



STATE OF NEW MEXICO  
 ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT  
 OIL CONSERVATION DIVISION  
 AZTEC DISTRICT OFFICE

*The Three!!!  
 DRUG FREE  
 It's a Mind of Mind  
 1/11*

BRUCE KING  
 GOVERNOR

ANITA LOCKWOOD  
 CABINET SECRETARY

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

Date: 8/28/92

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

RE: Proposed MC \_\_\_\_\_  
 Proposed NSL \_\_\_\_\_  
 Proposed WFX \_\_\_\_\_  
 Proposed NSP \_\_\_\_\_

Proposed DHC α \_\_\_\_\_  
 Proposed SWD \_\_\_\_\_  
 Proposed PMX \_\_\_\_\_  
 Proposed DD \_\_\_\_\_

Gentlemen:

I have examined the application received on 8/11/92  
 for the Meridian OPERATOR Cain # 20 LEASE & WELL NO.

M-15-284-10w and my recommendations are as follows:  
 UL-S-T-R

Ignore  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Yours truly,

J. J. G.

# MERIDIAN OIL

August 7, 1992

New Mexico Oil Conservation Division  
Attn: Mr. Bill LeMay  
P.O. Box 2088  
310 Old Santa Fe Trail  
Santa Fe, New Mexico 87501

**RECEIVED**  
AUG 11 1992  
OIL CON. DIV  
DIST. 3

**Subject:** Cain #20  
Unit M, Section 15, T28N, R10W  
San Juan County, New Mexico  
Downhole Commingling Request

Dear Mr. LeMay:

Meridian Oil Inc. is applying for an administrative downhole commingling order for the referenced well in the Aztec Pictured Cliffs and the Basin Fruitland Coal fields. The ownership of the zones to be commingled is common. The offset operators to this well are R. L. Bayless and Texaco Exploration & Producing, Inc. The Bureau of Land Management and the above mentioned operators will receive notification of this downhole commingling.

The subject well was completed in the Aztec Pictured Cliffs interval in December 1973 and gas sales commenced in December 1973. The well currently produces about 20 MCFD and has a cumulative production of 262 MMCF. This zone is still economic at the current rate and the well is not a candidate for plugging back the Pictured Cliffs and opening the Fruitland Coal.

The Fruitland Coal is proven to be productive in this area by Meridian and other operators producing wells. Based on offset production in this area, new well drilling is not economically justified. The only economical way to recover the Fruitland Coal reserves in this area is to commingle the production with an existing well.

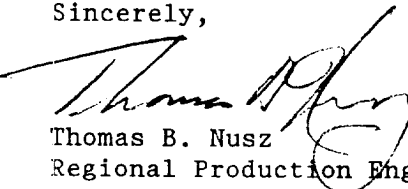
It is proposed to set a bridge plug above the Pictured Cliffs, perforate and stimulate the Fruitland Coal, then remove the bridge plug and produce both zones through a single string of tubing. The reservoir characteristics of each of the subject zones are such that underground waste will not be caused by the proposed commingling. Neither producing interval makes oil or water in the offset wells. The shut-in pressure for the Pictured Cliffs and Fruitland Coal is 200 and 250 psi, respectively.

New Mexico Oil Conservation Division  
Mr. Bill LeMay  
Cain #20  
Downhole Commingling Request  
Page Two

The allocation of the commingled production will be calculated using the attached allocation formula. This formula is based on the Pictured Cliffs production history for the last 19 years and uses accepted Reservoir Engineering methods to allocate the remaining Pictured Cliffs reserves. All additional reserves will be attributed to the Fruitland Coal reservoir. This addresses the Fruitland Coal producing characteristics of early life inclining production rates. The formula also addresses the possible situation of pipeline curtailment.

