



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

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

Date: May 27, 92

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

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

Proposed DHC X \_\_\_\_\_  
Proposed SWD \_\_\_\_\_  
Proposed PMX \_\_\_\_\_  
Proposed DD \_\_\_\_\_

Gentlemen:

I have examined the application received on 5/21/92  
for the Reclamation Kimuff #1  
OPERATOR LEASE & WELL NO.

A 13-25N-10W and my recommendations are as follows:  
UL-S-T-R

Approved  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Yours truly,

H. G.

# MERIDIAN OIL

May 14, 1992

RECEIVED  
MAY 21 1992  
OIL CON. DIV. 1  
DIST. 3

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

RE: Knauff #1  
Unit A, Section 13, T27N, 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 Fulcher Kutz 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 Amoco, Conoco, Mobil, Union Oil Company of California and McKenzie Methane. The Bureau of Land Management and the above mentioned operators will receive notification of this downhole commingling.

The subject well was completed in the Fulcher Kutz Pictured Cliffs interval in February 1955. Gas sales commenced in July 1955 with a cumulative production of 801 MMCF. This well has been inactive for three years and is currently blind plated. With the last production rate of 31 MCF/D, it is cost prohibitive to work over this well for its remaining reserves.

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 clean out the open hole Pictured Cliffs formation and re-establish production. It is then 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 228 and 320 psi, respectively.

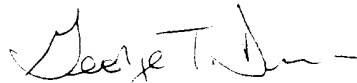
Meridian Oil Inc. 3535 East 30th St., P.O. Box 4289, Farmington, New Mexico 87499-4289. Telephone 505-326-9700

New Mexico Oil Conservation Division  
Mr. Bill LeMay  
Knauff #1  
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,

A handwritten signature in dark ink, appearing to read "George T. Dunn", followed by a horizontal line.

George T. Dunn  
Regional Production Engineer

KAS:tg  
attachments

cc: Frank Chavez - NMOCDA/Aztec

Pertinent Data Sheet - Knauff #1 FTC

Location: 790' FNL, 990' FEL, Section 13, T27N R10W, San Juan County, N.M.

Field: Basin Fruitland Coal

Elevation: 6152' KB    TD: 2069'  
PBTD: none

Completed: 2-9-55

GWI: 100%  
NRI: 66.25%  
DP Number: 50930A    PC  
50930B    FTC

Initial Potential:  
PC: 1215 MCF/D-PITOT

Casing Record:

<u>Hole Size</u>	<u>Csg Size</u>	<u>Wt. &amp; Grade</u>	<u>Depth Set</u>	<u>Cement</u>	<u>Top/Cmt.</u>
12-1/4"	9-5/8"	32 # NA	99'	75 sxs	SURF (CIRC)
8-3/4"	5-1/2"	14 # J55	2035' *	100 sxs	1685' (75%)

Tubing Record:

1"                      1.7# NA                      2060'

Formation Tops:

Ojo Alamo:            1120'  
Kirtland:             1261'  
Fruitland:            1846'  
Pictured Cliffs:    2051'

Logging Record: N/A

Stimulation: Open hole fraced with 10,700 gal oil and 8,600 lbs sand. Injection rate 31.5 BPM w/ max treating pressure 1100 psi and final treating pressure of 1100 psi.

