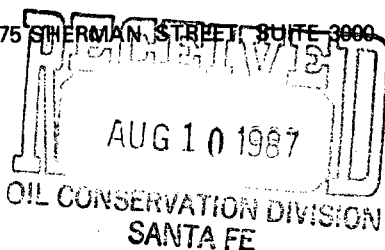




National Cooperative Refinery Association

1775 SHERMAN STREET, SUITE 3000 • DENVER, COLORADO 80203 • 303/861-4883



Crude Oil
Division
Office

July 29, 1987

New Mexico Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87504

RE: Commingling Application
Candado No. 21
Unit B, Sec 4, T26N-R7W
Rio Arriba County, New Mexico

Gentlemen:

National Cooperative Refinery Association requests administrative approval to downhole commingle production from the Blanco Mesaverde and the Otero Chacra in the subject well. The downhole commingling will be achieved by pulling both tubing strings and the packer. A single tubing string will be run to the Mesaverde and both the Chacra and the Mesaverde will produce through tubing.

The downhole commingling of the Candado No. 21 is necessary to improve the producing efficiency, and thereby prevent waste of the Mesaverde gas resources. Currently, the Mesaverde logs off every other day due to liquid loading and must be blown to the atmosphere to re-establish production. By commingling production downhole, the Chacra will provide additional gas production and aid the Mesaverde in unloading liquids from the wellbore. Subsurface and surface equipment installations can also be used to prevent waste if the well continues to log off. Such equipment cannot be used effectively with the current wellbore configuration.

The proposed commingling will not adversely effect either zone for the following reasons:

1. The bottom hole pressure of the Chacra is 63 percent of the Mesaverde bottom hole pressure based on a 5 day shut-in period.
2. Neither zone has a history of sensitivity to condensate or water and should not be damaged by the small amount produced.
3. Both zones produce gas with a similiar BTU content and commingling will not diminish the value of the commingled gas.

Mesaverde - 5058-5244
Chacra - 3764-3986

Commingling Application
July 29, 1987
Page 2

4. Both zones have common ownership.

In compliance with New Mexico Oil Conservation Division rule 303C, please find two copies of each of the following attachments:

1. Well location map showing acreage dedicated to well and ownership of offsetting leases.
2. Division Form C-116, 24-hour productivity test.
3. Production curve for the Mesaverde.
4. Production curve for the Chacra.
5. Bottom hole pressure for the Mesaverde.
6. Calculated bottom hole pressure for the Chacra.
7. Water analysis for the Mesaverde.*
8. Gas analysis for the Mesaverde.
9. Gas analysis for the Chacra.
10. Formula for the allocation of production for each commingled zone.
11. A copy of the letter sent to all offset operators notifying them of our intent to commingle.

* The Chacra formation does not produce any liquids in this well.

To allocate production to the individual Mesaverde and Chacra formations we recommend the following:

1. Allocate 63.4 percent gas production to the Mesaverde.
2. Allocate 36.6 percent gas production to the Chacra.

Commingling Application
July 29, 1987
Page 3

3. Allocate 100 percent condensate production to the Mesaverde.

Questions concerning this commingling application should be directed to the undersigned at (303) 861-4883.

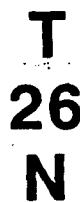
Sincerely,

A handwritten signature in cursive script, appearing to read "A.M. O'Hare".

A.M. O'Hare
Joint Operations Supervisor

MJB/bv1
enc

T
27
N



Rio Arriba County, New Mexico

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT

P.O. BOX 2028
SANTA FE, NEW MEXICO 87501

Form C-116
Revised 10-1-78

GAS-OIL RATIO TESTS

Operator		Pool		County											
National Cooperative Refinery Assd.		Blanco Mesaverde/Otero Chacra		Rio Arriba											
Address		1775 Sherman, Suite 300		Denver, CO 80203											
LEASE NAME	WELL NO.	LOCATION				DATE OF TEST	CHOKE SIZE	TBG. PRESS.	DAILY ALLOW-ABLE	LENGTH OF TEST HOURS	PROD. DURING TEST				GAS - OIL RATIO CU.FT./BBL
		U	S	T	R						WATER BBL'S	GRAV. OIL	OIL BBL'S	GAS M.C.F.	
Candado No. 21 Mesaverde	21	B	4	26N	7W	7/14/87		336		24	0	0.8	73	91,250	
Candado No. 21 Chacra	21	B	4	26N	7W	7/22/87		353		24	0	0	74		

No well will be assigned an allowable greater than the amount of oil produced on the official test.