Approval of this commingling application will allow for the prevention of wasted resources and protection of correlative rights. Included with this letter are plats showing ownership of offsetting leases for both the Pictured Cliffs and Fruitland Coal, a copy of letters to the BLM and offset operators, wellbore diagrams, production history curves, pertinent data sheet, and an allocation formula.

Sincerely,



Thomas B. Nusz  
Regional Production Engineer

KAS:tg  
attachments

cc: Frank Chavez - NMOCD/Aztec

Pertinent Data Sheet - CAIN #20

Location: 1150' FSL, 1170' FWL, Section 15, T28N-R10W San Juan, New Mexico

Field: Aztec Pictured Cliffs                      Elevation: 5932' GR              TD: 2180'

Spud: 11/24/73

Completed: 12/1/73

Initial Potential: 1225 MCF/D

Casing Record:

<u>Hole Size</u>	<u>Csq. Size</u>	<u>Wt.</u>	<u>Depth Set</u>	<u>Top/Cement</u>
12 1/4"	8 5/8"	24#	129'	130 sx circ
7 7/8"	4 1/2"	10.5#	2180'	255 sx
				TOC @ 1187'
				(calc @ 75% eff)
<u>Tubing Record:</u>	1"	1.7#	2076'	

Formation Tops:

Pictured Cliffs              2048'

Logging Record: IES, Cement Bond Log, Gamma Ray Log

Stimulation:              Perforated Pictured Cliffs 2 SPF 2050'-2070'.  
Frac'd w/30,000# sand and 34,800 gals water

