Union Texas Petroleum

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

January 29, 1989

Mr. W. J. LeMay
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87501-2088

Re: Angel Peak B #22E (SF 046017-A)
1750' FNL & 1650' FWL
Section 13, T28N-R11W
San Juan County, New Mexico

Dear Mr. LeMay:

Union Texas Petroleum is applying for a downhole commingling order for the referenced well in the Basin Dakota/Armenta Gallup fields. Ownership of the two zones to be commingled is common. The Bureau of Land Management and the offset operators indicted in the attached plats will receive notification of this proposed downhole commingling.

The subject well was drilled during December 1982 and completed during March 1983 in the Dakota and Gallup formations. The Dakota formation was fracture stimulated with 87,000# 20/40 sand in 135,417 gallons water and nitrogen. The Gallup formation was fracture stimulated with 303,500# 20/40 sand in 231,000 gallons nitrogen foam in three stages. CAOF of the Dakota zone (4/20/83) was 371 MCFD. Initial production test of the Gallup formation (5/3/83) was 145 MCFD and 10 BOPD. The Gallup zone is currently produced with a plunger lift system, and the Dakota is produced from below a packer. Two tubing strings are utilized. Most recent production from the Gallup formation is 18 MCFD and a trace of oil. The Dakota is not capable of sustained production due to high line pressure, but will produce 25 MCFD at lower line pressure.

This is a very marginal well which can no longer be produced economically. It is proposed to remove the Gallup tubing and Dakota packer and produce both zones using one tubing string only. The proposed commingling will result in recovery of additional hydrocarbons from both the Gallup and Dakota formation, thereby preventing waste, and will not violate correlative rights. Commingling of the two zones will result in a more efficient operation by helping to lift the very small amount of produced liquids from each zone. The Dakota will now be produced into the low pressure Union Texas Petroleum operated gathering system, and the plunger left system currently used to produce the Gallup zone will be eliminated.

The attached fluid analysis is from the Gallup and Dakota zones of the Angel Peak B #24E, an offset well in the same section approximately half mile to the southeast. The Gallup and Dakota zones were similarly commingled in this wellbore during October 1986, per Administrative Order No. DHC-602. Also, similarly commingled during May 1989, as per Administrative Order No. DHC-703, is the Congress Lachman #4E, one mile to the east of the subject well. The trace amounts of liquids produced in the subject well will be similar to these two offsets. The analysis indicates the total value of crude will not be reduced by the commingling. The reservoir characteristics of each zone 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 measurements, is 310 psi in the Gallup and 430 psi in the Dakota in the Congress Lachman #4E; 238 psi in the Gallup and 472 psi in the Dakota in the Angel Peak B #24E; within the limits of Rule 303-C, Section 1(b), Part (6). The small amount of liquids from each zone are compatible and no precipitates will be formed as a result of commingling to damage either reservoir. Current flow tests indicate the daily liquid 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 any time the commingled well is shut-in for seven consecutive days. To allocate the commingled production to each zone, historical production curves and current production volumes have been reviewed and submitted. See attached.

Included with this letter are two plats showing ownership of offsetting leases, a production curve of each zone, Form C-116 (GOR test), a Fluid Analysis Report, and a wellbore diagram showing the proposed downhole configuration after commingling.

Sincerely,

S. G. Katirgis

S. G. Katirgis
Production Engineer

attachments

Union Texas Petroleum

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

January 30, 1989

Mr. Frank Chavez
District Supervisor
N. M. Oil Conservation Division
1000 Rio Brazos Road
Aztec, New Mexico 87410

Re: Proposed Commingling
Angel Peak B #22E
Section 13, T28N-R11W
San Juan County, NM
Basin Dakota and Armenta Gallup

Dear Frank,

A rig will be moved on this well and the two zone commingled as soon as approval is received. We recommend production allocation as follows:

Gas:	Gallup	42%
	Dakota	58%
Oil:	Gallup	50%
	Dakota	50%

This allocation is based on recent production of approximately 18 MCFD and a trace of oil from the Gallup, and an estimated 25 MCFD and a trace of oil from the Dakota when line pressure drops. Historical decline curves also suggest the same allocation percentages.

If there are any questions, please contact me.

Yours truly,

Stergie Katirgis

Stergie Katirgis
Production Engineer

cc: W. K. Cooper
S. J. Hunter
B. A. Norman

NEW MEXICO OIL CONSERVATION COMMISSION

GAS - OIL RATIO TESTS

C-116

Revised 1-1-65

Operator: Union Texas Petroleum Corp.

Pool: Armenta Gallup/Basin Dakota

County: San Juan

Address: 375 US Highway 64 Farmington, NM 87401

TYPE OF TEST - (X) Scheduled [ ] Completion [ ] Special [X]

LEASE NAME	WELL NO.	LOCATION U	S	T	R	DATE OF TEST	STATUS	CHOKE SIZE	TBG. PRESS.	DAILY ALLOWABLE	LENGTH OF TEST HOURS	PROD. DURING TEST WATER BBLS.	GRAV. OIL	OIL BBLS.	GAS M.C.F.	GAS - OIL RATIO CU.FT./BBL
Angel Peak B (Gallup)	22E	F	13	28N	11W	2/22/89			76		24	0		T	22	N/A
Angel Peak B (Dakota)	22E	F	13	28N	11W	2/22/89			220		24	0		T	25	N/A

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.

