DHC Release 9-15-93

OIL CONSERVATION DIVISION
RECEIVED
'93 AU 25 AM 9 34

MERIDIAN OIL

August 19, 1993

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

RE: Rhodes C #100
Unit A, Section 30, T28N, R11W
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 West 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 BHP Petroleum, R & G Drilling Company, Inc., and M & G Drilling Company. The Bureau of Land Management and the above mentioned operators have received notification of this downhole commingle.

The Fruitland Coal and Pictured Cliffs wells producing in this area operated by Meridian and others are marginally productive. Based on offset production in this area, drilling of separate wells and dual completions to produce the Fruitland Coal and Pictured Cliffs are not economically justified. The only economical way to recover the Fruitland Coal and Pictured Cliffs reserves in this drill block is to downhole commingle production from both zones in this well.

It is proposed to complete the Pictured Cliffs formation and establish production. It is then proposed to set a bridge plug above the Pictured Cliffs, perforate and stimulate the Fruitland Coal, and test its production. The bridge plug will then be removed, and both zones produced 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, and only minimal amounts of similar water are produced in the offset wells. The shut-in pressures for the Pictured Cliffs and Fruitland Coal are **405** and **320** psi, respectively.

The allocation of the commingled production will be calculated using the attached allocation formula. This formula is based on offset Pictured Cliffs production performance (material balance) and volumetrics, and uses accepted Reservoir Engineering methods to allocate the Pictured Cliffs reserves. This addresses the Fruitland Coal producing characteristics of early life inclining production rates.

Approval of this commingling application will allow for the prevention of wasted resources and protection of correlative rights. The offset (Rhodes #101, SW/4 Sec. 30, T28N, R11W, has already received administrative approval NMOCD Order #R-9920). 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, pertinent data sheet, and an allocation formula.

Sincerely,

Arden L. Walker, Jr.
Regional Production Engineer

KAS:tg
Attachments

cc: Frank T. Chavez - NMOCD/Aztec

Pertinent Data Sheet - Rhodes C #100

Location: 805' FNL, 1055' FEL, Section 30, T28N, R11W, San Juan County, New Mexico

Field: Basin Fruitland Coal/West Kutz Pictured Cliffs **Elevation:** 5892' GL **TD:** 2026'
PBTD: 1992'

GWI: 100.00%
NRI: 82.50%

DP #: 36957A PC
DP #: 36957B FTC

Completed: N/A

Casing Record:

Hole Size	Csg Size	Wt. & Grade	Depth Set	Cement	Top/Cement
12 1/4"	8 5/8"	24.0# K-55	222'	160 sxs	Surface/Circ
7 7/8"	4 1/2"	10.5# K-55	2026'	553 sxs	Surface/Circ

Lead: 453 sxs Class B 65/35 POZ w/ 2% CaCl2, 6% gel, 5 lb/sxs Gilsonite, 1/4 lb/sx Flocele (811 cf).
Tail: 100 sxs Class B Neat w/ 2% CaCl2 (118 cf).

Tubing Record: N/A

Formation Tops:

Ojo Alamo:	624'
Kirtland:	695'
Fruitland:	1495'
Pictured Cliffs:	1760'

