~~Cont to Mar 31~~

~~Cont to Apr 14~~

Continued to
May 12

~~Cont to Mar 31~~

~~Cont to Apr 14~~

Continued to

May 12

CASE 7515: FOUR CORNERS GAS [illegible]
APPLICATION FOR DESIGNATION OF A TIGHT
FORMATION, SAN JUAN COUNTY, NEW MEXICO

CASE NO.

7515

APPLICATION,

TRANSCRIPTS,

SMALL EXHIBITS,

ETC.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-5434

August 12, 1982

Mr. Howard Kilchrist
Federal Energy Regulatory Commission
Department of Energy
825 North Capitol Street, N.E.
Washington, D.C. 20426

Re: Tight Formation Designation on the Application of Four Corners Gas Producers Association, Case 7515, OCD Order R-7021

Dear Mr. Kilchrist:

Enclosed please find two copies of the Recommendation and exhibits of the New Mexico Oil Conservation Division for designation of certain portions of the Dakota formation in San Juan County, New Mexico, as a tight formation.

Sincerely,

W. PERRY PEARCE
General Counsel

WPP/fd

enc.

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

NGPA SECTION 107 TIGHT FORMATION RECOMMENDATION	)	Docket No._____
STATE OF NEW MEXICO OIL CONSERVATIUN DIVISION OF THE ENERGY AND MINERALS DEPARTMENT	)	

RECOMMENDATION FOR TIGHT
FORMATION DESIGNATION UNDER
SECTION 107 OF THE NGPA.

Four Corners Gas Producers Association, pursuant to Section 107 of the Natural Gas Policy Act, 18 CFR §271.703 of the FERC regulations, and the Special Rules and Procedures for Tight Formation Designations under Section 107 of the Natural Gas Policy Act of 1978 of the Oil Conservation Division, petitioned the Oil Conservation Division for tight formation designation of a portion of the Dakota formation in San Juan County, New Mexico.

After notice and hearing on the application of Four Corners Gas Producers Association, the Oil Conservation Division hereby recommends that that portion of the Dakota formation which is described in Exhibit A (being Oil Conservation Division Order No. R-7021) attached hereto and incorporated by reference, be designated a tight formation. Additionally, the Oil Conservation Division submits herewith Exhibits B, a copy of the transcript of hearing and exhibits presented to the Division, and C, a copy of a letter evidencing the concurrence of the Minerals Management Service, attached hereto and incorporated herein by reference, which are supporting data required under 18 CFR §271.703(c)(3) of the FERC regulations and Minerals Management Service ratification of this recommendation, respectively.

Respectfully submitted,

W. PERRY PEARCE
Attorney for the
Oil Conservation Division

VERIFICATION

STATE OF NEW MEXICO)
)ss.
COUNTY OF SANTA FE)

W. PERRY PEARCE, being first duly sworn, on oath, states that he is an attorney for the Oil Conservation Division of the Energy and Minerals Department of the State of New Mexico; that he has executed the foregoing document with full power and authority to do so; and that the matters and facts set forth therein are true to the best of his information, knowledge and belief.

W. PERRY PEARCE

Subscribed and sworn to before me, this 12th day of August, 1982.

NOTARY PUBLIC

OFFICIAL SEAL
SIGNATURE
NOTARY PUBLIC - NEW MEXICO
NOTARY BOND FILED WITH SECRETARY OF STATE
My Commission Expires 4-9-83

My Commission Expires:

April 9 1983

CERTIFICATE OF SERVICE

I hereby certify that I have this day served a copy of the foregoing Recommendation on Four Corners Gas Producers Association in accordance with the requirements of Section 1.17 of the Rules of Practice and Procedure.

Dated this 12th day of August, 1982.

W. PERRY PEARCE

United States Department of the Interior

MINERALS MANAGEMENT SERVICE
SOUTH CENTRAL REGION
505 MARQUETTE AVENUE, N.W., SUITE 815
ALBUQUERQUE, NEW MEXICO 87102

IN REPLY REFER TO: MS 460

JUL 26 1982

JUL 27 1982
OIL CONS. DIV.
SANTA FE

Mr. W. Perry Pearce
Oil Conservation Division
State of New Mexico
P. O. Box 2088
Santa Fe, New Mexico 87501

Dear Mr. Pearce:

This jurisdictional agency concurs in the recommendation of the State of New Mexico, Case No. 7515, Order No. R-7021, dated July 16, 1982, that the Dakota formation underlying the described lands in subject order in San Juan County, New Mexico, be designated as a Section 107 tight formation.

It is requested that this concurrence be included with the recommendation submitted to the Federal Energy Regulatory Commission.

Sincerely yours,

James W. Shelton

FOR Gene F. Daniel
Deputy Minerals Manager
Oil and Gas

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

July 21, 1982

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87501
(505) 827-2434

Mr. Gene Daniels
Minerals Management Service
United States Department of the Interior
P. O. Box 26124
Albuquerque, New Mexico 87125

Re: Tight Formation Recommendation

Dear Mr. Daniels:

Enclosed please find copies of New Mexico Oil Conservation Division Order No. R-7021. This order recommends certain areas of formations within New Mexico for designation as tight formations under the provisions of Section 107 of the Natural Gas Policy Act of 1978.

Prior to forwarding this recommendation to the Federal Energy Regulatory Commission for their consideration, I will await your advising the Division on whether or not the Minerals Management Service concurs in such recommendations.

Thank you for your attention to this matter.

Sincerely,

W. PERRY PEARCE
General Counsel

WPP/dr
enc.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
12 May 1982

EXAMINER HEARING

IN THE MATTER OF:

Application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico. CASE 7515

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant:

MR. STAMETS: We'll call next Case 7515.

MR. PEARCE: Case 7515. That is the application of Four Corners Gas Producers Association for a designation of a tight formation, San Juan County, New Mexico.

MR. STAMETS: This case is continued from the April 14th, 1982, Examiner Hearing, and I believe has been readvertised.

Is there any additional testimony in this case today?

There being none, the case will be taken under advisement.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7515, heard by me on 5-12, 1982.

Richard L. Stamets, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
14 April 1982

EXAMINER HEARING

IN THE MATTER OF:

Application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico. CASE 7515

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant:

MR. STAMETS: Call next Case 7515.

MR. PEARCE: That is the application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico.

MR. STAMETS: At the request of the interested parties in this case the case will be continued to the May 12th Examiner Hearing.

(Hearing concluded.)

C E R T I F I C A T E

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7515, heard by me on 4-14 19 82.

Richard L. Stamets, Examiner
Oil Conservation Division

SALLY W. BOYD, C.S.R.
Rt. 1 Box 193-B
Santa Fe, New Mexico 87501
Phone (505) 455-7409

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
31 March 1982

EXAMINER HEARING

IN THE MATTER OF:

Application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico. CASE 7515

BEFORE: Daniel S. Nutter

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant:

MR. NUTTER: We will next call Case Number 7515.

MR. PEARCE: That is the application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico.

MR. NUTTER: Case Number 7515 will be continued to the Examiner Hearing schedule to be held at this same place at 9:00 o'clock a. m. April 14, 1982.

(Hearing concluded.)

CERTIFICATE

I, SALLY W. BOYD, C.S.R., DO HEREBY CERTIFY that the foregoing Transcript of Hearing before the Oil Conservation Division was reported by me; that the said transcript is a full, true, and correct record of the hearing, prepared by me to the best of my ability.

Sally W. Boyd CSR

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 7675 heard by me on 9/21 1982.

Oil Conservation Division, Examiner

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BLDG.
SANTA FE, NEW MEXICO
16 March 1982

EXAMINER HEARING

IN THE MATTER OF:

Application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico. CASE 7515

BEFORE: Richard L. Stamets

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: W. Perry Pearce, Esq.
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant: William F. Carr, Esq.
CAMPBELL, BYRD, & BLACK P.A.
Jefferson Place
Santa Fe, New Mexico 87501

APPEARANCES

For El Paso Natural Gas Company: MONTGOMERY & ANDREWS P.A.
Paseo de Peralta
Santa Fe, New Mexico 87501

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MR. STAMETS: We will now call Case 7515.

MR. PEARCE: Application of Four Corners Gas Producers Association for designation of tight formation, San Juan County, New Mexico.

MR. CARR: May it please the Examiner, my name is William F. Carr, with the law firm Campbell, Byrd, and Black, P. A., of Santa Fe, appearing on behalf of Four Corners Gas Producers Association.

I have one witness who needs to be sworn.

MR. STAMETS: Any other appearances in this case?

MR. PEARCE: Mr. Examiner, we have received a request of the law firm of Montgomery and Andrews, P. A., that their appearance be entered on behalf of El Paso Natural Gas Company.

They do not intend to participate in this matter but wish to have the record reflect their appearance.

(Witness sworn.)

KEVIN McCORD

being called as a witness and being duly sworn upon his oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. CARR:

Q Will you state your name and place of residence?

A My name is Kevin McCord and I reside in Farmington, New Mexico.

Q Mr. McCord, by whom are you employed and in what capacity?

A I am a self-employed petroleum engineer, acting as a consultant for the Four Corners Gas Producers Association.

Q Have you previously testified before this Commission or one of its Examiners and had your credentials as a petroleum engineer accepted and made a matter of record?

A Yes, I have.

Q Are you familiar with the application filed on behalf of Four Corners Gas Producers Association in this case?

A I am.

Q Are you familiar with the proposed West Side Tight Gas Area?

A Yes, I am.

MR. CARR: Are the witness' qualifications acceptable?

MR. STAMETS: They are.

Q Will you briefly state what Four Corners is seeking with this application?

A The Four Corners Gas Producers Association is applying for a portion of the Basin Dakota Gas Field to be designated as a tight formation under Section 107 of the Natural Gas Policy Act of 1978.

The proposed West Side Tight Gas Area is located in the northwestern portion of the San Juan Basin. The area covers portions of the City of Farmington and San Juan County of northwestern New Mexico.

Q Have you prepared certain exhibits for introduction in this case?

A Yes, I have.

Q Were these exhibits submitted to the Oil Conservation Division and to the Mineral Management Service fifteen days prior to hearing, as required by Oil Conservation Division rules?

A Yes, they were.

Q Will you please refer to what has been marked for identification as Exhibit Number One, identify this and explain what it shows?

A Exhibit Number One displays the West Side Tight Gas Area on a map of the Dakota reservoir in the San Juan Basin. The West Side Area includes approximately 165,120 acres in Townships 26 North, Range 12 West, Township 26 North, Range 13 West, Township 27 North, Range 12 West, Township 27 North, Range 13 West, Township 28 North, Range 13 West, Township 29 North, Range 13 West, Township 29 North, Range 14 West, Township 29 North, Range 15 West, Township 30 North, Range 14 West, and Township 30 North, Range 15 West.

Q Does the Dakota formation in the West Side Area meet the criteria established in Section 107 of the Natural Gas Policy Act?

A Yes, it does. The estimated average in situ gas permeability throughout the pay section is expected to be 0.1 millidarcy, or less. The stabilized production rates without stimulation at atmospheric pressure of these gas wells are not expected to exceed the maximum allowable production rate of 188 Mcf of gas per day, for an average depth of 5952 feet to the top of the Dakota formation in this area, and no well drilled into the Dakota formation in this area is expected to produce more than five

barrels of crude oil per day prior to stimulation.

Q Mr. McCord, will you now refer to Exhibit Number Two and review this for Mr. Stamets?

A Exhibit Number Two is a Dakota formation completion and production map of the proposed West Side Tight Gas Area.

The production figures presented for each producing well are initial potential, date of initial potential, average daily production for 1980, and January 1st, 1981, cumulative production of gas and oil.

Exhibit Number Two also presents completion and production data from several wells surrounding the proposed tight gas area.

Q Does this exhibit also have traces for later cross sections, which will be offered?

A Yes. Traces A-A' and B-B'.

Q How many wells are there in the proposed area?

A The tight gas area contains 36 producing Dakota formation gas wells, while 69 wells in this area are abandoned in the Dakota at this time. These 105 wells drilled in the area represent only 20 percent development of all possible drillsite spacing units, while only seven percent of the units have producing Dakota formation wells.

Q Will you now refer to Exhibit Number Three, identify this, and review it for Mr. Stamets?

A Exhibit Number Three is a list of the West Side Tight Gas Area wells. Examination of these figures indicate that these Dakota wells have not produced great quantities of natural gas, suggesting that low permeability reservoir rock is present in the area.

Q Will you now proceed to review Exhibit Number Four?

A Exhibit Number Four is a type log of a Dakota well found in the West Side Tight Gas Area. This log is from the Tenneco Oil Company USA Scott No. 1 Well, found in Section 28, Township 28 North, Range 13 West.

This well is in the east central portion of the West Side Tight Gas Area. The eastern portion of the West Side Tight Gas Area has exhibited better producing characteristics than the remainder of the area. Wells in the remaining sections of the West Side Area would be expected to have the same or poorer log characteristics than this type log.

This log also shows the entire Greenhorn and Dakota formation. The State of New Mexico has defined the Dakota producing interval in the Basin Dakota Pool to begin at the base of the Greenhorn limestone and extend to a

point 400 feet below the base of the Greenhorn. The formations covered in this 400 feet are the Graneros shale, Dakota sandstone, and Morrison formation.

The Graneros shale and Dakota formations are productive in this area, while the Morrison formation is generally water-bearing.

Q What is the average depth of the Dakota in the area?

A It's approximately 5952 feet and has from 250 to 300 feet of gross thickness. The sandstone, the Dakota sandstone is late Cretaceous in age with deposition occurring under both marine and non-marine conditions. The Dakota sandstone is the basal sequence of the southwesterly transgressing Cretasecous sea.

The Upper Dakota sand consists of barrier beach deposits about 40 to 60 feet thick, composed of fine-grained quartz-rich sandstones, characterized by an increase in grain size upward and low angle cross-bedding.

The next highest unit is transitional between fluvial and marine sedimentation, containing dark Cretaceous shales, thin mudstones, siltstones, and sandstones. This unit represents a lagoonal type environment.

The basal Dakota was deposited by a system of meandering streams creating deposits of carbonaceous

shales, thin coal seams, siltstones, and thin channel sandstones. The basal unit of Cretaceous strata in the Four Corners area is the Bell Canyon formation. This formation was deposited in a braided stream system and is sometimes considered part of the Dakota.

An unconformity exists between the Burro Canyon formation, the Morrison formation, represented by a sharp erosional contact between the two formations.

Q What is the porosity range in the Dakota sand in this area?

A Overall the sand has a porosity range of from 2-16 percent, with the average pay porosity being approximately 9-1/2 percent.

Silt and clay size matrix material is present throughout the Dakota sand sequence and represents a significant portion of the bulk rock composition. This matrix material reduces the effective permeability of this formation, making it difficult to produce.

Q Mr. McCord, will you now review Exhibit Number Five for Mr. Stanets?

These are cross sections A-A' and B-B'.

A Exhibit Number Five presents two log cross sections through the West Side Tight Gas Area, showing the continuity of the Dakota formation using the base of the

Greenhorn formation for a datum line.

Other wells in the vicinity of the West Side Area are included in these cross sections for comparison purposes. These cross sections show that the -- that wells in the West Side area exhibit poorer log characteristics than wells outside of the area.

Q. This does show, however, that the Dakota is present throughout the area.

A. That is correct.

Q. All right. Now we have several permeability questions.

Initially, is stimulation required to obtain commercial production from the Dakota in the proposed area?

A. Yes, it is.

Q. Is it dependent on this to be commercially productive?

A. Yes, sir.

Q. Mr. McCord, will you now refer to Exhibits Numbers Six through Twelve and using this core analysis explain the permeability encountered in the subject area?

A. Exhibit Number Six through Twelve present core analysis data taken from seven producing wells, which was used to determine the average laboratory perme-

ability to air for the Dakota formation pay zones in the West Side Area.

Five of these cored wells lie inside the tight gas area and two lie just outside of the area. On the other map in Exhibit -- Exhibit Number Two, the cored wells are shown in pink.

These exhibits contain the actual core analysis reports plus summary tables showing the analysis of cores taken from only the productive portion of the Dakota formation for each well.

The cored intervals chosen for permeability averaging were determined by log examination of the interval cored for each well. Only cored intervals of sand that were perforated by the operator of the well were considered pay intervals and were then used for permeability averaging.

The average laboratory permeability to air determined in this manner was 0.07 millidarcy. The actual in situ permeability of the Dakota formation in this area is less than the laboratory determined value, due to water saturations and net confining pressures found under reservoir conditions.

Q Will you now refer to Exhibit Number Thirteen?

A. Exhibit Number Thirteen presents a technical paper entitled The Effect of Overburden Pressure and Water Saturation on Gas Permeability of Tight Sandstone Cores, which was written by Rex Thomas and Don Ward of the U. S. Bureau of Mines.

This paper presents relationships between laboratory determined permeability in cores and actual in situ permeability found in reservoirs.

Exhibit Number Fourteen accompanies this and it explains how in situ permeability is calculated from the core analysis, using the technical paper presented.

Q. Will you now explain Exhibit Number Fifteen to the Examiner?

A. Exhibit Number Fifteen is a summary of all the laboratory core analysis results for the West Side Tight Gas Area. An average in situ permeability value of 0.003 millidarcy is calculated from the average laboratory permeability value of 0.07 millidarcy for the West Side Area.

This in situ permeability value is well below the 0.1 millidarcy tight gas cutoff. These permeability measurements substantiate that the Dakota formation is very tight in this area and must be stimulated to obtain commercial gas production.

Q. Have you obtained stabilized unstimula-

ted gas production rates for the area?

A. Yes, I have. Obtaining these stabilized unstimulated gas production rates for Dakota formation wells is not a standard procedure used by companies when completing their wells in the San Juan Basin.

Past experience has shown that these low permeability Dakota wells must be stimulated to obtain commercial production.

However, a 3-hour unstimulated gas production test was performed on Curtis Little's Federal Com No. 2-E Well, located in the south -- in Township 28 North, Range 13 West, Section 11, southeast of the southwest. On Exhibit Two is shown as an orange square.

This well is located just outside the West Side Tight Gas Area but is considered to have very similar flow characteristics to wells inside the area.

The unstimulated natural gas production rate from this test was 6.7 Mcf of gas per day. This rate is well below the 188 Mcf of gas per day allotted for tight formation gas wells having an average depth of 5952 feet.

Q. Now is this provided rate truly an unstimulated production rate for the Dakota?

A. No, it is not. This well was acidized with 500 gallons of 7-1/2 percent hydrochloric acid as a

production aid to induce a flow channel from the wellbore to the formation through the perforations. This acidizing cleans up the flow path so that gas can move more freely to the wellbore.

True unstimulated natural production would not have the aid of this formation clean-up procedure to assist in gas production, and could be expected to be even lower than this rate.

Q. Have you tested the validity of this natural production figure?

A. Yes, I have. I used Darcy's Law of fluid flow through a porous medium to calculate an unstimulated gas flow rate, using the average in situ permeability value of 0.003 millidarcy, calculated for the Dakota formation in this area from core analysis study.

This calculation is presented as Exhibit Sixteen and it shows that initial unstimulated gas flow rate of 5.7 Mcf of gas per day is associated with the average in situ permeability of 0.003 millidarcy for the West Side Area.

The close agreement of this calculated rate and the actual natural production rate indicates that the 6.7 Mcf of gas per day natural flow test is a good average rate for the West Side Area.

As a result of these calculations, the unstimulated natural gas production rate from the Dakota formation in the West Side Area is not expected to exceed 188 Mcf of gas per day.

Q Have you obtained stabilizez unstimulated oil production rates?

A Yes, I have. As stated previously, only one natural production test was taken in the vicinity of the West Side Area and this test produced virtually dry gas; therefor, no associated oil or condensate was reported for the test.

However, some of the cumulative production figures for Dakota wells in the West Side Area show that some oil is produced in the area. It should also be noted here that condensate is also reported as oil to the State of New Mexico, so oil production figures represent both oil and condensate, which is generally not in liquid form at reservoir conditions.

To examine the extent of the oil production in this area, the cumulative oil production per Mcf of gas was averaged for wells in the area. This average value was 0.026 barrels of oil per Mcf of gas produced.

Applying this figure to the 6.7 Mcf of gas per day natural production rate obtained for the area

results in an average initial unstimulated oil production rate of approximately 0.2 barrels of oil per day.

So both actual unstimulated and calculated unstimulated oil production rates do not exceed 5 barrels of oil per day; therefor, no well drilled in the area is expected to produce without stimulation more than 5 barrels of crude oil per day.

Q Have you reviewed existing State and Federal regulations concerning fresh water protection?

A Yes. Existing State and Federal regulations will assure that development of the Dakota formation will not adversely affect or impair any fresh water aquifers that are being used or expected to be used in the foreseeable future for domestic or agricultural water supplies.

Regulations require that casing programs be designed to seal off potential water-bearing formations from oil and gas producing formations. These fresh water zones exist from the surface to the base of the Ojo Alamo formation. The maximum Ojo Alamo depth is 1088 feet in the West Side Tight Gas Area.

Wells drilled in the West Side Area are drilled with natural mud that will not contaminate fresh water zones. Normal casing designs in this area consist of 8-5/8ths inch OD surface casing being set from the surface

to a depth of 300 to 350 feet. Production casing is either 4-1/2 inch or 5-1/2 inch OD and is set from surface to total depth.

The surface casing is cemented in place by circulating cement to the surface, protecting near surface formations from downhole contamination.

The production casing is cemented from total depth to a depth above the Mesaverde formation or to a point approximately 2000 feet above total depth. This cement covers the Dakota and Gallup oil and gas-bearing formations.

Diverting tools, such as a DV tool, are placed in the production string below the Pictured Cliffs formation and below the Mesaverde formation if the zone was not planned to be covered by the primary cement job.

After cementation of the bottom cement stage, cement is diverted through these tools individually to place cement across the Mesaverde formation and to circulate cement from below the Pictured Cliffs formation to the surface. This process protects the Mesaverde, Pictured Cliffs, and other shallow formations from contaminating the Ojo Alamo aquifer.

If cement is not circulated a temperature log or cement bond log is run to determine the top of

the cement and assure that all necessary zones are covered.

Therefor, all protective and fresh water zones are protected by both casing and cement.

Q. Are fracture treatments a threat to fresh water supplies in this area?

A. I don't believe so.

Stimulation of the Dakota formation involves large fracture treatments, usually consisting of a one or two percent potassium chloride water base that will not harm a fresh water aquifer.

Fresh water protection is adequate even with these larger stimulation treatments due to zone isolation caused by cementation. A large distance of over 4800 feet between the Dakota formation and the Ojo Alamo fresh water aquifer is additional insurance that no existing fresh water zone will be contaminated by stimulation of the Dakota wells in this area.

Therefor, New Mexico and Federal regulations will protect any fresh water supply that may be affected by drilling, completing, and producing the Dakota formation in the West Side Area.

Q. Will you please briefly summarize your conclusions concerning the proposed area and how it meets the qualifications for tight formation designation?

A Evidence presented here substantiates the following for the Four Corners Gas Producers proposed West Side Area.

One, the estimated average in situ gas permeability throughout the Dakota pay section is expected to be 0.1 millidarcy or less.

Two, for an average Dakota well depth of 5952 feet, the stabilized natural production rate at atmospheric pressure of these wells completed for production in the Dakota formation is not expected to exceed the maximum allowable rate of 188 Mcf of natural gas per day without stimulation.

And three, no well drilled into the Dakota formation in the West Side Area is expected to produce without stimulation more than five barrels of crude oil per day.

The proposed West Side Tight Gas Area meets all the specifications required and should be designated a tight formation in the Basin Dakota Pool under Section 107 of the Natural Gas Policy Act of 1978.

Q In your opinion will approval of this application be in the best interest of conservation, and the prevention of waste?

A Yes, it will.

Q Will it impair anyone's correlative rights?

A No, sir.

Q Would you please identify for the record what has been marked for identification as Four Corners Exhibit Number Seventeen?

A This is the written text of this report.

MR. CARR: At this time, Mr. Stamets, we would offer into evidence Four Corners Gas Producers Association Exhibits One through Seventeen.

MR. STAMETS: These exhibits will be admitted.

MR. CARR: Mr. Stamets, we have received several questions from the Mineral Management Service and they request that we ask them and we can do that at this time or we can defer that.

MR. STAMETS: If you would ask them at this time, I would appreciate it.

Q Mr. McCord, what criteria were used by Four Corners in determining the eastern boundary of the proposed area?

A The eastern boundary was chosen by cutting out infill wells that have been drilled in these townships covered. These wells were drilled probably due to anti-

cipation of 103 prices with little thought to 107.

An effort was also made to square up the area as much as possible so it wasn't real rough on the eastern side.

Generally speaking, some of these wells from my indications, looks like they're very marginal at 103 prices, but nevertheless, they were drilled.

Q There are a number of infill locations in the subject area that might or might not be eligible for tight formation designation. Would you comment on those?

A Well, first of all, there are no infill wells at all in this area. That's how the eastern boundary was chosen. We cut out all existing infill wells that were drilled or were staked to be drilled as of February 1st of 1982. I believe what the Mineral Management Service is indicating, that they are possible infill locations due to our producing wells already in the area, yes, it is possible to drill an infill well but I believe that these wells will not be drilled at this time due to the economics involved with 103 pricing.

I believe that 107 prices are needed to fully develop the area.

Q Mr. McCord, if this application is approved, there is other acreage immediately offsetting the

proposed area that might also qualify for inclusion in an order designating this general area as a tight formation. I'm talking specifically about acreage in Township 26 North, Range 11 West; 27 North, 12 West; 27 North, 13 West; 28 North, 13 West; 29 North, 13 West; and 30 North, 14 West.

Could you comment on this?

A As I stated earlier, in taking the boundaries for this area, an effort was also made to square up the area as much as possible. I have to agree that there is land to the east of the area that would probably have the same general characteristics as our base area. I would have no problem with the inclusion of that land as so, as Mineral Management Services has indicated here.

They've gone through section by section on areas that they think should be included. I don't see any big problem with that. I would say they would say they would have the same general characteristics as the base area, although once again, the base area was chosen as a base area because it beyond any question follows all the guidelines for rule 107 prices.

Q To your knowledge was anything other than the proposed area included in the legal advertisements for this hearing?

A No, sir, it was not.

MR. CARR: I have no further questions.

CROSS EXAMINATION

BY MR. STAMETS:

Q. Mr. McCord, you did a couple of cross sections here which showed the Dakota formation traversing most of the area. You did not run one down into the southwest corner of this area, like in, say, Section 32, 26 North, 13 West.

If you had done such a cross section, would it show the same thing that the others did, that the Dakota does extend into Section 32?

A. Yes, sir, the Dakota -- in fact, I have looked at the logs. I did not include that because we had a number of wells already in this cross section.

The Dakota does exist and it is a very poor looking section.

Q. Looking at Exhibit Number Three, I see a number of wells that have been drilled. I believe the number is eight have been drilled since 1979. I take that back, 1977, on. There are one, two, three, four, five, six, seven wells drilled from '79 on and of those, one, two, three, four are 1981 wells, including that Dugan Production Corporation well, and you show a potential there. Is that an

unstimulated potential?

A. No, sir, that's an after frac rate. That would be after the well has cleaned up from the fracture stimulation, 7-day build-up and a 3-hour flow test.

