



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE

1000 RIO BRAZOS ROAD
AZTEC, NEW MEXICO 87410
(505) 334-6176

OIL CONSERVATION DIVISION
BOX 2088
SANTA FE, NEW MEXICO 87501

DATE January 29, 1985

RE: Proposed MC _____
Proposed DHC ✓ _____
Proposed NSL _____
Proposed SWD _____
Proposed WFX _____
Proposed PMX _____

Gentlemen:

I have examined the application dated 1/27/85
for the Union Texas Pet. Corp. Zachary #51 P. 35-29N-10W
Operator Lesse and Well No. Unit,

and my recommendations are as follows:

Approve

Yours truly,

Frank J. Long



Union Texas Petroleum

375 U.S. Highway 64
Farmington, New Mexico 87401
Telephone (505) 325-3587

January 25, 1986

R. L. Stamets
Oil Conservation Division
P.O. Box 2088
State Land Office Bldg.
Santa Fe, New Mexico 87501

Re: Zachry #51
812' FSL; 573' FWL
Section 35, T29N-R10W
San Juan County, NM

RECEIVED
JAN 27 1986
OIL CON. DIV.
DIST. 3

Dear Mr. Stamets:

Union Texas Petroleum Corporation is applying for a downhole commingling order for the reference well in the Armenta Gallup and Blanco Mesaverde fields. The ownership of the zones to be commingled are common. The Bureau of Land Management and the offset operators indicated in Exhibits A and B will receive notification of this proposed downhole commingling.

The subject well was completed on May 15, 1983 and fracture stimulated in the Gallup formation with 139,600# in 107,000 gallons CO₂. Average first full months production was 138 MCFD and 8 BOPD. The well is currently shut in due to mechanical problems of the plunger lift and will require a workover to repair. Average production prior to shutting the well in September 1985 was 20 MCFD and 0.5 BOPD. The steep production decline of this well is typical of the Armenta Gallup formation in this area. Based on the decline, the remaining life of the subject well is calculated to be 2.2 years with additional reserves of up to 14 MMCFG and very little oil.

This is an uneconomic well to continue producing and the small production and additional calculated reserves cannot justify the expense of a workover to make repairs and continue producing from the Gallup formation. The proposed commingling will result in the recovery of additional hydrocarbons from the Gallup formation, thereby preventing waste and will not violate correlative rights. Commingling the two zones will result in a more efficient operation by helping to lift Gallup fluids without the aid of the plunger lift currently used. Although doubtful, the plunger lift will continue to be used if necessary.

Page 2 of 2
Stamets/Katirgis
January 25, 1986

Since the Zachry #51 is currently shut in a Gallup fluid sample was taken from an east offset, the Zachry #38. A Mesaverde fluid sample was obtained from the Zachry #43, also to the east. The attached fluid analysis from these wells indicates the total value of the crude will not be reduced by commingling. The reservoir characteristics of each of the subject zones are such that underground waste would not be caused by the proposed downhole commingling. The calculated static bottom hole pressure based on surface pressure and fluid level measurements is 612 psi in the Gallup (from the Zachry #51) and 1150 psi (from the Zachry #43); within the limits of Rule 303-C, Section 1(b), Part (6). The fluids from each zone are compatible and no precipitates will be formed as a result of commingling to damage either reservoir. Current flow tests (7 BOPD from Mesaverde and less than 0.5 BOPD from the Gallup) indicate the daily production will not exceed the limit of Rule 303-C, Section 1(a), Parts (1) and (3).

The Division Aztec District office will be notified anytime the commingled well is shut in for seven consecutive days. To allocate the commingled production to each of the zones, Union Texas Petroleum will consult with the supervisor of the Aztec District office and determine an allocation formula for each of the producing zones.

Included with this letter are two plots showing ownership of offsetting leases, a production curve of the subject well, a production curve of anticipated Mesaverde production (Zachry #43), Form C-116 (GOR Test), Fluid Analysis Report and a wellbore diagram showing the proposed downhole equipment of the subject well.

Yours truly,



S. G. Katirgis
Petroleum Engineer

SGK:tb

Attachments/6

cc: Frank Chavez, OCD Aztec Office
W. K. Cooper
M. R. Reisz

<p>CANDELA RIA A #1 6-1983 3/14 V55(A) <input type="radio"/></p>	<p>ARREHA CON E #1 0/0 0/0(A) <input type="radio"/></p>
<p>BORSEDO CON A #1 5-1983 1/0 0/0(A) <input type="radio"/></p>	<p>27</p>
<p>BOLLOCK CON D #1 6-1983 1/2 4/16(A) <input type="radio"/></p>	<p>ANOCO</p>
<p>MORRIS A #1 9-1981 16.3/131 2.5/88(A) <input type="radio"/></p>	<p>28</p>
<p>ABRAHNS L #1A 7-1983 14/2 1.9/16(A) <input type="radio"/></p>	<p>29</p>
<p>ABRAHNS L #1 7-1983 1/0 0/0(A) <input type="radio"/></p>	<p>30</p>

