4 4		_			

I hereby certify that I, or personnel under my supervision, have read and complied with all applicable Rules and Regulations of the Oil Conservation Division. Further, I assert that the attached application for administrative approval is accurate and complete to the best of my knowledge and where applicable, verify that all interest (WI, RI, ORRI) is common. I further verify that all applicable API Numbers are included. I understand that any omission of data, information or notification is cause to have the application package returned with no action taken.

Note: Statement must be completed by an individual with supervisory capacity.

C. WADE HOWARD
Print or Type Name

C. Wade How

ENGINEER ASSISTANT

3/4/97 Date **Texaco Exploration** and Production Inc.

500 North Loraine Midland TX 79701 P O Box 3109 Midland TX 79702

February 27, 1997

GOV - STATE AND LOCAL GOVERNMENTS Directional Drilling - Horizontal Non-Standard Proration Unit North Vacuum Abo West Unit Well No. 29 Vacuum Abo, North Field Lea County, New Mexico

State of New Mexico Energy and Minerals Department Oil Conservation Division 2040 South Pacheco Santa Fe, New Mexico 87505

Attention: Mr. Michael E. Stogner

Gentlemen:

Administrative approval, Rule 104.D, and Rule 111.D, is requested to directionally drill a dual lateral horizontal well in a non-standard proration unit in the Abo formation.

The North Vacuum Abo West Unit is a candidate for horizontal wells due to the heterogeneous nature of the reservoir. This Unit was designated a "Project Area" for horizontal drilling in 1996 (see Administrative Orders DD-153H and DD-154H). We have completed one successful horizontal well in this Unit (Well No. 26) and are currently drilling a second horizontal well (No. 27).

Attached for your information is a copy of our directional plans, a type log section, and Form C-102.

The "affected" offset operator to this well has been notified of this request. (See attached offset operator's list and certified mail receipts.)

Any questions concerning this request should be directed to me at (915) 688-4606.

Yours very truly,

E. Wade House

C. W. Howard Engineer's Assistant

CC: NMOCD, P. O. Box 1980, Hobbs, NM 88240 Attachments

DISTRICT 1
P. 0. Box 1980, Hobbs, NM 88240

DISTRICT II
P. O. Drawer DD, Artesia, NM 88210
DISTRICT III

1000 Rio Brazos Rd., Aztec, NM 87410
DISTRICT IV
P. O. Box 2088, Santa Fe, NM 87504-2088

State of New Mexico
Energy, Minerals and Natural Resources Department

OIL CONSERVATION DIVISION

PO Box 2088 Santa Fe, NM 87504-2088 Form C-102 Revised February 10, 1994

Instructions on back

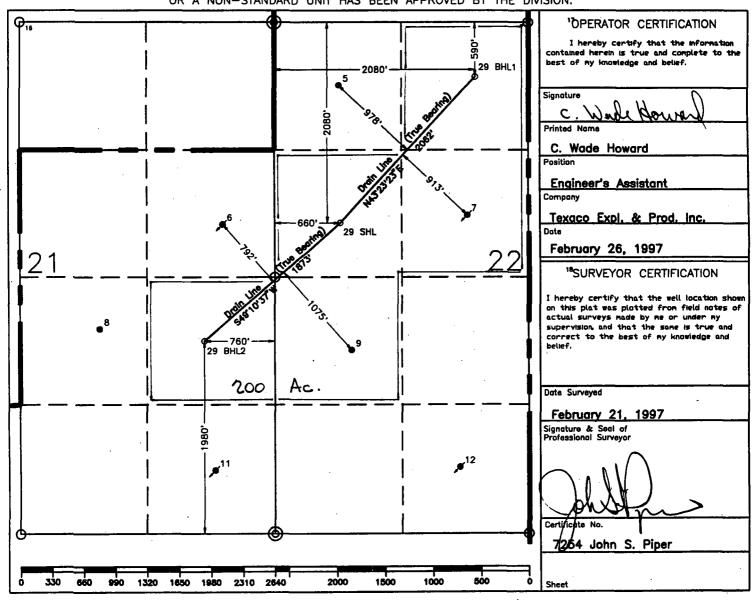
Submit to Appropriate District Office

State Lease-4 copies Fee Lease-3 copies

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number ² Paol Cade ³ Pool Name								0			
				6176	O Vac	uum Abo, North					
Property Cod	de				⁶ Property N	lame			⁸ Well Number		
11133	North Vacuum Abo West Unit 29										
OGRID No.											
22351	· · · · · · · · · · · · · · · · · · ·										
					¹⁰ Surface L	ocation					
UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	⁷ County		
Æ	22	17 - S	34-E		2080'	North	660'	West	Lea		
			11 B	ottom Hol	e 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	⁷ County		
L1 C/L2	22/21	17 - S	34-E		590'/1980'	North/South	2080'/760'	West/East	Lea		
1Dedicated Acres	13 Joi	int or Infill	1*Consolid	lation Code	¹⁵ Order No.						
200											

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.