Q. Do you know why this well wasn't tested unstimulated?

A. I assume, as I said before, the forethought to 107 prices was not used in that particular well. We were only able to actually see the forethought on -- on one well, and it's generally thought and generally considered that you need to fracture the well to see what it will do.

Q. In 1981, especially in December, 1981, it would certainly seem like a wise idea to have done an unstimulated test. It would seem like any well drilled in 1981 in this area it would have been a good idea to have done that sort of test.

A. Not having any real knowledge of why that was not done, I don't have any comment on that.

Q. Have you made any calculations on any of these wells to determine theoretically what their potentials would have been unstimulated?

A. Not from the IP's given, no, sir. Just the Darcy's Law calculation that I did give, using the average permeability found through the core tests taken and only

producing wells in the area. Through that analysis, yes, and we were very close to our 6.7 that we found in the Curtis Little well.

MR. STAMETS: Any other questions of this witness?

MR. CHAVEZ: Yes.

QUESTIONS BY MR. CHAVEZ:

Q Mr. McCord, in Exhibit Number Two, in Township 27 North, 13 West, Section 14, in the northeast quarter of that section there's one well which has a cumulative production of 2.7 billion cubic feet of gas.

Would you consider that perhaps the inclusion of that well in that area may be -- may not be appropriate with that cumulative production?

A Mr. Chavez, for that well, I would definitely say that well was productive under 103 prices.

The general nature of the Dakota sand, especially in this West Side Area, I would not be at all surprised to drill an offset to that well and have a very uneconomic proposition. Witness the well northeast of the southwest, the Fairfield No. 3. That well has made almost a half a Bcf since 1963. I would say that a few companies involved consider that an economic proposition but there are economics

around nowadays, especially with high interest rates, that that well would not even be considered economic.

MR. STAMETS: While we're on that, I hate to interrupt you, Mr. Chavez, but that stimulates a little -- questions on my part.

The Minerals Management Service was interested in why you established the cutoff line that you did for this area.

Is it not the case that with the outline that you've drawn that we're looking at an area which is largely undeveloped?

A. Yes, sir, that's correct.

MR. STAMETS: Do you know the percentage of proration units that have been developed by wells?

A. Yes, sir, I've presented that. That are 105 total wells drilled and that's 20 percent of all possible proration units and only actual producing wells, 7 percent of actual producing wells for the total amount of units.

MR. STAMETS: And there are no infill wells.

A. There are no infill wells.

MR. STAMETS: Now, that would not be the case, would it, with the -- with the area that the

Minerals Management Service would like to see brought in and squared off?

A. They would add more acreage to the area, largely undeveloped acreage, as to what they presented to us in question number three. Largely the acreage that they presented is --

MR. STAMETS: Did you say largely undeveloped? Is it undeveloped or developed acreage that would be brought in by including the -- the rest of those townships?

It would appear to me that the --

A. Yes.

MR. STAMETS: --density of producing wells is higher in those additional areas than it is in the area that you're proposing.

A. Yes, sir, some of them are developed.

MR. STAMETS: And would that not, under those conditions, require the applicant to get involved in a demonstration of the economics of drilling wells for Section 10?

A. No, sir, not in the areas that they have presented in question number three.

Out of all of those, only, as of February 1st, only one infill well was involved in all that acreage, and that was in Township 29 North, Range 13 West,

Section 29, on the east half.

In the northeast of the northeast of 29 there has been an infill well staked and it is not drilled at this time.

So due to the area that they've given us there, that's the only problem we would have.

MR. STAMETS: Let me say from the Examiner's standpoint that I do believe it would make a significant difference, in my opinion, as to whether or not that additional acreage was presented, and if it were to be included, I would certainly like to see economics evidence.

Since you are not suggesting that it be added, I don't believe there is any necessity in any economic evidence to be presented in this case.

I'm sorry, Mr. Chavez, you may continue.

Q. Mr. McCord, on that unstimulated production test, was there any kind of fluid level determination made to see if there was liquid in the wellbore at the time that the gas was being produced?

A. No, sir, it was not. It was -- to my knowledge, the well was acidized, swab runs were made until the well kicked off, and they ran a 3-hour flow test from there on a chart.

Q. So the assumption that you made of the

well producing to atmospheric pressure just -- just assumed that the wellbore was clear of all liquids.

A. That's -- that's correct. And I might add that our, once again, the Darcy's Law flow test substantiated that that test was very good.

Q. Were there any bottom hole pressure build-up tests?

A. No build-up tests were taken per se that we could run a Horner plot or some type of build-up analysis, no. The bottom hole pressures that we used were shut-in casing pressures found for wells from their 7-day flow tests, initial potentials.

MR. STAMETS: Any other questions of the witness? He may be excused.

Anything further in this case?

MR. CARR: Nothing further, Mr. Stamets.

MR. STAMETS: If there is nothing further, because of an error in the advertisement, this case will be readvertised and cannot be taken under advisement at this time, but it will be on -- readvertised and be brought up at the March 31st Examiner Hearing.

(Hearing concluded.)

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(Hearing concluded.)

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

LARRY KEHOE
SECRETARY

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July 16, 1982

Mr. William F. Carr
Campbell, Byrd & Black
Attorneys at Law
Post Office Box 2208
Santa Fe, New Mexico

Re: CASE NO. 7515
ORDER NO. R-7021

Applicant:

Four Corners Gas Producers Association

Dear Sir:

Enclosed herewith are two copies of the above-referenced Division order recently entered in the subject case.

Yours very truly,

JOE D. RAMEY
Director

JDR/fd

Copy of order also sent to:

Hobbs OCD x
Artesia OCD x
Aztec OCD x

Other _____

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 7515
Order No. R-7021

APPLICATION OF FOUR CORNERS GAS PRODUCERS ASSOCIATION FOR DESIGNATION OF A TIGHT FORMATION, SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on March 16, 1982, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this 16th day of July, 1982, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant, Four Corners Gas Producers Association, requests that the Division in accordance with Section 107 of the Natural Gas Policy Act and 18 C.F.R. §271.703 recommends to the Federal Energy Regulatory Commission that the Dakota formation underlying certain lands situated in San Juan County, New Mexico, as described on Exhibit "A" attached to this order, be designated as a tight formation in said Federal Energy Regulatory Commission's regulations.

(3) That the area proposed for tight formation designation lies within the horizontal limits of the Basin-Dakota Pool, which is a very large area previously defined and described by the Oil Conservation Division in San Juan County, New Mexico.

(4) That within the Basin-Dakota Pool are large areas of extensive development and large areas of very limited development.

(5) That the Dakota formation has been approved for infill drilling which permits the subject area to be developed with one Dakota well on each quarter section or 160-acre tract.

(6) That the area for which a tight formation designation is herein sought is one of very limited development comprised of approximately 516 320-acre proration units of which 105 are developed by a single well; 36 of which are producing wells and 69 are nonproducers.

(7) That no proration unit within the proposed area contains an infill well.

(8) That the area proposed for tight formation designation is a largely undeveloped exploratory area.

(9) That the Dakota formation underlies all of the described lands; that the upper Dakota sand consists of barrier beach deposits about 40 to 60 feet thick, composed of fine grained, quartz-rich sandstones characterized by an increase in grain size upward and low angle crossbedding. The next highest unit is transitional between fluvial and marine sedimentation containing dark carbonaceous shales, thin mudstones, siltstones and sandstones. The basal Dakota consists of carbonaceous shales, thin coal seams, siltstones, and thin channel sandstone.

(10) That the top of the Dakota formation is found at an average depth of 5952 feet below the surface of the area set out in Finding No. (2) above and Exhibit "A", and has approximately 250 to 300 feet of gross thickness.

(11) That the type section for the Dakota formation for the proposed tight formation designation is found at a depth of from approximately 5982 feet to 6270 feet on the log from the Compass Exploration, Inc. City of Farmington Well No. 1 located in Unit B of Section 4, Township 29 North, Range 13 West, San Juan County, New Mexico.

(12) That the technical evidence presented in this case demonstrated that the predominant percentage of wells which may be completed in the Dakota formation within the proposed tight formation area may reasonably be presumed to exhibit permeability, gas productivity, or crude oil productivity not in excess of the following parameters:

(a) average in situ gas permeability throughout the pay section of 0.1 millidarcy; and

(b) stabilized production rates, without stimulation, against atmospheric pressure, as found in the table set out in 18 C.F.R. §271.703(c)(2)(B) of the regulations; and

(c) production of more than five barrels of crude oil per day.

(13) That within the proposed area there is a recognized aquifer being the Ojo Alamo, found at a maximum depth of 1088 feet or approximately 4800 feet above the Dakota formation.

(14) That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure that development of the Dakota formation will not adversely affect any overlying aquifers.

(15) That the area described on Exhibit "A" to this order should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 107 of the Natural Gas Policy Act of 1978, and 18 C.F.R. §271.703 of the regulations that the Dakota formation underlying those lands in San Juan County, New Mexico, described on Exhibit "A" to this order, be designated as a tight formation.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISION

JOE D. RAMEY
Director

SEAL
fd/

EXHIBIT A

TOWNSHIP 26 NORTH, RANGE 12 WEST, NMPM
Sections 1 through 36: All

TOWNSHIP 26 NORTH, RANGE 13 WEST, NMPM
Sections 1 through 36: All

TOWNSHIP 27 NORTH, RANGE 12 WEST, NMPM
Section 8: S/2
Section 9: S/2
Sections 16 through 36: All

TOWNSHIP 27 NORTH, RANGE 13 WEST, NMPM
Section 3: W/2
Sections 4 through 9: All
Section 10: W/2
Sections 14 through 36: All

TOWNSHIP 28 NORTH, RANGE 13 WEST, NMPM
Sections 7 through 9: All
Sections 16 through 21: All
Sections 28 through 33: All
Section 34: W/2

TOWNSHIP 29 NORTH, RANGE 13 WEST, NMPM
Sections 4 through 9: All
Sections 16 through 19: All
Section 20: W/2
Section 29: W/2
Sections 30 and 31: All
Section 32: W/2

TOWNSHIP 29 NORTH, RANGE 14 WEST, NMPM
Section 1: All
Section 2: W/2 and SE/4
Sections 3 through 18: All
Section 19: NE/4
Sections 23 through 27: All
Section 28: N/2 and SE/4
Section 34: N/2
Sections 35 and 36: All

TOWNSHIP 29 NORTH, RANGE 15 WEST, NMPM
Sections 1 through 6: All
Section 7: N/2
Section 8: N/2
Section 9: N/2
Section 10: N/2 and SE/4
Sections 11 and 12: All
Section 13: N/2
Section 14: N/2

Exhibit A

TOWNSHIP 35 NORTH, RANGE 14 WEST, NMPM
Sections 1 through 12: All
Sections 13 through 23: All
Sections 26 through 34: All

TOWNSHIP 32 NORTH, RANGE 15 WEST, NMPM
Sections 1 through 36: All

Containing a total of 165,120 acres, more or less.

Docket No. 13-82

Dockets Nos. 14-82 and 15-82 are tentatively set for May 26 and June 9, 1982. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - MAY 12, 1982

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

The following cases will be heard before Richard L. Stamets, Examiner, or Daniel S. Nutter, Alternate Examiner:

ALLOWABLE: (1) Consideration of the allowable production of gas for June, 1982, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.

(2) Consideration of the allowable production of gas for June, 1982, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.

CASE 7540: (Continued and Readvertised)

In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Pauly-Anderson-Pritchard, William H. Pauly, and all other interested parties to appear and show cause why the Maloy Well No. 1, located in Unit P, Section 16, Township 29 North, Range 11 West, San Juan County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7538: (Continued and Readvertised)

In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Francis L. Harvey and all other interested parties to appear and show cause why the Pinkstaff Estate Well No. 2, located in Unit A, Section 29, Township 29 North, Range 10 West, San Juan County, should not be re-entered and plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7566: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Flag-Redfern Oil Co., Principal, National Surety Corporation, and all other interested parties to appear and show cause why four wells, being the Julander No. 1 located in Unit L, Section 34; Julander No. 2 located in Unit I, Section 33; Hargis No. 1 located in Unit G, Section 33; and Hargis No. 2 located in Unit J, Section 33, all in Township 30 North, Range 12 West, San Juan County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7560: (Continued from April 28, 1982, Examiner Hearing)

In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Charles H. Heisen, Fidelity and Deposit Company of Maryland, Surety, and all other interested parties to appear and show cause why the Crowpoint Well No. 1, located in Unit F, Section 18, Township 18 North, Range 13 West, McKinley County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7542: (Continued from April 14, 1982, Examiner Hearing)

In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Benson-Montin-Greer Drilling Corporation, Hartford Accident and Indemnity Company, and all other interested parties to appear and show cause why the following wells: Dustin No. 1, located in Unit K, Section 6, and the Gallegos Canyon Unit No. 2, located in Unit K, Section 35, both in Township 29 North, Range 12 West, and the Segal No. 1, located in Unit K, Section 10, and the Price No. 1, located in Unit N, Section 15, both in Township 31 North, Range 13 West, San Juan County, should not be plugged and abandoned in accordance with Division-approved plugging programs.

CASE 7567: Application of Harvey E. Yates Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the Richardson Unit Area, comprising 1,283.35 acres, more or less, of State and Fee lands in Townships 13 and 14 South, Range 36 East.

CASE 7565: (Continued from April 28, 1982, Examiner Hearing)

Application of Delta Drilling Company for a unit agreement, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the North Mescalero Unit Area, comprising 719.77 acres, more or less, of State, Fee and Federal lands in Townships 9 and 10 South, Range 32 East.

CASE 7568: Application of Petroleum Corp. of Delaware for a dual completion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the dual completion of its Superior Federal Well No. 6 located in Unit N of Section 6, Township 20 South, Range 29 East, East Burton Flat Field, to produce oil from the Strawn formation through tubing and gas from the Morrow formation through the casing-tubing annulus by means of a cross-over assembly.

CASE 7569: Application of Petroleum Corp. of Delaware for downhole commingling, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Atoka and Morrow production in the wellbores of its Parkway West Unit Well No. 3, located in Unit K of Section 29, and Well No. 10, located in Unit G of Section 27, both in Township 19 South, Range 29 East.

CASE 7570: Application of J. Cleo Thompson for three unorthodox oil well locations, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for three unorthodox well locations, being 660 feet from the North line and 1330 feet from the West line, 660 feet from the North line and 2630 feet from the East line, and 660 feet from the North line and 1310 feet from the East line, all in Section 2, Township 17 South, Range 30 East, Square Lake Pool.

CASE 7516: (Continued from March 31, 1982, Examiner Hearing)

Application of Benson-Montin-Greer for a unit agreement, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the North Canada Ojitos Unit Area, comprising 12,561 acres, more or less, of Jicarilla Apache Indian lands in Township 27 North, Range 1 West.

CASE 7571: Application of Yates Petroleum Corporation for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface through the Abo formation underlying the SE/4 of Section 9, the SW/4 of Section 10, the NW/4 of Section 15, all in Township 6 South, Range 26 East, each to form a standard 160-acre spacing and proration unit to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said wells and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the wells and a charge for risk involved in drilling said wells.

CASE 7551: (Continued from April 14, 1982, Examiner Hearing)

Application of Harvey E. Yates Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp through Mississippian formations underlying the E/2 of Section 21, Township 11 South, Range 31 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7572: Application of Anadarko Production Company for a waterflood expansion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to expand its Ballard GSA Waterflood Project by drilling and converting ten wells located in Unit N of Section 5, Units N and P of Section 6, Units F, H, J, and P of Section 7, Units F and N of Section 8, and Unit F of Section 17, all in Township 18 South, Range 29 East, Loco Hills Pool.

CASE 7573: Application of Anadarko Production Company for a waterflood expansion, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks authority to expand its West Square Lake Waterflood Project by the conversion to water injection of five wells located in Units J and N of Section 9, D and H of Section 10, and J of Section 3, all in Township 17 South, Range 30 East.

CASE 7574: Application of Sun Exploration and Production Company for two non-standard gas proration units and an unorthodox location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of two 160-acre non-standard Jalmat gas proration units comprising the NW/4 of Section 21, for its Boren & Greer Com Well No. 2 in Unit C and the NE/4 of Section 20, for its Boren & Greer Com Well No. 3, to be drilled at an unorthodox location 660 feet from the North line and 940 feet from the East line of said Section 20, all in Township 22 South, Range 36 East. Applicant further seeks rescission of Order No. R-5688.

CASE 7575: Application of Eagle Oil & Gas Co. for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for an unorthodox gas well location for a Wolfcamp-Penn test well to be drilled 1500 feet from the South line and 660 feet from the East line of Section 2, Township 17 South, Range 27 East, the S/2 of said Section 2 to be dedicated to the well.

CASES 7576 and 7577: Application of Apollo Oil Company for compulsory pooling, Lea County, New Mexico. Applicant, in each of the following cases, seeks an order pooling all mineral interests from the surface through the base of the San Andres formation underlying the lands specified in each case, each to form a standard 40-acre oil spacing and proration unit to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said wells and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the wells and a charge for risk involved in drilling said wells:

CASE 7576: NE/4 SW/4 Section 6, Township 19 South, Range 38 East

CASE 7577: SE/4 SW/4 Section 6, Township 19 South, Range 38 East

CASE 7578: Application of MWF Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface down through the Seven Rivers formation underlying the SE/4 of Section 31, Township 19 South, Range 39 East, to form a standard 160-acre gas proration unit to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7579: Application of MWF Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface down through the Seven Rivers formation underlying the N/2 NW/4 of Section 5, Township 20 South, Range 39 East, to form a non-standard 80-acre gas proration unit to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7580: Application of MWF Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface to the base of the Seven Rivers formation underlying the SW/4 of Section 31, Township 19 South, Range 39 East, to form a standard 160-acre gas proration unit to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7581: Application of Estoril Producing Corp. for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be drilled 660 feet from the South line and 990 feet from the East line of Section 10, Township 23 South, Range 34 East, Antelope Ridge-Morrow Gas Pool, the S/2 of said Section 10 to be dedicated to the well.

CASES 7582 thru 7585: Application of Jack J. Grynberg for compulsory pooling, Chaves County, New Mexico. Applicant, in each of the following cases, seeks an order pooling all mineral interests down through the Abo formation underlying the lands specified in each case, each to form a standard 160-acre gas spacing and proration unit to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said wells and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the wells and a charge for risk involved in drilling said wells:

CASE 7582: NW/4 Section 13, Township 6 South, Range 24 East

CASE 7583: NE/4 Section 13, Township 6 South, Range 24 East

CASE 7584: SW/4 Section 13, Township 6 South, Range 24 East

CASE 7585: NE/4 Section 24, Township 6 South, Range 24 East

CASES 7525 thru 7534: (Continued from April 28, 1982, Examiner Hearing)

Application of Jack J. Grynberg for compulsory pooling, Chaves County, New Mexico. Applicant, in each of the following 10 cases, seeks an order pooling all mineral interests down through the Abo formation underlying the lands specified in each case, each to form a standard 160-acre gas spacing and proration unit to be dedicated to a well to be drilled at a standard location thereon. Also to be considered in each case will be the cost of drilling and completing said wells and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the wells and a charge for risk involved in drilling said wells:

CASE 7525: SW/4 Section 3, Township 5 South, Range 24 East

CASE 7526: NW/4 Section 3, Township 5 South, Range 24 East

CASE 7527: SE/4 Section 3, Township 5 South, Range 24 East

CASE 7528: NW/4 Section 4, Township 5 South, Range 24 East

CASE 7529: NE/4 Section 4, Township 5 South, Range 24 East

CASE 7530: NW/4 Section 11, Township 6 South, Range 24 East

CASE 7531: SW/4 Section 11, Township 6 South, Range 24 East

CASE 7532: SE/4 Section 27, Township 6 South, Range 24 East

CASE 7533: SW/4 Section 27, Township 6 South, Range 24 East

CASE 7534: NW/4 Section 34, Township 6 South, Range 24 East

CASE 7515: (Continued from April 14, 1982, Examiner Hearing)

Application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Dakota formation underlying all or portions of Townships 26 and 27 North, Ranges 12 and 13 West, Township 28 North, Range 13 West, Township 29 North, Ranges 13 through 15 West, and Township 30 North, Ranges 14 and 15 West, containing 164,120 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705.

CASE 7536: Application of Standard Resources Corp. for designation of a tight formation, Chaves and Eddy Counties, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Abo formation underlying all or portions of Township 15 South, Ranges 23 through 25 East, Township 19 South, Range 20 East, and Township 20 South, Range 20 East, all in Chaves County; in Eddy County: Township 16 South, Ranges 23 through 26 East, Township 17 South, Ranges 21, 23, 24, and 25 East, and Township 18 South, Ranges 21, 23, 24 and 25 East, Township 19 South, Ranges 21, 23, and 24 East, and Township 20 South, Ranges 21, 23, and 24 East, containing 460,809 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705.

CASE 7537: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating, abolishing, and extending vertical and horizontal limits of certain pools in Chaves, Eddy, and Lea Counties, New Mexico:

(a) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Wolfcamp production and designated as the Draper Mill-Wolfcamp Gas Pool. The discovery well is the HNK Oil Company Vaca Draw 16 State Well No. 1 located in Unit E of Section 16, Township 25 South, Range 33 East, NMPM. Said pool would comprise:

TOWNSHIP 25 SOUTH, RANGE 33 EAST, NMPM
Section 16: W/2

(b) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the Jabalina-Morrow Gas Pool. The discovery well is the Amoco Production Company Perro Grande Unit Well No. 1 located in Unit J of Section 6, Township 26 South, Range 35 East, NMPM. Said pool would comprise:

TOWNSHIP 26 SOUTH, RANGE 35 EAST, NMPM
Section 6: E/2

(c) ABOLISH the Diamond Mound-Morrow Gas Pool in Chaves and Eddy Counties, New Mexico, as heretofore classified, defined, and described as:

TOWNSHIP 15 SOUTH, RANGE 27 EAST, NMPM
Section 35: All

TOWNSHIP 15 SOUTH, RANGE 28 EAST, NMPM
Section 31: E/2

TOWNSHIP 16 SOUTH, RANGE 28 EAST, NMPM
Section 3: Lots 1 through 16
Section 4: Lots 1 through 16
Section 5: Lots 1 through 16
Section 6: Lots, 1, 2, 7, 8, 9, 10, 15, 16, and S/2

(d) EXTEND the vertical limits of the Diamond Mound-Atoka Gas Pool in Chaves and Eddy Counties, New Mexico, to include the Morrow formation, and redesignate said pool to Diamond Mound-Atoka-Morrow Gas Pool, and extend the horizontal limits of said pool to include acreage from abolished Diamond Mound-Morrow Gas Pool and one additional well as follows:

TOWNSHIP 15 SOUTH, RANGE 27 EAST, NMPM
Section 35: All

TOWNSHIP 15 SOUTH, RANGE 28 EAST, NMPM
Section 31: E/2

TOWNSHIP 16 SOUTH, RANGE 27 EAST, NMPM
Section 9: S/2

TOWNSHIP 16 SOUTH, RANGE 28 EAST, NMPM
Section 3: Lots 1 through 16
Section 4: Lots 1 through 16
Section 5: Lots 1 through 16
Section 6: Lots 1, 2, 7, 8, 9, 10, 15, 16, and S/2

(e) EXTEND the Burton Flat-Strawn Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 28 EAST, NMPM
Section 35: E/2
Section 36: W/2

(f) EXTEND the Crow Flats-Morrow Gas Pool in Eddy County, New Mexico to include therein:

TOWNSHIP 17 SOUTH, RANGE 27 EAST, NMPM
Section 1: All
Section 12: W/2

(g) EXTEND the South Culebra Bluff-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 10: All
Section 11: W/2
Section 14: W/2
Section 15: W/2
Section 24: W/2

(h) EXTEND the South Empire-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 29 EAST, NMPM
Section 17: W/2

(i) EXTEND the Golden Lane-Strawn Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 30 EAST, NMPM
Section 28: All

(j) EXTEND the Kennedy Farms-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 26 EAST, NMPM
Section 10: W/2

(k) EXTEND the East Lakica-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 34 EAST, NMPM
Section 36: S/2

TOWNSHIP 18 SOUTH, RANGE 35 EAST, NMPM
Section 31: S/2

(l) EXTEND the Little Box Canyon-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 22 EAST, NMPM
Section 18: E/2

(m) EXTEND the Malaga-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM
Section 11: E/2

(n) EXTEND the South Millman-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM
Section 16: W/2

(o) EXTEND the East Millman-Queen-Grayburg Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 29 EAST, NMPM
Section 7: NE/4

(e) EXTEND the Burton Flat-Strawn Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 28 EAST, NMPM
Section 35: E/2
Section 36: W/2

(f) EXTEND the Crow Flats-Morrow Gas Pool in Eddy County, New Mexico to include therein:

TOWNSHIP 17 SOUTH, RANGE 27 EAST, NMPM
Section 1: All
Section 12: W/2

(g) EXTEND the South Culebra Bluff-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 23 SOUTH, RANGE 28 EAST, NMPM
Section 10: All
Section 11: W/2
Section 14: W/2
Section 15: W/2
Section 34: W/2

(h) EXTEND the South Empire-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 29 EAST, NMPM
Section 17: W/2

(i) EXTEND the Golden Lane-Strawn Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 30 EAST, NMPM
Section 28: All

(j) EXTEND the Kennedy Farms-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 26 EAST, NMPM
Section 10: W/2

(k) EXTEND the East LaRica-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 17 SOUTH, RANGE 34 EAST, NMPM
Section 36: S/2

TOWNSHIP 18 SOUTH, RANGE 35 EAST, NMPM
Section 31: S/2

(l) EXTEND the Little Box Canyon-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 22 EAST, NMPM
Section 18: E/2

(m) EXTEND the Malaga-Atoka Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 24 SOUTH, RANGE 28 EAST, NMPM
Section 11: E/2

(n) EXTEND the South Millman-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM
Section 16: W/2

(o) EXTEND the East Millman-Queen-Grayburg Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 29 EAST, NMPM
Section 7: NE/4

(p) EXTEND the Millman Strawn Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 28 EAST, NMPM
Section 8: S/2

(q) EXTEND the West Nadine-Blinebry Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 38 EAST, NMPM
Section 5: SW/4

(r) EXTEND the West Osudo-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 35 EAST, NMPM
Section 11: S/2
Section 12: S/2

(s) EXTEND the Pecos Slope-Abo Gas Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 4 SOUTH, RANGE 24 EAST, NMPM

Section 24: S/2
Section 25: All
Section 26: E/2
Section 35: W/2 and NE/4
Section 36: W/2

TOWNSHIP 4 SOUTH, RANGE 25 EAST, NMPM
Section 12: SW/4
Section 30: W/2
Section 31: NW/4

TOWNSHIP 5 SOUTH, RANGE 24 EAST, NMPM
Section 2: NW/4
Section 7: All
Section 8: All
Section 9: W/2 and SW/4
Section 16: W/2
Section 17 thru 20: All
Section 21: W/2
Section 28: W/2
Section 29: All
Section 30: All
Section 31: W/2
Section 32: W/2
Section 33: NW/4

TOWNSHIP 5 SOUTH, RANGE 25 EAST, NMPM
Section 1 thru 5: All
Section 6: E/2
Section 7: SW/4 and E/2
Section 8 thru 12: All
Section 14 thru 22: All
Section 23: W/2
Section 27: W/2
Section 28 thru 30: All
Section 31: NE/4
Section 32: W/2
Section 33: All
Section 34: All

TOWNSHIP 6 SOUTH, RANGE 24 EAST, NMPM
Section 2: All
Section 11 thru 14: All
Section 22 thru 28: All
Section 34: E/2
Section 35: All
Section 36: All

TOWNSHIP 6 SOUTH, RANGE 26 EAST, NMPM
Section 4 thru 6: All
Section 7 thru 8: All
Section 9: N/2
Section 17 thru 20: All
Section 29 thru 32: All

TOWNSHIP 7 SOUTH, RANGE 24 EAST, NMPM
Section 1: All
Section 2: All
Section 3: N/2
Section 9 thru 15: All
Section 22 thru 27: All
Section 34 thru 36: All

TOWNSHIP 7 SOUTH, RANGE 25 EAST, NMPM
Section 6: W/2
Section 7: S/2
Section 13: SW/4
Section 14: S/2
Section 15: S/2
Section 18 and 19: All
Section 20: S/2
Section 22 thru 27: All
Section 29 thru 32: All
Section 34 thru 36: All

TOWNSHIP 7 SOUTH, RANGE 26 EAST, NMPM
Section 5: All
Section 6: All
Section 7 thru 10: All
Section 11: W/2
Section 15 thru 17: All
Section 18: N/2
Section 19 thru 22: All
Section 28 thru 32: All

TOWNSHIP 8 SOUTH, RANGE 24 EAST, NMPM
Section 1 through 3: All
Section 10: E/2
Section 11: All
Section 12: All

TOWNSHIP 8 SOUTH, RANGE 25 EAST, NMPM
Section 1 through 12: All
Section 13 through 16: N/2

TOWNSHIP 8 SOUTH, RANGE 26 EAST, NMPM
Section 6: W/2

(t) EXTEND the West Pecos Slope-Abo Gas Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 22 EAST, NMPM
Section 23: SE/4
Section 24: S/2 and NE/4
Section 25 through 27: All
Section 28: E/2

TOWNSHIP 8 SOUTH, RANGE 23 EAST, NMPM
Section 3 through 5: All
Section 6: N/2
Section 8 through 10: N/2
Section 17: W/2
Section 18: SE/4
Section 19: All
Section 20: W/2
Section 29: W/2
Section 30: All
Section 31: All
Section 32: W/2

TOWNSHIP 9 SOUTH, RANGE 23 EAST, NMPM
Section 3: W/2
Section 4: All
Section 5: All
Section 6: E/2
Section 8: All

(u) EXTEND the East Red Lake-Queen-Grayburg Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 16 SOUTH, RANGE 28 EAST, NMPM
Section 25: N/2 NE/4 and NE/4 SE/4

(v) EXTEND the Sand Ranch-Morrow Gas Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 29 EAST, NMPM
Section 26: All

(w) EXTEND the Sawyer-San Andres Associated Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 10 SOUTH, RANGE 38 EAST, NMPM
Section 4: SW/4

(x) EXTEND the Tom-Tom-San Andres Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 31 EAST, NMPM
Section 7: All

(y) EXTEND the Turkey Track-Morrow Gas Pool in Eddy County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 29 EAST, NMPM
Section 2: W/2
Section 7: N/2

(z) EXTEND the Twin Lakes-San Andres Associated Pool in Chaves County, New Mexico, to include therein:

TOWNSHIP 8 SOUTH, RANGE 29 EAST, NMPM
Section 18: N/2 SE/4 and SE/4 SE/4

(aa) EXTEND the South Vacuum-Wolfcamp Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 18 SOUTH, RANGE 35 EAST, NMPM
Section 16: SE/4

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Docket No. 14-82

DOCKET: COMMISSION HEARING - MONDAY - MAY 17, 1982

OIL CONSERVATION COMMISSION - 9 A.M.
ROOM 205 - STATE LAND OFFICE BUILDING,
SANTA FE, NEW MEXICO.

