

# MERIDIAN OIL

OIL CONSERVATION DIVISION  
RECEIVED

AUG 9 1991

August 8, 1991

Mr William J. LeMay  
N. M. Oil Conservation Division  
P. O. Box 2088  
Santa Fe, N.M. 87501-2088

Re: McClanahan #12 PC/FRTC  
1450' FSL 1690' FWL  
Section 13, T28N R10W  
San Juan County, N. M.

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 Basin Fruitland Coal fields. The ownership of the zones to be commingled is common. There are no offset operators with Meridian Oil operating all of the drilling blocks surrounding the referenced well. The Bureau of Land Management will receive notification of this proposed downhole commingling.

The subject well was completed in the Pictured Cliffs in October 1959 and first delivered to pipeline in December 1959. The Pictured Cliffs has a cumulative production of 772 MMCF with a current producing capacity of about 30 MCF/D.

The Pictured Cliffs is producing at a low but still economical rate which eliminates the possibility of plugging and opening the Fruitland Coal as a single. The Fruitland Coal in the vicinity has proved to be very erratic which adds a higher risk to any coal project. It is concluded that commingling the Pictured Cliffs with the Fruitland Coal in this drilling block is the most efficient way to produce these two marginal intervals. Granting this application will be in the best interest of conservation, the prevention of waste, and the protection of correlative rights.

We plan to commingle this well by pulling the tubing, setting a bridge plug between the Pictured Cliffs and the Fruitland Coal, perforating the 4-1/2" casing in the Fruitland Coal intervals and stimulating. The bridge plug will then be removed and a tubing string run to the lower producing interval.

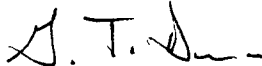
The reservoir characteristics of each of the subject zones are such that underground waste would not be caused by the proposed downhole commingling. Neither

producing interval should make oil or water. The daily production will not exceed the limit of Rule 303c, Section 1a, Part 1. The shut-in pressures for the Pictured Cliffs and Fruitland Coal are 225 psi and 378 psi, respectively.

The District Office in Aztec will be notified anytime the commingled well is shut-in for seven (7) consecutive days.

Using the well's most recent production from the Pictured Cliffs, the attached allocation formula was calculated. This formula insures that all the Pictured Cliffs reserves will be attributed to the PC using common Reservoir Engineering equations for traditional sandstone reservoirs. Any and all other reserves will be attributed to the Fruitland Coal reservoir. This addresses the common Fruitland Coal producing characteristic of increasing production rate early in the life of some coal wells. The formula also addresses and solves the possible problem of pipeline curtailment.

Yours truly,



G. T. Dunn  
Regional Production Engineer

attachments

cc: Frank Chavez - OCD

# MERIDIAN OIL

August 8, 1991

Bureau of Land Management  
1235 La Plata Hwy.  
Farmington, N. M. 87401

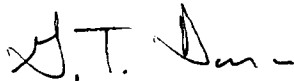
Gentlemen:

Meridian Oil, Inc. is in the process of applying for a downhole commingling order for their McClanahan #12 PC/FRTC well located 1450' FSL 1690' FWL, Section 13 T28N R10W, N.M.P.M., San Juan County, New Mexico, in the Fulcher Kutz Pictured Cliffs and the Basin Fruitland Coal.

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,



G. T. Dunn  
Regional Production Engineer

PMP:pmp

The above downhole commingling request is hereby approved:

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

Pertinent Data Sheet - McCLANAHAN #12 PC

Location: 1450' FSL 1690' FWL, SEC. 13 T28N R10W, SAN JUAN COUNTY, N.M.

Field: Fulcher Kutz Pictured Cliffs

Elevation: 5700' GR  
7' KB

TD: 1935'  
PBTD: 1930'

Completed: 10-25-59

GWI: 100.00%  
NRI: 87.00%  
DP Number: 46481

Initial Potential:

AOF=3996 MCF/D 622 PSI

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"	8-5/8"	24.0# J-55	167'	100 sx	CIRC.CMT
6-3/4"	4-1/2"	14.0# J-55	1935'	75 sx	1268' SURV

Tubing Record:

88 jts.	1"	N/A	1872'
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Formation Tops:

Ojo Alamo	807'
Kirtland	900'
Fruitland	1620'
Pictured Cliffs	1844

Logging Record: Induction Log

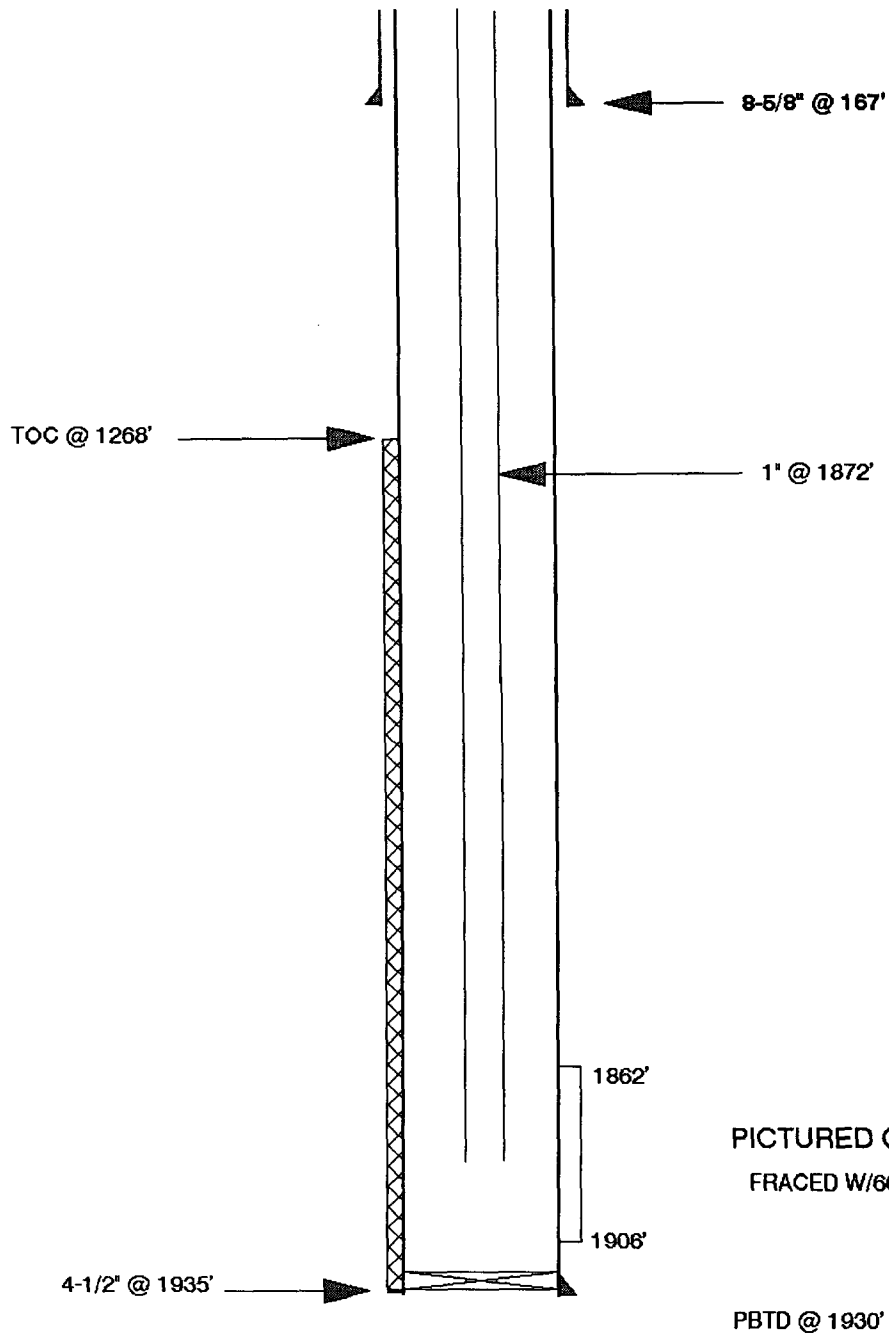
Stimulation: Perfed PC @ 1862'-1906' & fraced w/60,000# sand in water w/46 perf balls

Workover History: 8-20-71 TOH w/1" tbg. Cleaned out 1" tbg. Set Pkr @ 1768' on 2-3/8" tbg & acidized w/1000 gal 15% HCL. TOH w/2-3/8" & layed down. Ran 88 jts 1" tbg. spf.

Production History: 1st delivery in 12/59. Capacity = 10 MCF/D. Cumulative = 772 MMCF MMCF.