Texaco Exploration and Production Inc

500 North Loraine Midland TX 79701 P O Box 3109 Midland TX 79702

February 27, 1997

GOV - STATE AND LOCAL GOVERNMENTS
Directional Drilling - Horizontal
Non-Standard Location
North Vacuum Abo West Unit Well No. 29
Sec. 22, T-17-S, R-34-E
Lea County, New Mexico

TO THE OFFSET OPERATORS:

Gentlemen:

CWH: cwh

DATE:

As an offset operator to the captioned unit, you are being furnished with a copy of our Application to directionally drill a horizontal well. If you have no objection, please sign the waiver at the bottom of this letter and return in the enclosed envelope.

Any questions concerning this request should be directed to me at (915) 688-4606.

Yours very truly,

C. W. Howard
Engineer's Assistant

File
WAIVER APPROVED:
COMPANY:
BY:

OFFSET OPERATOR'S LIST North Vacuum Abo West Unit Well No. 29 LEA COUNTY, NEW MEXICO

Mobil Exploration and Producing US Inc. P. O. Box 633
Midland, Texas 79702

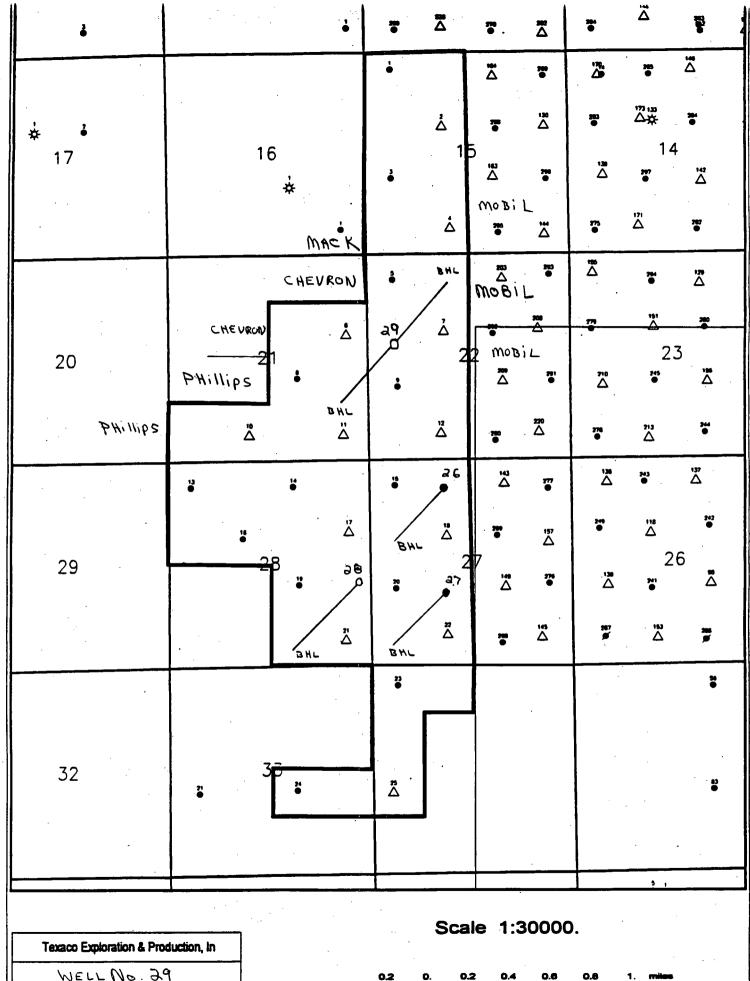
Mack Energy Corporation P. O. Box 1767 Artesia, NM 88211

