

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

September 8, 1989

RECEIVED

Mr. William LeMay N. M. Oil Conservation Division P. O. Box 2088 Santa Fe, NM 87504 SEP 1 4 1989

OIL CONSERVATION DIV. SANTA FE

Re: Pierce A #2E

1830' FNL & 860' FWL Section 34, T29N-R10W

Dear Mr. LeMay:

Union Texas petroleum is applying for a downhole commingling order for the referenced well in the Basin Dakota and Armenta Gallup fields. The ownership of the zones to be commingled is 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 June 5, 1981. The Gallup formation was fracture stimulated with 122,500# sand in 116,000 gallons 75 quality nitrogen foam in two stages. The Dakota formation was fracture stimulated with 126,000# sand in 78,000 gallons 30# crosslinked gel. The well has produced 179 MMCFG and 16 MBO from the Gallup formation, and 144 MMCFG and 1 MBO from the Dakota formation to date. Current production is 15 MMCFD and zero oil from the Gallup, and 65 MCFD and zero oil from the Dakota. The poor production of this well is typical of the Armenta Gallup and Basin Dakota formations in this area. Two tubing strings are utilized. The Dakota is flowed from below a packer and the Gallup is rod pumped. The Gallup rod pump has been stuck since mid 1989.

Continued production of this marginal well is dependent on few or no additional expenses. The mechanical problem of the Gallup zone will require the expense of a rig to repair and can not be justified unless the two zones can be commingled. Commingling both zones is the optimum way to utilize the existing wellbore. The proposed commingling will result in the continued production of the Gallup formation and recovery of additional hydrocarbons from both the Gallup and Dakota formations, thereby preventing waste. This procedure will not violate correlative rights. Commingling will result in a more efficient operation by helping to lift the small amount of Gallup liquids without the use of a rod pump currently utilized.

Currently neither the Gallup or the Dakota zones are lifting fluids. A Gallup fluid sample was taken from a south offset, the Zachry #32, and a Dakota fluid sample was taken from a southwest offset, the Zachry #16E.

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 bottom hole pressure relative to sea level, based on surface pressure and fluid level measurements, is 282 psi in the Gallup and 560 psi in the Dakota, and within the limits of Rule 303-C, Section 1 (b), Part (6). The fluids from each zone are compatible and no precipitates or emulsions will be formed as a result of commingling to damage either reservoir. Current flow tests of 0 BOPD and 0 BWPD from the Gallup and a trace of water from the Dakota, and anticipated flow rates after commingling of 1 BOPD and 0 water from each zone, indicate the daily production will not exceed the limit of Rule 303-C, Section 1 (a), Parts (1) and (3).

The 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 plats showing ownership of offsetting leases, a production curve of each zone, Form C-116 (GOR test), Fluid Analysis Report, and a wellbore diagram showing the existing and proposed downhole equipment of the subject well.

