

CASE 2761: Application of COMPASS  
EXPLORATION for creation of a  
Gallup Gas Pool, Rio Arriba County

1952/10.

2261

petition, Transcript,  
and Exhibits, Etc.

Case 2761

Heard 3-20-63

Res. 3-28-63

1. Recommend a new Pool be created named Largo - Gallup Gas pool.
2. Also that the following acreage be deleted from S. Blanco - Jorito oil Pool.

26 N - 7 W -

Sec. 1 S/2

" 2 S/2

" 3 S/2

" 4 A11

- 3 New Pool should consist of:

26 N - 7 W,

Sec 3 - S/2

Sec. 4 - A11

4. An order should be drafted to allow them 160 A. spacing & locations to conform to general NW gas well rules. (Rule 104). The order should be temporary for a 1 year period. Hearing should be called in March 1964 to show cause why this pool remain as classified. A limit of 500 MCFD should be put on gas well production for a 160 acre unit.
5. A finding should be included to the effect that this may well be a gas cap to a Gallup oil pool.

I do not feel that there is much possibility that there is much if any communication between the Compass area and S. Blanco - Jorito, however I do think that Caulters & Compass should bring in all reservoir data available.

March '64" that is available, particularly  
Bottom Hole pressures and logs of the  
Gallup formation.

Thurston R.



BEFORE THE  
OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
February 21, 1963

EXAMINER HEARING

IN THE MATTER OF:

Application of Compass Exploration, Inc.  
for the creation of a Gallup Gas Pool,  
Rio Arriba County, New Mexico. Applicant,  
in the above-styled cause, seeks an order  
deleting certain acreage from the South  
Blanco-Tocito Pool and redesignating  
portions of said acreage to comprise a new  
Gallup gas pool for its Northwest Lindrith  
Well No. 1-3, located in Unit K of Section  
3, Township 26 North, Range 7 West, Rio  
Arriba County, New Mexico.

Case 2761

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: The hearing will come to order, please. The  
first case on the docket will be 2761.

MR. DURRETT: Application of Compass Exploration, Inc.  
for the creation of a Gallup Gas Pool, Rio Arriba County, New  
Mexico.

MR. UTZ: Are there any appearances in Case 2761?

MR. KELLAHIN: Jason Kellahin, Kellahin and Fox,  
Santa Fe, appearing for Calkins. We have filed with the Com-

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ALBUQUERQUE, N. M.  
PHONE 243-6691



mission a request that this case be continued to the next hearing before the same examiner.

MR. DURRETT: If the Examiner please, we do have that request in the form of a letter from Mr. A. F. Holland requesting that the case be continued to the next Examiner Hearing. We also have a telegram from Compass Exploration, Inc., the applicant, stating that they concur the request of Calkins Oil Company for a postponement of the hearing on Case 2761.

MR. UTZ: Without objection, Case 2761 will be continued to the March 20 Examiner Hearing.

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PHONE 243 6651



STATE OF NEW MEXICO )  
 ) ss  
COUNTY OF BERNALILLO )

I, ADA DEARNLEY, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 24th day of February, 1963.

*Ada Dearnley*  
Notary Public-Court Reporter

My commission expires:

June 19, 1963.

I do hereby certify that the foregoing is a complete and correct transcript of the proceedings in the Examination of Case No. 2761, heard by me on Jan. 23, 1963.  
*[Signature]*, Examiner  
New Mexico Oil Conservation Commission

DEARNLEY-MEIER REPORTING SERVICE, Inc.

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SANTA FE, N. M.  
PHONE 983-3971

ALBUQUERQUE, N. M.  
PHONE 243-6091



DRAFT

JMD/esr  
April 1, 1963

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 FOR  
THE PURPOSE OF CONSIDERING:

CASE No. 2761

Order No. R- 2462  
*Nomenclature*

*[Handwritten signature]*  
APPLICATION OF COMPASS EXPLORATION, INC.,  
FOR THE CREATION OF A GALLUP GAS POOL,  
RIO ARriba COUNTY, NEW MEXICO.

ORDER OF THE COMMISSION

BY THE COMMISSION:

This cause came on for hearing at 9 o'clock a.m. on March 20, 1963, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this \_\_\_\_\_ day of April, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, 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 applicant, Compass Exploration, Inc., seeks an *Sections 1, 2 & 3, Township 26 North, Range 7 West, NMPM,* order deleting ~~certain acreage~~ from the South Blanco-Tocito Pool and redesignating portions of said acreage to comprise a new Gallup gas pool in Sections 3 and 4, Township 26 North, Range 7 West, NMPM, Rio Arriba County, New Mexico.

(3) That, by Order No. R-2265 entered by the Commission on June 15, 1962, the South Blanco-Tocito Oil Pool was extended to include the following-described acreage:

TOWNSHIP 26 NORTH, RANGE 7 WEST, NMPM  
Section 1: S/2  
Section 2: S/2  
Section 3: S/2

*and that by Order No. R-2428 entered by the Commission on February 21, 1963, the South Blanco-Tocito Oil Pool was extended to include the following-described acreage:*

(4) That all wells completed in the Gallup formation in Sections 3 and 4, Township 26 North, Range 7 West, NMPM, Rio Arriba County, New Mexico, are completed in and producing from a common source of supply that is not a part of the South Blanco-Tocito Oil Pool.

(5) That Sections 1, 2, 3, and 4, Township 26 North, Range 7 West, NMPM, Rio Arriba County, New Mexico, should not be included within the horizontal limits of the South Blanco-Tocito Oil Pool, and that Order No. R-2265 should be amended by <sup>deleting</sup> ~~the deletion of~~

Paragraph (d) ~~therefrom~~ <sup>therefrom</sup> ~~and Order No. R-2428 should be amended by deleting Paragraph (i) therefrom.~~

(6) That a new Gallup gas pool should be created comprising the following-described area:

TOWNSHIP 26 NORTH, RANGE 7 WEST, NMPM  
Section 3: S/2  
Section 4: All

(7) That in view of the history of the Gallup formation <sup>a</sup> there is/reasonable probability that gas production from the Gallup formation in Sections 3 and 4, Township 26 North, Range 7 West, NMPM, Rio Arriba County, New Mexico, is originating from a gas cap overlying an undesignated Gallup oil pool; that withdrawals from the gas pool created by this order should therefore be restricted in order to prevent undue dissipation of gas which may be the drive mechanism for an oil pool and in order to assure the protection of correlative rights.

(8) ~~That this order should be effective for a temporary one-year period and~~ <sup>T</sup> that this case should be reopened ~~as an~~ <sup>upon</sup> ~~examiner hearing in April, 1964,~~ <sup>further development of the Gallup formation in this area</sup> in order to determine whether the pool should remain classified as a gas pool or be reclassified as an oil pool.

IT IS THEREFORE ORDERED:

(1) That Order No. R-2265 is hereby amended by deleting <sup>therefrom</sup> Paragraph (d) ~~of said order and Order No. R-2428 is hereby amended by deleting Paragraph (i) therefrom.~~

(2) That a new pool in Rio Arriba County, New Mexico, classified as a gas pool for Gallup production is hereby created and designated the Largo-Gallup Gas Pool consisting of the following-described area:

TOWNSHIP 26 NORTH, RANGE 7 WEST, NMPM  
Section 3: S/2  
Section 4: All

(3) That the daily gas production from a 160-acre spacing unit in the Largo-Gallup Gas Pool shall not exceed 500 MCF of gas per day.

(4) That this case ~~should~~ <sup>shall</sup> be reopened ~~at an examiner hearing in April, 1964,~~ <sup>upon further development of the geologic formation in this area</sup> in order to determine whether the pool should remain classified as a gas pool or be reclassified as an oil pool.

(5) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

JACK M. CAMPBELL, Chairman

E. S. WALKER, Member

A. L. PORTER, Jr., Member & Secretary

**CLASS OF SERVICE**

This is a fast message unless its deferred character is indicated by the proper symbol.

# WESTERN UNION

## TELEGRAM

W. P. MARSHALL, PRESIDENT

=(07), 1201 (4-60)

**SYMBOLS**

DL=Day Letter  
NL=Night Letter  
LT=International Letter Telegram

The filing time shown in the date line on domestic telegrams is LOCAL TIME at point of origin. Time of receipt is LOCAL TIME at point of destination.

LA302 KC255

K DVB250 PD=DENVER COLO 19 341P MST=

A L PORTER JR SECRETARY NEW MEXICO OIL

CONSERVATION COMMISSION= STATE LAND OFC BLDG

SANTA FE NMEX=

COMPASS EXPLORATION INC. CONCURS WITH THE REQUEST OF  
CAULKINS OIL COMPANY FOR POSTPONEMENT OF THE HEARING  
ON CASE 2761 DOCKET NUMBER 7-63=

P J FARRELLS MGR EXPLORATION AND PRODUCTION

COMPASS EXPLORATION INC 101 UNIVERSITY BLVD DENVER=

**DOCKET MAILED**

Date 3/8/63

THE COMPA.

APPRECIATE SUGGESTIONS FROM ITS PATRONS CONCERNING ITS SERVICE

MAIN OFFICE OCC COMPASS EXPLORATION, INC.  
101 UNIVERSITY BOULEVARD  
DENVER 6, COLORADO  
1963 JAN 30 PM 1:27  
January 29, 1963

*Case  
2761*

State of New Mexico  
Oil Conservation Commission  
Post Office Box 871  
Santa Fe, New Mexico

Re: Application for an  
Examiner Hearing

Gentlemen:

Compass Exploration, Inc., of 101 University Boulevard, Denver 6, Colorado, requests a hearing before an examiner of the New Mexico Oil Conservation Commission on February 26, 1963, in Santa Fe, New Mexico, for the purpose of establishing the following:

1. A new Gallup gas pool in Sections three and four of Township twenty-seven North, Range six West, Rio Arriba County, New Mexico--such pool having been discovered by Compass Exploration Inc., #1-3 Northwest Lindrith well, located in NE SW of Section three, Township twenty-six North, Range seven West. This well was completed in the Gallup on September 12, 1961.

2. The spacing of the Gallup formation in the new field on one hundred sixty acres.

3. The rescinding of Commission Order R-2265 dated July 1, 1962, which put the subject area within the boundaries of the South Blanco Tocito Pool.



State of New Mexico  
Oil Conservation Commission  
January 29, 1963

Page 2

The following is a list of parties interested in this Application:

El Paso Natural Gas Company  
Post Office Box 990  
Farmington, New Mexico

Caulkins Oil Company  
1130 First National Building  
Denver 2, Colorado

El Paso Natural Gas Products Company  
Post Office Box 1560  
Farmington, New Mexico

International Oil Company  
825 Petroleum Club Building  
Denver, Colorado

Consolidated Oil and Gas Corporation  
4150 East Mexico Avenue - Suite 200  
Denver 22, Colorado

Respectfully submitted,

COMPASS EXPLORATION, INC.

*P. J. Farrelly*  
P. J. Farrelly  
Manager, Exploration  
and Production

PJF:cks

2748  
CERTIFICATE - DETERMINATION

14-08-0001 8501

Pursuant to the authority vested in the Secretary of Interior as to Federal Lands, under the Act approved February 25, 1920, 41 Stat. 437, as amended, 30 U.S.C. Secs. 181, et seq., and delegated to the Director of the Geological Survey pursuant to Departmental Order No. 2365 of October 8, 1947, 43 C.F.R. Sec. 4.611, 12 F.R. 6784, I do hereby:

A. Approve the attached Agreement for the development and operation of the Indian Hills Unit Area, Eddy County, State of New Mexico.

B. Certify and determine that the unit plan of development and operation contemplated in the attached agreement is necessary and advisable in the public interest for the purpose of more properly conserving the natural resources.

C. Certify and determine that the drilling, producing, rental, minimum royalty, and royalty requirements of all Federal leases committed to said agreement are hereby established, altered, changed, or revoked to conform with the terms and conditions of this agreement.

FEB 20 1963

DATED

Acting

*William M. Scher*  
Director, United States  
Geological Survey

RECEIVED  
JAN 23 1963  
U.S. DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

UNIT AGREEMENT  
FOR THE DEVELOPMENT AND OPERATION OF THE  
INDIAN HILLS UNIT AREA  
EDDY COUNTY, NEW MEXICO

NO. \_\_\_\_\_

THIS AGREEMENT, entered into as of the 23rd day of January, 1963, by and between the parties subscribing, ratifying, or consenting hereto, and herein referred to as the "parties hereto",

W I T N E S S E T H:

WHEREAS, the parties hereto are the owners of working, royalty or other oil and gas interests in the unit area subject to this agreement; and

WHEREAS, the Mineral Leasing Act of February 25, 1920, 41 Stat. 437, as amended, 30 U.S.C. Secs. 181 et seq., authorizes Federal lessees and their representatives to unite with each other, or jointly or separately with others, in collectively adopting and operating a cooperative or unit plan of development or operation of any oil or gas pool, field, or like area, or any part thereof for the purpose of more properly conserving the natural resources thereof whenever determined and certified by the Secretary of the Interior to be necessary or advisable in the public interest; and

WHEREAS, the Commissioner of Public Lands of the State of New Mexico is authorized by an Act of the Legislature (Sec 7-11-39 N.M. Statutes 1953 Annotated) to consent to or approve this agreement on behalf of the State of New Mexico, insofar as it covers and includes lands and mineral interests of the State of New Mexico; and

WHEREAS, the Oil Conservation Commission of the State of New Mexico is authorized by an act of the Legislature (Article 3, N.M. Stat. 1953 Annotated) to approve this agreement and the con-

servation provisions hereof; and

WHEREAS, the parties hereto hold sufficient interests in the Indian Hills Unit Area covering the land hereinafter described to give reasonably effective control of operations therein; and

WHEREAS, it is the purpose of the parties hereto to conserve natural resources, prevent waste, and secure other benefits obtainable through development and operation of the area subject to this agreement under the terms, conditions and limitations herein set forth;

NOW, THEREFORE, in consideration of the premises and the promises herein contained, the parties hereto commit to this agreement their respective interests in the below-defined unit area, and agree severally among themselves as follows:

1. ENABLING ACT AND REGULATIONS. The Mineral Leasing Act of February 25, 1920, as amended, supra, and all valid pertinent regulations, including operating and unit plan regulations, heretofore issued thereunder or valid, pertinent, and reasonable regulations hereafter issued thereunder are accepted and made a part of this agreement as to Federal lands, provided such regulations are not inconsistent with the terms of this agreement; and as to State of New Mexico and privately owned lands, the oil and gas operating regulations in effect as of the effective date hereof governing drilling and producing operations, not inconsistent with the terms hereof or the laws of the State of New Mexico are hereby accepted and made a part of this agreement.

2. UNIT AREA. The following-described land is hereby designated and recognized as constituting the unit area:

T-21-S, R-24-E, NMPM

Section 16: All  
Section 17: All  
Section 20: All  
Section 21: All  
Section 28: All  
Section 29: All  
Section 33: All

Containing 4,480 acres, more or less.

Exhibit A attached hereto is a map showing the unit area and the boundaries and identity of tracts and leases in said area to the extent known to the Unit Operator. Exhibit B attached hereto is a schedule showing to the extent known to the Unit Operator the acreage, percentage, and kind of ownership of oil and gas interests in all land in the unit area. However, nothing herein or in said schedule or map shall be construed as a representation by any party hereto as to the ownership of any interest other than such interest or interests as are shown in said map or schedule as owned by such party. Exhibits A and B shall be revised by the Unit Operator whenever changes in the unit area render such revision necessary, or when requested by the Oil and Gas Supervisor, hereinafter referred to as "Supervisor", or when requested by the Commissioner of Public Lands of the State of New Mexico, hereinafter referred to as "Commissioner", and not less than seven (7) copies of the revised exhibits shall be filed with the Supervisor, and two (2) copies thereof shall be filed with the Commissioner and one (1) copy with the New Mexico Oil Conservation Commission, hereinafter referred to as "Commission."

The above-described unit area shall when practicable be expanded to include therein any additional tract or tracts regarded as reasonably necessary or advisable for the purposes of this agreement, or shall be contracted to exclude lands not within any par-

icipating area whenever such expansion or contraction is necessary or advisable to conform with the purposes of this agreement. Such expansion or contraction shall be effected in the following manner:

(a) Unit Operator, on his own motion or on demand of the Director of the Geological Survey, hereinafter referred to as "Director", or on demand of the Commissioner, after preliminary concurrence by the Director, shall prepare a notice of proposed expansion or contraction describing the contemplated changes in the boundaries of the unit area, the reasons therefor, and the proposed effective date thereof, preferably the first day of a month subsequent to the date of notice.

(b) Said notice shall be delivered to the Supervisor, the Commissioner and the Commission and copies thereof mailed to the last known address of each working interest owner, lessee, and lessor whose interests are affected, advising that 30 days will be allowed for submission to the Unit Operator of any objections.

(c) Upon expiration of the 30-day period provided in the preceding item (b) hereof, Unit Operator shall file with the Supervisor, the Commissioner and the Commission evidence of mailing of the notice of expansion or contraction and a copy of any objections thereto which have been filed with the Unit Operator, together with an application in sufficient number, for approval of such expansion or contraction and with appropriate joinders.

(d) After due consideration of all pertinent information, the expansion or contraction shall, upon approval by the Director, the Commissioner and the Commission, become effective as of the date prescribed in the notice thereof.

(e) All legal subdivisions of unitized lands (i.e. 40 acres by Government survey or its nearest lot or tract equivalent in

instances of irregular surveys, however, unusually large lots or tracts shall be considered in multiples of 40 acres, or the nearest aliquot equivalent thereof, for the purpose of elimination under this subsection), no parts of which are entitled to be in a participating area within 5 years after the first day of the month following the effective date of the first initial participating area established under this unit agreement, shall be eliminated automatically from this agreement, effective as of the first day thereafter, and such lands shall no longer be a part of the unit area and shall no longer be subject to this agreement, unless at the expiration of said 5-year period diligent drilling operations are in progress on unitized lands not entitled to participation, in which event all such lands shall remain subject hereto for so long as such drilling operations are continued diligently, with not more than 90 days' time elapsing between the completion of one such well and the commencement of the next such well, except that the time allowed between such wells shall not expire earlier than 30 days after the expiration of any period of time during which drilling operations are prevented by a matter beyond the reasonable control of unit operator as set forth in the section hereof entitled "Unavoidable Delay"; provided that all legal subdivisions of lands not in a participating area and not entitled to become participating under the applicable provisions of this agreement within 10 years after said first day of the month following the effective date of said first initial participating area shall be eliminated as above specified. Determination of creditable "Unavoidable Delay" time shall be made by Unit Operator and subject to approval of the Director and the Commissioner. The Unit Operator shall, within 90

days after the effective date of any elimination hereunder, describe the area so eliminated to the satisfaction of the Director and the Commissioner and promptly notify all parties in interest.

If conditions warrant extension of the 10-year period specified in this subsection 2(e), a single extension of not to exceed two years may be accomplished by consent of the owners of 90 percent of the current unitized working interests and 60 percent of the current unitized basic royalty interests (exclusive of the basic royalty interests of the United States), on a total-non-participating-acreage basis, respectively, with approval of the Director, and the Commissioner, provided such extension application is submitted to the Commissioner and the Director not later than 60 days prior to the expiration of said 10-year period.

Any expansion of the unit area pursuant to this section which embraces lands theretofore eliminated pursuant to this subsection 2(e) shall not be considered automatic commitment or re-commitment of such lands.

3. UNITIZED LAND AND UNITIZED SUBSTANCES. All land committed to this agreement shall constitute land referred to herein as "unitized land" or "land subject to this agreement." All oil and gas in any and all formations of the unitized land are unitized under the terms of this agreement and herein are called "unitized substances."

4. UNIT OPERATOR. Ralph Lowe of Midland, Texas, is hereby designated as Unit Operator and by signature hereto as Unit Operator commits to this agreement all interests in unitized substances vested in him and agrees and consents to accept the duties and obligations of Unit Operator for the discovery, development and



production of unitized substances as herein provided. Whenever reference is made herein to the Unit Operator, such reference means the Unit Operator acting in that capacity and not as owner of interest in unitized substances, and the term "working interest owner" when used herein shall include or refer to Unit Operator as the owner of a working interest when such an interest is owned by him.

5. RESIGNATION OR REMOVAL OF UNIT OPERATOR. Unit Operator shall have the right to resign at any time prior to the establishment of a participating area or areas hereunder, but such resignation shall not become effective so as to release Unit Operator from the duties and obligations of Unit Operator and terminate Unit Operator's rights as such for a period of six (6) months after notice of intention to resign has been served by Unit Operator on all working interest owners and the Director, the Commissioner and Commission and until all wells then drilled hereunder are placed in a satisfactory condition for suspension or abandonment whichever is required by the Supervisor as to Federal lands and by the Commission as to State and privately owned lands unless a new Unit Operator shall have been selected and approved and shall have taken over and assumed the duties and obligations of Unit Operator prior to the expiration of said period.