During gas-oil ratio test, each well shall be produced at a rate not exceeding the top unit allowable for the pool in which well is located by more than 25 percent. Operator is encouraged to take advantage of this 25 percent tolerance in order that well can be assigned increased allowable when authorized by the Division.

Gas volumes must be reported in MCF measured at a pressure base of 15.025 psia and a temperature of 60° F. Specific gravity base will be 0.60.

Report casing pressure in lieu of tubing pressure for any well producing through casing.

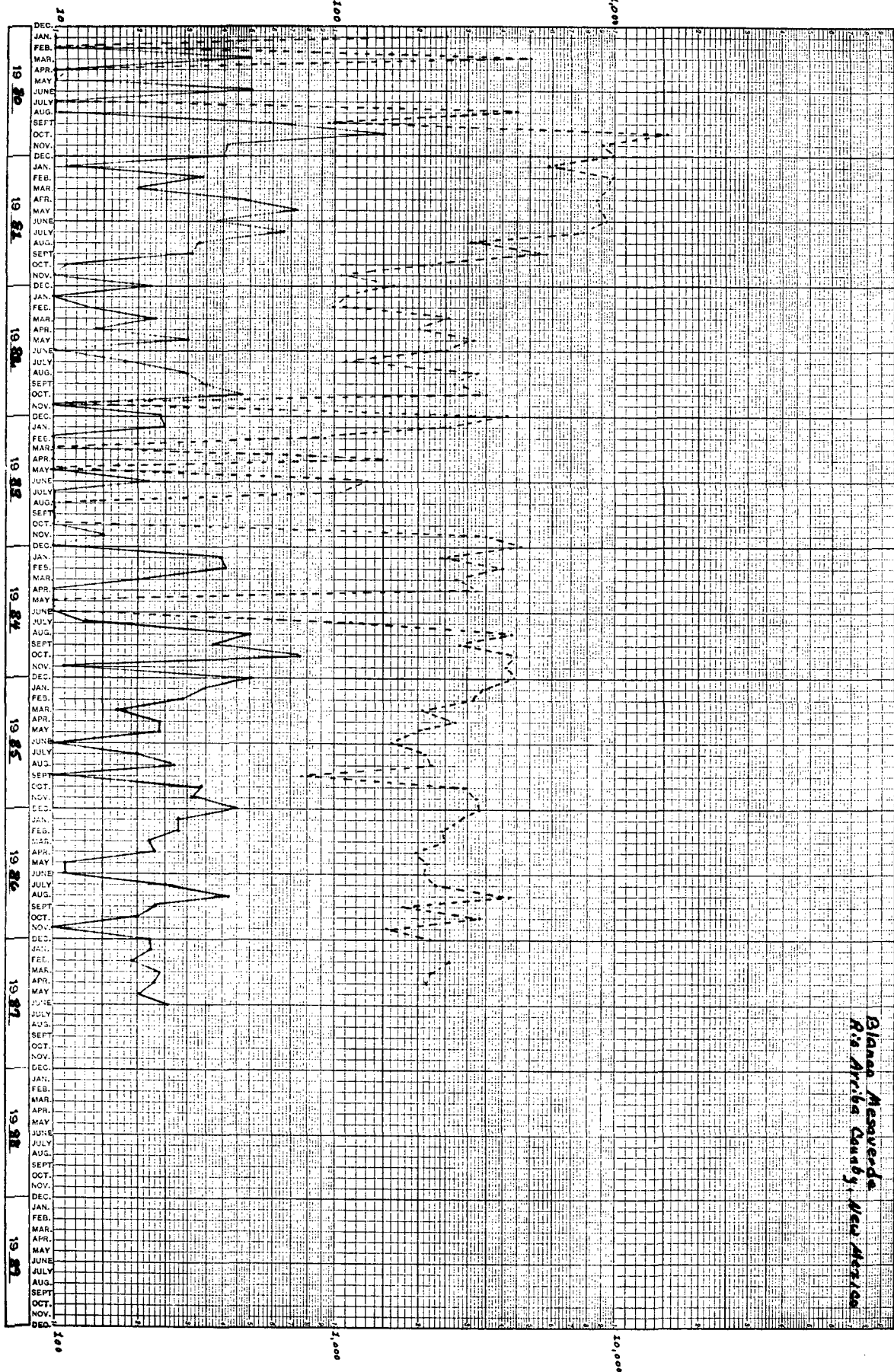
Mail original and one copy of this report to the district office of the New Mexico Oil Conservation Division in accordance with Rule 101 and appropriate pool rules.