Chevron USA Inc. P. O. Box 1150 Midland, Texas 79702

Phillips Petroleum Company 4001 Penbrook Odessa, Texas 79762

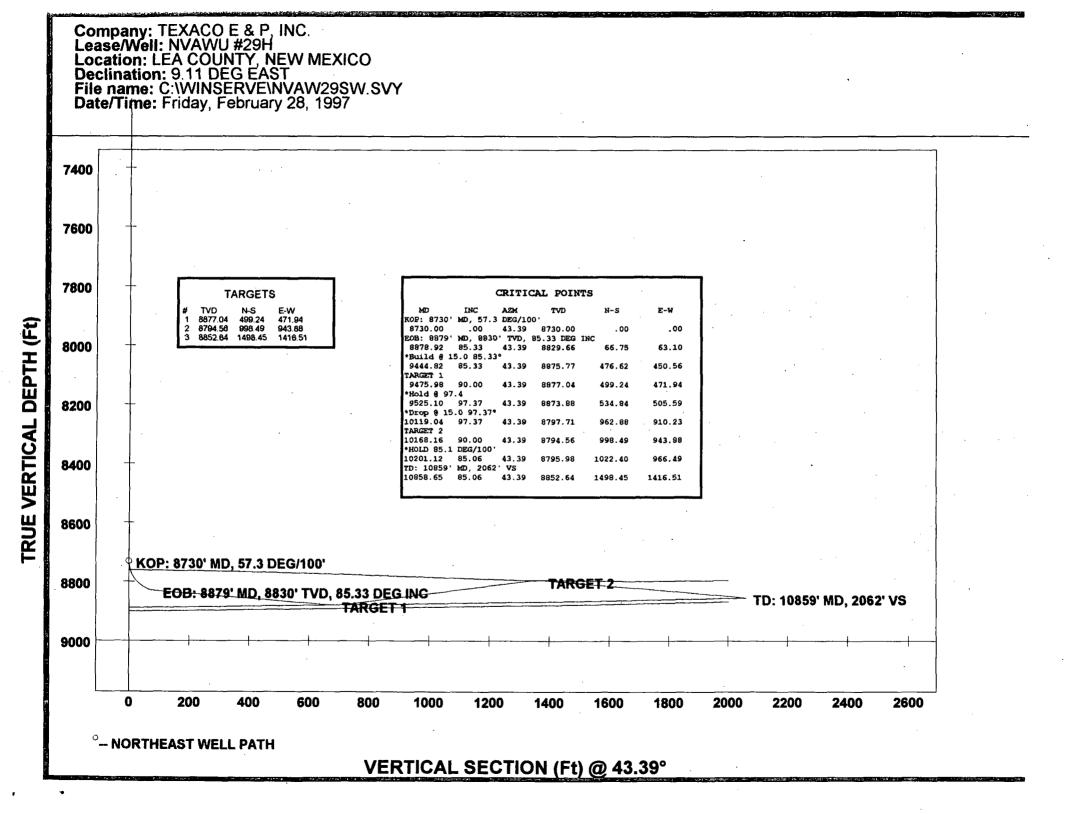
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D Complete items 3, and 48 % #		following services (for an extr
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Write "Return Receipt Requested" on the mailpiece below the The Return Receipt will show any angle of the mailpiece below the	article number	2. Restricted Delivery
 The Return Receipt will show to whom the article was delivered. 	ed and the date	Consult postmaster for fee.
3. Article Addressed to:	4a. Art	icle Number
delivered. 3. Article Addressed to: Chevron USA Inc. P. 0. Box 1150 Midland, TX 79702	P 32	9 313 831
P. O. Box 1150		vice Type
Midland, TX 79702	☐ Regi	
	XX Certi	
	L	ess Mail XX Return Receipt for Merchandise
	7. Date	of Delivery FEB 28 1997
5. Signature (Addressee)	8. Addr and	essee's Address (Only if requeste ee is paid)
Signature (Addressee) Signature (Addressee) PS Form 3811, December 1991, AUS CRO. (Co.)		
PS Form 3811, December 1991 &U.S. GPO: 1993-	- 1:	· :
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NELL No. 39
North Vacuum Abo West Unit
Base Map, Wells > 8,000' TD

0.2	0.	0.	2	0.4	. (). 6	0.6	3 1, miles
								•
	0.2	0.	0.2	0.4	0.6	8.0	1.	Idiometers
								•





Job Number: P97-102

Company: TEXACO E & P, INC.

Lease/Well: NVAWU #29H

Location: LEA COUNTY, NEW MEXICO

Rig Name:

State/Country:

Declination: 9.11 DEG EAST

Grid:

File name: C:\WINSERVE\NVAW29NE.SVY

Date/Time: 28-Feb-97 / 06:06

Curve Name: PROPOSED WELL PATH

Phoenix Drilling Services, Inc.