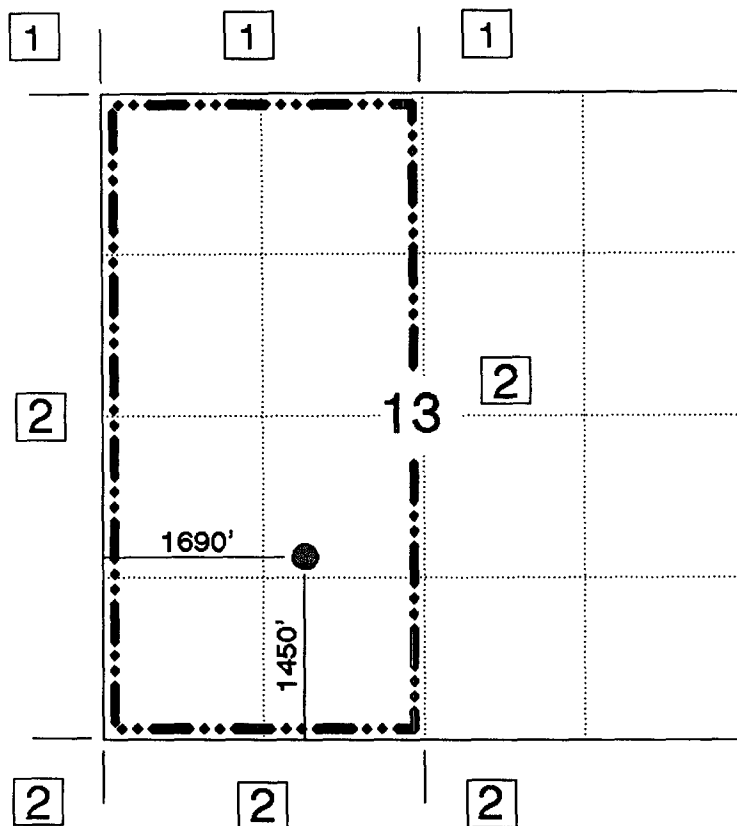
# McCLANAHAN #12 PC

UNIT K SECTION 13 T28N R10W  
SAN JUAN COUNTY, NEW MEXICO



**MERIDIAN OIL INC**  
**OFFSET OPERATOR PLAT**  
**McCLANAHAN #12**

Township 28 North, Range 10 West



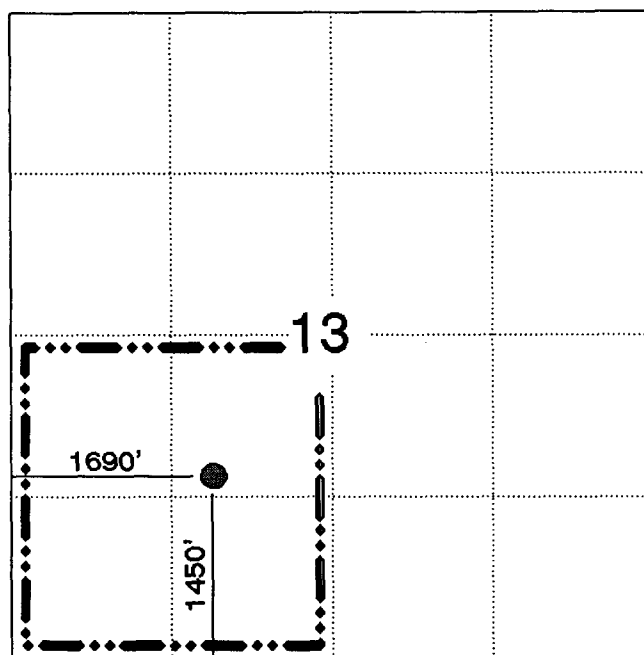
1) Meridian Oil Inc

2) Southland Royalty Company

**COMMINGLE PICTURED CLIFFS AND FRUITLAND COAL**  
Fruitland Coal Formation Ownership

**MERIDIAN OIL INC**  
**OFFSET OPERATOR PLAT**  
**McCLANAHAN #12**

Township 28 North, Range 10 West



Southland Royalty Company is the Operator or Owner of all offset acreage

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**COMMINGLE PICTURED CLIFFS AND FRUITLAND COAL**  
Pictured Cliffs Formation Ownership

## McClanahan #12 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

$Q_2$  = Rate two (at some future date ) MCFD

$Q_1$  = Rate One (current rate) MCFD

Yr = years into the future from current date

Rearranging the equation to solve for  $Q_2$ :

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

### McClanahan #3 Formula

Using Production plot (fig 1):

Last production rate =  $Q_1 = 737 \text{ MCFM} \approx 25 \text{ MCFD}$   
De = 6.176 from plot

$$Q_{2_{pc}} = 25 (1 - 0.06176)^{Yr} \text{ MCFD}$$

$$Q_{2_{pc}} = 25 (0.93800)^{Yr} \text{ MCFD} \quad \text{FORMULA FOR FUTURE PC RATES}$$

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:

$$Q_{2_{pc}} = 25 (0.93800)^{(Yr - \text{cumulative curtailment time})}$$

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

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

The total amount of PC gas produced will be the EUR calculated through decline curve and P-Cum analysis (see plot).