Unit Operator shall have the right to resign in like manner and subject to like limitations, as above provided, at any time a participating area established hereunder is in existence, but, in all instances of resignation or removal, until a successor unit operator is selected and approved as hereinafter provided, the working interest owners shall be jointly responsible for performance of the duties of unit operator, and shall not later than 30

days before such resignation or removal becomes effective appoint a common agent to represent them in any action to be taken hereunder.

The resignation of Unit Operator shall not release Unit Operator from any liability for any default by him hereunder occurring prior to the effective date of his resignation.

The Unit Operator may, upon default or failure in the performance of his duties or obligations hereunder, be subject to removal by the same percentage vote of the owners of working interests determined in like manner as herein provided for the selection of a new unit operator. Such removal shall be effective upon notice thereof to the Director and the Commissioner.

The resignation or removal of Unit Operator under this agreement shall not terminate his right, title, or interest as the owner of a working interest or other interest in unitized substances, but upon the resignation or removal of Unit Operator becoming effective, such Unit Operator shall deliver possession of all equipment, materials, and appurtenances used in conducting the unit operations and owned by the working interest owners to the new duly qualified successor Unit Operator or to the owners thereof if no such new Unit Operator is elected, to be used for the purpose of conducting unit operations hereunder. Nothing herein shall be construed as authorizing removal of any material, equipment and appurtenances needed for the preservation of any wells.

6. SUCCESSOR UNIT OPERATOR. Whenever the Unit Operator shall tender his or its resignation as Unit Operator or shall be removed as hereinabove provided, or a change of Unit Operator is negotiated by working interest owners, the owners of the working

interests in the participating area or areas according to their respective acreage interests in such participating area or areas, or, until a participating area shall have been established, the owners of the working interests according to their respective acreage interests in all unitized land, shall by majority vote select a successor Unit Operator: Provided, That, if a majority but less than 75 percent of the working interests qualified to vote are owned by one party to this agreement, a concurring vote of one or more additional working interest owners shall be required to select a new operator. Such selection shall not become effective until:

(a) a Unit Operator so selected shall accept in writing the duties and responsibilities of Unit Operator, and

(b) the selection shall have been filed with the Supervisor and approved by the Commissioner. If no successor Unit Operator is selected and qualified as herein provided, the Director and Commissioner at their election may declare this unit agreement terminated.

#### 7. ACCOUNTING PROVISIONS AND UNIT OPERATING AGREEMENT.

If the Unit Operator is not the sole owner of working interests, costs and expenses incurred by Unit Operator in conducting unit operations hereunder shall be paid and apportioned among and borne by the owners of working interests, all in accordance with the agreement or agreements entered into by and between the Unit Operator and the owners of working interests, whether one or more, separately or collectively. Any agreement or agreements entered into between the working interest owners and the Unit Operator as provided in this section, whether one or more, are herein referred to as the "unit operating agreement." Such unit operating agreement shall

also provide the manner in which the working interest owners shall be entitled to receive their respective proportionate and allocated share of the benefits accruing hereto in conformity with their underlying operating agreements, leases, or other independent contracts, and such other rights and obligations as between Unit Operator and the working interest owners as may be agreed upon by Unit Operator and the working interest owners; however, no such unit operating agreement shall be deemed either to modify any of the terms and conditions of this unit agreement or to relieve the Unit Operator of any right or obligation established under this unit agreement, and in case of any inconsistency or conflict between the unit agreement and the unit operating agreement, this unit agreement shall prevail. Three (3) true copies of any unit operating agreement executed pursuant to this section should be filed with the Supervisor, and one (1) true copy with the Commissioner, prior to approval of this unit agreement by the Director.

8. RIGHTS AND OBLIGATIONS OF UNIT OPERATOR. Except as otherwise specifically provided herein, the exclusive right, privilege, and duty of exercising any and all rights of the parties hereto which are necessary or convenient for prospecting for, producing, storing, allocating, and distributing the unitized substances are hereby delegated to and shall be exercised by the Unit Operator as herein provided. Acceptable evidence of title to said rights shall be deposited with said Unit Operator and, together with this agreement, shall constitute and define the rights, privileges, and obligations of Unit Operator. Nothing herein, however, shall be construed to transfer title to any land or to any lease or operating agreement, it being understood that under this

agreement the Unit Operator, in his capacity as Unit Operator, shall exercise the rights of possession and use vested in the parties hereto only for the purposes herein specified.

9. DRILLING TO DISCOVERY. Within six months after the effective date hereof, the Unit Operator shall begin to drill an adequate test well at a location approved by the Supervisor if on Federal land or by the Commissioner if on State land, unless on such effective date a well is being drilled conformably with the terms hereof, and thereafter continue such drilling diligently until the Devonian formations have been tested or until at a lesser depth unitized substances shall be discovered which can be produced in paying quantities (to-wit: quantities sufficient to repay the costs of drilling, and producing operations, with a reasonable profit) or the Unit Operator shall at any time establish to the satisfaction of the Supervisor if on Federal land, of the Commissioner if on State land, that further drilling of said well would be unwarranted or impracticable, provided; however, that Unit Operator shall not in any event be required to drill said well to a depth in excess of 10,500 feet. Until the discovery of a deposit of unitized substances capable of being produced in paying quantities, the Unit Operator shall continue drilling diligently one well at a time, allowing not more than six months between the completion of one well and the beginning of the next well, until a well capable of producing unitized substances in paying quantities is completed to the satisfaction of said Supervisor if it be on Federal land or of the Commissioner if on State land, or until it is reasonably proved that the unitized land is incapable of producing unitized substances in paying quantities in the formations drilled

hereunder. Nothing in this section shall be deemed to limit the right of the Unit Operator to resign as provided in Section 5 hereof, or as requiring Unit Operator to commence or continue any drilling during the period pending such resignation becoming effective in order to comply with the requirements of this section. The Director and Commissioner may modify the drilling requirements of this section by granting reasonable extensions of time when, in their opinion, such action is warranted.

Upon failure to comply with the drilling provisions of this section, the Director and Commissioner may, after reasonable notice to the Unit Operator, and each working interest owner, lessee, and lessor at their last known addresses, declare this unit agreement terminated.

10. PLAN OF FURTHER DEVELOPMENT AND OPERATION. Within six months after completion of a well capable of producing unitized substances in paying quantities, the Unit Operator shall submit for the approval of the Supervisor and the Commissioner an acceptable plan of development and operation for the unitized land which, when approved by the Supervisor and the Commissioner, shall constitute the further drilling and operating obligations of the Unit Operator under this agreement for the period specified therein. Thereafter, from time to time before the expiration of any existing plan, the Unit Operator shall submit for the approval of the Supervisor and the Commissioner a plan for an additional specified period for the development and operation of the unitized land. Any plan submitted pursuant to this section shall provide for the exploration of the unitized area and for the diligent drilling necessary for determination of the area or areas thereof capable

of producing unitized substances in paying quantities in each and every productive formation and shall be as complete and adequate as the Supervisor and the Commissioner may determine to be necessary for timely development and proper conservation of the oil and gas resources of the unitized area and shall:

(a) specify the number and location of wells to be drilled and the proposed order and time for such drilling; and

(b) to the extent practicable specify the operating practices regarded as necessary and advisable for proper conservation of natural resources. Separate plans may be submitted for separate productive zones, subject to the approval of the Supervisor and the Commissioner. Said plan or plans shall be modified or supplemented when necessary to meet changed conditions or to protect the interests of all parties to this agreement. Reasonable diligence shall be exercised in complying with the obligations of the approved plan of development. The Supervisor and Commissioner are authorized to grant a reasonable extension of the six-month period herein prescribed for submission of an initial plan of development where such action is justified because of unusual conditions or circumstances. After completion hereunder of a well capable of producing unitized substances in paying quantities, no further wells, except such as may be necessary to afford protection against operations not under this agreement or such as may be specifically approved by the Supervisor and the Commissioner shall be drilled except in accordance with a plan of development approved as herein provided.

11. PARTICIPATION AFTER DISCOVERY. Upon completion of a well capable of producing unitized substances in paying quantities,

the Unit Operator shall, within the month of such completion, if practicable, or as soon thereafter as required by the Supervisor or the Commissioner, submit for approval by the Director and the Commissioner a schedule based on subdivisions of the public-land survey or aliquot parts thereof, of all unitized land then regarded as reasonably proved to be productive of unitized substances in paying quantities; all lands in said schedule on approval of the Director and the Commissioner to constitute a participating area, effective as of the date of completion of such well or the effective date of the unit agreement, whichever is later. The acreages of both Federal and non-Federal lands shall be based upon appropriate computations from the courses and distances shown on the last approved public-land survey as of the effective date of the initial participating area. Said schedule also shall set forth the percentage of unitized substances to be allocated as herein provided to each unitized tract in the participating area so established, and shall govern the allocation of production from and after the date the participating area becomes effective. A separate participating area shall be established in like manner for each separate pool or deposit of unitized substances or for any group thereof produced as a single pool or zone, and any two or more participating areas so established may be combined into one with the consent of the owners of all working interests in the lands within the participating areas so to be combined, on approval of the Director and the Commissioner. The participating area or areas so established shall be revised from time to time, subject to like approval, whenever such action appears proper as a result of further drilling operations or other-



wise, to include additional land then regarded as reasonably proved to be productive in paying quantities, or to exclude land then regarded as reasonably proved not to be productive in paying quantities and the percentage of allocation shall also be revised accordingly. The effective date of any revision shall be the first of the month in which is obtained the knowledge or information on which such revision is predicated, provided, however, that a more appropriate effective date may be used if justified by the Unit Operator and approved by the Director and the Commissioner. No land shall be excluded from a participating area on account of depletion of the unitized substances.

It is the intent of this section that a participating area shall represent the area known or reasonably estimated to be productive in paying quantities; but, regardless of any revision of the participating area, nothing herein contained shall be construed as requiring any retroactive adjustment for production obtained prior to the effective date of the revision of the participating area.

In the absence of agreement at any time between the Unit Operator and the Director and the Commissioner as to the proper definition or redefinition of a participating area, or until a participating area has, or areas have, been established as provided herein, the portion of all payments affected thereby may be impounded in a manner mutually acceptable to the owners of working interests, except royalties due the United States and the State of New Mexico, which shall be determined by the Supervisor for Federal lands and the Commissioner for State lands and the amount thereof deposited, as directed by the

Supervisor and the Commissioner respectively, to be held as un-earned money until a participating area is finally approved and then applied as earned or returned in accordance with a determination of the sum due as Federal and State royalty on the basis of such approved participating area.

Whenever it is determined, subject to the approval of the Supervisor, as to wells drilled on Federal land, and of the Commissioner as to wells drilled on State land, that a well drilled under this agreement is not capable of production in paying quantities and inclusion of the land on which it is situated in a participating area is unwarranted, production from such well shall, for the purposes of settlement among all parties other than working interest owners, be allocated to the land on which the well is located so long as such land is not within a participating area established for the pool or deposit from which such production is obtained. Settlement for working interest benefits from such a well shall be made as provided in the unit operating agreement.

12. ALLOCATION OF PRODUCTION. All unitized substances produced from each participating area established under this agreement, except any part thereof used in conformity with good operating practices within the unitized area for drilling, operating, camp and other production or development purposes, for repressuring or recycling in accordance with a plan of development approved by the Supervisor and Commissioner, or unavoidably lost, shall be deemed to be produced equally on an acreage basis from the several tracts of unitized land of the participating area established for such production and, for the purpose of determining any benefits

accruing under this agreement, each such tract of unitized land shall have allocated to it such percentage of said production as the number of acres of such tract included in said participating area bears to the total acres of unitized land in said participating area, except that allocation of production hereunder for purposes other than for settlement of the royalty, overriding royalty, or payment out of production obligations of the respective working interest owners, shall be on the basis prescribed in the unit operating agreement whether in conformity with the basis of allocation herein set forth or otherwise. It is hereby agreed that production of unitized substances from a participating area shall be allocated as provided herein regardless of whether any wells are drilled on any particular part or tract of said participating area. If any gas produced from one participating area is used for repressuring or recycling purposes in another participating area, the first gas withdrawn from such last-mentioned participating area for sale during the life of this agreement shall be considered to be the gas so transferred until an amount equal to that transferred shall be so produced for sale and such gas shall be allocated to the participating area from which initially produced as constituted at the time of such final production.

13. DEVELOPMENT OR OPERATION OF NON-PARTICIPATING LAND OR FORMATIONS. Any party hereto owning or controlling the working interest in any unitized land having thereon a regular well location may with the approval of the Supervisor as to Federal land and the Commissioner as to State land, at such party's sole risk, costs and expense, drill a well to test any formation for which

a participating area has not been established or to test any formation for which a participating area has been established if such location is not within said participating area, unless within 90 days of receipt of notice from said party of his intention to drill the well the Unit Operator elects and commences to drill such a well in like manner as other wells are drilled by the Unit Operator under this agreement.

If any well drilled as aforesaid by a working interest owner results in production such that the land upon which it is situated may properly be included in a participating area, such participating area shall be established or enlarged as provided in this agreement and the well shall thereafter be operated by the Unit Operator in accordance with the terms of this agreement and the unit operating agreement.

If any well drilled as aforesaid by a working interest owner obtains production in quantities insufficient to justify the inclusion in a participating area of the land upon which such well is situated, such well may be operated and produced by the party drilling the same subject to the conservation requirements of this agreement. The royalties in amount or value of production from any such well shall be paid as specified in the underlying lease and agreements affected.

14. ROYALTY SETTLEMENT. The United States and any State and all royalty owners who, under existing contract, are entitled to take in kind a share of the substances now unitized hereunder produced from any tract, shall hereafter be entitled to the right to take in kind their share of the unitized substances allocated to such tract, and Unit Operator, or in case of the

operation of a well by a working interest owner as herein in special cases provided for, such working interest owner, shall make deliveries of such royalty share taken in kind in conformity with the applicable contracts, laws, and regulations. Settlement for royalty interest not taken in kind shall be made by working interest owners responsible therefor under existing contracts, laws and regulations on or before the last day of each month for unitized substances produced during the preceding calendar month; provided, however, that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any royalties due under their leases.

If gas obtained from lands not subject to this agreement is introduced into any participating area hereunder, for use in repressuring, stimulation of production, or increasing ultimate recovery, which shall be in conformity with a plan first approved by the Supervisor and the Commissioner, a like amount of gas, after settlement as herein provided for any gas transferred from any other participating area and with due allowance for loss or depletion from any cause, may be withdrawn from the formation into which the gas was introduced, royalty free as to dry gas, but not as to the products extracted therefrom; provided that such withdrawal shall be at such time as may be provided in the plan of operations or as may otherwise be consented to by the Supervisor, and the Commissioner as conforming to good petroleum engineering practice; and provided further, that such right of withdrawal shall terminate on the termination of this unit agreement.

Royalty due the United States shall be computed as provided in the operating regulations and paid in value or delivered in kind as to all unitized substances on the basis of the amounts thereof allocated to unitized Federal land as provided herein at the rates specified in the respective Federal leases, or at such lower rate or rates as may be authorized by law or regulation; provided, that for leases on which the royalty rate depends on the daily average production per well, said average production shall be determined in accordance with the operating regulations as though each participating area were a single consolidated lease.

Royalty due on account of State lands shall be computed and paid on the basis of all unitized substances allocated to such lands.

15. RENTAL SETTLEMENT. Rental or minimum royalties due on leases committed hereto shall be paid by working interest owners responsible therefor under existing contracts, laws, and regulations, provided that nothing herein contained shall operate to relieve the lessees of any land from their respective lease obligations for the payment of any rental or minimum royalty in lieu thereof due under their leases. Rental or minimum royalty for lands of the United States subject to this agreement shall be paid at the rate specified in the respective leases from the United States unless such rental or minimum royalty is waived, suspended, or reduced by law or by approval of the Secretary or his duly authorized representative.

Rentals on State of New Mexico lands subject to this agreement shall be paid at the rates specified in the respective leases.

With respect to any lease on non-Federal land containing provisions which would terminate such lease unless drilling operations were within the time therein specified commenced upon the land covered thereby or rentals paid for the privilege of deferring such drilling operations, the rentals required thereby shall, notwithstanding any other provision of this agreement, be deemed to accrue and become payable during the term thereof as extended by this agreement and thereafter until the required drilling operations are commenced upon the land covered thereby or some portion of such land is included within a participating area.

16. CONSERVATION. Operations hereunder and production of unitized substances shall be conducted to provide for the most economical and efficient recovery of said substances without waste, as defined by or pursuant to State or Federal law or regulation.

17. DRAINAGE. The Unit Operator shall take appropriate and adequate measures to prevent drainage of unitized substances from unitized land by wells on land not subject to this agreement, or, with the consent of the Director and the Commissioner, pursuant to applicable regulations pay a fair and reasonable compensatory royalty.

18. LEASES AND CONTRACTS CONFORMED AND EXTENDED. The terms, conditions, and provisions of all leases, subleases, and other contracts relating to exploration, drilling, development, or operation for oil or gas of lands committed to this agreement are hereby expressly modified and amended to the extent necessary to make the same conform to the provisions hereof, but otherwise

to remain in full force and effect; and the parties hereto hereby consent that the Secretary as to Federal leases and the Commissioner as to State leases shall and each by his approval hereof, or by the approval hereof by his duly authorized representative, does hereby establish, alter, change, or revoke the drilling, producing, rental, minimum royalty, and royalty requirements of Federal and State leases committed hereto and the regulations in respect thereto to conform said requirements to the provisions of this agreement, and, without limiting the generality of the foregoing, all leases, subleases, and contracts are particularly modified in accordance with the following:

(a) The development and operation of lands subject to this agreement under the terms hereof shall be deemed full performance of all obligations for development and operation with respect to each and every part or separately owned tract subject to this agreement, regardless of whether there is any development of any particular part or tract of the unit area, notwithstanding anything to the contrary in any lease, operating agreement or other contract by and between the parties hereto, or their respective predecessors in interest, or any of them.

(b) Drilling and producing operations performed hereunder upon any tract of unitized lands will be accepted and deemed to be performed upon and for the benefit of each and every tract of unitized land, and no lease shall be deemed to expire by reason of failure to drill or produce wells situated on the land therein embraced.

(c) Suspension of drilling or producing operations on all unitized lands pursuant to direction or consent of the



Secretary and the Commissioner, or their duly authorized representatives, shall be deemed to constitute such suspension pursuant to such direction or consent as to each and every tract of unitized land.

(d) Any Federal lease for a fixed term of twenty (20) years or any renewal thereof or any part of such lease which is made subject to this agreement shall continue in force beyond the term provided therein until the termination hereof. Any other Federal lease committed hereto shall continue in force beyond the term so provided therein or by law as to the land committed so long as such lease remains subject hereto, provided that production is had in paying quantities under this unit agreement prior to the expiration date of the term of such lease, or in the event actual drilling operations are commenced on unitized land, in accordance with the provisions of this agreement, prior to the end of the primary term of such lease and are being diligently prosecuted at that time, such lease shall be extended for two years and so long thereafter as oil or gas is produced in paying quantities in accordance with the provisions of the Mineral Leasing Act Revision of 1960.

(e) Each sublease or contract relating to the operation and development of unitized substances from lands of the United States committed to this agreement, which by its terms would expire prior to the time at which the underlying lease, as extended by the immediately preceding paragraph, will expire, is hereby extended beyond any such term so provided therein so that it shall be continued in full force and effect for and during the term of the underlying lease as such term is herein

extended.

(f) Any lease embracing lands of the State of New Mexico which is made subject to this agreement, shall continue in force beyond the term provided therein as to the lands committed hereto until the termination hereof.

(g) The segregation of any Federal lease committed to this agreement is governed by the following provision in the fourth paragraph of Sec. 17(j) of the Mineral Leasing Act, as amended by the Act of September 2, 1960 (74 Stat. 781-784): "Any (Federal) lease heretofore or hereafter committed to any such (unit) plan embracing lands that are in part within and in part outside of the area covered by any such plan shall be segregated into separate leases as to the lands committed and the lands not committed as of the effective date of unitization: Provided, however, That any such lease as to the non-unitized portion shall continue in force and effect for the term thereof but for not less than two years from the date of such segregation and so long thereafter as oil or gas is produced in paying quantities."