Logging Record: GR, Density/Neutron, Micro Log, Cyberlook/Coal, Mud Log

Spud Date: 6/29/93

Estimated Drilling Costs: $55,397

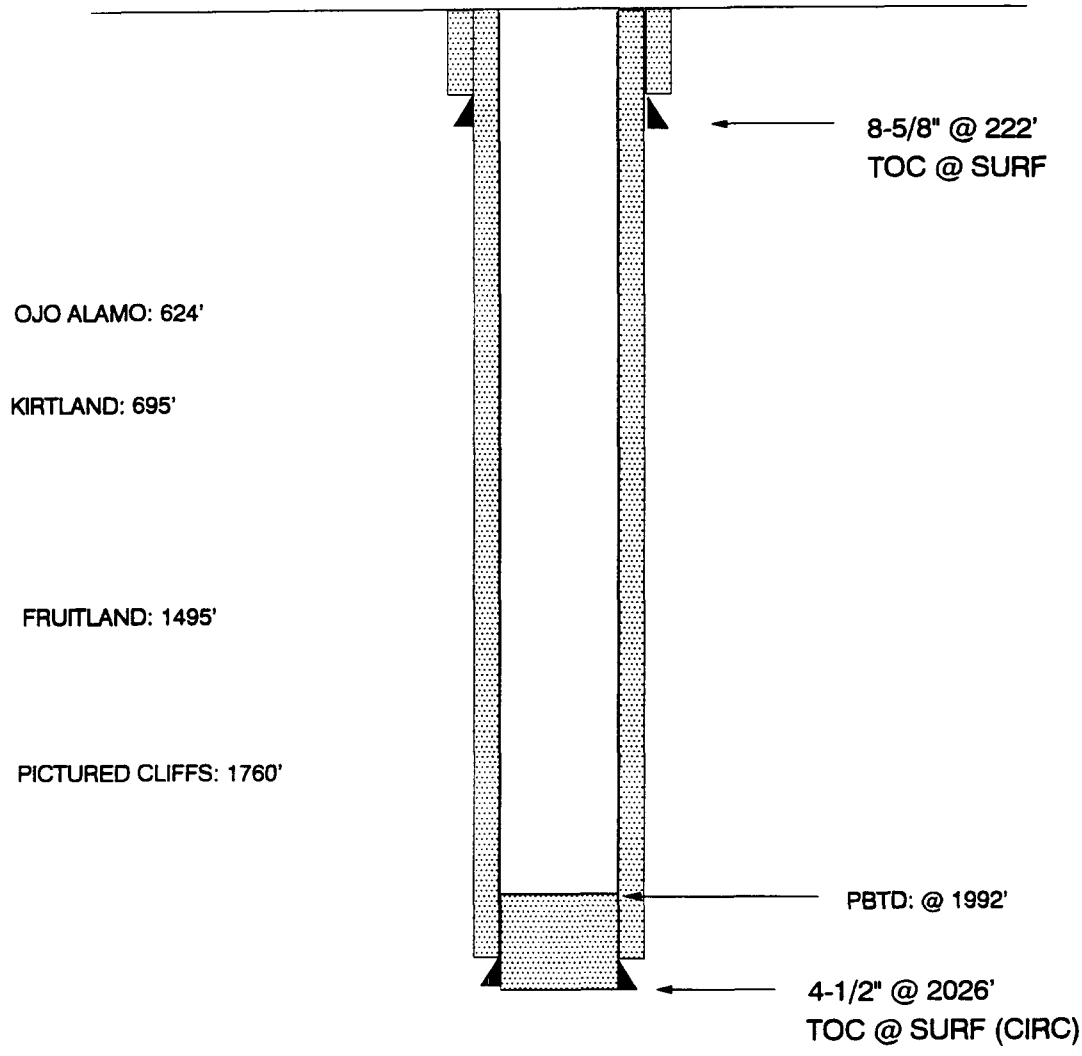
tdg/7-6-93

CURRENT

RHODES C #100

UNIT A SECTION 30 T28N R11W

SAN JUAN COUNTY, NEW MEXICO

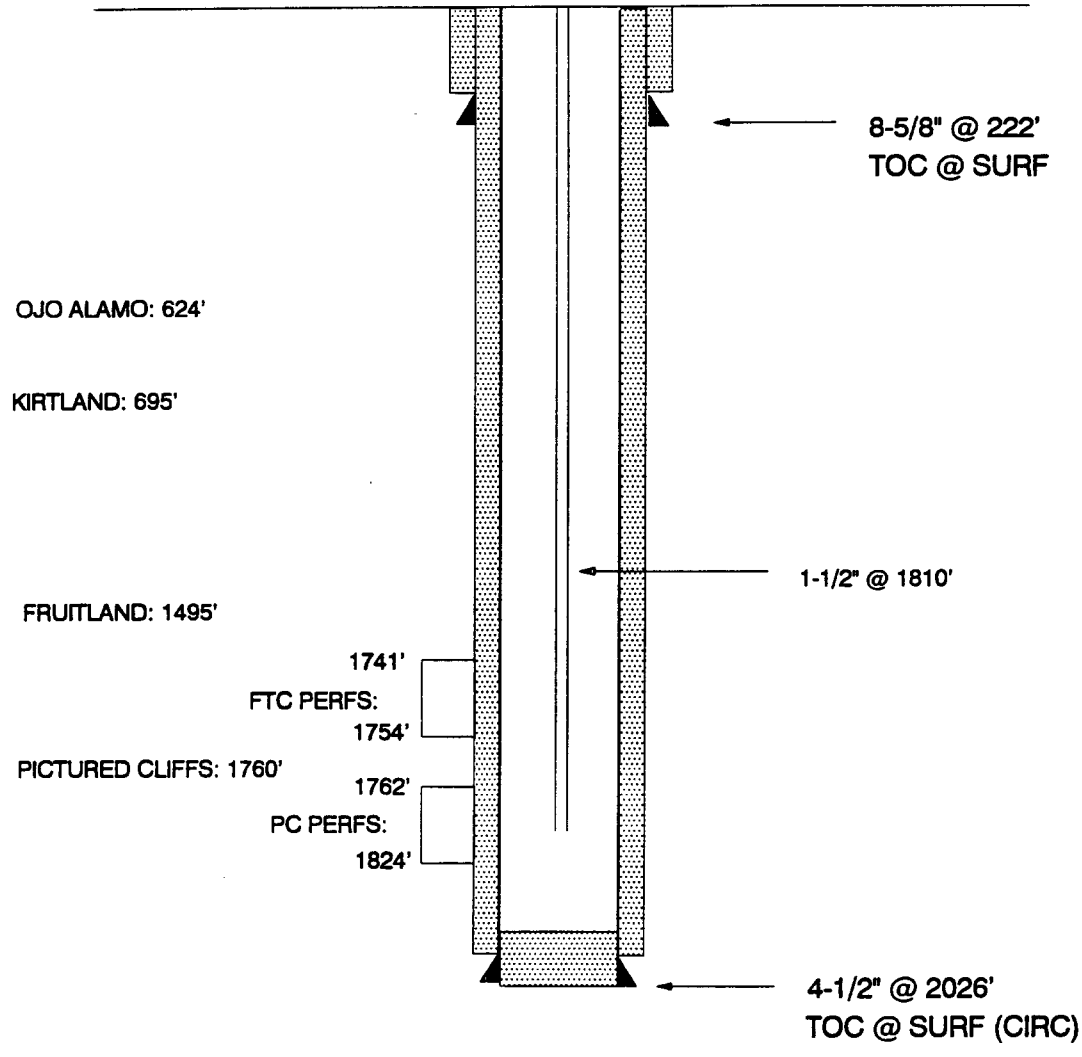


PROPOSED

RHODES C #100

UNIT A SECTION 30 T28N R11W

SAN JUAN COUNTY, NEW MEXICO



RHODES C #100

MONTHLY GAS PRODUCTION ALLOCATION FORMULA

GENERAL EQUATION

Qt = Qftc + Qpc

WHERE: Qt = TOTAL MONTHLY PRODUCTION (MCF/MONTH)

Qftc = FRUITLAND COAL (ftc) MONTHLY PRODUCTION
Qpc = PICTURED CLIFFS (pc) MONTHLY PRODUCTION (MCF/MONTH)

REARRANGING THE EQUATION TO SOLVE FOR Qftc:

Qftc = Qt - Qpc

ANY PRODUCTION RATE OVER WHAT IS CALCULATED FOR THE PICTURED CLIFFS (PC) USING THE APPLIED FORMULA IS FRUITLAND COAL (FTC) PRODUCTION.

