# Case No.

# 5994

Application, Transcripts,

Small Exhibits, Etc.

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Blackword + Nichola

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[exhibit 1]

APPLICATION FOR APPROVAL
OF
DEFINITION OF "MESAVERDE"
AS USED IN DESIGNATION OF
MESAVERDE PARTICIPATING AREA
FOR

THE NORTHEAST BLANCO UNIT, I-SEC. NO. 929
SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO
AND IN SUBSEQUENT ENLARGEMENTS THEREOF

TO: The Director of The United States Geological Survey Roswell, New Mexico

Commissioner of Public Lands State of New Mexico Santa Fe, New Mexico

Oil Conservation Commission State of New Mexico Santa Fe, New Mexico BEFORE THE OIL CONSERVATION COMMISSION
Senta Fe, Is an Abaxica
Case No. 5994 Estate No. 1
Submitted by 8 + N
Hearing Date 1/-10-77

Pursuant to the provisions of Section 11 of the Unit Agreement approved by the Director of the Geological Survey on April 16, 1952, by the Commissioner of Public Lands of the State of New Mexico on October 23, 1951, and by the Oil Conservation Commission of the State of New Mexico on October 31, 1951, and pursuant to a resolution duly adopted by the Advisory Committee under the Unit Operating Agreement under Unit Agreement for the Development and Operation of the Northeast Blanco Unit Area, San Juan and Rio Arriba Counties, New Mexico, Blackwood & Nichols Company, as Unit Operator, hereby submits for your approval a definition of the term "Magaverde" as used in the Application for Approval of Mesaverde Participating Area for the Northeast Blanco Unit, I-Sec. No. 929, San Juan and Rio Arriba Counties, New Mexico, and in subsequent enlargements thereof. In support of this Application, Operator states as follows:

1. The Application for Approval of Mesaverdo Participating Area was approved by the Geological Survey on Movember 20, 1952. The original Participating Area was subsequently enlarged five times, with your approval, so that the Mesaverde Participating Area now covers the entire Unit Area. In the original Application and in subsequent enlargements, the term "Mesaverde" was used, and was sometimes followed by the term "zona," "formation," "horizon," "group," or the like, but was never otherwise defined.

- 2. Pursuant to the Plan of Development for 1976, on June 26, 1976, the Unit Operator commenced drilling of its Northeast Blanco Well No. 64 located in the SE/4 of Section 24. Township 30 North. Range 8 West. Rio Arriba County, New Mexico. The well was drilled for the purpose of protecting against drainage from the traditional producing intervals; however, the Operator encountered gas production at a level above the traditional producing interval. The details of the drilling and completion of this well are set forth on Exhibit "A", "Geological and Engineering Memorandum." After the completion of the well, Tenneco Oil Company and Continental Oil Company, owners of the lease upon which this well was drilled, took the position that the production encountered in the well was not within the vertical limits of the Mesaverde Participating Area.
- 3. In view of the questions which had been raised concerning the vertical extent of the Participating Area, the Advisory Committee under the Unit Operating Agreement met on October 12, 1976, for purposes of considering the matter, and other Unit business, pursuant to the Advisory Committee's duty under Section 6 of the Unit Operating Agreement to approve or disapprove any Participating Area or amendments thereof. In that meeting, the Advisory Committee duly adopted the definition of "Mesaverde" set forth in the Geological and Engineering Memorandum. The Unit owners, and their respective interests, voting in favor of the adoption of the definition were as follows:

 Amoco Production Company
 .32975933

 Blackwood & Nichols Co., Ltd.
 .29805862

 Jacqulyn M. Williams
 .00260911

 Westland Oil Davelopment Corp.
 .64940399

 Total
 .67983705

Those voting not to adopt the definition were as follows:

El Paso Natural Gas Company .21199416
Tenneco Oil Company .01440596
Continental Oil Company .01440595
Total .24080607

Mr. F. G. Blackwood was authorized by letter to represent the .00492448 Thayer H. Laurie and .00310743 T. H. Laurie and D. N. Mills, Tr. interests; although not present at the meeting due to illness has approved the definition of Mesaverde as presented by the Advisory Committee. This makes the total authorized approval .68786896.

Continental Oil Company has not yet furnished written authority for their .01440595 "no" vote. Therefore the authorized "no" vote is .22640012.

The definition therefore was adopted by the required affirmative vote of 65% of the voting power of the Advisory Committee, as provided in Section 5 of the Unit Operating Agreement.

4. The Geological and Engineering Memorandum discusses evidence that the accumulation found in the No. 64 Well is part of the same accumulation found in the traditional producing interval. The Memorandum also points out that the definition of Mesaverde adopted by the Advisory Committee is consistent with that term as used in geologic literature dating back to the creation of the Unit.

The Operator respectfully requests that the Director, the Commissioner and the Commission approve this Application.

DATED this 15th day of November, 1976.

BLACKWOOD & NICHOLS COMPANY

General Partner

OPERATOR

STATE OF OKLAHOMA	)	
	)	SS
COUNTY OF OKTAHOMA	)	

Before me, the undersigned, a notary public in and for said County and State, on the 15th day of November, 1976, personally appeared F. G. Blackwood , General Partner of Blackwood & Michols Company, a General Partnership, to me known to be the identical person who avocated the minimum of the control of the control of the minimum of the control of person who executed the within and foregoing instrument on behalf of the partnership.

FUBLIC TEST OCTOBER 12, 1980

, c. <del>. .</del> .

Notary/Rublic

## EXHIBIT "A" NORTHEAST BLANCO UNIT, I-SEC. NO. 929 SAN JUAN AND RIO ARRIBA COUNTIES, NEW MEXICO SIXTH ENLARGED PARTICIPATING AREA

#### GEOLOGICAL AND ENGINEERING MEMORANDUM

Northeast Blanco Well #64 (originally called 105A) was completed on July 10, 1976, with an open flow potential of 9,900 MCF per day. The well is located in the SE/4 of Section 24-T30N-R8W Rio Arriba County, New Mexico.

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Well #64 (105A) is completed in open hole from 4,252' to 4,278' in a fractured sand and shale portion of the Mesaverde group above the top of the "Massive Sandstone Member" of the Cliff House sandstone. As the well was being drilled from 4,258' to 4,262' the well started making gas and the 4' interval was penetrated in two minutes. A copy of the Totco time vs. depth chart for this section is attached. The drill pipe was raised off bottom and the rams were closed. The shut in pressure rose to 550 psig in 15 minutes. The valve was opened allowing gas to flow up the drill pipe and the gas flow rate estimated by use of a pitot tube at 15,000 MCF per day. The valve was closed and an immediate shut in pressure of 550 psig was recorded.

The well was killed with 200 bbls of 35 vis. gel-water, and  $4\ 1/2\ K-55\ 10.5\%$  ST & C casing was run to 4,252.

A Lynes external casing to formation packer was set @ 4,119' and 50 sacks of class B cement with 2% CaCl<sub>2</sub> was pumped thru a stage collar at 4,085', plug down at 12:30 p.m. July 8, 1976. On July 10 the hole was drilled out and deepened to 4,278'. The well began blowing gas at 4,251' and upon reaching 4,278' (T.D.) was allowed to blow to clean up for 10 hrs. After nippling up the tree the tubing was perforated with 10, 3/8" holes from 4,240'-4,245'. A shut in csg. pressure of 640 psig and a shut in tbg pressure of 640 psig was recorded July 12, 1976 along with a AOF of 9,900 MCFPD. The well has been connected to El Paso Natural Gas Company's line and is shut in at present.

On August ?, 1976, Blackwood and Nichols filed Well Completion

Forms (9-330) and Request for Allowable Forms (C-104). These forms were

returned approved but with the Pool or Field name changed from Blanco

Mesaverde to Chacra Undesignated Unit. However, the 4,252' to 4,278' inter
val in Well #64 (105A) does not correlate with any designated producing

reservoir in the San Juan Basin. This interval is approximately 500'

above the top of the "Massive Sandstone Member" of the Cliff House and 250'

below the Chacra producing interval as recognized in the area.

We believe that any gas which might be produced from the #64 (105A) well would be gas which was originally in the Massive Cliff House or deeper beds and has migrated to a higher level in this very small area for the following reasons:

- 1. The measured <u>surface pressure</u> of 640 psig which is <u>correlative</u> with newly completed Mesaverde wells in the area, and the nearby producing well #2-43. If this were a new reservoir the pressure should be much higher.
- Q 2. When the offset wells were drilled they did not encounter gas in this interval.
- $\mathbb{Q}$  3. The chemical characteristics of the gas from Well #64 (105A) and offsetting Mesaverde wells are very similar as shown in the attached gas analyses.
- Q4. The very high natural flow rates are not usual in normal unfractured reservoirs,
  - -5, The high penetracion rate of the 4,250-4,262' interval.

#### Definition of Mesaverde

The completion of a gas well in a fractured sand and shale zona which is approximately 500' above the top of the "Massive Cliff House sandstone" has brought about the need to define the term Mesaverde insofar as the Northeast Blanco Unit I-Sec. 929 is concerned. The Advisory Committee of the Northeast Blanco Unit met October 12, 1976 and passed a Resolution defining Mesaverde as follows:

"RESOLVED, that the term "Mesaverde" as used in the "Application for Approval of Mesaverde Participating Area for the Northeast Blanco Unit,

I-Sec. No. 929, San Juan and Rio Arriba Counties, New Mexico", and in subsequent applications for enlargements thereof (and sometimes followed by the term "Zone", "Formation", "Horizon" or the like), all such applications duly approved by the Director of the United States Geological Survey, the Commissioner of Public Lands, State of New Mexico and the Oil Conservation Commission, State of New Mexico, is hereby defined as the stratigraphic equivalent of the interval between (i) the base of the Green Shale Marker, which occurs at a depth of 4,054 feet on the Gamma Ray-Neutron Log, dated May 31, 1957, of the Blackwood & Nichols Northeast Blanco Unit No. 34-19 Well, Section 19, Township 30 North, Range 7 West, Rio Arriba County, New Mexico, and (ii) 300 feet below the base of the Point Lookout Formation, which base occurs at a depth of 5,565 feet on the log of the foregoing well." A copy of the above referred to log is attached.