Your truly,

S. G. Katirgis

Production Engineer

S. D. Katings

SGK: 1mg attachments

cc: Frank Chavez, Aztec OCD

W. K. Cooper S. J. Hunter

ZACHRY 34

ZACHRY49

ZACHRY 39

ZACHRY 56

ZACHRY 36

ZACHRY 37

ZACHRY 55

ZACHRY 51

L1

ZACHRY 28

728N

ZACHRY 52

RIDW

ZACHRY 40

ZACHRY 35

ZACHRY 32

ZACHRY 47

10

EXHIBIT A - OFFSET GALLUP WELLS

SANCHEZ COM

ZACHRY 45

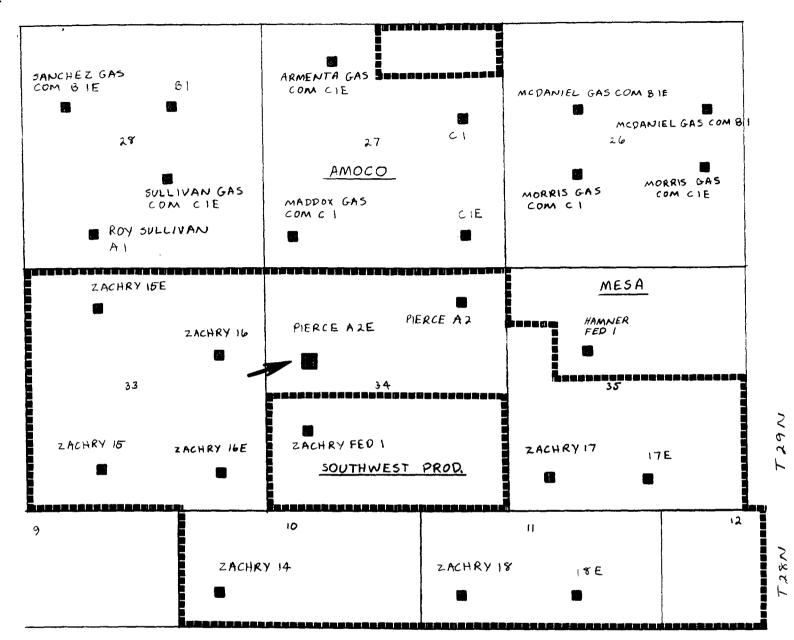
ZACHRY 42

ZACHRY 57

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TRUJILLO COM

ZACHRY 33



RIDW

EXHIBIT B - OFFSET DAKOTA WELLS



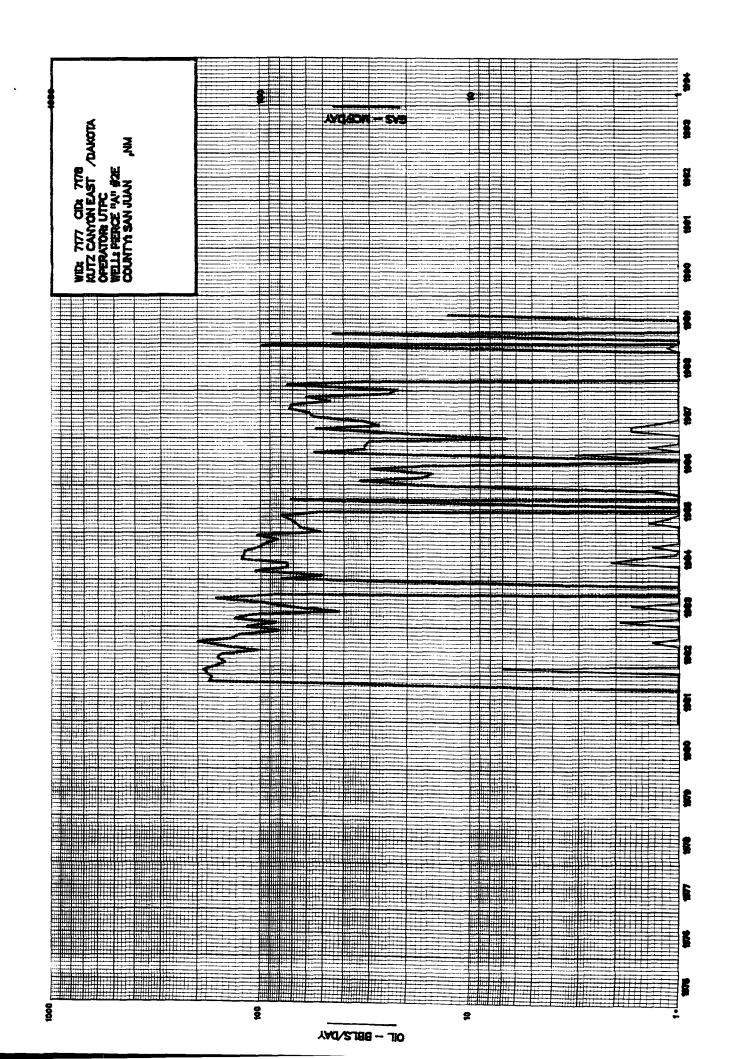
SUBJECT:	PIE	RCE	A #2E	
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BY:5(5-K		DATE: _	17/89
			PAGE	OF