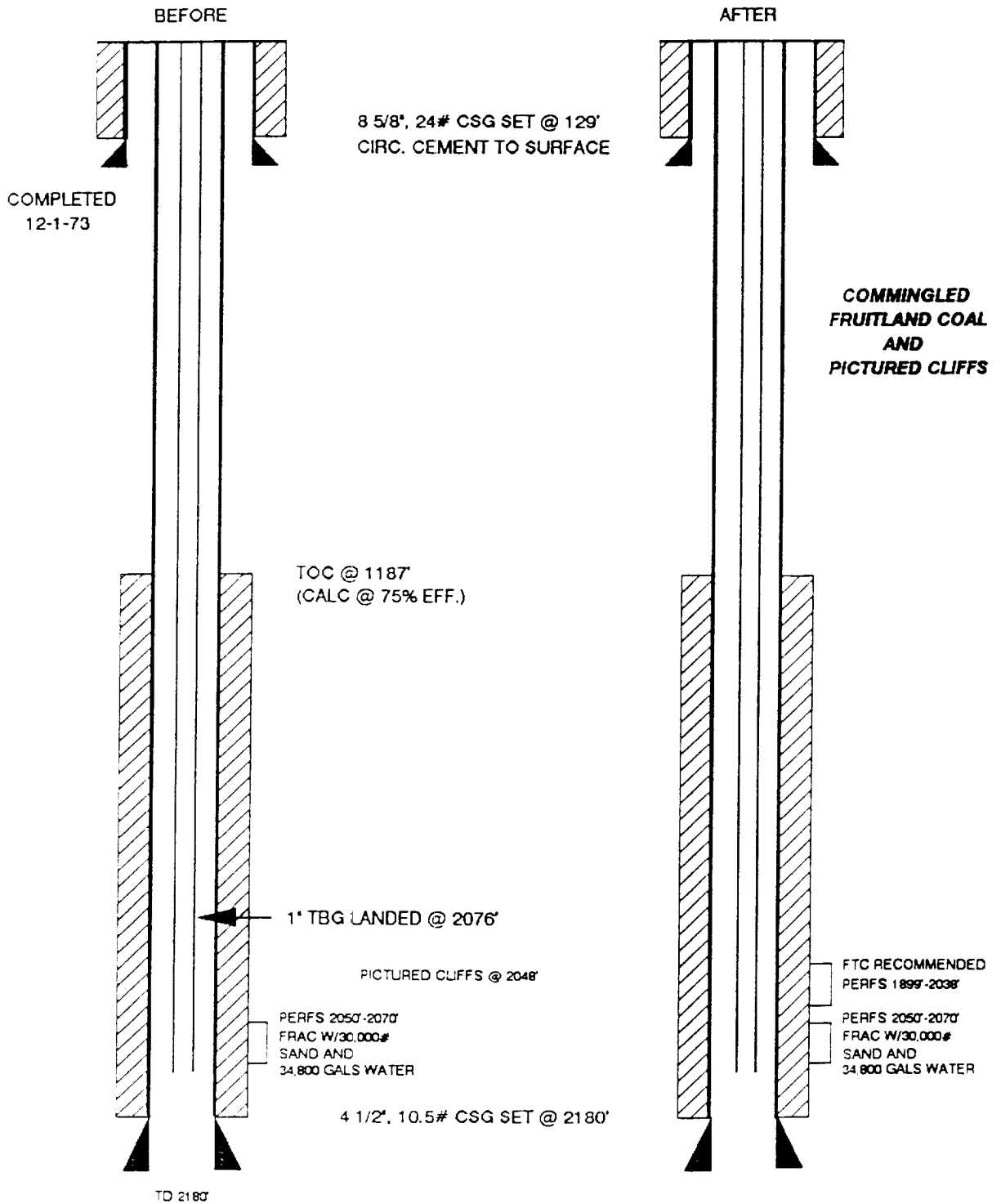
Workover History: NONE

Production History: Initial Deliverability - 66 MCF/D

Transporter: Sunterra Gas Gathering Company

# CAIN #20

AZTEC PICTURED CLIFFS  
UNIT M SECTION 15, T28N-R10W



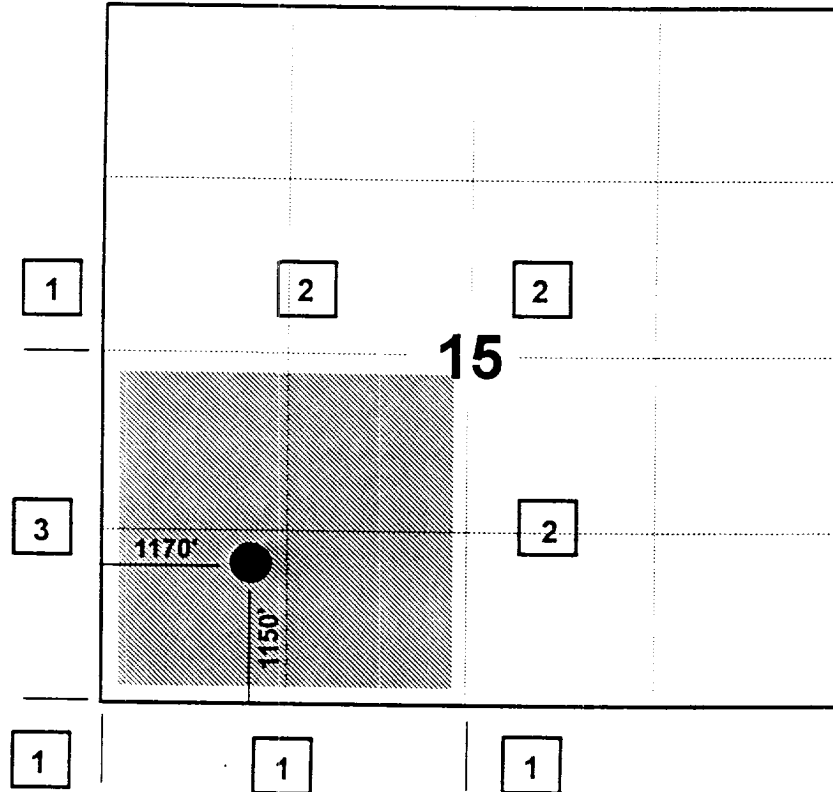
# MERIDIAN OIL INC

OFFSET OPERATOR \ OWNER PLAT

CAIN #20

Fruitland Coal \ Pictured Cliffs Commingle