10W

CAPACITY

FIRST PRODUCTION DATE (YEAR-MONTH-DAY)
CUM OIL(MBO)/GAS(MMCFG) - THROUGH 05/31/85
05 AVG. OIL(TPOPD)/GAS(MMCFGPD) (STATUS)

GALLUP FORMATION

PRODUCTION DATA

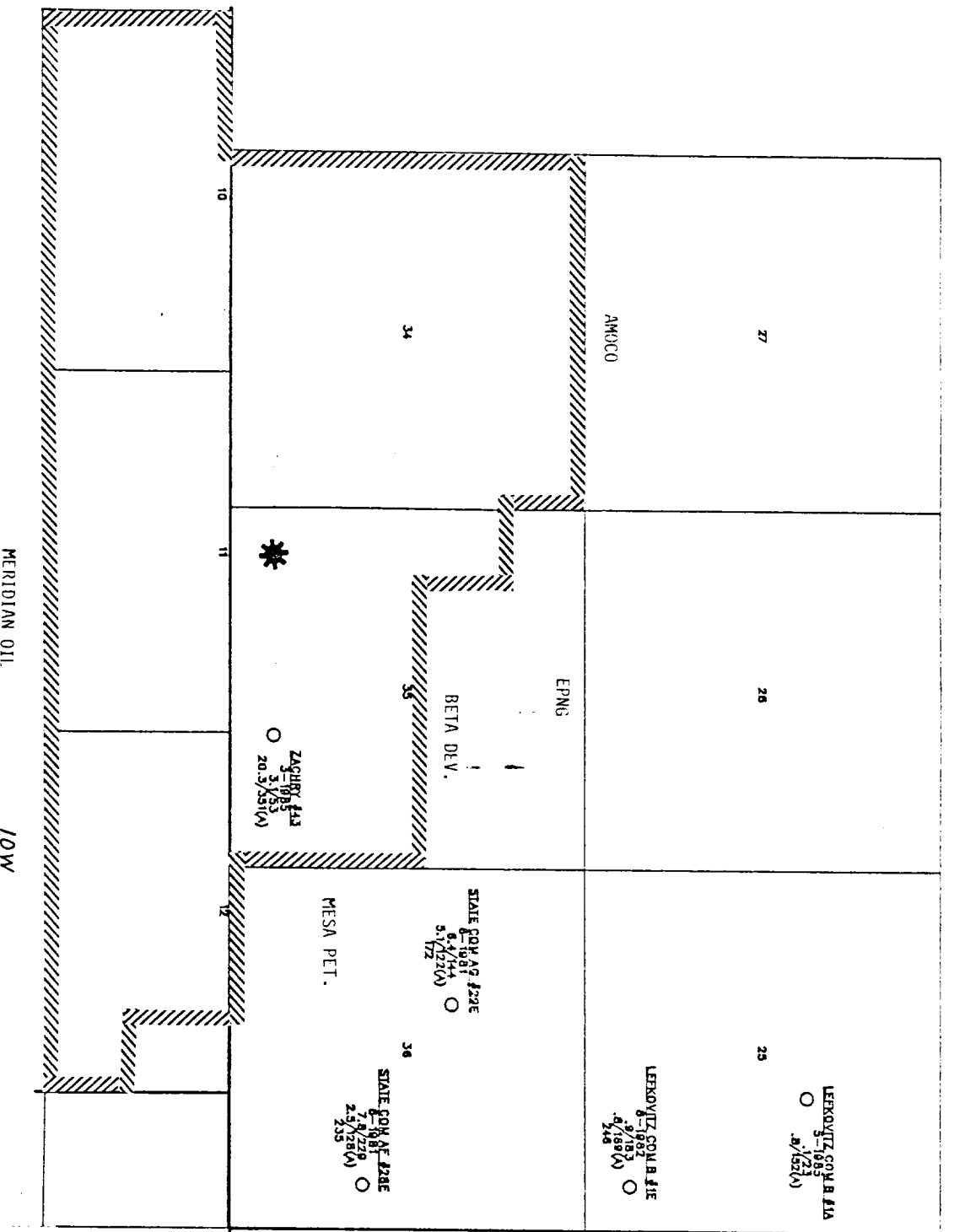
WELLNAME

FIRST PRODUCTION DATE (YEAR-MONTH-DAY)

CUM OIL(MBO)/GAS(MMCFG) - THROUGH 05/31/85

05 AVG. OIL(ROPD)/GAS(MCFGPD) (STATUS)

EXHIBIT B - OFFSET MESAVERDE PRODUCERS



MESAVERDE FORMATION

PRODUCTION DATA

WELLNAME

FIRST PRODUCTION DATE (YEAR-MONTH-DAY)