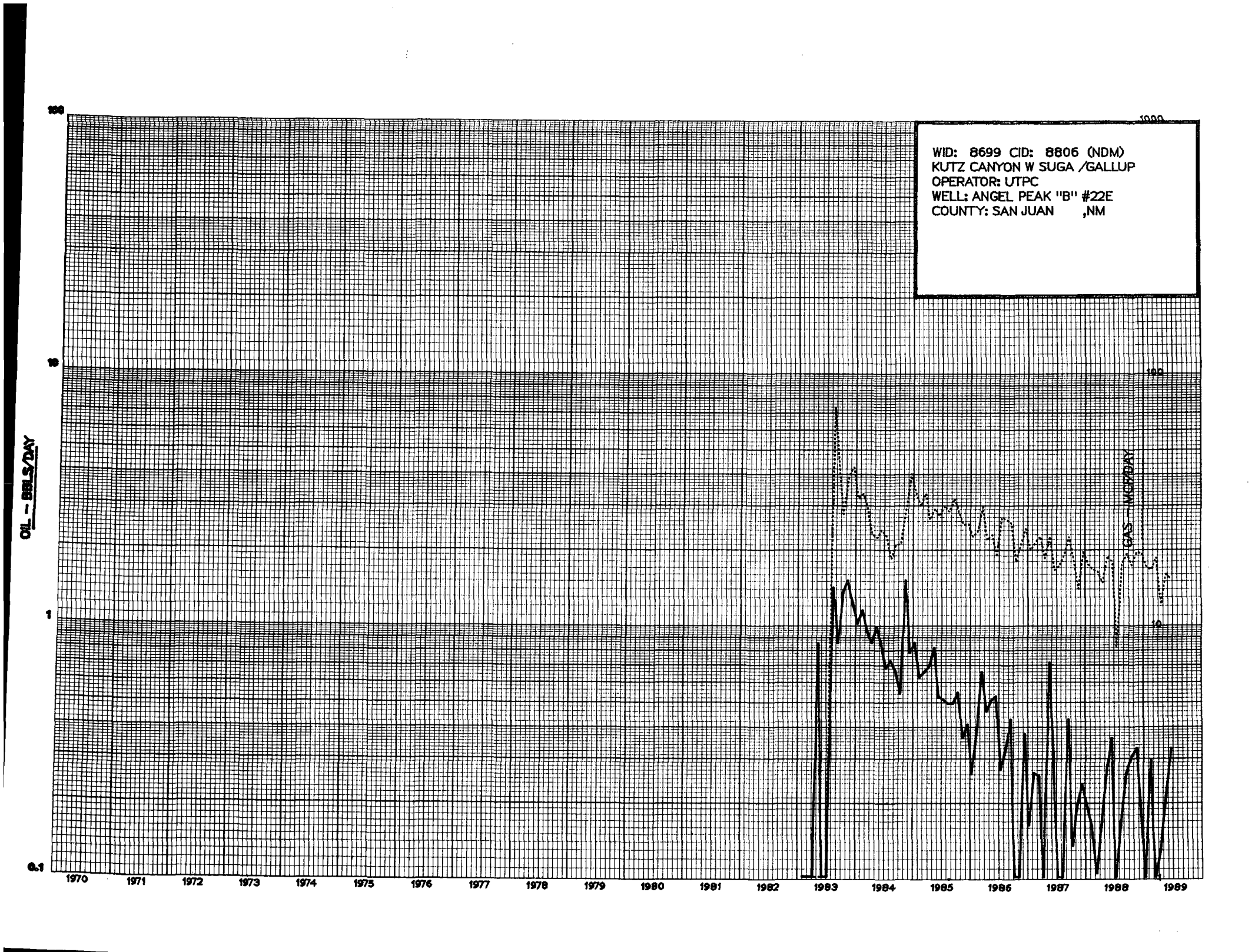
Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Commission in accordance with Rule 301 and appropriate pool rules.

