MERIDIAN OIL

OIL CONSERVATION DIVISION
RECEIVED
'92 MAY 22 AM 9 52

May 14, 1992

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.

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,

George T. Dunn
Regional Production Engineer

KAS:tg
attachments

cc: Frank Chavez - NMOCD/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:

Hole Size	Csg Size	Wt. & Grade	Depth Set	Cement	Top/Cmt.
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.

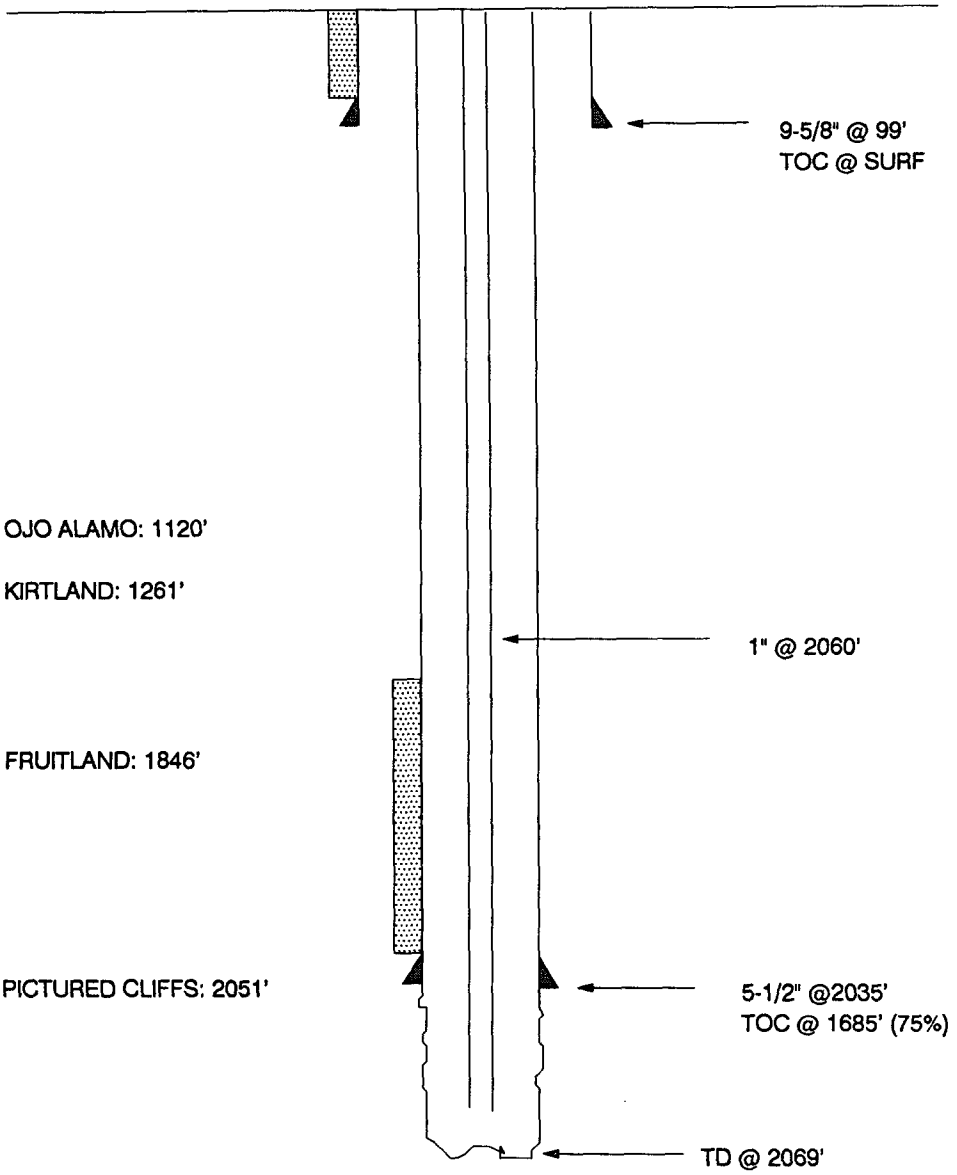
Production History: PC cum = 801 MMCF since 1st delivery in July of 1955. Well has been inactive since 1988 and is currently SIBP.