(h) Any lease embracing lands of the State of New Mexico having only a portion of its lands committed hereto, shall be segregated as to the portion committed and the portion not committed, and the terms of such lease shall apply separately to such segregated portions commencing as of the effective date hereof; provided, however, notwithstanding any of the provisions of this agreement to the contrary any lease embracing lands of the State of New Mexico having only a portion of its lands committed hereto shall continue in full force and effect beyond the

term provided therein as to all lands embraced in such lease, if oil or gas is discovered and is capable of being produced in paying quantities from some part of the lands embraced in such lease at the expiration of the secondary term of such lease; or if, at the expiration of the secondary term, the Lessee or the Unit Operator is then engaged in bona fide drilling or reworking operations on some part of the lands embraced in such lease, the same, as to all lands embraced therein, shall remain in full force and effect so long as such operations are being diligently prosecuted, and if they result in the production of oil or gas, said lease shall continue in full force and effect as to all of the lands embraced therein, so long thereafter as oil or gas in paying quantities is being produced from any portion of said lands.

19. COVENANTS RUN WITH LAND. The covenants herein shall be construed to be covenants running with the land with respect to the interest of the parties hereto and their successors in interest until this agreement terminates, and any grant, transfer, or conveyance, of interest in land or leases subject hereto shall be and hereby is conditioned upon the assumption of all privileges and obligations hereunder by the grantee, transferee, or other successor in interest. No assignment or transfer of any working interest, royalty, or other interest subject hereto shall be binding upon Unit Operator until the first day of the calendar month after Unit Operator is furnished with the original, photostatic, or certified copy of the instrument of transfer.

20. EFFECTIVE DATE AND TERM. This agreement shall

become effective upon approval by the Director and the Commissioner or their duly authorized representatives as of the date of approval by the Director and shall terminate five (5) years from said effective date unless:

(a) such date of expiration is extended by the Director and the Commissioner, or

(b) it is reasonably determined prior to the expiration of the fixed term or any extension thereof that the unitized land is incapable of production of unitized substances in paying quantities in the formations tested hereunder and after notice of intention to terminate the agreement on such ground is given by the Unit Operator to all parties in interest at their last known addresses, the agreement is terminated with the approval of the Director and Commissioner, or

(c) a valuable discovery of unitized substances has been made or accepted on unitized land during said initial term or any extension thereof, in which event the agreement shall remain in effect for such term and so long as unitized substances can be produced in quantities sufficient to pay for the cost of producing same from wells on unitized land within any participating area established hereunder and, should production cease, so long thereafter as diligent operations are in progress for the restoration of production or discovery of new production and so long thereafter as the unitized substances so discovered can be produced as aforesaid, or

(d) it is terminated as heretofore provided in this agreement.

This agreement may be terminated at any time by not

less than 75 per centum, on an acreage basis, of the owners of working interests signatory hereto, with the approval of the Director and Commissioner; notice of any such approval to be given by the Unit Operator to all parties hereto.

21. RATE OF PROSPECTING, DEVELOPMENT, AND PRODUCTION. The Director is hereby vested with authority to alter or modify from time to time in his discretion the quantity and rate of production under this agreement when such quantity and rate is not fixed pursuant to Federal or State law or does not conform to any state-wide voluntary conservation or allocation program, which is established, recognized, and generally adhered to by the majority of operators in such State, such authority being hereby limited to alteration or modification in the public interest, the purpose thereof and the public interest to be served thereby to be stated in the order of alteration or modification. Without regard to the foregoing, the Director is also hereby vested with authority to alter or modify from time to time in his discretion the rate of prospecting and development and the quantity and rate of production under this agreement when such alteration or modification is in the interest of attaining the conservation objectives stated in this agreement and is not in violation of any applicable Federal or State law; Provided, further, that no such alteration or modification shall be effective as to any land of the State of New Mexico, as to the rate of prospecting and developing in the absence of the specific written approval thereof by the Commissioner and as to any lands of the State of New Mexico or privately owned lands subject to this agreement as to the quantity and rate of

production in the absence of specific written approval thereof by the Commission.

Powers in this section vested in the Director shall only be exercised after notice to Unit Operator and opportunity for hearing to be held not less than 15 days from notice.

22. CONFLICT OF SUPERVISION. Neither the Unit Operator nor the working interest owners nor any of them shall be subject to any forfeiture, termination or expiration of any rights hereunder or under any leases or contracts subject hereto, or to any penalty or liability on account of delay or failure in whole or in part to comply with any applicable provision thereof to the extent that the Unit Operator, working interest owners or any of them are hindered, delayed or prevented from complying therewith by reason of failure of the Unit Operator to obtain in the exercise of due diligence, the concurrence of proper representatives of the United States and proper representatives of the State of New Mexico in and about any matters or thing concerning which it is required herein that such concurrence be obtained. The parties hereto, including the Commission, agree that all powers and authority vested in the Commission in and by any provisions of this agreement are vested in the Commission and shall be exercised by it pursuant to the provisions of the laws of the State of New Mexico and subject in any case to appeal or judicial review as may now or hereafter be provided by the laws of the State of New Mexico.

23. APPEARANCES. Unit Operator shall, after notice to other parties affected, have the right to appear for and on

behalf of any and all interests affected hereby before the Department of the Interior, the Commissioner of Public Lands of the State of New Mexico and the New Mexico Oil Conservation Commission and to appeal from orders issued under the regulations of said Department, the Commission or Commissioner or to apply for relief from any of said regulations or in any proceedings relative to operations before the Department of the Interior, the Commissioner, or Commission or any other legally constituted authority; provided, however, that any other interested party shall also have the right at his own expense to be heard in any such proceeding.

24. NOTICES. All notices, demands or statements required hereunder to be given or rendered to the parties hereto shall be deemed fully given if given in writing and personally delivered to the party or sent by postpaid registered or certified mail, addressed to such party or parties at their respective addresses set forth in connection with the signatures hereto or to the ratification or consent hereof or to such other address as any such party may have furnished in writing to party sending the notice, demand or statement.

25. NO WAIVER OF CERTAIN RIGHTS. Nothing in this agreement contained shall be construed as a waiver by any party hereto of the right to assert any legal or constitutional right or defense as to the validity or invalidity of any law of the State wherein said unitized lands are located, or of the United States, or regulations issued thereunder in any way affecting such party, or as a waiver by any such party of any right beyond his or its authority to waive.

26. UNAVOIDABLE DELAY. All obligations under this agreement requiring the Unit Operator to commence or continue drilling or to operate on or produce unitized substances from any of the lands covered by this agreement shall be suspended while, but only so long as, the Unit Operator despite the exercise of due care and diligence is prevented from complying with such obligations, in whole or in part, by strikes, acts of God, Federal, State, or municipal law or agencies, unavoidable accidents, uncontrollable delays in transportation, inability to obtain necessary materials in open market, or other matters beyond the reasonable control of the Unit Operator whether similar to matters herein enumerated or not.

27. NONDISCRIMINATION. In connection with the performance of work under this agreement, the operator agrees to comply with all of the provisions of section 301(1) to (7) inclusive, of Executive Order 10925 (26 F.R. 1977), which are hereby incorporated by reference in this agreement.

28. LOSS OF TITLE. In the event title to any tract of unitized land shall fail and the true owner cannot be induced to join in this unit agreement, such tract shall be automatically regarded as not committed hereto and there shall be such readjustment of future costs and benefits as may be required on account of the loss of such title. In the event of a dispute as to title as to any royalty, working interest, or other interests subject thereto, payment or delivery on account thereof may be withheld without liability for interest until the dispute is finally settled; provided, that, as to Federal and State land or leases, no payments of funds due the United



States or the State of New Mexico should be withheld, but such funds of the United States shall be deposited as directed by the Supervisor and such funds of the State of New Mexico shall be deposited as directed by the Commissioner to be held as unearned money pending final settlement of the title dispute, and then applied as earned or returned in accordance with such final settlement.

Unit Operator as such is relieved from any responsibility for any defect or failure of any title hereunder.

29. NON-JOINDER AND SUBSEQUENT JOINDER. If the owner of any substantial interest in a tract within the unit area fails or refuses to subscribe or consent to this agreement, the owner of the working interest in that tract may withdraw said tract from this agreement by written notice to the Director, the Commissioner, and the Unit Operator prior to the approval of this agreement by the Director and Commissioner. Any oil or gas interests in lands within the unit area not committed hereto prior to submission of this agreement for final approval may thereafter be committed hereto by the owner or owners thereof subscribing or consenting to this agreement, and, if the interest is a working interest, by the owner of such interest also subscribing to the unit operating agreement. After operations are commenced hereunder, the right of subsequent joinder, as provided in this section, by a working interest owner is subject to such requirements or approvals, if any, pertaining to such joinder, as may be provided for in the unit operating agreement. After final approval hereof, joinder by a non-working interest owner must be consented to in writing by the

working interest owner committed hereto and responsible for the payment of any benefits that may accrue hereunder in behalf of such non-working interest. Joinder by any owner of a non-working interest, at any time, must be accompanied by appropriate joinder by the owner of the corresponding working interest in order for the interest to be regarded as committed hereto. Joinder to the unit agreement by a working-interest owner, at any time, must be accompanied by appropriate joinder to the unit operating agreement, if more than one committed working-interest owner is involved, in order for the interest to be regarded as committed to this unit agreement. Except as may otherwise herein be provided, subsequent joinders to this agreement shall be effective as of the first day of the month following the filing with the Supervisor and the Commissioner of duly executed counterparts of all or any papers necessary to establish effective commitment of any tract to this agreement unless objection to such joinder is duly made within sixty (60) days by the Director or Commissioner.

30. NO PARTNERSHIP. It is expressly agreed that the relation of the parties hereto is that of independent contractors and nothing in this agreement contained, expressed or implied, nor any operations conducted hereunder, shall create or be deemed to have created a partnership or association between the parties hereto or any of them.

31. COUNTERPARTS. This agreement may be executed in any number of counterparts no one of which needs to be executed by all parties or may be ratified or consented to by separate instrument in writing specifically referring hereto and shall be

binding upon all those parties who have executed such a counter-  
part, ratification, or consent hereto with the same force and  
effect as if all such parties had signed the same document and  
regardless of whether or not it is executed by all other parties  
owning or claiming an interest in the lands within the above-  
described unit area.

IN WITNESS WHEREOF, the parties hereto have caused this  
agreement to be executed and set opposite their respective names  
the date of execution.

*Ralph Lowe*  
RALPH LOWE

P.O. Box 832  
Midland, Texas

UNIT OPERATOR & WORKING INTEREST  
OWNER

*Erma Lowe*  
ERMA LOWE, his wife.

WORKING INTEREST OWNERS

MARATHON OIL COMPANY

By *J. G. Burrell* *JB*  
Address: \_\_\_\_\_

ATTEST:

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

INTERNATIONAL OIL & GAS CORPORATION

By \_\_\_\_\_  
Address: \_\_\_\_\_

ATTEST:

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

ATTEST:

\_\_\_\_\_  
Secretary

SUN OIL COMPANY

By [Signature]

Address: \_\_\_\_\_  
\_\_\_\_\_

~~XXXXXX~~

~~XXXXXXXXXXXXXXXXXXXXXXXXXXXX~~  
~~Secretary~~

MONSANTO CHEMICAL COMPANY

By Frank Richardson

Attorney-in-Fact

Address: 1401 South Coast Building

Houston 2, Texas

\_\_\_\_\_  
MARION E. SPITLER  
\_\_\_\_\_

STATE OF Texas

COUNTY OF Midland

ss.

The foregoing instrument was acknowledged before me  
this 13th day of January, 1963, by RALPH LOWE and  
Elena LOWE, his wife.

[Signature]  
Notary Public

My Commission Expires:

6-1-63

STATE OF Texas )  
COUNTY OF Harris ) ss.

The foregoing instrument was acknowledged before me  
this 14<sup>th</sup> day of February, 1963, by John A. [unclear],  
Agent in Fact of MARATHON OIL COMPANY, an Ohio  
corporation, on behalf of said corporation.

Viola LaMunyon  
Notary Public

My Commission Expires:  
\_\_\_\_\_

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) ss.

The foregoing instrument was acknowledged before me  
this \_\_\_\_\_ day of \_\_\_\_\_, 1963, by \_\_\_\_\_,  
\_\_\_\_\_ of INTERNATIONAL OIL & GAS CORPORATION, a  
\_\_\_\_\_ corporation, on behalf of said corporation.

\_\_\_\_\_  
Notary Public

My Commission Expires:  
\_\_\_\_\_

STATE OF Texas )  
COUNTY OF Dallas ) ss.

The foregoing instrument was acknowledged before me  
this 11<sup>th</sup> day of February, 1963, by T. F. HILL,  
Agent and Attorney in Fact of SUN OIL COMPANY, a New Jersey  
corporation, on behalf of said corporation.

Alf Burr  
Notary Public

My Commission Expires:  
6-1-63

ALF BURR  
Notary Public in and for  
Dallas County, Texas

STATE OF Iowa )  
COUNTY OF Harris ) ss.

The foregoing instrument was acknowledged before me  
this 14th day of February, 1963, by FRANK RICHARDSON,  
Attorney-in-Fact of MONSANTO CHEMICAL COMPANY, a Delaware  
corporation, on behalf of said corporation.

Dorothy D. Norton  
Notary Public

My Commission Expires:

JUNE 1, 1963.

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) ss.

The foregoing instrument was acknowledged before me  
this \_\_\_\_\_ day of \_\_\_\_\_, 1963, by MARION E. SPITLER  
\_\_\_\_\_.

\_\_\_\_\_  
Notary Public

My Commission Expires:

\_\_\_\_\_.

**CONSENT AND RATIFICATION OF UNIT AGREEMENT AND  
UNIT OPERATING AGREEMENT FOR THE DEVELOPMENT  
AND OPERATION OF THE INDIAN HILLS UNIT AREA,  
SADDY COUNTY, NEW MEXICO**

---

WHEREAS, 4,400 acres in Township 21 South, Range 24 East, N.M.P.M., Saddy County, New Mexico, have been committed to the Indian Hills Unit Agreement which designates Ralph Lane of Midland, Texas, as the unit operator; and

WHEREAS, International Oil & Gas Corporation is the lessee of record of Oil and Gas Lease LC 864343-A described as Tract No. 3 in Exhibit "B" attached to the Unit Agreement, <sup>WCS 6 WPM</sup> and Marion E. Spitzer is the lessee of record of Oil and Gas Lease LC 864343-B described as Tract No. 3 in Exhibit "B" <sup>WCS 7 WPM</sup> attached to the Unit Agreement; and

WHEREAS, the Indian Hills Unit Agreement has not been submitted for final approval by the director and the commissioner and pursuant to Article 19 of the Unit Agreement, the undersigned owners desire to subscribe and consent to the Unit Agreement and Unit Operating Agreement for the development and operation of the Indian Hills Unit Area, Saddy County, New Mexico.

Now, therefore, in consideration of the premises and other good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the undersigned do hereby ratify and consent to all of the terms and provisions of the Indian Hills Unit Agreement for all intents and purposes the same as if they had executed the original agreement. And

For the same consideration, the undersigned do hereby notify and consent to all of the terms and provisions of the Indian Hills Unit Operating Agreement for all intents and purposes the same as if they had executed the original Unit Operating Agreement.

EXECUTED this 12th day of February, 1963.

ATTEST:

INTERNATIONAL OIL & GAS  
CORPORATION

J. V. Kowalski  
ASSISTANT Secretary

By W. B. Macey  
W. B. Macey, President

Mary Lou Spitzer  
Mary Lou Spitzer

Marion E. Spitzer  
Marion E. Spitzer

STATE OF COLORADO )  
COUNTY OF DENVER ) ss.

The foregoing instrument was acknowledged before me this 12th day of February, 1963, by W. B. MACEY, President of International Oil & Gas Corporation, a Delaware corporation, on behalf of said corporation.

My commission expires:  
Nov. 25, 1964

Carlton L. Saradis  
Notary Public

STATE OF COLORADO )  
COUNTY OF DENVER ) ss.

<sup>15TH</sup> The foregoing instrument was acknowledged before me this 15th day of February, 1963, by MARION E. SPITZER and MARY LOU SPITZER, his wife.

My commission expires:  
July 8, 1963

James V. Kowalski  
Notary Public



CONSENT AND RATIFICATION  
INDIAN HILLS UNIT AGREEMENT  
EMBRACING LANDS IN EDDY COUNTY, NEW MEXICO

The undersigned (whether one or more) hereby acknowledge receipt of a copy of the Unit Agreement for the Development and Operation of the Indian Hills Unit Area embracing lands situated in Eddy County, New Mexico, which said Agreement is dated the 23<sup>rd</sup> day of January, 1963, and acknowledge that they have read the same and are familiar with the terms and conditions thereof. The undersigned also being the owners of leasehold, royalty or other interests in the lands or minerals embraced in said unit area, as indicated on the schedule attached to said Unit Agreement as Exhibit "B", do hereby commit all of their said interests to the Indian Hills Unit Agreement and do hereby consent thereto and ratify all of the terms and provisions thereof, exactly the same as if the undersigned had executed the original of said Unit Agreement or a counterpart thereof.

IN WITNESS WHEREOF, this instrument is executed by the undersigned as of the date set forth in their respective acknowledgements.

\_\_\_\_\_  
\_\_\_\_\_

Ralph A. Shugart  
Ralph A. Shugart

STATE OF New Mexico )  
COUNTY OF Eddy ) SS

Rena Shugart  
Rena Shugart

The foregoing instrument was acknowledged before me this 23<sup>rd</sup> day of January, 1963, by Ralph A. Shugart and Rena Shugart, his wife.

My commission expires: \_\_\_\_\_

Notary Public  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) SS

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 1963, by \_\_\_\_\_.

My commission expires: \_\_\_\_\_

\_\_\_\_\_  
Notary Public

CONSENT AND RATIFICATION  
INDIAN HILLS UNIT AGREEMENT  
EMBRACING LANDS IN EDDY COUNTY, NEW MEXICO

The undersigned (whether one or more) hereby acknowledge receipt of a copy of the Unit Agreement for the Development and Operation of the Indian Hills Unit Area embracing lands situated in Eddy County, New Mexico, which said Agreement is dated the 29<sup>th</sup> day of January, 1963, and acknowledge that they have read the same and are familiar with the terms and conditions thereof. The undersigned also being the owners of leasehold, royalty or other interests in the lands or minerals embraced in said unit area, as indicated on the schedule attached to said Unit Agreement as Exhibit "B", do hereby commit all of their said interests to the Indian Hills Unit Agreement and do hereby consent thereto and ratify all of the terms and provisions thereof, exactly the same as if the undersigned had executed the original of said Unit Agreement or a counterpart thereof.

IN WITNESS WHEREOF, this instrument is executed by the undersigned as of the date set forth in their respective acknowledgements.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
STATE OF NEW MEXICO )  
COUNTY OF CHAVES ) ss

L. C. Harris  
Marion V. Harris  
Marion V. Harris

The foregoing instrument was acknowledged before me this  
29th day of January, 1963, by L. C. Harris and wife,  
Marion V. Harris

My commission expires:  
My Commission Expires March 10th 1964

Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) ss

The foregoing instrument was acknowledged before me this  
\_\_\_\_\_ day of \_\_\_\_\_, 1963, by \_\_\_\_\_

My commission expires:  
\_\_\_\_\_

\_\_\_\_\_  
Notary Public

CONSENT AND RATIFICATION  
INDIAN HILLS UNIT AGREEMENT  
EMBRACING LANDS IN EDDY COUNTY, NEW MEXICO

The undersigned (whether one or more) hereby acknowledge receipt of a copy of the Unit Agreement for the Development and Operation of the Indian Hills Unit Area embracing lands situated in Eddy County, New Mexico, which said Agreement is dated the 23<sup>rd</sup> day of January, 1963, and acknowledge that they have read the same and are familiar with the terms and conditions thereof. The undersigned also being the owners of leasehold, royalty or other interests in the lands or minerals embraced in said unit area, as indicated on the schedule attached to said Unit Agreement as Exhibit "B", do hereby commit all of their said interests to the Indian Hills Unit Agreement and do hereby consent thereto and ratify all of the terms and provisions thereof, exactly the same as if the undersigned had executed the original of said Unit Agreement or a counterpart thereof.

IN WITNESS WHEREOF, this instrument is executed by the undersigned as of the date set forth in their respective acknowledgements.

Charles B. Gonzales  
Charles B. Gonzales

STATE OF NEW MEXICO )  
COUNTY OF BERNALILLO ) ss

The foregoing instrument was acknowledged before me this 23<sup>rd</sup> day of FEBRUARY, 1963, by CHARLES B. GONZALES

My commission expires:  
MY COMMISSION EXPIRES JAN. 13, 1967

James D. Neal  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) ss

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 1963, by \_\_\_\_\_

My commission expires:

\_\_\_\_\_  
Notary Public

CONSENT AND RATIFICATION  
INDIAN HILLS UNIT AGREEMENT  
EMBRACING LANDS IN EDDY COUNTY, NEW MEXICO

The undersigned (whether one or more) hereby acknowledge receipt of a copy of the Unit Agreement for the Development and Operation of the Indian Hills Unit Area embracing lands situated in Eddy County, New Mexico, which said Agreement is dated the 23<sup>rd</sup> day of January, 1963, and acknowledge that they have read the same and are familiar with the terms and conditions thereof. The undersigned also being the owners of leasehold, royalty or other interests in the lands or minerals embraced in said unit area, as indicated on the schedule attached to said Unit Agreement as Exhibit "B", do hereby commit all of their said interests to the Indian Hills Unit Agreement and do hereby consent thereto and ratify all of the terms and provisions thereof, exactly the same as if the undersigned had executed the original of said Unit Agreement or counterpart thereof.