Township 28 North, Range 10 West



1) Meridian Oil Inc

2) Southland Royalty Company

3) R. L. Bayless

PO Box 168, Farmington, NM 87499

PICTURED CLIFFS FORMATION

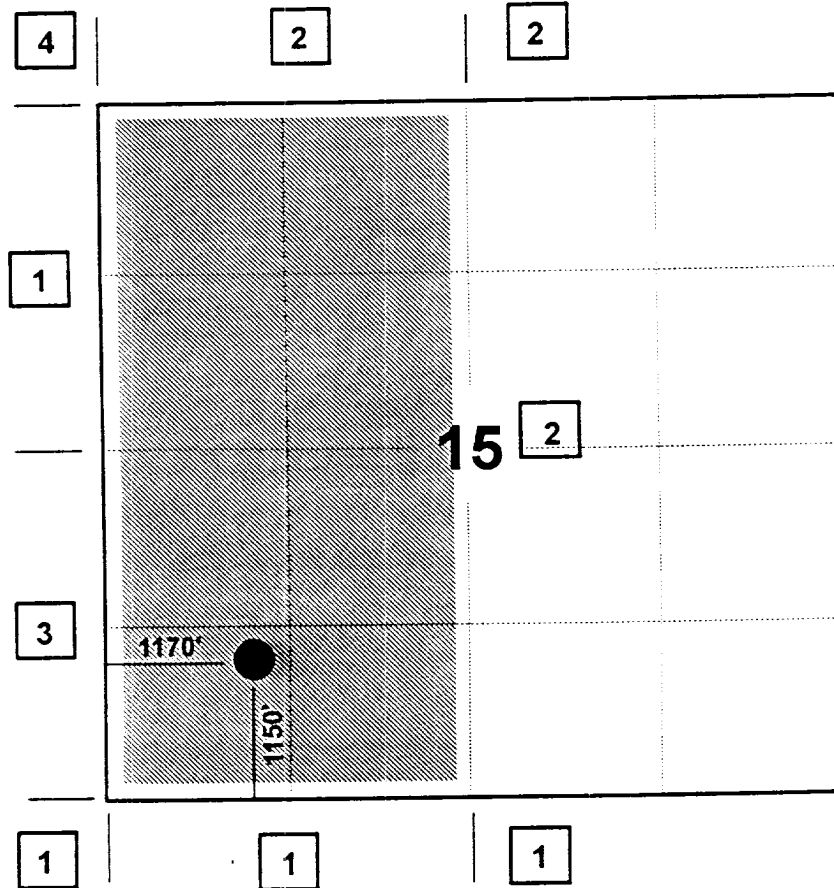
# MERIDIAN OIL INC

OFFSET OPERATOR \ OWNER PLAT

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Fruitland Coal \ Pictured Cliffs Commingle