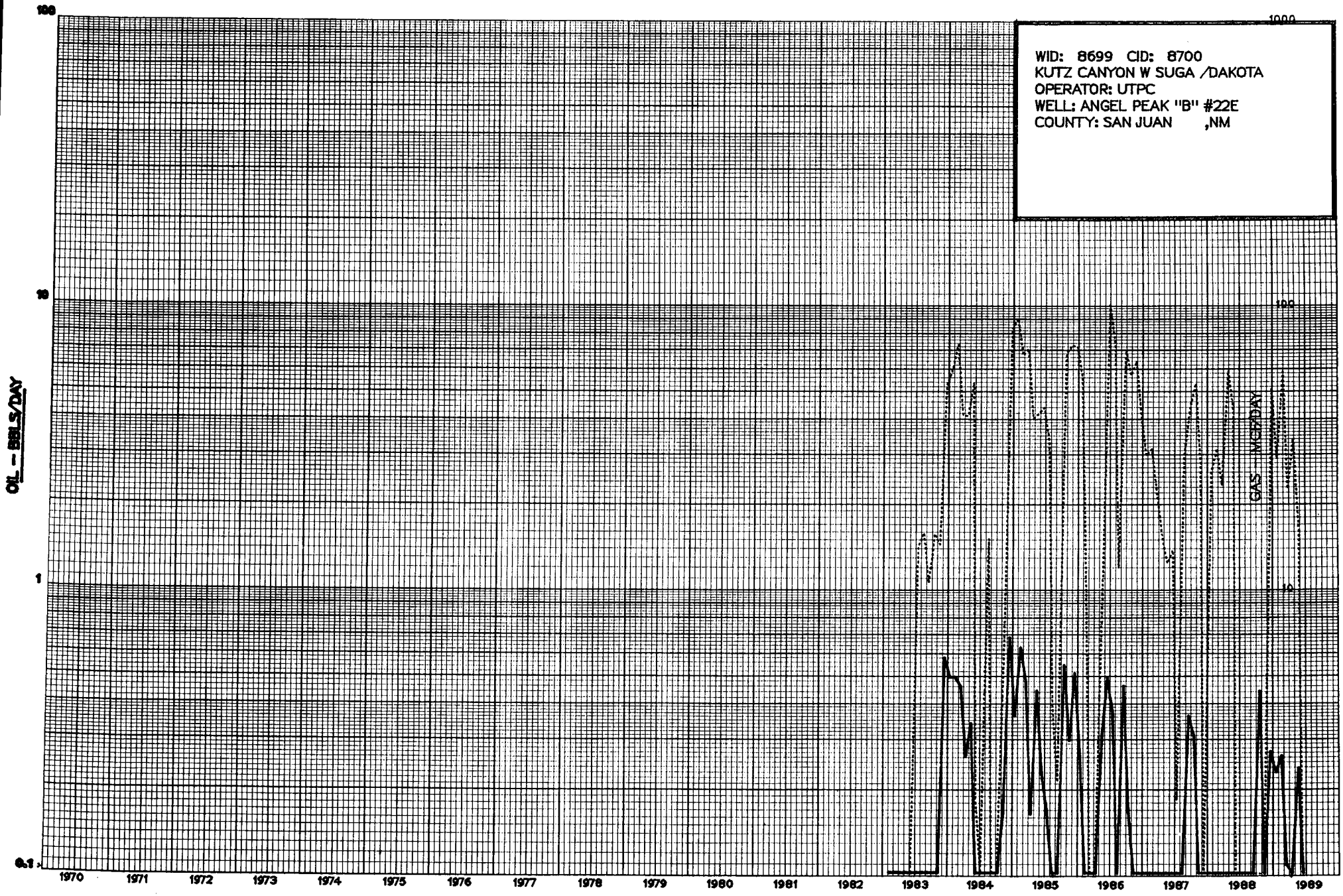
I hereby certify that the above information is true and complete to the best of my knowledge and belief.

(Signature)

Production Engineer

(Title)


WID: 8699 CID: 8806 (NDM)
KUTZ CANYON W SUGA /GALLUP
OPERATOR: UTPC
WELL: ANGEL PEAK "B" #22E
COUNTY: SAN JUAN ,NM
OIL - BBLS/DAY
GAS - MCF/DAY
100
10
1
0.1
100
10
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989