CASE 7522: (DE NOVO)

Application of Santa Fe Exploration Co. for an unorthodox gas well location, Eddy County, New Mexico Applicant, in the above-styled cause, seeks approval of an unorthodox location 660 feet from the North and West lines of Section 14, Township 20 South, Range 25 East, Permo-Penn, Strawn, Atoka and Morrow formations, the N/2 of said Section 14 to be dedicated to the well.

Upon application of Chama Petroleum Company, this case will be heard De Novo pursuant to the provisions of Rule 1220.

CASE 7476: (DE NOVO)

Application of Jack J. Grynberg for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Abo formation, underlying two 150-acre gas spacing units, being the NE/4 and SE/4, respectively, of Section 12, Township 5 South, Range 24 East, each to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

Upon application of Mesa Petroleum Company, this case will be heard De Novo pursuant to the provisions of Rule 1220.

CASE 7513: (DE NOVO)

Application of Mesa Petroleum Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Abo formation underlying the NE/4 of Section 12, Township 5 South, Range 24 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

Upon application of Mesa Petroleum Company, this case will be heard De Novo pursuant to the provisions of Rule 1220.

Docket No. 10-82

Dockets No. 11-82 and 12-82 are tentatively set for April 28 and May 12, 1982. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - APRIL 14, 1982

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

The following cases will be heard before Richard L. Stamets, Examiner, or Daniel S. Nutter, Alternate Examiner:

ALLOWABLE: (1) Consideration of the allowable production of gas for May, 1982, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.

(2) Consideration of the allowable production of gas for May, 1982, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.

CASE 7536: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit A. H. Bernstein and all other interested parties to appear and show cause why the Allen Well No. 1 located in Unit F, Section 23, Township 29 North, Range 13 West, San Juan County, should not be re-entered and plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7537: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit F. E. Unberger, Trustee and all other interested parties to appear and show cause why the Davis Pooled Unit Well No. 1, located in Unit I, Section 27, Township 29 North, Range 11 West, San Juan County, should not be re-entered and plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7538: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Francis L. Harvey and all other interested parties to appear and show cause why the Pinkstaff Estate Well No. 1, located in Unit A, Section 29, Township 29 North, Range 10 West, San Juan County, should not be re-entered and plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7539: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit B.M.W.S. Company, American Employers Insurance and all other interested parties to appear and show cause why the following wells: Waggoner No. 1, Brown No. 2, Wyper No. 2, located in Units K, M, and O, respectively, of Section 29, Township 30 North, Range 12 West, San Juan County, should not be plugged and abandoned in accordance with Division-approved plugging programs.

CASE 7540: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Pauly-Anderson-Pritchard and all other interested parties to appear and show cause why the Haloy Well No. 1, located in Unit P, Section 16, Township 29 North, Range 11 West, San Juan County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7541: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit E. J. Riley and all other interested parties to appear and show cause why the Hare (Ransom) Well No. 1, located in Unit H, Section 14, Township 29 North, Range 11 West, San Juan County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7542: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Benson-Montin-Greer Drilling Corporation, Hartford Accident and Indemnity Company, and all other interested parties to appear and show cause why the following wells: Dustin No. 1, located in Unit K, Section 6, and the Gallegos Canyon Unit No. 2, located in Unit K, Section 35, both in Township 29 North, Range 12 West, and the Segal No. 1, located in Unit K, Section 10, and the Price No. 1, located in Unit N, Section 19, both in Township 31 North, Range 13 West, San Juan County, should not be plugged and abandoned in accordance with Division-approved plugging programs.

CASE 7543: In the matter of the hearing called by the Oil Conservation Division on its own motion to permit Calvin Petroleum Corporation, United States Fidality and Guaranty Co., and all other interested parties to appear and show cause why the Kaserf SWD Well No. 1, located in Unit N, Section 19, Township 30 North, Range 11 West, San Juan County, should not be plugged and abandoned in accordance with a Division-approved plugging program.

CASE 7544: Application of Dinero Operating Company for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be drilled 660 feet from the North and East lines of Section 20, Township 22 South, Range 28 East, Morrow formation, the N/2 of said Section 20, to be dedicated to the well.

CASE 7545: Application of Baker Engineering for a non-standard gas proration unit, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 258.16-acre non-standard gas proration unit for the Morrow formation comprising all of partial Section 32, Township 26 South, Range 30 East.

CASE 7546: Application of Sonny's Oil Field Services, Inc. for an oil treating plant permit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority for the construction and operation of an oil treating plant for the purpose of treating and reclaiming sediment oil at its salt water disposal site in the NW/4 NE/4 of Section 29, Township 18 South, Range 38 East.

CASE 7547: Application of Anadarko Production Company for an unorthodox oil well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox location 2550 feet from the North line and 1350 feet from the West line of Section 15, Township 22 South, Range 37 East, Penrose Skelly Pool, the SE/4 NW/4 of said Section 15 to be dedicated to the well.

CASE 7517: (Continued from March 31, 1982, Examiner Hearing)

Application of Anadarko Production Company for an unorthodox oil well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox location 1650 feet from the South line and 1400 feet from the West line of Section 15, Township 22 South, Range 37 East, Penrose Skelly Pool, the NW/4 SW/4 of said Section 15 to be dedicated to the well.

CASE 7548: Application of Tahoe Oil & Cattle Co. for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the San Andres formation in the perforated interval from 4932 feet to 4992 feet in its Schwalbe Well No. 1, located in Unit P of Section 21, Township 9 South, Range 37 East, West Sawyer-San Andres Pool.

CASE 7549: Application of H. L. Brown for an unorthodox gas well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox Pennsylvanian gas well location 609 feet from the South line and 1665 feet from the East line of Section 32, Township 15 South, Range 32 East, the S/2 of said Section 32 to be dedicated to the well, an existing well which is to be deepened.

CASE 7550: Application of Harvey E. Yates Company for the Rescission of Order No. R-6918, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the rescission of Order No. R-6918, which compulsorily pooled the Atoka-Morrow formation underlying the E/2 of Section 19, Township 8 South, Range 30 East, Chaves County, New Mexico, to be dedicated to a well to be drilled at a standard location thereon. Applicant now seeks the rededication of the E/2 of said Section 19 to the aforesaid well without compulsory pooling.

CASE 7551: Application of Harvey E. Yates Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp through Mississippian formations underlying the E/2 of Section 21, Township 11 South, Range 31 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7552: Application of Merrion Oil & Gas Company for compulsory pooling, Sandoval County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Gallup formation underlying the S/2 SE/4 of Section 20, Township 23 North, Range 6 West, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7553: Application of Fred Pool Drilling Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface down through the Abo formation, underlying the SW/4 of Section 17, Township 6 South, Range 25 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7520: (Continued and Readvertised)

Application of Lewis B. Burleson, Inc. for compulsory pooling and a non-standard oil proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Jalmat Pool underlying a 30-acre non-standard oil proration unit comprising the E/2 of the Easternmost 60 acres of the NW/4 of Section 15, Township 24 South, Range 36 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7554: Application of Morris R. Antwil for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface to the top of the Drinkard formation underlying the NW/4 SW/4 of Section 5, Township 20 South, Range 38 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7555: Application of Morris R. Antwil for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface to the top of the Drinkard formation underlying the SW/4 NW/4 of Section 5, Township 20 South, Range 38 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7556: Application of MGF Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface down through the San Andres formation underlying the NE/4 NW/4 of Section 5, Township 20 South, Range 39 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7557: Application of MGF Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface down through the Seven Rivers formation underlying the SW/4 of Section 32, Township 19 South, Range 39 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7558: Application of MGF Oil Corporation for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests from the surface down through the Seven Rivers formation underlying the SE/4 of Section 31, Township 19 South, Range 39 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7515: (Continued from March 31, 1982 Examiner Hearing)

Application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Dakota formation underlying all or portions of Townships 26 and 27 North, Ranges 12 and 13 West, Township 28 North, Range 13 West, Township 29 North, Ranges 13 through 15 West, and Township 30 North, Ranges 14 and 15 West, containing 174,120 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705.

CASE 7550: In the matter of the hearing called by the Oil Conservation Division on its own motion for an order creating, abolishing, and extending certain pools in Lea and Roosevelt Counties, New Mexico.

(a) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Mississippian production and designated as the Cundill-Mississippian Gas Pool. The discovery well is the Morgan Exploration, Inc. Gann Well No. 1 located in Unit D of Section 9, Township 15 South, Range 36 East, NMPM. Said pool would comprise:

TOWNSHIP 15 SOUTH, RANGE 36 EAST, NMPM
Section 9: NW/4

(b) CREATE a new pool in Roosevelt County, New Mexico, classified as an oil pool for Pennsylvanian production and designated as the North Dora-Pennsylvanian Pool. The discovery well is the Shamrock Exploration, Inc. Collier Well No. 1 located in Unit I of Section 29, Township 4 South, Range 33 East, NMPM. Said pool would comprise:

TOWNSHIP 4 SOUTH, RANGE 33 EAST, NMPM
Section 29: E/2

(c) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the Johnson Ranch-Morrow Gas Pool. The discovery well is the Kaw Petroleum Company Jackson Unit Well No. 1 located in Unit G of Section 22, Township 24 South, Range 33 East, NMPM. Said pool would comprise:

TOWNSHIP 24 SOUTH, RANGE 33 EAST, NMPM
Section 22: E/2

(d) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for Delaware production and designated as the East Triste Draw-Delaware Pool. The discovery well is the Getty Oil Company Getty SB State Well No. 1 located in Unit J of Section 28, Township 24 South, Range 33 East, NMPM. Said pool would comprise:

TOWNSHIP 24 SOUTH, RANGE 33 EAST, NMPM
Section 28: SE/4

(e) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Morrow production and designated as the Triste Draw-Morrow Gas Pool. The discovery well is the Amoco Production Company State IG Com Well No. 1 located in Unit B of Section 32, Township 23 South, Range 32 East, NMPM. Said pool would comprise:

TOWNSHIP 23 SOUTH, RANGE 32 EAST, NMPM
Section 32: N/2

(f) CREATE a new pool in Lea County, New Mexico, classified as a gas pool for Wolfcamp production and designated as the Vada Draw-Wolfcamp Gas Pool. The discovery well is the MMG Oil Company Bell Lake 11 Federal Well #1 located in Unit B of Section 11, Township 25 South, Range 33 East, NMPM. Said pool would comprise:

TOWNSHIP 25 SOUTH, RANGE 33 EAST, NMPM
Section 11: N/2

(g) CREATE a new pool in Lea County, New Mexico, classified as an oil pool for Bone Spring production and designated as the West Vacuum-Bone Spring Pool. The discovery well is the Amoco Production Company State NE Com Well No. 1 located in Unit K of Section 9, Township 18 South, Range 34 East, NMPM. Said pool would comprise:

TOWNSHIP 18 SOUTH, RANGE 34 EAST, NMPM
Section 9: SW/4

(h) CREATE a new pool in Roosevelt County, New Mexico, classified as a gas pool for Granite Wash production and designated as the South Tennyhill-Granite Wash Gas Pool. The discovery well is the Threshold Development Company Morris 14 Well No. 1 located in Unit B of Section 14, Township 6 South, Range 33 East, NMPM, currently classified as producing from the Pennsylvanian formation and in the Tennyhill-Pennsylvanian Gas Pool. The well has been re-evaluated and the producing interval is more correctly defined as Granite Wash. Said pool would comprise:

TOWNSHIP 6 SOUTH, RANGE 33 EAST, NMPM
Section 14: N/2

(i) ABOLISH the Tonneghill-Pennsylvanian Gas Pool in Roosevelt County, New Mexico, as heretofore classified, defined, and described as:

TOWNSHIP 4 SOUTH, RANGE 33 EAST, NMPM
Section 14: All

(j) EXTEND the Bonn-Upper Pennsylvanian Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 14 SOUTH, RANGE 33 EAST, NMPM
Section 7: NE/4

(k) EXTEND the Bilbrey-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 32 EAST, NMPM
Section 6: E/2
Section 8: NE/4

(l) EXTEND the Blinebry Oil and Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 20 SOUTH, RANGE 38 EAST, NMPM
Section 33: NE/4

(m) EXTEND the Bronco Ridge-Morrow Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 22 SOUTH, RANGE 33 EAST, NMPM
Section 19: E/2

(n) EXTEND the Buffalo-Pennsylvanian Gas Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 19 SOUTH, RANGE 33 EAST, NMPM
Section 9: E/2

(o) EXTEND the North Peterson-Pennsylvanian Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 4 SOUTH, RANGE 33 EAST, NMPM
Section 15: NE/4
Section 20: NE/4

(p) EXTEND the South Peterson-Pennsylvanian Associated Pool in Roosevelt County, New Mexico, to include therein:

TOWNSHIP 4 SOUTH, RANGE 33 EAST, NMPM
Section 14: All

(q) EXTEND the Scoggin-Morrow Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 15 SOUTH, RANGE 32 EAST, NMPM
Section 11: NW/4

(r) EXTEND the Wantz-Abo Pool in Lea County, New Mexico, to include therein:

TOWNSHIP 21 SOUTH, RANGE 37 EAST, NMPM
Section 9: NE/4

Dockets Nos. 10-82 and 11-82 are tentatively set for April 14 and April 28, 1982. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - WEDNESDAY - MARCH 31, 1982
9 A.M. - OIL CONSERVATION DIVISION CONFERENCE ROOM
STATE LAND OFFICE BUILDING, SANTA FE, NEW MEXICO

The following cases will be heard before Daniel S. Nutter, Examiner, or Richard L. Stamets, Alternate Examiner:

CASE 7469: (Continued from March 3, 1982, Examiner Hearing)

In the matter of the hearing called by the Oil Conservation Division on its own motion to permit H. N. Bailey & Associates, Commercial Union Insurance Company, and all other interested parties to appear and show cause why the following wells on the H. N. Bailey Lease, Township 21 South, Range 1 West, Dona Ana County, should not be plugged and abandoned in accordance with a Division-approved plugging program: In Section 10: Nos. 9 in Unit A, 9, 11, 12, and 13 in Unit B, 10 and 14 in Unit C; and No. 15 in Unit C of Section 9.

CASE 7497: (Continued and Readvertised)

Application of Parabo, Inc. for an oil treatment plant permit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority for the construction and operation of an oil treating plant for the purpose of treating and reclaiming sediment oil at its salt water disposal site in the SW/4 of Section 29, Township 21 South, Range 38 East.

CASE 7516: Application of Benson-Montin-Greer for a unit agreement, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the North Canada Ojitos Unit Area, comprising 12,361 acres, more or less, of Jicarilla Apache Indian Lands in Township 27 North, Range 1 West.

CASE 7517: Application of Amadarko Production Company for an unorthodox oil well location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox location 1450 feet from the South line and 1400 feet from the West line of Section 15, Township 22 South, Range 37 East, Townsend Shally Pool, the NE/4 SW/4 of said Section 15 to be dedicated to the well.

CASE 7518: Application of Consolidated Oil & Gas Inc., for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of produced salt water into the Abo formation in the perforated interval from 8688 feet to 8856 feet in its Midway State Well No. 1, located in Section 8, Township 17 South, Range 37 East, Midway-Abo Pool.

CASE 7519: Application of S & J Oil Company for special pool rules, McKinley County, New Mexico. Applicant, in the above-styled cause, seeks the promulgation of special pool rules for the Seven Lakes-Pennsylvanian Oil Pool to provide for wells to be located not nearer than 25 feet to the quarter-quarter section line nor nearer than 165 feet to lands owned by an offset operator.

CASE 7510: (Continued from March 16, 1982, Examiner Hearing)

Application of Union Oil Company of California for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp and Penn formations underlying the N/2 of Section 10, Township 22 South, Range 32 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7511: (Continued from March 16, 1982, Examiner Hearing)

Application of Buffton Oil & Gas Inc. for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp through Devonian formations underlying the W/2 of Section 35, Township 16 South, Range 35 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7520: Application of Lewis B. Burleson Inc. for compulsory pooling and a non-standard proration and spacing unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Jalmat Pool underlying a 160-acre non-standard proration unit comprising the NW/4 of Section 15, Township 24 South, Range 36 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7521: Application of William E. Barnhill for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox location 660 feet from the South and West lines of Section 35, Township 19 South, Range 25 East, Permo-Penn, Strawn, Atoka and Morrow formations, the S/2 of said Section 35 to be dedicated to the well.

CASE 7522: Application of Santa Fe Exploration Co. for an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks approval of an unorthodox location 660 feet from the North and West lines of Section 14, Township 20 South, Range 25 East, Permo-Penn, Strawn, Atoka and Morrow formations, the N/2 of said Section 14 to be dedicated to the well.

CASE 7523: Application of Robert N. Enfield for compulsory pooling and an unorthodox gas well location, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp-Penn formations underlying the E/2 of Section 18, Township 19 South, Range 27 East, to be dedicated to a well to be drilled at an unorthodox location 660 feet from the North and East lines of said Section 18. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well and a charge for risk involved in drilling said well.

CASE 7524 THRU 7535: Application of Jack J. Grynberg for compulsory pooling, Chaves County, New Mexico. Applicant, in each of the following 12 cases, seeks an order pooling all mineral interests down through the Abo formation underlying the lands specified in each case, each to form a standard 160-acre gas spacing and proration unit to be dedicated to a well to be drilled at a standard location thereon. Also to be considered in each case will be the cost of drilling and completing said wells and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the wells and a charge for risk involved in drilling said wells:

CASE 7524: SE/4 Section 2, Township 5 South, Range 24 East

CASE 7525: SW/4 Section 3, Township 5 South, Range 24 East

CASE 7526: NW/4 Section 3, Township 5 South, Range 24 East

CASE 7527: SE/4 Section 3, Township 5 South, Range 24 East

CASE 7528: NW/4 Section 4, Township 5 South, Range 24 East

CASE 7529: NE/4 Section 4, Township 5 South, Range 24 East

CASE 7530: NW/4 Section 11, Township 6 South, Range 24 East

CASE 7531: SW/4 Section 11, Township 6 South, Range 24 East

CASE 7532: SE/4 Section 27, Township 6 South, Range 24 East

CASE 7533: SW/4 Section 27, Township 6 South, Range 24 East

CASE 7534: NW/4 Section 34, Township 6 South, Range 24 East

CASE 7535: SW/4 Section 17, Township 6 South, Range 25 East

CASE 7515: (Continued and Readvertised)

Application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Dakota formation underlying all or portions of Townships 26 and 27 North, Ranges 12 and 13 West, Township 28 North, Range 13 West, Township 29 North, Ranges 13 through 15 West, and Township 30 North, Ranges 14 and 15 West, containing 164,120 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705.

Docket No. 8-82

Dockets Nos. 9-82 and 10-82 are tentatively set for March 31, and April 14, 1982. Applications for hearing must be filed at least 22 days in advance of hearing date.

DOCKET: EXAMINER HEARING - TUESDAY - MARCH 16, 1982

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

The following cases will be heard before Richard L. Stamets, Examiner, or Daniel S. Nutter, Alternate Examiner:

ALLOWABLE: (1) Consideration of the allowable production of gas for April, 1982, from fifteen prorated pools in Lea, Eddy, and Chaves Counties, New Mexico.

(2) Consideration of the allowable production of gas for April, 1982, from four prorated pools in San Juan, Rio Arriba, and Sandoval Counties, New Mexico.

CASE 7502: Application of Sun Oil Company for an unorthodox gas well location and non-standard gas proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be drilled 760 feet from the South line and 960 feet from the East line of Section 6, Township 24 South, Range 37 East, Jalmat Gas Pool, and a 160-acre non-standard proration unit comprising the SE/4 of said Section 6.

CASE 7503: Application of Sun Oil Company for an unorthodox gas well location and non-standard gas proration unit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well to be drilled 1980 feet from the North line and 1400 feet from the East line of Section 22, Township 22 South, Range 36 East, Jalmat Gas Pool, and a 120-acre non-standard proration unit comprising the W/2 NE/4 and SE/4 NE/4 of said Section 22.

CASE 7504: Application of Cities Service Company for the extension of vertical limits of the Langlie Mattix Pool, Lea County, New Mexico. Applicant, in the above-styled cause, seeks the contraction of the vertical limits of the Jalmat Pool and the upward extension of the vertical limits of the Langlie Mattix Pool to a subsurface depth of 3416 feet underlying the NW/4 of Section 19, Township 24 South, Range 37 East.

CASE 7505: Application of BCO, Inc. for downhole commingling, Rio Arriba County, New Mexico. Applicant, in the above-styled cause, seeks approval for the downhole commingling of Lybrook-Gallup and Basin-Dakota production in the wellbores of wells drilled and to be drilled in Section 2, 3, 4, 9 and 10, Township 23 North, Range 7 West.

CASE 7506: Application of Getty Oil Company for salt water disposal, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority to dispose of salt water into the Abo formation in the perforated interval from 8900 feet to 9300 feet in its State "P" Well No. 1, located in Unit P, Section 32, Township 16 South, Range 37 East, Lovington-Abo Pool.

CASE 7507: Application of Sonny's Oilfield Service, Inc. for an oil treating plant permit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority for the construction and operation of an oil treating plant for the purpose of treating and reclaiming sediment oil at a site in the NW/4 NE/4 of Section 29, Township 18 South, Range 38 East.

CASE 7508: Application of P & O Oilfield Services, Inc. for an oil treating plant permit, Lea County, New Mexico. Applicant, in the above-styled cause, seeks authority for the construction and operation of an oil treating plant for the purpose of treating and reclaiming sediment oil at a site in the SW/4 NE/4 of Section 10, Township 25 South, Range 36 East.

CASE 7459: (Continued from February 17, 1982, Examiner Hearing)

Application of Red Mountain Associates for the Amendment of Order No. R-6538, McKinley County, New Mexico. Applicant, in the above-styled cause, seeks the amendment of Order No. R-6538, which authorized applicant to conduct waterflood operations in the Chaco Wash-Mesa Verde Oil Pool. Applicant seeks approval for the injection of water through various other wells than those originally approved, seeks deletion of the requirement for packers in injection wells, and seeks an increase in the previously authorized 68-pound limitation on injection pressure.

CASE 7457: (Continued from February 17, 1982, Examiner Hearing)
(This Case will be continued to April 28, 1982)

Application of E. T. Ross for nine non-standard gas proration units, Harding County, New Mexico. Applicant, in the above-styled cause, seeks approval for nine 40-acre non-standard gas proration units in the Bravo Dome Carbon Dioxide Area. In Township 19 North, Range 30 East: Section 12, the NW/4 NW/4 and NE/4 NW/4; Section 14, the NW/4 NE/4, SW/4 NE/4, and SE/4 NE/4. In Township 20 North, Range 30 East: Section 11, the NE/4 SW/4, SW/4 SE/4, SE/4 SW/4, and NW/4 SE/4.

CASE 7509: Application of Supron Energy Corporation for a non-standard proration unit or compulsory pooling, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks approval of a 160-acre non-standard proration unit for the Dakota and Mesaverde formations comprising the SW/4 of Section 2, Township 21 North, Range 8 West, or in the alternative, an order pooling all mineral interests from the surface down through the Dakota formation underlying the S/2 of said Section 2, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7510: Application of Union Oil Company of California for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp and Penn formations underlying the W/2 of Section 10, Township 22 South, Range 32 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7511: (This Case will be continued to March 31, 1982)
Application of Buffton Oil & Gas Inc. for compulsory pooling, Lea County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Wolfcamp through Devonian formations underlying the W/2 of Section 35, Township 16 South, Range 35 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7496: (Continued from March 3, 1982, Examiner Hearing)

Application of Viking Petroleum, Inc. for an unorthodox location, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of an Abo gas well to be drilled 62 feet from the South line and 1984 feet from the East line of Section 29, Township 5 South, Range 24 East, the SE/4 of said Section to be dedicated to the well.