WINSERVE SURVEY CALCULATIONS Minimum Curvature Method

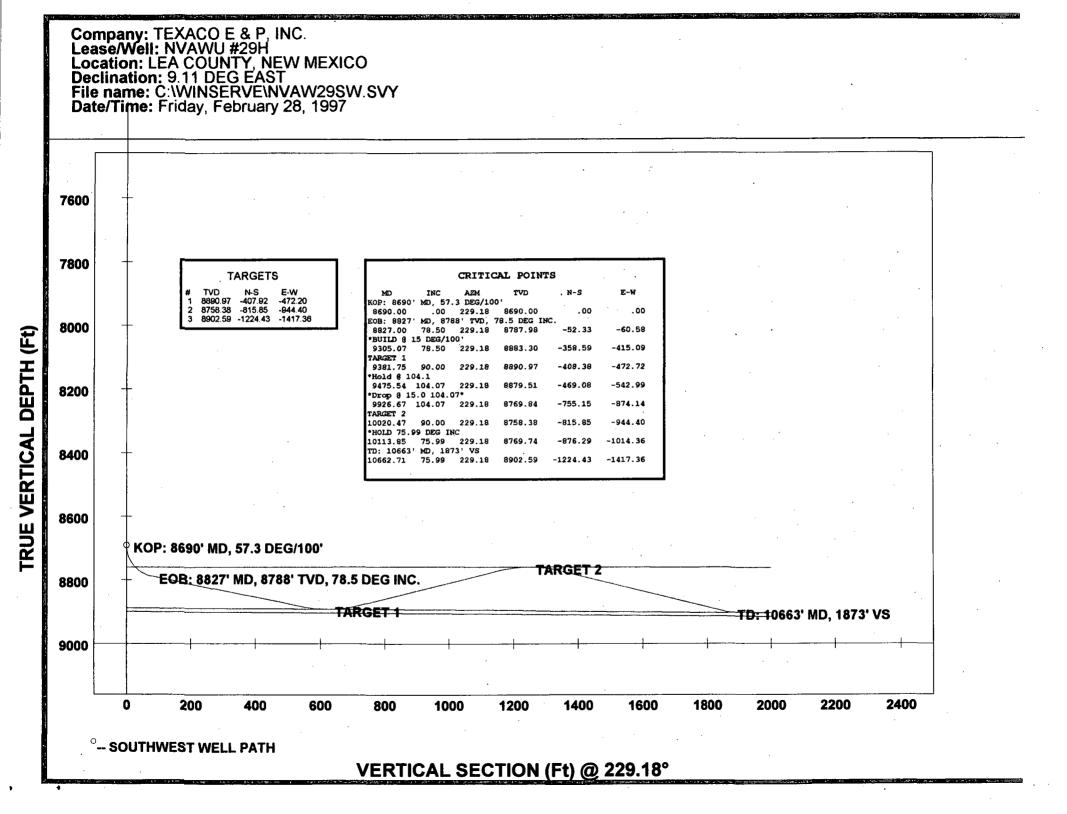
Vertical Section Plane 43.39

Inci	Drift Direction \		Subsea			Vertical	CLO	CLOSURE	
Angle Deg	Direction Deg	Vertical Depth	TVD FT	N-S FT	E-W FT	Section FT	Distance FT	Direction Deg	Dogleg Severity Deg/100
0' MD, 57.	3 DEG/100'	•			· · · · · · · · · · · · · · · · · · ·				
.00	43.39	8730.00	4656.00	.00	.00	.00	.00	.00	.00
5.73	43.39	8739.98	4665.98	.36	.34	.50	.50	43.39	57.30
11.46	43.39	8749.87	4675.87	1.45	1.37	1.99	1.99	43.39	57.30
17.19	43.39	8759.55	4685.55	3.25	3.07	4.47	4.47	43.39	57.30
22.92	43.39	8768.94	4694.94	5.74	5.42	7.89	7.89	43.39	57.30
28.65	43.39	8777.94	4703.94	8.90	8.41	12.24	12.24	43.39	57.30
34.38	43.39	8786.46	4712.46	12.69	12.00	17.47	17.47	43.39	57.30
40.11	43.39	8794.42	4720.42	17.09	16.16	23.52	23.52	43.39	57.30
45.84	43.39	8801.73	4727.73	22.04	20.84	30.33	30.33	43.39	57.30
51.57	43.39	8808.33	4734.33	27.50	26.00	37.84	37.84	43.39	57.30
57.30	43.39	8814.14	4740.14	33.41	31.58	45.97	45.97	43.39	57.30
63.03	43.39	8819.12	4745.12	39.71	37.54	54.64	54.64	43.39	57.30
68.76	43.39	8823.20	4749.20	46.34	43.81	63.77	63.77	43.39	57.30
	Angle Deg 0' MD, 5700 5.73 11.46 17.19 22.92 28.65 34.38 40.11 45.84 51.57 57.30 63.03	Angle Direction Deg 0' MD, 57.3 DEG/100' .00 43.39 5.73 43.39 11.46 43.39 17.19 43.39 22.92 43.39 28.65 43.39 34.38 43.39 40.11 43.39 45.84 43.39 51.57 43.39 57.30 43.39 63.03 43.39	Angle Deg Direction Deg Vertical Depth 0' MD, 57.3 DEG/100' .00 43.39 8730.00 5.73 43.39 8739.98 11.46 43.39 8749.87 17.19 43.39 8759.55 22.92 43.39 8768.94 28.65 43.39 8768.94 8777.94 34.38 43.39 8786.46 40.11 43.39 8794.42 45.84 43.39 8801.73 51.57 43.39 8808.33 57.30 43.39 8814.14 63.03 43.39 8819.12	Angle Deg Direction Deg Vertical Depth TVD FT 0' MD, 57.3 DEG/100' .00 43.39 8730.00 4656.00 5.73 43.39 8739.98 4665.98 11.46 43.39 8749.87 4675.87 17.19 43.39 8759.55 4685.55 22.92 43.39 8768.94 4694.94 28.65 43.39 8786.46 4712.46 40.11 43.39 8794.42 4720.42 45.84 43.39 8801.73 4727.73 51.57 43.39 8808.33 4734.33 57.30 43.39 8814.14 4740.14 63.03 43.39 8819.12 4745.12	Angle Deg Direction Deg Vertical Depth TVD FT N-S FT 0' MD, 57.3 DEG/100' .00 43.39 8730.00 4656.00 .00 5.73 43.39 8739.98 4665.98 .36 11.46 43.39 8749.87 4675.87 1.45 17.19 43.39 8759.55 4685.55 3.25 22.92 43.39 8768.94 4694.94 5.74 28.65 43.39 8786.46 4712.46 12.69 40.11 43.39 8794.42 4720.42 17.09 45.84 43.39 8801.73 4727.73 22.04 51.57 43.39 8808.33 4734.33 27.50 57.30 43.39 8814.14 4740.14 33.41 63.03 43.39 8819.12 4745.12 39.71	Angle Deg Direction Deg Vertical Depth TVD FT N-S FT E-W FT 0' MD, 57.3 DEG/100' .00 .00 .00 .00 .00 5.73 43.39 8739.98 4665.98 .36 .34 11.46 43.39 8749.87 4675.87 1.45 1.37 17.19 43.39 8759.55 4685.55 3.25 3.07 22.92 43.39 8768.94 4694.94 5.74 5.42 28.65 43.39 8786.46 4712.46 12.69 12.00 40.11 43.39 8794.42 4720.42 17.09 16.16 45.84 43.39 8801.73 4727.73 22.04 20.84 51.57 43.39 8808.33 4734.33 27.50 26.00 57.30 43.39 8814.14 4740.14 33.41 31.58 63.03 43.39 8819.12 4745.12 39.71 37.54	Angle Deg Direction Deg Vertical Depth TVD FT N-S FT E-W FT Section FT 0' MD, 57.3 DEG/100' .00 43.39 8730.00 4656.00 .00 .00 .00 5.73 43.39 8739.98 4665.98 .36 .34 .50 11.46 43.39 8749.87 4675.87 1.45 1.37 1.99 17.19 43.39 8759.55 4685.55 3.25 3.07 4.47 22.92 43.39 8768.94 4694.94 5.74 5.42 7.89 28.65 43.39 8777.94 4703.94 8.90 8.41 12.24 34.38 43.39 8786.46 4712.46 12.69 12.00 17.47 40.11 43.39 8794.42 4720.42 17.09 16.16 23.52 45.84 43.39 8801.73 4727.73 22.04 20.84 30.33 51.57 43.39 8808.33 4734.33 27.50 26.00 37.8	Angle Deg Direction Degth Vertical Depth TVD FT N-S FT E-W FT Section FT Distance FT 0' MD, 57.3 DEG/100' .00 .0	Angle Deg Direction Deg Vertical Depth TVD FT N-S FT E-W FT Section FT Distance FT Direction Deg 0' MD, 57.3 DEG/100' .00 43.39 8730.00 4656.00 .00 </td