PICTURED CLIFFS (PC) FORMATION PRODUCTION FORMULA IS:

Qpc = Qpci X e^{-(Dpc) X (t)}

WHERE: **Qpci** = INITIAL PC MONTHLY FLOW RATE (CALCULATED FROM FLOW TEST)

Dpc = PICTURED CLIFFS MONTHLY DECLINE RATE CALCULATED FROM:
Dpc = (Qpci-Qpcabd)/Np(pc)
See Determination of Qpci and PC Estimated Ultimate Recovery (Np(pc))
Qpcabd = 300 MCF/M

WHERE: **Np(pc)** = PICTURED CLIFFS ESTIMATED ULTIMATE RECOVERY (EUR)
Np(pc) = P X 1.06 MMCF/PSI X Rf**
P* = INITIAL RESERVOIR PRESSURE (SIBHP)
RF = RECOVERY (FIELD ANALOGY): = 0.85
** DETERMINED FROM MATERIAL BALANCE (FIELD ANALOGY) AND VOLUMETRIC RESERVES (LOG ANALYSIS)

By calculating Np(pc) from SIBHP and determining Qpci, Dpc can then be calculated utilizing the previously described parameters. See derivation of Dpc, item (c) on page 4.

THUS: **Qftc = Qt - Qpci X e^{-(Dpc) X (t)}**
WHERE: **(t) IS IN MONTHS**

REFERENCE: Thompson, R. S., and Wright, J. D., "Oil Property Evaluation", pages 5-2, 5-3, 5-4.

RHODES C #100

DETERMINATION OF Qpci:
(INITIAL PICTURED CLIFFS MONTHLY PRODUCTION)

$$Qpci = Qt(1) \times Qpc(p) / \{Qpc(p) + Qftc(p)\}$$

WHERE:

Qt(1) = FIRST MONTH TOTAL PRODUCTION (MCF)

Qpc(p) = FINAL PICTURED CLIFFS FLOW TEST (MCFPD)

Qftc(p) = FINAL FRUITLAND COAL FLOW TEST (MCFPD)

RHODES C #100

EXAMPLE DETERMINATION OF:

(a) Np(pc)	PC EUR
(b) Qpci	INITIAL PC MONTHLY FLOW RATE
(c) Dpc	PC MONTHLY DECLINE RATE

(a) DETERMINATION OF Np(pc)

(see page 5 for Np(pc) derivation)

Np(pc) = 1.06 (MMCF/PSI) X P*(PSI) X Rf

P* = 405 PSI (FROM SIBHP)

Np(pc) = 1.06 MMCF/PSI X 405 PSI X 0.85

Np(pc) = 366.5 MMCF

(b) DETERMINATION OF Qpci

Qpci = Qt(1) X {Qpc(p)/(Qpc(p) + Qftc(p))}

Qt(1) =	15,000 MCF	1ST MONTH TOTAL PRODUCTION
Qpc(p) =	500 MCF/D	PC FLOW TEST
Qftc(p) =	400 MCF/D	FTC FLOW TEST

Qpci = 15,000 MCF/M X {500 MCF/D/(500 MCF/D + 400 MCF/D)}

Qpci = 8,333 MCF/M

(c) DETERMINATION OF Dpc

Dpc = (Qpci - Qpcabd)/Np(pc)

Qpcabd = 300 MCF/M

Dpc =(8,333MCF/M - 300MCF/M)/(366,500MCF)

Dpc = 0.022/M

THUS: Qftc = Qt(MCF/M) - 8,333(MCF/M) X e^{-(0.022(1/M)) X t(M)}

RHODES C #100

A. DETERMINATION OF PC RESERVES Np(pc)= (HCPV X Bg X Rf)

Volumetric Evaluation (averages are for subject 160 acre drill block)

a.	(t)	thickness	=	50.0	ft
b.	(phi)	porosity	=	15.0	%
c.	(Sw)	H2O saturation	=	69.0	%
d.	(Rf)	Recovery Factor	=	85.0	%
e.	(rcf)	Reservoir Cubic Feet	@ reservoir conditions		
f.	(scf)	Standard Cubic Feet	@standard conditions		

1. HCPV = HYDROCARBON PORE VOLUME (rcf)

= t (ft) X a (ft^2) X phi X (1-Sw)
= 35 (ft) X 160 (acres) X 43,560 (ft^2/acre) X 0.15 X (1-0.55)
= 16,204,320 ft^3 1mmrcf = 1,000,000 ft^3

HCPV = 16.204 mmrcf

2. Bg = FORMATION VOLUME FACTOR (scf/rcf)

UTILIZING THE REAL GAS LAW TO DETERMINE THE FORMATION VOLUME FACTOR (Bg):