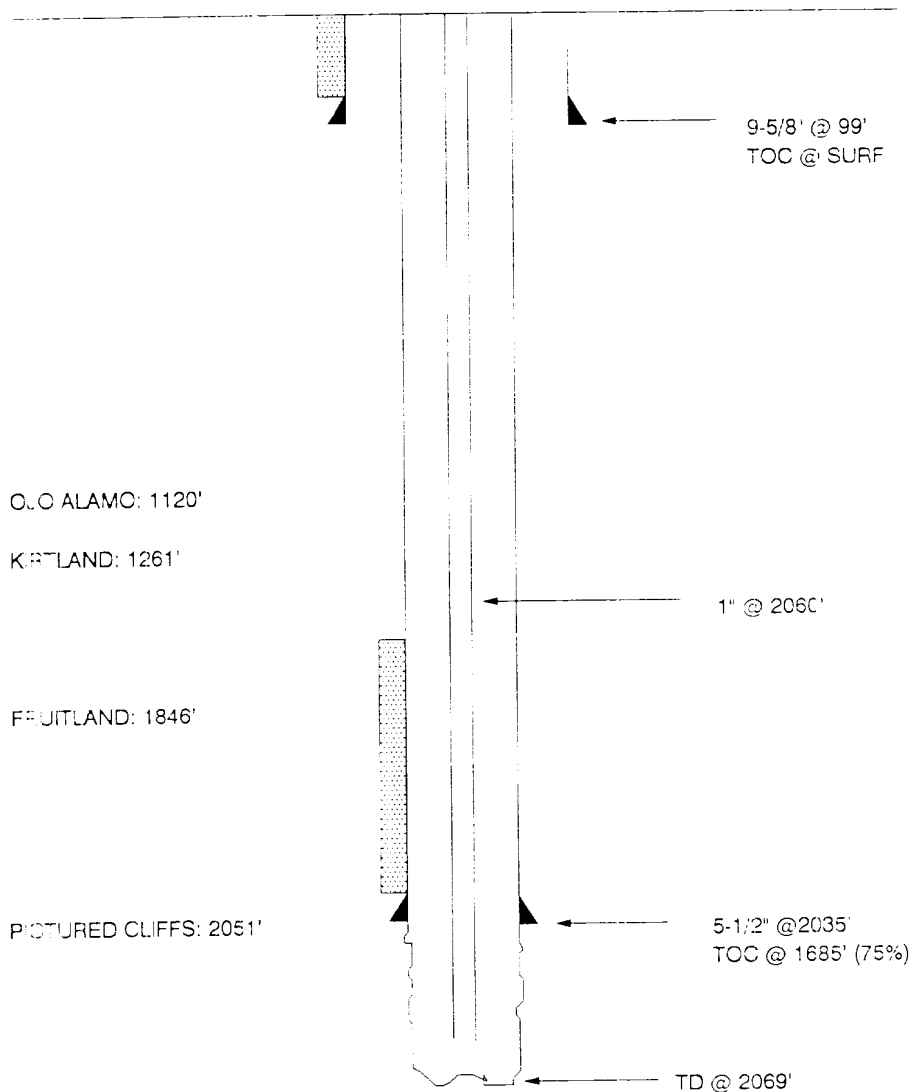
Workover History: None.

Production History: PC cum = 801 MMCF since 1st delivery in July of 1955. Well has been inactive since 1988 and is currently SIBP.