CURRENT

KNAUFF #1

UNIT A SECTION 13 T27N R10W

SAN JUAN COUNTY, NEW MEXICO

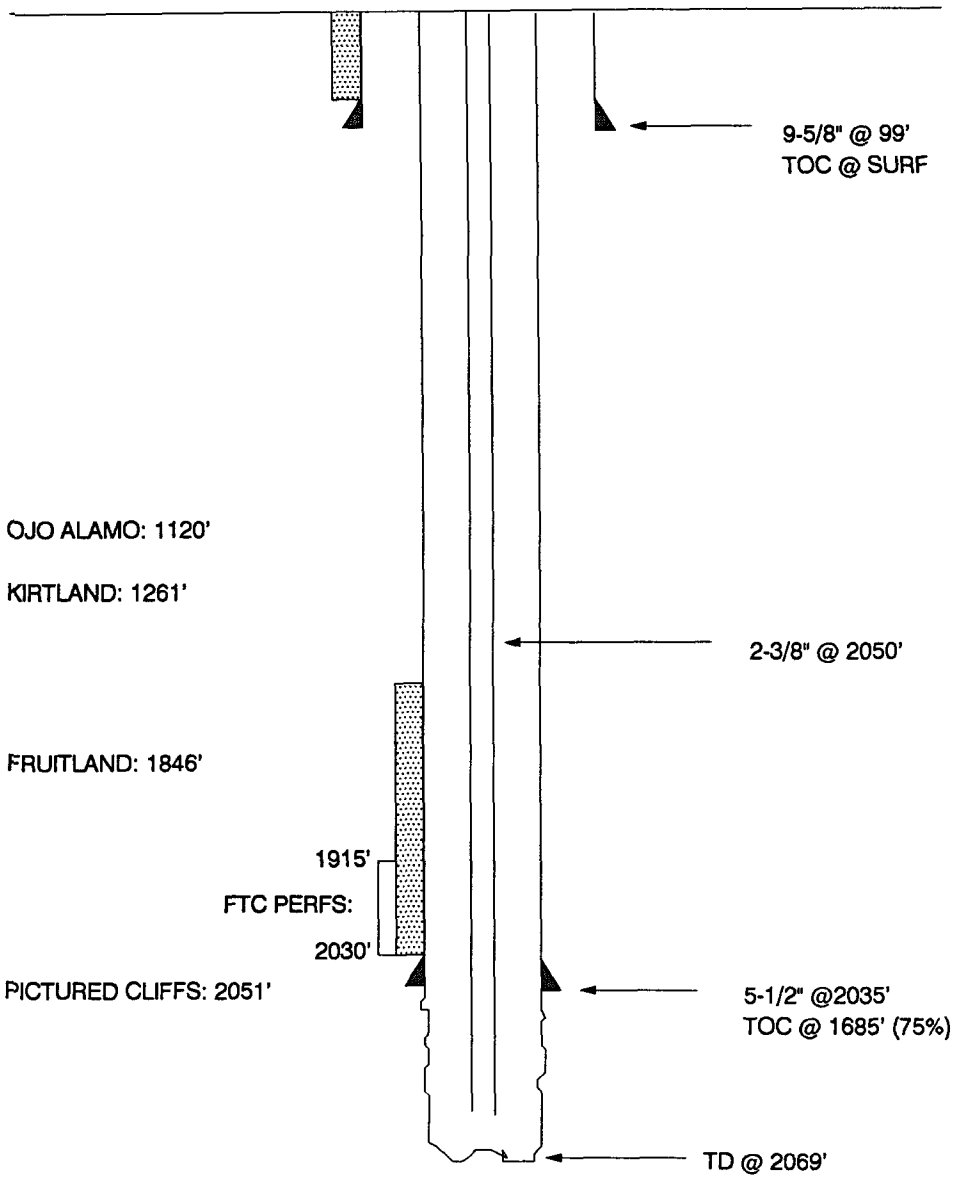