This definition is to apply to the Northeast Blanco Unit only and has no effect on any area outside the area of the Northeast Blanco Unit.

This definition will allow a reasonable and prudent development and production of hydrocarbons from the Mesaverde group. It will allow for and encourage drilling 300' below the base of the Massive Sandstone member of the Point Lookout portion of the Mesaverde group to search for an elusive, seldom present oil accumulation which could not economically be tested if a definition which limited the interval to the base of the Massive Sandstone member of the Point Lookout were adopted.

This definition also protects the ownership of presently developed Meseverda reservoirs from thieving by fractures, atc., to intervals above the Massive Cliff House sandstone of the Meseverde group. We believe the gas which would be produced from the #64 (105A) well is actually gas from the currently producing Meseverde reservoir of the Northeast Blanco Unit which has migrated 500° above the Cliff House sandstone, as enumerated.

The published literature on the Mesaverde group in the San Juan Basin supports the definition adopted by the Northeast Blanco Unit Advisory Committee.

In the "Guidebook of the San Juan Basin New Mexico and Colorado" published by the New Mexico Geological Society November, 1950, a paper by Caswell Silver "The Occurrence of Gas in Cretaceous Rocks of the San Juan

Basin New Mexico and Colorado" shows clearly that the Mesaverde group is not limited to the "Massive Sandstone Members" of the Point Lookout or Cliff House. A cross section Figure 1, shows that benches of the Point Lookout extend 200'-500' below the "Massive Sandstone Member". Benches also extend 600'-800' above the top of the "Massive Sandstone Member" of the Cliff House. In A.A.P.G. Bulletin Vol. 40, No. 9, September, 1956, a paper by Beaumont, Dane and Sears, of the U.S.G.S., entitled "Revised Nomenclature of Mesaverde Group, San Juan Basin on page 2159 states that "In view of the continuity of the massive sandstone unit through this area the name Cliff House sandstone of the Mesaverde group will replace Chacra sandstone member throughout the former extent of that unit."

In U.S.G.S. Professional Paper 400-B 1960, entitled "New Information on the Areal Extent of Some Upper Cretaceous Units in North-western New Mexico", C. H. Dane refers to "The Hosta sandstone, a lower tongue of the Point Lookout sandstone of the Mesaverde Group." This points out the problem with limiting the lower limits to the base of the thick easily identified thick "Massive Sandstone Member" of Point Lookout Sandstone.

A cross section reproduced from A.A.P.G. Bulletin, Vol. 44, No. 1, 1960, "Upper Cretaceous Stratigraphy, Rocky Mountains" by R. J. Weimer is shown below which illustrates the continuity of deposition and transgressive/regressive relationship.

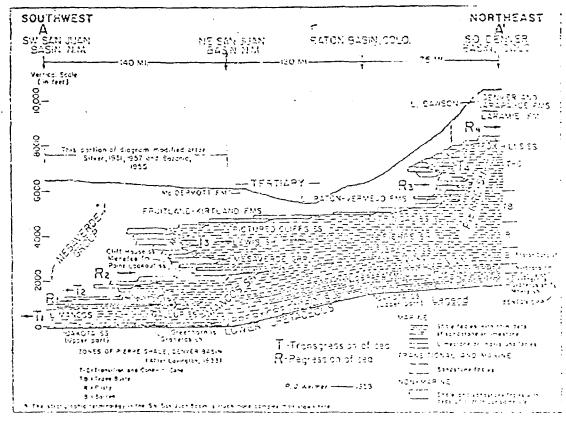


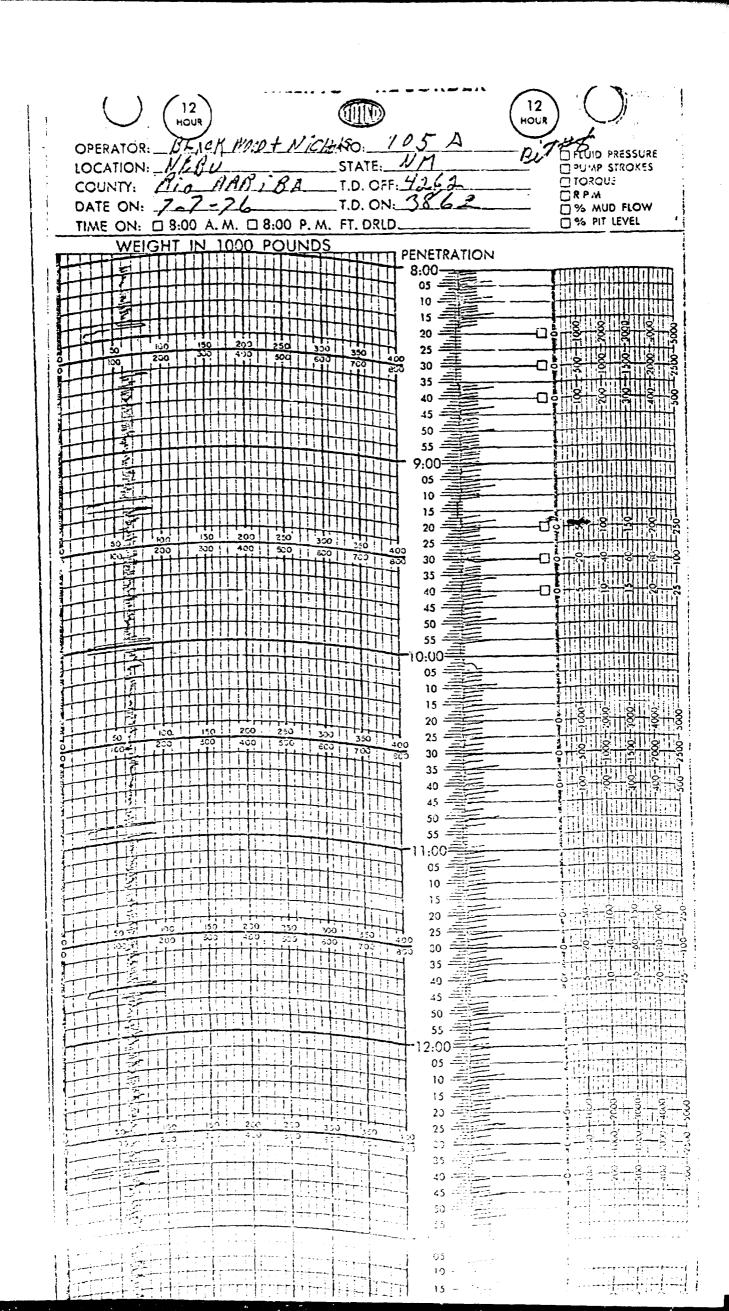
Fig. 2.—Diagrammatic restored section of Upper Cretogeous rucks extending from outlesest 3 in fig. 2 Dance of New Mexico to south part of Denver Basin, Colorado, Terriary recess regionally cover presieval surface of Cretacoous strata. Diagram structurally distorts this surface.

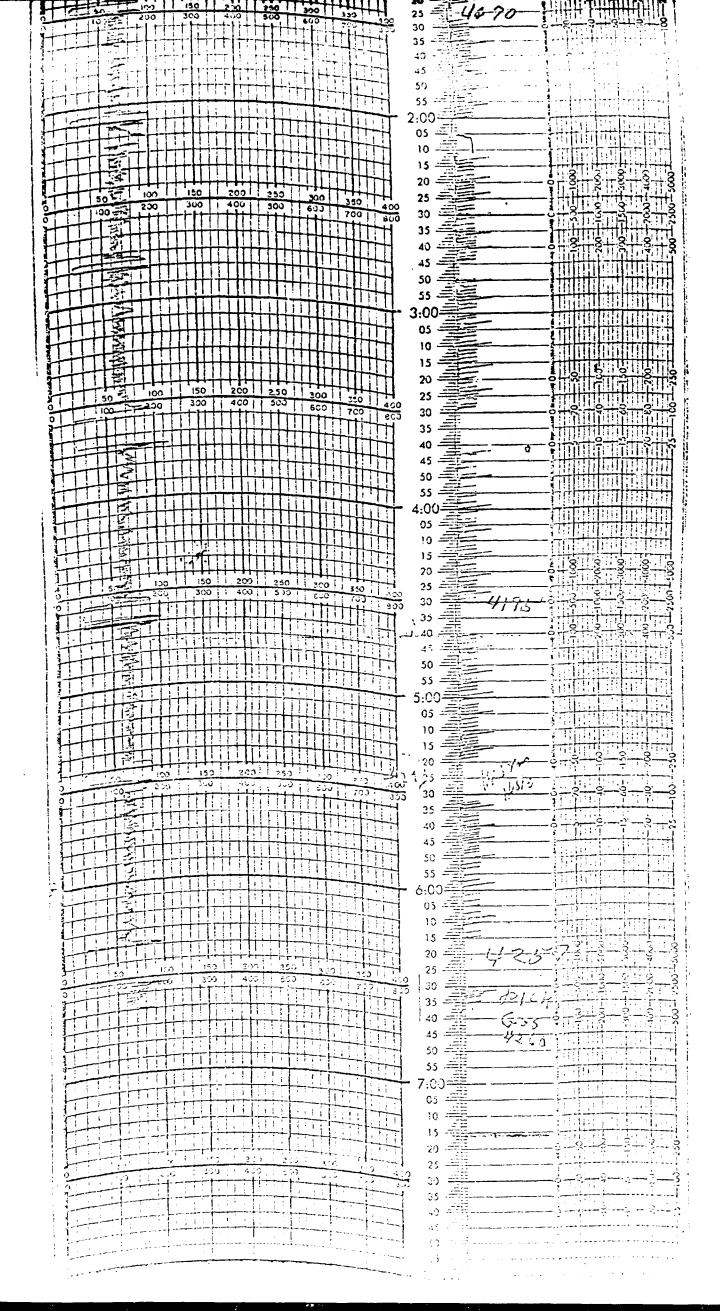
In the 1961 A.A.P.G. Book, "Geometry of Sandstone Bodies", a paper by Charles T. Hollenshead and Roy L. Pritchard entitled "Geometry of Producing Mesaverde Sandstones, San Juan Basin" in describing the "Green Marker Horizon" on page 106 stated "It is believed to represent approximate contemporanenty and therefore can be used to delineate accurately major vertical steps in the regressive Point Lookout and transgressive Cliff House Strand lines." Various benches of the Cliff House and Point Lookout sandstone are shown and mapped in the paper. We believe that the interval in which gas was encountered in Well #64 (105A) is equivalent to Bench "B" of the Cliff House sandstone as defined and mapped in this paper.