CASE 7512: Application of Viking Petroleum, Inc. for an unorthodox location, Lea County, New Mexico. Applicant, in the above-styled cause, seeks approval for the unorthodox location of a well located in Unit H of Section 31, Township 13 South, Range 34 East, Monombre-Penn Pool, said well being a recompleted Morrow test and located in the SE/4 of the quarter section whereas the pool rules require wells to be located in the NE/4 or SW/4 of the quarter section.

CASE 7476: (Continued from March 3, 1982, Examiner Hearing)

Application of Jack J. Grynberg for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests down through and including the Abo formation, underlying two 160-acre gas spacing units, being the NE/4 and SE/4, respectively, of Section 12, Township 5 South, Range 24 East, each to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said wells and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the wells and a charge for risk involved in drilling said wells.

CASE 7513: Application of Mesa Petroleum Company for compulsory pooling, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Abo formation underlying the SE/4 of Section 12, Township 5 South, Range 24 East, to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a charge for risk involved in drilling said well.

CASE 7514: Application of Santa Fe Exploration Co. for compulsory pooling, or in the alternative a non-standard proration unit, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order pooling all mineral interests in the Permo-Penn, Strawn, Atoka and Morrow formations underlying the W/2 of Section 2, Township 20 South, Range 25 East to be dedicated to a well to be drilled at a standard location thereon. Also to be considered will be the cost of drilling and completing said well and the allocation of the cost thereof as well as actual operating costs and charges for supervision, designation of applicant as operator of the well, and a 200 percent charge for risk involved in drilling said well. In the event said 200 percent risk factor is not approved, applicant seeks a non-standard unit excluding the lands of owners not participating in the well.

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EXAMINER HEARING - TUESDAY - MARCH 16, 1982

CASE 7515: Application of Four Corners Gas Producers Association for designation of a tight formation, San Juan County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Dakota formation underlying all or portions of Townships 26 and 27 North, Ranges 12, and 13 West, Township 29 North, Ranges 13 through 15 West, and Township 30 North, Ranges 14 and 15 West, containing 164,120 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705.

CASE 7465: (Continued from February 17, 1982, Examiner Hearing)
(This Case will be continued to April 28, 1982)

Application of Harvey E. Yates Company for an NGPA determination, Eddy County, New Mexico. Applicant, in theabove-styled cause, seeks a new onshore reservoir determination in the San Andres formation for its Fulton Collier Well No. 1 in Unit G of Section 1, Township 18 South, Range 28 East.

CASE 7482: (Continued and Readvertised)

Application of Harvey E. Yates Company for a tight formation, Chaves County, New Mexico. Applicant, in the above-styled cause, seeks the designation of the Atoka-Morrow formation underlying all or portions of Townships 7, 8, and 9 South, Ranges 28, 29, 30 and 31 East, containing 161,280 acres, more or less, as a tight formation pursuant to Section 107 of the Natural Gas Policy Act and 18 CFR Section 271. 701-705.

CASE 7500: (Continued from March 3, 1982, Examiner Hearing)

Application of Read & Stevens, Inc. for an exception to the maximum allowable base price provisions of the New Mexico Natural Gas Pricing Act, Eddy County, New Mexico. Applicant, in the above-styled cause, seeks an order of the Division prescribing the price allowed for production enhancement gas under Section 107 of the Natural Gas Policy Act as the maximum allowable base price if production enhancement work which qualifies under the NGPA is performed on its Hackberry Hills Unit Well No. 4 located in Section 22, Township 22 South, Range 26 East, Eddy County, New Mexico.

LIST OF EXHIBITS

Exhibit Number	Exhibit Name	Purpose of Exhibit
1	Dakota Reservoir Map	Show location of Westside Tight Gas Area with respect to Dakota formation production.
2	Dakota Formation Completion & Production Map	Show production figures of completed and dry Dakota wells in and around the tight formation area.
3	Westside Tight Gas Area Wells	List production figures of completed and dry Dakota wells in the tight formation area.
4	Type Log	Show log characteristics and depth of Dakota formation in the Westside Tight Gas Area.
5	Cross Section A-A' and B-B'	Show Dakota formation development in the Westside Tight Gas Area.
6	Core Analysis Benson-Montin-Greer Bayview No. 1	Show average laboratory core permeability.
7	Core Analysis Alex W. Campbell Western No. 1	Show average laboratory core permeability.
8	Core Analysis Benson-Montin-Greer Douthit No. 1	Show average laboratory core permeability.
9	Core Analysis Benson-Montin-Greer Ginther No. 1	Show average laboratory core permeability.
10	Core Analysis Benson-Montin-Greer Fullerton No. 2	Show average laboratory core permeability.
11	Core Analysis Benson-Montin-Greer Fullerton No. 1	Show average laboratory core permeability.
12	Core Analysis SunRay Mid-Continent Oil New Mexico Federal I No. 2	Show average laboratory core permeability.
13	Technical Paper	Present relationship between laboratory and in situ permeability.
14	Determination of In Situ Permeability	Show method of determining in situ permeability from laboratory core analysis.
15	Summary of Core Permeability Data	Show summary of permeability data, average laboratory permeabilty and in situ permeability.
16	Darcy's Law Calculation	Show determination of natural gas production from core analysis average permeability

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 3
CASE NO. 7515
Submitted by McCord
Hearing Date 3-4-82

EXHIBIT NO. 3

WESTSIDE TIGHT GAS AREA WELLS
AS OF FEBRUARY 1, 1982

	COMPANY	WELL NAME	LOCATION	DAKOTA DEPTH	IP DATE	IP GAS/OIL MCFPD/BOPD	1980 PROD. MCFPD/BOPD	CUMULATIVE 01-01-81 ECF/BO
1.	Skelly Oil Co.	Gallegos Glp. Sand Unit #33	NE/NE 11 26-12	5825	03/58	D&A	Recompleted in Gallup	
2.	Coleman Oil & Gas	Nelson #1	NE/NW 13 26-12	5859	12/81	D&A	Recompleted in Gallup	
3.	Skelly Oil Co.	Navajo B-1	NE/SE 14 26-12	5996	09/54	D&A	Recompleted in Gallup	
4.	El Paso Natural Gas Co.	Hill #1	NE/NE 20 26-12	5678	05/55	D&A	Recompleted in Gallup	
5.	Coleman Oil & Gas	Navajo-Smith #1	SW/NE 24 26-12	5720	05/81	D&A	Recompleted in Greenhorn	
6.	Tenneco Oil Company	Arroyo Com #1	NW/NW 25 26-12	5832	03/74	D&A	Recompleted in Gallup	
7.	El Paso Natural Gas Co.	Sullivan B-2	SW/NW 29 26-12	5649	05/57	D&A	----	----
8.	El Paso Natural Gas Co.	Hill #1-A	SW/SW 36 26-12	5830	03/58	D&A	----	----
9.	British American Oil Co.	Scott #C-1	SW/SW 7 26-13	5958	04/57	D&A	----	----
10.	Sunray Mid-Continent Oil	New Mexico Federal #G-1	NE/NE 32 26-13	5804	01/60	D&A	----	----
11.	Southwest Production	1 Wright State Com	NE/NE 16 27-12	5943	09/60	4986/0	4/.1	.620/4851
12.	Dietrich Exploration	1 Dietrich State	NE/SW 16 27-12	5898	01/78	D&A	----	----
13.	John R. Knott	1 STP-State	NE/NW 16 27-12	5918	03/80	D&A	Recompleted in Pictured Cliffs	
14.	Southwest Production	1 Warren Federal	NE/NE 17 27-12	5805	06/60	3268/0	P&A 1975	.192/1127
15.	John R. Knott	STP Federal #1	NE/NW 17 27-12	5853	08/79	TA	----	----
16.	Southwest Production	1 Collier Fed.	NW/SW 18 27-12	5830	07/60	1387/0	P&A 1965	.010/48

	COMPANY	WELL NAME	LOCATION	DAKOTA DEPTH	IP DATE	IP GAS/OIL MCFPD/BOPD	1980 PROD. MCFPD/BOPD	CUMULATIVE 01-01-81 BCF/BO
17.	Amoco Production Co.	1 Bayview Riddle	NE/NE 18 27-12	5810	07/59	1235/0	43/0	.449/2333
18.	British American	#1 Warren	SE/NW 18 27-12	5860	03/56	D&A	----	----
19.	Compania Exploration	1-19 Government	NE/NE 19 27-12	6054	03/61	D&A	----	----
20.	Tenneco Oil Co.	1 H.O. Watson Gas Unit	NW/NW 21 27-12	5810	07/62	D&A	----	----
21.	Tenneco Oil Co.	1 Watson-B	NE/NE 21 27-12	5862	08/61	3737/0	SI	1.088/6056
22.	Tenneco Oil Co.	1 Watson	SW/NE 22 27-12	5920	05/61	2750/0	SI	.553/6125
23.	Tenneco Oil Co.	2 Watson	SW/NW 22 27-12	5890	04/62	1938/0	P&A 1975	.006/37
24.	Alex H. Campbell	1-Federal Tonkin	SE/SE 23 27-12	6072	02/59	4921/0	40/0	.682/3632
25.	Amoco Production Co.	McGrady 2-A	SW/NW 23 27-12	6088	08/64	1937/0	64/.3	.624/5393
26.	Amoco Production Co.	Federal Gas Com J-1	SE/NE 24 27-12	6280	07/66	3166/0	68/.2	.752/5043
27.	Amoco Production Co.	McGrady B-1	SE/SE 24 27-12	6220	08/64	4215/0	201/1.2	1.950/15438
28.	Beta Development Co.	1 Campbell Federal	SW/NE 25 27-12	6090	10/59	3440/0	155/1.3	1.073/17241
29.	Beta Development Co.	4 Campbell Federal	NE/SW 25 27-12	6105	10/61	D&A	----	----
30.	Beta Development Co.	2 Campbell Federal	NE/NE 26 27-12	6165	02/61	6233/0	P&A 1977	.964/9092
31.	Beta Development Co.	3 Campbell Federal	NE/SW 26 27-12	5895	03/61	2638/0	P&A 1977	.777/10072
32.	Western Development	1 Rummel	SW/NW 27 27-12	5930	01/58	D&A	----	----
33.	Beta Development Co.	5 Campbell	NE/NE 27 27-12	5946	09/61	2432/0	73/.9	.788/11662

	COMPANY	WELL NAME	LOCATION	DAKOTA DEPTH	IP DATE	IP GAS/OIL MCFPD/BOPD	1980 PROD. MCFPD/BOPD	CUMULATIVE 01-01-81 BCF/BO
34.	Beta Development Co.	6 Campbell Federal	NE/NW 27 27-12	5912	05/62	1913/0	P&A 1978	.180/2562
35.	Southwest Production	1 Campbell Federal B	NE/NE 28 27-12	5898	05/62	D&A	----	----
36.	Merrion & Bayless	Morgan #3	NW/NW 31 27-12	5734	07/76	34/0	TA	Not Produced
37.	Jerome P. McHugh	Nassau #1	NE/NE 36 27-12	6123	09/70	2139/0	53/.5	.376/3340
38.	Southwest Production	1 Morgan Federal	NW/SE 36 27-12	6036	12/60	D&A	----	----
39.	Southwest Production	1 Federal	NW/NW 36 27-12	5998	05/60	D&A	Recompleted in Gallup	
40.	Benson-Montin-Greer	1 Douthit	NE/NE 5 27-13	5928	07/59	1190/0	11/1	.058/3597
41.	Rex Uranium-Royal Devel.	1 Royal Rex	NW/NE 8 27-13	5939	08/58	D&A	Recompleted in Gallup	
42.	Delhi Oil Corp.	Douthit #1	NE/NE 8 27-13	5930	08/50	D&A	----	----
43.	Kirby Exploration	1 Kirby English	NE/NE 9 27-13	6030	08/75	D&A	----	----
44.	Rocanville Corp.	#3 Fairfield	SE/NW 14 27-13	5890	11/63	1613/0	10/0	.452/1523
45.	Rocanville Corp.	#1 Fairfield	NE/NE 14 27-13	5888	05/61	11686/0	101/0	2.737/40912
46.	Rocanville Corp.	#2 Fairfield	NE/NE 15 27-13	5930	09/62	3186/0	11/0	1.239/6713
47.	Stanolind Oil & Gas Co.	F. A. Schultz #1	SW/SW 15 27-13	5970	02/56	D&A	----	----
48.	Rex Uranium-Royal Devel.	#2 Royal Rex	NW/NW 18 27-13	5946	08/58	D&A	Recompleted in Gallup	
49.	W. M. Galloway	#7 Machel	SE/SE 23 27-13	5812	12/74	D&A	----	----
50.	SunRay Mid-Continent Oil	2 New Mexico Fed. J	SE/SE 23 27-13	5810	08/61	D&A	----	----

	COMPANY	WELL NAME	LOCATION	DAKOTA DEPTH	IP DATE	IP GAS/OIL MCFPD/BOPD	1980 PROD. MCFPD/BOPD	CUMULATIVE 01-01-81 BCF/BO
51.	Dugan Production Corp.	Kuta #1	NE/NE 23 27-13	5891	01/61	2918/0	65/0	.987/1232
52.	Jerome P. McHugh	4 Nassau	NW/SE 24 27-13	5888	07/74	D&A	----	----
53.	Jerome P. McHugh	Nassau #2	NE/NW 24 27-13	5898	09/70	2388/0	70/.2	.382/1626
54.	O. P. Featherstone	Roberson #4	SW/SE 25 27-13	5884	06/58	D&A	Recompleted in Gallup	
55.	Amoco Production Co.	#2 Newman	NW/SW 28 27-13	5903	03/57	D&A	----	----
56.	Stanolind Oil & Gas Co.	Newman #1	SE/SE 31 27-13	5877	05/56	D&A	----	----
57.	Supron Energy Corp.	C. J. Holder #16	SE/SW 9 28-13	6228	09/81	4798/0	New Well	----
58.	Benson-Montin-Greer	1 Jones	SE/SE 17 28-13	6214	06/59	1813/0	SI	.404/7931
59.	British Am. Oil Prod.	1 Scott "D"	NE/NE 20 28-13	6190	09/57	D&A	----	----
60.	Pan American Petroleum	1 USA - C.J. Holder	SE/SE 21 28-13	6200	07/58	D&A	Recompleted in Gallup	
61.	Tenneco Oil Co.	USA - Scott #1	SE/NW 28 28-13	6070	06/63	2814/0	60/.8	.488/9192
62.	Benson-Montin-Greer	2 Fullerton	SE/SE 28 28-13	6084	08/59	3958/0	SI	.282/3200
63.	Kern County Land	1 Douthit Fed.	NW/SE 33 28-13	6048	11/60	D&A	----	----
64.	Royal Development	1 Douthit	SE/SE 33 28-13	6065	09/57	5229/10	P&A 1958 - Recomp. in Gallup Not Produced in Dak.	
65.	Dugan Production Co.	Fullerton #1	SE/NW 34 28-13	6910	11/63	not available	32/0	.121/0
66.	Ladd Petroleum	Farmington #1	NW/NE 4 29-13	5986	05/60	2480/0	42/.4	.552/11849

	COMPANY	WELL NAME	LOCATION	DAKOTA DEPTH	IP DATE	IP GAS/OIL MCFPD/BOPD	1980 PROD. MCFPD/BOPD	CUMULATIVE 01-01-81 BCF/BO
67.	Pioneer Production Corp.	1 Pruitt	SW/NW 4 29-13	5937	05/61	2500/125	P&A 1971	.132/3654
68.	Ladd Petroleum	1-6 SE Mounds	NW/NE 6 29-13	5722	01/63	1731/0	P&A 1965	.026/730
69.	Pioneer Prod. Corp.	#1 Airport	NE/NE 8 29-13	5843	11/61	2000/0	P&A 1971	.076/1823
70.	Pioneer Prod. Corp.	#2 Airport	SE/SE 8 29-13	5820	10/61	1757/0	P&A 1974	.032/3416
71.	Southland Royalty	1 Harris "D"	NE/SE 18 29-13	5622	07/61	440/0	5/0	.156/2299
72.	Southland Royalty	22 Hagood "G"	SW/SW 20 29-13	5791	03/61	D&A	Recompleted in Gallup	
73.	Tenneco Oil Co.	3 Callow B	SW/NE 31 29-13	6130	02/62	D&A	Recompleted in Gallup	
74.	Dugan Production Corp.	Federal I #3	NW/NW 1 29-14	5836	02/61	3480/0	5/0	.408/5926
75.	Dugan Production Corp.	Federal I #2	NE/NE 1 29-14	5840	06/58	1800/0	10/0	.267/2233
76.	Ladd Petroleum Co.	1-2 SW Mounds	NE/NW 2 29-14	5647	09/62	2521/0	7/0	1.334/7410
77.	Dugan Production Corp.	Com 1	NW/SE 2 29-14	5768	05/61	1985/0	.5/0	.133/1119
78.	Pubco Petroleum Corp.	Russell #1	SE/SW 4 29-14	5480	03/54	D&A	----	----
79.	Sunray Mid-Continent Oil	1 New Mexico Fed. "K"	NE/NE 6 29-14	5408	06/59	845/0	P&A 1967	Not Produced
80.	Sunray Mid-Continent Oil	1 New Mexico Fed. "I"	SW/NW 11 29-14	5621	10/57	D&A	----	----
81.	El Paso Natural Gas Prod.	Ojo Amarillo #1	NE/NE 27 29-14	5931	05/60	D&A	Recompleted in Gallup	
82.	Humble Oil & Refining	Navajo #7L	SW/NE 35 29-14	6158	01/61	D&A	Recompleted in Gallup	
83.	Jalco Drilling	Waterflow Unit #1	SW/NW 8 29-15	4542	05/58	D&A	----	----

	COMPANY	WELL NAME	LOCATION	DAKOTA DEPTH	IP DATE	IP GAS/OIL MCFPD/BOPD	1980 PROD. MCFPD/BOPD	CUMULATIVE 01-01-81 BCF/BO
84.	El Paso Natural Gas Prod.	Fouts #1	SW/NE 12 29-15	5200	07/61	D&A	----	----
85.	Shar Alan Oil Co.	Hunt Federal #3	NE/SW 1 30-14	6133	12/64	D&A	Recompleted in Fruitland	
86.	Lynco Oil Corp.	Hunt Fed. #2	SE/NE 1 30-14	6226	11/64	3250/0	36/.2	.234/590
87.	Odessa Natural Corp.	2 Little - Federal	NE/NW 1 30-14	6308	02/77	2994/0	10/2	.212/6730
88.	Albert C. Bruce, Jr.	1 Federal Pipkin	NE/NE 5 30-14	5648	11/59	D&A	----	----
89.	Dugan Production Co.	1 Big Field	SE/SE 10 30-14	6425	05/79	149/0	38/1	.008/273
90.	Humble Oil & Refining	1 Unit	NW/SE 11 30-14	6358	10/61	D&A	----	----
91.	Odessa Natural Corp.	3 Little - Federal	NE/NW 12 30-14	6271	04/77	2200/0	23/2	.075/3484
92.	Lynco Oil Corp.	Hunt Fed. 1	NE/SE 12 30-14	6260	02/64	3759/0	45/.5	.394/11726
93.	Dugan Production Corp.	2 Ms. Nona	NE/NE 15 30-14	6396	01/78	484/0	14/1	.019/1550
94.	Humble Oil & Refining	1 Kirtland Unit	NE/NE 19 30-14	5654	07/58	D&A	----	----
95.	Dugan Production Corp.	2 Jacobs	SW/NE 26 30-14	5873	01/80	1919/0	311/4	.038/493
96.	Dugan Production Corp.	1 Horace Smith	SE/SE 26 30-14	5914	12/64	2283/11	SI	.164/2035
97.	Dugan Production Corp.	1-R Horace Smith	NE/SE 26 30-14	5836	01/81	1062/0	New Well	----
98.	Wempro Company	Greg #1	SE/SE 27 30-14	5730	06/81	140/2	New Well	----
99.	Mountain Fuel Supply	Fruitland #1	NE/NE 28 30-14	5734	05/77	D&A	Recompleted in Menefee	
100.	Wempro Co.	Stevens #1	NW/NE 29 30-14	5680	06/81	148/0	New Well	----

	COMPANY	WELL NAME	LOCATION	DAKOTA DEPTH	IP DATE	IP GAS/OIL MCFPD/BOPD	1980 PROD. MCFPD/BOPD	CUMULATIVE 01-01-81 BCF/BO
101.	Mesa Petroleum	Twin Mounds Fed. 33-1	SW/NE 33 30-14	5580	04/81	40/5	New Well	----
102.	Compass Exploration	1-34 Aztec	SE/SE 34 30-14	5660	05/61	D&A	----	----
103.	Dugan Production Corp.	Greek's Fate #2	NW/NE 24 30-15	5450	12/81	225/0	New Well	----
104.	Humble Oil & Refining	1 North Waterflow Unit	NE/SW 28 30-15	4763	03/58	D&A	----	----
105.	SunRay Mid-Continent Oil	1 New Mexico Fed. "L"	NW/NW 29 30-15	4673	08/59	D&A	Recompleted in Gallup	

EXHIBIT NO. 6

Company: Benson-Montin-Greer Drilling Corp. Well Now: Amoco Production Company
Well: Bayview No. 1 Bayview Riddle Gas Com No. 1

Basin Dakota Field
NENE, Section 18, Township 27 North, Range 12 West
San Juan County, New Mexico

DAKOTA FORMATION CORE DATA
(Only Perforated Zones Chosen)

Depth (ft)	Sample Footage (ft)	Permeability (md)
5828-5829	1	0.02
5829-5830	1	0.02
5840-5841	1	0.02
5841-5842	1	<0.01
5842-5843	1	0.01
5843-5844	1	0.01
5844-5845	1	<0.01
5845-5846	1	<0.01
5846-5847	1	0.02
5847-5848	1	0.01
5848-5849	1	<0.01
5849-5850	1	<0.01
5850-5851	1	<0.01
5851-5852	1	0.03
5893-5894	1	0.01
5905-5906	1	<0.01
5906-5907	1	0.08
5907-5908	1	0.09
5908-5909	1	0.10
5909-5910	1	0.10
5910-5911	1	0.04
5911-5912	1	0.09
5912-5913	1	0.05
5913-5914	1	0.16
5914-5915	1	0.02
5915-5916	1	0.04
5916-5917	1	0.04
5917-5918	1	0.02
5918-5919	1	0.03
5919-5920	1	0.09
5920-5921	1	0.14
5921-5922	1	0.10
5922-5923	1	0.01
	33	1.42

Average laboratory permeability = $\frac{1.42}{33}$ = 0.04 md

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Four Corners EXHIBIT NO. 6
CASE NO. 7515
Submitted by Meford
Hearing Date 3-16-82

CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

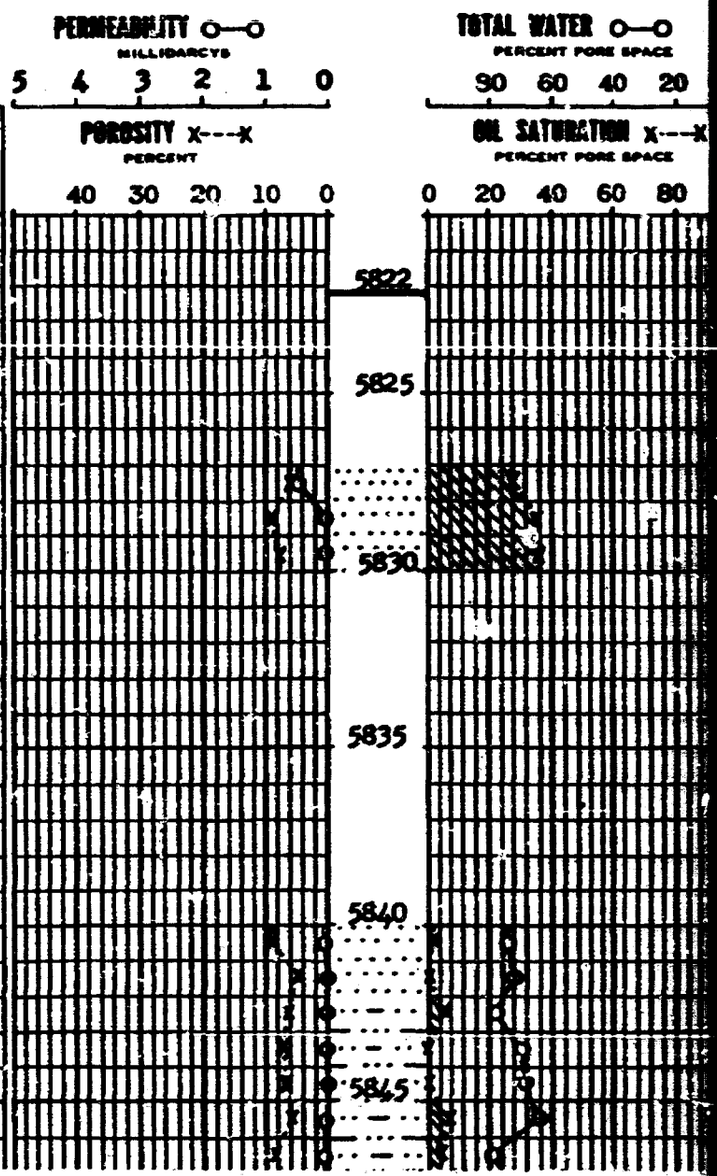
COMPANY BENSON - MONTIN - GREER | DATE ON 3/31/59 | FILE NO. RP-3-954
WELL BAYVIEW No. 1 | DATE OFF 4/4/59 | ENGRS. CLIFFORD
FIELD WILDCAT | FORMATION DAKOTA | ELEV. 5767' DF
COUNTY SAN JUAN | STATE NEW MEX. | DRLG. FLD. OIL EMULSION | CORES DIAMOND
LOCATION NE NE SEC 18 T27N R12W | REMARKS SAMPLED BY CLIENT