PROPOSED

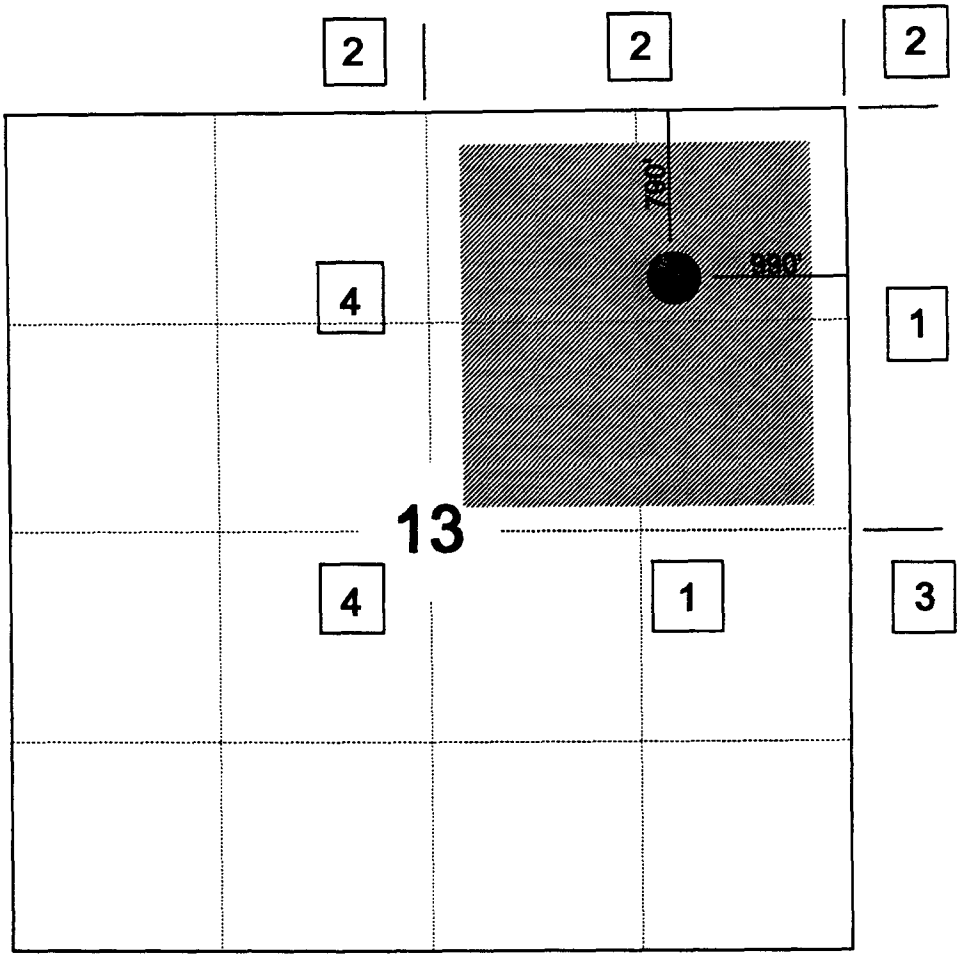
KNAUFF #1

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.