In the "Geologic Atlas of the Rocky Mountain" published in 1972 by the Rocky Mountain Association of Geologists Figure 35, taken from work by R. J. Weimer, shows the Mesaverde group from the San Juan Basin to Wyoming. The vertical limits vary greatly from one area to another.

The Mesaverde group has been described in the literature as extending from the base of the regressive Point Lookout to the top of the Cliff House sandstones. Massive Sandstone Members occur in both the Point Lookout and the Cliff House intervals. Several sandstone benches are known and mapped below the base of the "Massive Sandstone Member" of the Point Lookout and above the "Massive Sandstone Member" of the Cliff House. This definition recognizes that the system of transgressive/regressive shorelines in the Mesaverde group in the San Juan Basin is a continuam having a vertical producing column in excess of 1,400°. The definition of Mesaverde Group as adopted by the Advisory Committee of the Northeast Blanco Unit I-Sec.

929 will allow orderly development and production of hydrocarbon reserves from the Mesaverde group in the area of the Unit.





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DEFORE THE OIL CONSERVATION COMMISSION

Santa Fe, New Mexico

Case No. 5994 Exhibit No. 2

Submitted by Blackwood + Thehals

Hearing Date 11/10/77

	was pr corres accesses			
•	DISTRIBUTION SANTA FE	1 /	CONSERVATION COMMISSION	Porm C-104
	FILE II	REQUEST	FOR ALLOWABLE	Capersedes Old Patrix nat Effective 1-2-65
,	U.S.G.S.	AUTHORIZATION TO TO	AND ANSPORT OIL AND NATURAL (	
	LAND OFFICE	TO THORITATION TO THE	WALLEY OF WAR HATCHAF	Exhibit #3
	TRANSPORTER OIL	1		Chibit -
	GAS /	4		Ltu.
1.	PRORATION OFFICE	1		
	Condine TENNECO OTI COMBANI		ra -an in rate and an and an and an an an and an	
	TENNECO CIL COMPANY			
		e 1200 Lincoln Twr. Blda	., Denver, Colorado 802	03
-	Reason(s) for filing (Check proper box		Other (Please explain) -	
	New Well	Change in Transporter of:		
	Recompletion Change in Ownership	Oil Dry Go	`` <b>`</b> 7-1	•
		Canadaco cos [ ] Couge	· [_]	
	If change of ownership give name and address of previous owner			
	•			
n.	DESCRIPTION OF WELL AND	LEASE   Well No.; Pool Name, Including F	ounction Kind of Load	Lease Nag
	Florance	29A Mesa Verde	State, Federa	C
	Location			
	Unit Letter F : 1850	Feet From The North Lir	ne and 1850 Feet From	rhe West
	Line of Section 25 Toy	wnship 30N Range	8W , NMPM, San J	(Ian
	Line of Section 40 Tov	wnship SUN Range	8W , мирм, San J	Udfi Grunty
III.	DESIGNATION OF TRANSPORT			
	Name of Authorized Transporter of Oil	or Condensate 💢	Address (Give address to which appropriate P. O. Box 108, Farmingt	
	Plateau Refining Name of Authorized Transporter of Cas	singhead Gas Or Dry Gas X	Address (Give address to which approx	-
	Southern Union Gas Co.	. , u. u., uus	Fidelity Union Twr., Da	
	If well produces oil or liquids,	Unit Sec. Twp. P.qe.	ls gas catually connected? Whe	en .
	give location of tanks.	F 25 30N 8W	no !	The second secon
	If this production is commingled wit	th that from any other lease or pool,	give commingling order numbers	
iV.	COMPLETION DATA	Oil Well Gas Well	New Well Workovet Deepen	Plug Back   Same Resty. Diff. Resty
	Designate Type of Completio	. ; ^	X	· • • • • • • • • • • • • • • • • • • •
	Date Spudded	Date Compl. Ready to Prod.	Total Depth	P.B.T.D.
	ł ·	8/15/75	A502	Ones hale Deales 4070
	8/5/75	8/16/75   Name of Producing Formation	4503 Top Otl/Gas Pay	Open hole Packer 4378
	ł ·	l		Open hole Packer 4378 Tubing Cepth None
٠	8/5/75 Elavations (DF, RKB, RT, GR, etc.) 6263 GL Perforations	Name of Producing Formation Mesa Verde	Top Otl/Gas Pay	Tubing Lepth None Depth Casing Shoe
	8/5/75 Elavations (DF, RKB, RT, GR, etc.) 6263 GL	Name of Producing Formation Mesa Verde Completion	Top Otl/Gas Pay -4410	Tubing Septh None
	8/5/75 Elavations (DF, RKB, RT, GR, etc.) 6263 GL Perforations None Open Hole -	Name of Producing Formation Mesa Verde  Completion TUBING, CASING, AND	Top O!!/Gas Pay -4410  CEMENTING RECORD	None Depth Casing Shoe 4410.
	8/5/75 Elavations (DF, RKB, RT, GR, etc.) 6263 GL Perforations	Name of Producing Formation Mesa Verde  Completion TUBING, CASING, AND CASING & TUBING SIZE 9 5/8"	Top Otl/Gas Pay -4410	Tubing Lepth None Depth Casing Shoe
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	8/5/75  Elavations (DF, RKB, RT, GR, etc.) 6263 GL  Perforations  None Open Hole -  HOLE SIZE	Name of Producing Formation Mesa Verde  Completion TUBING, CASING, AND CASING & TUBING SIZE 9 5/8"	Top 0:1/Gas Pay -4410  CEMENTING RECORD  DEPTH SET 2041	Tubing Lepth None Depth Cosing Shoe 4410.  SACKS CEMENT 200 SX
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	8/5/75  Elavations (DF, RKB, RT, GR, etc.) 6263 GL  Perforations  None Open Hole -  HOLE SIZE  12½" 8 3/4"	Name of Producing Formation Mesa Verde  Completion TUBING, CASING, AND CASING & TUBING SIZE 9 5/8" 7" 4:2"  OR ALLOWABLE (Test must be a)	Top 0:!/Gas Pay 4410  CEMENTING RECORD  DEPTH SET  204'  3458'  4410'  fier recovery of total volume of load ail apth or be for full 24 hows)	Tubing Depth None Depth Cosing Shoe 4410.  SACKS CEMENT 200 SX 475 SX 200 SX
	8/5/75  Elavations (DF, RKB, RT, GR, etc.) 6263 GL  Perforations  None Open Hole -  HOLE SIZE  [2½" 8 3/4"  TEST DATA AND REQUEST FO	Name of Producing Formation Mesa Verde  Completion TUBING, CASING, AND CASING & TUBING SIZE 9 5/8" 7" 4:2"  OR ALLOWABLE (Test must be a)	Top O!!/Gas Pay 4410  CEMENTING RECORD  DEPTH SET  204'  3458'  4410'  Gier recovery of total volume of load oil of	Tubing Depth None Depth Cosing Shoe 4410.  SACKS CEMENT 200 SX 475 SX 200 SX
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	8/5/75  Elavations (DF, RKB, RT, GR, etc.) 6263 GL  Perforations None Open Hole -  HOLE SIZE  12½"  8 3/4"  TEST DATA AND REQUEST FOOL, WELZ. Date First New Oil Bun To Tanks  Langth of Test  Actual Prod. During Test  GAS WELL  Actual Prod. Test-MCF/D  5062  Testing Method (pitot, back pr.)	Name of Producting Formation  Mesa Verde  Completion  TUBING, CASING, AND CASING & TUBING SIZE  9 5/8"  7"  4:2"  OR ALLOWABLE (Test must be a able for this de Date of Test Tubing Pressure  Length of Test 3 hrs.  Tubing Pressure (Shat-in)	Top Oil/Gas Pay  4410  CEMENTING RECORD  DEPTH SET  204  3458  4410  ifter recovery of total volume of load oil of pith or be for full 24 hows)  Producing Method (Flow, pump, gas lift)  (Casing Pressure  (Casing Pressure  (Shut-in)	Tubing Depth None Depth Casing Shoe 4410.  SACKS CEMENT 200 SX 475 SX 200 SX  and must be equation or exceed top allow the etc.)  Choke Size  Gravity of Condensate IVA Choke Size