I hereby certify that the above information is true and complete to the best of my knowledge and belief.

A.M. O'Hare
A.M. O'Hare (Signature)
Joint Operations Supervisor

(Title)

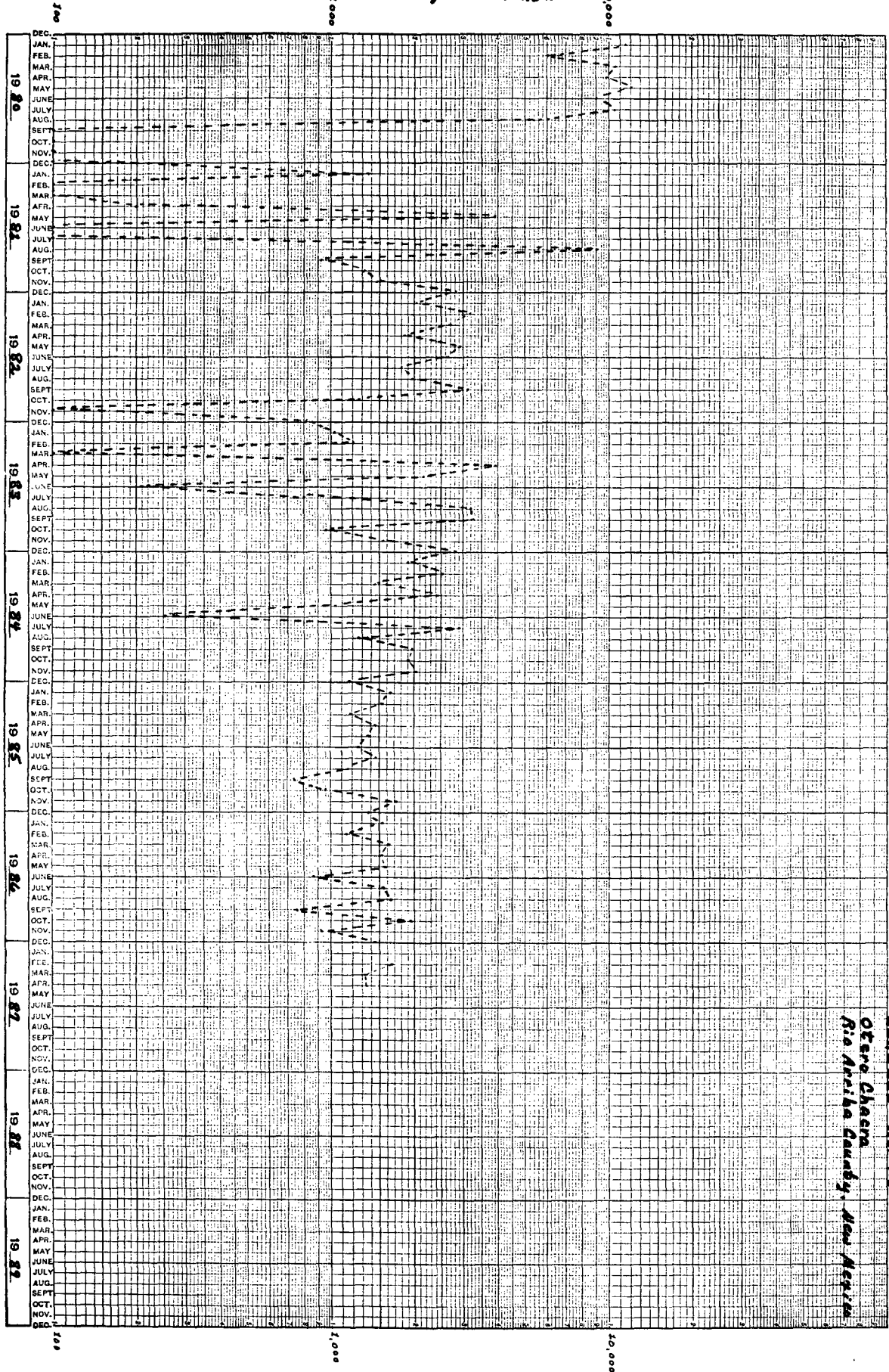
Condensate per Month



Condado No. 21
Blanco Mesurado
Rio Arriba County, New Mexico

MCF per Month

MCF per Month



Cadado No. 21
Otero Chama
Rio Arriba County, New Mexico

B & R SERVICE, INC.

P. O. Box 1048
Farmington, New Mexico 87499
(505) 325-2393

Company N.C.R.A. Lease CANADO Well #21
County RIO ARRIBA State NEW MEXICO Date 6-25-87
Shut-In _____ Zero Point G.L. Tbg. Pressure 529
Casing Pressure _____ Tbg. Depth _____ Casing Perf. _____
Max. Temp. _____ Fluid Level 4650'

<u>DEPTH</u>	<u>PSIG</u>	<u>GRADIENT</u>
0	529	----
3950	609	.020
5100	759	.130
5200	788	.290

CANDADO NO. 21

CHACRA BOTTOM HOLE PRESSURE CALCUALTION

Measured Surface Pressure, $P_s = 453 \text{ psig} = 467 \text{ psia}$

From Gas Analysis, Apparent Molecular Weight, $M_A = 20 \frac{\text{lbm}}{\text{lb}\cdot\text{mol}}$