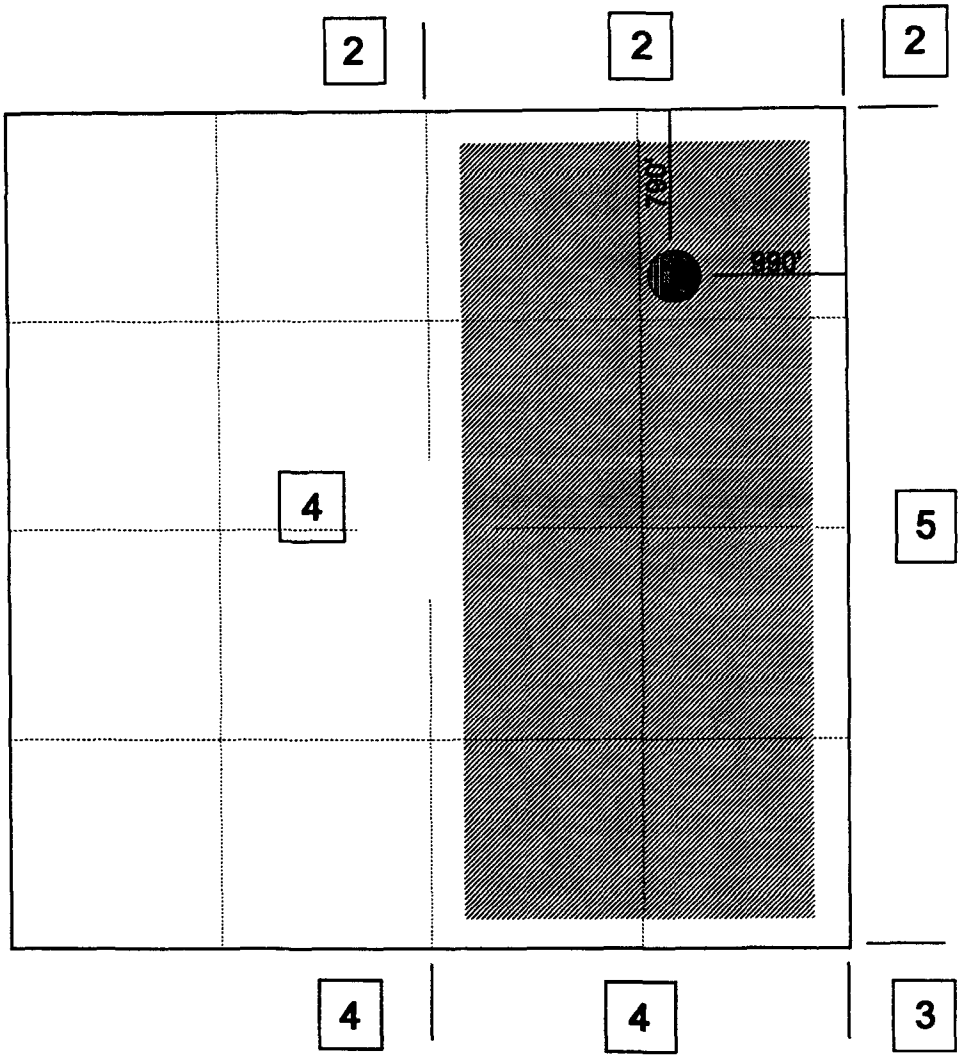
PO Box 2197 Houston, TX 77252

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