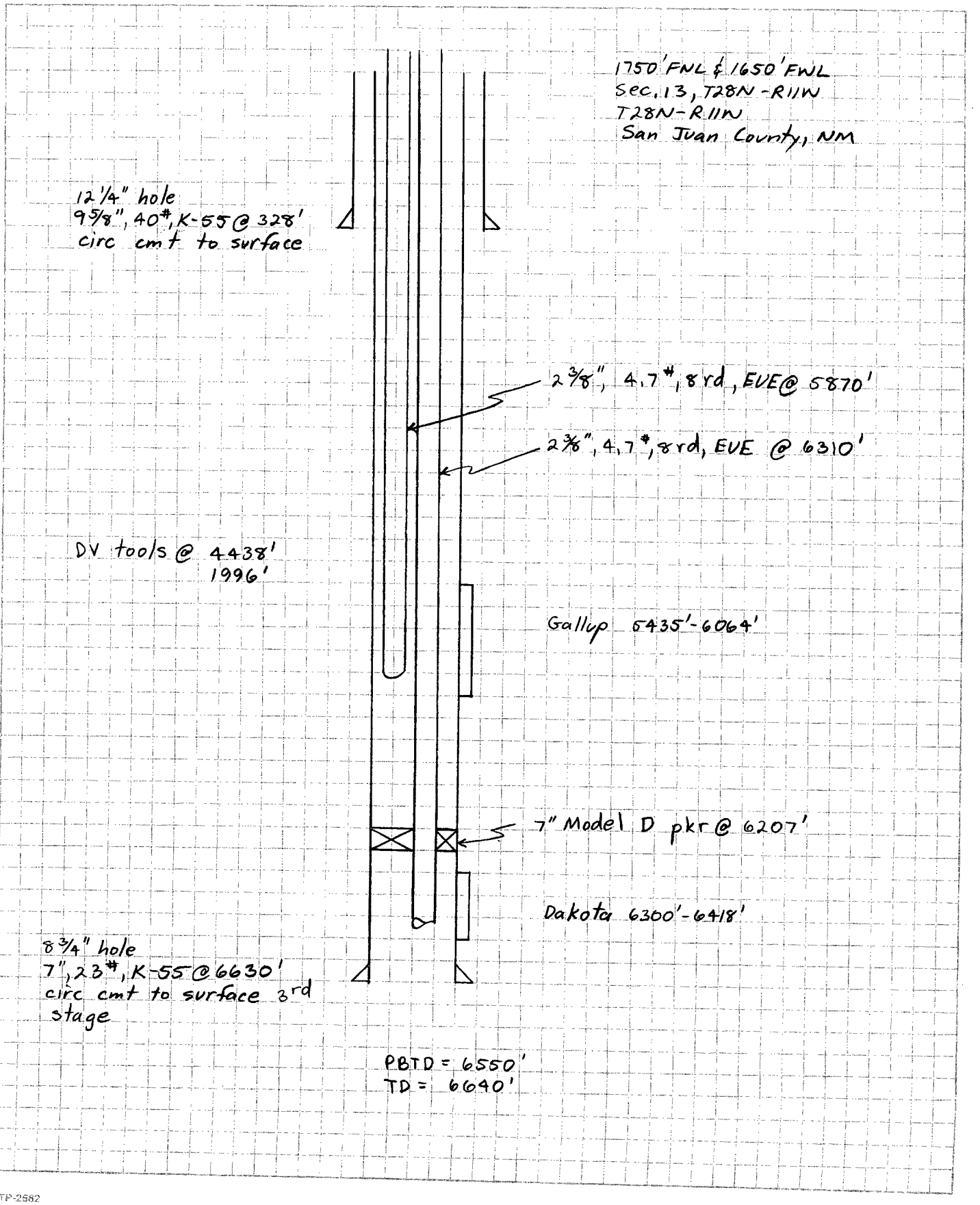

WID: 8699 CID: 8700
KUTZ CANYON W SUGA /DAKOTA
OPERATOR: UTPC
WELL: ANGEL PEAK "B" #22E
COUNTY: SAN JUAN ,NM
OIL - BBLS/DAY
GAS - MCF/DAY
100
10
1
0.1
1000
100
10
1970
1971
1972
1973
1974
1975
1976
1977
1978
1979
1980
1981
1982
1983
1984
1985
1986
1987
1988
1989

Union Texas Petroleum

SUBJECT: ANGEL PEAK B #22E
Existing Wellbore Diagram

BY: SGK DATE: 6/30/89

PAGE ____ OF ____

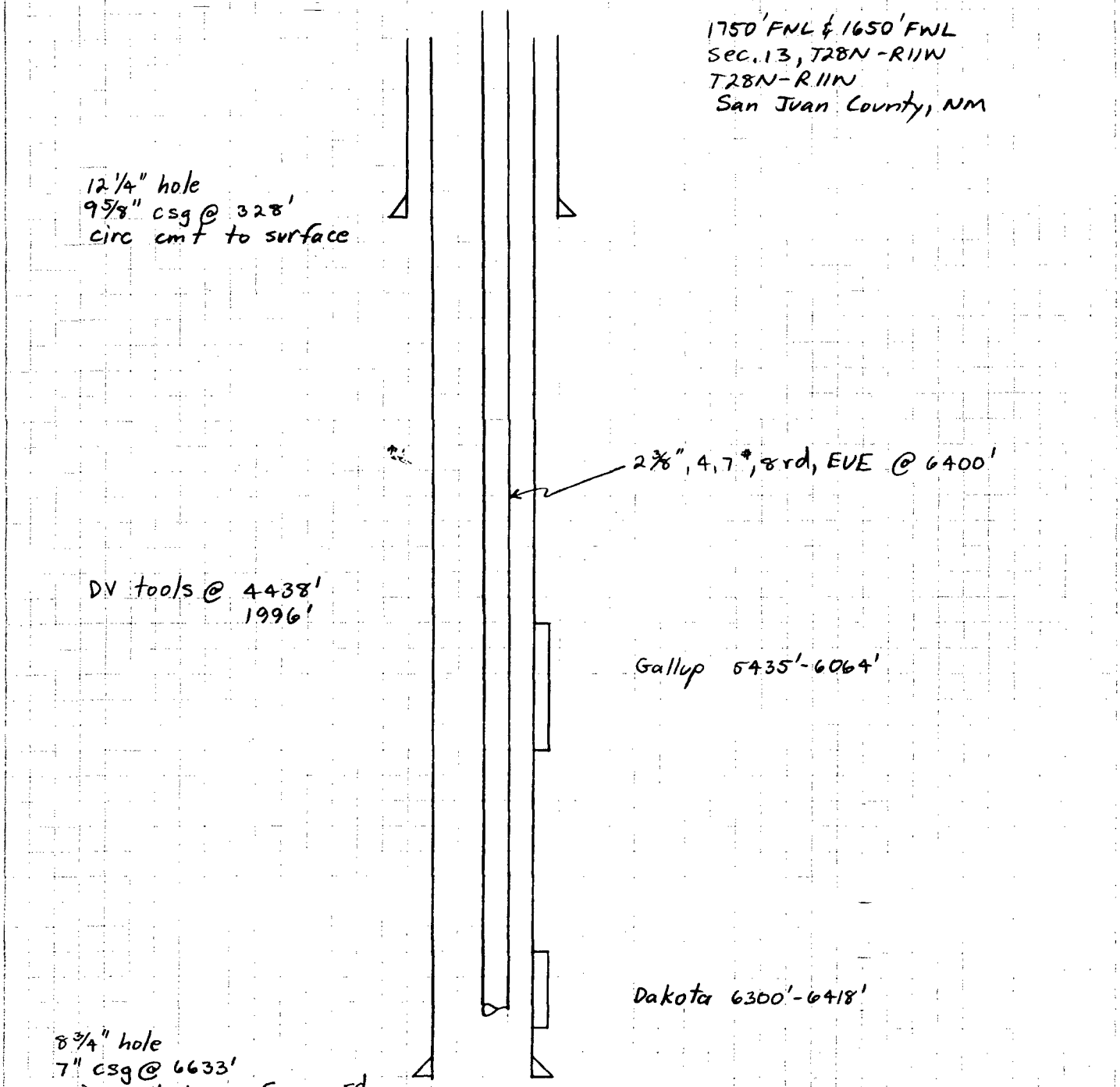


Union Texas Petroleum

SUBJECT: ANGEL PEAK B #22E
Proposed Wellbore Diagram

BY: SGK DATE: 6/30/89

PAGE ____ OF ____



UNION TEXAS PETROLEUM
ANGEL PEAK B24E
LEASE FLUIDS

LABORATORY INVESTIGATION
OF
ANGEL PEAK GALLUP AND DAKOTA FLUIDS COMPATABILITY
JANUARY 22, 1986

PREPARED FOR:

UNION TEXAS PETROLEUM
Sterg Katirgis
Petroleum Engineer

PREPARED BY:

James C. Terry
PRODUCTION ANALYSTS

LABORATORY INVESTIGATION
ANGEL PEAK B24E
LEASE FLUIDS

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.