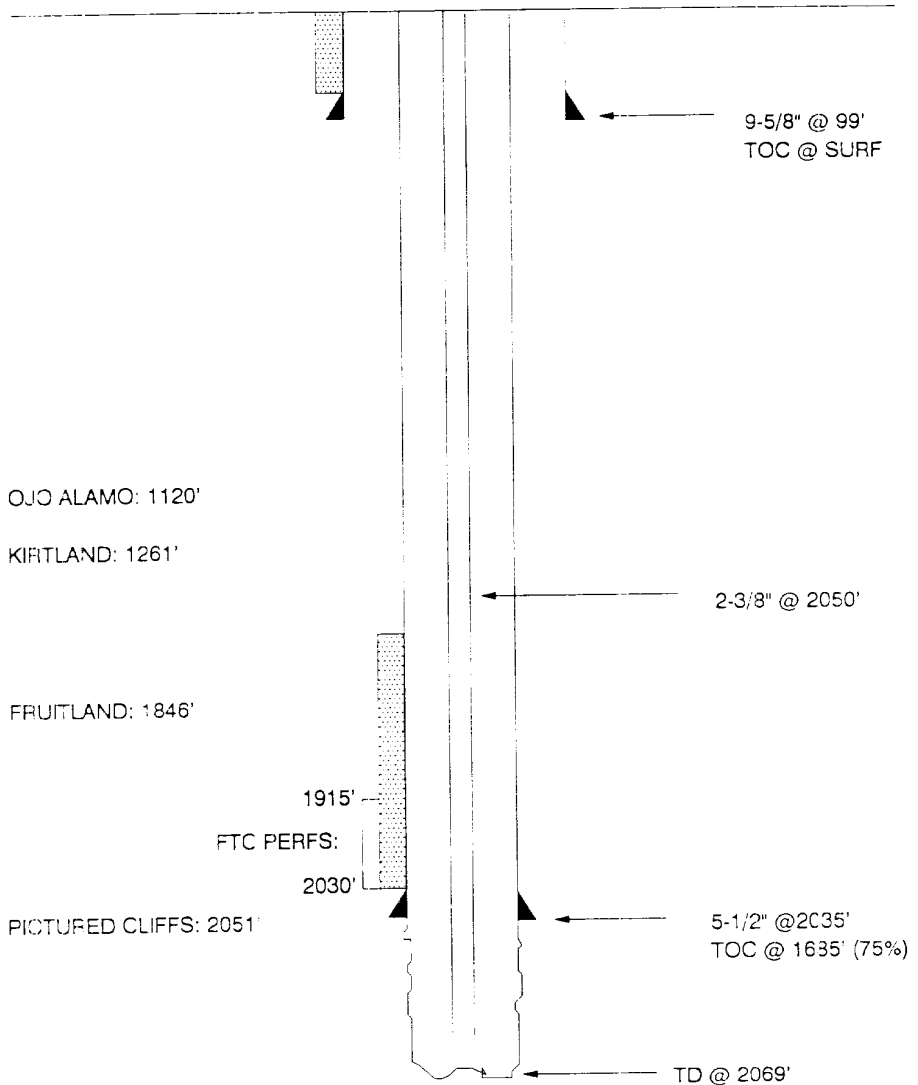
CURRENT

# KNAUFF #1

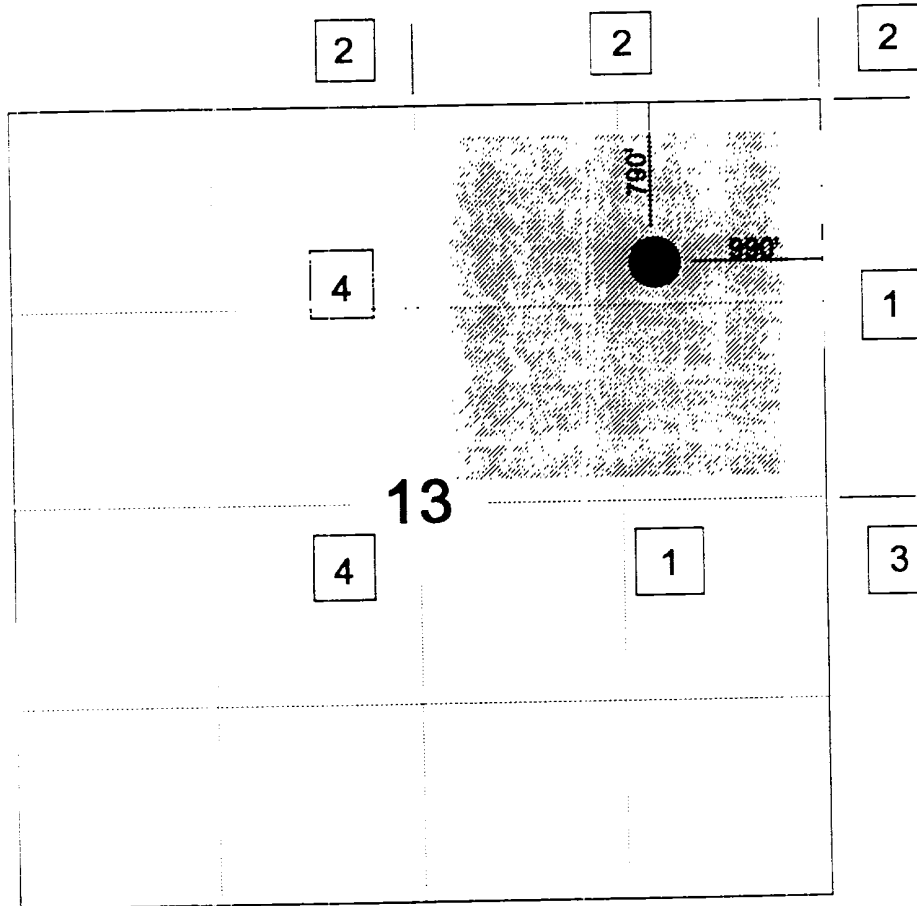
UNIT A SECTION 13 T27N R10W  
SAN JUAN COUNTY, NEW MEXICO



PROPOSED  
**KNAUFF #1**  
UNIT A SECTION 13 T27N R10W  
SAN JUAN COUNTY, NEW MEXICO



MERIDIAN OIL INC  
OFFSET OPERATOR PLAT  
KNAUFF #1  
Fruitland Coal \ Pictured Cliffs Comingle