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VI.	8/5/75  Elavations (DF, RKB, RT, GR, etc.) 6263 GL  Perforations None Open Hole -  HOLE SIZE  [2½" 8 3/4"  TEST DATA AND REQUEST FOOL, WELL.  Date First New Oil Bun To Tanks  Langth of Test  Actual Prod. During Test  GAS WELL  Actual Prod. Test-MCF/D 5062  Testing Method (pitot, back pr.) Back pressure  CERTIFICATE OF COMPLIANCE  hereby certify that the rules and re-	Name of Producting Formation  Mesa Verde  Completion  TUBING, CASING, AND  CASING & TUBING SIZE  9 5/8"  7"  4:2"  OR ALLOWABLE (Test must be a able for tils de  Date of Test  Tubing Pressure  [Oil-Bble.]  Length of Test  3 hrs.  Tubing Pressure (Shat-ia)  NA.  CE  eguistions of the Oil Conservation	Top Oil/Gas Pay  4410  CEMENTING RECORD  DEPTH SET  204  3458  4410  Inter recovery of total volume of load oil of pith or be for full 24 hows)  Producing Method (Flow, pump, gas life)  Casing Pressure  (Casing Pressure  (Shut-in)  580  OIL CONSERVA  APPROVED	Tubing Depth None  Depth Casing Shoe  4410.  SACKS CEMENT  200 SX  475 SX  200 SX  and must be equal to or exceed top allow the etc.)  Choice Size  Gravity of Condensate  IVA  Choice Size  3/4"  TION COMMISSION  SEP 29,1975
VI. 6	8/5/75  Elsyations (DF, RKB, RT, GR, etc.) 6263 GL  Perforations None Open Hole -  HOLE SIZE  12½" 8 3/4"  TEST DATA AND REQUEST FOOL, WELL.  Date First New Oil Bun To Tanks  Langth of Test  Actual Prod. During Test  GAS WELL  Actual Prod. Test-MCF/D  5062  Testing Method (pitot, back pt.)  Back pressure  CERTIFICATE OF COMPLIANCE  Thereby certify that the rules and recommission have been compiled we	Name of Producting Formation  Mesa Verde  Completion  TUBING, CASING, AND  CASING & TUBING SIZE  9 5/8"  7"  4:2"  OR ALLOWABLE (Test must be a able for tills de  Date of Test  Tubing Pressure  Length of Test  3 hrs.  Tubing Pressure (Shut-in)  NA.  CE  eguistions of the Oil Conservation ith and that the information given	Top Oil/Gas Pay  4410  CEMENTING RECORD  DEPTH SET  204  3458  4410  Inter recovery of total volume of load oil of pith or be for full 24 hows)  Producing Method (Flow, pump, gas life)  Casing Pressure  (Casing Pressure  (Shut-in)  580  OIL CONSERVA  APPROVED	Tubing Depth None  Depth Casing Shoe  4410.  SACKS CEMENT  200 SX  475 SX  200 SX  and must be equal to or exceed top allow the etc.)  Choice Size  Gravity of Condensate  IVA  Choice Size  3/4"  TION COMMISSION  SEP 29,1975
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VI. 6	8/5/75  Elsyations (DF, RKB, RT, GR, etc.) 6263 GL  Perforations None Open Hole -  HOLE SIZE  12½" 8 3/4"  TEST DATA AND REQUEST FOOL, WELL.  Date First New Oil Bun To Tanks  Langth of Test  Actual Prod. During Test  GAS WELL  Actual Prod. Test-MCF/D  5062  Testing Method (pitot, back pt.)  Back pressure  CERTIFICATE OF COMPLIANCE  Thereby certify that the rules and recommission have been compiled we	Name of Producting Formation  Mesa Verde  Completion  TUBING, CASING, AND  CASING & TUBING SIZE  9 5/8"  7"  4:2"  OR ALLOWABLE (Test must be a able for tills de  Date of Test  Tubing Pressure  Length of Test  3 hrs.  Tubing Pressure (Shut-in)  NA.  CE  eguistions of the Oil Conservation ith and that the information given	Top Oil/Gas Pay  4410  CEMENTING RECORD  DEPTH SET  204  3458  4410  Ifter recovery of total volume of load oil of pith or be for full 24 hows)  Producing Method (Flow, pump, gas life)  (Casing Pressure)  (Casing Pressure)  (Casing Pressure)  (Shut-in)  580  OIL CONSERVA  APPROVED  BY Original Signed by A  TITLE SUPERVISO	Tubing Depth None  Depth Casing Shoe  4410.  SACKS CEMENT  200 SX  475 SX  200 SX  and must be equation or exceed top allow the etc.)  Choke tize  SER  Choke tize  SER  Choke tize  SER  Choke tize  3/4"  TION COMMISSION  SEP 29,1975  R. Kendrick  R DIST. #3
VI. 6	8/5/75  Elsyations (DF, RKB, RT, GR, etc.) 6263 GL  Perforations None Open Hole -  HOLE SIZE  12½" 8 3/4"  TEST DATA AND REQUEST FOOL, WELL.  Date First New Oil Bun To Tanks  Langth of Test  Actual Prod. During Test  GAS WELL  Actual Prod. Test-MCF/D  5062  Testing Method (pitot, back pt.)  Back pressure  CERTIFICATE OF COMPLIANCE  Thereby certify that the rules and recommission have been compiled we	Name of Producting Formation  Mesa Verde  Completion  TUBING, CASING, AND  CASING & TUBING SIZE  9 5/8"  7"  4:2"  OR ALLOWABLE (Test must be a able for tills de  Date of Test  Tubing Pressure  Length of Test  3 hrs.  Tubing Pressure (Shut-in)  NA.  CE  eguistions of the Oil Conservation ith and that the information given	Top Ot!/Gas Pay  4410  CEMENTING RECORD  DEPTH SET  204'  3458'  4410'  Sier recovery of total volume of load oil of pith or be for full 24 hours)  Preducing Method (Flow, pump, gas lift)  Cosing Pressure  Cosing Pressure  Cosing Pressure  (Shut-in)  580  OIL CONSERVA  APPROVED  By Original Signed by A  TITLE SUPERVISO  This form is to be filed in c	Tubing Depth None  Depth Casing Shoe  4410.  SACKS CEMENT  200 SX  475 SX  200 SX  and must be equal to or exceed top allow the etc.)  Choke Size  3/4"  TION COMMISSION  SIP 29,1975  R. Kendrick  R DIST. #3  spliance with RULE 1104.
VI. 6	8/5/75  Elavations (DF, RKB, RT, GR, etc.) 6263 GL  Perforations None Open Hole -  HOLE SIZE  12½"  8 3/4"  TEST DATA AND REQUEST FOOL, WELL  Date First New Oil Bun To Tanks  Langth of Test  Actual Prod. During Test  GAS WELL  Actual Prod. Test-MCF/D  5062  Testing Method (pitot, back pr.)  Back pressure  CERTIFICATE OF COMPLIANO  Thereby certify that the rules and recommission have been complied we above is true and complete to the	Name of Producting Formation Mesa Verde  Completion  TUBING, CASING, AND CASING & TUBING SIZE  9 5/8"  7" 4:2"  OR ALLOWABLE (Test must be a able for this de Date of Test  Tubing Pressure  Oil-Bbis.  Culting Pressure  (Shut-in)  NA.  CE  egulations of the Oil Conservation ith and that the information given best of my knowledge and belief.	Top Ot!/Cas Pay  4410  CEMENTING RECORD  DEPTH SET  204¹  3458¹  4410¹  If this is a request for allow well, this form that to be filed in control of the successory of the su	Tubing Cepth  None  Depth Cosing Shoe  4410.  SACKS CEMENT  200 SX  475 SX  200 SX  and must be squal to or exceed top allow the etc.)  Choice Size  3/4"  TION COMMISSION  SEP 29,1975  R. Kendrick  RDIST. #3  spliance with mule 1104, while for a newly drilled or despendenced by a tabulation of the deviation
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BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico

Case No. 5994 Exhibit No. 3

Submitted by Blackwood + Michals.

Hearing Date 11/10/17

## BLACKWOOD & NICHOLS COMPANY 2013 FIRST NATIONAL CENTER WEST - OKLAHOMA CITY, OKLAHOMA 73102

December 29, 1975

The Oil and Gas Supervisor United States Geological Survey P. O. Box 1857 Roswell, New Mexico 88201

Oramissioner of Public Lands State of New Mexico P. O. Box 1148 Santa Fe, New Mexico 87501

Oil Conservation Commission State of New Mexico P. O. Box 2088 Santa Pe, New Mexico 87501



Address Reply Te: P. O. Bez 1237 Durango, Colorado 81301 Telephone: (303) 247-0728

N 2 CECLOSICAL SURVEY.

BEFORE THE
OIL CONSERVATION COMMISSION
Santa Fe, New Mexico
Case No. 5994 Exhibit No. 4
Submitted by Blackwood + Neckels
Hearing Date 11 10 17

Re: Northeast Blanco Unit No. 1, Sec. 929 San Juan and Rio Arriba Counties, New Mexico

#### Gentlemen:

Blackwood & Nichols Company, as Unit Operator, on behalf of itself and all other owners of oil and gas leases within the Northeast Blanco Unit, hereby submits a Plan of Development of the Mesaverde Formation for the calendar year 1976.