Township 28 North, Range 10 West



1) Meridian Oil Inc

2) Southland Royalty Company

3) R. L. Bayless

PO Box 168, Farmington, NM 97499

4) Texaco Exploration & Producing, Inc

PO Box 46513, Denver, CO 80201-9710

FRUITLAND COAL FORMATION

FIGURE 1

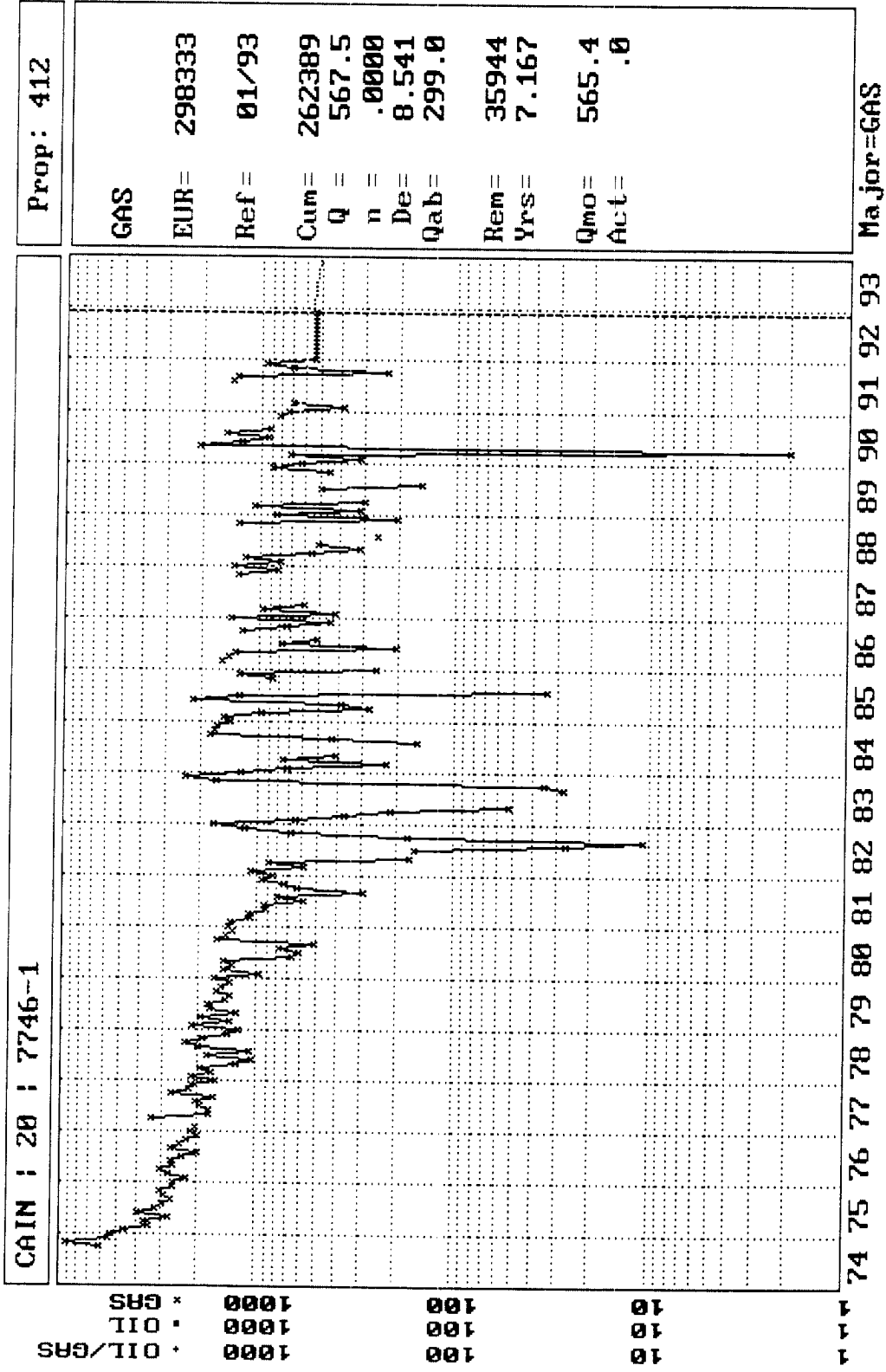
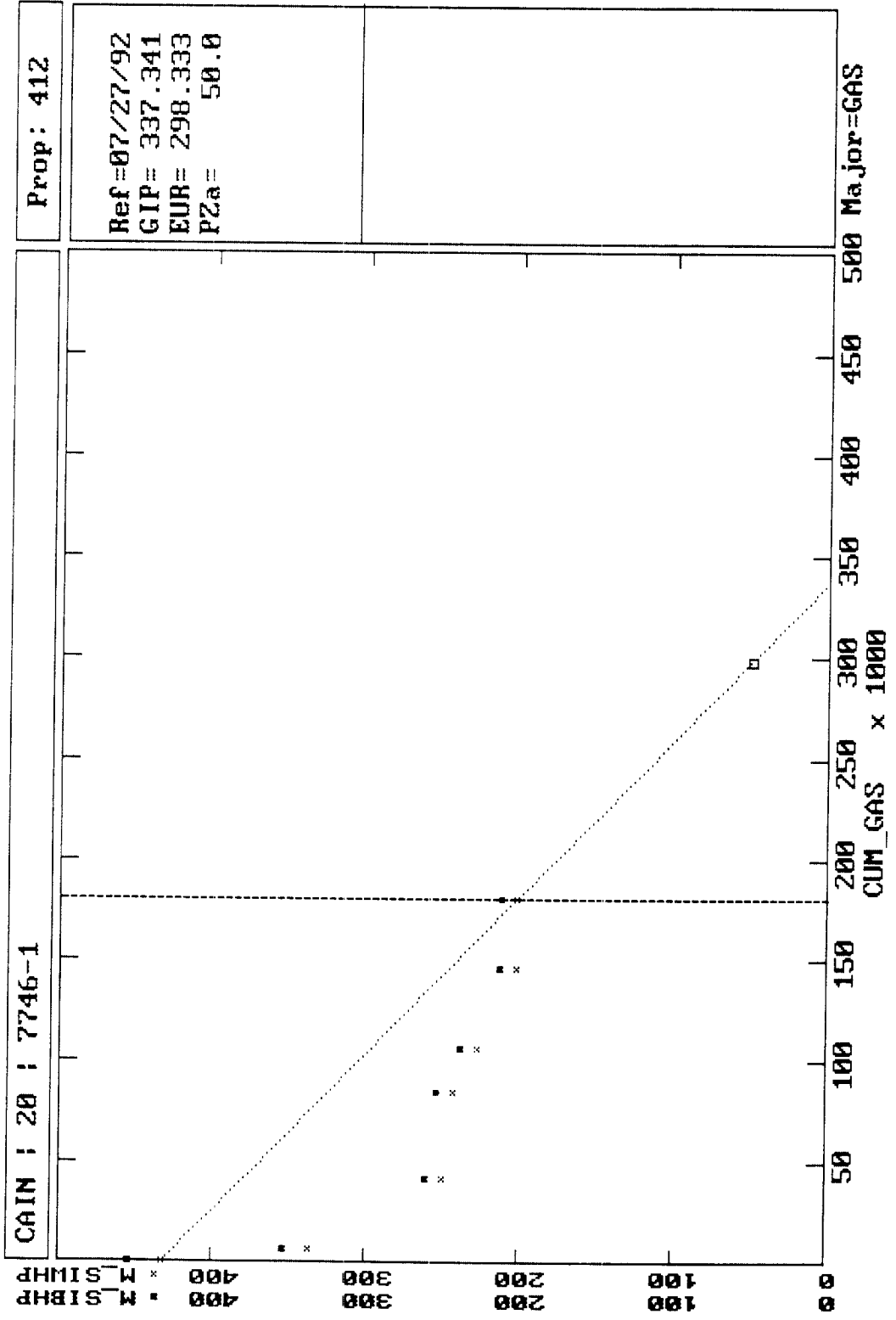