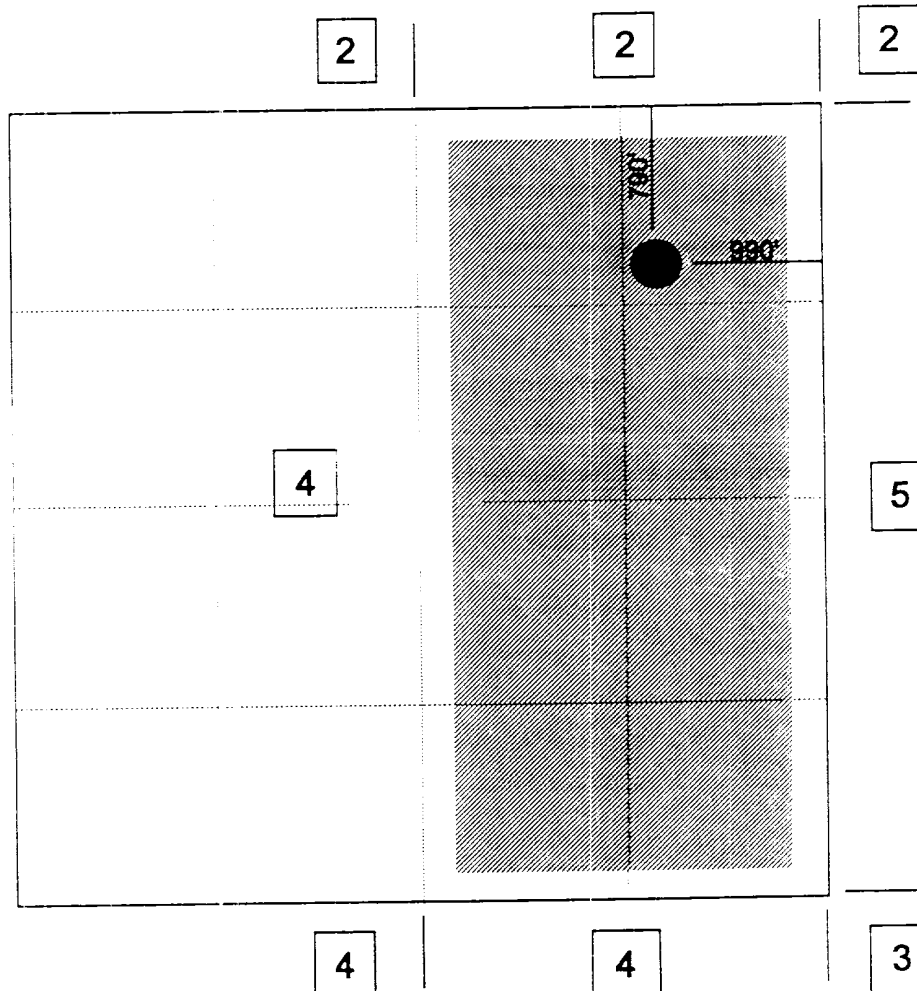


Township 27 North, Range 10 West

- 1) Meridian Oil Inc
- 2) Southland Royalty Company
- 3) Amoco Production Company
- PO Box 800 Denver, CO 80281
- Conoco, Inc.
- PO Box 2197 Houston, TX 77252
- 4) Mobil Producing Texas & New Mexico Inc.
- PO Box 633 Midland, TX 79702

Pictured Cliffs Ownership

**MERIDIAN OIL INC**  
**OFFSET OPERATOR PLAT**  
**KNAUFF #1**  
**Fruitland Coal \ Pictured Cliffs Comingle**



Township 27 North, Range 10 West

- 1) Meridian Oil Inc
- 2) Southland Royalty Company
- 3) Union Oil Company of California  
 PO Box 691007, Houston, TX 77269-1007
- 4) McKenzie Methane  
 7800 San Filipe. Houston, TX 77063
- 5) Meridian Oil Inc  
 Amoco Production Company PO Box 800, Denver, CO 80201  
 Conoco, Inc  
 PO Box 2197 Houston, TX 77252