IN WITNESS WHEREOF, this instrument is executed by the undersigned as of the date set forth in their respective acknowledgements.

Bonnie H. Matlock Morrison  
Bonnie H. Matlock Morrison

George S. Morrison  
George S. Morrison

STATE OF NEW MEXICO )

COUNTY OF Chaves )

ss

The foregoing instrument was acknowledged before me this

23 day of January, 1963, by George S. Morrison

and Bonnie H. Matlock Morrison

My commission expires:

May 12, 1964

Notary Public

CONSENT AND RATIFICATION  
INDIAN HILLS UNIT AGREEMENT  
EMBRACING LANDS IN EDDY COUNTY, NEW MEXICO

The undersigned (whether one or more) hereby acknowledge receipt of a copy of the Unit Agreement for the Development and Operation of the Indian Hills Unit Area embracing lands situated in Eddy County, New Mexico, which said Agreement is dated the 23<sup>rd</sup> day of January, 1963, and acknowledge that they have read the same and are familiar with the terms and conditions thereof. The undersigned also being the owners of leasehold, royalty or other interests in the lands or minerals embraced in said unit area, as indicated on the schedule attached to said Unit Agreement as Exhibit "B", do hereby commit all of their said interests to the Indian Hills Unit Agreement and do hereby consent thereto and ratify all of the terms and provisions thereof, exactly the same as if the undersigned had executed the original of said Unit Agreement or counterpart thereof.

IN WITNESS WHEREOF, this instrument is executed by the undersigned as of the date set forth in their respective acknowledgements.

\_\_\_\_\_  
\_\_\_\_\_

Paul Pugh  
Paul Pugh

Acknowledgement

STATE OF NEW MEXICO,  
County of DOBSON } ss.

On this the 23<sup>rd</sup> day of JANUARY, 1963, before me personally appeared Paul Pugh  
to me personally known to be the person described in and who executed the foregoing instrument. and acknowledged that he executed the same as his free act and deed.

IN WITNESS WHEREOF, I have hereunto set my hand and official seal on the day and year in this certificate first above written.

Raymond L. Hansen  
Notary Public

My Commission expires January 1964, 1964.  
Form 579--Hall-Postbough Press--Roswell, N. M.

CONSENT AND RATIFICATION  
INDIAN HILLS UNIT AGREEMENT  
EMBRACING LANDS IN EDDY COUNTY, NEW MEXICO

The undersigned (whether one or more) hereby acknowledge receipt of a copy of the Unit Agreement for the Development and Operation of the Indian Hills Unit Area embracing lands situated in Eddy County, New Mexico, which said Agreement is dated the 23<sup>rd</sup> day of January, 1963, and acknowledge that they have read the same and are familiar with the terms and conditions thereof. The undersigned also being the owners of leasehold, royalty or other interests in the lands or minerals embraced in said unit area, as indicated on the schedule attached to said Unit Agreement as Exhibit "B", do hereby commit all of their said interests to the Indian Hills Unit Agreement and do hereby consent thereto and ratify all of the terms and provisions thereof, exactly the same as if the undersigned had executed the original of said Unit Agreement or counterpart thereof.

IN WITNESS WHEREOF, the said party of the first part has caused this instrument to be signed by its Chairman  
~~President~~, attested by its Secretary, and the corporate seal of said corporation hereunto affixed, the 23<sup>rd</sup> day  
of Jan., 1963  
Attest: H. E. Hemmington Secretary Donald B. Anderson ~~President~~ Chairman  
ROSWELL MUSEUM ASSOCIATION

STATE OF NEW MEXICO, }  
COUNTY OF Chaves } ss.

On this 23rd day of January, A. D., One Thousand Nine Hundred and Sixty-Three,  
before me personally appeared Donald B. Anderson  
to me personally known, who, being by me duly sworn, did say that he is the Chairman ~~President~~ of  
Roswell Museum Association, and that the seal affixed to said  
instrument is the corporate seal of said corporation, and that said instrument was signed and sealed in behalf of said cor-  
poration by authority of its Board of Directors, and said Donald B. Anderson  
acknowledged said instrument to be the free act and deed of said corporation.

IN WITNESS WHEREOF, I have hereunto set my hand and affixed my official seal on this, the day and year last  
above written.

My Commission expires April 10, 1965 W. L. Brewer Notary Public  
Form 501--Hall-Poorbaugh Press--Roswell, N. M.

CONSENT AND RATIFICATION  
INDIAN HILLS UNIT AGREEMENT  
EMBRACING LANDS IN EDDY COUNTY, NEW MEXICO

The undersigned (whether one or more) hereby acknowledge receipt of a copy of the Unit Agreement for the Development and Operation of the Indian Hills Unit Area embracing lands situated in Eddy County, New Mexico, which said Agreement is dated the 23<sup>rd</sup> day of January, 1963, and acknowledge that they have read the same and are familiar with the terms and conditions thereof. The undersigned also being the owners of leasehold, royalty or other interests in the lands or minerals embraced in said unit area, as indicated on the schedule attached to said Unit Agreement as Exhibit "B", do hereby commit all of their said interests to the Indian Hills Unit Agreement and do hereby consent thereto and ratify all of the terms and provisions thereof, exactly the same as if the undersigned had executed the original of said Unit Agreement or a counterpart thereof.

IN WITNESS WHEREOF, this instrument is executed by the undersigned as of the date set forth in their respective acknowledgements.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
D. E. Gillespie, Jr.  
\_\_\_\_\_  
\_\_\_\_\_

STATE OF New Mexico )  
COUNTY OF Chaves ) ss

The foregoing instrument was acknowledged before me this 24<sup>th</sup> day of January, 1963, by D. E. Gillespie Jr.

My commission expires: Jan 29 1966  
\_\_\_\_\_  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) ss

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 1963, by \_\_\_\_\_

My commission expires: \_\_\_\_\_  
\_\_\_\_\_  
Notary Public

CONSENT AND RATIFICATION  
INDIAN HILLS UNIT AGREEMENT  
EMBRACING LANDS IN EDDY COUNTY, NEW MEXICO

The undersigned (whether one or more) hereby acknowledge receipt of a copy of the Unit Agreement for the Development and Operation of the Indian Hills Unit Area embracing lands situated in Eddy County, New Mexico, which said Agreement is dated the 23<sup>rd</sup> day of January, 1963, and acknowledge that they have read the same and are familiar with the terms and conditions thereof. The undersigned also being the owners of leasehold, royalty or other interests in the lands or minerals embraced in said unit area, as indicated on the schedule attached to said Unit Agreement as Exhibit "B", do hereby commit all of their said interests to the Indian Hills Unit Agreement and do hereby consent thereto and ratify all of the terms and provisions thereof, exactly the same as if the undersigned had executed the original of said Unit Agreement or a counterpart thereof.

IN WITNESS WHEREOF, this instrument is executed by the undersigned as of the date set forth in their respective acknowledgements.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Sarah Louise Harrington  
Sarah Louise Harrington

H. E. Harrington  
H. E. Harrington

STATE OF NEW MEXICO )  
COUNTY OF CHAVES ) ss

The foregoing instrument was acknowledged before me this 24<sup>th</sup> day of Jan., 1963, by Sarah Louise Harrington and H. E. Harrington

My commission expires:  
April 10, 1965

W. L. Brewer  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) ss

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 1963, by \_\_\_\_\_

My commission expires:  
\_\_\_\_\_

\_\_\_\_\_  
Notary Public



CONSENT AND RATIFICATION  
INDIAN HILLS UNIT AGREEMENT  
EMBRACING LANDS IN EDDY COUNTY, NEW MEXICO

The undersigned (whether one or more) hereby acknowledge receipt of a copy of the Unit Agreement for the Development and Operation of the Indian Hills Unit Area embracing lands situated in Eddy County, New Mexico, which said Agreement is dated the 23rd day of January, 1963, and acknowledge that they have read the same and are familiar with the terms and conditions thereof. The undersigned also being the owners of leasehold, royalty or other interests in the lands or minerals embraced in said unit area, as indicated on the schedule attached to said Unit Agreement as Exhibit "B", do hereby commit all of their said interests to the Indian Hills Unit Agreement and do hereby consent thereto and ratify all of the terms and provisions thereof, exactly the same as if the undersigned had executed the original of said Unit Agreement or a counterpart thereof.

IN WITNESS WHEREOF, this instrument is executed by the undersigned as of the date set forth in their respective acknowledgements.

ATTEST: M. E. Parrot  
Secretary

DEKALB AGRICULTURAL ASSN., INC.

By: C. C. Roberts  
Vice President

STATE OF Illinois )  
COUNTY OF DeKalb ) ss

W. P. J.

The foregoing instrument was acknowledged before me this 30th day of January, 1963, by C. C. Roberts  
Vice President of DeKalb Agricultural Association, Inc.

My commission expires:  
11-12-64

George R. Brown  
Notary Public

STATE OF \_\_\_\_\_ )  
COUNTY OF \_\_\_\_\_ ) ss

The foregoing instrument was acknowledged before me this \_\_\_\_\_ day of \_\_\_\_\_, 1963, by \_\_\_\_\_

My commission expires:

\_\_\_\_\_  
Notary Public

**EXHIBIT "g"**  
**SCHEDULE SHOWING THE PERCENTAGE AND KIND**  
**OF OWNERSHIP OF ALL LANDS IN THE**  
**INDIAN HILLS UNIT AREA, EDDY COUNTY, NEW MEXICO**

Tract Number	Description of Land	No. of Acres	Serial No. and Expiration Date of Lease	Basic Royalty & Percentage	Lessee of Record	Overriding Royalty and Percentage	Working Interest and Percentage
FEDERAL LANDS							
T-21S, R-24-E, MPM:							
1	NW $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 28	280	NM 06293 11-30-63	US 12 $\frac{1}{2}$ %	Marathon Oil Company	Rena Shugart - 3%	Marathon Oil Company - All
2	NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 28	40	NM 06293-A 11-30-63	US 12 $\frac{1}{2}$ %	Ralph Lowe	Rena Shugart - 3% L. C. Harris - 2%	Ralph Lowe - All
3	All Sec. 21; S $\frac{1}{2}$ , NW $\frac{1}{4}$ , S $\frac{1}{2}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 33	1,240	NM 07260 2-29-64	US 12 $\frac{1}{2}$ %	Marathon Oil Company	JoAnne Wills light Obligation \$750.00 per acre out of 3%	Marathon Oil Company - All
4	S $\frac{1}{2}$ Sec. 28	320	NM 030482 10-1-67	US 12 $\frac{1}{2}$ %	Sun Oil Company	Charles B. Gonzales - 3%	Sun Oil Company - All
5	SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 29	40	NM 0330449 Effective 2-1-63	US 12 $\frac{1}{2}$ %	Robert G. Hanagan	None	Robert G. Hanagan All
6	S $\frac{1}{2}$ , N $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 17	400	LC 064243-A 2-28-63	US 12 $\frac{1}{2}$ %	International Oil & Gas Corporation	Wola Zook Garrett - 2%	International Oil & Gas Corporation - All
7	NE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 17	40	LC 064243-D	US 12 $\frac{1}{2}$ %	Marion E. Spittler	Wola Zook Garrett - 2%	Marion E. Spittler - All
8	All Sec. 20; N $\frac{1}{2}$ , SW $\frac{1}{4}$ , N $\frac{1}{2}$ SE $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 29	1,240	LC 064391-B 10-31-64	US 12 $\frac{1}{2}$ %	Ralph Lowe	Honnie H. Matlock Morrison - 2 $\frac{1}{2}$ % Paul Pugh - 1/2 of 1%	Ralph Lowe - All
9	NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 33	40	LC 067649-A 2-29-64	US 12 $\frac{1}{2}$ %	Ralph Lowe	Foswell Museum - 2 $\frac{1}{2}$ % D. E. Gillespie, Tr., - 2% Sarah Louise Farrington - 1/2%	Ralph Lowe - All

NINE (9) FEDERAL TRACTS COMPRISING 3,640 ACRES OR 81.2% OF UNIT AREA.

Tract Number	Description of Land	No. of Acres	Serial No. and Expiration Date of Lease	Basic Royalty & Percentage	Lessee of Record	Overriding Royalty and Percentage	Working Interest and Percentage
STATE LANDS T-21-S, R-24-E, NQPM:							
10	SE $\frac{1}{4}$ NW $\frac{1}{4}$ Sec. 17	40	K 2959 12-18-72	State 12 $\frac{1}{2}$ %	Max H. Christenson	None	Max H. Christenson
11	S $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ NE $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$ , SE $\frac{1}{4}$ SE $\frac{1}{4}$ ; Sec. 16; SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 17.	240	OC 6063 10-20-69	State 12 $\frac{1}{2}$ %	Marathon Oil Company	None	Marathon Oil Company All
12	NW $\frac{1}{4}$ , W $\frac{1}{2}$ NE $\frac{1}{4}$ , NE $\frac{1}{4}$ NE $\frac{1}{4}$ , NE $\frac{1}{4}$ SW $\frac{1}{4}$ , NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 16; W $\frac{1}{2}$ NW $\frac{1}{4}$ , SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 17.	480	E 7437 9-15-63	State 12 $\frac{1}{2}$ %	Marathon Oil Company	None	Marathon Oil Company All
13	NW $\frac{1}{4}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 16	80	E 10169 6-19-66	State 12 $\frac{1}{2}$ %	Monsanto Chemical Company	None	Monsanto Chemical Company - All

FOUR (4) STATE TRACTS COMPRISING 840 ACRES OR 18.8% OF UNIT AREA.

TOTAL: THIRTEEN (13) TRACTS COMPRISING 4,480 ACRES IN ENTIRE UNIT AREA.

\*Subject to an overriding royalty payable to Dekalb Agricultural Association, Inc.  
payable out of the working interest of Ralph Lowe in and to certain tracts in which  
Ralph Lowe has a working interest.

**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 FOR  
THE PURPOSE OF CONSIDERING:**

CASE No. 2748  
Order No. R-2420

**APPLICATION OF RALPH LOWE  
FOR APPROVAL OF THE INDIAN  
HILLS UNIT AGREEMENT, SDDY  
COUNTY, NEW MEXICO.**

**ORDER OF THE COMMISSION**

**BE THE COMMISSION:**

This cause came on for hearing at 9 o'clock a.m. on February 6, 1963, at Santa Fe, New Mexico, before Daniel S. Mutter, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

Now, on this 6th day of February, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Daniel S. Mutter, 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 applicant, Ralph Lowe, seeks approval of the Indian Hills Unit Agreement covering 4,480 acres, more or less, of State and Federal lands in Township 21 South, Range 24 East, SDDY, SDDY County, New Mexico.

(3) That approval of the proposed Indian Hills Unit Agreement will in principle tend to promote the conservation of oil and gas and the prevention of waste.

**IT IS THEREFORE ORDERED:**

(1) That the Indian Hills Unit Agreement is hereby approved.

(2) That the plan under which the unit area shall be operated shall be entered in the form of a unit agreement for the development and operation of the Indian Hills Unit Area, and such plan shall be known as the Indian Hills Unit Agreement Plan.

-2-

CASE No. 2748  
Order No. N-3420

(3) That the Indian Hills Unit Agreement Plan is hereby approved in principle as a proper conservation measure; provided, however, that notwithstanding any of the provisions contained in said unit agreement, this approval shall not be considered as waiving or relinquishing, in any manner, any right, duty, or obligation which is now, or may hereafter be, vested in the Oil Conservation Commission of New Mexico by law relative to the supervision and control of operations for the exploration and development of any lands committed to the Indian Hills Unit, or relative to the production of oil or gas therefrom.

(4) (a) That the unit area shall be:

NEW MEXICO PRINCIPAL MERIDIAN

EDDY COUNTY, NEW MEXICO

TOWNSHIP 21 SOUTH, RANGE 24 EAST

Section 16: All

Section 17: All

Section 20: All

Section 21: All

Section 28: All

Section 29: All

Section 33: All

containing 4,480 acres, more or less.

(b) That the unit area may be enlarged or contracted as provided in said plan; provided, however, that administrative approval for expansion or contraction of the unit area must also be obtained from the Secretary-Director of the Commission.

(5) That the unit operator shall file with the Commission an executed original or executed counterpart of the Indian Hills Unit Agreement within 30 days after the effective date thereof. In the event of subsequent joinder by any party or expansion or contraction of the unit area, the unit operator shall file with the Commission within 30 days thereafter counterparts of the unit agreement reflecting the subscription of those interests having joined or ratified.

(6) That this order shall become effective upon the approval of said unit agreement by the Commissioner of Public Lands for the State of New Mexico and the Director of the United States Geological Survey, and shall terminate ipso facto upon the termination of said unit agreement. The last unit operator shall notify the Commission immediately in writing of such termination.

(7) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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CASE No. 2748  
Order No. B-2420

SENT at Santa Fe, New Mexico, on the day and year hereinafter designated.

SENATE OF NEW MEXICO  
CEL COMMUNICATION COMMISSION

JACK M. CAMPBELL, Chairman

H. S. WALKER, Member

A. L. FORBES, Jr., Member & Secretary

S E A L

ent/

CERTIFICATE OF APPROVAL

BY COMMISSIONER OF PUBLIC LANDS, STATE OF NEW MEXICO  
INDIAN HILLS UNIT  
EDDY COUNTY, NEW MEXICO

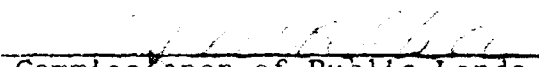
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There having been presented to the undersigned Commissioner of Public Lands of the State of New Mexico for examination, the attached Agreement for the development and operation of acreage which is described within the attached Agreement, dated January 23, 1963, which has been executed or is to be executed by parties owning and holding oil and gas leases and royalty interests in and under the property described, and upon examination of said Agreement, the Commissioner finds:

- (a) That such agreement will tend to promote the conservation of oil and gas and the better utilization of reservoir energy in said area.
- (b) That under the proposed agreement the State of New Mexico will receive its fair share of the recoverable oil or gas in place under its lands in the area.
- (c) That each beneficiary Institution of the State of New Mexico will receive its fair and equitable share of the recoverable oil and gas under its lands within the area.
- (d) That such agreement is in other respects for the best interests of the state, with respect to state lands.

NOW, THEREFORE, by virtue of the authority conferred upon me under Sections 7-11-39, 7-11-40, 7-11-41, 7-11-47, 7-11-48, New Mexico Statutes Annotated 1953 Compilation, I, the undersigned, Commissioner of Public Lands of the State of New Mexico, for the purpose of more properly conserving the oil and gas resources of the State, do hereby consent to and approve the said Agreement, and any leases embracing lands of the State of New Mexico within the area shall be and the same are hereby amended to conform with the terms thereof, and shall remain in full force and effect according to the terms and conditions of said Agreement. This approval is subject to all of the provisions of the aforesaid statutes.

IN WITNESS WHEREOF, this Certificate of Approval is executed, with seal affixed, this 15th day of February 19 63.

  
Commissioner of Public Lands  
of the State of New Mexico

DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182

SANTA FE, N. M.  
PHONE 983-3871

ALBUQUERQUE, N. M.  
PHONE 243-6611

BEFORE THE  
OIL CONSERVATION COMMISSION  
Santa Fe, New Mexico  
March 20, 1963

EXAMINER HEARING

IN THE MATTER OF:

Application of Compass Exploration, Inc.,  
for the creation of a Gallup Gas Pool,  
Rio Arriba County, New Mexico. Applicant,  
in the above-styled cause, seeks an order  
deleting certain acreage from the South  
Blanco-Tocito Pool and redesignating  
portions of said acreage to comprise a  
new Gallup gas pool for its Northwest  
Lindrith Well No. 1-3, located in Unit K  
of Section 3, Township 26 North, Range 7  
West, Rio Arriba County, New Mexico.

Case 2761

BEFORE: Elvis A. Utz, Examiner.

TRANSCRIPT OF HEARING

MR. UTZ: Case No. 2761.

MR. DURRITT: Application of Compass Exploration, Inc.,  
for the creation of a Gallup Gas Pool, Rio Arriba County, New  
Mexico.

MR. KELLY: Booked Kelly with Gilbert, White & Gilbert,  
Santa Fe, New Mexico, appearing on behalf of the plaintiffs. Mr.  
T. P. Stockmar is associated with me.