Estimated Bottom Hole Temperature, $BHT = 110^\circ\text{F} = 570^\circ\text{R}$

Surface Temperature, $T_s = 60^\circ\text{F} = 520^\circ\text{R}$

$$\bar{T} = \frac{BHT + T_s}{2} = \frac{570^\circ\text{R} + 520^\circ\text{R}}{2} = 545^\circ\text{R}$$

Assume BHP = 513 psia, $P = \frac{467 + 513 \text{ psia}}{2} = 490 \text{ psia}$

$$\rho = \frac{\bar{P}}{\bar{T}} \frac{M_A}{R} = 490 \text{ psia} \cdot 20 \frac{\text{lbm}}{\text{lb}\cdot\text{mol}} \cdot \frac{1}{545^\circ\text{R} \cdot 10.73 \frac{\text{psia}\cdot\text{ft}^3}{\text{lb}\cdot\text{mol}\cdot^\circ\text{R}}} = 1.676 \frac{\text{lb}}{\text{ft}^3}$$

$$BHP = P_s + \text{depth} (\rho) = 467 \text{ psia} + 3950 \text{ ft} \left(1.676 \frac{\text{lb}}{\text{ft}^3} \right) \frac{1 \text{ ft}^2}{144 \text{ in}^2} =$$

$$BHP = 512.9 \text{ psia} \approx 513 \text{ psia}$$

$$BHP = 513 \text{ psia} = 499 \text{ psig}$$

Company: N. C. R. A
Address:
Attention: MIKE BARNES
Date Sampled: 3-22-87

Report No: 1
Date: 3-23-7
County: SAN JUAN
Field: BLANCO
Formation: MESA VERDE
Lease: CANDADO
Well: 21