SAND | LIMESTONE | CONGLOMERATE | CHERT
SHALE | DOLOMITE | VERTICAL FRACTURES

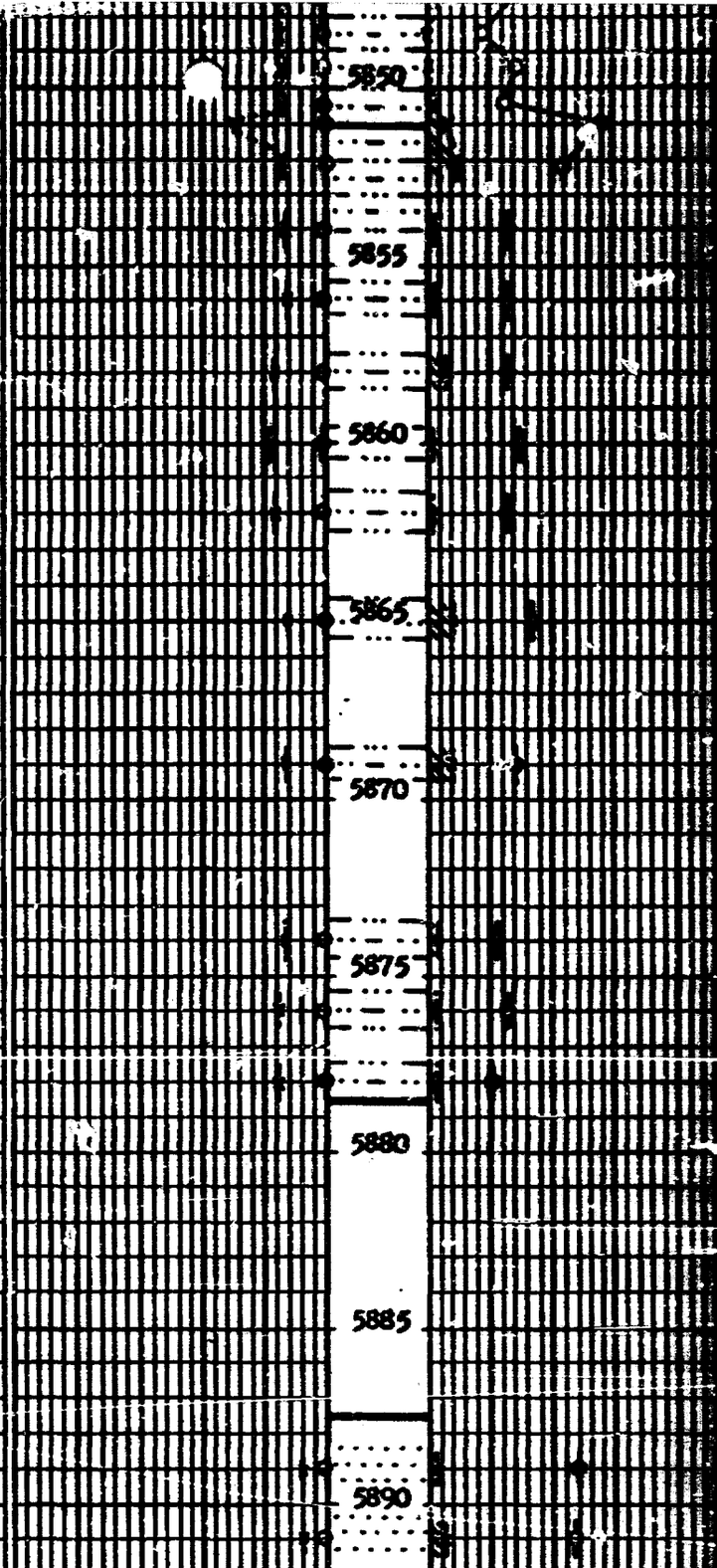
TABULAR DATA and INTERPRETATION

SAMPLE NUMBER	DEPTH FEET	PERM. MD.	POROSITY %	RESIDUAL SATURATION % PORE SPACE OIL	RESIDUAL SATURATION % PORE SPACE TOTAL WATER		PROD
	LOGGED FROM SAMPLES ONLY.						
1	5827-28	0.45	5.8	27.6	57.0		
2	28-29	0.02	9.0	35.6	33.3		
3	29-30	0.02	7.7	36.4	36.4		
4	5840-41	0.02	8.7	2.3	73.6		
5	41-42	<0.01	5.4	0.0	72.2		
6	42-43	0.01	6.2	3.2	77.5		
7	43-44	0.01	7.4	0.0	69.0		
8	44-45	<0.01	6.4	0.0	68.8		
9	45-46	<0.01	5.9	8.5	64.4		
10	46-47	0.02	8.4	2.4	79.8		

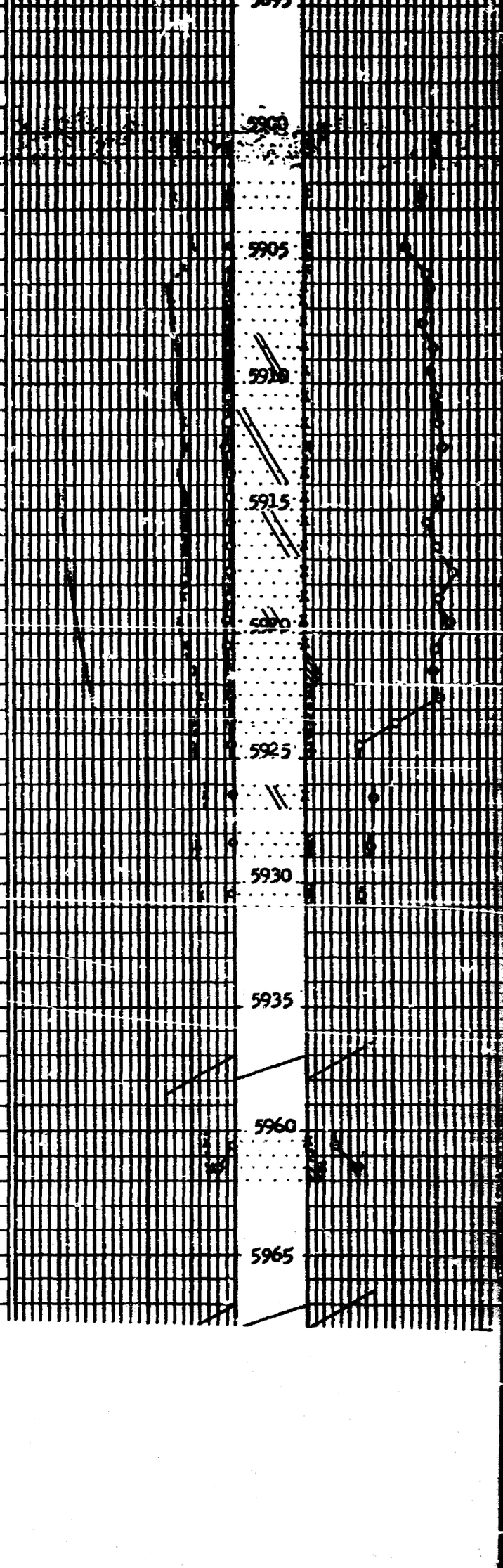
COMPLETION COREGRAPH



	47–48	0.01	6.9		
2	48–49	<0.01	7.1	0.0	81.7
3	49–50	<0.01	7.6	0.0	.2
4	50–51	<0.01	7.0	2.9	75.6
5	5851	0.03	14.3	7.7	44.8
6	52	<0.01	6.9	10.2	56.6
7	5854	<0.01	7.4	2.7	73.1
8	5856	<0.01	6.3	3.2	74.6
9	5858	<0.01	8.3	6.0	74.8
10	5860	0.01	9.2	2.2	70.6
11	5862	<0.01	8.0	2.5	75.0
12	5865	0.00	5.9	8.5	66.2
13	5869	0.00	6.2	8.1	72.5
14	5874	<0.01	6.5	3.1	78.6
15	5876	0.02	7.6	2.6	73.8
16	5878	0.00	7.2	2.8	79.2
17	5889	<0.01	7.8	2.6	53.8
18	5891	<0.01	7.8	6.4	55.2
19	5893	0.01	6.9	10.2	62.4



1	5901	0.04	12.6	4.0	38.1
2	5903	0.06	13.9	1.4	44.6
3	5905	<0.01	9.4	2.1	52.2
4	06	<0.01	11.2	1.8	42.8
5	06	0.08	14.4	0.0	41.0
6	07	0.09	13.9	0.0	41.7
7	08	0.10	13.6	0.0	44.2
8	09	0.10	12.5	0.0	40.0
9	10	0.04	12.2	0.0	41.0
10	11	0.09	12.6	0.0	39.7
11	12	0.05	11.3	0.0	37.2
12	13	0.16	10.9	0.0	36.7
13	14	0.02	12.1	1.7	38.1
14	15	0.04	10.7	0.0	36.4
15	16	0.04	10.8	0.0	43.5
16	17	0.02	10.8	0.0	38.8
17	18	0.03	10.6	0.0	33.1
18	19	0.09	11.6	0.0	37.1
19	20	0.14	12.3	0.0	38.2
20	21	0.10	11.2	0.0	38.4
21	22	0.01	8.2	6.1	39.0
22	23	0.04	7.3	2.7	37.0
23	24	0.01	8.3	2.4	57.8
24	5925	0.01	8.1	2.5	74.2
25	5927	<0.01	6.2	0.0	67.7
26	5929	<0.01	8.1	2.5	69.2
27	5931	<0.01	7.8	2.6	73.9
28	5960-61	<0.01	6.6	0.0	86.5
29	61-62	0.41	5.8	6.9	76.0



7	5960-61	<0.01	6.6	0.0	86.5
8	61-62	0.41	5.8	6.9	76.0
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27	6008	0.45	12.9	1.7	70.0
28	11	0.29	6.9	0.0	47.8
29	12	0.41	16.0	0.0	76.3
30	13	0.15	11.5	7.8	65.1
31	14	0.61	9.5	7.4	63.1
32	15	0.06	8.7	2.3	50.6
33	16	0.13	14.9	3.4	63.1
34	17	0.23	12.2	0.0	61.5
35	6018	3.7	17.1	0.0	78.4
36					
37					
38					

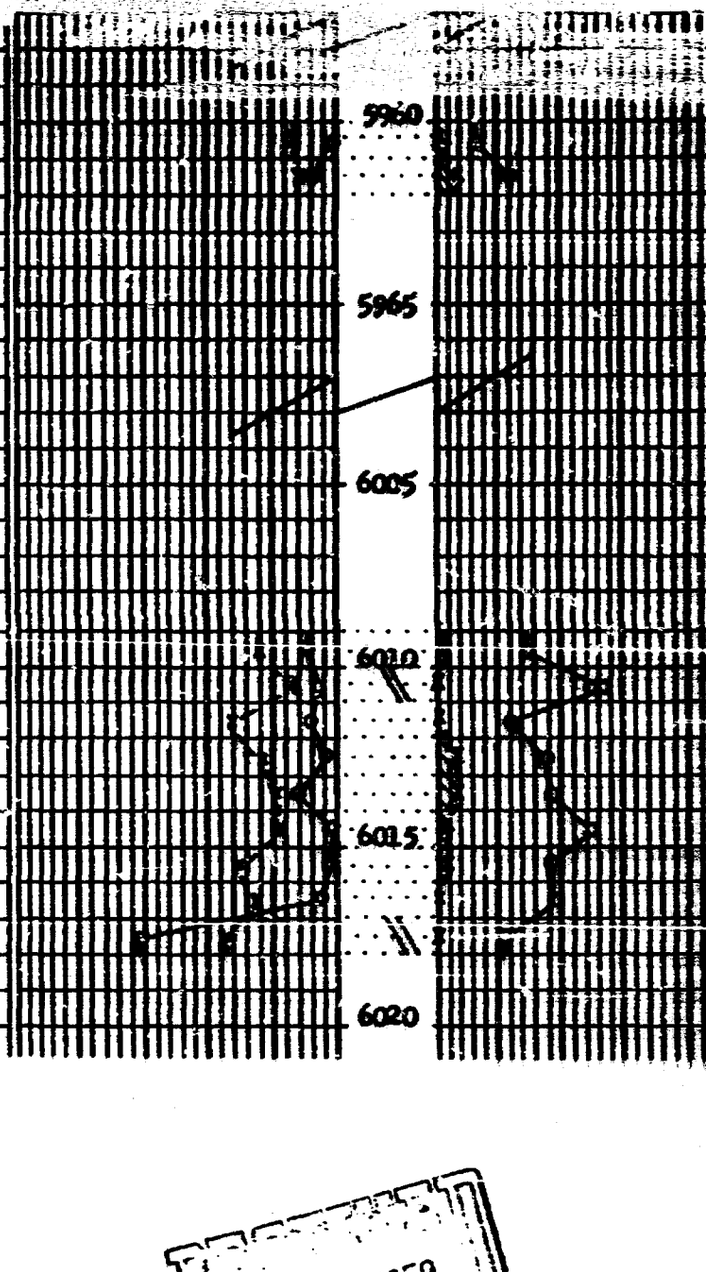


EXHIBIT NO. 7

Company: Alex W. Campbell Well Now: Beta Development Co.
Well: Western No. 1 Campbell Federal No. 1

Basin Dakota Field
NENE, Section 25, Township 27 North, Range 12 West
San Juan County, New Mexico

DAKOTA FORMATION CORE DATA
(Only Perforated Zones Chosen)

Depth (ft)	Sample Footage (ft)	Permeability (md)
6158-6159	1	0.02
6159-6160	1	0.06
6175-6176	1	0.01
6176-6177	1	0.28
6177-6178	1	0.06
6178-6179	1	0.01
6179-6180	1	0.01
6180-6181	1	0.01
6181-6182	1	0.04
6182-6183	1	0.03
6183-6184	1	0.01
6184-6185	1	0.02
6185-6186	1	<0.01
6186-6187	1	<0.01
6187-6188	1	0.01
	15	0.59

Average laboratory permeability = $\frac{0.59}{15}$ = 0.04 md

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Four Corners EXHIBIT NO. 7
CASE NO. 7516
Submitted by Mclord
Hearing Date 3-16-82

CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

COMPANY ALEX W. CAMPBELL — DATE ON 9/18/59 — FILE NO. RP-3-1081
WELL WESTERN # 1 — DATE OFF 9/19/59 — ENGRS. ENGLISH
FIELD BISTI — FORMATION DAKOTA — ELEV. 6042' KB
COUNTY SAN JUAN — STATE N. MEXICO — DRLG. FLD. WATER BASE MUD — CORES DIAMOND
LOCATION SEC 5 - T27N - R12W — REMARKS SAMPLED BY CLIENT

SAND ▨ SHALE ▬ LIMESTONE ▭ DOLOMITE ▭ CONGLOMERATE ○ VERTICAL FRACTURE ▭ CHERT ▭

TABULAR DATA and INTERPRETATION

DEPTH FEET	PERM MD	POR %	RESIDUAL SATURATION % PORE SPACE OIL	RESIDUAL SATURATION % PORE SPACE TOTAL WATER		PROD

COMPLETION CORREGRAPH

PERMEABILITY o—o MILLIDARCYS 5 4 3 2 1 0
POROSITY x---x PERCENT 40 30 20 10 0
TOTAL WATER o—o PERCENT PORE SPACE 80 60 40 20
OIL SATURATION x--- PERCENT PORE SPACE 0 20 40 60 80

6114
6115
6120
6125
6130
6135
6140
6145
6148

6158–59	0.02	6.3	7.9	47.6
59–60	0.36	7.8	6.4	35.9
60–61	0.23	8.3	6.0	38.6
61–62	0.06	6.9	7.3	37.7
62–63.5	<0.01	3.3	6.1	66.7
6174–75	<0.01	1.5	0.0	86.3
75–76	0.01	2.2	9.1	72.7
76–77	0.28	4.6	15.2	60.8
77–78	0.06	3.9	12.8	56.4
78–79	0.01	6.9	2.9	40.6
79–80	0.01	6.6	3.0	37.9
80–81	0.02	5.6	0.0	32.1
81–82	0.04	7.3	6.8	34.2
82–83	0.03	7.4	2.7	32.4
83–84	0.01	7.0	0.0	28.6
84–85	0.02	5.4	3.7	32.4
85–86	<0.01	5.1	0.0	39.2
86–87	<0.01	4.1	0.0	43.8
87–88	0.01	5.1	0.0	27.4
88–89	<0.01	4.5	4.4	53.3
89–90	0.01	7.9	8.9	34.2
90–91	0.21	4.8	0.0	37.5
91–92	<0.01	4.6	15.2	67.4
92–93	0.01	5.9	20.3	72.8
93–94	<0.01	7.5	9.3	50.7
94–95	<0.01	3.0	0.0	80.0
95–96	0.02	9.1	28.5	66.0
96–97	<0.01	2.3	0.0	78.5
97–98	0.02	5.1	3.9	60.8
98–99	<0.01	5.2	3.8	71.2
199–6200	<0.01	2.9	6.9	69.0

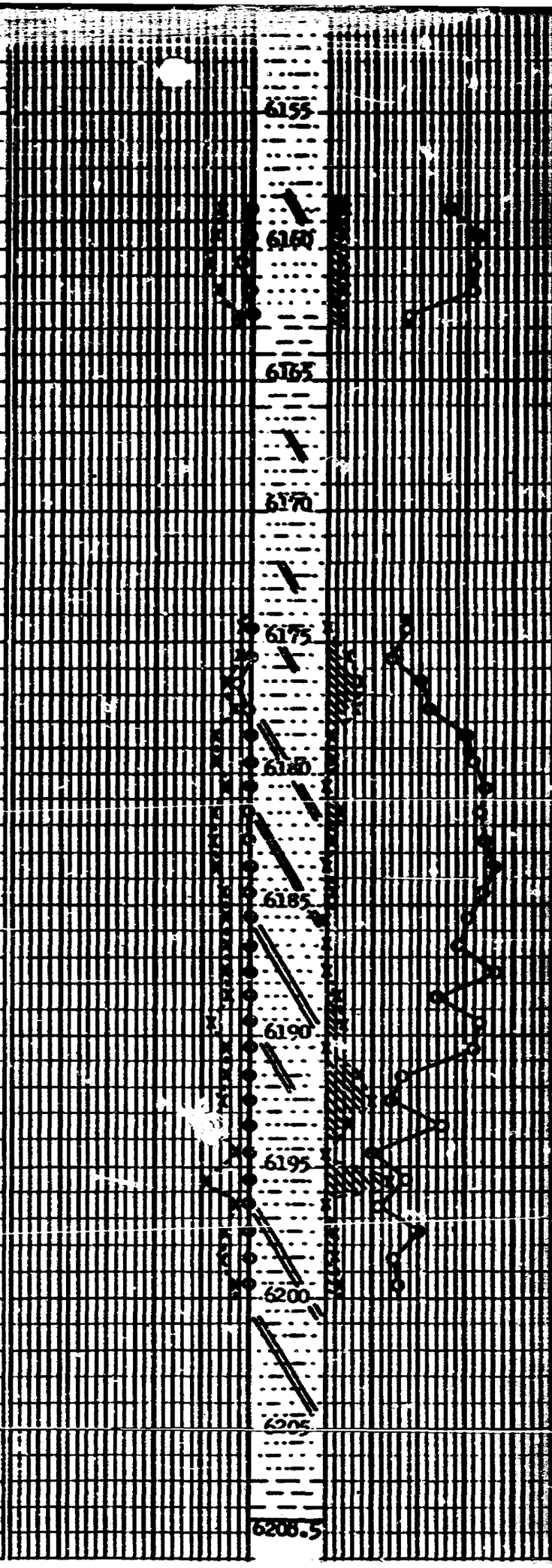


EXHIBIT NO. 8

Company: Benson-Montin-Greer
Well: Southit No. 1

Basin Dakota Field
NENE, Section 5, Township 27 North, Range 13 West
San Juan County, New Mexico

DAKOTA FORMATION CORE DATA
(Only Perforated Zones Chosen)

Depth (ft)	Sample Footage (ft)	Permeability (md)
5964-5965	1	0.01
5965-5966	1	0.02
5966-5967	1	0.02
5967-5968	1	<0.01
5968-5969	1	0.02
5969-5970	1	0.02
5970-5971	1	0.01
5971-5972	1	<0.01
5972-5973	1	<0.01
5973-5974	1	0.01
5974-5975	1	0.02
5975-5976	1	0.02
5976-5977	1	0.03
5977-5978	1	0.04
5978-5979	1	0.04
5979-5980	1	0.06
5980-5981	1	0.44
5981-5982	1	0.02
6008-6009	1	0.02
6009-6010	1	0.04
6010-6011	1	0.07
6011-6012	1	0.04
6012-6012.5	.5	0.08
6020-6021	1	0.05
6021-6022	1	0.06
6022-6023	1	0.07
	25.5	1.24

Average laboratory permeability = $\frac{1.24}{25.5}$ = 0.05 md

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Four Corners EXHIBIT NO. 8
CASE NO. 7515
Submitted by Meford
Hearing Date 3-16-82

CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

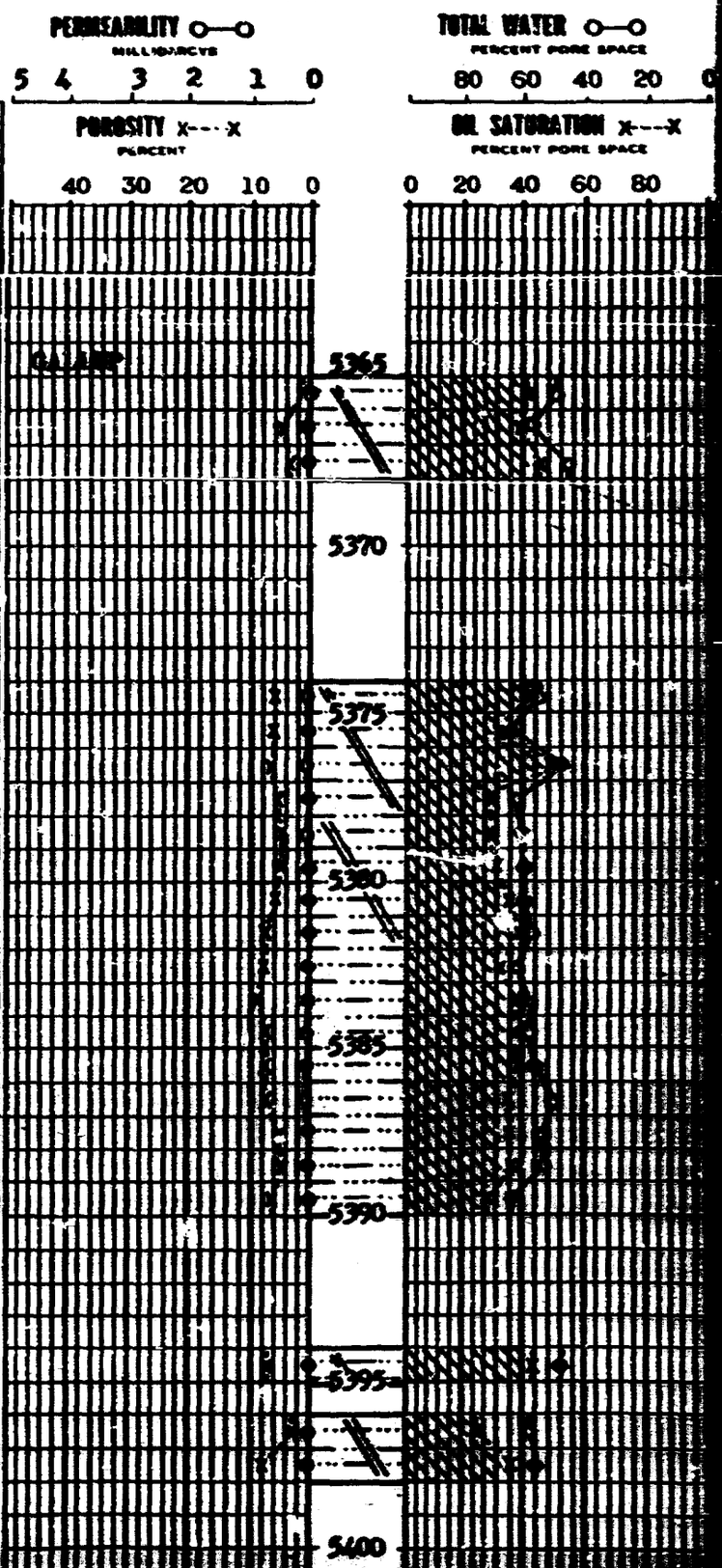
COMPANY: BENSON - MONTIN - GREER | DATE ON: 7/5/59 | FILE NO: RP-3-1029
WELL: No. 1 DOUGHIT | DATE OFF: 7/11/59 | ENGRS: ENGLISH
FIELD: WILDCAT | FORMATION: AS NOTED | ELEV.: 9916' KB
COUNTY: SAN JUAN | STATE: N. MEXICO | DRLG. FLD.: OIL BASE MUD | CORES: DIAMOND
LOCATION: Sec 5 - T27N - R13W | REMARKS: SAMPLED BY CLIENT

SAND | LIMESTONE | CONGLOMERATE | CHERT
SHALE | DOLOMITE | COAL | VERTICAL FRACTURES

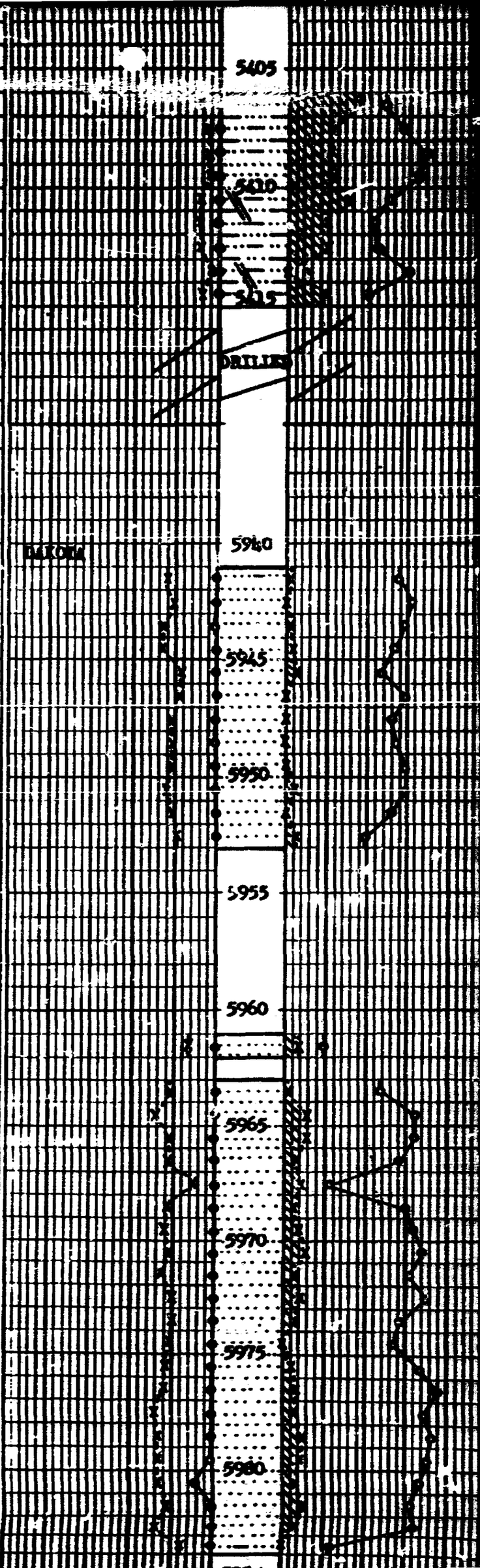
TABULAR DATA and INTERPRETATION

DEPTH FEET	PERM MD	POROSITY %	SATURATION % PORE SPACE OIL	SATURATION % PORE SPACE TOTAL WATER		PROD
LOGGED FROM SAMPLES ONLY.						
5365-66	<0.01	1.2	41.7	50.1		
66-67	0.02	4.3	39.6	58.2		
67-68	0.02	3.5	45.7	45.7		
5374-75	0.06	5.9	42.3	55.9		
75-76	0.01	6.0	33.3	64.9		
76-77	0.06	6.8	48.6	48.6		
77-78	0.01	5.3	30.2	62.2		
78-79	0.03	4.8	29.2	60.4		
79-80	<0.01	4.9	32.6	59.2		
80-81	<0.01	5.9	35.6	59.3		
81-82	<0.01	7.2	38.9	57.0		
82-83	<0.01	7.5	33.4	62.7		
83-84	0.01	8.5	36.8	57.8		
84-85	0.03	7.5	38.7	57.4		
85-86	0.03	7.4	39.1	56.8		
86-87	0.17	7.4	35.1	51.3		
87-88	0.01	5.3	35.9	56.7		
88-89	0.01	4.7	36.2	53.1		
89-90	<0.01	6.6	28.8	63.7		
5394-95	<0.01	7.5	43.5	48.7		
5396-97	<0.01	2.9	24.1	58.6		
97-98	0.02	8.0	36.2	56.3		