**Fruitland Coal Ownership**



FIGURE 1

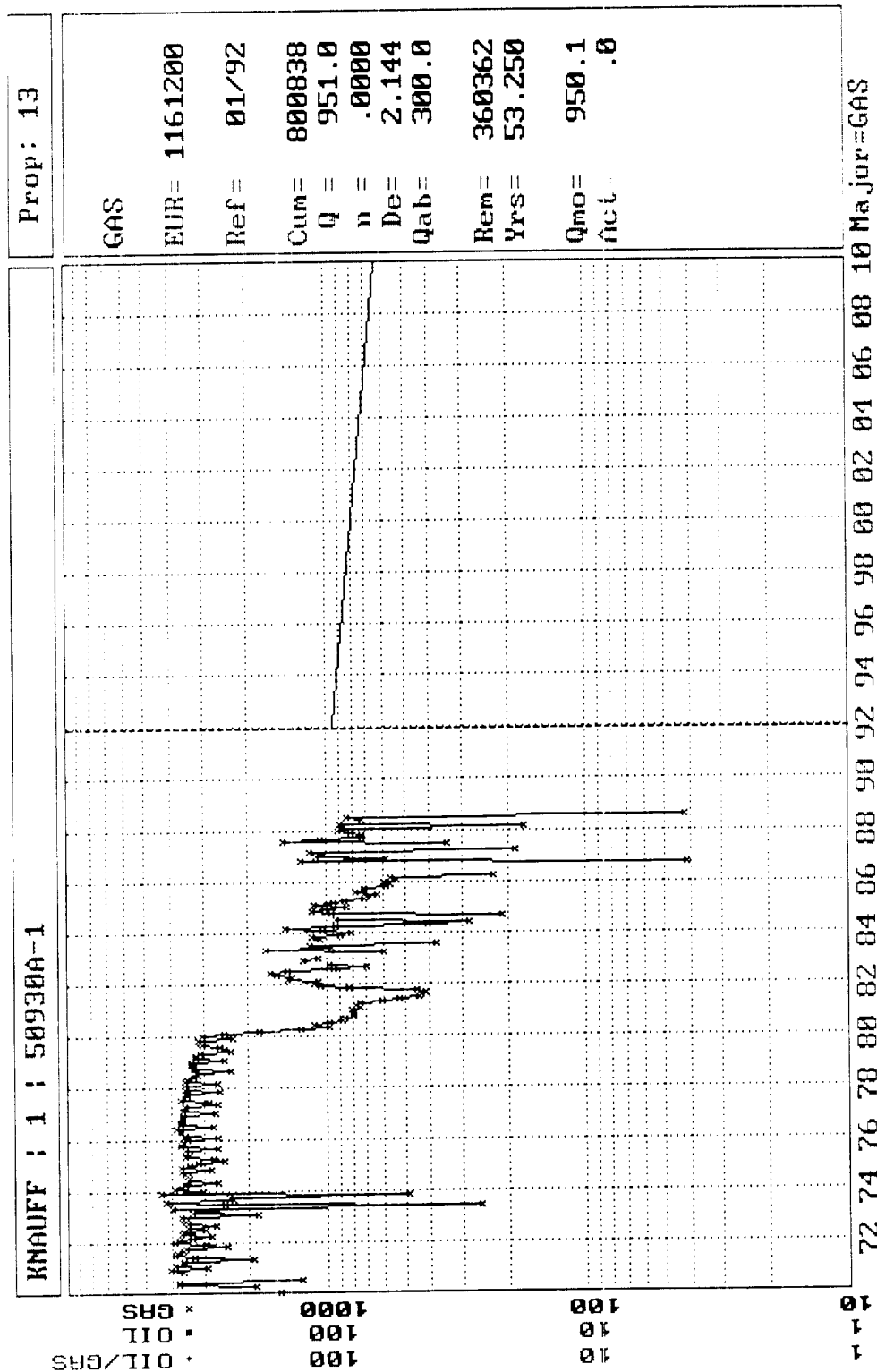