QUM OIL(BOPD)/QAS(MC/GPD) - THROUGH 05/31/85

05 AVG. OIL(BOPD)/QAS(MC/GPD) (STATUS)

CAPACITY

/// 01 PG. ACRES/AGE

EXHIBIT C

UNION TEXAS PETROLEUM CO

ZACHRY #051

ARMENTA GALLUP

35M-29-10

WID: 30429N10W35M00GP

PRODUCTION YEAR

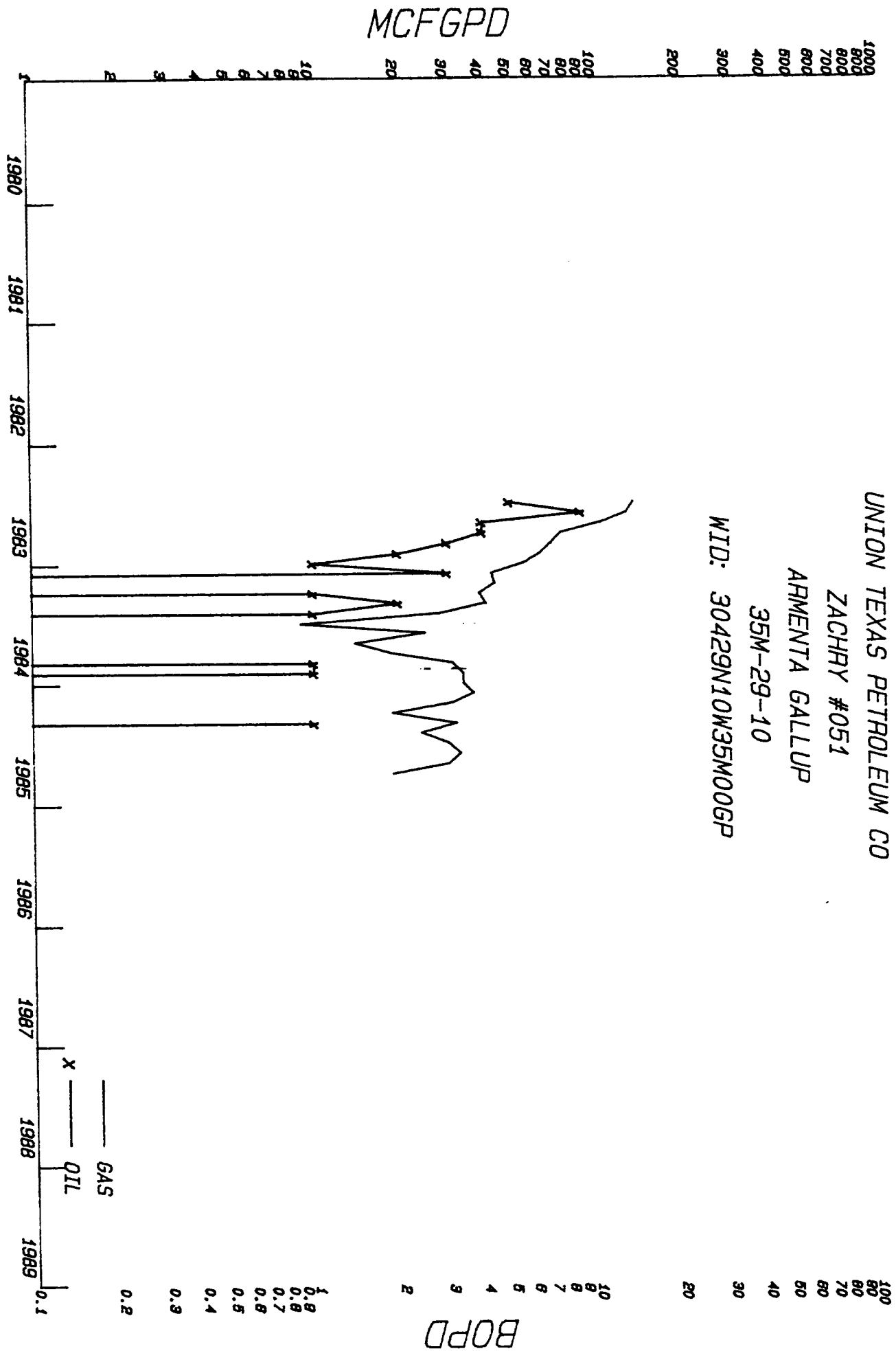


EXHIBIT D

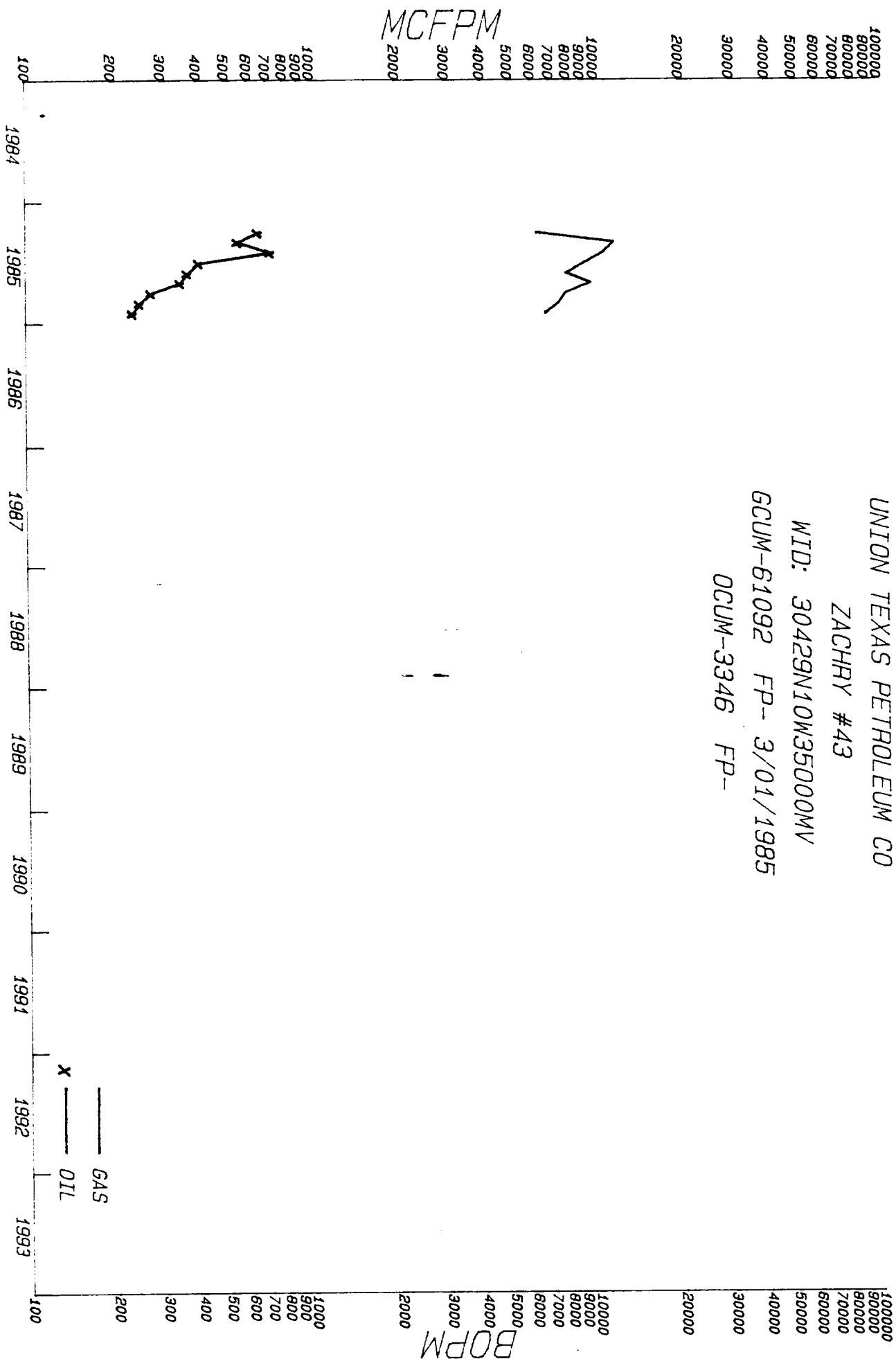
UNION TEXAS PETROLEUM CO

ZACHRY #43

WID: 30429N10W35000MV

GCUM-61092 FP- 3/01/1985

OCUM-3346 FP-



NEW MEXICO OIL CONSERVATION COMMISSION
GAS-OIL RATIO TESTS

C-11b
Form No. 1-1-67

Operator		Union Texas Petroleum		Pool		Blanco Mesaverde/Armenta Gallup		County		San Juan County					
Address		375 U.S. Hwy 64, Farmington, NM 87401		TYPE OF TEST - (X)		<input type="checkbox"/> Spontaneous <input type="checkbox"/> Controlled <input type="checkbox"/> Cong. Latent <input checked="" type="checkbox"/> Special									
LEASE NAME	WELL NO.	LOCATION				DATE OF TEST	CHOKE SIZE	TBG. PRESS.	DAILY ALLOW-ABLE	LENGTH OF TEST HOURS	PROD. DURING TEST			GAS - OIL RATIO CU. FT./BBL	
		U	S	T	R						WATER BBLs.	GRAV. OIL BBLs.	OIL BBLs.		GAS M.C.F.
Zachry (Gallup)	51	M	35	29N	10W	9/18/85		90		24	0.5	43	0.2	24	120,000
Zachry (Mesaverde)	43	O	35	29N	10W	9/18/85		90		24	2.5	45	10	302	30,200

No well will be assigned an allowable greater than the amount of oil produced on the official test.