The total number of wells in the Northeast Blanco Unit is as follows:

Mesaverde (Producing)	58
Mesaverde (Incapable of Production)	3
Mesaverde (Plugged and Abandoned)	5
Dakota-Mesaverde (Dual)	4
Dakota	1

Total Mesaverde Cumulative Production through October 31, 1975 - 196,896,767 MCF. Total Dakota Cumulative Production through October 31, 1975 - 3,812,762 MCF. Total Condensate Production through October 31, 1975 - 62,333.08 Barrels.

Unit Operator does not propose any development wells during the calendar year 1976. However, we have requested and received approval from a majority of the Working Interest Owners, to plug and abandon Northeast Blanco Unit Wells Number 21, 5W/4, Sec. 36, T-31N, R7W, and Number 22, NE/4, Sec. 36, T-31N, R7W, Rio Arriba County, New Mexico. As a replacement of the wells to be abandoned, we plan to drill a new Mesaverde well in:

TOWNSHIP 31 NORTH, RANGE 7 WEST, N.M.P.M., Rio Arriba County, New Mexico

Sec. 36: SE 1/4

Pursuant to Section 17 of the Northeast Blanco Unit Agreement, we propose to drill the following Mesaverde wells to meet offset obligations:

TOWNSHIP 31 NORTH, RANGE 7 WEST, N.M.P.M., San Juan County, New Mexico

Sec. 1: SW 1/4

TOWNSHIP 30 NORTH, RANGE 8 WEST, N.M.P.M., San Juan County, New Mexico

Sec. 13: NN 1/4 Sec. 24: SE 1/4

In addition to the above, Blackwood & Nichols Company as Unit Operator, will drill any other offset wells that may be required to prevent drainage of unitized substances and any other wells subsequently deemed necessary or desired by the Unit Operator and the Working Interest Owners.

Blackwood & Nichols Company as Unit Operator, believes that all current obligations have been satisfied.

All acreage within the Northeast Blanco Unit boundaries is now participating in the Mesaverde Formation.

If this plan is acceptable, please signify your approval as required under Section 10 of the Unit Agreement, in the space provided on the attached form and return two approved copies to Blackwood & Nichols Company.

The effective date of the Plan of Development shall be January 1, 1976.

Yours very truly,

BLACKWOOD & NICHOLS COMPANY

DL:lw

Four copies to each addresses

Approved:		_Date:	MAR	11	197
•	The Oil and Gas Supervisor United States Geological Survey Subject to like approval by The Commissioner of Oil Conservation Commission.	of Publ:	ic Lar	nds (	and
Approved.		_ Date:			
	Commissioner of Public Lands State of New Mexico Subject to like approval by the United States and Oil Conservation Commission.	Geolog:	ical 8	Surv	ey .
ypproved		Date:_	·		
	Oil Conservation Commission State of New Mexico				

Subject to like approval by the United States Geological Survey and Commissioner of Public Lands.

The above approvals are for the Northeast Blanco Unit Agreement No. 1, Section 929, San Juan and Rio Arriba Counties, New Mexico, 1976 Plan of Development.



United States Department of the Interior

**GEOLOGICAL SURVEY** Drawer 1857 Roswell, New Mexico 88201

March 11, 1976

Blackwood & Nichols Company Attention: Mr. D. Loos 2013 First National Center West Oklahoma City, Oklahoma 73102

#### Gentlemen:

Your 1976 plan of development for the Northeast Blanco unit area, San Juan and Rio Arriba Counties, New Mexico, has been reviewed by this office.

Such plan proposes the drilling of 4 Mesaverde wells to be located as follows: 1)  $SE_{\frac{1}{4}}$  sec. 36, T. 31N., R. 7W., as a replacement well for the two wells in such section which are to be plugged and abandoned; 2)  $SW_{\frac{1}{4}}$  sec. 1, T. 31N., R. 7W., as an offset obligation to Northwest Pipeline Corporation San Juan 32-7 well No. 27, located in the SW $\frac{1}{4}$  sec. 36, **T.** 32N., R. 7W.; 3)  $NW_{\frac{1}{4}}$  sec. 13, T. 30N., R. 8W., as an offset obligation to El Paso Natural Gas Company's well Howell **E No. 2A,** located in the  $SE_{\frac{1}{4}}$  sec. 14, T. 30N., R. 8W.; and 4)  $SE_4^1$  sec. 24, T. 30N., R. 8W., as an offset obligation to Tenneco Oil Company's well Florance 29A, located in the NW 1 sec. 25, T. 30N., R. 8W.

The proposed wells described in 2) through 4) above conform with the intent of those provisions contained in Section 17 of the unit agreement which states that the unit area will be protected from drainage of unitized substances by wells on land not subject to the unit agreement. Accordingly, your 1976 plan of development is hereby approved on this date and two approved copies are enclosed.

BEFORE THE OIL CONSERVATION COMMISSION Santa Fe, New Mexico

Case No. 5974 Exhibit No. Submitted by Bias word + ) Hearing Date 11 10/17

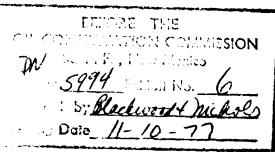
This approval is subject to like approval by the appropriate State officials.

Sincerely yours,

CARL C. TRAYWICK
Acting Area Oil and Gas Supervisor

## BEFORE THE OIL CONSERVATION COMMISSION OF THE STATE OF NEW MEXICO

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION COMMISSION OF NEW MEXICO ON ITS OWN MOTION TO CONSIDER REDEFINITION OF THE VERTICAL LIMITS OF THE BLANCO-MESAVERDE POOL, RIG ARRIBA AND SAN JUAN COUNTIES, NEW MEXICO.



CASE NO. 5893 Order No. R-5459

### ORDER OF THE COMMISSION

#### BY THE COMMISSION:

This cause came on for hearing at 9 a.m. on March 23, 1977, at Santa Fe, New Mexico, before the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission."

NOW, on this 14th day of June, 1977, the Commission, a quorum being present, having considered the testimony presented and the exhibits received at said hearing, and being fully advised in the premises,

#### FINDS:

- (1) That due public notice having been given as required by law, the Commission has jurisdiction of this cause and the subject matter thereof.
- (2) That the Blanco-Mesaverde Pool, located in Rio Arriba and San Juan Counties, New Mexico, was created by Commission Order No. 799, dated February 25, 1949.
- (3) That Section (2) of said Order No. 799 defined the vertical limits of said Blanco-Mesaverde Pool as the "4200-5100 feet productive horizon where the productive sands are contained between the top of the Cliff House Sand and the base of the Point Lookout Sand of the Mesaverde."
- (4) That said definition of the vertical limits of said Blanco-Mesaverde Pool has proved inadequate for the following reasons:
  - A. The definition does not take into account variations in surface elevations and formation dip which can cause the "Mesaverde" productive horizon to occur above or below the 4200 feet to 5100 feet interval.
  - B. The definition does not adequately take into account the transgressive, regressive, gradational nature of formations composing the "Mesaverde" productive horizon.

- (5) That because of the imprecise nature of said vertical limits definition, Mesaverde productive zones above or below the 4200 foot to 5100 foot interval in any particular well might not be completed in said well.
- (6) That failure to complete such zones could result in wast of gas in the ground.
- (7) That the current infill drilling program within said Blanco-Mesaverde Pool has increased the need for a more precise definition of the vertical limits of such pool.
- (8) That in December, 1976, the Commission appointed an industry-government study committee to examine the problem and report its findings to the Commission.
- (9) That, based on geological evidence, the study committee recommended that the vertical limits of said Blanco-Mesaverde Pool be redefined as that interval from the Huerfanito bentonite marker to a point 500 feet below the top Point Lookout formation.
- (10) That the Induction-Flectrical Log of the El Paso Natural Gas Company Johnston State Wel. No. 1 located in Unit A of Section 32, Township 26 North, Range 6 West, NMPM, Rio Arriba County, New Mexico, should be the type log for said Blanco-Mesaverde Pool.
- (11) That the Huerfanito bentonite marker and the top of the Point Lookout formation are found at depths of 3255 feet and 5100 feet, respectively, on said type log.
- (12) That such definition should permit maximum development of productive horizons within the Blanco-Mesaverde Pool, thereby preventing waste.
- (13) That there are several Chacra Sand gas pools developed along the Southwest flank of the Blanco-Mesaverde Pool which have been separately drilled and developed which would be included within the revised definition of the vertical limits of the Blanco-Mesaverde Pool.
  - (14) That such pools are completed in porous Chacra sands.
- (15) That such porous Chacra sands lie South and West of a line generally running from the Northwest corner of Township 31 North, Range 13 West, NMPM, San Juan County, New Mexico, to the Southwest Corner of Township 24 North, Range 1 East, NMPM, Rio Arriba County, New Mexico, as more fully described on Exhibit "A" of this order.
- (16) That to protect the correlative rights of the owners in said Chacra pools, the top vertical limit of said Blanco-Mesaverde Pool should be lowered to a point 750 feet below the Huerfanito bentonite marker within the area South and West of the line define in Finding No. (15) above and Exhibit "A".

-3-Case No. 5893 Order No. R-5459

- (17) That there are 4 wells North and East of the line defined in Finding No. 15 above and Exhibit A which may be producing from fractured shale or siltstone zones equivalent to said Chacra sands and which may or may not be connected to other producing zones in said Blanco-Mesaverde Pool.
- (18) That to protect the correlative rights of the owners of said four wells, the effective date of any redefinition of the vertical limits of said Blanco-Mesaverde Pool should be delayed to provide such owners with the opportunity to bring a case for an exception before the Commission.
- (19) That with the safeguards provided in Finding No. (16) and No. (18) above, the proposed redefinition of the vertical limits of the Blanco-Mesaverde Pool will not violate correlative rights.
- (20) That to prevent waste, the vertical limits of said Blanco-Mesaverde Pool should be redefined in accordance with the study committee recommendation as adjusted to protect Chacra gas pools as set out in Finding No. (14) above.