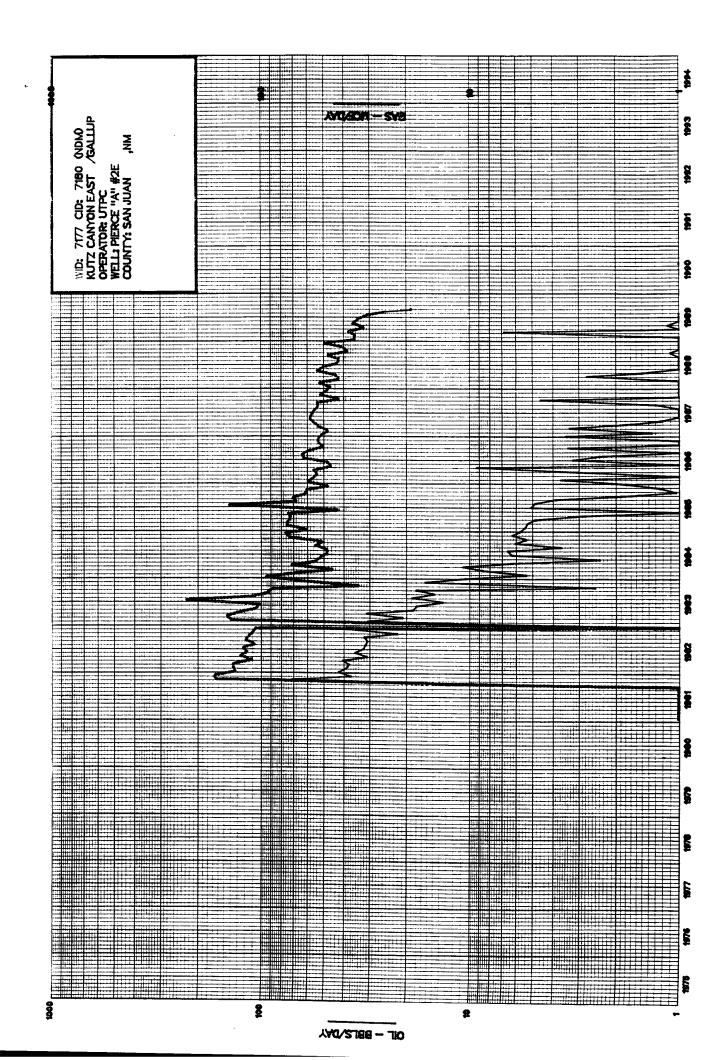
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SUBJECT: PIERCE A #2	? E	
COMMINGLED Wellbore		
BY: <u>56</u> K	DATE: 9/	7/89

PAGE____ OF _ 1830 FNL \$ 860 FNL SEC 34, T29N-RIOW SAN JUAN CO., NM 12 1/4" HOLE 85/8",24*, H-40 @ 292' Circ cmt to surface 5643 GLE 5656 RKB 21/6", 3.25#, J-55, 10rd, 15 tbg set @ 6390! 5.N. and perfed sub on bottom. 54121 63031 7 7/8" HOLE 5½", 15.5 *****, K-55 @6581' DV TOOLS @ 3064' \$ 5784' Circ mud during 1st & 3rd cmt stage. 2nd stage not cmted. DV tool malfunction.

PBTD = 65 42'







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

September 8, 1989

Mesa Petroleum P. O. Box 579 Flora Vista, NM 87415

Gentlemen:

Union Texas Petroleum Corporation is in the process of applying for a downhole commingling order for our Pierce A #2E well located 1830' FNL & 860' FWL, Section 34, Township 29N, Range 10W, NMPM, San Juan County, New Mexico, in the Armenta Gallup and Basin Dakota zones.