During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowables when authorized by the Commission.

Gas volumes must be reported in MCF measured at a pressure base of 15.025 psia and a temperature of 60° F. Specific gravity base will be 0.60.

Report casing pressure in lieu of tubing pressure for any well producing through casing.

Well original and one copy of this report to the district office of the New Mexico Oil Conservation Commission in accordance with Rule 301 and appropriate pool rules.

I hereby certify that the above information is true and complete to the best of my knowledge and belief.

(Signature)

(Title)



UNION TEXAS PETROLEUM
REID, ZACHRY AND SULLIVAN
LEASE OILS

Rocky Mountain Region


LABORATORY INVESTIGATION
OF
REID, ZACHRY & SULLIVAN LEASE OILS
JANUARY 9, 1986

PREPARED FOR:

UNION TEXAS PETROLEUM
Stergie Katirgis
Petroleum Engineer

PREPARED BY:


JAMES C. TERRY
Senior Technical Representative

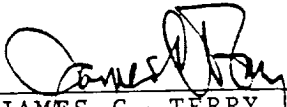

RUSSEL S. PYEATT
Field Engineer

SERVICE POINT
FARMINGTON, NEW MEXICO
505-327-6222

LABORATORY INVESTIGATION
REID, ZACHRY AND SULLIVAN
LEASE OILS

SUMMARY OF RESULTS

1. No precipitation of materials was observed from either admixture of fluids.
2. Emulsion testing was performed. There is no concern over emulsion effects.
3. The cloud point of oil mixtures dropped or remained the same upon mixing of fluids.
4. According to calculations not enough cool down from gas expansion will occur to alter paraffin deposition significantly.
5. The mixture of water sources presents no concern over resulting scaling tendencies.



JAMES C. TERRY
Senior Technical Rep
Western Company of North
America-Farmington District

LABORATORY INVESTIGATION
REID, ZACHRY AND SULLIVAN
LEASE OILS

On Thursday, December 28, 1985, a request for laboratory work was placed by Stergie Katirgis, Petroleum Engineer of Union Texas Petroleum Corporation.

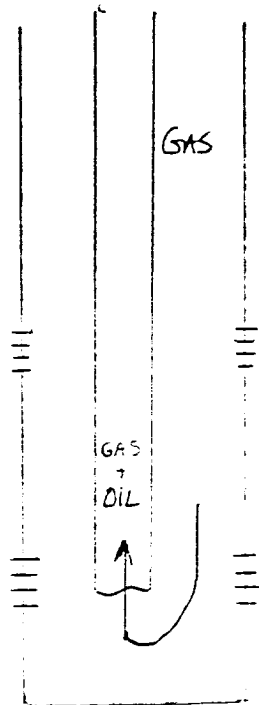
PURPOSE

Four oil samples were received of Mr. Katirgis with the request we investigate the concern of potentially detrimental effects due to comingling of Gallup and Mesa Verde fluids in respective wells.

INVESTIGATION

1. Background Information

a)



Proposed Mesa Verde Perforations

Existing Gallup Perforations

- b) BHST Gradient: $1.375^{\circ}\text{F}/100\text{ ft. depth.}$
- c) Current production problems are primarily due to paraffin deposition from surface down to $\approx 1000'$ depth

LABORATORY INVESTIGATION
REID, ZACHRY AND SULLIVAN
LEASE OILS

d) Commingling Order Mixture Requirements:

Since these tests relate to 2 separate commingling applications and yet they were performed in a single investigation it is necessary to identify the appropriate mixture used in testing. The commingling requests present the mixing of [Zachry 38 Gallup oil with Zachry 43 Mesa Verde fluids (oil/water)] and the mixing of [Reid B #4 Gallup oil with B.Sullivan B Com #1 Mesa Verde Gas (with accompanying water)].

The tests performed simulated the mixture of fluids that may result from these commingling actions. Each oil component was analyzed for API gravity, paraffin and cloud point. Each water component was analyzed for dissolved solids, pH, specific gravity and resistivity. The mixture of oils addressed the potential increase in precipitation of materials and the potential increase in paraffin content by a synergistic effect of mixing oils of different constitution. Emulsion tests simulated the mixing environment of the wellbore where the water component of a fluid could be tied up in a resulting emulsion without the ability to break out and allow separation of the oil and water constituents. The emulsion test results present the number of ml (% of mixture) of water breakout at listed time intervals. The volume of test sample (mixture) used in the emulsion tests is 100 ml.

LABORATORY INVESTIGATION
REID, ZACHRY AND SULLIVAN
LEASE OILS

2. Concerns to address in analysis.

- a) The precipitation of materials produced by the admixture of oils of potentially different constitution.
- b) The creation of emulsions due to the admixture of different fluids.
- c) Increased paraffin deposition by additive properties of oils.
- d) Increased paraffin deposition due to the reduction of temperature accompanying gas expansion.
- e) Increased scaling tendencies of water component of mixed fluids.