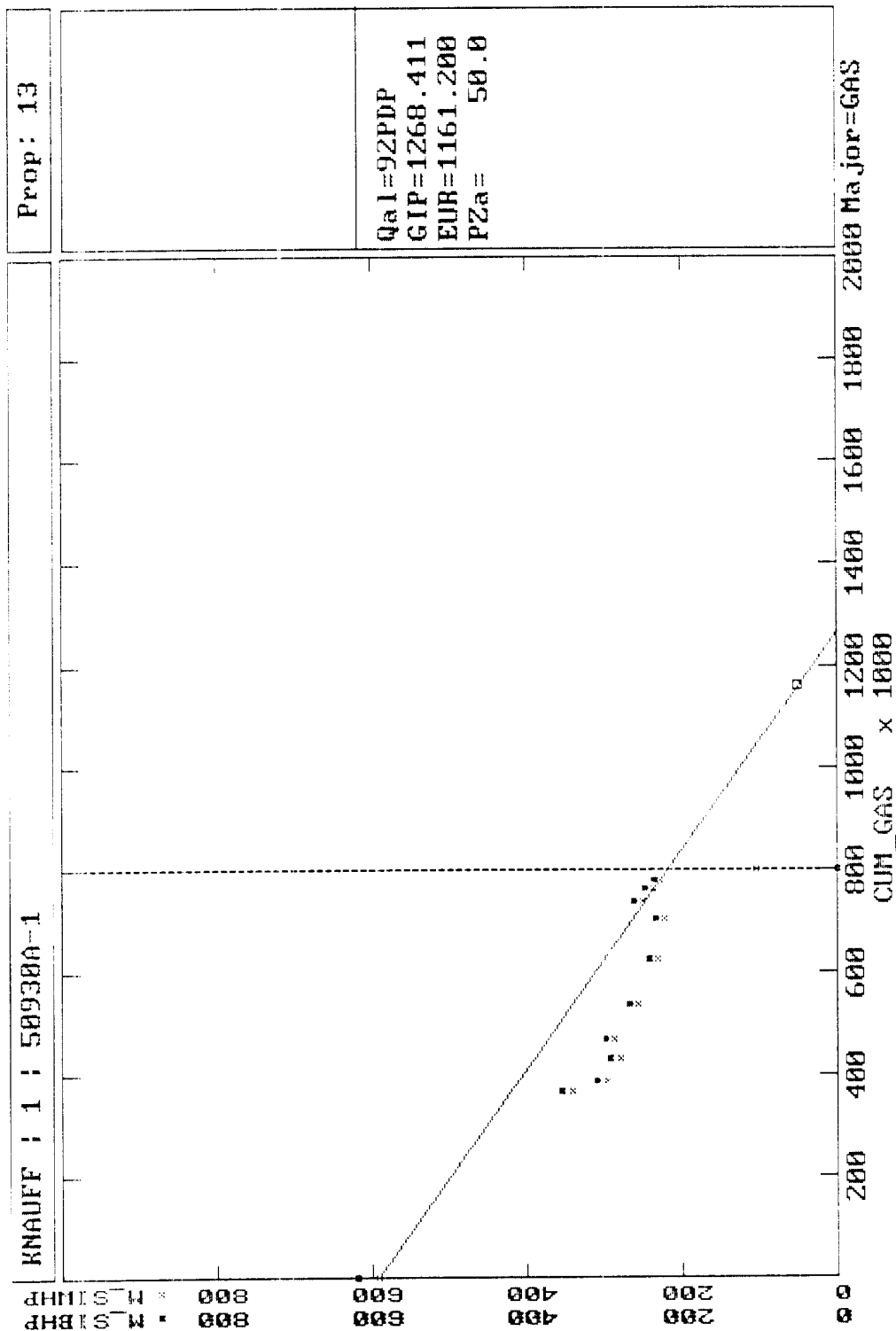