MR. STOCKMAR: We have two witnesses and ask that they  
be sworn.

MR. UTZ: Any other appearances in this case?





DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
PHONE 325-1182

SANTA FE, N. M.  
PHONE 983-3971

ALBUQUERQUE, N. M.  
PHONE 243-6691

MR. KELLAHIN: Jason Kellahin of Kellahin & Fox, Santa Fe, appearing on behalf of the Caulkins Oil Company.

MR. SPANN: Charles C. Spann, 914 Bank of New Mexico Building, Albuquerque, New Mexico, appearing on behalf of El Paso Natural Gas Products Company.

MR. UTZ: Any other appearances?

You may swear the witnesses.

(Witnesses sworn.)

MR. STOCKMAR: I might state for the record that one of the witnesses may only be called as a rebuttal witness.

If I may make a very short opening statement. This seems to be a fairly simple case. I hope it doesn't develop into something more, on the basis of routine nomenclature hearings. We have added to a fairly old and established pool simply by geographic proximity an area which now contains there three obvious gas wells. The geologic evidence to be presented here I think will show very clearly that there is no geologic connection between the two pools and we have separate sources of supply. As I am sure the Commission is fully aware, the oil pool is one of ancient vintage, well advanced on secondary recovery mechanism, and I am sure well on the way exhaustion to secondary oil. It would certainly be impracticable, even if there is a redefinition of certain wells into gas wells to attempt to operate under common pool rules.

Another facet of the applicant's application was that in



## DEARNLEY-MEIER REPORTING SERVICE, Inc.

FARMINGTON, N. M.  
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addition to having a new field designated that 160-acre spacing be permitted. There was not an intent here to have a full dress spacing hearing as such, but simply to rely on the statewide rules at this time. So there is no intent to move forward with a full dress appearance on that.

With that, I would like to call our first witness, Mr. Farrelly, who has been sworn.

PETER J. FARRELLY

a Witness, called by the Oil Conservation Commission, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATIONBY MR. STOCKMAR:

Q Mr. Farrelly, would you state your full name, address, and employment for the record, please?

A Peter J. Farrelly, 101 University Boulevard, Denver, Colorado. I am employed by Compass Exploration, Inc., as Manager of Exploration and Production.

Q Mr. Farrelly, have you ever been qualified and have you ever appeared as a witness before this Commission?

A No, I have not.

Q Would you then give us some idea of your general educational background?

A Bachelor of Science Degree from The University of Illinois, 1952; Master of Science Degree from the University of Illinois, 1953; employed by Continental Oil Company in the Durango



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area for approximately four years and then went to work for Compass Exploration for a period of another four years.

During this period I have worked on the San Juan Basin, both for horizon--I have actually supervised and done the basin work for exploration and the production of Gallup and Dakota formations in the area.

Q Mr. Farrelly, was your educational work and your employment as a geologist?

A Yes, it was.

Q Do you have a specific knowledge of the data available as to the South Blanco-Tocito Oil Pool?

A Yes, I do. I have worked the area. I have analyzed the electrical logs and completion data available in the South Blanco-Tocito Oil Pool and the drillings of our wells in the same area. I have supervised their completion and actually worked up the initial exploration for the Gallup-San Juan area.

MR. STOCKMAR: Mr. Examiner, I ask that the witness' qualifications as a geologist be accepted.

MR. UTZ: He is qualified.

Q I would like to have marked as Applicant's Exhibit 1 a map entitled Structure Contour Map on Top Sanastee Formation. Mr. Farrelly, would you generally describe what this exhibit is?

A This exhibit is a structure contour map on the top Sanastee Formation, South Tocito area. The map is contoured on the 50-foot interval. Logs have been examined in a four township



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area in which the field is included and immediately adjacent to the field.

Q Are there any corrections or things that you might wish to point out with respect to the exhibit?

A Yes, in Section 10 of 26 North, 6 West, the gas well which falls in Section 10 of 26 North, 6 West, the gas well which falls in the Northeast of the Southeast--pardon me--Northwest of the Southeast should be deleted, that is a shallow producing well.

Q Could that be Section 9 that you are referring to?

A Pardon me, it is 9, I am sorry--Section 9, it's in the Northwest of the Southeast, the gas well there, the gas well symbol you see there immediately below the oil well.

Q Is it your contention, Mr. Farrelly, that this should be simply eliminated from the map as a shallow producing well?

A As a shallow producing well. The area that is shown in the dash lines across 26 Northwest, 6 West, 27 North, 7 West, represent the boundaries of the South Blanco-Tocito Pool. And in examination of these logs and construction of this cross section, I mean of this map, we have found generally northeast regional addition across the area. There are no particular structural observations. There are a few ridges in our strike but that is about it.

We have constructed this map for two reasons. The first reason was, No. 1, to determine whether there was a structural consideration between the two fields, and about the only thing



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we can derive is that the Tocito Pool proper, as opposed to our gas pool, is downdip; generally, the strike across the bottom is the same, as there is no closure represented, so we can assume then that is a stratigraphic trap.

No. 2, the second reason we constructed this map was, generally speaking, in the regional setting of the entire basin, the Gallup oil and hydrocarbon accumulations run parallel to the strike on the Sanastee and we wanted to establish just how these two fields set in there. You will note on it that there is a cross section represented as of AA brim, this is a later exhibit, but too, we will again refer back to this map, the cross section was set up as such. Let it be noted the cross section is set up as such to obtain a normal position to the strike of the area.

Q I would like to have marked for identification Exhibit No. 2, which is a map entitled Isopach Map of Gallup Sand.

Mr. Farrelly, should the same correction be made on the shallow gas well in Section 9 on the map?

A Yes, with respect to the well in Section 9, it should be deleted from the map.

Q Mr. Farrelly, will you please describe Exhibit 2 and state what it purports to show?

A Exhibit 2 is an isopach constructed on the gross Gallup sand in the producing interval of both the Compass Gas Pool located 26-7 and South Tacito located 26 North, 6 West. Our company in the analysis of this thing, the way we approached it initially,



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we tried to take the most general rules for parameters possible in the construction of this map. It was vitally important to us to find out whether we were hooked up with the field. Basically, on assuming this very gross parameter, all that is meant by the total Gallup sand in this area is that from the electrical logs any kick that was, we first took--let me re-explain that--we first took a typical well in our field in the Gallup Gas Pool and a typical well in the oil pool. From this, we compared all the logs in the four-section area. We came to the point where there were no overlaps. We gave them every benefit of the doubt to say that there was possibly some sand in this well in this interval and we contoured, we added those up and totalled the thickness and contoured on that basis. The wells have no data represents zero, that there was no Gallup sand present. Now, so we won't get a nomenclature problem I know in some areas--in the past, the Tocito has been referred to as a separate sand. For our purposes, we consider the Tocito and the Gallup one and the same. This is a lower Gallup sand accumulation and this is what we have examined.

Q Mr. Farrelly, do I understand from your explanation that the contours, isopack contours here do not necessarily represent net pay but simply the existence?

A No, they do not represent net pay at all, simply the existence of the sand.

Q Mr. Farrelly, what are the small numbers lying between



each well designation that are inside the zero contour limits?

A That is actually the thickness of the sand as pictured from the electric logs.

Q You testified that anywhere on the map which is outside of the zero contour had zero thickness?

A Had zero thickness.

Q Mr. Farrelly, were there in some instances two independent bodies of sand counted?

A Yes, in the examination of the South Tocito-Blanco Field, we found that in this portion of the Gallup there were in essence two separate sand developments. We totalled these again, approaching the benefits of given gross sand, as a later exhibit will show that actually what is producing from the Compass Gas area over in 26-7 Compass Gas area is actually just the top sand at the South Blanco-Tocito Pool and equivalent I should say to the South Blanco-Tocito Pool. In order to just reiterate what we have done, we have prepared this thing in total of all sands in interval to give the broadest possible sand connection. What we have come up with can well be seen. We come up with one large body of sand setting in the South Blanco Pool area and to the north. The sand has not been developed to the north and we understand by examination of the Case File 1420 that the people who are the operators in that area felt it had a little too low permeability. We did not consider the permeability of the sand at all. So we represent one area to the east and then another area building up to the west. We

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can show that by the well in the northeast of Section 3 of 26-6, the well in the north--actually it would be in the northeast of Section 10 of that same township and range--but the two feet represented in Section 1 of 26-6 and by the well located in Section 23 of 26-6--pardon me, 13 of 26-6--these are all zero wells in contouring this thing logically. When I say zero except for the two feet represented up here, I mean there is no sand at all present. This is in essence a three point picture across the area. Any pinching or anything would represent no sand across the area. This forces us to draw a blank spot in the area--an area of no sand and demonstrates there is in essence two separate sand pods.

CROSS EXAMINATION

BY MR. UTZ:

Q Let's go through the streaks again. Either you are wrong or I am wrong. I am not sure which.

A On Section 1 there is two feet of sand, Section 1 of 26-6. In Section 3 in the Northeast there is no sand. In Section 10 the well in Section 10, of the same township and range, there is no sand. In Section 13 there is no sand.

Q Well, now that is where I left you. This would be 13 over here.

A 13, right above 24 of the same township and range. And, Mr. Examiner, what I am referring to in particular are the three wells that are zero and one well going to practically zero, having





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two feet of sand, and the three points of the three zero wells would cause us to contour these two separate units. It should also be noted the rate of pinch out of the sand established in South Tocito. In the area again, going from Section 9 of 26-6, where you have 16 feet on down to 5 feet and eventually to the South to zero feet, we have established a rate of pinch out across there. If we do carry the same rate of pinch out around you will note we have a decrease in the sand from the Tocito on westward. When you come to the Compass area, you have an increase in sand as you go westward from 8 feet to 12 feet. We have a decrease to the West at Tocito, increase to the West on the Compass, which again would lead us to believe that there is no sand in between the two fields.

Q What are those wells completed in?

A The wells in the Compass area or other wells?

Q These wells that you have described.

A They are Dakota wells which penetrated the Gallup formation.

REDIRECT EXAMINATION

BY MR. STOCKMAR:

Q In each case you did have a log available?

A In each case I did have a log available.

MR. STOCKMAR: Any further questions?

MR. UTZ: No.

Q Mr. Farrelly, in describing your qualifications, you indicated a degree of familiarity with the Gallup reservoir and the entire basin. From this experience, are there any further



conclusions you can draw with respect to there being two fields here?

A I would like for the Commission to note the fact that Totah and Cha Cha are just about a mile apart, producing from like sands. They are considered by the Commission as two separate fields. It is very possible in the deposition, the strike valley type of deposition we get in the Gallup, to have two separate fields, less than a mile apart but in essence two separate sand bodies to be treated as two separate sand bodies. I would also like to note again sand as such were found on a log. The areas can be as far apart as 10 miles or 15 miles and you will see a like similarity in the Gallup sand so that the fact that the log characteristics in one area are the same as that in another area, it does not necessarily make it the same pool.

Q Mr. Farrelly, have you prepared a cross section AA Prime? Assuming your answer to be yes, I would like to have it marked for identification as Applicant's Exhibit 3.

Mr. Farrelly, would you please identify Exhibit 3 and explain it?

A Exhibit 3 is a West-East Stratigraphic Cross Section, which has a datum at the top on the Sanastee. The most of the section is represented on the earlier two exhibits. It will be noted that the section wasn't carried directly into the boundaries of the South Blanco-Tocito Pool as it came eastward. I went up north of the actual boundaries of the field. I will endeavor

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to explain why. Starting with the Compass Well in the section on the west end at A of the cross section, you will note the log characteristics and the sand characteristics of the Gallup formation, the lower Gallup formation. Then as we come into the El Paso NCRA Well, Section 3 of 26 North, 7 West, we lose the sand characteristics completely. We instead have replaced with siltstone. As we come back, or as we come further east into Section 36 of 27 North, 7 West, the zone is oil in the Rincon No. 1 Well. We again pick up sand and going into Section 31 of 27 North, 6 West, we again have the sand characteristics. What we did, as I have explained earlier, while talking about Exhibit No. 1, we attempted to make a cross section across the strike area, get a cross section normal to these two sand buildups. In doing this, of course, we show sand in the Compass area going to no sand in the NCRA Well and then coming back into sand in the Rincon area. I can show the Commission and we have the logs available the cross section can be carried down below other sections in South Blanco area, in the actual field area. The same sand conditions exist and can be carried on across.

MR. UTZ: Your testimony then is, Mr. Farrelly, that within the zero contour lines of the larger body of sand there is continuity of the sand and the logs can be correlated?

THE WITNESS: That is correct, sir.

MR. STOCKMAR: Mr. Examiner, would you care to see any additional logs laid by this to show this correlation?



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MR. UTZ: I don't think so.

Q To reiterate again, a cross section was designed--one of the places of that cross section was taken and designed on that going to sand, to no sand, and back into sand again. So that the Commission may be able to appraise the fact that there is actually a zero sand band through the middle of these two areas. Does this study further confirm your stated opinion that no sand body exists between these two developed areas?

A Yes, it does.

Q Mr. Farrelly, were Exhibits No. 2 and 3 prepared by you or under your supervision?

A They were.

MR. STOCKMAR: Mr. Examiner, I ask these exhibits 1, 2 and 3 be accepted into evidence.

MR. UTZ: Without objection, Exhibits 1, 2 and 3 will be made a part of this record.

MR. STOCKMAR: Mr. Farrelly is available for questions by Mr. Examiner or others.

RECROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Farrelly, I am Jason Kellahin. I represent Caulkins Oil Company. In connection with your preparation of Exhibit 1, did I understand you correctly to say that the Tocito Oil Pool is down dip from the Compass Area?

A Yes, you did, sir.



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Q Assuming that the Tocito is a solution gas drive reservoir and then assuming again for the purposes of this question that there is a connection between two zones, it would be normal to expect you would find a gas cap at the upper zone, would it not, at an advanced stage of completion?

A If the reservoirs were connected at all, yes, sir, you would, but as described in our direct testimony, we don't feel we have any evidence prepared that the reservoirs are even connected, and should be treated as two separate units.

Q You do find gas in the Compass Wells?

A Yes, we do.

Q Referring to your Exhibit No. 2 where you cut off your zero isopach line, what control did you have between the Tocito area as you described it and the so-called Compass area?

A I had the controls of the wells that I pointed out in direct testimony. Also, I was very surprised to note this, on examination of the Caulkins and El Paso files in Case 1420 that their zero lines were the same practically as mine in the old testimony.

Q That testimony was submitted prior to the drilling of Compass wells, was it not?

A Yes, sir, it was.

Q And they had no control then in that direction, did they?

A No, sir. They did have control in Section 36, in Section 1 and in Section 13.



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Q That would be on the other side?

A On the west side of the field, they did have that control. They did have those three well controls.

Q They did not have the benefit of the information obtained from the Compass Wells?

A No, sir.

Q For the purposes of your testimony, you treated the Tocito and Gallup as one and the same formation?

A Yes.

Q Although it is defined as a lens in the Maucas shale, is it not, the Tocito?

A There is a great deal of discussion going on amongst all geologists. Actually, Tocito or Gallup sand buildup, all the buildups are actually lower on any previous sand accumulations overlying the Carlisle unconformity or hiatus between the Carlisle and any hiatus and these things, as I mentioned just previously in the testimony--actually probably this is the consideration of most geologists--are probably strike valley sands and are actually sands that are quest of valleys of this unconformity.

Q Now, as I understand your testimony in regard to Exhibit No. 2, you pointed to certain wells inside of the area as being wells which had no sand development.

A Inside of the Tocito area, inside the area zero line.

Q You said, for example, one of the wells had two feet.

You would consider it as no sand at all?



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A That well I referred to, I believe is outside the pool limits.

Q It was outside the pool limits in the northeast section of Section 2?

A I will correct that statement. The wells have datums inside the pool areas, no footage marked. They are not zero, they are just wells that we did not have any data on, we did not have the logs.

Q You don't say that they have no development?

A No.

Q Now, do you say the El Paso NCRA 1 in 1 had no sand development?

A Yes, I do.

Q Did you compare the log on that well to the logs on our other two Compass wells?

A Yes, sir, I did.

Q You still say there was no sand development?

A I say no sand. There is probably siltstone development, which is very characteristic in the Gallup.

Q Did you take into consideration permeability at all in defining your sand zone here?

A No, sir, I did not.

Q Did you have information other than the logs on this El Paso NCRA Well?

A I have the logs and completion data, as reported by



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service.

Q You had no core information?

A No.

Q Why do you not consider then that the development below the point you show that sand development as being sand?

A I told you, sir, that in selecting a parameter for this we selected the logs on the two production areas; we considered those sands since we had examined those sands in the drilling of the wells in our area and we are able to make an analysis. We could have set up a set of parameters and really not have been fair to your people. We could have stopped at over 50 ohms or 5 million ohms, but we didn't. Instead we attempted to use the overlay theory to just get as gross a pick as we could of these things and I am just sorry to say the NCRA well would in no way overlay.

Q The microlog shows permeability in that zone?

A I don't think the microlog shows permeability on any well. Microlog demonstrates porosity but not permeability.

Q How did you determine gross pay in these other wells?

A I didn't call it gross pay, I said gross sand. I determined it from the E log or the induction ES log.

Q Mr. Farrelly, did you know that there is a gas cap development in the Tocito reservoir?

A I noted that in examining the past exhibits in the field area yesterday that you people did draw a gas cap through approxi-





mately the southwest edge of Tocito. I did note that.

Q And what date was that exhibit that you were referring to?

A I think it was 1959 Exhibit, I can't recall.

Q You haven't made any investigation since that date to determine whether there is a gas cap and to what extent it may have grown since '59?

A You mean on the South Tocito Pool itself?

Q Yes.

A Just the investigation that my people have told me and I am not prepared to testify in Engineering things, on the accum-latives, and so forth that they have rounded up. They have told me that in the injection program that is presently going on, the pressure maintenance program that some of the wells, of course, that had been high gas - oil ratio wells had been converted to inject wells as such. I couldn't definitely say that I have ex-plored the exact size of the gas cap and how far it expanded. I had just general conversation with my people.

MR. UTZ: Any other questions?

MR. STOCKMAR: Mr. Examiner, the record might be clear if we identified the map to which he is referring to Case File 1420.

MR. STOCKMAR: Mr. Farrelly, is the map you refer to Exhibit A to a letter of El Paso Natural Gas Company of April 1st, 1959, addressed to the Commission and others, signed by Mr. C. L. Perkins, Vice President?

THE WITNESS: Yes, sir, it is.

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MR. UTZ: Are there any other questions?

MR. STOCKMAR: I do have one question on redirect examination if there are no others.

MR. UTZ: Any other questions of this witness?

BY. MR. UTZ:

Q Mr. Farrelly, the well in the northeast, northeast of Section 1, 26-7, I believe you stated that was completed as a Dakota Well?

A Yes, sir, I did.

Q But you show two feet of Gallup pay?

A Yes, sir.

Q It was not completed in the Gallup?

A No, sir, it was not.

Q Now, the well down in northeast corner of Section 13, the same township and range, you inspected that log and you found no pay in the Gallup?

A No, sir, I did not.

Q Now, in the southwest portion of the South Blanco-Tocito Pool, do you have all wells which were dipped through the Gallup plotted on the map?

A Yes, sir, as far as I know, I do.

Q So you can be sure that there were no gas wells in the southwest portion of this pool?

A Yes, sir.

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Q In the Gallup?

A Yes, sir.

Q Now, the gas wells shown in the northwest portion of the pool which you have net pays marked, which I presume are Gallup net pays?

A Not net pays, they are sand, sir.

Q Gross sand?

A Yes.

Q Are those wells completed in the Gallup?

A The wells with circle around them are the Dakota completions only.

Q So that in the northwest portion of this pool, there were no Gallup gas wells?

A No, sir.

Q Do you have any information as to the gas-oil ratios of any of the Gallup wells or Tocito wells in Section 6 or 7 portion of the pool that is nearest to your area?

A Yes, sir, we have the latest gas-oil ratio.

Q I imagine on Caulkins wells?

A Yes, sir, in Section 7, the B unit well is not GOR listed, it is a border injection well as shown.

In Section 6, the P unit well, which is an El Paso Natural Gas Products Company well, has a GOR of 1008 report. Also, in Section 6, the F unit well has a GOR of 17,400 report.

Q Those wells are pretty high gas-oil ratio for an oil



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pool, aren't they?

A Yes, sir, they are.

Q Do you have any idea as to the gravity of the liquid produced in South Blanco-Tocito?

A No, sir, I do not.

Q Are your wells producing any liquid?

A Yes, sir, their condensate and gravity is up around 49 degrees.

Q Do you have any GOR's on your well?