This letter is to notify you of such action as our records indicate that you are owner and operator of acreage which adjoins the area in which the downhole commingling is requested. If you have no objections to the proposed downhole commingling order, we would appreciate your signing the attached copy of this letter and returning it to this office.

Your prompt attention to this matter would be greatly appreciated.

Sincerely,

S. G. Katirgis Production Engineer

The downhole commingling request is hereby approved:

(Date)



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

September 8, 1989

Southwest Production, Inc. Attn: Fred Crum P. O. Box 400 Aztec, NM 87410

Dear Mr. Crum:

Union Texas Petroleum Corporation is in the process of applying for a downhole commingling order for our Pierce A #2E well located 1830' FNL & 860' FWL, Section 34, Township 29N, Range 10W, NMPM, San Juan County, New Mexico, in the Armenta Gallup and Basin Dakota zones.

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Sincerely,

S. G. Katirgis
Production Engineer

The	downhole	commingling	request	is	hereby	approved:
		(Date)				



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

September 8, 1989

Amoco Production Company 34 Southside River Road Farmington, NM 87401

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Your prompt attention to this matter would be greatly appreciated.

Sincerely,

S. G. Katirgis
Production Engineer

The downhole commingling request is hereby approved:

(Date)



UNION TEXAS PETROLEUM ZACHRY 16E ZACHRY 32 LEASE FLUIDS

Rocky Mountain Region

LABORATORY INVESTIGATION

OF

ZACHRY, DAKOTA AND GALLUP FLUIDS COMPATABILITY

SEPTEMBER 11, 1989

PREPARED FOR:

UNION TEXAS PETROLEUM STERG KATIRGIS PETROLEUM ENGINEER PREPARED BY:

BRIAN P. AULT PETROLEUM ENGINEER WESTERN COMPANY OF NORTH AMERICA

SERVICE POINT
FARMINGTON, NEW MEXICO
505-327-6222

SUMMARY OF RESULTS

- 1. No precipitation of material was observed from either admixture of fluids.
- 2. Emulsion testing was performed. There should be no concern over the formation of a stablized emulsion at wellbore temperatures.
- 3. The cloud point of oil mixtures dropped or remained the same upon mixint of fluids.
- 4. According to calculations not enough cool down from gas expansion will occur to alter paraffin deposition significantly.

BRIAN AULT
PETROLEUM ENGINEER
WESTERN COMPANY OF NORTH AMERICA
FARMINGTON DISTRICT
FARMINGTON, N.M.

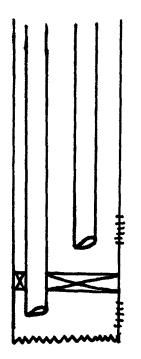
On Tuesday, September 5, 1989, a request for laboratory work was placed by Sterg Katirgis, Petroleum Engineer of Union Texas Petroleum Corportion.

PURPOSE

Two oil samples were received of Mr. Katirgis with the request we investigate the concern of potentially detrimental effects due to commingling of Gallup and Dakota fluids in the Zahcry 16E and 32.

INVESTIGATION

Background information - current wellbore
 a)



PROPOSED GALLUP PERFORATIONS

EXISTING DAKOTA PERFORATIONS

- b. BHST gradient: 1.375° f/100 ft. depth
- c. Current production problems are primarily due to paraffin deposition from surface down to ≈ 1000 ' depth.

d) Commingling Order Mixture Requirements:

The commingling requests present the mixing of Zachry 16E fluids with Zachry 32 Gallup fluids.

The tests performed simulated the mixture of fluids that may result from this commingling action. Each oil component was analyzed for API gravity, paraffin, pour point 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 tests 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.

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.