COMPLETION COREGRAPH



5406-07	0.02	4.3	34.9	53.4
07-08	<0.01	2.3	21.7	43.4
08-09	<0.01	2.5	20.0	32.0
09-10	<0.01	2.2	22.7	36.3
10-11	0.02	4.1	29.3	51.2
11-12	0.02	4.6	19.6	58.8
12-13	0.01	4.8	18.7	56.3
13-14	<0.01	2.0	0.0	40.0
14-15	<0.01	4.1	17.1	61.1
5941-42	0.02	12.4	1.6	45.1
42-43	0.04	10.5	0.0	38.0
43-44	0.06	13.1	1.5	42.1
44-45	0.03	13.2	3.8	47.0
45-46	0.01	8.9	5.6	55.0
46-47	0.01	9.2	0.0	41.5
47-48	0.02	10.8	0.0	48.1
48-49	0.02	11.0	0.0	46.4
49-50	0.04	12.6	0.0	41.3
50-51	0.02	11.9	4.2	41.2
51-52	0.01	10.9	0.0	48.5
52-53	<0.01	9.4	5.3	61.6
5961-62	0.01	6.6	7.6	81.7
5963-64	<0.01	11.3	1.8	55.0
64-65	0.01	14.3	11.9	35.0
65-66	0.02	11.7	12.0	35.0
66-67	0.02	11.5	6.1	44.5
67-68	<0.01	5.5	9.1	78.2
68-69	0.02	11.7	4.3	40.1
69-70	0.02	12.0	7.5	36.6
70-71	0.01	10.9	11.0	32.1
71-72	<0.01	12.6	5.6	38.1
72-73	<0.01	10.1	8.9	30.7
73-74	0.01	10.0	5.0	43.0
74-75	0.02	10.6	0.0	46.2
75-76	0.02	11.8	4.2	33.9
76-77	0.03	11.8	7.6	24.6
77-78	0.04	14.1	6.4	31.1
78-79	0.04	13.1	9.7	27.6
79-80	0.06	13.6	8.8	29.4
80-81	0.44	13.0	6.9	33.8
81-82	0.02	11.3	10.6	38.1
82-83	<0.01	14.1	6.4	36.9
83-84	0.01	7.5	0.0	77.4



4	82-83	<0.01	14.1	6.4	36.9
5	83-84	0.01	7.5	0.0	77.4
6	84-85	0.01	7.5	2.8	78.9
7	85-86	0.01	4.5	0.0	85.0
8	86-87	<0.01	4.9	10.2	79.6
9	87-88	0.01	5.8	12.1	81.1
10	88-89	0.04	5.2	13.5	73.0
11	89-90	0.02	5.7	13.5	72.0
12	90-91	0.02	6.2	8.1	82.3
13	91-92	0.01	6.7	7.5	71.7
14	92-93	0.01	5.3	3.8	86.7
15	93-94	0.01	4.6	0.0	93.5
16	94-95	0.01	7.3	0.0	87.7
17	95-96	0.02	8.7	2.3	72.4
18	96-97	0.02	6.7	0.0	79.1
19	97-98	0.02	8.6	2.3	77.8
20	98-99	0.02	8.0	2.5	75.1
21	99-00	0.02	8.1	0.0	74.2
22	6000-01	0.02	7.5	2.7	78.7
23	01-02	0.01	8.5	0.0	76.8
24	02-03	0.01	6.5	0.0	87.6
25	03-04	*	6.8	72.0	22.1
26	04-05	0.13	10.0	0.0	47.0
27	05-06	0.05	11.7	0.0	39.3
28	06-07	0.02	10.0	0.0	41.0
29	07-08	0.04	12.2	0.0	41.0
30	08-09	0.07	10.7	0.0	43.9
31	09-10	0.04	6.9	0.0	29.0
32	10-10½	0.08	9.7	0.0	52.6
33	6020-21	0.05	5.6	0.0	53.6
34	21-22	0.06	7.5	0.0	62.7
35	22-23	0.07	6.1	3.3	55.7
36	6032-33	0.02	4.4	15.9	65.9
37	33-34	<0.01	4.1	12.2	70.7
38	6035-36	0.04	6.3	58.7	38.1
39	6039-40	0.01	4.4	11.3	72.7
40	40-41	0.01	4.8	10.4	73.0
41	6049-50	0.02	10.1	11.9	75.2

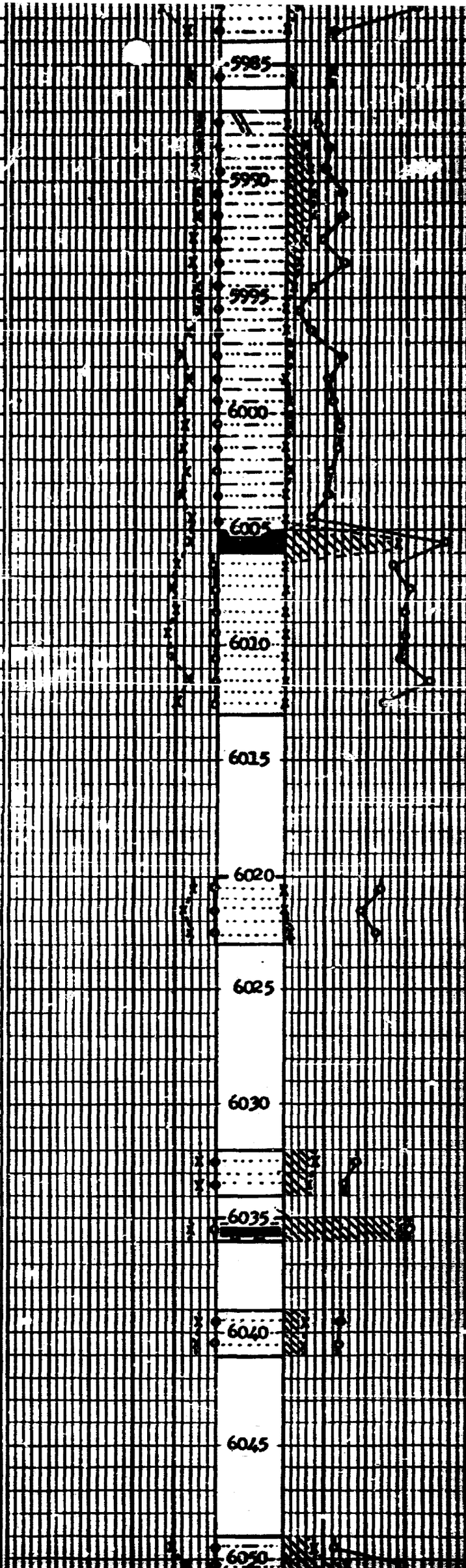


EXHIBIT NO. 9

Company: Benson-Montin-Greer Drilling Corp. Well Now: Amoco Production Co.
Well: Ginther No. 1 Ginther No. 1

Basin Dakota Field
NENE, Section 13, Township 27 North, Range 13 West
San Juan County, New Mexico

DAKOTA FORMATION CORE DATA
(Only Perforated Zones Chosen)

Depth (ft)	Sample Footage (ft)	Permeability (md)
5914-5915	1	0.02
5915-5916	1	0.03
5916-5917	1	<0.01
5917-5918	1	0.61
5918-5919	1	0.92
5919-5920	1	<0.01
5920-5921	1	0.01
5921-5922	1	0.01
5922-5923	1	<0.01
5923-5924	1	<0.01
5924-5925	1	0.02
5925-5926	1	0.04
5926-5927	1	0.02
5927-5928	1	0.04
5928-5929	1	0.06
5929-5930	1	0.02
5930-5931	1	0.05
5931-5932	1	0.17
5932-5933	1	0.05
5933-5934	1	0.02
5934-5935	1	0.15
5935-5936	1	0.08
5936-5937	1	0.05
5937-5938	1	0.04
5938-5939	1	0.02
5939-5940	1	0.01
5940-5941	1	0.02
5941-5942	1	0.01
5942-5943	1	0.01
5943-5944	1	<0.01
5946-5947	1	<0.01
5987-5988	1	0.14
5988-5989	1	0.10
5989-5990	1	0.11
5990-5991	1	0.08
5991-5992	1	0.19
5992-5993	1	0.22
5993-5994	1	0.25
5994-5995	1	0.32
5995-5996	1	0.23
5996-5997	1	0.05
5997-5998	1	0.19
5998-5999	1	0.12
	43	3.64

Average laboratory permeability = $\frac{3.64}{43}$ = 0.08 md

(This well is outside of the Westside Tight Gas

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
EXHIBIT NO. 9
CASE NO. 7515
Submitted by Meloy
Hearing Date 3-16-82

CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

COMPANY BENSON - MONTIN - GREER
WELL NO.1 GUNTHER
FIELD KUTZ
COUNTY SAN JUAN STATE NEW MEX.
LOCATION NE NE SEC. 13 T27N R13W

DATE ON 4/21/59
DATE OFF 4/25/59
FORMATION DAKOTA
DRLG. FLD.
REMARKS SAMPLED BY CLI ENGINEER AS DIRECTED AND SAMPLED BY CLIENT

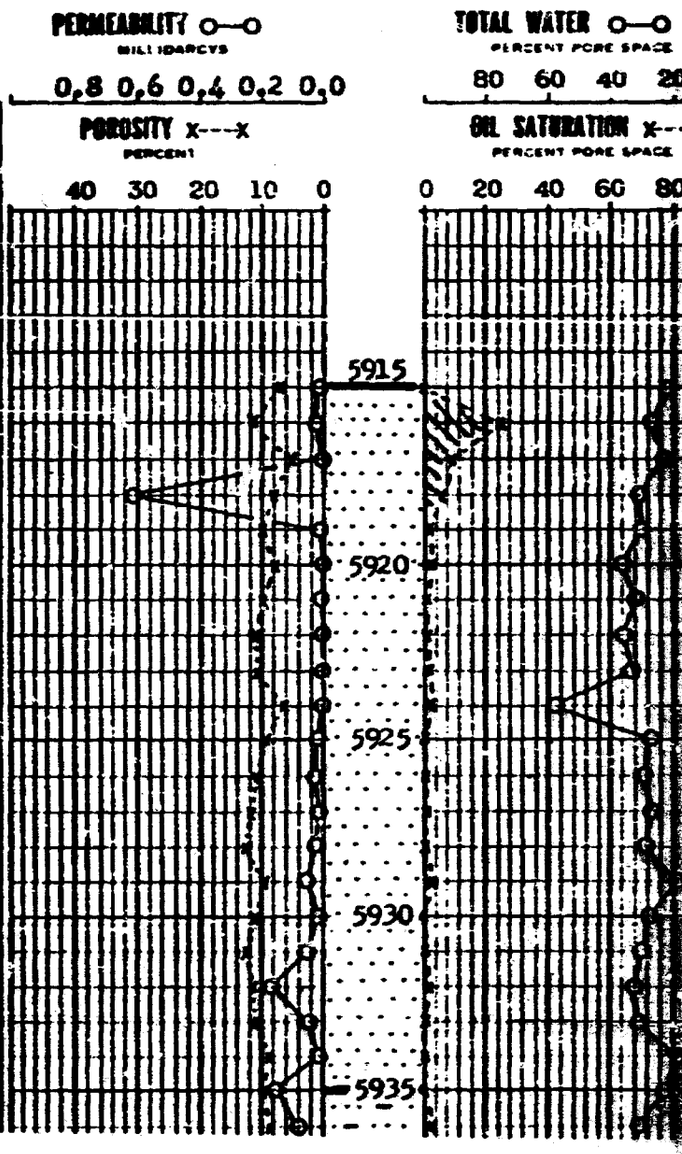
FILE NO. RP-3-975
ENGRS. CLIFFORD
ELEV. 5828' DF
CORES DIAMOND

SAND LIMESTONE CONGLOMERATE CHERT
SHALE DOLOMITE

TABULAR DATA and INTERPRETATION

SAMPLE NUMBER	DEPTH FEET	PERM MD.	POROSITY %	RESIDUAL SATURATION % PORE SPACE OIL	RESIDUAL SATURATION % PORE SPACE TOTAL WATER	*	PROD
1	5915	0.02	6.4	0.0	21.9		
2	16	0.03	11.4	27.2	27.2		
3	17	<0.01	5.1	9.8	23.5		
4	18	0.61	7.7	6.5	31.3		
5	19	0.02	9.8	2.0	31.7		
6	20	<0.01	7.8	2.6	35.9		
7	21	0.01	9.8	2.0	31.7		
8	22	0.01	10.6	1.9	34.9		
9	23	<0.01	10.4	1.9	33.7		
10	24	<0.01	6.5	3.1	57.0		
11	25	0.02	8.9	0.0	27.0		
12	26	0.04	10.1	0.0	28.7		
13	27	0.02	11.6	0.0	26.7		
14	28	0.04	12.5	0.0	28.1		
15	29	0.06	9.7	2.1	19.6		
16	30	0.02	10.5	0.0	27.6		
17	31	0.05	12.2	0.0	28.7		
18	32	0.17	11.7	1.7	31.7		
19	33	0.05	10.7	0.0	30.8		
20	34	0.02	8.3	0.0	19.3		
21	35	0.15	9.5	0.0	23.2		
22	35-36	0.08	8.0	2.5	30.0		

COMPLETION COREGRAPH



21	0.01	9.8	2.0	31.7
22	0.01	10.6	1.9	34.8
23	<0.01	10.4	1.9	35.7
24	<0.01	6.5	3.1	57.0
25	0.02	8.9	0.0	27.0
26	0.04	10.1	0.0	28.7
27	0.02	11.6	0.0	26.7
28	0.04	12.5	0.0	28.1
29	0.06	9.7	2.1	19.6
30	0.02	10.5	0.9	27.6
31	0.05	12.2	0.0	28.7
32	0.17	11.7	1.7	31.7
33	0.05	10.7	0.0	30.8
34	0.02	8.3	0.0	19.3
35	0.15	9.5	0.0	23.2
35-36	0.08	8.0	2.5	30.0
36-37	0.05	11.3	1.8	34.5
37-38	0.04	6.2	8.1	45.2
38-39	0.02	6.5	3.1	61.5
39-40	0.01	9.4	2.1	51.1
40-41	0.02	8.2	2.4	42.7
41-42	0.01	10.9	0.0	40.4
42-43	0.01	9.4	2.1	42.6
43-44	<0.01	6.6	3.0	75.7
5946-47	<0.01	6.0	8.3	76.9
5987	0.14	13.3	3.8	39.8
88	0.10	12.0	4.2	35.0
89	0.11	11.9	1.7	33.6
90	0.08	11.5	1.7	40.9
91	0.19	12.3	0.0	37.4
92	0.22	14.1	1.4	39.0
93	0.25	14.7	1.4	38.8
94	0.32	14.6	1.4	36.3
95	0.23	10.9	1.8	34.0
96	0.05	9.1	2.2	36.3
97	0.19	11.7	1.7	34.2
5998	0.12	12.8	1.6	35.9

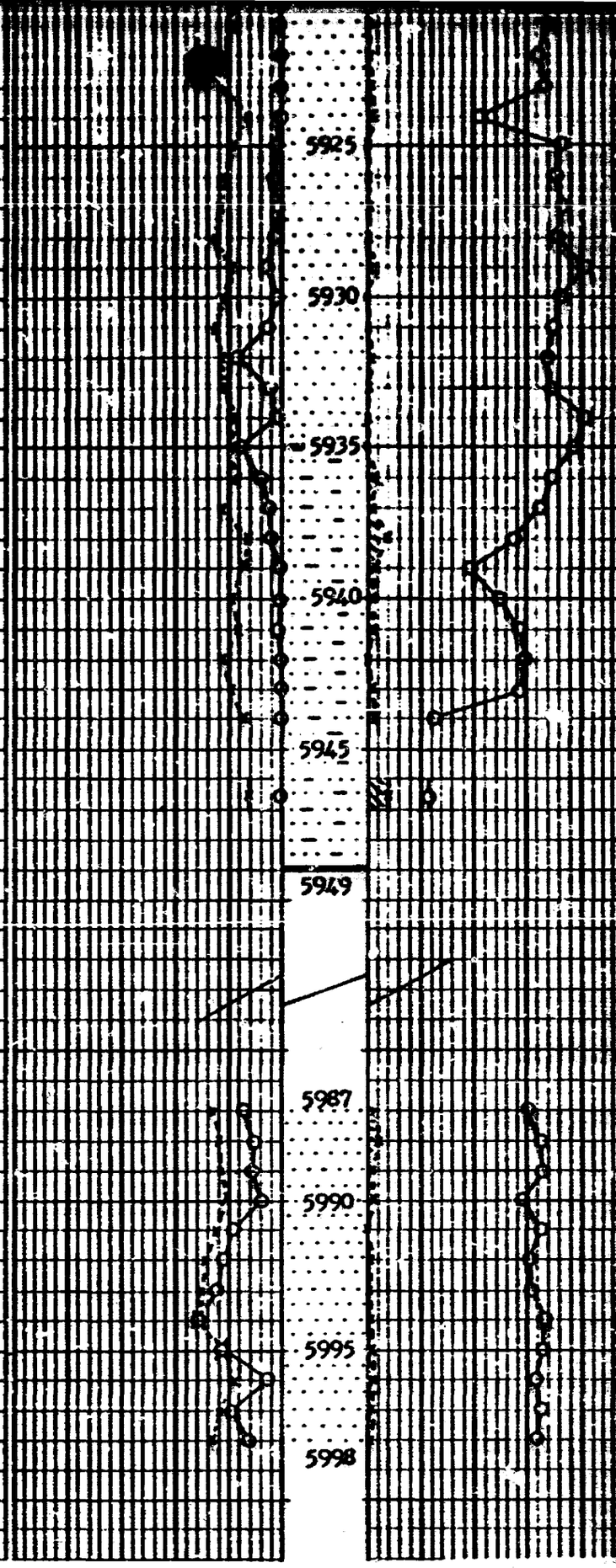


EXHIBIT NO. 10

Company: Benson-Montin-Greer
Well: Fullerton No. 2

Basin Dakota Field
SESE, Section 28, Township 28 North, Range 13 West
San Juan County, New Mexico

DAKOTA FORMATION CORE DATA
(Only Perforated Zones Chosen)

Depth (ft)	Sample Footage (ft)	Permeability (md)
6113-6114	1	0.06
6114-6115	1	0.04
6115-6116	1	0.14
6116-6117	1	0.38
6117-6118	1	0.05
6118-6119	1	0.03
6119-6120	1	0.02
6152-6153	1	0.25
6153-6154	1	0.26
6159-6160	1	0.01
6160-6161	1	0.01
6161-6162	1	0.01
	12	1.26

Average laboratory permeability = $\frac{1.26}{12}$ ~ 0.11 md

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Four Corners EXHIBIT NO. 10
CASE NO. 7515
Submitted by Melord
Hearing Date 3-16-82

CORE LABORATORIES, INC. Petroleum Reservoir Engineering

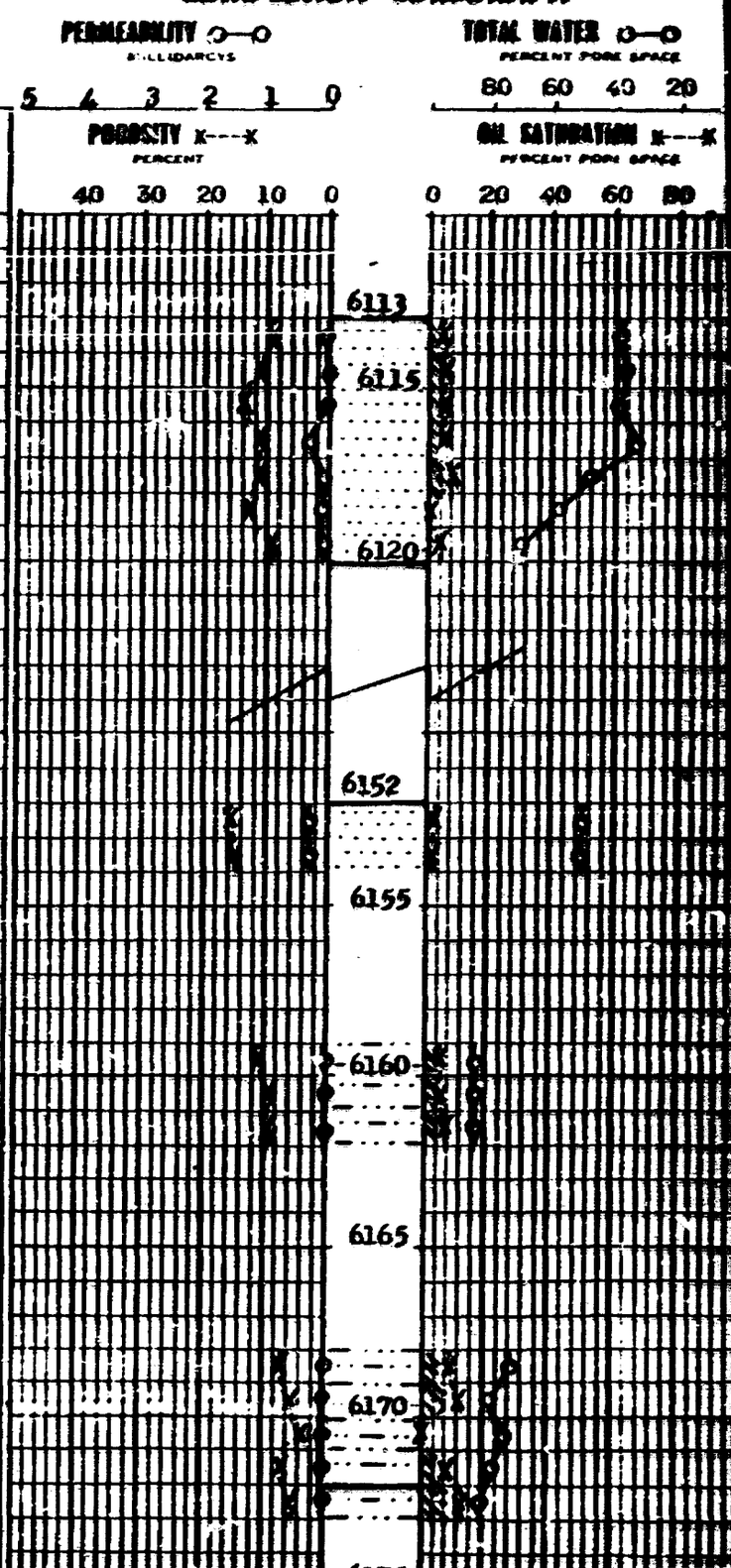
COMPANY BENSON - MONTIN - GREER | DATE ON 6/1/59 | FILE NO. RP-2-998
WELL No. 2 PULLIAM | DATE OFF 6/2/59 | ENGRS. ENGLISH
FIELD WILDCAT | FORMATION DAKOTA | ELEV. 5912' KB
COUNTY SAN JUAN | STATE NEW MEX. | DRLG. FLD. OIL EMBLEIGH | CORES DIAMOND
LOCATION SEC 28-29N-13W | REMARKS SAMPLED BY CLIENT

SAND | LIMESTONE | CONGLOMERATE | CHERT
SHALE | DOLOMITE | VERTICAL FRACTURES | COAL

TABULAR DATA and INTERPRETATION

DEPTH FEET	PERM MD.	POROSITY %	RESIDUAL SATURATION % PORE SPACE OIL	RESIDUAL SATURATION % PORE SPACE TOTAL WATER		PROD
SCRIBED FROM SAMPLES ONLY.						
** DENOTES BROKEN FLUID.						
6113-14	0.06	9.5	5.3	36.6		
14-15	0.06	10.4	6.7	37.5		
15-16	0.14	11.8	5.9	39.8		
16-17	0.38	10.8	6.5	34.2		
17-18	0.05	10.2	8.8	48.0		
18-19	0.03	11.3	1.8	57.5		
6119-20	0.02	9.4	5.3	70.4		
6152-53	0.25	15.8	1.3	45.6		
53-54	0.26	14.2	1.4	50.6		
6159-60	0.01	10.6	4.7	82.1		
60-61	0.01	9.1	5.5	82.4		
6161-62	0.01	9.7	7.2	83.6		
6168-69	<0.01	6.1	11.4	70.3		
69-70	0.01	5.0	14.0	78.0		
70-71	0.01	3.1	0.0	64.6		
6171-72	0.01	6.1	8.2	77.0		
6173	0.01	5.6	12.5	80.1		

COMPLETION COREGRAPH



[illegible]-69	<0.01	6.1	11.4	70.3
69-70	0.01	5.0	14.0	78.0
70-71	0.01	3.1	0.0	64.6
6171-72	0.01	6.1	8.2	77.0
6173	0.01	5.6	12.5	80.1
6176	0.01	7.3	12.3	75.4
77	0.02	8.2	8.4	78.1
78	0.01	10.0	7.0	76.0
79	0.04	11.8	4.2	78.1
80	<0.01	9.5	5.3	74.8
81	<0.01	5.9	11.9	76.2
6183	0.01	6.3	11.1	74.7
84	0.01	4.6	0.0	71.8
85	0.02	7.1	7.0	73.4
86	0.04	6.0	15.0	71.6
87	0.02	6.1	14.8	73.7
88	0.01	5.7	12.3	75.5
89	<0.01	5.9	15.3	72.9
90	<0.01	6.0	8.3	80.0
91	0.02	6.3	11.1	77.7
6193	0.02	11.4	4.4	72.8
6193½	0.16	10.5	0.0	55.2
6194-95	0.04	11.8	3.4	63.8
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6196-97	0.02	8.4	5.9	55.9
97-98	0.17	9.9	5.0	69.7
98-99	0.02	10.0	5.0	67.0
99-6200	0.14	8.2	8.5	73.4
6200-01	0.02	5.7	15.8	70.2
01-02	**	12.2	81.1	13.9
02-03	0.01	3.7	13.5	78.3
03-04	<0.01	5.8	8.6	84.5
04-05	0.01	5.4	9.3	83.5
05-06	0.01	4.7	10.6	83.1
06-07	0.05	5.1	9.8	82.3
07-08	0.02	5.4	9.3	85.2
08-09	0.09	3.3	0.0	87.9
6211-12	<0.01	4.2	11.9	83.6
6214-15	0.29	10.8	82.4	13.0
6218-19	0.05	13.0	81.6	12.3
6220-21	0.08	7.9	6.3	82.2

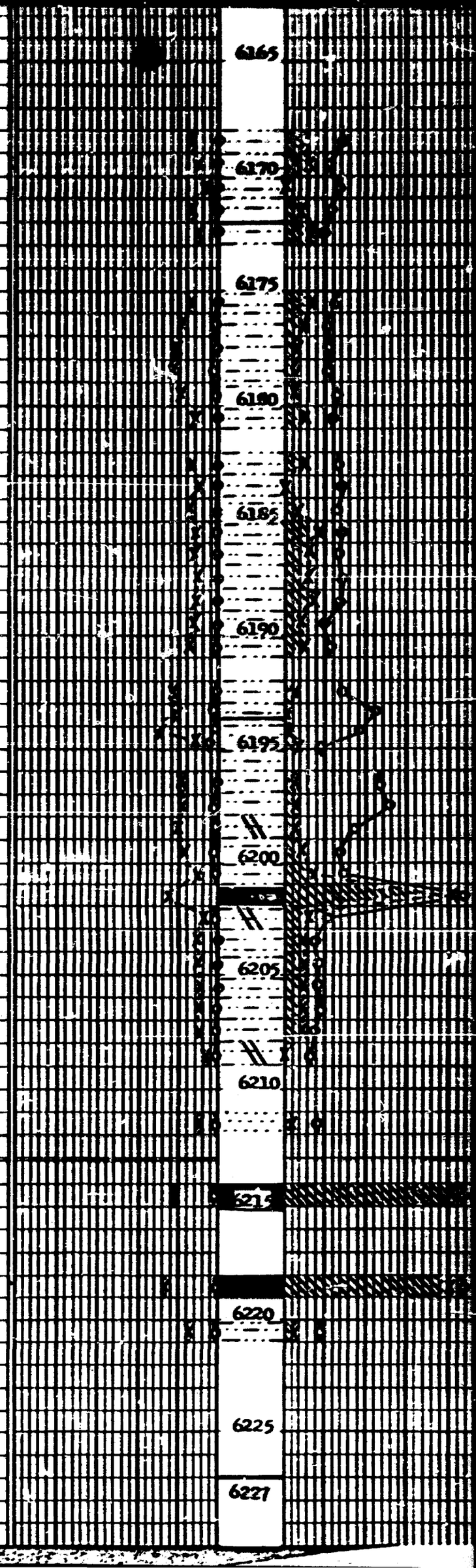


EXHIBIT NO. 11

Company: Benson-Montin-Greer Drilling Corp. Well Now: Amoco Production Company
Well: Fullerton No. 1 Fullerton No. 1

Basin Dakota Field
NW/NE, Section 34, Township 28 North, Range 13 West
San Juan County, New Mexico

DAKOTA FORMATION CORE DATA
(Only Perforated Zones Chosen)

Depth (ft)	Sample Footage (ft)	Permeability (md)
6186-6187	1	<0.01
6187-6188	1	0.07
6188-6189	1	0.08
6189-6190	1	0.07
6190-6191	1	0.12
6193-6194	1	0.08
6195-6196	1	0.02
6225-6226	1	0.01
6228-6229	1	<0.01
6230-6231	1	0.04
6251-6252	1	0.01
6252-6253	1	0.01
6253-6254	1	0.17
6256-6257	1	<0.01
6257-6258	1	0.13
6258-6259	1	0.04
6259-6260	1	0.23
6260-6261	1	0.03
6261-6262	1	0.10
6262-6263	1	0.03
6263-6264	1	0.03
6264-6265	1	0.06
6265-6266	1	0.07
	23	1.43

Average laboratory permeability = $\frac{1.43}{23}$ = 0.06 md

(This well is outside of the Westside Tight Gas Area.)