Measured Depth FT	inci Angle Deg	Drift Direction Deg	True Vertical Depth	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	C L C Distance FT	SURE Direction Deg	Dogleg Severity Deg/100
8860.00 8870.00	74.49 80.22	43.39 43.39	8826.35 8828.54	4752.35 4754.54	53.23 60.32	50.32 57.02	73.25 83.01	73.25 83.01	43.39 43.39	57.30 57.30
				• • • • • • • • • • • • • • • • • • • •	00.02	37.02	- 00.01		40.00	
EOB: 887	,	30' TVD, 85.3			00 75	00.40	04.05	04.05	40.00	57.00
8878.92	85.33	43.39	8829.66	4755.66	66.75	63.10	91.85	91.85	43.39	57.29
8979.11	85.33	43.39	8837.82	4763.82	139.32	131.70	191.71	191.71	43.39	.00
9079.11	85.33	43.39	8845.97	4771.97	211.74	200.16	291.38	291.38	43.39	.00
9179.11	85.33	43.39	8854.12	4780.12	284.17	268.63	391.05	391.05	43.39	.00
9279.11	85.33	43.39	8862.27	4788.27	356.60	337.10	490.71	490.71	43.39	.00
9379.11	85.33	43.39	8870.41	4796.41	429.03	405.57	590.38	590.38	43.39	.00
Build @ 1	15.0 85.33	•								
9444.82	85.33	43.39	8875.77	4801.77	476.62	450.56	655.87	655.87	43.39	.00
9445.98	85.50	43.39	8875.86	4801.86	477.46	451.35	657.03	657.03	43.39	15.00
9455.98	87.00	43.39	8876.51	4802.51	484.71	458.21	667.01	667.01	43.39	15.00
9465.98	88.50	43.39	8876.91	4802.91	491.97	465.07	677.00	677.00	43.39	15.00
TARGET			,							
9475.98	90.00	43.39	8877.04	4803.04	499.24	471.94	687.00	687.00	43.39	15.00
9485.98	91.50	43.39	8876.91	4802.91	506.51	478.81	697.00	697.00	43.39	15.00
9495.98	93.00	43.39	8876.51	4802.51	513.77	485.67	706.99	706.99	43.39	15.00
9505.98	94.50	43.39	8875.86	4801.86	521.02	492.53	716.97	716.97	43.39	15.00
9515.98	96.00	43.39	8874.95	4800.95	528.25	499.37	726.93	726.93	43.39	15.00
Hold @ 9	7 A				· · · · · · · · · · · · · · · · · · ·	<u></u>				
9525.10	97.37	43.39	8873.88	4799.88	534.84	505.59	735.99	735.99	43.39	15.00
9625.10	97.37	43.39	8861.06	4787.06	606.91	573.72	835.16	835.16	43.39	.00
9725.10	97.37	43.39	8848.23	4774.23	678.98	641.85	934.34	934.34	43.39	.00
9825.10	97.37	43.39	8835.41	4761.41	751.05	709.98	1033.51	1033.51	43.39	.00
9925.10	97.37	43.39	8822.58	4748.58	823.12	778.11	1132.68	1132.68	. 43.39	.00
10025.10	97.37	43.39	8809.76	4735.76	895.19	846.23	1231.86	1231.86	43.39	.00
Drop @ 1	5.0 97.37°				· <u></u>					
10119.04	97.37	43.39	8797.71	4723.71	962.88	910.23	1325.01	1325.01	43.39	.00
10119.11	97.36	43.39	8797.70	4723.70	962.93	910.27	1325.08	1325.08	43.39	15.00
10128.16	96.00	43.39	8796.65	4722.65	969.47	916.45	1334.08	1334.08	43.39	15.00