WATER ANALYSIS

Specific Grav:	1.000	pH:	6.50
Chloride:	2,899 mg/l	Calcium:	60 mg/l
Bicarbonate:	61 mg/l	Magnesium:	12 mg/l
Sulfate:	0.	Total Iron:	0.
Sulfide:	0.	Sodium:	1,810 mg/l
Total Hardness		Total Dissolved	
(as CaCO ₃):	200 mg/l	Solids:	4,843 mg/l
Resistivity:	2.70	Ohm Meters @:	60 F
Potassium:	0.	Carbonate:	N D

Sample Source:

Remarks:

Analyst: M. CONREY
Smith Representative: M. CONREY

06-05-87

EL PASO NATURAL GAS COMPANY
MEASUREMENT DEPARTMENT
POST OFFICE BOX 1492
EL PASO, TEXAS 79978

MAILEE
04920

CHROMATOGRAPHIC GAS ANALYSIS REPORT

NATIONAL CO-OP REFINERY ASSN
1775 SHERMAN ST. SUITE 3000
DENVER, CO 80203

ANAL DATE 00-00-00

METER STATION NAME
CANDADO #21 MV

METER STA 90720
OPER 6311

TYPE CODE	SAMPLE DATE	EFF. DATE	USE MOS	H2S GRAINS	LOCATION
00 ***	04-16-87	04-28-87	06	0	4 F 13

	NORMAL MOL%	GPM
CO2	.38	.000
H2S	.00	.000
N2	2.73	.000
METHANE	78.23	.000
ETHANE	7.69	2.057
PROPANE	5.44	1.499
ISO-BUTANE	1.69	.553
NORM-BUTANE	1.65	.520
ISO-PENTANE	.86	.315
NORM-PENTANE	.56	.203
HEXANE PLUS	.77	.335
	100.00	5.482

SPECIFIC GRAVITY .758

MIXTURE HEATING VALUE
(BTU/CF @14.73 PSIA, 60 DEGREES, DRY) 1276

RATIO OF SPECIFIC HEATS 1.279

NO TEST SECURED FOR H2S CONTENT

*** TYPE CODE EXPLANATION SINGLE METER ANALYSIS

GXC

06-05-87

EL PASO NATURAL GAS COMPANY
MEASUREMENT DEPARTMENT
POST OFFICE BOX 1492
EL PASO, TEXAS 79978

MAILEE
04920

CHROMATOGRAPHIC GAS ANALYSIS REPORT

NATIONAL CO-OP REFINERY ASSN
1775 SHERMAN ST. SUITE 3000
DENVER, CO 80203

ANAL DATE 00-00-00

METER STATION NAME
CANDADO #21 CH

METER STA 90723
OPER 6311

TYPE CODE	SAMPLE DATE	EFF. DATE	USE MOS	H2S GRAINS	LOCATION
00 ***	04-16-87	04-28-87	06	0	4 F 13

	NORMAL MOL%	GPM
CO2	.36	.000
H2S	.00	.000
N2	1.03	.000
METHANE	82.82	.000
ETHANE	8.32	2.226
PROPANE	4.54	1.251
ISO-BUTANE	.80	.262
NORM-BUTANE	1.17	.369
ISO-PENTANE	.38	.139
NORM-PENTANE	.28	.101
HEXANE PLUS	.30	.130
	100.00	4.478

SPECIFIC GRAVITY .697

MIXTURE HEATING VALUE
(BTU/CF @14.73 PSIA, 60 DEGREES, DRY) 1210

RATIO OF SPECIFIC HEATS 1.284

NO TEST SECURED FOR H2S CONTENT

*** TYPE CODE EXPLANATION SINGLE METER ANALYSIS

GXC

ALLOCATION FORMULA

The recommended allocation of production back to the Chacra and Mesaverde formations is based on the percentage of gas historically produced from each formation to the total amount of gas produced from the wellbore.