REAL GAS LAW states: P V = Z n R T

Rearranging to solve for n: n = P V / Z R T

assuming: **nr = ns**

WHERE: **nr** = NUMBER OF MOLES OF GAS AT RESERVOIR CONDITION

ns = NUMBER OF MOLES OF GAS AT SURFACE CONDITIONS

THUS: Pr Vr/ Zr Tr R = Ps Vs / Zs Ts R

Rearranging: Vs/Vr = Bg = Zs Ts Pr / Zr Tr Ps

assuming:

Zs	=	1.00	
Zr	=	0.94	
Ts	=	60 *F	or 520 *R
Tr	=	100 *F	or 560 *R
Ps	=	15.025 psia	
Pr	=	Determined from build-up test	

Bg = FORMATION VOLUME FACTOR (scf/rcf)= Zs Ts Pr / Zr Tr Ps

= (scf/rcf) {1.00 X 520 (*R) X Pr (psia)}/ {0.94 X 560 (*R) X 15.025 (psia)}

Bg = 0.0657 {scf/ (rcf psia)} X Pr (psia)

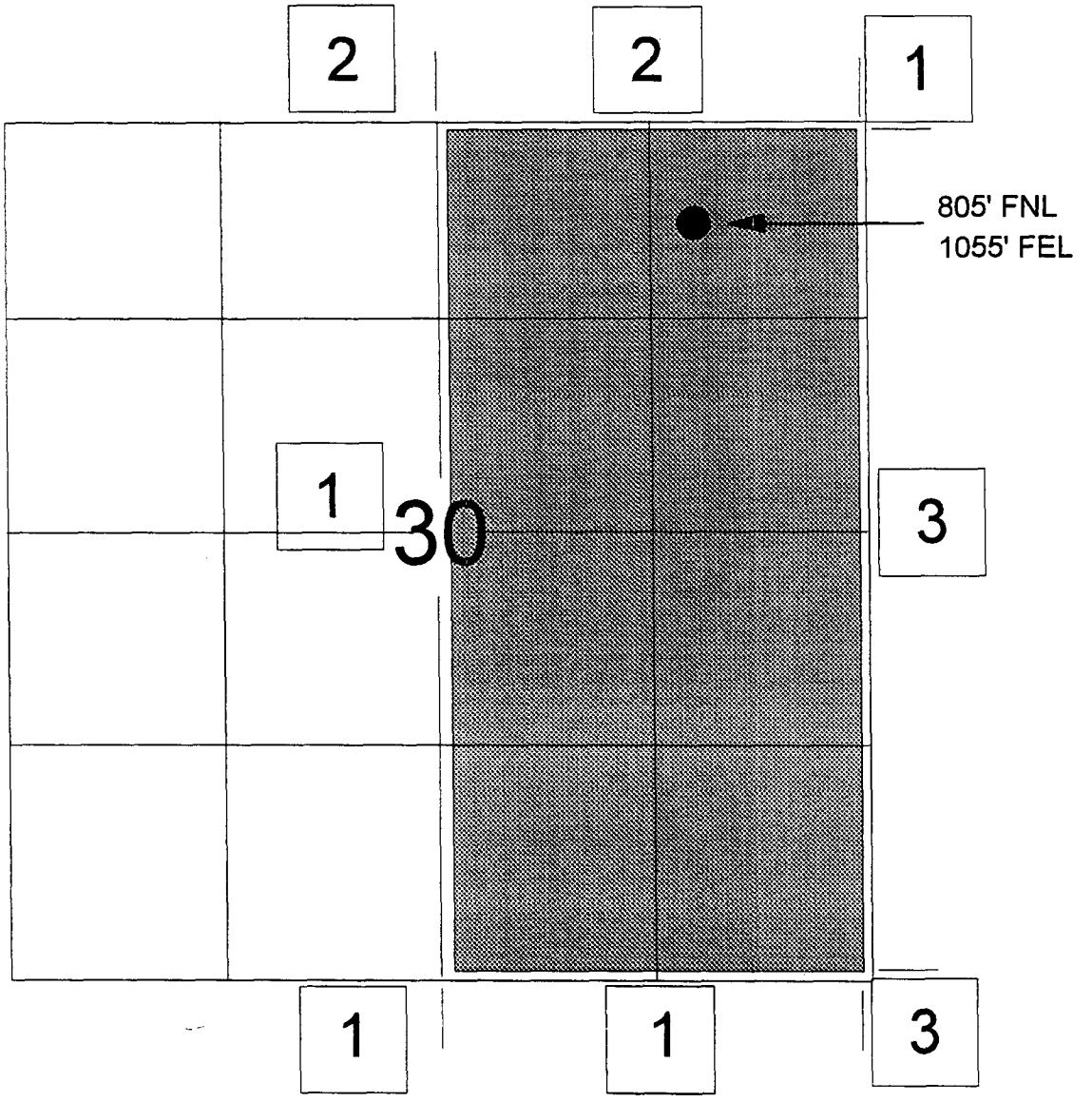
3. EUR = HCPV X Bg X Rf

= 16.204 (mmrcf) X 0.0657 {scf/(rcf psia)} X Pr (psia) X 0.85

Np(pc) = 1.06 (mmscf/psia) X Pr (psia) X 0.85

MERIDIAN OIL INC.

OFFSET OPERATOR\OWNER PLAT
Fruitland Coal\Pictured Cliffs Commingle
RHODES C #100
NE NE Section 30, T28N, R11W
San Juan County, New Mexico