A Yes, sir, I do. Mr. Utz, I would like to call your attention to the fact that actually if the wells in the northwest on the structure map of Section--pardon me--in Section 6 is a Tocito-Blanco and wells in the northeast portion are further downdip even than our wells and actually structural strike with the majority of the pools.

Q Yes, I understand that.

A On the 13th well located in Section 3 with the box around it of 26-7 is the Compass Exploration, Inc.; 1-3 GOR is 80,833. The well in the east--the easterly most well in Section 4 of 26-7 is recently hooked up; the western most well is not on the line shaft as yet. The GOR on the 14, which is the well in the northeast of Section 4 is 100, 450.

Q Both of those wells produce the same type of fluid?

A Yes, sir.

Q Mr. Farrelly, have you done any subsurface work on any



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other Gallup areas in San Juan Basin?

A Yes, I have.

Q The results of your studies show that the Gallup invariably follows the trend directly and tend to cut across the trend in there?

A In the entire basin which I refer to as area inside the Mesaverde outgrowth it will follow the strike except for a slight cocking. Now this change in attitude has been caused by late structural movement of deposition of the sand. We feel sand was deposited along the strike and late structural movement caused some cocking. When you see a structure contour map without a tilt eliminated, you will note sometimes they run slightly obliquely to the strike.

Q Is it your contention the fact that there are some 100 feet difference in contours between the South Blanco-Tocito Pool and your area, that there would be no connection? That is one of your contentions?

A Yes, sir, there are no connections, through reservoir connections as such. The sand does not exist in between.

MR. UTZ: Does Caulkins intend to put on any testimony?

MR. KELLAHIN: Yes, sir.

MR. UTZ: Are there any other questions of the witness?  
The witness may be excused.

REDIRECT EXAMINATION

BY MR. STOCKMAR:



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Q Very briefly so the record is clear. Mr. Farrelly, would you refer to the four wells marked Dakota Completions on Sections 13, 14, 15 and 16 of 26 North, 6 West, around which pen circles have been drawn.

A There was error in the plotting of our map.

Q In essence it is a Dakota only completion and not a Gallup gas completion?

A That is true, sir.

Q Mr. Farrelly, in one of Mr. Utz' questions about the well in the northeast quarter of Section 17, 26 north, 7 west, he asked you if that had two feet of net pay and you answered yes. Is that your answer?

A No, sir, if I answered yes to that, I was wrong. It should be two feet of gross sand.

Q To your knowledge is there any production in the Gallup through that well?

A No, sir.

Q Mr. Farrelly, is there any way in which the net pay by any definition could be larger than the gross sand, as you have used that term here?

A No, sir.

MR. STOCKMAR: That is all the questions we have.

MR. UTZ: Any other questions? The witness may be excused.

MR. STOCKMAR: If there is to be other testimony, I



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would like to reserve the right to make a statement at the conclusion of the matter and put on rebuttal testimony.

MR. UTZ: You may have that permission. You just have the one witness at this time?

MR. STOCKMAR: Yes, sir.

A. H. HOLLAND

a Witness, called by the Oil Conservation Commission, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q State your name, please.

A My name is A. H. Holland.

Q By whom are you employed and in what position, Mr. Holland?

A I am Manager of Production for Caulkins Oil Company.

Q Mr. Holland, are you a Petroleum Engineer?

A Yes, I am a graduate Petroleum Engineer.

Q Have you testified before the Oil Conservation Commission and made your qualifications a matter of record before the Commission?

A I have.

Q Have you had any experience in the South Blanco-Tocito Pool?

A Yes, sir, I have followed the development of the pool for approximately the past ten years.



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Q Were you connected with the development of this pool practically from its inception to the present time?

A That is correct, from about the second well completed in the pool to the present.

Q Have you had actual field experience in this connection?

A Yes, I have.

Q Have you had anything to do with the pressure maintenance program which is being conducted by Caulkins Oil Company and was conducted by its predecessor in this pool?

A Yes, I have. I handled what was involved in the initial engineering, have followed it to the present time.

MR. KELLAHIN: We submit the qualifications of this witness.

MR. UTZ: He is qualified to testify in this case.

Q Referring to what has been marked Exhibit No. 1, Mr. Holland, would you identify that exhibit and state how it was prepared?

A Exhibit 1 is a structure contour map on the top of the Tocito sand. The map was prepared under my supervision by an examination of electric logs.

Q In connection with the picking of the top of the Tocito sands, Mr. Holland, is there a well defined electric log marker which can be picked for the purpose of identifying the top of the sand?

A Yes, there is. By correlation of logs, I experienced





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no difficulty in picking the top of the sand. There is also above the sand there about 50 feet or so there is a conductive member in the Maucas shale that can be traced out throughout a very broad area.

Q Is that marker uniformly 50 feet above the Tocito?

A It varies just slightly, not a great deal, so that the sand can be easily identified. In connection with this contour map, we have had contours on the Tocito production for a number of years. At the time that the Compass' first producing well that they had located in Section 3 was drilled we compared this log with the logs of our Tocito wells, extended our contour map over to the area and this, to our way of thinking, was just an extension of our Tocito sand and extension of the South Blanco-Tocito gas cap.

Q Do you agree with the testimony of Mr. Farrelly to the effect that the Compass wells, which are the subject of this hearing, are located higher on the structure than the South Blanco-Tocito wells in the original portion of the pool?

A This exhibit brings that out. It illustrates that they are located at a higher structural level. To us it just appears a continuation of the present contour pattern over in the Tocito Oil Pool Area.

Q Do you have anything further to add in connection with this particular exhibit?

A No, sir, I do not.



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Q Now, have you had prepared a cross section showing some of the wells involved in this hearing? I am now referring to what has been marked Caulkins Exhibit No. 2, would you identify that exhibit and state what is shown thereon?

A Exhibit 2 is a comparison of the electric logs of the Compass Federal Lindrith 1-3, the Caulkins T-123, Caulkins T-129. The red line on the cross section indicates that conductive member that I mentioned, that is traceable throughout a wide area. There are also other points on these logs. You can look at them and practically lay one log right on top of the other. The upper resistive members, there is very good correlation across the area. And I would particularly like to point out the Tocito sand indicated in general on the Caulkins T-123, as compared to the Tocito sand indicated in general on the Compass Federal Lindrith 1-3. They are both almost exactly 50 feet below this conductive member. They look practically exactly alike on the logs except for perhaps a few feet of thickness. I would like to point out that our T-123 well was a gas well. It is located in the gas cap to the Tocito Reservoir. To us, it just looks like the sand extends over into the Compass area and they are producing from this Tocito gas cap.

Q Would you locate the T-123 well you referred to as being gas well located in the gas cap?

A T-123 northeast quarter, Section 7, 20 North, 6 West. The Compass Federal Lindrith 1-3 is located in the southwest



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quarter of Section 3, Township 26 North, Range 7 West. And the T-129 is located in the northwest quarter of Section 9, Township 26 North, Range 6 West.

Q T-123 you indicated was a gas well which was located in the gas cap in the Tocito Pool, is that correct?

A That is correct.

Q It was a gas well when originally completed?

A Yes, it was. I don't have the initial potential. As I remember, it was 4 to 5 million cubic feet. It was an excellent gas well.

Q That is the same well that Mr. Farrelly referred to now as being an injection well?

A It is a water injection well.

Q And while we are on the subject, it might help if we discussed the T-111 in Section 6. Is that the correct number of that well?

A Yes, that is correct.

Q What is the situation in regard to that well?

A It is also a gas injection well--I mean a water injection well.

Q And was it completed as an oil well?

A It was a very high ratio oil well.

Q Do you recall what the ratios on that well were before it was converted to water injection?

A I don't recall exactly. It was a very high ratio well. As a guess, I would say in excess of 25,000 to 1.



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Q Is it your practice to produce in the South Blanco-Tocito Pool Gas Wells, which are in the gas cap of the pressure maintenance project?

A We have never produced T-123.

Q You never produced it?

A It was a shutin well.

Q And when a well represents a high gas-oil ratio, what do you do with it in this pool?

A Well, we have produced and are producing in wells in excess of 2,000 to 1 limits. We were regulated by the Commission. We are under a gas-oil ratio limitation.

Q Now, getting back to our Exhibit No. 2, Mr. Holland, would you say that this exhibit reflects a uniform sand member going across the area covered by this cross section?

A We think so. There are such good correlation in the experience that I have had in this and other areas, correlating electric logs, I don't believe I have ever worked with an area that correlated as well as this one.

Q You heard the testimony of Mr. Farrelly in regard to the conclusion he reached that you would expect to find correlation between Gallup sand members, although they may not be connected? Did you hear that testimony?

A Yes, I did.

Q Are you in agreement with that conclusion in this area?

A In this area, I very definitely think the Compass



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wells are connected to the South Blanco-Tocito reservoir.

Q In your experience with the South Blanco-Tocito reservoir, have you ever found a situation such as he has described, where there is the intersection connection between the areas, as closely located as these two are?

A Not to my knowledge.

Q Have you anything further to add in connection with Exhibit No. 2?

A I have nothing further.

Q Referring to what has been marked Caulkins Exhibit No. 3, would you identify that exhibit and state what is shown thereon?

A Exhibit No. 3 is an electric log cross section of the Compass Northwest Lindrith 2-4, the Compass Northwest Lindrith 1-4, and the Compass Federal Lindrith 1-3. And this exhibit is intended to show that the three wells are producing from a common source of supply. I think if you examine the exhibit, you will find that the Tocito sand is a little lower in the Maucas shale section for the 2-4 well as compared to the 1-3, the 1-4 Tocito sand. It is lower in the Maucas shale section again when compared with Federal Lindrith 1-3.

Q Have you examined the log on the El Paso NCRA No. 1 Well?

A Yes, I have examined that log.

Q Do you have a copy of that log here?



A I have a copy of it with me. And in this connection, I cannot understand the reason for making a division of the sand that was made in the Compass Exhibit No. 3, I believe it is.

Q Number 3?

A Number 3. I think in correlating, if you will use, especially if you will use one of the other wells, one of the other Compass wells, say the Northwest Lindrith 2-4, that you find that sand section correlates with the lower member of the El Paso NCRA No. 1 Well and that there would be no way other than to connect these sand thickness lines.

Q Mr. Holland, would you step over to the Examiner and point out to him the correlation you were referring to?

A I will. I want to show on their Exhibit 3 where they have discontinued there sand isopach lines, saying that there was no sand in the well. This is the well that avoided or separated the area. This is the log of the well, the El Paso Gas Products NCRA-1. I would like to show you how it correlates with one of the other Compass wells. Here is the same little conductive member that you can trace throughout the area. If you line it up with the conducting member there, there is no question that they are the same. This sand correlates exactly with that sand. So my contention is that isopach map should have been continuous.

CROSS EXAMINATION

BY MR. UTZ:

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Q Is this the log that is shown on Exhibit 3?

A Yes, sir.

Q This is the member here, right here, that they are showing on their Exhibit 3?

A That is right. The producing section in their wells to the west is lower in the Maucas shale and correlates almost exactly with the sand section in this El Paso Well. So to my way of thinking, there was no reason to subdivide that isopach map in the manner it was presented.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q I hand you what has been marked as Caulkins Exhibit No. 4 and ask you if that is the log of the El Paso NCRA Well No. 1 to which you have been referring?

A Yes, sir, that is the log that I have been using as a comparison.

Q Now, Mr. Holland, you heard the testimony of Mr. Farrelly in conclusion, stating that there is no reservoir connection because the sand does not exist between the South Blanco-Tocito Pool and the Compass Wells. Do you agree with that conclusion?

A No, I do not. I think that although there are no wells drilled in the interval between Caulkins T-123 that there is such good log correlation over that area that is one and the same sand member.

Q Now, assuming that it is one and the same sand member, Mr. Holland, and since it is higher on the structure,



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would you expect to find a gas cap in the area of the Compass well?

A Yes, we would. The only gas well completed as such in the Tocito reservoir is the highest well that we drilled.

Q Which was?

A T-123.

Q And you do not produce that as a gas well?

A We are using it as a water injection well.

Q Now, assuming that this connection exists, which you have stated, would production of the Compass wells, as gas wells, have any adverse effect upon the pressure maintenance program being conducted by Caulkins Oil Company in the South Blanco-Tocito Pool?

A Any well that is allowed to produce unrestricted in gas cap will affect an oil reservoir, irregardless of whether you are injecting water or producing under a gas cap expansion drive.

Q An adverse effect would exist whether you have pressure maintenance program or not, is that correct?

A That is correct. Our opinion and recommendation is that they should be regulated.

Q Should they be regulated under the rules of South Blanco-Tocito Pool?

A We believe they should, yes, sir.

Q Now, these wells are removed at some distance from





your nearest injection and producing wells, isn't that correct?

A That is correct.

Q Based on your experience with the South Blanco-Tecito Pool and your familiarity of the producing characteristics of that pool, would the production of the Compass wells have an adverse effect on your pressure maintenance program?

A They would have, unrestricted production would decrease our ultimate oil recovery.

Q In your opinion that communication across that area which would affect you?

A I believe so, yes.

Q Do you have anything further to add to your testimony?

A No, sir.

Q Were Exhibits 1 through 4 prepared by you or under your supervision?

A They were prepared under my supervision.

MR. KELLAHIN: At this time I would like to offer in evidence Exhibits 1 through 4.

MR. UTZ: Without objection, Exhibits 1 through 4 will be entered into the record of this case.

RECROSS EXAMINATION

BY MR. UTZ:

Q Mr. Holland, what is the gravity of fluid producing in South Blanco-Tecito Pool?

A That gravity ranges from 42 to 45 API.

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Q And the fluid in the Compass area was testified to as 49?

A Let me elaborate a little on our gravities in producing T-123--I am recalling from memory--but the liquid from that was nearly white and as in many of our wells, it was a gas cap encroachment the gravity would increase. I have no figures to show you but I know that to be a fact. And if we had produced that well T-123, our gravity would have been well above 42 to 45 range that I gave you.

Q T-123 was the only gas well that you drilled on the west side?

A We drilled there and quit, yes, sir.

MR. UTZ: Any other questions of this witness?

MR. STOCKMAR: Yes, I have, Mr. Examiner.

BY MR. STOCKMAR:

Q Mr. Holland, referring to your Exhibit 3, you have colored in green certain parts of the log there. Would you tell me what the significance of that is?

A What I colored is just a portion of the resistivity curve on the electric log.

Q What is the significance of coloring just a portion of it?

A I colored it principally for identification.

Q You seem to have colored only the resistivity above a certain point. What point is that? There is a legend on top of Exhibit 3 here?

A I colored, I believe, above the 50 ohm line.



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Q We refer to your Exhibit No. 4, which is the log then of NCRA well and refer to the part which you have identified as being the same sand, does any part of that kick on the curve there exceed 50 ohms?

A Well, it looks like at one point it is a little over 50, but not very much.

Q Would you identify for me the place on the log we are talking about?

A This is it right there. That looks like it is just barely over the 50 line.

Q It looks like it just touches on it, maybe a line possibly penetrates it, is that the one?

A This is the one right here.

Q Would you identify the depth measurement of that, please?

A That logs about 6645.

Q 6645. And what does the wiggle on the right-hand side of the curve mean on a log of this kind?

A That is a resistivity measurement.

Q What does that tell you about the formation that you have penetrated and logged?

A It is simply an electrical measurement. In some cases it would indicate oil or hydrocarbon production. You would say hydrocarbon fluids were present which would influence resistivity.

Q It measures some kind of fluid in the formation, is



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that it?

A It measures similar resistivity.

Q Then the absence of resistivity would indicate no fluid present?

A I didn't say that. I said you could--in areas you can use resistivity as a correlation measure. By that, I mean if you measure an oil and gas zone or log an oil and gas zone, such as Tocito, you actually produce hydrocarbon fluid from it. You measure the resistivity of an offset well or well in the area, the resistivity then is a guide in helping you correlate and possibly an indicator of whether it would be on hydrocarbon productivity.

Q Don't resistivities in some way measure the porosity of sand or rock, whatever it is you have encountered?

A I have never used it as such, no, sir.

Q Well, doesn't the resistivity measure some of the ability of the rock to pass the electric current?

A It is a resistivity of the rock, nothing else.

Q It has nothing to do with the fluid that might or might not be in the rock, is that correct?

A Well, I don't think, from resistivity, you can positively say what type of fluid is there.

Q I didn't ask that. Can we fairly state that the lower the resistivity, the lower the porosity of the rock?

A No, I don't think that is true at all.



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Q Well, it it true, Mr. Holland, that the maximum resistivity on this seems to be the cutoff point that you have used on your exhibit for coloring in green the kind of resistivity there?

A I could just as well have colored the other side of the log, the SP which is indicative of porosity.

Q You have talked about the Tocito sand, what do you mean when you say "sand"?

A Well, Tocito sand stone is the formation that we are producing from and in South Blanco-Tocito Pool.

Q Is this a member of the Gallup formation?

A It is a sand member in the Maucas shale section.

Q Is it fairly uniform over wide areas? Does it extend in all parts of the basin here? Is it limited or its lensing or what?

A The oil productive portion of it is there on the map you have.

Q I am just talking about the member, whatever it is, is it a broad blanket like thing of some kind?

A No, not necessarily. This essentially covers the Tocito sand section.

Q Well, it is not a broad blanket of some kind then? Does it occur in lenses or pods of some kind?

A It is a sand lens.

Q Are there many of these in the general vicinity of



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the two or three counties here?

A What do you mean "many"?

Q I mean a number of pods of sand that have been lenses of sand that have been encountered.

A Throughout the San Juan Basin there are several producing sands in the Maucas shale section.

Q And each of those others, except the ones we are talking about here, have been found to be separate sources of supply?

A Those that I know of, there is no way of correlating with the Tocito sand here, as compared to correlating the Compass wells with the Tocito oil wells.

Q Is it a possibility, Mr. Holland, that we do have two separate lenses here?

A I don't think we do, no, sir.

Q Do you have any control whatsoever for tying, for showing that there is a continuity across this three-mile distance here?

A The exhibit that we have presented.

Q Is it your testimony that the drilling of any well in between these two areas should be productive of gas?

A It is.

Q Do I infer then that the El Paso Natural Gas NCRA No. 1 should have been completed as a gas well?

A Whether it should or shouldn't, I don't think is



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pertinent. El Paso owns the well, they elected not to complete it as a gas well.

Q Does every place on this Exhibit No. 1, where you have shown Tocito sand development, should that be productive of oil or gas?

A Getting back to this NCRA well, I think it would be productive. I don't know how good a gas well it would be, but I think it would be productive of gas.

Q Is it possible that it also may be productive of oil?

A I would predict gas production.

Q It is not on strike practically according to the Applicant's Exhibit No. 1, with some oil wells that--

A The Tocito sand in that well is some 50 feet higher and continuous to our way of thinking, as compared to gas well we completed in the gas cap; based on that, I think it would produce gas.

Q What is it that defines the productive limits of the Tocito Pool, as you have worked on it these ten years?

A The sand essentially disappears updip. Downdip it seems to graduate grade into lower and lower permeability. We have some wells in which he has indicated some 20 feet of sand. We got a few barrels of oil out of. He assigned gross pay to them.

Q I think he might have testified it was gross sand, not gross pay, Mr. Holland. Did you hear the testimony that



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the formation there became siltstone? Do you agree with that?

A Well, in the course that we took in the area, I don't recall siltstone in comparable sections I have made across here.

Q Whatever, it was found that the low permeability would not give up oil and gas, is that correct?

A As you move downdips, some wells, I guess that is what is defined as the reservoir downdip.

Q Why is it impossible then that the same condition could not exist to the wells as you leave the Tocito Pool?

A Well, our exhibit indicates that there is a permeable Tocito sand that extends from the western producing portion of our reservoir to the Compass gas cap area.

Q Well, is this whole project of yours that this is all permeable sand, based on your study 1 log, which is your Exhibit No. 4?

MR. KELLAHIN: I object to the question. We have three exhibits showing logs which have been examined and correlated and certainly the witness didn't testify to any such thing that he based it on one log.

MR. STOCKMAR: Well, he can say no.

A It is based on the exhibits of which there are four or five different logs and correlated with other logs in our area.

Q Is there any correlation on what you have called Exhibit No. 3? These seem to be all Compass Wells. That doesn't show any correlation with the Field Tocito Pool, does it?





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A It shows that it is a common reservoir between the 3 Compass wells. It shows that comparison of the El Paso Well, NCRA Well that we have been talking about correlates with the 3 Compass Wells, more specifically with some of the wells with the sand member a little lower in the section, that is what the exhibit shows.

Q Mr. Holland, you testified that the production of some reasonable amount of gas from the so-called Compass area would have an adverse effect on your pressure maintenance program. Would you develop that a little more, if you will? Just how could this happen?

A Broadly, my basic belief and it is the belief of a number of Conservation Commissions that gas production from a gas cap should be regulated. I recommend it and I subscribe to it.