The established production declines were extrapolated to mid-year 1987. The monthly values from that point were individually divided by the sum of the values and multiplied by 100 to get the percentage production for each formation. This procedure is outlined arithmetically below.

$$\text{Chacra Allocation} = \frac{\text{Chacra Production}}{\text{Chacra} + \text{Mesaverde Prod. combined}} \times 100$$

$$\text{Mesaverde Allocation} = \frac{\text{Mesaverde Production}}{\text{Chacara} + \text{Mesaverde Prod. combined}} \times 100$$



National Cooperative Refinery Association

1775 SHERMAN STREET, SUITE 3000 • DENVER, COLORADO 80203 • 303/861-4883

*Crude Oil
Division
Office*

July 29, 1987

Offset Operators

RE: Candado #21
Section 4, T26N-R7W
Rio Arriba County, NM

Gentlemen:

National Cooperative Refinery Association is applying to the New Mexico Oil Conservation Division pursuant to NMOCD Rule 303C for administrative approval to commingle production from the Mesaverde and Chacra zones in the subject well. If you have no objections to this application we ask that you sign and return one copy of the enclosed Waiver of Objection to the NMOCD in the envelope provided.

Please contact the undersigned at (303)861-4883 if you have any questions pertaining to this application.

Sincerely,

A.M. O'Hare
Joint Operations Supervisor

/bvl
enc



National Cooperative Refinery Association

1775 SHERMAN STREET, SUITE 3000 • DENVER, COLORADO 80203 • 303/861-4883

*Crude Oil
Division
Office*

WAIVER OF OBJECTION

The undersigned, as an offset operator to National Cooperative Refinery Association's dual Mesaverde/Chacra producer known as Candado No. 21 and located in Unit B, Section 4, T26N, R7W, Rio Arriba County, New Mexico, does hereby waive any and all objections to NCRA's application for downhole commingling of the above specified well.

By: _____

Name(print): _____

Title: _____

Firm: _____

Date: _____

8/3/87

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

SUBMIT IN TRIPLICATE*
(Other instructions on re-
verse side)

Form approved.
Budget Bureau No. 1004-0135
Expires August 31, 1985

5. LEASE DESIGNATION AND SERIAL NO.
SF-079161

6. IF INDIAN, ALLOTTEE OR TRIBE NAME

7. UNIT AGREEMENT NAME

8. FARM OR LEASE NAME

Candado

9. WELL NO.

21

10. FIELD AND POOL, OR WILDCAT
Blanco Mesa Verde-
Otero Chacra

11. SEC., T., R., M., OR BLK. AND
SURVEY OR AREA

Sec 4, T26N-R7W

14. PERMIT NO.

15. ELEVATIONS (Show whether DF, RT, GR, etc.)

12. COUNTY OR PARISH
Rio Arriba

13. STATE
NM

13. Check Appropriate Box To Indicate Nature of Notice, Report, or Other Data

NOTICE OF INTENTION TO:

TEST WATER SHUT-OFF

☐
☐
☐
☐

PULL OR ALTER CASING

☐
☐
☐
☐

FRACTURE TREAT

MULTIPLE COMPLETE

SHOOT OR ACIDIZE

ABANDON*

REPAIR WELL

CHANGE PLANS

(Other)

Comingling Well

☒

SUBSEQUENT REPORT OF:

WATER SHUT-OFF

☐
☐
☐

REPAIRING WELL

☐
☐
☐

FRACTURE TREATMENT

ALTERING CASING

SHOOTING OR ACIDIZING

ABANDONMENT*

(Other)

(NOTE: Report results of multiple completion on Well
Completion or Recompletion Report and Log form.)

17. DESCRIBE PROPOSED OR COMPLETED OPERATIONS (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work. If well is directionally drilled, give subsurface locations and measured and true vertical depths for all markers and zones pertinent to this work.)*

It is our intention to seek administration approval for downhole comingling of the Mesa Verde and Chacra Zones in this well from New Mexico Oil Conservation Division.

18. I hereby certify that the foregoing is true and correct

SIGNED J. M. O'Hare

TITLE Jt. Operations Supervisor DATE 8-8-87

(This space for Federal or State office use)

APPROVED BY _____
CONDITIONS OF APPROVAL, IF ANY:

TITLE _____

DATE _____

*See Instructions on Reverse Side



National Cooperative Refinery Association

1775 SHERMAN STREET, SUITE 3000 • DENVER, COLORADO 80203 • 303/861-4883

*Crude Oil
Division
Office*

August 27, 1987

State of New Mexico
Oil and Gas Conservation Commission
Box 2088
Sante Fe, New Mexico 87501-2088

RE: Candado Wells
Rio Arriba, NM

Gentlemen:

Enclosed please find the signed Waiver of Objection covering each of the Candado wells for which Southern Union is an offset operator.