Page 2

Measured Depth FT	inci Angle Deg	Drift Direction Deg	True Ve <i>r</i> tical Depth	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	C L C Distance FT	SURE Direction Deg	Dogleg Severity Deg/100
10138.16	94.50	43.39	8795.73	4721.73	976.71	923.29	1344.03	1344.03	43.39	15.00
10148.16	93.00	43.39	8795.08	4721.08	983.96	930.15	1354.01	1354.01	43.39	15.00
<u>10158.16</u>	91.50	43.39	8794.69	4720.69	991.22	937.01	1364.00	1364.00	43.39	15.00
TARGET	2									
10168.16	90.00	43.39	8794.56	4720.56	998.49	943.88	1374.00	1374.00	43.39	15.00
10178.16	88.50	43.39	8794.69	4720.69	1005.75	950.75	1384:00	1384.00	43.39	15.00
10188.16	87.00	43.39	8795.08	4721.08	1013.01	957.61	1393.99	1393.99	43.39	15.00
10198.16	85.50	43.39	8795.73	4721.73	1020.26	964.47	1403.97	1403.97	43.39	15.00
HOLD 85	.1 DEG/100)'		• .						
10201.12	85.06	43.39	8795.98	4721.98	1022.40	966.49	1406.92	1406.92	43.39	15.00
10301.12	85.06	43.39	8804.59	4730.59	1094.80	1034.93	1506.55	1506.55	43.39	.00
10401.12	85.06	43.39	8813.21	4739.21	1167.20	1103.37	1606.17	1606.17	43.39	.00
10501.12	85.06	43.39	8821.83	4747.83	1239.60	1171.81	1705.80	1705.80	43.39	.00
10601.12	85.06	43.39	8830.44	4756.44	1312.00	1240.25	1805.43	1805.43	43.39	.00
10701.12	85.06	43.39	8839.06	4765.06	1384.40	1308.69	1905.06	1905.06	43.39	.00
10801.12	85.06	43.39	8847.68	4773.68	1456.80	1377.13	2004.69	2004.69	43.39	.00
TD: 1085	9' MD, 206									
10858.65	85.06	43.39	8852.64	4778.64	1498.45	1416.51	2062.00	2062.00	43.39	.00





Job Number: P97-102

Company: TEXACO E & P, INC.

Lease/Well: NVAWU #29H

Location: LEA COUNTY, NEW MEXICO

Rig Name:

State/Country:

Declination: 9.11 DEG EAST

Grid:

File name: C:\WINSERVE\NVAW29SW.SVY

Date/Time: 28-Feb-97 / 06:50

Curve Name: SOUTHWEST WELL PATH

Phoenix Drilling Services, Inc.