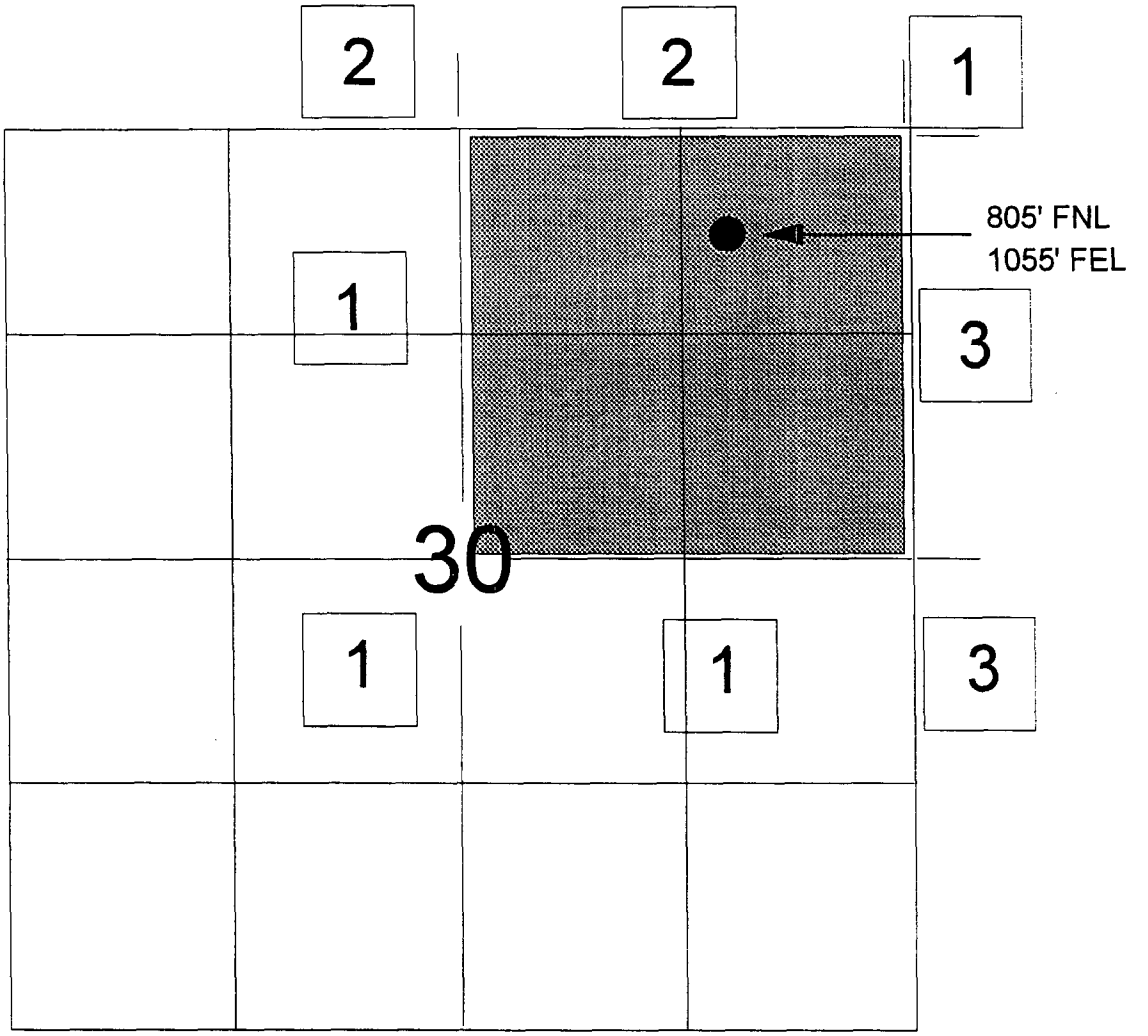


1) Meridian Oil Inc., P.O. Box 4289, Farmington, New Mexico 87499-4289
2) BHP Petroleum (Americas) Inc., 5847 San Felipe, Suite 3600, Houston, Texas 77057
3) R & G Drilling Company, Inc., P.O. Box 158, Thousand Palms, California 92276
   M & G Drilling Company, P.O. Box 2560, Palms Springs, California 92263

Fruitland Coal Formation

MERIDIAN OIL INC.

OFFSET OPERATOR\OWNER PLAT
Fruitland Coal\Pictured Cliffs Commingle
RHODES C #100
NE NE Section 30, T28N, R11W
San Juan County, New Mexico



1) Meridian Oil Inc., P.O. Box 4289, Farmington, New Mexico 87499-4289
2) BHP Petroleum (Americas) Inc., 5847 San Felipe, Suite 3600, Houston, Texas 77057
3) R & G Drilling Company, Inc., P.O. Box 158, Thousand Palms, California 92276
   M & G Drilling Company, P.O. Box 2560, Palms Springs, California 92263

Pictured Cliffs Formation

MERIDIAN OIL

August 19, 1993

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

RE: Rhodes C #100
Unit A, Section 30, T28N, R11W
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 Rhodes C #100 well located in Unit A, Section 30, T28N, R11W, N.M.P.M., San Juan County, New Mexico, in the Kutz Pictured Cliffs and the 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 this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,

Keith A. Swainson
Production Engineering

KAS/tg

The above downhole commingling request is hereby approved:

_____

Date: _____

MERIDIAN OIL

August 19, 1993

BHP Petroleum (Americas) Inc.
5847 San Felipe
Suite 3600
Houston, Texas 77057

RE: Rhodes C #100
Unit A, Section 30, T28N, R11W