#### IT IS THEREFORE ORDERED:

- (1) That effective August 1, 1977, the vertical limits of the Blanco-Mesaverde Pool, Rio Arriba and San Juan Counties, New Mexico, as previously described and defined by the Commission are hereby redefined as follows:
  - A. That North and East of a line generally running from the Northwest corner of Township 31 North, Range 13 West, San Juan County, New Mexico, to the Southwest corner of Township 24 North, Range 1 East, NMPM, Rio Arriba County, New Mexico, as fully described on Exhibit "A" attached to this order, and incorporated herein by reference the vertical limits of the Blanco-Mesaverde Pool shall be from the Huerfanito bentonite marker to a point 500 feet below the top of the Point Lookout Sandstone.
  - B. That South and West of the line described under A above, the vertical limits of the Blanco-Mesaverde Pool shall be from a point 750 feet below said Huerfanito bentonite marker to a point 500 feet below the top of the Point Lookout Sandstone.
- (2) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

-4-Case No. 5893 Order No. R-5459

DONE at Santa Fe, New Mexico, on the day and year hereinabove designated.

STATE OF NEW MEXICO OIL CONSERVATION COMMISSION

Thilk . meers

PHIL R. LUCERO, Chairman

EMERY C. ARNOLD, Member

JOE D. RAMEY, Member & Secretary

SEAL

#### EXHIBIT "A"

#### COMMISSION ORDER NO. R-5459

This exhibit defines the Northwest-Southeast trending line that divides the Blanco-Mesaverde Pool, Rio Arriba and San Juan Counties, New Mexico, for purposes of defining the vertical limits for said pool. Said line traverses the South side or west side of the sections listed below:

> TOWNSHIP 31 NORTH, RANGE 14 WEST, NMPM Section 12: South

> TOWNSHIP 31 NORTH, RANGE 13 WEST, NMPM Sections 7 and 8: South

Section 16: West and South Sections 15 and 14: South Section 24: West and South

TOWNSHIP 31 NORTH, RANGE 12 WEST, NMPM

Section 19: South

Section 29: West and South Sections 28 and 27: South Section 35: West and South Section 36: South

TOWNSHIP 30 NORTH, RANGE 11 WEST, NMPM

Section 6: West and South

Section 5: South

Section 9: West and South Sections 10 and 11: South Section 13: West and South

TOWNSHIP 30 NORTH, RANGE 10 WEST, NMPM

Section 18: South

Section 20: West and South Sections 21 and 22: South Section 26: West and South

Section 25: South

TOWNSHIP 30 NORTH, PANGE 9 WEST, NMPM Section 31: West and South Section 32: South

TOWNSHIP 29 NORTH, RANGE 9 WEST, NMFM

Section 4: West and South

Section 3: South

Section 11: West and South Section 12: South

TOWNSHIP 29 NORTH, RANGE 8 WEST, NMPM

Section 18: West and South

Section 17: South

Section 21: West and South

Section 22: South Section 26: West and South

Section 25: South

TOWNSHIP 29 NORTH, RANGE 7 WEST, NMPM Section 31: West and South Sections 32 through 36: South

TOWNSHIP 28 NORTH, RANGE 6 WEST, Sections 7, 18, 19, 30, and 31: NMPM

TOWNSHIP 27 NORTH, RANGE 6 WEST, NMPM

Section 6: West

Section 7: West and South Sections 8 and 9: South Section 15: West and South

Section 14: South Section 24: West South

Section 25: West and South

TOWNSHIP 27 NORTH, RANGE 5 WEST, NMPM Section 31: West and South Sections 32 through 36: South

TOWNSHIP 27 MORTH, RANGE 4 WEST, NMPM

Sections 31 through 36: South

TOWNSHIP 27 NORTH, RANGE 3 WEST, NMPM Sections 31 and 32: South

TOWNSHIP 26 NORTH, RANGE 3 WEST, NMPM Section 4: West and South

Sections 3 and 2: South Section 12: West and South

TOWNSHIP 26 NORTH, RANGE 2 WEST, NMPM Sections 7 and 8: South

Sections 16 and 22: West and South

Section 26: West

Section 35: West and South

TOWNSHIP 25 NORTH, RANGE 2 WEST, NMPM Section 1: West and South

TOWNSHIP 25 NORTH, RANGE 1 WEST, NMPM

Section 7: West

Sections 18 and 20: West and South

Section 28: West

Section 33: West and South

TOWNSHIP 24 NORTH, RANGE 1 WEST, NMPM

Section 3: West

Sections 10 and 14: West and South

Section 24: West Section 25: West and South

TOWNSHIP 24 NORTH, RANGE 1 EAST, NMPM Section 31: West

EL PASO 11-26-75 1-14 後 (PL) 19 2455 MCF 51P 747	TENNECO 8-19-'55 43 章 (PL) IP 4396 YICF SIP 1050 SIP 633 (5-76) SIP 529 (11-75)		4-30-32 43-24 19-3120 MCF 519-1025 519-477 (1075)		9
8-12-163 U1 \$ (PL) 12-33:11 MCF S1P 782	2-18-'77 10-27-'67 43.4 105.0 19.3211 MCF 51P.475(4-'77) Florance	N. E.  13-26-51 1-6 & 19-530 MCF 31P 252 (5-176)	BLANCO UNIT	(B) 6-10-57 34 ⇔ 17-5397 MCF 51P 1052	T 30
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- LEGEND -

COMPLETION DATE

THE PRODUCTION
ORIGINAL SHUT-IN CASING PRESS.
RECENT SHUT-IN PRESS (DATE TAKEN)

TRACE OF CROSS SECTION

BLACKWOOD & NICHOLS CO. LTD.

LOCATION & PRESSURE DATA MAP

DICET THE		SCALE	
OIL COMSULTATION COMMISSION		MILES	
Come N. 5994	1 mark 4 68.7		
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11-10-77			



## DIRECTOR JOE D. RAMEY

## OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO 1000 RIO BRAZOS RD. - AZTEC

> 87410 LAND COMMISSIONER

PHIL R. LUCERO



STATE GEOLOGIST EMERY C. ARNOLD

MEMORANDUM

2-24-77

TO:

INTERESTED PARTIES\_

FROM: N. E. MAXWELL, JR., ENGINEER, DIST. #3
PROJECT: CURRENT MESAVERDE INFILL WELL DATA

Attached is a compilation of data on the Mesaverde Infill completion program thru 2-22-77. Operator, well name and location are given. The initial shutin is tabulated and CAOF where available. The average 1976 pressure of the four wells offset to each infill well has been tabulated and the latest 1976 shut-in pressure  $(P_C)$  and Q rate for the infill well is shown.

Test data for 50 wells, received since 114-76 show that these infill wells had an average shut-in pressure  $(P_c)$  of 593 psia while their offsets only had 481 psia. A difference of 112 psia. The average  $P_c$  on the 1976 latest tests on all infill wells is 553 psia while the average pressure of their offsets is 450 psia. Our records show 113 infill wells were completed during 1976. There were 249 total infill completions as of 2-22-77. There have been 345 locations applied for with 96 locations to be drilled.

The asterisk following an intili initial pressure denotes wells completed during 1976. Where no infill tests are shown, the wells have either not been connected or tests are in progress.

The offset pressure shown will hold thru the 1978 testing schedule. Infill well data will be added both on new completions and revised deliverability tests as they are received.

			AVERAGE	ξ.	INFILL WELL
WELLS COMPLETED	NO. WELLS	INITIAL SIP	CAOF MCF	OFFSET Pc	AVE. AVE. Pc 0
1975 Report	104	696	9846	502 (1974)	1098 (1975
1976 Thru 11-4-76	68	722	7074	470 (1976)	539 (1976) 732 (1976
INFILL WELLS COMPLETED 11-4-76 to 2-22-77	77	7 <i>1</i> +2	7962	481 (1976)	593 (1976)1240 (1976
NIFIEL WELL STATUS TOTAL TESTED 1976 TESTS IN PROGRESS MOT TIED IN	168 42 39				553 989
TOTAL INFILL WELLS	5 249		3506	450	

5994 10 Machieror Richards 11-11-77



## DIRECTOR JOE D. RAMEY

## OIL CONSERVATION COMMISSION

STATE OF NEW MEXICO 1000 RIO BRAZOS RD. - AZTEC

> 87410 LAND COMMISSIONER PHIL R. LUCERO



STATE GEOLOGIST EMERY C. ARNOLD

MEMORANDUM

5-25-77

INTERESTED PARTIES

FROM:

FROM: N. E. MAXWELL, JR., ENGINEER, DIST. #3
PROJECT: MESAVERDE INFILL WELL DATA, REPORT #4

Attached is a compilation of data on the Mesaverde Infill completion program thru 5-20-77. Operator, well name and location are given. The initial shut-in is tabulated and CAOF where available. The average 1976 pressure of the four wells offset to each infill well has been tabulated and the latest shutin pressure (Pc) and Q rate for the infill well is shown.

Test data for 53 wells, received since 2-22-77 show that these infill wells had an average initial shut-in pressure ( $P_{\rm C}$ ) of 777# while their offsets only had 461#. A difference of 316#.

Sixteen of the new completions or 30% were in Township 26 North, Range 3 West; Township 26 North, Range 7 West; Township 27 North, Range 3 West and Township 29 North, Range 6 West. The 16 infill wells had an average Pc of 978#. The remaining 37 new infill wells only had an average Pc of 689#.