JAMES C. TERRY
PRODUCTION ANALYSTS
Farmington, New Mexico

LABORATORY INVESTIGATION
ANGEL PEAK B24E
LEASE FLUIDS

On Monday, January 13, 1986, a request for laboratory work was place by Sterg Katirgis, Petroleum Engineer of Union Texas Petroleum Corporation.

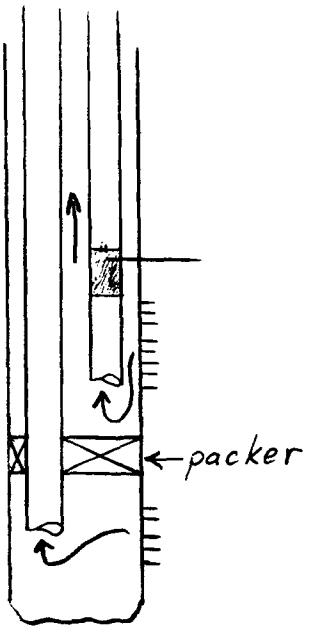
PURPOSE

Two oil samples were received of Mr. Katirgis with the request we investtigate the concern of potentially detrimental effects due to comingling of Gallup and Dakota fluids in the Angel Peak B24E.

INVESTIGATION

1. Background Information- Current Wellbore

a)



Existing 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 Angel Peak B24E Dakota oil with Angel Peak B24E Gallup fluids (oil/water).

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 by 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
ANGEL PEAK B24E
LEASE FLUIDS

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 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

   e) Emulsion tendency testing via mixing of fluids in appropriate cases.

LABORATORY INVESTIGATION
ANGEL PEAK B24E
LEASE FLUIDS

DATA

Sample #1	
Zone:	Dakota
API Gravity @ 60°F	53.0
Cloud Point	22°F
Pour Point	-1°F
Pafaffin Content	7.98% (weight)
Sample #2	
Zone:	Gallup
API Gravity @ 60°F	44.1
Cloud Point	2°F
Pour Point	<-12°F
Paraffin Content	14.19% (weight)
Sample #3	
Zone:	50/50 Mix
API Gravity @ 60° F	48.9
Cloud Point	24°F
Pour Point	<-10°F
Paraffin Content	11.89% (weight)

Analysis No. 1

Date 1-22-86

PRODUCTION ANALYSTS

Oil Analysis

Operator Union Texas Petroleum

Well Angel Peak B24E

Field -

Formation Dakota

Depth -

County San Juan

State New Mexico

Date Sampled 1-10-86

Date Received 1-13-86

Submitted By Sterg Katirgis

Worked By Clay Terry

Sample Description Brownish, clear oil sample. No water phase or emulsion. Small bottom solids component.

API Gravity 53.0 ° at 60°F

Paraffin Content 7.98 % by weight

Asphaltene Content n/a % by weight

Pour Point -1 °F

Cloud Point 22 °F

SAMPLE COMPOSITION:

H_2O	0
Emulsion	0
Oil	780
Total	780 ml

Comments:

B S & W Test Results:

Oil	99.9
Water	0
Solids	<0.1
Emulsion	0

Analyst Clay Terry

Analysis No. 2

Date 1-22-86

PRODUCTION ANALYSTS

Oil Analysis

Operator Union Texas Petroleum

Well Angel Peak B24E

Field -

Formation Gallup

Depth -

County San Juan

State New Mexico

Date Sampled 1-10-86

Date Received 1-13-86

Submitted By Sterg Katirgis

Worked By Clay Terry

Sample Description Oil/Water/Emulsion sample.

Oil phase is yellowish-brown, opaque.

Emulsion phase not serious.

API Gravity 44.1 ° at 60°F

Paraffin Content 14.19 % by weight

Asphaltene Content N/A % by weight

Pour Point <-12 °F

Cloud Point 2 °F

Sample Composition:

H_2O	103
Emulsion	16
Oil	807
Total	926ml

Comments:

B S & W Test Results:

Oil	95.5%
Water	0.8%
Solids	<0.1%
Emulsion	3.7%

Analyst Clay Terry

Analysis No. 3

Date 1-22-86

PRODUCTION ANALYSTS

Oil Analysis

Operator Union Texas Petroleum

Well Angel Peak B24E

Field -

Formation Gallup/Dakota

Depth -

County San Juan

State New Mexico

Date Sampled 1-10-86

Date Received 1-13-86

Submitted By Sterg Katirgis

Worked By Clay Terry

Sample Description 50/50 mix of oils from Gallup and Dakota intervals.