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 Rhodes C #100 well located in Unit A, Section 30, T28N, R11W, N.M.P.M., San Juan County, New Mexico, in the Kutz Pictured Cliffs and the 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 this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,

Keith A. Swainson
Production Engineering

KAS/tg

The above downhole commingling request is hereby approved:

_____

Date: _____

MERIDIAN OIL

August 19, 1993

R & G Drilling Company, Inc.
P.O. Box 158
Thousand Palms, California 92276

RE: Rhodes C #100
Unit A, Section 30, T28N, R11W
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 Rhodes C #100 well located in Unit A, Section 30, T28N, R11W, N.M.P.M., San Juan County, New Mexico, in the Kutz Pictured Cliffs and the 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 this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,

Keith A. Swainson
Production Engineering

KAS/tg

The above downhole commingling request is hereby approved:

_____

Date: _____

MERIDIAN OIL

August 19, 1993

M & G Drilling Company, Inc.
P.O. Box 2560
Thousand Palms, California 92263

RE: Rhodes C #100
Unit A, Section 30, T28N, R11W
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 Rhodes C #100 well located in Unit A, Section 30, T28N, R11W, N.M.P.M., San Juan County, New Mexico, in the Kutz Pictured Cliffs and the 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 this letter and returning it to this office.

Your prompt attention to this matter would be appreciated.

Yours truly,

Keith A. Swainson
Production Engineering

KAS/tg

The above downhole commingling request is hereby approved:

_____

Date: _____