3. Steps taken in analysis

- a) API Analysis of oils including: API Gravity
Cloud Point
Paraffin Content
B S & W
- b) Discussion with Mr. Katirgis regarding the well bore production environment; e.g., mode of hydrocarbon production, pump type and operation, water components of production fluids, current paraffin problems, etc.
- c) Mixing of oils in appropriate cases with additional cloud point testing to determine resulting fluid characteristics.
- d) API Water Analysis with accompanying scaling tendency calculations.
- e) Emulsion tendency testing via mixing of fluids in appropriate cases.

LABORATORY INVESTIGATION
REID, ZACHRY AND SULLIVAN
LEASE OILS

DATA

SAMPLE #1

Well: Zachry #38	Zone: Gallup
API Gravity @ 60°F	42.7
Cloud Point	73°F
Paraffin Content	0.26% by weight

SAMPLE #2

Well: Zachry #43	Zone: Mesa Verde
API Gravity @ 60°F	45.1° API
Cloud Point	62°F
Paraffin Content	3.54% by weight

SAMPLE #3

Well: Reid B #4	Zone: Gallup
API Gravity @ 60°F	43.7
Cloud Point	55°F
Paraffin Content	18.91% by weight

SAMPLE #4

Well: B. Sullivan B #1	Zone: Mesa Verde
API Gravity @ 60°F	NA
Cloud Point	NA
Paraffin Content	NA
Specific Gravity	1.018

SAMPLE #5

Mixture 50/50 Samples 1 & 2	Zone: Mesa Verde/Gallup
Cloud Point	55°F
Paraffin Content	24.3% by weight
API Gravity @ 60°F	43.0

SAMPLE #6

Mixture 50/50 Samples 3 and 4	Zone: Gallup/Mesa Verde
Cloud Point	43.7
Paraffin Content	18.91% by weight

DATE:

Fig. 1
EMULSION TESTS DATA SHEET

OPERATOR: UNION TEXAS PET SUBMITTED BY: S. KATIRGIS
 WELL: ZACHRY 38/ZACHRY 43 SOURCE OF SAMPLE: -
 FIELD: KUTZ/GALLUP DATE SAMPLED: 12-20-85
 FORMATION: GALLUP/MV DATE RECEIVED: 12-22-85
 DEPTH: API GRAVITY OF OIL: 42.7/45.1
 COUNTY: SAN JUAN

TYPE & CONC. OF FLUID: -
 TYPE & CONC. OF INHIBITOR: -
 TYPE & CONC. OF SOLIDS: -
 TEST TEMPERATURE: 70°F
 OIL/WATER FLUID RATIO: 50/50
 ANALYSIS BY: R. Pyeatt

PERCENTAGE OF ORIGINAL H₂O SEPARATED AT VARIOUS TIME INTERVALS AFTER EMULSIFYING

Test Number	1		2		3		4		5		6		7		8	
Elapsed Time	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol
1 min	1	20	2		3		4		5		6		7		8	
2	2	35	3		4		5		6		7		8		9	
3	3	38	4		5		6		7		8		9		10	
4	4	37	5		6		7		8		9		10		11	
5	5	37	6		7		8		9		10		11		12	
6	6	37	7		8		9		10		11		12		13	
7	7	37	8		9		10		11		12		13		14	
8	8	37	9		10		11		12		13		14		15	
9	9	37	10		11		12		13		14		15		16	
10	10	37	11		12		13		14		15		16		17	
20	20	37	21		22		23		24		25		26		27	
30	30	37	31		32		33		34		35		36		37	
Total Vol (ml)		100														
Vol. Emulsion / Sediment		2														
OIL		61														
Interface**		V														
Vol. Sediment *		0														

REMARKS:

* Preferential wetting of solids: OS=oil-wet bottom; OO=oil-wet oil phase; WS=water-wet bottom; WO=water-wet oil phase
 OI=oil-wet interface; WI=water-wet interface
 ** Interface: F=Fluid; S=Solid; V=Viscous

LABORATORY INVESTIGATION
REID, ZACHRY AND SULLIVAN
LEASE OILS

CALCULATIONS

Cool down effects due to gas expansion:

Reference: Perry's Handbook of Chemical Engineering

Re: Adiabatic Expansion of Ethane, Methane

$$T_s = T_r \left(\frac{P_s}{P_r} \right)^{\left(\frac{K-1}{K} \right)}, \text{ where}$$

T_s = Surface Temperature

T_r = Reservoir Temperature

P_s = Surface Pressure

P_r = Reservoir Pressure

$K = \frac{\text{Specific Heat at Constant Pressure}}{\text{Specific Heat at Constant Volume}}$