API Gravity 48.9 ° at 60°F

Paraffin Content 11.89 % by weight

Asphaltene Content n/a % by weight

Pour Point <-10 °F

Cloud Point 24 °F

Comments:

B S & W Test Results:

Oil	96.0%
Water	0.4%
Solids	<0.1%
Emulsion	3.6%

Analyst Clay Terry

API FORM 45-1

API WATER ANALYSIS REPORT FORM

Company		Sample No.	Date Sampled
Union Texas Petroleum		2B	1-10-86
Field	**Legal Description**	**County or Parish**	**State**
Angel Peak Gal/Dak	-	San Juan	NM
Lease or Unit	**Well**	**Depth**	**Formation**	**Water, B/D**
Angel Peak B	24E	-	Gallup	H_2O
Type of Water (Produced, Supply, etc.)	**Sampling Point**		**Sampled By**
Produced	Separator		SK

DISSOLVED SOLIDS

CATIONS	*mg/l*	*me/l*
Sodium, Na (calc.)	218	9.5
Calcium, Ca	-0-	-0-
Magnesium, Mg	29	2.4
Barium, Ba		
Potassium, K	180	4.6

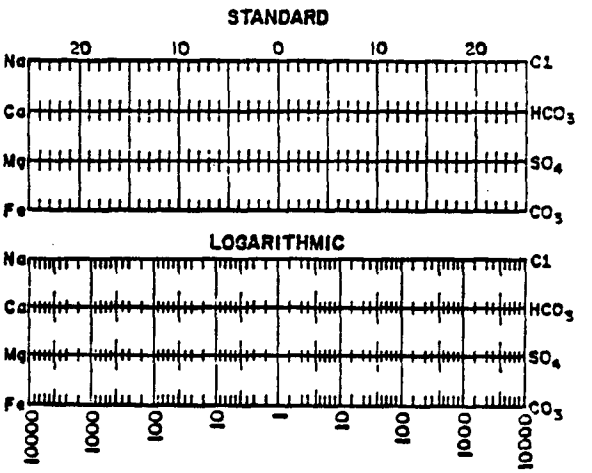
ANIONS		
Chloride, Cl	383	10.8
Sulfate, SO_4	25	0.5
Carbonate, CO_3	-0-	-0-
Bicarbonate, HCO_3	319	5.2
Hydroxide, OH	-0-	-0-

Total Dissolved Solids (calc.)	1154
Iron, Fe (total)	-0-
Sulfide, as H_2S	-0-

OTHER PROPERTIES

pH	6.3
Specific Gravity, 60/60 F.	1.003
Resistivity (ohm-meters) 75 F.	∞
Total Hardness	120

WATER PATTERNS — *me/l*



REMARKS & RECOMMENDATIONS:

DATE:

Fig. 1
EMULSION TESTS DATA SHEET

OPERATOR: UNION TEXAS
WELL: ANGEL PEAK B24E
FIELD: Angel Peak Gal/B Dakota
FORMATION: Gallup/Dakota
DEPTH: Unknown
COUNTY: San Juan

SUBMITTED BY: S. KATIRGIS
SOURCE OF SAMPLE: -
DATE SAMPLED: 1-10-86
DATE RECEIVED: 1-13-86
API GRAVITY OF OIL: 48.9

TYPE & CONC. OF FLUID: 50/50 MIX OF GALLUP/DAKOTA FLUIDS
TYPE & CONC. OF SOLIDS:
TEST TEMPERATURE: 75°F
FLUID RATIO: 50/50
ANALYSIS BY: C. Terry

PERCENTAGE OF ORIGINAL H_2O SEPARATED AT VARIOUS TIME INTERVALS AFTER EMULSIFYING

Test Number	1															
Elapsed Time	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol	Time	Vol
1 min	1	4	2		3		4		5		6		7		8	
2	2	6	3		4		5		6		7		8		9	
3	3	7	4		5		6		7		8		9		10	
4	4	7	5		6		7		8		9		10		11	
5	5	7	6		7		8		9		10		11		12	
6	6	7	7		8		9		10		11		12		13	
7	7	7	8		9		10		11		12		13		14	
8	8	7	9		10		11		12		13		14		15	
9	9	7	10		11		12		13		14		15		16	
10	10	7	11		12		13		14		15		16		17	
20	20	7	21		22		23		24		25		26		27	
30	30	7	31		32		33		34		35		36		37	
Total Vol (ml)		100														
Vol. Emulsion / Sludge		0														
Solids*																
Interface**																
OIL		93														

REMARKS:

* Preferential wetting of solids: OB=oil-wet bottom; OO=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

**The mixture of fluids was constructed to reflect proper proportions of the various fluids within each sample. Therefore, the mix was 50 ml Dakota oil, 43 ml Gallup oil, 6 ml Gallup H_2O, 1 ml Gallup Emulsion

CALCULATIONS

Cool down effects due to gas expansion:

Reference: Perry's Handbook of Chemical Engineering

RE: Adiabatic Expansion of Ethane, Methane

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

T_s = Surface Temperature

T_r = Reservoir Temperature

P_s = Surface Pressure

P_r = Reservoir Pressure

$K = \dfrac{\text{Specific heat at constant pressure}}{\text{Specific heat at constant volume}}$