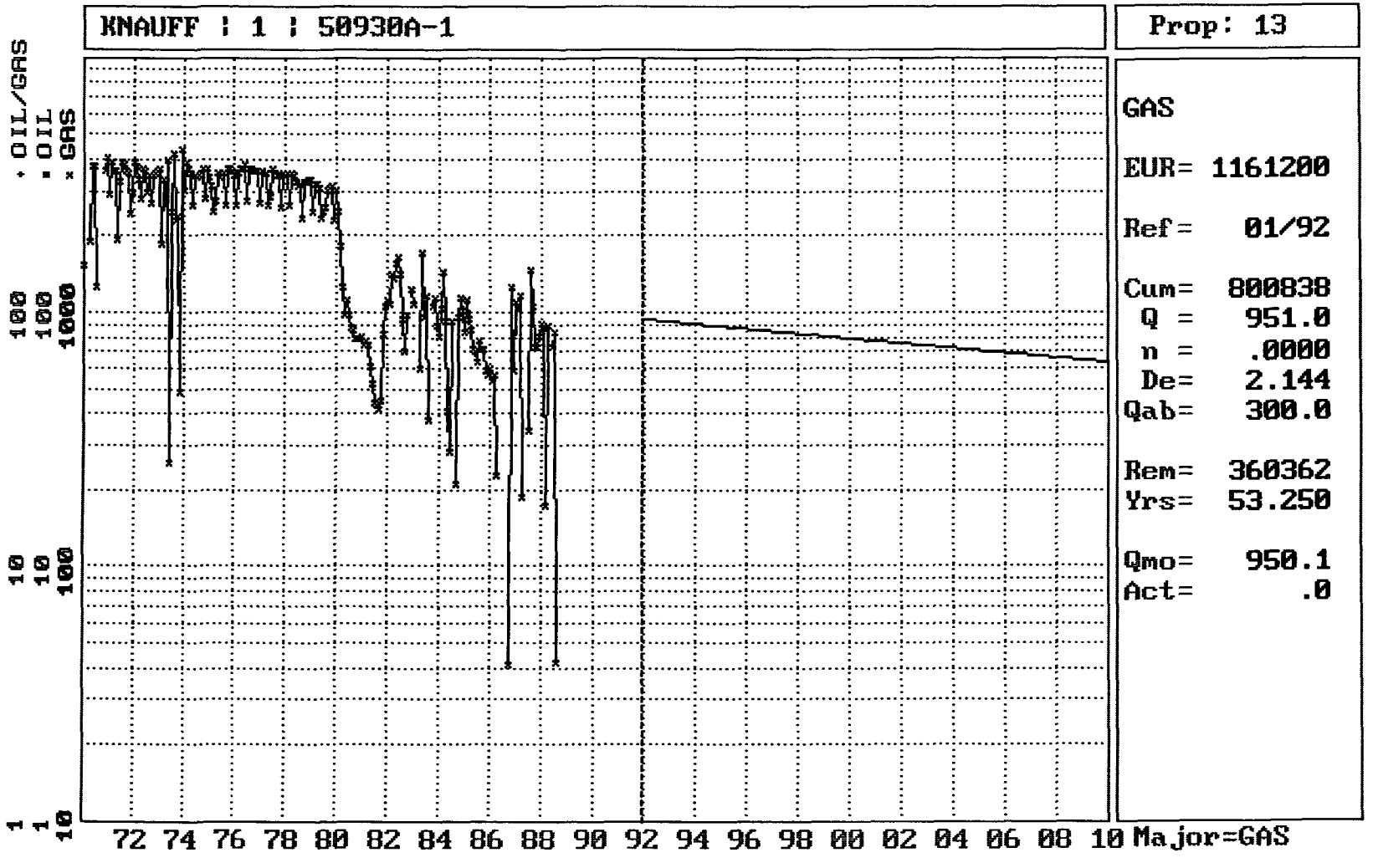
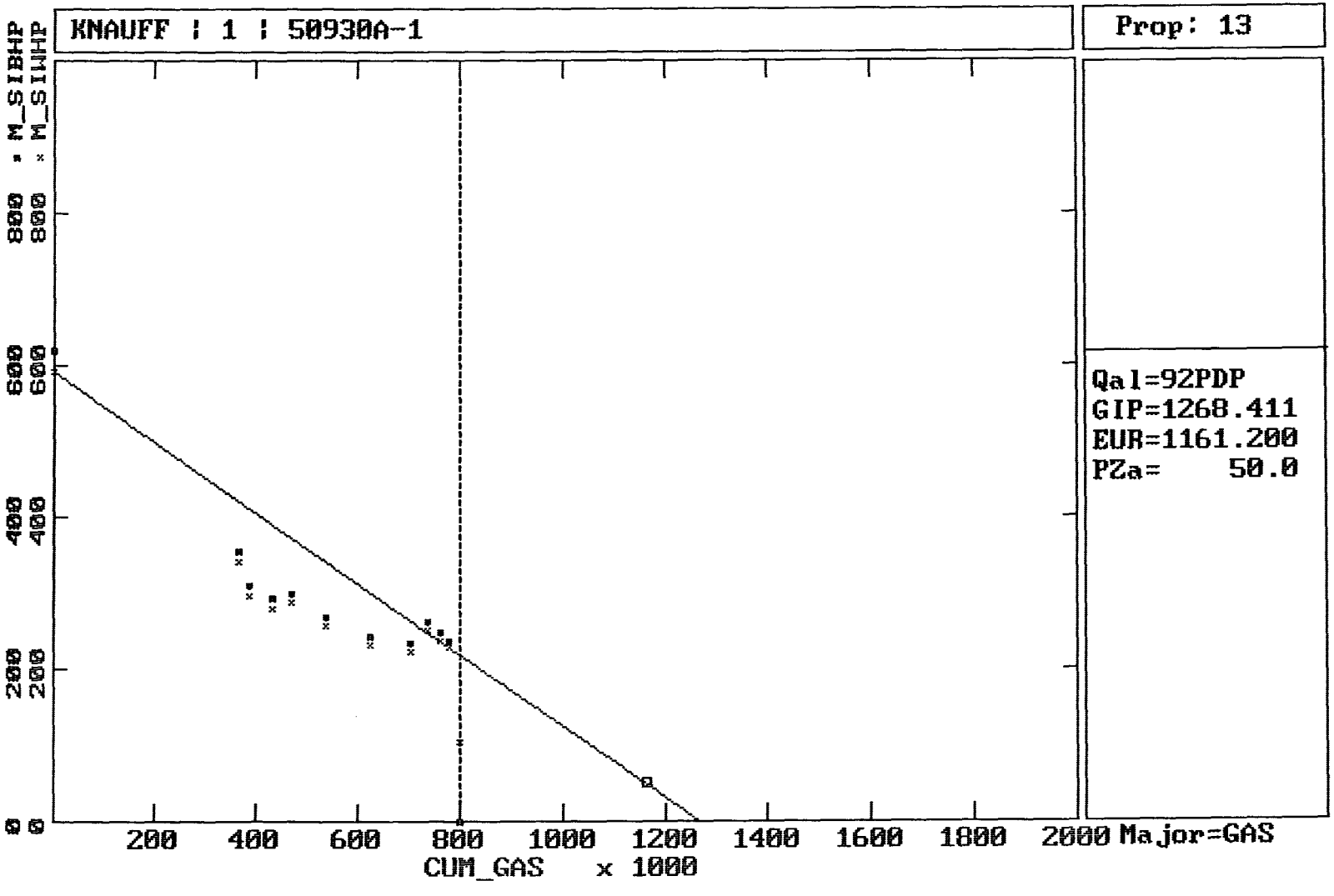