Q Let's assume for a moment that there is some connection across here. What would be the engineering route of some production from the gas wells that Compass has?

A In what way do you mean? You mean the loss of ultimate oil recovery?

Q This is what I am trying to get at. You have testified that it has an adverse effect and I want to find out why you think so?

A Well, any depletion of energy in a reservoir in a gas cap area would affect the oil portion of the reservoir.



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Q Have you made any calculations as to how much pressure decline or how much withdrawal that the Compass areas might have to result before these wells could have any affect whatsoever, a distance of three miles away?

A Well, I think that any production would affect the area. I don't subscribe to shutting the wells in. I don't believe that is the correct approach. I recommend and subscribe to the idea of regulation.

Q You have followed the secondary recovery, the program of the Tocito Field for many years. What is your estimate of the time in which that program will be completed?

A I have made no estimate.

Q Have you testified in previous hearings on this particular matter?

A As far as the time element is concerned, I don't believe I have.

Q Do you have any rough estimates or are we talking about two years or ten years or fifty years?

A I don't know.

Q Have you made any economic projections of any kind with respect to the secondary recovery mechanism?

A I have made reserve calculations. It is a continuing study.

Q Have you made any calculations with respect to elements of recovery you hope to obtain?



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A Yes, we have and it has been presented in other hearings.

Q Assuming, Mr. Holland, that the recovery program will be completed in, say, three years, what possible effect would some production of the Compass wells have on that program?

A You mean now?

Q Yes, sir, or three years from now.

A Its unrestricted production would affect ultimate oil recovery.

Q Are you saying that within a three-year period the Compass wells would have created a drainage pattern of some kind that would reach  $3\frac{1}{2}$  or 4 miles?

A What kind of production are you talking about? Unrestricted?

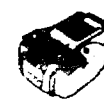
Q Say unrestricted production to pipeline--restrictions of some kind.

A I testified several times, about three times that is what I believe.

Q Is that equivalent to testifying Compass wells will drain 2 or 3 or 4 millidarcies in a three-year period?

A I think the situation here isn't any different than any other oil field in the State of New Mexico. Wells producing from a gas cap should be regulated, that is the basic conservation procedure.

Q Can we agree, Mr. Holland, that the pressure is no doubt higher, reservoir pressure is no doubt higher at Compass



wells than it is at the Tocito Pool?

MR. KELLAHIN: If the Commission please, there is no testimony before the Commission on pressures at the present time.

MR. UTZ: Objection is sustained. I don't believe there is any testimony as to pressures in any of these wells.

Q Mr. Holland, I think it has been testified that what you have identified as the T-123 Well and the T-11 Well are now water injection wells?

A That is correct.

Q By the injection of water into the wells is there not a barrier being put up between the oil part of the field and this alleged gas cap?

A Irregardless of water injection, I recommend and believe that gas wells and gas cap of a reservoir should be regulated. It is a practice in other oil and gas pools, it should be the practice here.

Q Well, is that a regulation because of some waste of oil that might arise through those well bores or some conservation of energy concept?

A It is basically, I believe, an ultimate oil recovery conservation procedure.

Q Is it your opinion that the owner of the gas cap should be entitled to some fair recovery of the gas under the gas cap?

A I have already testified that I didn't think that it

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was right to shut those wells in. I think they should be regulated.

Q What kind of regulation do you think is reasonable?

A The South Blanco-Tocito Pool Field Rules.

Q Do not those rules presently apply to oil wells only?

MR. KELLAHIN: If the Commission please, I believe the rules speak for themselves. He is just belaboring this point.

MR. UTZ: Objection sustained. I believe that is true. South Blanco-Tocito rules have been in effect several years and gas is regulated as a matter of information to counsel.

MR. STOCKMAR: I don't think I have any more questions, Mr. Examiner.

BY MR. UTZ:

Q Mr. Holland, do you have any pressure information on your pool?

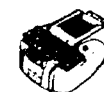
A Yes, sir, we do have.

Q Do you have any pressure information on some specific wells, say, those wells that are nearest to the Compass area?

A Those two wells are water injection wells. The closest wells, we have not measured pressures on those. I can tell you on the injection wells and in the water injection area, we have pressures on from 2300 to 2500 pounds.

Q Is this your face pressure?

A No, those are bottom hole. Our producing oil wells weigh from the water injection wells in the range of 1000 pounds.



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Q What datum would that be?

A Minus 100.

Q The range of 1000 pound bottom hole. You have no pressures on the Compass areas?

A I have none. I have seen face pressures.

MR. UTZ: Does consolidated on Compass have any pressure sub-surface pressures in your area?

MR. STOCKMAR: I believe some surface pressures. Do you want to put those in the record? I think we can stipulate as to what they are, not necessarily as having any bearing on precise bottom hole pressure however.

Q (By Mr. Utz) Mr. Holland, what is the GOR limitation on gas wells in your area?

A 2000 to 1.

Q And what is top allowable for Tocito?

A I think it has been running about 135 barrels a day, something like that. Depth break of 1.33. It is 80-acre factor which would be 2.77 depth factor. 135 or 140 barrels a day, I believe, is the--

Q But you give the gas well a little less than 300,000-- roughly, 230,000 a day on an 80-acre tract?

A Yes, sir.

BY CARL SPANN:

Q Mr. Holland, I would like to request one question here. Do you know of other areas in the San Juan Basin, other



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than the South Blanco Field, wherein the Gallup formation gas is found associated with oil?

A I know there are areas. I believe the **Escrito** area is one. I haven't followed; I haven't correlated logs; I know nothing about it.

Q This is not an uncommon situation you find here?

A No, I don't think so. And in the best tie area there is some we have no production in by tie so I am not qualified to be specific.

MR. SPANN: That is all.

BY P. T. MC GRATH:

Q Mr. Holland, if the Commission would grant Compass permission to produce these wells, these three gas wells, could you tell within a reasonable length of time the reaction of pressure maintenance program, whether there was interference or not?

A Unless we shut the water injection down, I doubt it.

Q Just wondered if there was some way we could prove it, one way or the other. We can prove it on the taking of bottom hole pressure, if connected with the pressure maintenance program, it is going to maintain the pressure on these wells?

A I don't think we could discontinue injecting water in over a period of several years.

MR. UTM: Any other questions?

MR. STOCKER: Dr. Examiner, if I could suggest a very



short recess; I think we could shorten down the rebuttal.

MR. UTZ: I have one more question and we will have a recess.

MR. STOCKMAR: Yes, sir.

BY MR. UTZ:

Q I would like to get back to interpretation of the resistivity side of your electric log. Mr. Holland, you maintained that this side of the log measured resistivity in the formation. Now, what is there in the formation that would change resistivity measurement?

A Water within a formation would reduce resistivity measurement.

Q Any reason why that water would be there? Porosity have anything to do with the amount of water and amount of resistivity in the formation?

A I think to a limited degree. Probably permeability has perhaps a little more. These are fresh waters in these sands so the resistivity analysis I have used is simply a correlation, just showing that it identifies sand members across the field.

Q In a general way, would you say that the more porosity and sand stone, the farther to the right the resistivity curve would fall?

A The higher the porosity?

Q Yes.

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A It would depend.

Q Even in the absence of liquid?

A I don't know. I simply don't know.

MR. UTZ: Are there any other questions? We will take a 15-minute recess.

AFTER RECESS

MR. STOCKMAR: I would like to recall Mr. Farrelly for a question or two on redirect examination.

PETER J. FARRELLY

a Witness, was recalled, examined, and testified as follows:

REDIRECT EXAMINATION

BY MR. STOCKMAR:

Q Mr. Farrelly, would you compare for us the NCRA No. 1 Well log characteristics with those of producing wells in this vicinity?

A I think that actually there isn't any producing well in either our area or the South Blanco-Tocito area that has a like log characteristic. I won't disagree with Mr. Holland. In fact, I will more than agree to the effect that you can correlate through this. These correlations don't necessarily represent the presence of sand which would have been able to compose an isopach which composed a four township area which correlated something all the way through to see something was or was not present. The correlation exists as you get outside of this area. As you approach the limits of either one of these

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reservoirs, you are going to get in tighter siltier sands. The Gallup is this way in nature in all fields, that you go into siltstone before you in essence shale out. I think perhaps that happens in the NCRA Well. I don't think it is producible. If you were going to say it was in a producible state, the fact you could frac Gallup shale any place. It would produce something too. I don't doubt that a bit. It is completely beyond the realm of completion to complete it. And I definitely feel that it does make a block over there and does represent a zero sand.

Q It is your opinion then that there are two separate sources of supply involved here?

A Yes, sir, it is.

MR. STOCKMAR: That is the end of redirect examination for this witness. We do want to put on some pressure data.

MR. UTZ: The other witness will give the pressure data?

MR. STOCKMAR: yes, sir.

RECROSS EXAMINATION

BY MR. UTZ:

Q Since I inquired into the interpretation of the resistivity curve with Mr. Holland, I will do the same with you. What is your interpretation of what the resistivity curve actually shows you in the formation?

A Resistivity curve means everything. It will measure in part the fluid, the actual rock resistivity. Actually, in utilizing with other logs on calculations on log basis porosity,



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you can arrive--it can apply as one of the factors in your calculations. I will not agree with the fact that you can have a lot of porosity and have a high resistivity, and because a lot of porosity fields with gas, which normally gives a high resistivity, it does measure hydrocarbons in an indirect sense. In that respect, you can in essence have a low resistivity and it can be either salt water or oil and it does definitely measure fluids in that respect or it can also be just shaley.

Q It wouldn't necessarily read porosity?

A It doesn't read porosity directly at all, Mr. Utz.

MR. UTZ: Any other questions of this witness?

BY MR. KELLAHIN:

Q Mr. Farrelly, you heard Mr. Holland's testimony that he has never found any siltstone in the Tocito formation, did you not?

A Yes, sir, I did.

Q Have you ever examined any core in the Tocito?

A In the Tocito, no, sir, I have not.

Q You don't know whether there is any siltstone in there or not, do you?

A I think I can say in the regional Tocito and Gallup that probably facie out into the siltstone.

Q Have you yourself ever found any siltstone in the Tocito?

A No, sir, I have not in core examination.



Q If there isn't any siltstone in the El Paso Well, then wouldn't that log then indicate porosity?

A No, sir, I do not feel that log indicates porosity at all. I don't think it shows siltstone. I do feel my interpretation, on the basis of the log characteristics, as opposed to log characteristics of the immediate surrounding area, shows there is a difference of rock type. I can correlate the rock types through both, as Mr. Holland pointed out, the upper and lower sands. I think the difference in the rock type has the affect on log characteristic.

Q What difference would there be if there were no siltstone?

A I would interpret it being siltstone.

Q You have not examined any cores and Mr. Holland testified he has examined cores, has testified there is no siltstone. For the purposes of this question, will you assume there is no siltstone, then what on the log indicates?

A Let's say a very shaley sand then.

Q What does the S-P curve indicate?

A I think originally any calculations that Schlumbeyer put out permeability wise in essence have been more and more utilized as a correlative device, I think in cases it can be interpreted as indicating a cleanness of something, with a cleanness of the sand, whether it does have any shale particles in this or it can also and probably does indicate a little bit of

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fluid content at times too. I have seen areas where the SP, not this particular area, signifies oil-water contact, through an oil-water contact, see a change in the SP. It is a very qualitative, not a very quantitative thing at all.

Q It would indicate porosity development if it indicates fluid, wouldn't it?

A It wouldn't definitely, no. El Royden Schlumberger, I think, is the man who started kicking the thing out.

Q Well, in sandstone, doesn't the SP Curve indicate porosity?

A Not necessarily, no, sir. I could have a tight sand with a very good SP kick.

MR. KELLAHIN: That is all.

BY MR. UTZ:

Q That is not the rule, however, is it, that you have a tight sand and have a good SP kick?

A I doubt if that is the exact rule, but it does occur.

MR. UTZ: Any other questions of this witness? Witness may be excused.

THOMAS A. DUGAN

A Witness, called by the Oil Conservation Commission, having been first duly sworn, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. STOCKMAR:

Q Mr. Dugan, you have been sworn?



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A Yes.

Q Will you state your name, address, and occupation for the record?

A Thomas A. Dugan, 1007 North Dustin Avenue, Farmington, New Mexico, Consulting Petroleum Engineer.

Q Have you previously testified before the New Mexico Oil Conservation Commission?

A Yes.

MR. UTZ: His qualifications are acceptable.

MR. STOCKMAR: Thank you, sir.

Q Mr. Dugan, did you not hear the interpretation of the other witnesses and their testimony here?

A Yes, sir.

Q Did you hear Mr. Utz' question with respect to bottom hole pressures?

A Yes, sir.

Q Do you have some knowledge with respect to the Compass wells and the pressure data?

A Compass has not taken any bottom hole pressure determinations with a bottom hole pressure bomb; however, recently I have made some bottom hole pressure calculations from surface pressures.

Q Would you continue and tell Mr. Utz what the results of your calculations were?

A Well, the pressure in the Compass area, as bottom hole



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pressure in the Compass area, is a minimum of 1950 pounds.

BY MR. UTZ:

Q Bottom hole at what depth?

A Well, at a minus 100 datum.

Q Calculating 1950 pounds at minus 100 datum, did you consider gravity of the fluid?

A The gravity of the gas.

Q Consider any fluid in the bottom of the hole.

A No, sir, I did not, but I am certain that there was fluid in bottom of the hole, that is why I said it was minimum of 1950 pounds.

Q And what was the relative surface pressures?

A 1600 pounds. They varied.

Q How much did they vary?

A I calculated one on the Federal 1-3 from shutin, indicating pressure measured September the 3rd, 1962, of 1549 on it.

BY MR. STOCKMAR:

Q Which well was that, Lindrith Federal 1-3?

A That is PSIG. On the Lindrith Federal 1-4, measured October the 28th, 1962, by dead weight gage, of 1603 PSIG and then a pressure on the Lindrith Federal 2-4, measured 12-1-62, of 1543 PSIG.

MR. UTZ: Any other questions of this witness?

MR. STOCKMAR: Yes, I still have some more of him still in the nature of rebuttal. He is still on his direct examination.



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BY MR. STOCKMAR:

Q Mr. Dugan, I think you just stated that these minium or conservative figures--as an engineer, is there any indication to you from this data which necessarily requires you to assume a connection between these two areas? Did I make myself clear?

A No, you didn't.

Q You have obtained some kind of calculated bottom hole pressures for the three Compass wells?

A Yes, sir.

Q Based on the other data, as a Petroleum Engineer, can you make any conclusion as to whether or not these wells are connected to the Tocito Pool?

A From that data, I can make no conclusion one way or the other from the information I have available, strictly by bottom hole pressures; however, considering all the other aspects, I believe they are separated.

Q Have you had occasion to study some of the physical rights to the Tocito Pool secondary recovery program?

A Yes.

Q Have you been able to make some estimates of the time within which that program might be concluded?

A Well, looking over their production figures and the way some of their wells are watering out, it would appear to me that their secondary recovery program would be completed within the next three or four years.





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Q Could the production of a substantial quantity of gas from the Compass wells have any effect upon the Tocito Pool, even if we assume it is connected, until such time as the bottom hole pressure in the Compass wells was below that of the Tocito Pool?

A I don't see how the Compass area could affect the South Blanco-Tocito even if it was connected until the Compass areas bottom hole pressure is lower than the South Blanco-Tocito pressure.

Q Did you hear Mr. Holland's testimony in which he spoke of unrestricted production?

A Yes.

Q To your knowledge, is there any unrestricted production of gas anywhere in the State of New Mexico?

A Not in the San Juan Basin.

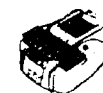
Q Mr. Dugan, if there is any impact of the Compass wells on the Tocito Pool, there must be quite a substantial drainage radius involved in the Compass wells. Do you have any comments with respect to that from your knowledge of the reservoir?

A Well, I am afraid that the Compass wells are not capable of draining a radius of three miles, although they are good wells.

Q You say you are afraid they are or are not capable of draining?

A I will say this. I am sure they are not capable of draining a radius of three miles.

Q Is it possible, Mr. Dugan, that if there is some con-



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nection between these pools that the production from the Compass wells could have any effect within a year or two years or three years that might be measured?

A This is assuming that there is a connection?

Q Assuming that there is a connection, yes, sir.

A Well, as I stated before, I don't believe that we can affect the South Blanco-Tocito area until the Compass bottom hole pressure is lower than the South Blanco-Tocito area bottom hole pressure, and depending on the rate of withdrawal, but by the gas takes there in the San Juan Basin, I would anticipate this to be quite some time, probably in the neighborhood of five years or more.

MR. STOCKMAR: I think that is all the questions on direct that I have.

MR. UTZ: Are there any other questions of this witness?

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Dugan, you said in your opinion the production from the Compass wells would not affect the South Blanco-Tocito Pool, assuming a connection of course, if the pressures were lower than those of the South Blanco-Tocito?

A Yes, sir.

Q Have you taken into consideration that there are two injection wells which would substantially affect the pressures in both directions?



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A Assuming a connection?

Q Yes, sir, assuming a connection.

A Well, the water being injected in these two wells will naturally take a line of least resistance which is toward the lower bottom hole pressures of the South Tocito Oil Pool.

Q Also serve to maintain the pressures in Compass wells, would they not?

A It might be. Now, this is assuming a connection between the two fields, it will probably act as a temporary block as you are pointing out.

Q Now, as I understand you testified you could draw in conclusion based solely upon pressures as to whether there was a connection or was not a connection?

A Yes, that is correct.

MR. KELLAHIN: That is all the questions I have.

BY MR. UTZ:

Q Mr. Dugan, do you know when South Blanco-Tocito injection program was put into effect?

A 1953.

Q That is closest?

A I am not sure but I think that is it.

Q Do you have any knowledge of what the pressures were at that time?

A I glanced at an exhibit this morning that showed it to be around 1800 at that time.



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Q That is bottom hole pressures?

A Yes, sir.

Q That would be comparable to pressures you have now possibly at lower--

A Lower.

Q Now, if there were a reasonable connection between this area and the South Blanco-Tocito area, do you believe that your pressures would be as high as they are or would not the South Blanco-Tocito area drain the pressures down from the Compass area?

A Well, assuming a connection that was permeable enough to drain over an area that great, you might assume that they would be lower than they are now.

Q Do you have any knowledge of what the original pressures were in South Blanco-Tocito?

A I looked at an exhibit this morning that showed 2200.

Q As bottom hole?

A Yes, sir.

MR. UTZ: Are there any other questions?

BY MR. KELLAHIN:

Q Do you know what the pressures are now on the west side of the South Blanco-Tocito Pool closest to the Compass wells?

A Closest to the El Paso-Rincon Unit No. 20 is 1700 plus.

Q And you are figuring 1950 on the Compass?

A As a minimum.



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Q And do you know what pressures would be in the vicinity of the injection wells?

A Well, the El Paso-Rincon Unit No. 20 was the highest pressure reported in South Blanco-Tocito. The rest of the pressures are down in the vicinity of 1000 pounds or lower.

Q I am referring to the injection wells themselves.

A What the bottom hole pressure of the injection wells would be?

Q Yes, sir. They are the closest wells, aren't they, to the Compass wells?

A Well, they are not closer than this Rincon Unit No. 20 I don't believe.

Q Did you have anything to do with filing the pressure of the completion reports with the Oil Conservation on these wells?

A On Compass?

Q Yes, sir.

A Not on the Federal 1-4 and 2-4, I might have filed a couple of reports on the Federal 1-3.

Q Now, what was the measure you gave on surface pressure you used on the Federal 3-1?

A I used the pressure of 1594 PSIG, taking 9326.

Q Do you know that the completion report showed the pressure of 1511 on that well?

A I am not aware of it. I wouldn't doubt it because as



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I pointed out there is a lot of fluid in the wells. The wells haven't been cleaned up and of course fluid has a big affect on the pressures.

Q You calculated these pressures without consideration of the fluid?

A Yes, sir, that is correct.

Q All of the initial measures as reported to the Commission are generally lower than those figures you used, isn't that correct, or do you know?

A I don't know.

Q Would you take it as correct if I said that on the Lindrith No. 1-4 the tubing pressure was 1547, casing pressure 1561, reported to the Commission by Compass on it?

A On which well?

Q 1-4.

A Yes, sir.

Q On the 2-4 well, that was taken 10-9-62 the pressures that you read?

A The pressure taken 10-28-62 following an additional 19-day shut-in.

Q Had the well been produced prior to that?

A On completion and testing, yes.

Q It hadn't been produced in the pipeline, had it?

A No, sir.

Q Now, on the 2-4 well, Compass reported casing pressure



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1520 and tubing pressure 1543?

A Yes, that is the pressure I used. That further indicates there is water in the well bore.

Q Only one well has been produced to any extent?