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Four Corners EXHIBIT NO. 11
CASE NO. 7515
Submitted by McCord
Hearing Date 3-16-82

CORE LABORATORIES, INC. CORE LAB *Petroleum Reservoir Engineering*

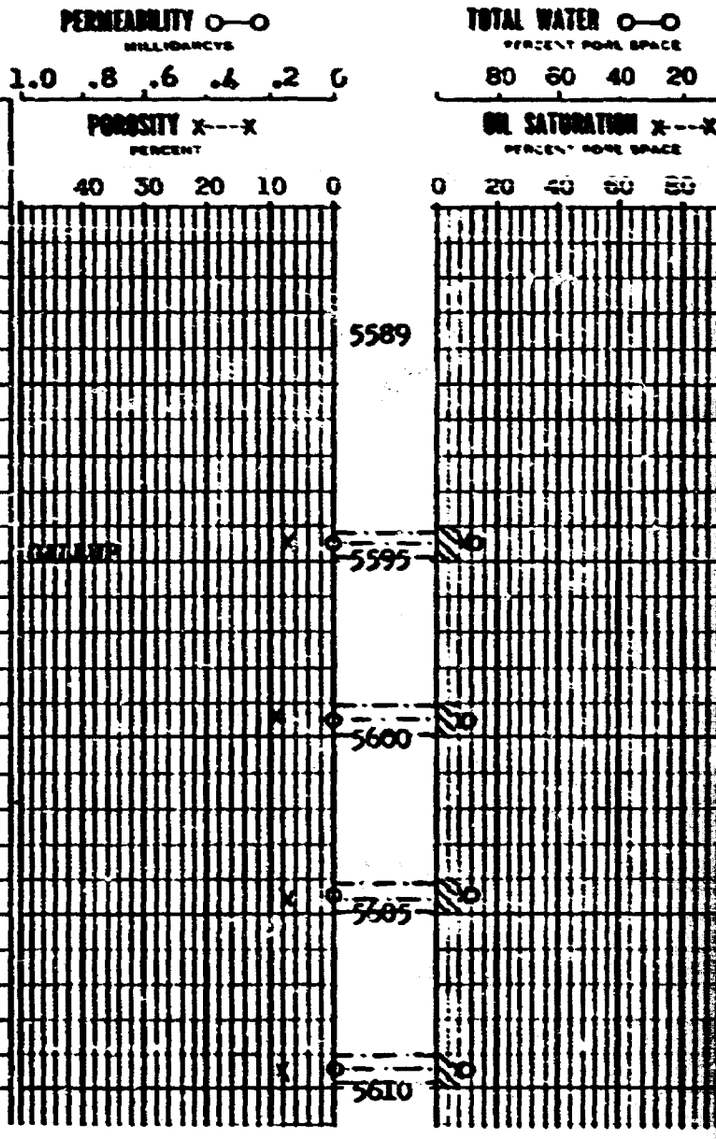
COMPANY	BENSON - MONTIN - GREER	DATE ON	5/8/59	FILE NO.	RP-3-982
WELL	NO.1 FULLERTON	DATE OFF	5/15/59	ENGRS.	CLIFFORD
FIELD	WILDCAT	FORMATION	AS NOTED	ELEV.	6021' KB
COUNTY	SAN JUAN STATE NEW MEX.	DRLG. FLD.	OIL BASE MUD	CORES	DIAMOND
LOCATION	NE NE SEC 34 - T28N - R13W	REMARKS	SAMPLED BY CLIENT		

SAND LIMESTONE CONGLOMERATE CHERT
SHALE DOLOMITE VERTICAL FRACTURE

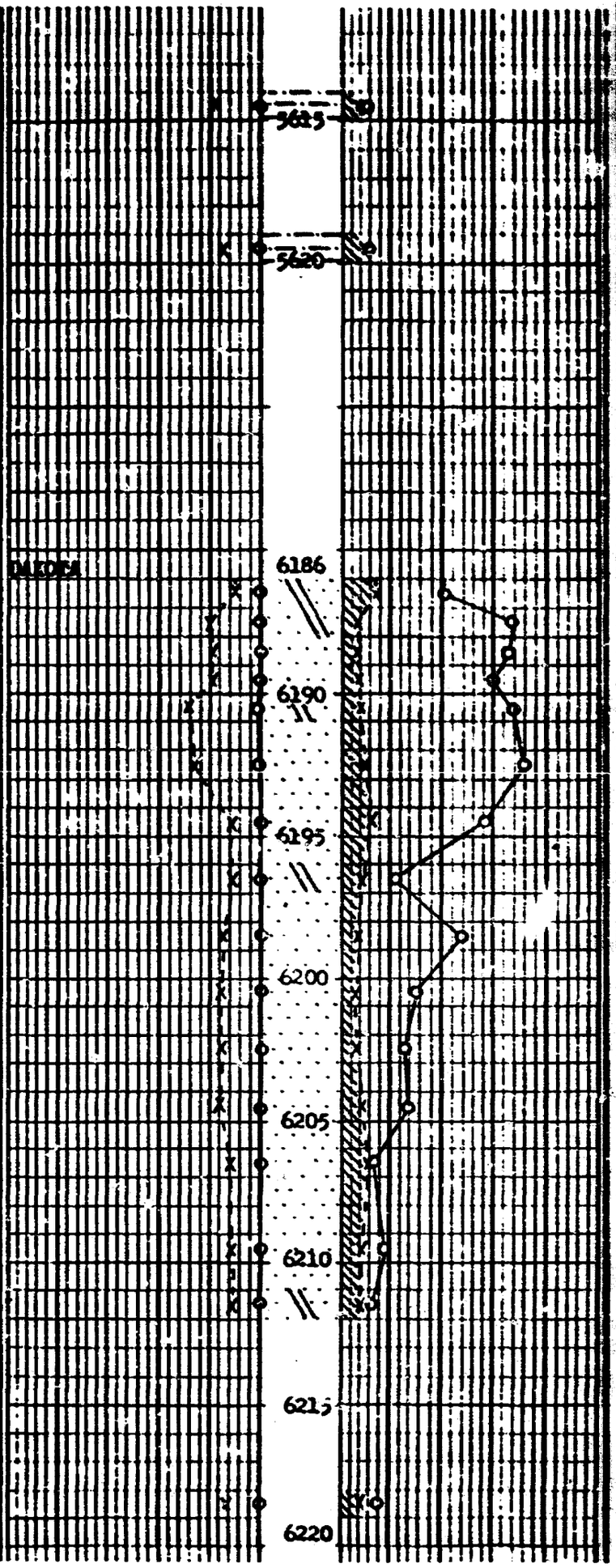
TABULAR DATA and INTERPRETATION

SAMPLE NUMBER	DEPTH FEET	PERM. MD.	POROSITY %	RESIDUAL SATURATION % PORE SPACE OIL	RESIDUAL SATURATION % PORE SPACE TOTAL WATER	-	PROD
	LOGGED FROM SAMPLES ONLY						
1	5595	<0.01	6.8	10.3	88.2		
2	5600	<0.01	8.5	8.3	90.6		
3	5605	<0.01	7.0	10.0	88.7		
4	5610	<0.01	8.0	8.8	90.2		

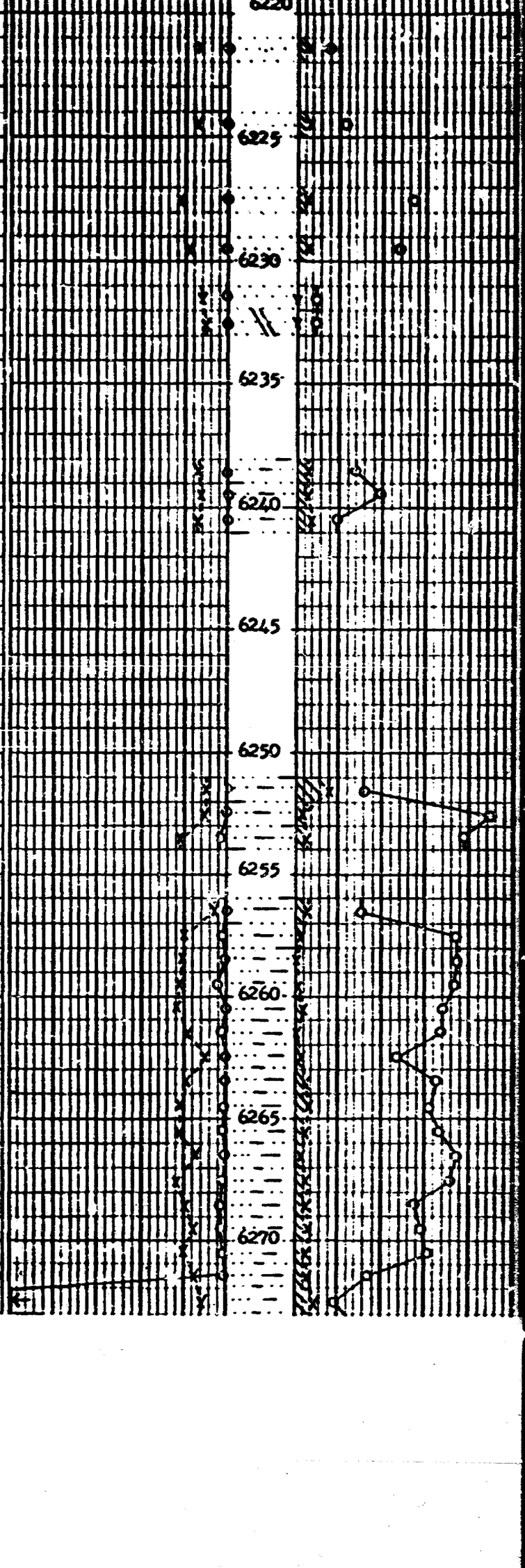
COMPLETION COREGRAPH



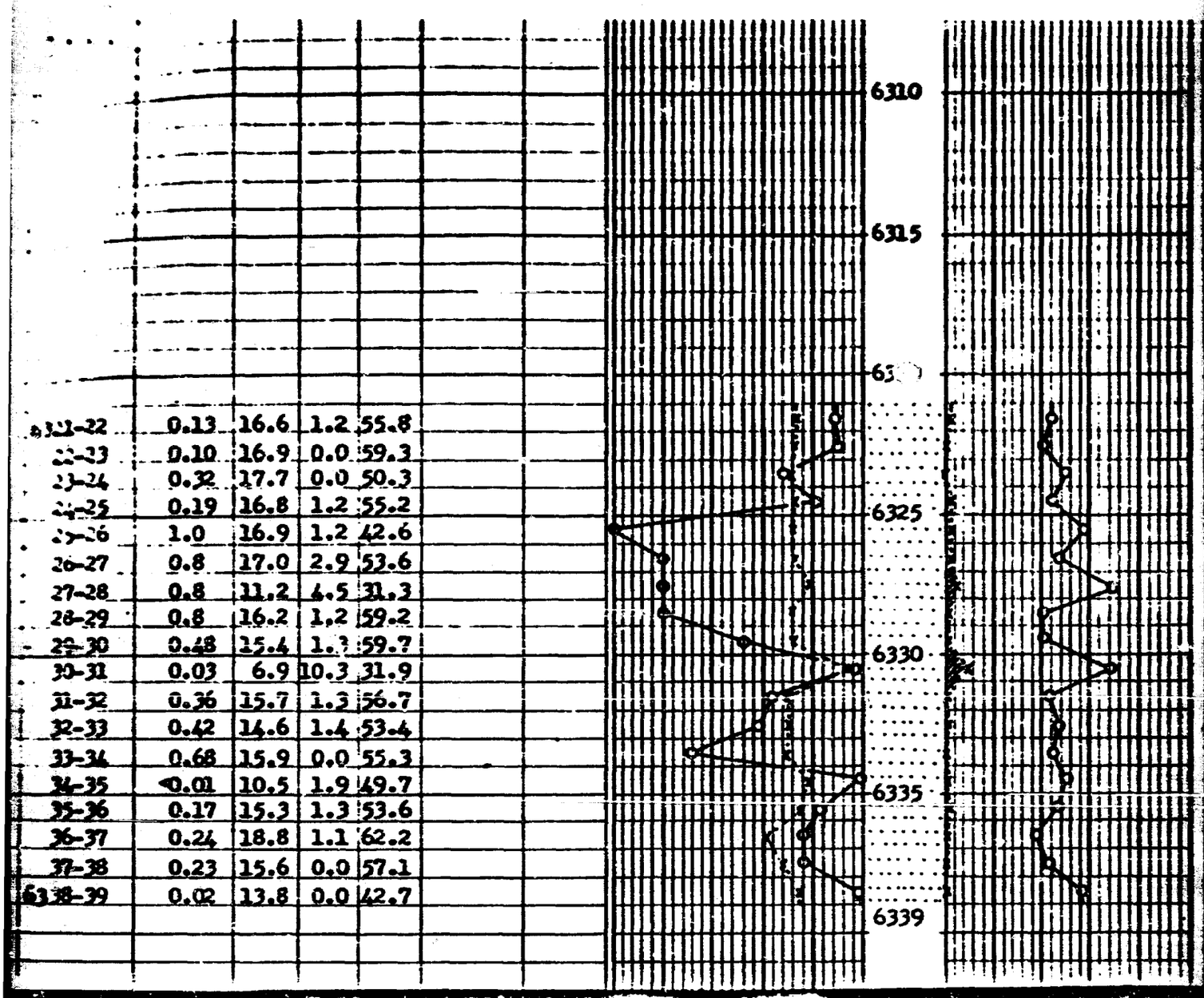
5615	0.06	8.9	7.9	91.1
5620	0.03	7.0	10.0	88.7
6186-87	<0.01	4.7	14.7	59.6
6188	0.07	10.0	7.0	33.0
89	0.08	9.7	7.2	34.0
90	0.07	9.7	7.2	40.2
91	0.12	14.7	8.8	36.1
6193	0.08	13.1	9.2	22.1
6195	0.02	5.6	12.5	43.0
6197	0.31	5.6	8.9	78.7
6199	<0.01	7.0	7.1	52.9
6201	<0.01	7.7	6.5	70.1
6203	0.01	7.8	6.4	74.4
6205	<0.01	8.0	8.8	72.5
6207	<0.01	6.1	11.5	86.9
6210	0.02	5.2	9.6	82.6
6212	0.01	5.8	8.6	86.1
6219	<0.01	6.5	7.7	84.8



6222	0.01	6.5	7.7	84.7
6225	0.01	7.2	6.9	77.9
6228	<0.01	11.4	4.4	46.5
6230	0.06	9.8	5.1	53.1
6232	0.01	6.0	0.0	90.0
6232½	<0.01	5.2	0.0	90.5
6238-39	0.03	10.4	6.7	72.1
39-40	0.01	7.7	6.5	61.1
40-41	0.01	10.0	7.0	81.0
6251-52	0.01	5.5	16.4	67.4
52-53	0.01	5.5	3.6	10.9
53-54	0.17	11.0	6.4	22.8
6256-57	<0.01	3.2	6.2	68.8
57-58	0.13	10.1	2.0	26.7
58-59	0.04	10.2	0.0	25.5
59-60	0.23	11.2	1.8	27.7
60-61	0.03	11.9	4.2	32.8
61-62	0.10	9.5	0.0	33.7
62-63	0.03	6.9	2.9	53.8
63-64	0.03	9.9	5.1	35.4
64-65	0.06	11.5	6.1	38.3
65-66	0.07	11.3	4.4	33.5
66-67	0.03	7.8	2.6	25.7
67-68	0.08	12.1	4.1	33.1
68-69	0.17	10.0	5.0	45.0
69-70	0.12	7.9	6.3	41.8
70-71	0.07	10.3	4.9	38.9
71-72	0.06	7.8	6.4	66.5
72-73	1.3	5.5	9.1	81.9



67-68	0.08	12.1	4.1	33.1
68-69	0.17	10.0	5.0	45.0
69-70	0.12	7.9	6.3	41.8
70-71	0.07	10.3	4.9	38.9
71-72	0.06	7.8	6.4	66.5
72-73	1.3	5.5	9.1	81.9
73-74	0.16	7.0	7.1	71.4
74-75	0.15	7.7	6.5	66.3
75-76	0.08	9.2	5.4	56.4
76-77	0.04	5.7	8.8	49.2
75-76	<0.01	3.8	0.0	63.1
76-77	<0.01	1.9	26.1	52.5
77-78	0.02	2.3	8.7	56.5
78-79	<0.01	0.9	22.4	66.7
79-80	0.06	7.1	7.1	81.6
6280-81	0.02	9.1	7.7	73.8



6321-22	0.13	16.6	1.2	55.8
22-23	0.10	16.9	0.0	59.3
23-24	0.32	17.7	0.0	50.3
24-25	0.19	16.8	1.2	55.2
25-26	1.0	16.9	1.2	42.6
26-27	0.8	17.0	2.9	53.6
27-28	0.8	11.2	4.5	31.3
28-29	0.8	16.2	1.2	59.2
29-30	0.48	15.4	1.3	59.7
30-31	0.03	6.9	10.3	31.9
31-32	0.36	15.7	1.3	56.7
32-33	0.42	14.6	1.4	53.4
33-34	0.68	15.9	0.0	55.3
34-35	<0.01	10.5	1.9	49.7
35-36	0.17	15.3	1.3	53.6
36-37	0.24	18.8	1.1	62.2
37-38	0.23	15.6	0.0	57.1
6338-39	0.02	13.8	0.0	42.7

EXHIBIT NO. 12

Company: SunRay Mid-Continent Oil
Well: New Mexico Federal I-2

Well Now: Dugan Production Corp.
New Mexico Federal I-2

Basin Dakota Field
NENE, Section 1, Township 29 North, Range 14 West
San Juan County, New Mexico

DAKOTA FORMATION CORE DATA
(Only Perforated Zones Chosen)

Depth (ft)	Sample Footage (ft)	Permeability (md)
5942-5943	1	0.32
5943-5944	1	0.02
5944-5945	1	0.01
5945-5946	1	0.02
5946-5947	1	0.02
5947-5948	1	0.04
5948-5949	1	0.10
5949-5950	1	0.08
5954-5955	1	0.33
5955-5956	1	0.17
5956-5957	1	0.16
5957-5958	1	0.06
5958-5959	1	0.05
5959-5960	1	0.02
5960-5961	1	0.01
5961-5962	1	0.06
5962-5963	1	0.03
5963-5964	1	0.02
5968-5969	1	0.06
5969-5970	1	0.05
5970-5971	1	0.05
5971-5972	1	0.05
5972-5973	1	0.06
5973-5974	1	0.04
5974-5975	1	0.04
5975-5976	1	0.02
5976-5977	1	0.12
5977-5978	1	0.05
5978-5979	1	0.04
5979-5980	1	0.02
5980-5981	1	0.05
5981-5982	1	0.03
5982-5983	1	0.06
5983-5984	1	0.12
5984-5985	1	0.07
5985-5986	1	0.07
5986-5987	1	0.06
5987-5988	1	0.09
5988-5989	1	0.12
5989-5990	1	0.18
5990-5991	1	0.02
	41	2.99

Average laboratory permeability = $\frac{2.99}{41}$ = 0.07 md

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Four Corners EXHIBIT NO. 12
CASE NO. 7515
Submitted by Nelord
Hearing Date 3-16-82

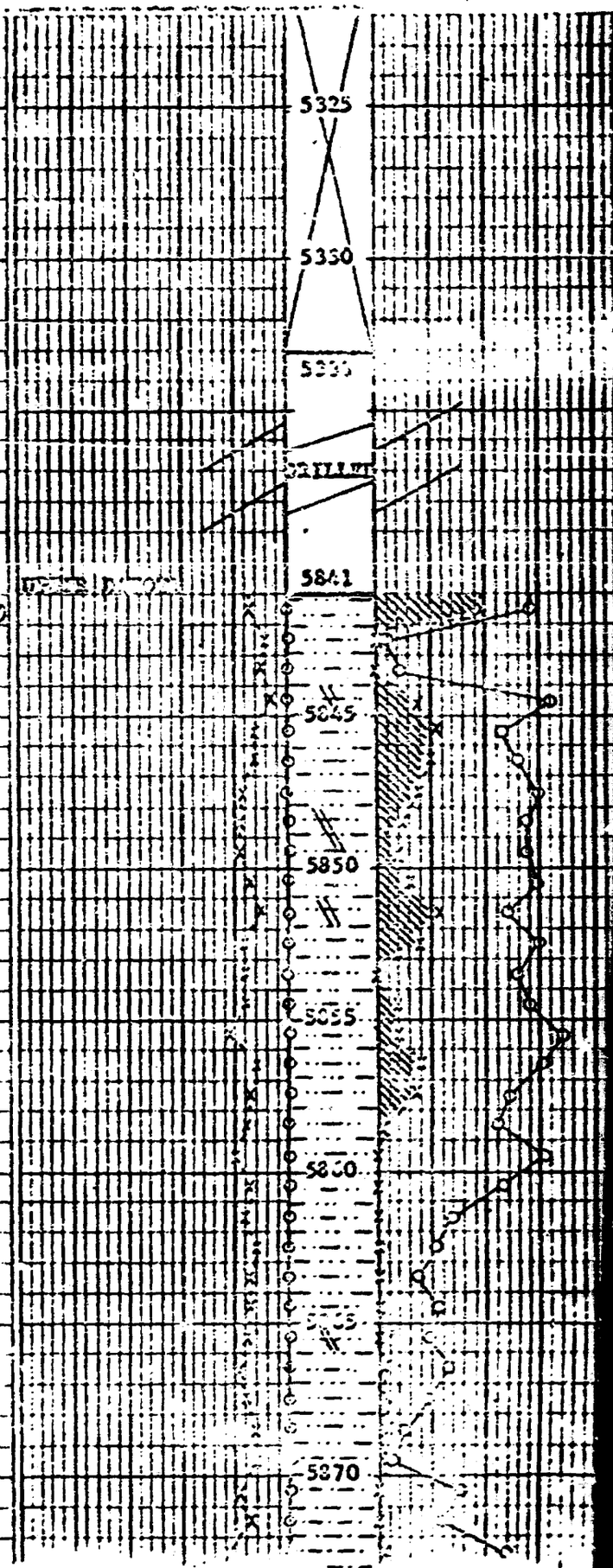
CORE LABORATORIES, INC. *Petroleum Reservoir Engineering*

COMPANY	SUNRAY MID-CONTINENT OIL COMPANY	DATE ON	3/29/58
WELL	NO. 2 NEW MEXICO FEDERAL "I"	DATE OFF	4/6/58
FIELD	WILDCAT	FORMATION	AS NOTED
COUNTY	SAN JUAN	STATE	NEW MEX.
LOCATION	SEC. 1-T29N-R	29-14 - I MENE	

FILE NO	RP-3-734		
ENGRS.	WJC		
ELEV.	5550' GL		
DRLG. FLD	WATER BASE MUD	CORES	DIAMOND
SAMPLED BY	REPRESENTATIVE OF COMPANY		