Assumed values for ~~maximum~~ cool down due to gas expansion:

T_s = Unknown

T_r = 160°F

P_s = 500 psi

P_r = 2000 psi

K = 1.2

$T_s = 160 \left(\frac{500}{2000} \right)^{0.1667}$

$T_s = 127^\circ\text{F}$

NOTE:

A total cooldown of 33°F would be expected

LABORATORY INVESTIGATION
REID, ZACHRY AND SULLIVAN
LEASE OILS

B S & W TEST

% COMPONENT	ZACHRY #43 (Mesa Verde)	REID B#4 (Gallup)	ZACHRY #38 (Gallup)	B.SULLIVAN B#1 (Mesa Verde)
SOLIDS	0.4	0.1	0.1	NA
WATER	4.6	0.3	49.0	100
EMULSION	2.0	0.0	0.0	NA
OIL	93.0	99.6	51.0	NA

[illegible]

ANALYSIS NO: 1
EXTENSION NO:

GENERAL INFORMATION

OPERATOR: UNION TX PETROLEUM
WELL: ZACHRY #32
FIELD: LARMENTA GALLUP
FORMATION: GALLUP
COUNTY: SAN JUAN
STATE: NM
SAMPLE DESCR: OIL AND WATER SAMPLE

DEPTH: 5000 FT
DATE SAMPLED: 12/20/85
DATE RECEIVED: 12/22/85
SUBMITTED BY: S. KATURGIS
WORKED BY: D. TERRY

PHYSICAL AND CHEMICAL DETERMINATIONS

SPECIFIC GRAVITY: 1.005 AT 69 DEG. F PH = 7.3

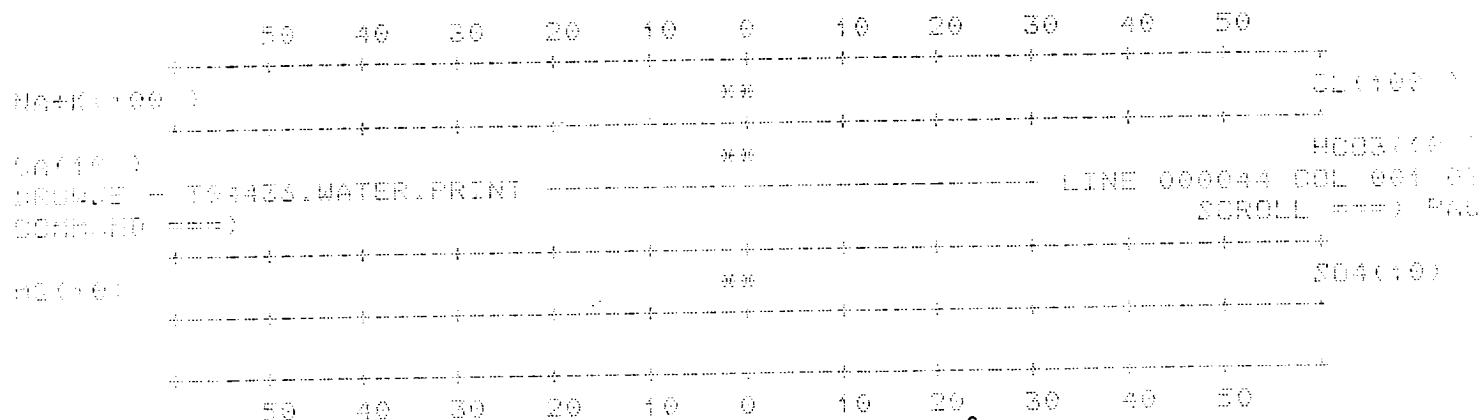
BROWSE - T04435.WATER.PRINT ----- LINE 000022 COL 001 080
COMMAND ==> SCROLL ==> PAGE

IRON:	0 PPM	SULFATE:	25 PPM
SODIUM:	713 PPM	CHLORIDE:	1526 PPM
POTASSIUM:	39 PPM	SODIUM CHLORIDE (CALC):	1812 PPM
CALCIUM:	0 PPM	BICARBONATE:	328 PPM
MAGNESIUM:	1 PPM	TOT. HARDNESS AS CaCO3:	1075 PPM
PHOSPHATE: 0		TOT. DISSOLVED SOLIDS:	3705 PPM
HYDROGEN SULFIDE: 0			

RESISTIVITY: NOT CALCULATED

RESISTIVITY: NO CALCULATED
CALCIUM CARBONATE SCALING IS REMOTE CALCIUM SULFATE SCALING IS REMOTE
REMARKS:

STIFF TYPE PLOT (IN MEQ/L)



ANALYST

C. J. TERRY

THE WESTERN COMPANY OF AMERICA (BERTAL)
SCALING TERMINATED

ANALYTIC NO. 1
EXTENSION NO.