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

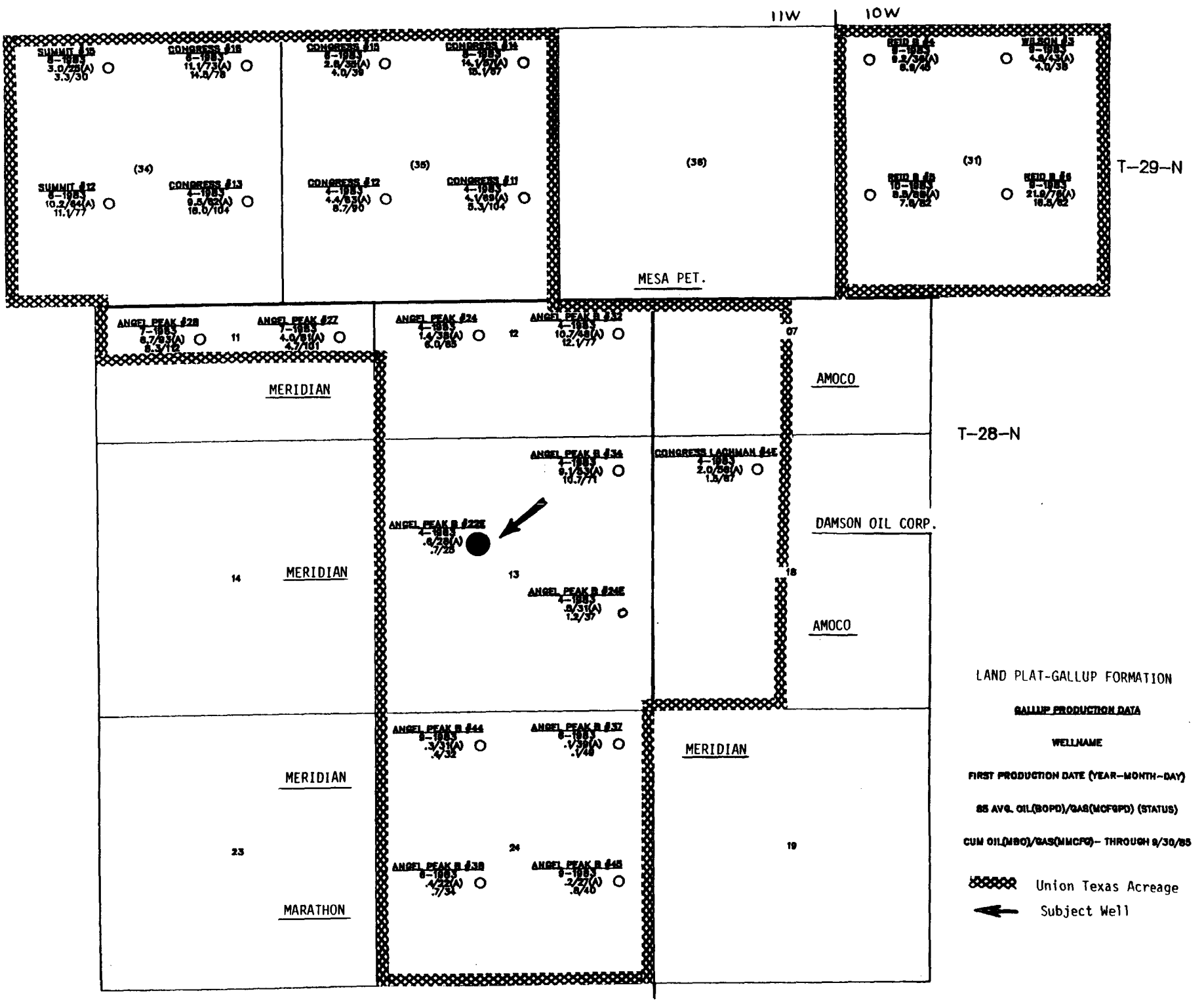
K = 1.2

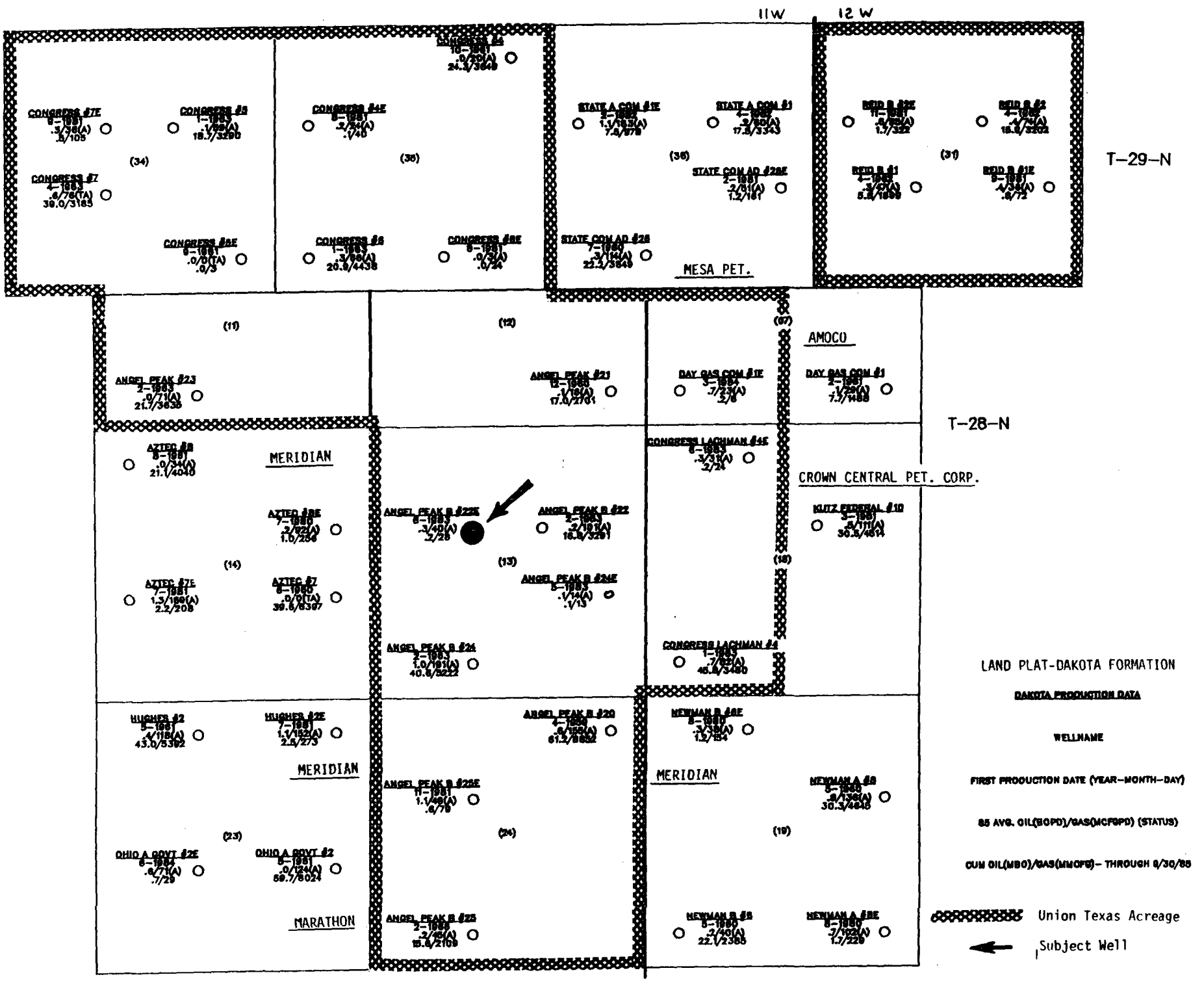
$$T_s = 160 \left(\frac{500}{2000}\right)^{0.1667}$$