503 infill locations have appeared on our scout letter. As of 5-20-77, 306 infill wells have been completed.

All infill wells have been numbered according to the dates they appeared on the

#1 - #105 appeared during 1975 #106- #214 appeared during 1976

#215- #306 have been shown on the scout letters for 1977.

Our records show Mesa Petroleum Corporation, State Com #10-A located in 0-29N-8W to be the first infill completion on 1-16-75, carried on scout letter 2-27-75.

#### MESAVERDE INFILL WELLS

COMPLETIONS	NO. OF WELLS	INITIAL AVE. SIP	LATEST Pc	TEST Q	1976 OFFSET Pc
1975 1976 1977 theu May	105 109 92	678 758 764,	510 636 588*	905 1114 838*	474 479 461
TOTAL	306	732	571	993	452

\*1977 test data available on 20 infill wells completed in 1977 thru May 20.

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## EL PASO NATURAL GAS COMPANY

YNOTARCEAU NAUL NAS

FRACTIONAL DISTILLAT:	ON ANALYSIS			GAS CHROMATOGR	APHY ANALYSIS
Date of Run	10-5-76	a galanta a anggana nagana		Analysis No. VF2958	6
Sample From	Blackwood Nickols			Date Secured10-4-7	6
	N. E. Blanco Unit # 34				n Loos
COMPONENT	MOL. %	G. P. M.	LIQ. VOL. %	HEATING V	Ţ
Carbon Dioxide	.14			Dry Basis, 14.696 lbs./sq. in., Calculated from % Composition	
Hydrogen Sulfide	.00				
Nitrogen	.32			Calorimeter	
Methane	37.93			SULPHUR CO GRAINS PER 100	_
Ethane	6.96			14.7 lbs./sq. in., 60° F. Hydrogen Sulfide	.00
Propane	2.73	.7493		Mercaptons	00
I-Butane	.55	,1794			
N-Butche	.72	.2263		\$PECIFIC GR	.650
I-Pentane	.23	.0839		14.696 lbs./sq. in., 60° F. Calculated from % Composition	
N-Pentane	.16	.0573		Calculated from % Liquid	
Hexane	.26	.1131		VAPOR PRE PSIA at 100° F.	SSURE
TOTALS	100.00	1.410		Calculated from Mole %	
Run By Ross	Check	ed By James	3	AE&MS Calculation By	
Remæks				NGPA	
R L Ahrens H. L. Holder R. Ullrich R. E. Johnson R. B. Herr M. E. Blakely		Sonie IV, N	DEL COMMISSIO	Ccebon Dioxide NGPA Hydrogen Sulfide	
R. F. Lemon J. E. Ashworth Don Adams File	S	Blacki	vood 4 Nicho 10 77	County	·
				Rio_Arriba	
	ia stali inter d'università	o mon un oraș ni fina centa	a log, Laguago acordino atomo, s	Educat "	<u>/</u>

FRACTIONAL DISTILLATION ANALYSIS				GAS CHROMATOGRAPHY ANALYSIS _			
Date of Run	10-5-76		Analysis No. VF29687				
Sample From	Blackwood	Nickols		Date Secured 10-4-76			
Sample Marked	Sample Marked N. E. Blanco Unit # 105		Secured By DeLasso	Loos			
				HEATING	VALUE		
COMPONENT	MOL. %	G.P.M	LIQ. VOL. %	B.T.U. PER	-		
Carbon Dioxide	.87			Dry Basis, 14.696 lbs./sq. in. Calculated from % Composition	7171		
Hydrogen Sulfide	.00			Calorimeter			
Nitrogen	.28				CONTENT		
Methone	88.33			SULPHUR ( GRAINS PER			
Ethane	6.31	`		14.7 lbs./sq. in., 60° F. Hydrogen Sulfide	00		
Propane		<u> </u>					
	2.46	.6752	+	Mercaptons	00		
I-Butane	.48	.1565	1	******	GRAVITY		
N-Butane	.64	.2012		\$PECIFIC : 14.696 lbs./sq. in., 60° F.			
I-Pentane	.20	.0730		Calculated from % Composition	on <u>.649</u>		
N-Pentane	.13	.0469		Calculated from % Liquid			
Hexane	.30	.1305		VAPOR PA	RESSURE		
	. 30	•1303		PSIA at 100° F.			
TOTAL 0		<del> </del>	+	Calculated from Mole %			
TOTALS	100.00	1.284		Column's Used	-		
Run By Ross	Check	ted by Jame	<b>\S</b>	AE&IS Celeulation By	·		
Rem⊂ks				<u> NGPA</u>			
R. L. Ahrens							
H. L. Holder				Combon Dioxide			
R. Ullrich R. E. Johnson	<del></del>			NGPA Hydrogen Sulfide			
R. E. Johnson R. B. Herr							
M. E. Blakley				<del></del>			
R. F. Lemon				promover sensor and an area of the control of the c			
J. E. Ashworth				LOCATION AND			
Don Adams		ang a mang a and a second a second and a second a second and a second		Sec. 24 T. 30 N.	r. 8 Y.		
File	1			San Juan			
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				New Mexico			
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ACTIONAL DISTILLATION ANALYSIS				GAS CHROMATOGRAPHT ATALTSIS			
Date of Run				Analysis No.	VF29588		
Sample From				Date Secured 10-4-76			
Sample Marked N. E. Blanco Unit #64~A				Secured By	Delasso Loo	5	
COMPONENT	MOL. %	G. P. M.		HEATING VALUE			
Carbon Dioxide	MOL. 78	G. F. M.	LIQ. VOL. %	B.T.U. FER CU. FT.  Dry Basis, 14.696 lbs./sq. in., 60° F.			
dirou Dioxice	.92			Calculated from %		1107	
ydrogen Sulfide	.00			Calorimeter			
itrogen	.20			•	SULPHUR CONTENT		
ethane	89.95				AINS PER 100 CU. FT	Γ.	
thane				14.7 lbs./sq. in., 6	60° F.		
	5.60			Hydrogen Sulfide		00_	
ropane	2.06	.5654		Mercaptan <b>s</b>	_	00	
-Butane	.34	.1109		,			
- Butane	.47	,1477			SPECIFIC GRAVITY		
-Pentane	.13	.0474		14.695 lbs./sq. in. Calculated from %		.633	
-Pentane	.09	.0325		Calculated from %	Liquid		
exane					VAPOR PRESSURE		
	.24	.1044		PSIA at 100° F.			
				Calculated from Ma			
TOTALS	100.00	1.009		Column/s Used			
	<u> </u>			AE&MS Colculation By			
ByRoss	Check	ed ByJar	nes	NGPA			
m.æks							
R L Ahrens H. L. Holder		·		Carbon Dioxide			
R. U. Ullrich				NGPA			
R. E. Johnson				Hydrogen Sulfide			
R. B. Herr							
M. E. Blakley R. F. Lemon							
J. E. Ashworth				Los	CATION AND WELL DA	TA	
Oon adams				Sec. 24 T.	30 N. P. 8	·	
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				Pond Pressure			
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RACTIONAL DISTILLATION ANALYSIS				GAS CHROMATOGRAPHY ANALYSIS			
Date of Run	10-5-76			Analysis NoVF29588			
Sample From	•			Date Secured			
Sample Marked				Secured By DeLasso	Loos		
COMPONENT	MOL. %	G.P.M.	LIQ. VOL. %	HEATING VAI B.T.U. PER CL			
Carbon Dioxide	.92			Dry Basis, 14.696 lbs./sq. in., 50 Calculated from % Gomposition	• F.		
Hydrogen Sulfide	.00			Calorimeter			
Nitrogen	.20			SULPHUR CON	TENT		
Methane	89,95			GRAINS PER 100			
Ethane	5,60			14.7 lbs./sq. in., 60° F. Hydrogen Sulfida	00		
Propone	2.06	5654		Mercoptons	00		
I-Butane	34	-1109					
N-Butane				SPECIFIC GRA	YIIY		
I-Pentane	.47	.1477		14.696 lbs./sq. in., 60° F. Calculated from % Composition	.633		
N - Peniane	.13	.0474		Calculates from % Liquid			
Hexane	- 09	.0325		YAPOR PRESS	SURE		
	. 24	1044		PSIA at 100° 7. Calculated from Mole %			
TOTALS	700.00	7 000		Column's Used			
		<u> </u>		AEMIS Cdesiation By			
un By Ross	Creax	ed By		HCPA			
R L Ahrens							
H. L. Holder R. U. Wilrich				NCPA			
R. E. Johnson				अपूर्वका अधिकर			
R. B. Herr							
M. E. Blakley R. F. Lemon					•		
J. E. Ashworth				LOCATION AND WE	LL DATA		
Don adams				Sec. 24 T. 30 N. R.	8 **		
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				New Mexico			
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## EL PASO NATURAL GAS COMPANY