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



Example:

Date Now = 1/1/91

Assuming the well produces steadily in 1991. On 1/1/92, the well produces 300 MCFD.

$$Q_1 = 25 \text{ MCFD} \quad D_e = 6.176 \%$$

$$Q_{PC} = 25 (0.93800) (\text{yr} - \text{cumulative curtailment time})$$

$$Q_{PC} = 25 (0.93800) (1-0) = 23 \text{ MCFD}$$

$$Q_{TOT} = 300 \text{ MCFD} = Q_{PC} + Q_{FTC}$$

$$Q_{FTC} = 300 - 23 = 277 \text{ MCFD}$$

Then on 1/2/92, the well gets shut in for 1 month:

On 2/2/92, assume that the PC stream will come back on line at the same rate it left off. Or:

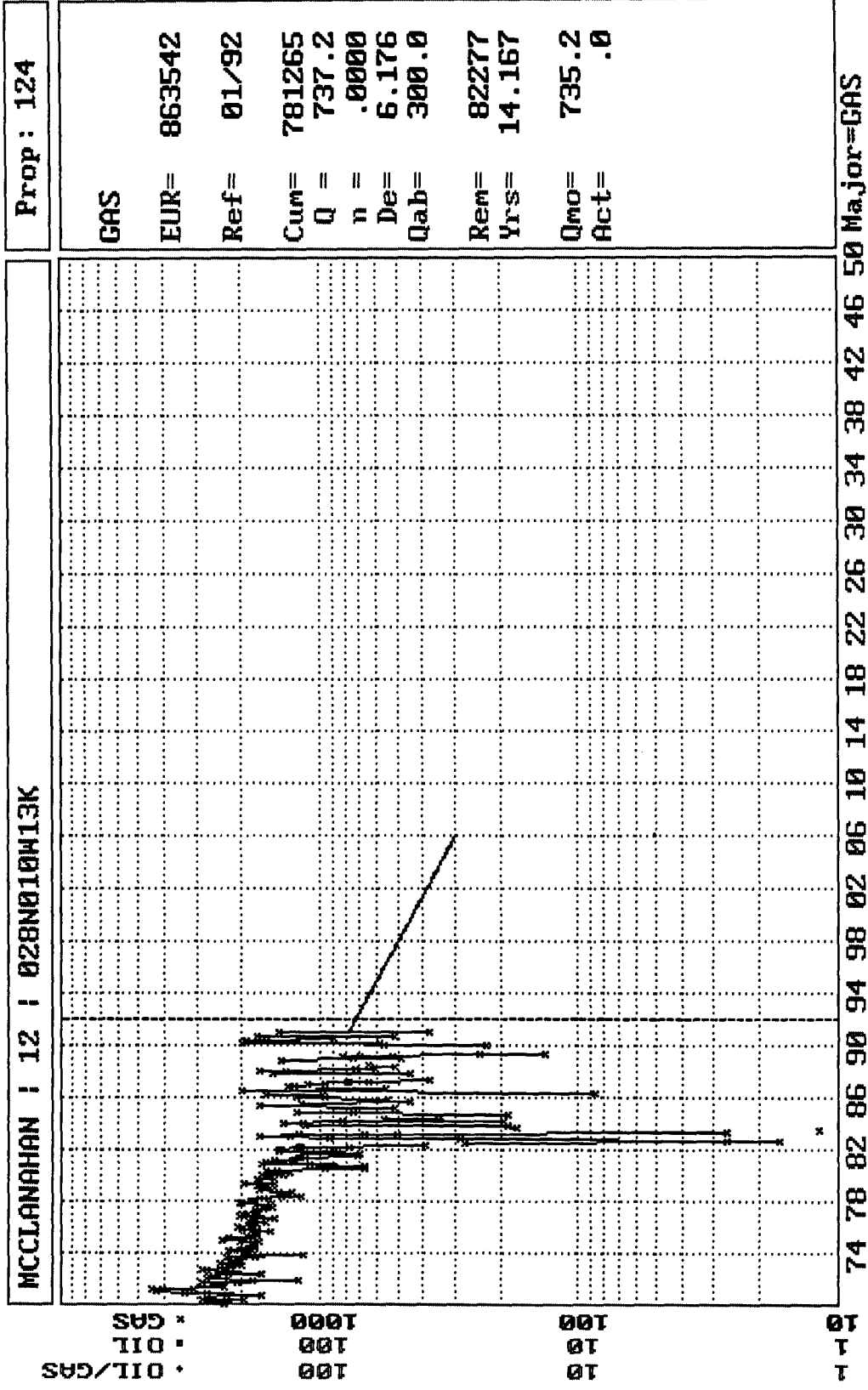
$$1 \text{ month curtailment} = 1/12 = 0.0833$$

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

$$Q_{PC} = 25 (0.93800) (1.0833 - .0833) = 23 \text{ MCFD}$$

$$Q_{TOT} = 300 \text{ MCFD}$$

$$Q_{FTC} = 277 \text{ MCFD}$$



Major=GAS