IONIC STRENGTH CALCULATIONS

BROWSE - T04436.WATER.PRINT ----- LINE 000066 COL 001 080
COMMAND ===> SCROLL ===> PAGE

ION	IONIC STRENGTH
NA + K	0.0165
CA	0.0000
MG	0.0001
CL	0.0214
HCO3	0.0027
SO4	0.0005
TOTAL:	0.0412

CALCIUM CARBONATE

EQUATION: $SI = PH - (K + PCA + PALK)$

WHERE: $PCA = -\log(CA, PPM)$ & $PALK = -\log(HCO3 + CO3, PPM)$

$SI = 7.3 - (1.3 + 4.9 + 2.6) = -1.4$

CACO3 SCALING IS REMOTE

CALCULATED USING STIFF AND DAVIS EXTENSION OF LANGEЛИER METHOD.

CALCIUM SULFATE

EQUATION: $S = 1000 (\sqrt{X^2 + 4KSP}) - X$

BROWSE - T04436.WATER.PRINT ----- LINE 000088 COL 001 080
COMMAND ===> SCROLL ===> PAGE

WHERE X IS THE EXCESS ION CONC. 1.03E-08

KSP IS THE SOLUBILITY PROD. CONST. 2.00E-04

& S IS THE CALC. SOLUBILITY OF GYPSUM 2.33E+01

THIS IS COMPARED TO THE ACTUAL CONC. 1.39E-02

CACOA SCALING IS REMOTE

CALCULATED USING SKILLMAN, MC DONALD, AND STIFF METHOD

ANALYST

Clay Bury
C. TERRY

***** BOTTOM OF DATA *****

UNION TEXAS PETROLEUM CORP.

WELLBORE DIAGRAM FOR DHC APPLICATION

WELL NAME Zachry #51

LOCATION 812' FSL & 573' FWL SECTION 35 T 29N R 10W

COUNTY San Juan STATE NM LEASE _____

GLE 5717'

KBE 5730'

KB 13'

SURFACE CASING

Hole size: 13-3/4" to 315'

Casing: 9-5/8" 36#

Casing set @ 315'

Top of Cement: Circ to surface

INTERMEDIATE CASING

Hole Size: 8-3/4" to 5360'

Casing: 7" 23# K-55

Casing set @ 5360'

Top of Cement: Circ to surface

LINER HANGER

Hanger Type: _____

Hanger Top @ 5148'

FORMATION TOPS

Ojo Alamo 850'

Kirtland Shale 970'

Pictured Cliffs 1940'

Lewis Shale 2020'

Chacra 2540'

Cliffhouse 3610'

Point Lookout 4240'

Mancos Shale 4650'

Gallup 5450'

Greenhorn _____

Graneros _____

Dakota _____

PRODUCTION LINER

Hole Size: 6-1/4" to 6100'

Liner: 4-1/2" 11.6# K-55

Liner set @ 6065'

Top of Cement: Circulated

WELL HISTORY

Spud date: 3/30/83

Original owner: UNICON

IP: MCFD _____ BOPD _____ BWPD _____

GOR _____

Completion treatment: _____

CURRENT DATA

Pumping Unit: _____

Tubing: 2-3/8" 4.7# J-55 EUE @ ±5900'

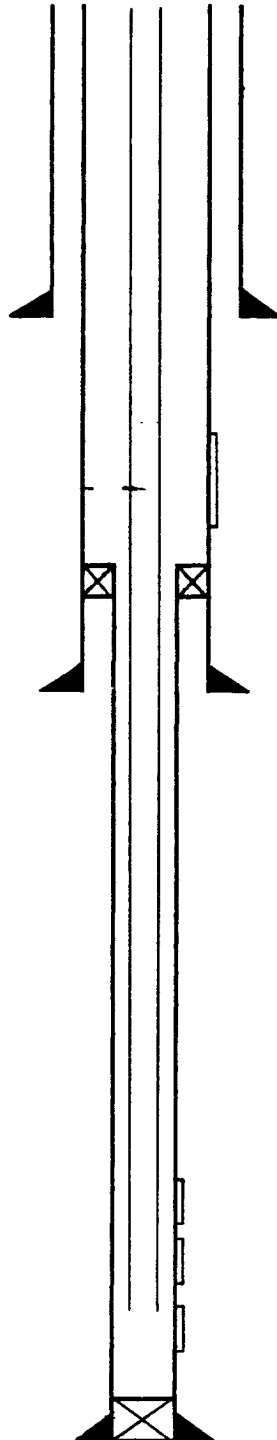
Pump size: _____

Rod string: _____

Well Head: _____

Remarks: _____

DV tool @ 2025'



PBT D 6050'

TD 6100'

PERFORATIONS

Upper Gallup: 5458'-5652' (16 shots)

Middle Gallup: 5670'-5790' (14 shots)

Lower Gallup: 5888'-6036' (27 shots)

Est. Mesaverde: 3830'-4620' (50 shots)