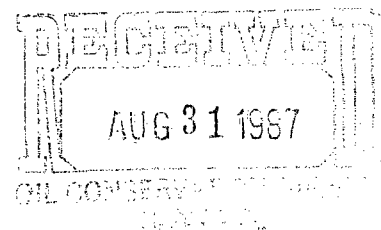
These Waiver of Objection's were inadvertantly returned to us and are being forwarded to you in order to obtain permission to commingle production in the wells specified.

If you have any questions, please contact the undersigned at (303) 861-4883. Thank you.

Sincerely,

Becky Van Lewen
Production Secretary

BVL/bms
enc





National Cooperative Refinery Association

1775 SHERMAN STREET, SUITE 3000 • DENVER, COLORADO 80203 • 303/861-4883

Crude Oil
Division
Office

WAIVER OF OBJECTION

The undersigned, as an offset operator to National Cooperative Refinery Association's dual Mesaverde/Chacra producer known as Candado No. 21 and located in Unit B, Section 4, T26N, R7W, Rio Arriba County, New Mexico, does hereby waive any and all objections to NCRA's application for downhole commingling of the above specified well.

By: Lon H. Rader
Name(print): Lon H. Rader
Title: Casper District Oper. Manager.
Firm: UNION OIL CO. OF CALIFORNIA
Date: 9-1-87

8/3/87



National Cooperative Refinery Association

1775 SHERMAN STREET, SUITE 3000 • DENVER, COLORADO 80203 • 303/861-4883

Crude Oil
Division
Office

WAIVER OF OBJECTION

The undersigned, as an offset operator to National Cooperative Refinery Association's dual Mesaverde/Chacra producer known as Candado No. 21 and located in Unit B, Section 4, T26N, R7W, Rio Arriba County, New Mexico, does hereby waive any and all objections to NCRA's application for downhole commingling of the above specified well.

By Clyde E. Phillips

Name(print): Clyde E. Phillips

Title: District Superintendent

Firm: Ladd Petroleum Corporation

Date: 8-17-87

8/3/87



National Cooperative Refinery Association

1775 SHERMAN STREET, SUITE 3000 • DENVER, COLORADO 80203 • 303/861-4883

Crude Oil
Division
Office

WAIVER OF OBJECTION

The undersigned, as an offset operator to National Cooperative Refinery Association's dual Mesaverde/Chacra producer known as Candado No. 21 and located in Unit B, Section 4, T26N, R7W, Rio Arriba County, New Mexico, does hereby waive any and all objections to NCRA's application for downhole commingling of the above specified well.

By: G. F. Reiger
Name(print): G. F. REIGER
Title: Mgr. Outside Ops
Firm: DEPCO, INC
Date: 8-20-87

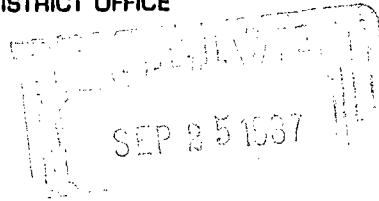
8/3/87



STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
AZTEC DISTRICT OFFICE

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

OIL CONSERVATION DIVISION
BOX 2088
SANTA FE, NEW MEXICO 87501



DATE 9-18-87

RE: Proposed MC _____
Proposed DHC X _____
Proposed NSL _____
Proposed SWD _____
Proposed WFX _____
Proposed PMX _____

Gentlemen:

I have examined the application dated 9-15-87
for the National Cooperative Refining Assoc. Candidate #21 B-4-26N-7W
Operator Lease and Well No. Unit, S-T-R

and my recommendations are as follows:

Approve with an allocation of 63% to
the N.C.R. 37% to the Chasco

Yours truly,

Em Busch