3. Steps taken in analysis

- a) API analysis of oils including: API Gravity
 Pour Point
 Cloud Point
 Paraffin Content
- 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
- e) Emulsion tendency testing via mixing of fluids in appropriate cases.

LABORATORY INVESTIGATION ZACHRY 16E ZACHRY 32

DATA

SAMPLE #1 ZACHRY 16E

ZONE: DAKOTA

API GRAVITY @ 60° F 57.7

CLOUD POINT <20° F

POUR POINT

✓20° F

PARAFFIN CONTENT .15% (WEIGHT)

SAMPLE #2 ZACHRY 32

ZONE: GALLUP

API GRAVITY @ 60° F 40.0

CLOUD POINT 77° F

POUR POINT <20° F

PARAFFIN CONTENT 4.08% (WEIGHT)

SAMPLE #3 50/50 MIX

ZONE 50/50 MIX, SAMPLE #1 AND #2

API GRAVITY @ 60° F 47.8

CLOUD POINT 63° F

POUR POINT <20° F

PARAFFIN CONTENT 1.15% (WEIGHT)

Analy	sis	No	•	53-05-89
Date	09	06	89	

The Western Company

Oil Analysis

Operator_UNION TEXAS PETROLEUM	Date Sampled 09 01 89
WellZACHRY 16E	Date Received 09 06 89
Field	Submitted By STERG KATIRGIS
Formation DAKOTA	Worked By
Depth	Sample Description
County	OIL/WATER SAMPLE: OIL PHAS IS CLEAR
State	YELLOW, WATER PHASE IS ORANGE, SMALL
	AMOUNT OF BOTTOM SOLIDS PRESENT
API Gravity 57.67° at 60°F	
*Paraffin Content_15 % by weight	_
*Asphaltene Content NA % by weight	nt
Pour Point < 20 °F	
Cloud Point 20 °F	
sample: 75% H ₂₀ + 25% oil	

Analyst	L.	LEE
---------	----	-----

^{*}Report calculations and data on back.

Analysis	No.		53	06	89
Date	-	09	06	89.	

The Western Company

Oil Analysis

Operator UNION TEXAS PETROLEUM	Date Sampled 09 01 89
Well ZACHRY 32	Date Received 09 06 89
Field	Submitted By STERG KATIRGIS
Formation GALLUP	Worked By LEE
Depth	Sample DescriptionOIL/WATER SAMPLE
County	OIL PHASE IS DARK BROWN
State	WATER PHASE IS CLEAR, SMALL AMOUNT OF
API Gravity 40.02 at 60°F *Paraffin Content 4.08 % by weight	BOTTOM SOLIDS PRESENT
*Asphaltene Content $_{\mathrm{NA}}$ % by weight	ht
Pour Point <u>20</u> °F	
Cloud Point 77 °F	
SAMPLE 37% H ₂ 0 + 63% OIL	
,	•
	AnalystL. LEE

*Report calculations and data on back.

The Western Company

Oil Analysis

Operator UNION TEXAS PETROLEUM	Date Sampled 09 01 89
Well	Date Received 09 06 89
Field	Submitted By STERC KATIRGIS
Formation	Worked By IFE
Depth	Sample Description OIL
CountySAN_JUAN	- 50/50 MIX OF ZACHRY 16E
State	OIL AND ZACHRY 32 OIL
API Gravity 47.76° at 60°F	
*Paraffin Content 1.15 % by weight	-
*Asphaltene Content_NA % by weig	ght
Pour Point <20 °F	
Cloud Point 63 °F	
Comments:	
·	•
,	•
	Analyst

^{*}Report calculations and data on back.