WINSERVE SURVEY CALCULATIONS

Minimum Curvature Method Vertical Section Plane 229.18

Measured	Incl	Drift	True	Subsea			Vertical	CLO	SURE	Dogleg
Depth	Angle	Direction	Vertical	TVD	N-S	E-W	Section	Distance	Direction	Severity
FT	Deg	Deg	Depth	FT	FT	FT	FT	FT	Deg	Deg/100
KOP: 869	90' MD, 57.	3 DEG/100'				·		 		
8690.00	.00	229.18	8690.00	4616.00	.00	.00	.00	.00	.00	.00
8700.00	5.73	229.18	8699.98	4625.98	33	38	.50	.50	229.18	57.30
8710.00	11.46	229.18	8709.87	4635.87	-1.30	-1.51	1.99	1.99	229.18	57.30
8720.00	17.19	229.18	8719.55	4645.55	-2.92	-3.38	4.47	4.47	229.18	57.30
8730.00	22.92	229.18	8728.94	4654.94	-5.16	-5.97	7.89	7.89	229.18	57.30
8740.00	28.65	229.18	8737.94	4663.94	-8.00	-9.26	12.24	12.24	229.18	57.30
8750.00	34.38	229.18	8746.46	4672.46	-11.42	-13.22	17.47	17.47	229.18	57.30
8760.00	40.11	229.18	8754.42	4680.42	-15.37	-17.80	23.52	23.52	229.18	57.30
8770.00	45.84	229.18	8761.73	4687.73	-19.83	-22.95	30.33	30.33	229.18	57.30
8780.00	51.57	229.18	8768.33	4694.33	-24.74	-28.64	37.84	37.84	229.18	57.30
8790.00	57.30	229.18	8774.14	4700.14	-30.05	-34.79	45.97	45.97	229.18	57.30
8800.00	63.03	229.18	8779.12	4705.12	-35.72	-41.35	54.64	54.64	229.18	57.30
8810.00	68.76	229.18	8783.20	4709.20	-41.69	-48.26	63.77	63.77	229.18	57.30

Measured Depth FT	inci Angle Deg	Drift Direction Deg	True Vertical Depth	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	C L C Distance FT	SURE Direction Deg	Dogleg Severity Deg/100
8820.00	74.49	229.18	8786.35	4712.35	-47.89	-55.43	73.25	73.25	229.18	57.30
EOB: 882	7' MD, 87	88' TVD, 78.	DEG INC.							
8827.00	78.50	229.18	8787.98	4713.98	-52.33	-60.58	80.06	80.06	229.18	57.30
8927.00	78.50	229.18	8807.92	4733.92	-116.40	-134.74	178.05	178.05	229.18	.00
9027.00	78.50	229.18	8827.86	4753.86	-180.46	-208.89	276.04	276.04	229.18	.00
9127.00	78.50	229.18	8847.80	4773.80	-244.52	-283.04	374.03	374.03	229.18	.00
9227.00	78.50	229.18	8867.74	4793.74	-308.58	-357.20	472.03	472.03	229.18	.00
9275.00	78.50	229.18	8877.31	4803.31	-339.32	-392.79	519.06	519.06	229.18	.00
BUILD @	15 DEG/1	00'								
9305.07	78.50	229.18	8883.30	4809.30	-358.59	-415.09	548.53	548.53	229.18	.00
9315.07	80.00	229.18	8885.17	4811.17	-365.01	-422.53	558.36	558.36	229.18	15.00
9325.07	81.50	229.18	8886.78	4812.78	-371.47	-430.00	568.23	568.23	229.18	15.00
9335.07	83.00	229.18	8888.12	4814.12	-377.94	-437.49	578.14	578.14	229.18	15.00
9345.07	84.50	229.18	8889.21	4815.21	-384.44	-445.02	588.08	588.08	229.18	15.00
9355.07	86.00	229.18	8890.04	4816.04	-390.96	-452.56	598.04	598.04	229.18	15.00
9365.07	87.50	229.18	8890.61	4816.61	-397.48	-460.11	608.03	608.03	229.18	15.00
9375.07	89.00	229.18	8890.91	4816.91	-404.02	-467.68	618.02	618.02	229.18	15.00
TARGET	1									
9381.75	90.00	229.18	8890.97	4816.97	-408.38	-472.72	624.69	624.69	229.18	15.00
9391.75	91.50	229.18	8890.84	4816.84	-414.91	-480.29	634.69	634.69	229.18	15.00
9401.75	93.00	229.18	8890.45	4816.45	-421.45	-487.85	644.68	644.68	229.18	15.00
9411.75	94.50	229.18	8889.79	4815.79	-427.97	-495.40	654.66	654.66	229.18	15.00
9421.75	96.00	229.18	8888.88	4814.88	-434.48	-502.94	664.62	664.62	229.18	15.00
9431.75	97.50	229.18	8887.70	4813.70	-440.97	-510.45	674.55	674.55	229.18	15.00
9441.75	99.00	229.18	8886.27	4812.27	-447.44	-517.94	684.45	684.45	229.18	15.00
9451.75	100.50	229.18	8884.58	4810.58	-453.88	-525.40	694.30	694.30	229.18	15.00
9461.75	102.00	229.18	8882.62	4808.62	-460.29	-532.82	704.11	704.11	229.18	15.00
9471.75	103.50	229.18	8880.42	4806.42	-466.67	-540.20	713.86	713.86	229.18	15.00
Hold @ 10	na 1	-		,				1.1111		
9475.54	104.07	229.18	8879.51	4805.51	-469.08	-542.99	717.55	717.55	229.18	15.00