KNAUFF ¦ 1 ¦ 50930A-1
Prop: 13
GAS
EUR= 1161200
Ref= 01/92
Cum= 800838
Q = 951.0
n = .0000
De= 2.144
Qab= 300.0
Rem= 360362
Yrs= 53.250
Qmo= 950.1
Act= .0
Major=GAS
* OIL/GAS
▪ OIL
× GAS
100
100
1000
10
10
100
1
1
10
72 74 76 78 80 82 84 86 88 90 92 94 96 98 00 02 04 06 08 10

FIGURE 2


KNAUFF : 1 : 50930A-1
Prop: 13
M_SIBHP
M_SIWHP
0
200
400
600
800
0
200
400
600
800
200
400
600
800
1000
1200
1400
1600
1800
2000
CUM_GAS x 1000
Qal=92PDP
GIP=1268.411
EUR=1161.200
PZa= 50.0
Major=GAS

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_2 = Rate two (at some future date) MCFD
Q_3 = Rate one (current rate) MCFD

Rearranging the equation to solve for Q2:

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

Knauff #1 Formula

Using Production plot (fig 1):

Last production rate = Q1 = 951 MCFM ≅ 32 MCFD
De = 2.144% from plot

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

$$Q_{2PC} = 32\ (0.97856)^{yr} \text{ MCFD}$$ **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 MCFD De = 2.144%

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

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

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

$Q_{FTC} = 400 - 31 = 369$ 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 month curtailment = 1/12 = 0.0833

Tot. Time = 1 yr + 1 month = 1 + 1/12 = 1.0833

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

Q_{TOT} = 400 MCFD

Q_{FTC} = 369 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:

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Yours truly,

George T. Dunn
Regional Production Engineer

KAS:tg

The above downhole commingling request is hereby approved:

_____

Date: _____

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

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:

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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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Yours truly,

George T. Dunn
Regional Production Engineer

KAS:tg

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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

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George T. Dunn
Regional Production Engineer

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Date: _____

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

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.

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Yours truly,

George T. Dunn
Regional Production Engineer

KAS:tg

The above downhole commingling request is hereby approved:

_____

Date: _____

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

STATE OF NEW MEXICO

ENERGY, MINERALS and NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

RECEIVED

'92 JUN 1 AM 10 55

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 DHC X
Proposed NSL_____ Proposed SWD_____
Proposed WFX_____ Proposed PMX_____
Proposed NSP_____ Proposed DD_____

Gentlemen:

I have examined the application received on 5/21/92

for the Meridian (OPERATOR) Knauff # 1 (LEASE & WELL NO.)

A-13-27N-10W (UL-S-T-R) and my recommendations are as follows:

Approve.

Yours truly,

BJ. S