A Yes, sir, the 1-3, and which is further proof and indication that the wells haven't been cleaned following fracing and completion and fluid in the well bore.

MR. KELLAHIN: Thank you.

MR. STOCKMAR: May I ask two questions on redirect examination?

MR. UTZ: Yes, sir.

REDIRECT EXAMINATION

BY MR. STOCKMAR:

Q Mr. Dugan, were these wells fraced with oil?

A All three wells were fraced with oil.

Q I understand from prior testimony that these wells were also drilled on the Dakota. Was it necessary to kill these wells with water?

A We had to kill the Lindrith Federal 1-4 and Lindrith Federal 2-4 on completion with water.

Q Would either of these things contribute to there being fluid in the hole when pressures were taken?

A We put several thousand barrels of water into both wells when we killed them because the formation was taking water and this water has not been produced back.



MR. STOCKMAR: That is all the questions I have, Mr. Examiner.

RECROSS EXAMINATION

BY MR. UTZ:

Q Mr. Dugan, do you think there is any chance that El Paso will try to drill a Gallup well in the four-section area between the Compass area and the South Blanco-Tocito?

A I wouldn't want to predict what El Paso does. This South Blanco-Tocito has been producing for some time and they have very nice accumulative production from these wells and I think I have enough confidence in El Paso to think if they thought it was productive they would have drilled it some ten years ago.

MR. UTZ: Any other questions? The witness may be excused. Any other statements in this case?

MR. SPANN: In behalf of El Paso Natural Gas Products Company, I would like to state we agree with the evidence presented here by Caulkins and concur in the opinions and conclusions that were made by Mr. Holland in regard to this situation and would join in the recommendations that he made to the effect that unrestricted production of the Compass wells should not be allowed in accordance with the applications filed.

MR. STOCKMAR: Mr. Examiner, I think the evidence has clearly demonstrated, first, that there is no geological connection between these two pools so that they could be called a

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common source of supply of the Conservation Act. If that be your findings, then there also seems to be no alternative except to identify the new area as a new gas pool and treat it as such under the law of the State. Even if there should be some geologic connection, there is no longer a real connection. They are no longer really a common source of supply in any sense of the word. One of them is definitely an oil pool in the advanced stages of recovery which has been segregated to a large extent, if not entirely, from any other part of the formation by a huge water block of some kind. They are no longer a common source of supply, even if, one, they might have been geologically connected, it would certainly be awkward and unfair at best to attempt to bring in these wells that are three and a half miles from any present production; simply because they produce from comparable sand, to apply them to rather complex field rules that have grown up over the ten-year period to apply to secondary recovery project. There certainly seems to be no mechanism for a sharing, as this there be a common pool for the sharing by the gas people in the proceeds at this time. They have available energy. They are contributing that energy. If it is a common reservoir, there are certainly no indication that they would be recompensed within.

I think I can say that Compass does not wish to simply participate in gas storage project here. I think we hear those words in other times and places. It is entitled to produce a



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reasonable and fair share of the hydrocarbons there are. The present order is primarily for the benefit of the oil production, and certainly, even if they are found to be the same pool of substance, revision of field rules would be indicated. The present limiting oil-gas ratio has true application to these wells that oil-gas ratio in Case 100 and 1000. In essence, this pool simply ought to be treated as what it is, a new gas discovery, whether or not there would or would not be one on geological connection. It is as simple as that.

MR. KELLIAHIN: I think we have here a situation where our engineers and our engineering geologists at least meet head on in connection with their interpretation of the situation. The Compass attorney would seem to ignore the facts that have been presented in the course of this hearing.

In the first instance, we have a comparable sand, that has been admitted. We have a situation where you have an oil reservoir and a discovery called higher on the structure, the reservoir being a solution gas drive reservoir. We have shown by the evidence that in a comparable position Caulkins has drilled a gas well. Obviously you would expect to find on a comparable structural position gas wells drilled by Compass. Now, to say then that Caulkins has in the course of its pressure maintenance program injected water which may or may not form some sort of a barrier between there is to lose sight of the point that we are dealing with a conservation measure here. The



pressure maintenance program was set up by this Commission back in the early part of the 1950's. The Commission probably has more information on this reservoir in its files than any other reservoir in the State of New Mexico.

Our witness has testified, for example, that he has found no evidence of shale. He has examined cores. Compass' witness concludes that there is shale in here, although he has never seen cores, and cores are available. And on that basis, he says that he has shale in the El Paso Well and therefore no sand member present there. Obviously that is just a conclusion based on a lack of information. And the information was available, was examined by our witness and he concludes on the basis of the same information, and the information was available too but not examined by Compass, that there is a connection. They admit they have no control as between the two areas which they would seek to define as a common source of supply, other than the El Paso Well. Obviously there is no control simply because there are no wells drilled in there. But you can follow this across this formation, across from the east to the west side of the reservoir some five miles and it correlates in exactly the same fashion as it does from Toelto Reservoir, as it was originally designed to the extension of the reservoir which was so properly made by the Commission in its nomenclature hearing.

Now, to permit the production of gas from the gas cap in a solution gas drive reservoir, whether it be under pressure

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maintenance or not, is a violation of good conservation practice in, one, that has never been followed by this Commission and we certainly urge that it not be followed in this case.

MR. STOCKMAR: I think the applicant normally gets the last word for one minute, does he not, Mr. Examiner?

MR. UTZ: We will allow you about 30 seconds.

MR. STOCKMAR: First, I think Mr. Farrelly clearly indicated that there is adequate control for him. He does not dispute that the top of something called a Tocito rock may extend all across there. What he does find and clearly find is that there is no sand, as such, that could contain a collection of hydrocarbons that is producible.

I think what strikes me most of all is if we have a field here that has--on which more information has been developed than any other field in the State of New Mexico, an oil field which contains what--6 or 7 square miles--and all this time there has been a gas cap that also has 6 or 7 square miles in it. This would have come to the attention of anybody dealing with this. It simply is too much involved there for this not to be immediately apparent to anyone dealing with our reservoir. I submit that it has never been connected or would have been known long before this.

MR. UTZ: The case will be taken under advisement.

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STATE OF NEW MEXICO )  
COUNTY OF BERNALILLO ) ss

I, ELAINE BUCHANAN, Court Reporter, do hereby certify that the foregoing and attached transcript of proceedings before the New Mexico Oil Conservation Commission at Santa Fe, New Mexico, is a true and correct record to the best of my knowledge, skill and ability.

IN WITNESS WHEREOF I have affixed my hand and notarial seal this 18th day of June, 1963.

Elaine Buchanan  
Notary Public

My Commission Expires:  
October 14, 1966.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 2761, heard by me on May 20, 1963.  
Shirley A. [Signature], Examiner  
New Mexico Oil Conservation Commission

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No. 10-63

DOCKET: EXAMINER HEARING - WEDNESDAY - MARCH 20, 1963

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM,  
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, as alternate examiner:

- CASE 2773: Application of C. W. Trainer for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of the Hume-Queen Unit Area comprising 1,240 acres of State land in Township 16 South, Range 34 East, Lea County, New Mexico.
- CASE 2774: Application of C. W. Trainer for a waterflood project, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Queen formation, Hume-Queen Pool, Lea County, New Mexico, through 15 wells located in Sections 7, 8, 9, and 17, Township 16 South, Range 34 East.
- CASE 2775: Application of Cima Capitan, Inc. et al, for a waterflood project, Eddy County, New Mexico. Applicants, in the above-styled cause, seek authority to institute a waterflood project by the injection of water into the Grayburg-San Andres formation, Red Lake Pool, Eddy County, New Mexico, through 13 wells located in Sections 22 and 27, Township 17 South, Range 28 East.
- CASE 2776: Application of International Oil & Gas Corporation for a waterflood project, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to institute a waterflood project by the injection of water into the Queen formation, High Lonesome Pool, Eddy County, New Mexico, through one injection well located in Section 15, Township 16 South, Range 29 East.
- CASE 2777: Application of Consolidated Oil & Gas, Inc., for an unorthodox location, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval of its Apache Well No. 2-16 at an unorthodox location 790 feet from the North line and 1850 feet from the West line of Section 16, Township 26 North, Range 3 West, Blanco Mesaverde Pool, Rio Arriba County, New Mexico.
- CASE 2778: Application of Tenneco Oil Company for a unit agreement, San Juan County, New Mexico. Applicant, in the above-styled



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Docket No. 10-63

cause, seeks approval of the Central Totah Gallup Unit Area comprising 2,738 acres of Federal and Fee lands in Townships 28 and 29 North, Range 13 West, San Juan County, New Mexico.

CASE 2737: (Continued from January 23, 1963 Examiner Hearing)

Application of Gulf Oil Corporation for special pool rules, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks the establishment of special pool rules for the White City-Pennsylvanian Gas Pool, Eddy County, New Mexico, including provisions for 640-acre spacing therein. This case was continued to the March 20, 1963 examiner hearing by Order No. R-2429.

CASE 2761: (Continued)

Application of Compass Exploration, Inc., for the creation of a Gallup Gas Pool, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks an order deleting certain acreage from the South Blanco-Tocito Pool and re-designating portions of said acreage to comprise a new Gallup gas pool for its Northwest Lindrith Well No. 1-3, located in Unit K of Section 3, Township 26 North, Range 7 West, Rio Arriba County, New Mexico.

CASE 2746: (Continued)

In the matter of the hearing called by the Oil Conservation Commission on its own motion to permit Continental National Insurance Group and all other interested parties to appear and show cause why the Kenneth V. Barbee Well No. 1, located 1980 feet from the South line and 660 feet from the East line of Section 9, Township 11 South, Range 25 East, NMPM, Chaves County, New Mexico, should not be plugged in accordance with a Commission-approved plugging program.

iqg/

No. 10-63

SUPPLEMENTAL DOCKET - EXAMINER HEARING - WEDNESDAY, MARCH 20, 1963

9 A.M. - OIL CONSERVATION COMMISSION CONFERENCE ROOM, STATE LAND  
OFFICE BUILDING, SANTA FE, NEW MEXICO

The following case will be heard before Elvis A. Utz, Examiner, or Daniel S. Nutter, as alternate examiner:

CASE 2779: Application of Marathon Oil Company for a unit agreement, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of the North Indian Basin Unit Area, comprising 5786 acres, more or less, of State and Federal Lands in Townships 20 $\frac{1}{2}$  and 21 South, Range 23 East, Eddy County, New Mexico.

CAULKINS OIL COMPANY  
1130 FIRST NATIONAL BANK BUILDING  
DENVER 2, COLORADO  
TELEPHONE MAIN 31873

February 14, 1963

*case file  
pm*

The New Mexico Oil Conservation Commission  
Santa Fe, New Mexico

Attn: A. L. Porter, Jr., Member and Secretary

Re: Case No. 2761 Application  
Compass Exploration, Inc.  
For the creation of a Gallup Gas Pool

Gentlemen:

Case No. 2761 application of Compass Exploration, Inc. to delete a portion of the South Blanco Tocito Pool is presently set for hearing February 21, 1963.

This case came to our attention on the commission docket only this week, leaving inadequate time to prepare the necessary exhibits to participate in the case.

For this reason we respectfully request a continuance to the next examiner hearing before the same examiner.

Yours very truly,

CAULKINS OIL COMPANY

*A. F. Holland*

A. F. Holland

AFH:gf

DOCKET MAILED  
Date 2/8/63

**COMPASS EXPLORATION, INC.**

101 UNIVERSITY BOULEVARD  
DENVER 6, COLORADO

January 29, 1963

MAILED  
JAN 30 11 27

*Case 2761*

State of New Mexico  
Oil Conservation Commission  
Post Office Box 871  
Santa Fe, New Mexico

Re: Application for an  
Examiner Hearing

Gentlemen:

Compass Exploration, Inc., of 101 University Boulevard, Denver 6, Colorado, requests a hearing before an examiner of the New Mexico Oil Conservation Commission on February 26, 1963, in Santa Fe, New Mexico, for the purpose of establishing the following:

1. A new Gallup gas pool in Sections three and four of Township twenty-seven North, Range six West, Rio Arriba County, New Mexico--such pool having been discovered by Compass Exploration Inc., #1-3 Northwest Lindrith well, located in NE SW of Section three, Township twenty-six North, Range seven West. This well was completed in the Gallup on September 12, 1961.
2. The spacing of the Gallup formation in the new field on one hundred sixty acres.
3. The rescinding of Commission Order R-2265 dated July 1, 1962, which put the subject area within the boundaries of the South Blanco Tocito Pool.

DOCKET MAILED

DOCKET MAILED

Date 2/8/63  
*R*

State of New Mexico  
Oil Conservation Commission  
January 29, 1963

Page 2

The following is a list of parties interested in this  
Application:

El Paso Natural Gas Company  
Post Office Box 990  
Farmington, New Mexico

Caulkins Oil Company  
1130 First National Building  
Denver 2, Colorado

El Paso Natural Gas Products Company  
Post Office Box 1560  
Farmington, New Mexico

**DOCKET MAILED**

International Oil Company  
825 Petroleum Club Building  
Denver, Colorado

**Date** \_\_\_\_\_

Consolidated Oil and Gas Corporation  
4150 East Mexico Avenue - Suite 200  
Denver 22, Colorado

Respectfully submitted,

COMPASS EXPLORATION, INC.

*P. J. Farrelly*

P. J. Farrelly  
Manager, Exploration  
and Production

PJF:cks

2748

LAW OFFICES  
HERVEY, DOW & HINKLE  
HIRAM M. DOW  
CLARENCE E. HINKLE  
W. E. BONDURANT, JR.  
GEORGE H. HUNKER  
HOWARD C. BRATTEN  
S. B. CHRISTY IV  
LEWIS C. COX, JR.  
PAUL W. EATON, JR.  
CONRAD E. COFFIELD  
HAROLD L. HENSLEY, JR.

MAIN OFFICE  
HINKLE BUILDING  
ROSWELL, NEW MEXICO  
663 FEB 27 AM 8:15

TELEPHONE 622-6510  
AREA CODE 505  
POST OFFICE BOX 10

February 26, 1963

Mr. A. L. Porter, Jr.  
Secretary-Director  
New Mexico Oil Conservation Commission  
Box 871  
Santa Fe, New Mexico

Re: Indian Hills Unit Agreement

Dear Mr. Porter:

We enclose herewith an approved copy of the Unit Agreement for the development and operation of the Indian Hills Unit Area, Eddy County, New Mexico, which was approved by the Commission on February 6, 1963.

This copy is filed with you in compliance with paragraph 5 of your Order.

Yours very truly,

HERVEY, DOW & HINKLE

By 

CEH:ev  
Encl.  
cc: Mr. Charles Morgan  
Mr. Fred Goodwin  
Mr. Charles Perry

GOVERNOR  
JACK M. CAMPBELL  
CHAIRMAN

State of New Mexico  
**Oil Conservation Commission**



LAND COMMISSIONER  
E. S. JOHNNY WALKER  
MEMBER

STATE GEOLOGIST  
A. L. PORTER, JR.  
SECRETARY - DIRECTOR

P. O. BOX 871  
SANTA FE

April 5, 1963

Mr. Ted Stockmar ✓  
Holmes, Roberts, More, Owen & Stockmar  
Attorneys at Law  
1700 Broadway - 2112 Tower Building  
Denver 2, Colorado

Re: Case No. 2761  
Order No. R-2462  
Applicant:  
Compass Exploration, Inc.

Dear Sir:

Enclosed herewith are two copies of the above-referenced  
Commission order recently entered in the subject case.

Very truly yours,

*A. L. Porter, Jr.*

A. L. PORTER, Jr.  
Secretary-Director

lr/

Carbon copy of order also sent to:

Hobbs OCC   x  

Artesia OCC           

Aztec OCC   x  

OTHER Mr. Booker Kelly ✓  
Mr. Jason Kellahin ✓

Mr. Charlie Spann ✓  
Mr. P. T. McGrath

**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 FOR  
THE PURPOSE OF CONSIDERING:**

CASE No. 2761  
Order No. R-2462  
RECOMMENDATION

**APPLICATION OF COMPASS EXPLORATION, INC.,  
FOR THE CREATION OF A GALLUP GAS POOL,  
RIO ARriba COUNTY, NEW MEXICO.**

**ORDER OF THE COMMISSION**

**BY THE COMMISSION:**

This cause came on for hearing at 9 o'clock a.m. on March 20, 1963, at Santa Fe, New Mexico, before Elvis A. Utz, Examiner duly appointed by the Oil Conservation Commission of New Mexico, hereinafter referred to as the "Commission," in accordance with Rule 1214 of the Commission Rules and Regulations.

NOW, on this 5th day of April, 1963, the Commission, a quorum being present, having considered the application, the evidence adduced, and the recommendations of the Examiner, Elvis A. Utz, 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 applicant, Compass Exploration, Inc., seeks an order deleting Sections 1, 2, and 3, Township 26 North, Range 7 West, NMPM, from the South Blanco-Tocito Pool and redesignating portions of said acreage to comprise a new Gallup gas pool in Sections 3 and 4, Township 26 North, Range 7 West, NMPM, Rio Arriba County, New Mexico.

(3) That by Order No. R-2265, entered by the Commission on June 15, 1962, the South Blanco-Tocito Oil Pool was extended to include the following-described acreage:

TOWNSHIP 26 NORTH, RANGE 7 WEST, NMPM  
Section 1: 3/2  
Section 2: 3/2  
Section 3: 3/2



CASE No. 2761  
Order No. R-2462

and that by Order No. R-2428 entered by the Commission on February 21, 1963, the South Blanco-Tocito Pool was further extended by the addition of all of Section 4, Township 26 North, Range 7 West, NMPM, Rio Arriba County, New Mexico.

(4) That all wells completed in the Gallup formation in Sections 3 and 4, Township 26 North, Range 7 West, NMPM, Rio Arriba County, New Mexico, are completed in and producing from a common source of supply that is not a part of the South Blanco-Tocito Oil Pool.

(5) That Sections 1, 2, 3, and 4, Township 26 North, Range 7 West, NMPM, Rio Arriba County, New Mexico, should not be included within the horizontal limits of the South Blanco-Tocito Oil Pool, and that Order No. R-2265 should be amended by deleting Paragraph (d) therefrom and Order No. R-2428 should be amended by deleting Paragraph (1) therefrom.

(6) That a new Gallup gas pool should be created comprising the following-described area:

TOWNSHIP 26 NORTH, RANGE 7 WEST, NMPM

Section 3: S/2

Section 4: All

(7) That in view of the history of the Gallup formation there is a reasonable probability that gas production from the Gallup formation in Sections 3 and 4, Township 26 North, Range 7 West, NMPM, Rio Arriba County, New Mexico, is originating from a gas cap overlying an undesignated Gallup oil pool; that withdrawals from the gas pool created by this order should therefore be restricted in order to prevent undue dissipation of gas which may be the drive mechanism for an oil pool and in order to assure the protection of correlative rights.

(8) That this case should be reopened upon further development of the Gallup formation in this area in order to determine whether the pool should remain classified as a gas pool or be reclassified as an oil pool.

IT IS THEREFORE ORDERED:

(1) That Order No. R-2265 is hereby amended by deleting Paragraph (d) therefrom and Order No. R-2428 is hereby amended by deleting Paragraph (1) therefrom.

(2) That a new pool in Rio Arriba County, New Mexico, classified as a gas pool for Gallup production is hereby created and designated the Largo-Gallup Gas Pool consisting of the following-described area:

-3-

CASE No. 2761  
Order No. R-2462

TOWNSHIP 26 NORTH, RANGE 7 WEST, NEPM

Section 3: S/2

Section 4: All

(3) That the daily gas production from a 160-acre spacing unit in the Largo-Gallup Gas Pool shall not exceed 500 MCF of gas per day.

(4) That this case shall be reopened upon further development of the Gallup formation in this area in order to determine whether the pool should remain classified as a gas pool or be reclassified as an oil pool.

(5) That jurisdiction of this cause is retained for the entry of such further orders as the Commission may deem necessary.

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

STATE OF NEW MEXICO  
OIL CONSERVATION COMMISSION

*Jack M. Campbell*

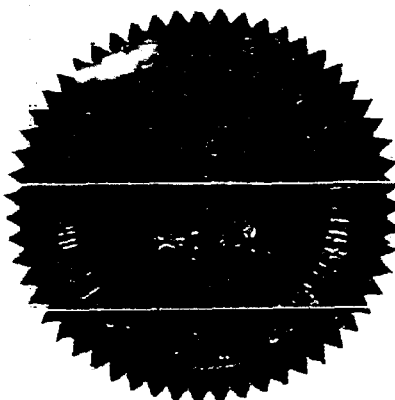
JACK M. CAMPBELL, Chairman

*E. S. Walker*

E. S. WALKER, Member

*A. L. Porter, Jr.*

A. L. PORTER, Jr., Member & Secretary



esr/