GAS CHROMATOGRAPHY ANALYSIS

	San juan laboratory	
	•	
FRACTIONAL DISTILLATION ANALYSIS		

Date of Run	10-5-76		. <u> </u>	Analysis No.	VF29586		
Sample From	Blackwood Nickols N. E. Blanco Unit # 34			Date Secured 10-4-76			
Sample Marked				Secured By DeLasso Loos			
	-				HEATING VALUE		
COMPONENT	MOL. 5	G. P. M.	LIQ. VOL. %	·	B.T.U. PER CU. FT	•	
Carbon Dioxide	.14			Dry Basis, 14.595 Calculated from %	lbs./sq. in., 60° F. Composition	1150	
Hydrogea Sulfide	.00			Calorimeter			
Nitrogen	.32				SULPHUR CONTENT	r	
Methane	37.93				AINS PER 100 CU.	•т. •	
Ethane	6.96			14.7 lbs./sq. in., Hydrogen Sulfide	50° F. -	.00	
Propune	2,73	.7493		Mercoptons	•	.00	
I-Butche	.55	.1794					
N - Sutane	.72	.2263		14.696 lbs./sq. in	SPECIFIC GRAVITY	.650	
I-Pentane	,23	.0839		Calculated from %			
N-Pentoné	.16	.0573		Calculated from %	Liquid		
Hexane	.26	.1131		·. · · · ·	VAPOR PRESSURE	•	
	<b>;</b> ,.			PSIA at 100° F. Calculated from M	ole %		
TOTALS	100,00	1.410		Catama/s Used			
Run By Ross		ed By James	<del></del>	ADAMS Calculation By			
	Cecx			NGPA		<del> </del>	
R L Ahrens					•	•	
H. L. Holder				Carson Dioxide			
R. Ullrich				MGPA Hyaragen Salfice			
R. E. Johnson	·		ł	Whateday offica			
R. 3. Herr M. E. Blakely							
P. F. Leron							
J. E. Ashworth					כאדופא אום אבננ ם		
<u>Don Adams</u>				Sec. 10 To 30	n % P. 7	3.	
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				Mesa Verd			
				Sama Pressure			
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FRACTIONAL DISTILLATION ANALYSIS

## EL PASO NATURAL GAS COMPANY SAN JUAN LABORATORY

GAS CHROMATOGRAPHY ANALYSIS

Date of Run	10-5-76			Analysis No.	VF29687	
Sample From	Blackwood Nickols			Date Secured 10-4-76		
. Sample Marked	mple Marked N. E. Blanco Unit # 105				Delasso Loos	1 and
				•		
COMPONENT	MOL. %	G.P.M.	LIQ. VOL. %		HEATING VALUE B.T.U. PER CU. FT.	-
Carbon Dioxide	.87			Dry Basis, 14.69 Calculated from	6 lbs./sq. in., 60° F. 5 Composition	1131
Hydrogen Sulfide	.00			Calorimeter .	_	•
Nitrogen	.28				SULPHUR CONTENT	
Methane	88.33				RAINS PER 100 CU. F	
Ethane	6.31			14.7 lbs/sq. in. Hydrogen Sulfide		.00
Propone	2,46	.6752		Mercaptons		00
I-Butane	.48	,1565				
N-Butane .	.64	.2012		14.696 lbs./sq. !	SPECIFIC GRAVITY	
I-Pentane	.20	.0730		Calculated from		.64 <u>°</u>
N-Pentone	.13	.0469		Calculated from	% Liquid	
Hexane	.30	.1305			VAPOR PRESSURE	
	·			PSIA at 100° F. Calculated from	Mole %	•
TOTALS	100.00	1.284		Column/s Used		
Run By Ross	≻ Check	ed DyJame	es.	AE&IS Calculation By		
Remarks				NGPA		
R. L. Ahrens		·		Ceson Dicaide		·
H. L. Holder R. Ullrich			į	ngpa		
R. E. Johnson	•			समुद्रस्त वृक्ते हें ये रे दर		
R. B. Herr						
M. E. Blakley R. F. Lemon						
J. E. Ashworth				<del></del>	SCATION AND WELL DA	
Don Adams		· · · · · · · · · · · · · · · · · · ·		Sec 26 To	30 % <sup>54.</sup> 8	w
File				San Ju	ian	
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				Mega \		
				Bomb Pressers		

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RACTIONAL DISTILLAȚI	ON ANALYSIS			GAS CHROMATOGRA	PHY ANALYSIS [	
Date of Run	10-5-75			Analysis No. VF29588		
Sample From	Blackwood Nickols			Date Secured		
Scriple Liczked	N. E. Bla	nco Unit #6	4 .	Secured By Dclasso	Lons	
				HEATING VAL	υE	
COMPONENT	MOL. %	G.P.M.	LIQ. VOL. %	B.T.U. PER CU.		
Carbon Dioxide	92			Dry Bosis, 14.695 lbs./sq. in., 50° Colculated from % Composition		
Hydrogen Sulfide	.00			Calorimeter	•	
Mitrogen	.20	,		SULPHUR CONT	TNT	
Methane	89.95			GRAINS PER 100 C		
<b>Ethane</b>				14.7 lbs./sq. in., 60° F.	•	
	5.60			Hydrogen Sulfide		
Propose	2.06	5654		Mercaptons		
I-Butane	.36	.1109			•	
N-Sutane	.47	. 1477		SPECIFIC GRAY	MTY	
I-Pentane	.13	0474		14.695 lbs./sq. in., 60° F. Calculated from % Composition	. 603	
N-Pentane	.09			Calculated from % Liquid		
Hexane	.24	1044		YAPOR PRESSI	JRE	
	1.	, maa		PSIA et 100° F. Calculated from Mole %		
TOTALS	100,00	1,000				
				AEGIS Cdc:Idia By		
un ByRoss	Check	ed by	:es	NGPA		
Percenta .			·			
R L Ahrens H. L. Holder		<u></u>		Caron Cioxide .		
R. U. Ullrich				MCPA Hydrogen Substan		
R. E. Johnson R. B. Herr					. *	
M. S. Blakley			<del></del>			
R. F. Lemon						
J. E. Ashworth				LOCATION AND WELL  Sec. 24 Tr. 30 Nr. Rr.	8 %	
Don adams				County	3 **	
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ACTIONAL DISTILLATION	ON ANALYSIS	GAS CHROMATOGRAPHY ANALYSIS				
Date of Rua	10-5-76		**************************************	Analysis No.	VF29586	
Sample From	Blackwood Rickols			Date Secured	10-4-76	
Sample Marked	Morked N. E. Blanco Unit # 34			Secured By	DeLasso Loo	\$
					HEATING VALUE	<u> در پیش با ایر داست ای کندیار</u> 
COMPONENT	MOL. S	G.P.M.	LIQ. VOL. %	8.Y.U. PER CU. FT.		
Carbon Dioxide	.14			Dry Basis, 14.598 Calculated from %	lbs./sq. in., 50° F. Composition	1150
fydrogen Sulfide	.00	<del></del>		Calorimeter		
Vitrogen	.32	· · · · · · · · · · · · · · · · · · ·			SULPHUR CONTENT	•
lethcre	37.93			GR	AINS PER 100 CU. F	
Ethane	6.96			14.7 lbs./sq. in., ( Hydrogen Sulfide	- co. F.	.00
olobare	2,73	.7493		Merceptons		.00
-Butane	.55	.1794				
V-Sutane	.72	.2263		• .	SPECIFIC GRAVITY	.650
-Pentane	.23	.0839		14.596 lbs./sq. in. Calculated from %		
V-Pentane	.16	,0573		Calculated from %	Liquid _	
Hexane	.26	.1131		• .	YAPOR PRESSURE	•
	.20	• 1 - 31		PSIA at 100° F. Calculated from M	-1 - ×	
TOTALS	: 100.00	1.410		Column/s Used	-	
	100,00			AE&MS Calculation By		•
n By Ross		ed By James	<u> </u>	NGPA		
25513						•
R L Abrens H. L. Nolder				Caron Cloxica		
R. Ullrich				Hydrogen Suffice		<del></del>
R. E. Johnson R. B. Herr						
M. E. Blakely						Taring in the second second
J. E. Ashworth		·		Lo	CATION AND VELL DA	CTA
Don Adams		·		Sec 19 7. 30	3 St. B. 7	<i>h.</i>
File				County		
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## EL PASO NATURAL GAS COMPANY VROTARCEAL NAUL NAZ

RACTIONAL DISTILLAT	GAS	GAS CHROMATOGRAPHY ANALYSIS				
Date of Run	10-5-76			_ Analysis No.	VF29687	•
Sample From	Blackwood Nickols			Dote Secured	10-4-76	
. Sample Marked	N. E. Blac	co Unit #	105	•	Delasso Loos	
				. •	HEATING VALUE	
COMPONENT	MOL. %	G.P.M.	LIQ. VOL. %		B.T.U. PER CU. FT	•
Carbon Dioxide	.87			Dry Basis, 14.69 Calculated from	36 lbs./sq. in., 60° 5. % Composition	1131
Hydrogen Sulfide	.00			Calorim <del>e</del> ter		•
Nitrogen	.28				SULPHUR CONTENT	•
Methane	88.33	i			GRAINS PER 100 CU.	
Ethane	6.31			14.7 Ibs/sq. in. Hydrogen Sulfide		.00
Propane					•	
,	2.46	,6752		Mercapians	•	.00
I-Butane	.48	.1565			SPECIFIC GRAVITY	· ·
N-Butane -	.64	.2012		14.696 lbs./sq.	in., 60° F.	
I-Pentane	.20	.0730		Calculated from	% Composition	.649
N-Pantone	.13	.0469		Calculated from	% Liquid .	
Hexane	.30	.1305	·	• • • • •	YAPOR PRESSURE	•
				PSIA at 190° F.	Mola %	
TOTALS	100.00	1.284		Column/s Used		
Run By Ross	>	ed By Jame	:S	AFENS Calculation By		-
Rencks				нара	•	
R. L. Ahrens			. •			•
H. L. Holder R. Ullrich			į	Com Diaxide		
R. E. Johnson				Hydrogen Sulfic	<del>.</del>	
R. B. Herr M. E. Blakley		<del></del>				
R. F. Lenon	·				GCATION AND WELL D	4 î A
J. E. Ashworth Don Adams				Sec. 24 T.		W.
File	1			County		
				Sen J.	ion	
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				Somb Pressure	**************************************	
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