FIGURE 2



## Cain #20 Allocation Formula

### Equation Derivation

Given the exponential decline curve analysis formula\*:

$$De = 1 - (Q_2/Q_1)^{(1/Yr)}$$

Where: De = Effective Decline in %/yr  
Q<sub>2</sub> = Rate two (at some future date) MCFD  
Q<sub>3</sub> = Rate one (current rate) MCFD

Rearranging the equation to solve for Q<sub>2</sub>:

$$Q_2 = Q_1(1-De)^{Yr} \text{ MCFD}$$

### Cain #20 Formula

Using Production plot (fig 1):

Last production rate = Q<sub>1</sub> = 567 MCFM  $\cong$  19 MCFD  
De = 8.54% from plot

$$Q_{2PC} = 19 (1 - 0.0854) \text{ MCFD}$$

$$Q_{2PC} = 19(0.9146)^{Yr} \text{ MCFD} \quad \text{FORMULA FOR FUTURE PC RATES}$$

Any production rate over what is calculated using the above PC formula on a specific date is Fruitland Coal.

### Curtailment Situations

If any curtailment occurs, both streams will be affected the same and go to 0 MCFD.

When production resumes, the rates will equate to those when the well was shut in:

$$Q_{2PC} = 19 (0.9146)$$

$$Q_{FTC} = Q_{TOT} - Q_{PC}$$

$$Q_{TOT} = Q_{FTC} + Q_{PC}$$

The total amount of PC gas produced will be the EUR calculated through decline curve and P-Sum analysis (see figs 1 & 2).

\*Reference: pg. 5-46 Oil Property Evaluation  
by R. S. Thompson & J. D. Wright

Cain #20 Allocation Formula, page 2

Example:                    Date Now = 1/1/93

Assuming the well produces steadily in 1993. On 1/1/94, the well produces 400 MCFD.

$$\begin{aligned}Q_1 &= 19 \text{ MCFD} & De &= 8.54\% \\Q_{PC} &= 19 (0.9146) \text{ (Yr - curtailment time)} \\Q_{PC} &= 19 (0.9146) (1 - 0) = 17 \text{ MCFD} \\Q_{TOT} &= 400 \text{ MCFD} = Q_{FTC} + Q_{PC} \\Q_{FTC} &= 400 - 17 = 383 \text{ MCFD}\end{aligned}$$

Then on 1/2/94, the well gets shut in for 1 month:

On 2/2/94, assume that the PC stream will come back on line at the same rate it left off. Or:

$$\begin{aligned}1 \text{ month curtailment} &= 1/12 = 0.0833 \\Tot. \text{ Time} &= 1 \text{ yr} + 1 \text{ month} = 1 + 1/12 = 1.0833 \\Q_{PC} &= 19 (0.9146) (1.0833 - 0.0833) = 17 \text{ MCFD.} \\Q_{TOT} &= 400 \text{ MCFD} \\Q_{FTC} &= 383 \text{ MCFD}\end{aligned}$$

# MERIDIAN OIL

August 7, 1992

Bureau of Land Management  
1235 La Plata Highway  
Farmington, New Mexico 87401

Subject: Cain #20  
Unit M, Section 15, T28N, R10W  
San Juan County, New Mexico  
Downhole Commingling Request

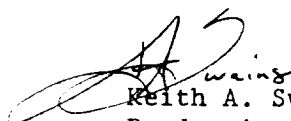
Gentlemen:

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The purpose of this letter is to notify you of such action. If you have no objections to the proposed commingling order, we would appreciate your signing this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,

  
Keith A. Swainson  
Production Engineer

KAS:tg

The above downhole commingling request is hereby approved:

\_\_\_\_\_  
Date: \_\_\_\_\_

# MERIDIAN OIL

August 7, 1992

R. L. Bayless  
P.O. Box 168  
Farmington, New Mexico 87499

**Subject:** Cain #20  
Unit M, Section 15, T28N, R10W  
San Juan County, New Mexico  
Downhole Commingling Request


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Production Engineer

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Date: \_\_\_\_\_

# MERIDIAN OIL

August 7, 1992

Texaco Exploration & Producing, Inc.  
P.O. Box 46513  
Denver, Colorado 80201-9710

Subject: Cain #20  
Unit M, Section 15, T28N, R10W  
San Juan County, New Mexico  
Downhole Commingling Request


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