Measured Depth FT	inci Angle Deg	Drift Direction Deg	True Vertical Depth	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	C L C Distance FT	SURE Direction Deg	Dogleg Severity Deg/100
9575.54	104.07	229.18	8855.20	4781.20	-532.49	-616.40	814.55	814.55	229.18	.00
9675.54	104.07	229.18	8830.89	4756.89	-595.90	-689.80	911.55	911.55	229.18	.00
9775.54	104.07	229.18	8806.58	4732.58	-659.31	-763.20	1008.55	1008.55	229.18	.00
9875.54	104.07	229.18	8782.27	4708.27	-722.73	-836.60	1105.55	1105.55	229.18	.00
Drop @	15.0 104.07	70								
9926.67	104.07	229.18	8769.84	4695.84	-755.15	-874.14	1155.15	1155.15	229.18	.00
9926.69	104.07	229.18	8769.84	4695.84	-755.16	-874.15	1155.16	1155.16	229.18	15.00
9930.47	103.50	229.18	8768.94	4694.94	-757.56	-876.93	1158.83	1158.83	229.18	15.00
9940.47	102.00	229.18	8766.73	4692.73	-763.93	-884.31	1168.59	1168.59	229.18	15.00
9950.47	100.50	229.18	8764.78	4690.78	-770.35	-891.73	1178.39	1178.39	229.18	15.00
9960.47	99.00	220.48	8763.09	4680.00	776 70	-899.19	1188.25	1188.25	220.48	15.00
9970.47 9970.47	99.00 97.50	229.18 229.18		4689.09 4687.65	-776.79		1100.25 1198.14	1100.25 1198.14	229.18 229.18	15.00
9980.47 9980.47	97.50 96.00		8761.65	4687.65	-783.26	-906.67	1208.08		229.18 229.18	
9990.47 9990.47	96.00 94.50	229.18 229.18	8760.48 8750.56	4686.48	-789.75	-914.19	1208.08	1208.08 1218.03	229.18 229.18	15.00 15.00
10000.47			8759.56	4685.56	-796.26	-921.72				
10000.47	93.00	229.18	8758.91	4684.91	-802.78	-929.28	1228.01	1228.01	229.18	15.00
10010.47	91.50	229.18	8758.52	4684.52	-809.31	-936.84	1238.00	1238.00	229.18	15.00
TARGET	2			•						
10020.47	90.00	229.18	8758.38	4684.38	-815.85	-944.40	1248.00	1248.00	229.18	15.00
10030.47	88.50	229.18	8758.52	4684.52	-822.39	-951.97	1258.00	1258.00	229.18	15.00
10040.47	87.00	229.18	8758.91	4684.91	-828.92	-959.53	1267.99	1267.99	229.18	15.00
10050.47	85.50	229.18	8759.56	4685.56	-835.44	-967.08	1277.97	1277.97	229.18	15.00
10060.47	84.00	229.18	8760.48	4686.48	-841.95	-974.62	1287.93	1287.93	229.18	15.00
10070.47	82.50	229.18	8761.65	4687.65	-848.44	-982.13	1297.86	1297.86	229.18	15.00
10080.47	81.00	229.18	8763.09	4689.09	-854.91	-989.62	1307.76	1307.76	229.18	15.00
10090.47	79.50	229.18	8764.78	4690.78	-861.36	-997.08	1317.61	1317.61	229.18	15.00
10100.47	78.00	229.18	8766.73	4692.73	-867.77	-1004.50	1327.42	1327.42	229.18	15.00
10110.47	76.50	229.18	8768.94	4694.94	-874.14	-1011.88	1337.17	1337.17	229.18	15.00
HOLD 75	5.99 DEG IN	IC			· . · · · · · · · · · · · · · · · · · ·	S-1747				
10113.85	75.99	229.18	8769.74	4695.74	-876.29	-1014.36	1340.45	1340.45	229.18	15.00
10213.85	75.99	229.18	8793.95	4719.95	-939.72	-1087.79	1437.48	1437.48	229.18	.00
10313.85	75.99	229.18	8818.15	4744.15	-1003.15	-1161.21	1534.51	1534.51	229.18	.00
10413.85	75.99	229.18	8842.35	4768.35	-1066.58	-1234.63	1631.53	1631.53	229.18	.00

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Measured Depth FT	inci Angle Deg	Drift Direction Deg	True Vertical Depth	Subsea TVD FT	N-S FT	E-W FT	Vertical Section FT	CLOSURE		Dogleg
								Distance FT	Direction Deg	Severity Deg/100
10513.85	75.99	229.18	8866.56	4792.56	-1130.00	-1308.06	1728.56	1728.56	229.18	.00
10613.85	75.99	229.18	8890.76	4816.76	-1193.43	-1381.48	1825.59	1825.59	229.18	.00
TD: 1066	3' MD, 187	'3' VS					.,			
10662.71	75.99	229.18	8902.59	4828.59	-1224.43	-1417.36	1873.00	1873.00	229.18	.00