•		~~ ~~ ~~
ANALYSIS	ио	53-38-89

Ţ	ET.D	RE	CEIPT	NO.	*

API FORM 45-1

API WATER ANALYSIS REPORT FORM

Company Union	Toxas Petro	leum	Sample No.	Date Sampled
Field	Legal D	escription '-	County or Pa	urish State
Lease or Unit	Well Zachry	16E Der	Pormation Oakota	Water, B/D
Type of Water (Produ	ced, Supply, etc.)	Sampling Point		Sampled By

•				
DISSOLVED SOLIDS				OTHER PROPERTIES
CATIONS Sodium, Na (calc.) Calcium, Ca Magnesium, Mg Earium, Ba Potassium, K	1105 4& 5 - 9a	78.06 3.09 -40 -2.35	•	Specific Gravity, 60/60 F. Resistivity (ohm-meters) 77 F. Total hardness 7.81 1.002 1.85 1.85
(,			WATER PATTERNS - me/l
ANIONS Chloride, Cl Sulfate, SO4 Carbonate, COa Bicarbonate, HCOa	1443 183 0 587	40.71 a.56 0 9.63		STANDARD No 10 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
Total Dissolved Solids (ca	3397		• •	Nammer purper purper report to the control of the c
Iron. Fe (total) Sulfide. as H ₂ S	O.O. neg			E • mint t mint t mint t mint to the column

ANALYST: Agel

THE WESTERN COMPANY OF NORTH AMERICA, FARMINGTON. NM (505) 327-6222

Please refer any questions to: BRIAN AULT

District Engineer

ANALYSIS	ΝΟ	53-	-39.	-89	
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API FORM 45-1

FIELD RECEIPT NO.

Company	Union	Texas	Petroleum	Sample No.	Date	Sampled
Field			Legal Description	County or Par	ish	State
•			16	İ		,

API WATER ANALYSIS REPORT FORM

Lease or Unit Well ZOCHY 32 Depth Formation Water, B/D

Type of Water (Produced, Supply, etc.) Sampling Point Sampled By

Type of Water (Produced, Supply, etz.) Sampling Point Sampled By

DISSOLVED SOLIDS

CATIONS	mg/l	me/l
Sodium, Na (calc.)	841	36,56
Calcium, Ca	<u>a5</u>	1.25
Magnesium, Mg	4	.36
Barium, Ba 4		
Potassium, K'	<u> </u>	<u>bl</u>

ANIONS Chloride, Cl Sulfate, SO₄ Carbonate, CO₃ Bicarbonate, HCO₃ ANIONS 1304 33.96 0 0 0 4.82

Total Dissolved Solids (cal	<u>a,07a</u>
Iron. Fe (total) # ,## Sulfide. as H ₂ S	0.0

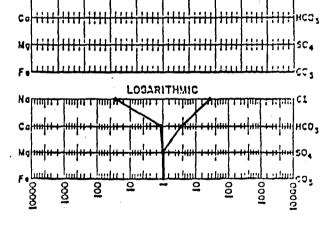
REMARKS & RECOMMENDATIONS:

OTHER PROPERTIES

pH Specific Gravity, 60/60 F. Resistivity (ohm-meters) 77 F. Total hardness	7,93 1,001 2,90 80

WATER PATTERNS - me/l

STANDARD



ANALYST: Lall

THE WESTERN COMPANY OF NORTH AMERICA, FARMINGTON. NM (505) 327-6222

Please refer any questions to: BRIAN AULT

District Engineer

Fig. 1 ACID-OIL EMULSION TESTS DATA SHEET

OPERATOR:U T P

WELL:

FIELD:

FORMATION:

STERG KATIRGIS TYPE & CONC. OF FLUID 50/50 MIX OF GALLUP/DAKOTA SUBMITTED BY:

API GRAVITY OF OIL: 47.76

SOURCE OF SAMPLE:

DATE SAMPLED: DATE RECEIVED:

09 01 89

09 06 89

TYPE & CONC. OF SOLIDS:

TYPE & CONC. OF INHIBITOR: ZACHRY 16E OIL AND WATER

AND ZACHRY 32 OIL

FLUIDS

TEST TEMPERATURE: 75°F AND WATER

OIL/TREATMENT FLUID RATIO:

ANALYSIS BY:

DEPTH: COUNTY: SAN JUAN

GALLUP/DAKOTA

PERCENTAGE OF ORIGINAL AXX SEPARATED AT VARIOUS TIME INTERVALS AFTER EMULSIFYING

Test Number		1		*												
Additives & Concentration, Gal/1000 Gal																
Elapsed Time	Time	Vol	Time	Vol	Time	Vol	Time	Vp1	Time	Vol	Time	Vol	Time	Vol	Time	Vol
· l min	1	_50	ž		3		4	1	5		6		7		8	
2	2		3		.4		5		6		7		. 8		9	
3	3		4		5		6		7		8		9		10	
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9	9		13		11		12	· ·	13		14		15		16	
10 ·	10		11		12	· · · · · · · · · · · · · · · · · · ·	13		14		15		16		17	
20	20		21		22		23		24		25		26		27	
30	30		31		32		33		34	Ì	35		36		37	
Total Vol (ml)		50														
Vol. Emulsion / Sludge		0				Tq.										
Solids*																
Interface**																
Vol. Sediment						~										

25 ML GALLUP ZACHERY 32 OIL + 10 ML GALLUP ZACHERY 32 WATER +

²⁵ ML DAKOTA ZACHERY 16E OIL + 40 ML DAKOTA ZACHERY 16E WATER * Preferential vetting of solids: OB-oil-wet bottom; OD-oil-wet oil phase; WB-water-wet bottom; WO-water-wet oil phase OI-oil-wet interface; WI-water-wet interface

^{**} Interface: F=Fluid; S=Solid; V=Viscous

ZACHRY 16E ZACHRY 32

CALCULATIONS

Cool down effects due to gas expansion:

Reference: Perry's Handbook of Chemical Engineering

RE: Adiabatic Expansion of Ethane, Methane

$$T_s + T_r = \begin{pmatrix} P \\ -\frac{s}{2} \end{pmatrix} = \begin{pmatrix} \frac{K-1}{2} \end{pmatrix}$$
, where

T = Surface Temperature

 $T_r = Reservoir Temperature$

P_s = Surface Pressure

P_r = Reservoir Pressure

K = Specific heat at constant pressure
Specific heat at constant volume

Assumed values for maximum cool down due to gas expansion:

T_s = Unknown

$$T_r = 160^{\circ} F$$

$$P_s = 500 \text{ psi}$$

$$P_r = 2000 \text{ psi}$$

$$K = 1.2$$

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

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

NOTE:

A total cooldown of 33° F would be expected

1 4 4 6 6 1		>	9	22-	201-	8870 887	20	77 27 84	70 559 610	04°	80	61	147	26 65 91	59 173 232	044	8 10 6 8 1 1 2 4 4 6 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	140B	3401	20	129 334 463	13	52		86 12	276 569	27.2 1.58 1.58		
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	ons Sing	AUG 0/0							45503-						12867	17414	5330				6048					30823- 91175			
	ION SCHEDOLE	17.P							60136	15619							43877									45797			
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STATE OF NEW MEXICO

ENERGY AND MINERALS DEPARTMENT

OIL CONSERVATION DIVISION AZTEC DISTRICT OFFICE

GARREY CARRUTHERS
GOVERNOR

1000 RIO BRAZOS ROAD AZTEC, NEW MEXICO 87410 (505) 334-6178

Date: 7/20/99	
Oil Conservation Division P.O. Box 2088 Santa Fe, NM 87504-2088	RECEIVED
Re: Proposed MC Proposed DHC Proposed NSL Proposed SWD Proposed WFX Proposed PMX	SEP-25 1989 OIL CONSERVATION DIV. SANTA FE
Gentlemen:	
I have examined the application for the Common Separated Common Operator E-34-2960-1000 and my recommon Separated Common	Lease & Well No. ommendations are as follows:
Yours truly,	
D. G	