FIGURE 2



## Knauff #1 Allocation Formula

### Equation Derivation

Given the exponential decline cure 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>:

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

### Knauff #1 Formula

Using Production plot (fig 1):

Last production rate = Q<sub>1</sub> = 951 MCFM  $\cong$  32 MCFD

De = 2.144% from plot

$$Q_{2PC} = 32 (1 - 0.02144)^{Yr} \text{ MCFD}$$

$$Q_{2PC} = 32 (0.97856)^{Yr} \text{ MCFD} \quad \text{FORMULA FOR FUTURE PC RATES}$$

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:

$$Q_{2PC} = 32 (0.97856)^{(Yr - \text{curtailment time})}$$

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

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

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

Knauff #1 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.

$$Q_1 = 32 \text{ MCFD} \qquad \qquad \qquad De = 2.144\%$$

$$Q_{PC} = 32 (0.97856)^{(\text{Yr} - \text{curtailment time})}$$

$$Q_{PC} = 32 (0.97856)^{(1 - 0)} = 31 \text{ MCFD}$$

$$Q_{TOT} = 400 \text{ MCFD} = Q_{FTC} + Q_{PC}$$

$$Q_{FTC} = 400 - 31 = 369 \text{ MCFD}$$

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:

$$1 \text{ month curtailment} = 1/12 = 0.0833$$

$$\text{Tot. Time} = 1 \text{ yr} + 1 \text{ month} = 1 + 1/12 = 1.0833$$

$$Q_{PC} = 32 (0.97856)^{(1.0833 - 0.0833)} = 31 \text{ MCFD.}$$

$$Q_{TOT} = 400 \text{ MCFD}$$

$$Q_{FTC} = 369 \text{ MCFD}$$

# MERIDIAN OIL

May 14, 1992

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

RE: Knauff #1  
Unit A, Section 13, T27N, R10W  
San Juan County, New Mexico  
Downhole Commingling Request

Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for the Knauff #1 well located in Unit A, Section 13, T27N, R10W, N.M.P.M., San Juan County, New Mexico, in the Fulcher Kutz Pictured Cliffs and Basin Fruitland Coal fields.

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 the attached copy of this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,

George T. Dunn  
Regional Production Engineer

KAS:tg

The above downhole commingling request is hereby approved:

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

# MERIDIAN OIL

May 14, 1992

Amoco Production Company  
Attn: Bill Hawkins  
P.O. Box 800  
Denver, Colorado 80281

RE: Knauff #1  
Unit A, Section 13, T27N, R10W  
San Juan County, New Mexico  
Downhole Commingling Request

Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for the Knauff #1 well located in Unit A, Section 13, T27N, R10W, N.M.P.M., San Juan County, New Mexico, in the Fulcher Kutz Pictured Cliffs and Basin Fruitland Coal fields.

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 the attached copy of this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,

George T. Dunn  
Regional Production Engineer

KAS:tg

The above downhole commingling request is hereby approved:

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

# MERIDIAN OIL

May 14, 1992

Conoco, Inc.  
P.O. Box 2197  
Houston, Texas 77252

RE: Knauff #1  
Unit A, Section 13, T27N, R10W  
San Juan County, New Mexico  
Downhole Commingling Request

Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for the Knauff #1 well located in Unit A, Section 13, T27N, R10W, N.M.P.M., San Juan County, New Mexico, in the Fulcher Kutz Pictured Cliffs and Basin Fruitland Coal fields.

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 the attached copy of this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,

George T. Dunn  
Regional Production Engineer

KAS:tg

The above downhole commingling request is hereby approved:

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

# MERIDIAN OIL

May 14, 1992

Mobil Producing Texas  
and New Mexico Inc.  
P.O. Box 633  
Midland, Texas 79702

RE: Knauff #1  
Unit A, Section 13, T27N, R10W  
San Juan County, New Mexico  
Downhole Commingling Request

Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for the Knauff #1 well located in Unit A, Section 13, T27N, R10W, N.M.P.M., San Juan County, New Mexico, in the Fulcher Kutz Pictured Cliffs and Basin Fruitland Coal fields.

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Your prompt attention to this matter would be appreciated.

Yours truly,

George T. Dunn  
Regional Production Engineer

KAS:tg

The above downhole commingling request is hereby approved:

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



# MERIDIAN OIL

May 14, 1992

Union Oil Company of California  
P.O. Box 691007  
Houston, Texas 77269-1007

RE: Knauff #1  
Unit A, Section 13, T27N, R10W  
San Juan County, New Mexico  
Downhole Commingling Request

Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for the Knauff #1 well located in Unit A, Section 13, T27N, R10W, N.M.P.M., San Juan County, New Mexico, in the Fulcher Kutz Pictured Cliffs and Basin Fruitland Coal fields.

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 the attached copy of this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,

George T. Dunn  
Regional Production Engineer

KAS:tg

The above downhole commingling request is hereby approved:

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

# MERIDIAN OIL

May 14, 1992

McKenzie Methane  
7800 San Filipe  
Houston, Texas 77063

RE: Knauff #1  
Unit A, Section 13, T27N, R10W  
San Juan County, New Mexico  
Downhole Commingling Request

Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for the Knauff #1 well located in Unit A, Section 13, T27N, R10W, N.M.P.M., San Juan County, New Mexico, in the Fulcher Kutz Pictured Cliffs and Basin Fruitland Coal fields.

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 the attached copy of this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,

George T. Dunn  
Regional Production Engineer

KAS:tg

The above downhole commingling request is hereby approved:

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