T_s = 127° F

NOTE:

A total cooldown of 33°F would be expected


11W
10W
T-29-N
T-28-N
SUMMIT #13
SUMMIT #12
CONGRESS #16
CONGRESS #15
CONGRESS #13
CONGRESS #12
CONGRESS #14
CONGRESS #11
REID B #4
REID B #5
REID B #6
WILSON #3
(34)
(35)
(36)
(31)
MESA PET.
ANGEL PEAK #28
ANGEL PEAK #27
ANGEL PEAK #24
ANGEL PEAK B #32
11
12
07
MERIDIAN
AMOCO
ANGEL PEAK B #34
CONGRESS LAUGHMAN #4E
ANGEL PEAK B #22E
DAMSON OIL CORP.
14
MERIDIAN
13
18
ANGEL PEAK B #24E
AMOCO
ANGEL PEAK B #44
ANGEL PEAK B #37
MERIDIAN
MERIDIAN
23
24
19
ANGEL PEAK B #38
ANGEL PEAK B #45
MARATHON
R-11-W
R-10-W
LAND PLAT-GALLUP FORMATION
GALLUP PRODUCTION DATA
WELLNAME
FIRST PRODUCTION DATE (YEAR-MONTH-DAY)
85 AVG. OIL(BOPD)/GAS(MCFGPD) (STATUS)
CUM OIL(MBO)/GAS(MMCFG)- THROUGH 9/30/85
Union Texas Acreage
Subject Well


11W
12 W
T-29-N
T-28-N
R-11-W
R-10-W
(34)
(35)
(36)
(31)
(11)
(12)
(07)
(14)
(13)
(18)
(23)
(24)
(19)
CONGRESS #7E
CONGRESS #5
CONGRESS #4E
CONGRESS #4
STATE A COM #1E
STATE A COM #1
REID B #2E
REID B #2
CONGRESS #7
REID B #1
REID B #1E
STATE COM AD #2SE
CONGRESS #6E
CONGRESS #6
CONGRESS #6E
STATE COM AD #2S
MESA PET.
ANGEL PEAK #23
ANGEL PEAK #21
DAY GAS COM #1E
DAY GAS COM #1
AMOCO
AZTEC #8
MERIDIAN
AZTEC #8E
ANGEL PEAK B #22E
ANGEL PEAK B #22
CONGRESS LACHMAN #4E
CROWN CENTRAL PET. CORP.
KUTZ FEDERAL #10
AZTEC #7E
AZTEC #7
ANGEL PEAK B #24E
ANGEL PEAK B #24
CONGRESS LACHMAN #4
HUGHES #2
HUGHES #2E
ANGEL PEAK B #20
NEWMAN B #8E
MERIDIAN
ANGEL PEAK B #23E
NEWMAN A #8
OHIO A GOVT #2E
OHIO A GOVT #2
ANGEL PEAK B #25
NEWMAN B #8
NEWMAN A #8E
MARATHON
LAND PLAT-DAKOTA FORMATION
DAKOTA PRODUCTION DATA
WELLNAME
FIRST PRODUCTION DATE (YEAR-MONTH-DAY)
85 AVG. OIL(BOPD)/GAS(MCFGPD) (STATUS)
CUM OIL(MBO)/GAS(MMCFG)- THROUGH 6/30/85
Union Texas Acreage
Subject Well

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: 7/7/89

RECEIVED
JUL 12 1989
OIL CONSERVATION DIV.
SANTA FE

Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504-2088

Re: Proposed MC_____
Proposed DHC__X__
Proposed NSL_____
Proposed SWD_____
Proposed WFX_____
Proposed PMX_____

Gentlemen:

I have examined the application dated 7/7/89
for the Union Texas Petroleum Corp. Angel Peak B 4 22E
Operator Lease & Well No.
F-13-28N-11W and my recommendations are as follows:
Unit, S-T-R

Approve