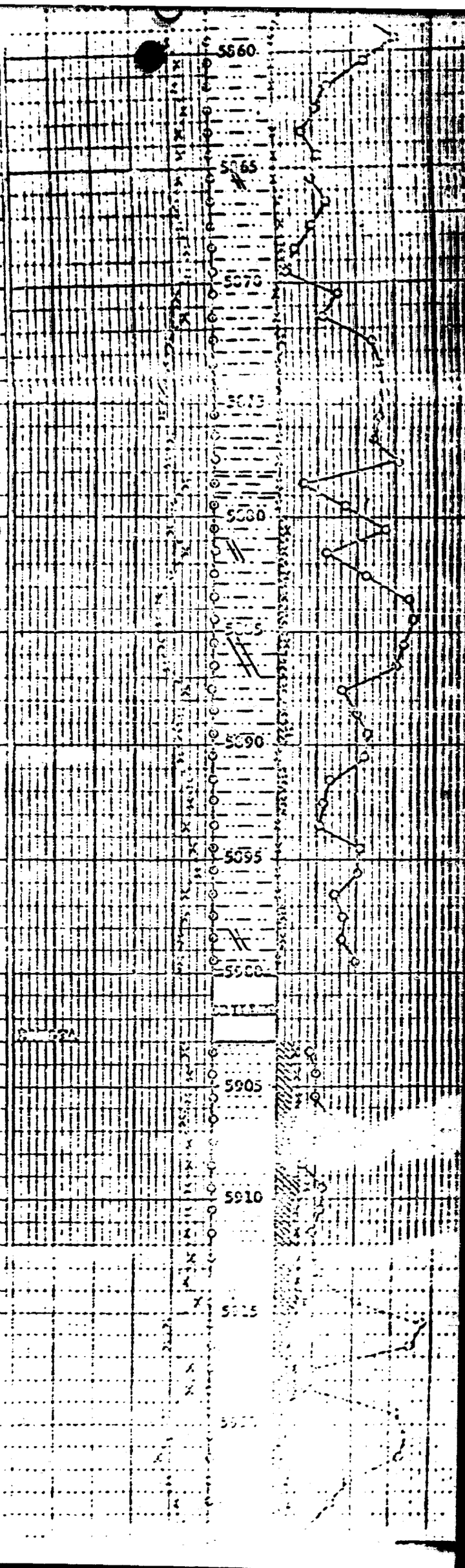
SAND · LIMESTONE · CONGLOMERATE · CEMENT · SHALE · DOLOMITE · FRACTURES

6	5041-42	0.12	7.2	39.0	44.5	
7	42-43	0.02	3.9	0.0	97.5	
8	43-44	<0.01	5.0	0.0	92.0	
9	44-45	<0.01	3.3	15.2	36.4	
10	45-46	0.02	6.5	21.6	53.9	
11	46-47	0.08	6.4	20.3	48.5	
12	47-48	0.01	7.8	15.4	39.8	
13	48-49	<0.01	8.7	10.3	44.9	
	49-50	<0.01	8.6	8.2	45.3	
15	50-51	<0.01	7.5	12.0	41.3	
16	51-52	<0.01	5.2	23.1	52.0	
17	52-53	<0.01	8.2	14.6	40.1	
18	53-54	<0.01	8.0	0.0	48.8	
19	54-55	<0.01	8.2	6.5	42.7	
20	55-56	<0.01	10.9	8.3	32.1	
21	56-57	<0.01	6.1	14.8	39.4	
22	57-58	<0.01	6.6	13.6	51.5	
23	58-59	0.01	7.9	2.5	57.1	
24	59-60	0.04	10.0	0.0	39.0	
25	60-61	<0.01	7.0	0.0	54.2	
26	61-62	<0.01	7.9	0.0	72.2	
27	62-63	<0.01	6.1	0.0	78.6	
28	63-64	<0.01	6.6	0.0	84.9	
	64-65	<0.01	7.2	0.0	77.8	
30	65-66	<0.01	7.9	0.0	81.1	
31	66-67	0.01	8.6	2.3	74.6	
32	67-68	0.02	8.5	2.4	81.2	
33	68-69	<0.01	5.9	3.4	90.0	
34	69-70	<0.01	5.7	3.5	84.0	
	70-71	0.01	8.7	0.0	69.0	
36	71-72	<0.01	7.1	0.0	77.5	

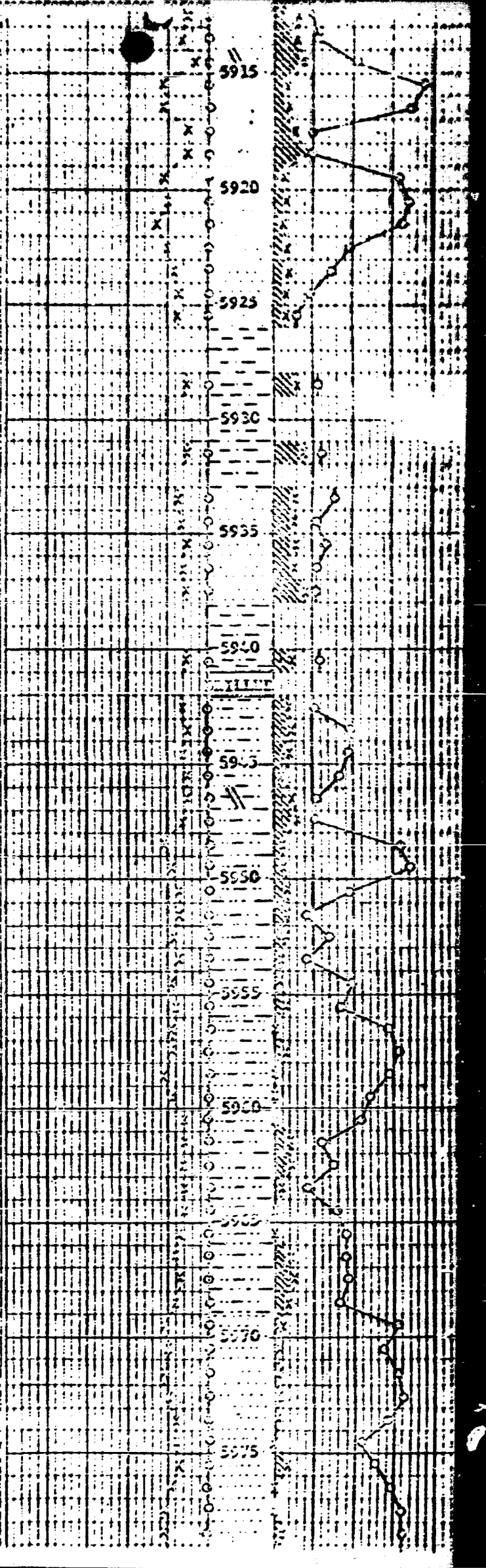


	58-59	0.01	7.8	2.5	57.
	59-60	0.04	10.0	0.0	3
	60-61	<0.01	7.0	0.0	54.2
	61-62	<0.01	7.9	0.0	72.2
	62-63	<0.01	6.1	0.0	78.6
	63-64	<0.01	6.6	0.0	84.9
	64-65	<0.01	7.2	0.0	77.6
	65-66	<0.01	7.9	0.0	81.1
	66-67	0.01	8.6	2.3	74.4
	67-68	0.02	8.5	2.4	81.2
	68-69	<0.01	5.9	3.4	90.0
	69-70	<0.01	5.7	3.5	84.8
	70-71	0.01	8.7	0.0	69.0
	71-72	<0.01	7.1	0.0	77.5
	72-73	0.03	11.4	1.8	51.9
	[illegible]	[illegible]	12.9	0.0	40.4
	[illegible]	[illegible]	13.2	0.0	47.0
	75-76	0.04	12.9	0.0	40.9
	76-77	0.03	10.9	0.0	52.3
	77-78	0.02	12.2	0.0	39.3
	78-79	0.01	7.1	0.0	87.5
	79-80	0.02	9.2	0.0	65.9
	80-81	0.02	10.7	4.7	65.8
	81-82	0.01	7.2	2.8	76.5
	82-83	0.01	9.8	5.1	50.1
	83-84	0.02	14.1	3.5	32.0
	84-85	0.07	14.3	3.5	30.7
	85-86	0.03	13.4	3.7	36.5
	86-87	0.04	11.6	1.7	40.5
	87-88	0.01	7.8	2.7	66.7
	88-89	0.01	7.6	2.6	60.5
	89-90	<0.01	8.7	5.7	55.1
	90-91	0.01	8.5	0.0	50.5
	91-92	<0.01	6.0	3.3	73.4
	92-93	<0.01	6.5	3.1	77.0
	93-94	<0.01	6.6	0.0	70.0
	94-95	<0.01	5.2	0.0	57.6
	95-96	<0.01	4.1	0.0	53.6
	96-97	0.01	6.9	0.0	71.0
	97-98	<0.01	7.4	2.7	67.5
	98-99	<0.01	7.8	2.6	66.8
	5899-00	0.01	7.9	0.0	60.6
	5903-04	<0.01	7.0	10.0	82.9
	04-05	0.0	6.2	11.3	80.0
	05-06	0.02	5.2	11.9	81.3
	06-07	0.0	6.8	10.3	73.5
	07-08	0.0	6.5	7.7	60.1
	08-09	<0.01	5.9	3.4	86.5
	09-10	0.0	5.6	16.1	75.0
	10-11	0.0	6.3	11.1	77.9
	11-12	<0.01	5.9	11.9	81.5
	12-13	0.06	5.6	12.7	80.0
	13-14	0.01	5.8	12.1	77.6
	14-15	0.07	3.1	16.1	58.9
	15-16	0.03	11.0	8.2	24.6
	16-17	0.04	10.7	6.4	30.8
	17-18	0.05	4.6	10.9	80.5
	18-19	<0.01	5.0	18.0	60.0
	19-20	<0.01	10.5	6.5	37.1
	20-21	0.07	10.2	6.9	32.3
	21-22	0.01	12.7	5.5	35.4
	22-23	0.0	10.1	6.9	61.4
	23-24	0.0	7.9	8.9	69.6
	[illegible]	0.07	7.0	7.2	81.3

4680



[illegible]	[illegible]	0.05	5.5	12.7	[illegible]
76.	13-14	0.01	5.8	12.1	[illegible]
76.	14-15	0.07	3.1	16.1	58.0
77.	15-16	0.03	11.0	8.2	24.6
78.	16-17	0.04	10.7	8.4	30.8
79.	17-18	0.05	4.5	10.9	80.5
80.	18-19	<0.01	5.0	18.0	80.9
81.	19-20	<0.01	10.8	6.5	32.1
82.	20-21	0.07	10.2	6.9	32.3
83.	21-22	0.01	12.7	5.5	35.4
84.	22-23	0.0	10.1	6.9	61.4
85.	23-24	0.0	7.9	8.9	69.0
	24-25	0.07	7.0	7.2	81.5
	5925-26	0.02	7.4	6.8	68.9
88.	5928-29	0.20	5.5	12.7	76.2
89.	5931-32	0.23	5.5	16.4	76.5
90.	5933-34	0.23	7.2	12.5	69.5
91.	34-35	0.04	6.0	11.7	78.4
92.	35-36	0.01	5.2	13.5	73.0
93.	36-37	0.02	6.4	10.9	78.2
	5937-38	0.01	5.4	16.7	77.6
95.	5940-41	0.04	4.9	10.2	77.5
96.	5942-43	0.32	6.1	8.2	76.7
97.	43-44	0.02	4.9	10.2	61.2
98.	44-45	0.01	5.6	8.9	62.5
99.	45-46	0.02	4.8	4.2	66.7
100.	46-47	0.02	5.2	9.6	79.0
101.	47-48	0.04	5.7	12.3	79.0
102.	48-49	0.10	11.1	4.5	30.0
103.	49-50	0.03	9.4	5.3	31.9
104.	50-51	0.04	7.2	7.0	62.5
105.	51-52	0.05	7.5	6.7	64.0
106.	52-53	0.05	8.2	6.1	72.0
107.	53-54	0.09	7.1	2.8	63.2
108.	54-55	0.33	8.9	2.3	60.7
109.	55-56	0.17	8.4	6.0	66.6
110.	56-57	0.16	9.0	0.0	43.4
111.	57-58	0.06	9.5	5.3	36.9
	58-59	0.05	11.1	0.0	42.4
[illegible]	59-60	0.02	8.9	0.0	51.6
114.	60-61	0.01	6.1	0.0	57.4
115.	61-62	0.06	5.9	8.5	76.2
116.	62-63	0.03	5.7	8.8	70.2
117.	63-64	0.02	5.8	3.5	62.8
[illegible]	64-65	0.05	5.8	0.0	69.0
119.	65-66	0.07	6.9	0.0	63.8
120.	66-67	0.10	8.2	8.6	64.6
121.	67-68	0.07	7.0	10.0	62.0
122.	68-69	0.06	7.6	6.6	67.2
123.	69-70	0.05	11.5	4.4	30.3
124.	70-71	0.05	9.8	2.0	44.9
125.	71-72	0.05	10.9	1.8	35.8
126.	72-73	0.03	10.1	2.0	35.7
127.	[illegible]	0.04	8.1	2.5	43.2
128.	[illegible]	0.04	7.7	0.0	55.7
129.	[illegible]	0.03	7.4	6.8	50.0
130.	[illegible]	0.12	9.5	0.0	41.1
131.	[illegible]	0.05	10.8	0.0	36.1
		0.04	11.1	4.5	35.2



[illegible]	0.06	5.9	8.5	76.[illegible]
[illegible]	0.03	5.7	8.8	70.[illegible]
[illegible]	0.02	5.8	3.[illegible]	82.8
[illegible]	0.05	5.8	0.0	69.0
[illegible]	[illegible]	6.9	0.0	63.8
[illegible]	[illegible]	8.3	8.6	64.6
[illegible]	0.07	7.0	10.0	62.8
65-66	0.06	7.6	6.6	67.2
[illegible]	0.05	11.5	4.4	35.3
70-71	0.05	9.8	2.0	44.9
71-72	0.03	10.9	1.0	35.0
72-73	0.06	10.1	2.0	34.7
73-74	0.04	8.1	2.3	43.2
74-75	0.04	7.7	6.0	55.7
75-76	0.02	7.4	6.8	50.0
76-77	0.12	9.5	0.0	41.1
77-78	0.05	10.8	0.0	36.1
78-79	0.04	11.1	4.5	35.2
79-80	0.02	9.2	0.0	35.9
80-81	0.05	9.4	0.0	33.0
81-82	0.03	10.2	4.9	32.4
82-83	0.06	9.9	2.0	29.3
83-84	0.12	10.8	4.6	27.8
84-85	0.07	10.2	6.9	25.5
85-86	0.07	9.0	0.0	32.3
86-87	0.06	9.5	2.1	32.7
87-88	0.09	11.5	1.7	20.1
88-89	0.12	10.4	0.0	23.9
[illegible]	0.12	9.7	0.0	27.8
90-91	0.02	7.7	6.5	50.6

5935

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5975

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5990

EXHIBIT NO. 13

Effect of Overburden Pressure and Water Saturation on Gas Permeability of Tight Sandstone Cores

Rex D. Thomas, SPE-AIME, U.S. Bureau of Mines
Don C. Ward, SPE-AIME, U.S. Bureau of Mines

Introduction

Research on the potential of nuclear explosions to stimulate gas production from low-permeability (tight) sandstone reservoirs is being conducted by the U.S. Bureau of Mines in cooperation with the Atomic Energy Commission. This report describes the part of that research that was conducted to establish correlation between permeability measured on dry cores at low external pressure (routine analysis) and permeability at reservoir conditions.

Cores used in this research were obtained from two Plowshare gas-stimulation projects. Project Gasbuggy cores from the Pictured Cliffs formation, Choza Mesa field, Rio Arriba County, N. M., can be described as very fine grained, slightly calcareous, well indurated sandstone. Project Wagon Wheel cores from the Fort Union formation, Pinedale field, Sublette County, Wyo., can be described as very fine grained, slightly calcareous, very well indurated sandstone.

Underground reservoirs are under considerable compressive stress as a result of the weight of overlying rocks (offset somewhat by internal-fluid pressure). The resultant net confining pressure or effective overburden pressure is referred to in this report simply as overburden pressure. The resulting effects on the physical properties of the reservoir rock have been studied.[1-3] Overburden pressure causes only a small decrease in porosity, which can usually be ignored.[3] This was confirmed for Project Gasbuggy and Project Wagon Wheel cores. A commercial laboratory found that the porosity of these cores is reduced by about 5 percent of the original porosity. The effect of overburden pressure on permeability, however, is appreciable and varies considerably for different reservoir rocks,[1-3] causing greater reductions in permeability for low-permeability rocks.[2,3] The effect of overburden pressure on relative permeability has been found to be small[4] or nonexistent.[5]

This report presents material that confirms and extends previous research findings on the effect that overburden pressure has upon the permeability of dry cores. Also presented are the results of research on the relative gas permeability of low-permeability cores under overburden pressure.

Apparatus and Procedure

Cylindrical cores 2.0 to 7.5 cm long and 2.5 cm in diameter were cut parallel to the bedding plane. After the cores were dried overnight in a vacuum oven (4.5 psia, 70°C), the gas (N_2) permeability of each core was measured in a Hassler cell. An external pressure of 100 psi over the inlet pressure was used to maintain a good seal between the rubber sleeve and the core.[6] Permeability was measured at inlet pressures of 45, 60, and 100 psia, with atmospheric pressure at the outlet. A bubble tube and timer were used to measure gas flow rate. Initial permeability (k_i) then was calculated by the Klinkenberg technique to correct for the effect of gas slippage. All other permeabilities reported here were calculated by this method.

In the same manner, permeability was measured at

Research conducted to determine the potential of nuclear explosions to stimulate gas production verifies that the gas permeability of tight sandstone cores is markedly decreased with increasing overburden pressure. Water saturation also reduces the gas permeability by a large amount. The relative permeability, however, does not change significantly with overburden pressure.

increasing external pressures of about 500, 1,000, 2,000, 3,000, 4,000, 5,000, and 6,000 psi. External pressures actually were somewhat higher to compensate for internal pressure. The bare end stainless steel end pieces were placed in a rubber sleeve (piece of bicycle innertube) 0.1 cm thick. Rubber cement was used to seal the stainless steel end pieces to the rubber sleeve. Shrinkable plastic tubing proved unsatisfactory because high pressure was required to seal the core. The jacketed core was mounted in a high-pressure cell with distilled water as the external fluid.

Cores used in relative permeability studies were first subjected to high external pressure and then allowed to recover their initial permeability. Bulk volume, dry weight, and porosity were measured by conventional gas-expansion techniques. Cores then were subjected to a vacuum (0.3 psia) for 2 hours, immersed in water, and allowed to stand under a vacuum overnight. The cores were weighed and again subjected to vacuum overnight and weighed again to assure complete saturation. Most of the cores were completely saturated after one night. Porosity values calculated on the basis of water saturation are in good agreement with those measured by conventional gas-expansion techniques.

Water in the core was allowed to evaporate at atmospheric conditions to a saturation of about 70 percent and the core was placed in the holder for 2 hours under external pressure (100 psi above inlet) only so the water saturation was uniform. Gas permeability then was measured at three inlet pressures between 30 and 100 psia with atmospheric pressure at the outlet. This procedure was repeated for decreasing water saturations at the same external pressure. After the permeability was measured the core was weighed to determine if any water was lost. In all cases the amount lost was negligible. After the core was dried in a vacuum oven, the gas permeability at this external pressure was measured. The procedure was repeated for external pressures of 3,000 and 6,000 psi.

Results and Discussion

Effect of Overburden Pressure on Permeability

Core number, length, porosity, and initial permeability of the cores used in this research are shown in Table 1. The core number refers to the depth in feet at which the core was obtained. Typical plots of the effect of simulated overburden pressure on Gasbuggy cores are shown in Fig. 1. The permeability is decreased by about 75 percent at an overburden pressure of 3,000 psi and by 90 percent at 6,000 psi. The hydrostatic loading used in these experiments does not reproduce subsurface conditions exactly; in an actual reservoir the horizontal component of stress is usually less than the vertical component. Since the actual loading is not known, this method probably is as realistic as any other. Cores that contain microfractures are affected to a greater extent, as shown in Fig. 2. In these cores the permeability is decreased by about 95 percent at a simulated overburden pressure of 3,000 psi, with most of the reduction occurring below 2,000 psi.

The data shown in Table 1 and Figs. 1 and 2 were obtained by subjecting the core to successive incre-

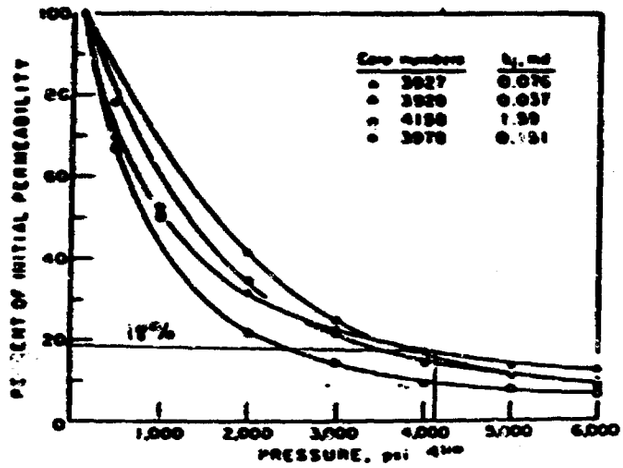

Fig. 1—Effect of overburden pressure on gas permeability of Gasbuggy cores.

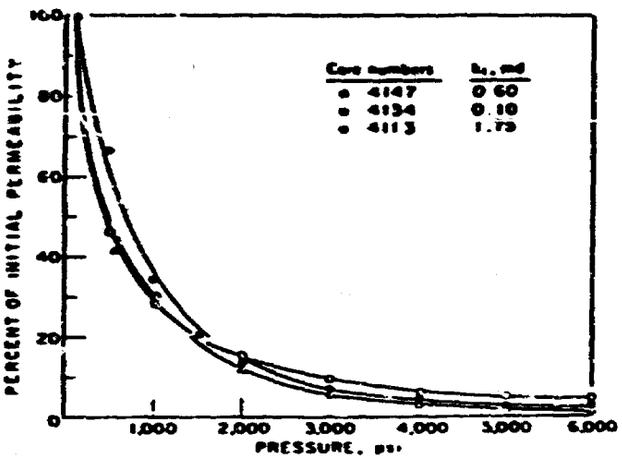

Fig. 2—Effect of overburden pressure on gas permeability of fractured Gasbuggy cores.

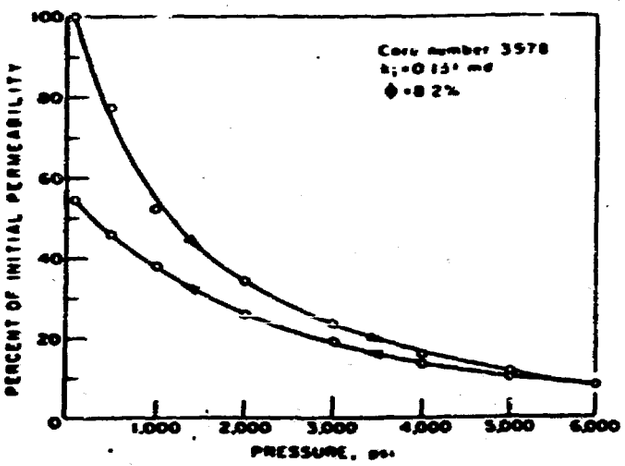

Fig. 3—Hysteresis effect at decreasing confining pressures.

TABLE 1—EFFECT OF OVERBURDEN PRESSURE ON GAS PERMEABILITY

Effective Overburden Pressure (psi):				500	1,000	2,000	3,000	4,000	5,000	6,000
Core Number*	Length (cm)	Porosity (percent)	k_i†	Permeability (md)						
Gasbuggy										
3927	2.1	8.1	0.076	0.053	0.040	0.024	0.0175	0.0132	0.0105	0.0095
3928	7.5	8.3	0.037	0.031	0.024	0.015	0.0093	0.0059	0.0046	0.0035
3978	2.1	8.2	0.151	0.118	0.078	0.052	0.036	0.024	0.0175	0.0132
4113**	2.1	10.1	1.75	1.16	0.602	0.252	0.113	0.068	0.042	0.029
4134**	2.1	11.6	0.10	0.046	0.029	0.0152	0.0085	0.0065	0.0055	0.0047
4146**	7.5	11.6	2.40	1.73	1.32	0.31	0.14	0.069	0.052	0.022
4147**	7.5	11.3	0.60	0.247	0.181	0.071	0.034	0.0186	0.0118	0.0032
4158	2.1	13.6	1.59	1.06	0.80	0.35	0.225	0.152	0.116	0.100
Wagon Wheel										
8084	3.8	7.7	0.028	0.022	0.020	0.010	0.0070	0.0047	0.0035	0.0030
8122	3.8	11.4	0.071	0.055	0.048	0.034	0.027	0.024	0.021	0.019
8975**	3.8	8.7	0.039	0.029	0.024	0.0114	0.0073	0.0048	0.0032	0.0025
10156	3.8	8.5	0.088	0.067	0.051	0.032	0.025	0.022	0.018	0.016
10990**	3.8	9.0	0.048	0.020	0.0175	0.0080	0.0050	0.0040	0.0025	0.0019

*Number denotes depth in feet.
**Slightly fractured.
†Initial permeability.

mental increases in external pressure. The core was assumed to be in equilibrium at each pressure when permeability measurements remained constant for 15 minutes, which required between 1 and 2 hours. A period of 30 minutes to an hour was required to attain equilibrium when the inlet pressure was changed. Consequently, each external pressure was maintained for a minimum of 2 hours.

The effect of decreasing external pressure was determined on a few cores, and typical results are shown in Fig. 3. Other researchers[2,3] have observed and shown that this hysteresis is mainly dependent on the stress history of the core. Cores generally recover their original permeability after 3 to 6 weeks at atmospheric conditions. This time could be shortened by storing the core in an oven at 70°C.

The effect of overburden pressure on the permeability of cores from Project Wagon Wheel is similar to that on cores from Project Gasbuggy, and typical results are shown in Fig. 6. The permeability is decreased to about 30 percent of initial permeability at an overburden pressure of 3,000 psi and to 20 percent at 6,000.

A study of the data in Table 1 indicates that the original porosity of the core and the reduction in permeability caused by overburden pressure are not related. Pore structure (fractures to uniform pores) is probably the governing factor.

Water Saturation Effects

The data in Table 2 show that the permeability decreased with increasing water saturation. The values at 20-, 40-, and 60-percent water saturation were obtained from individual relative-permeability curves for Gasbuggy and Wagon Wheel cores. Relative-permeability curves for three cores from Project Gasbuggy are shown in Fig. 4 with the data points for Core 3978. Data points were omitted for the other cores to avoid confusion. This figure shows that although gas permeability is reduced, the relative gas permeability of Gasbuggy cores is not significantly affected by increased overburden pressure. This conclusion is in agreement with the results of others.[4,5]

Extremely low values of permeability that resulted from water saturation and overburden pressure required that either long flow times or high inlet pressures (high differential across the core) be used. Since a high inlet pressure increases the end effects by changing the distribution of water in the core, long flow times were required. Although end-effect problems were encountered with the short cores (Cores 3978 and 4158), the permeability of these cores was

TABLE 2—EFFECT OF OVERBURDEN PRESSURE AND WATER SATURATION ON GAS PERMEABILITY

Water Saturation (percent):		0	20	40	60
Core Number	Pressure (psi)	Permeability (md)			
Gasbuggy					
3927	100	0.115	0.099	0.041	0.0023
3927	3,000	0.026	0.023	0.009	0.0005
3927	6,000	0.012	0.010	0.003	0.0002
3978	100	0.112	0.080	0.034	0.011
3978	3,000	0.036	0.026	0.011	0.004
3978	6,000	0.013	0.009	0.004	0.0013
4158	100	0.447	0.335	0.156	0.045
4158	3,000	0.075	0.056	0.026	0.0074
4158	6,000	0.027	0.020	0.010	0.0026
Wagon Wheel					
8084	100	0.038	0.030	0.014	0.0042
8084	3,000	0.012	0.0096	0.0043	0.0013
8084	6,000	0.0070	0.0056	0.0025	0.0008
8122	100	0.074	0.054	0.017	0.006
8122	3,000	0.027	0.020	0.008	0.002
8122	6,000	0.020	0.015	0.006	0.002
10156	100	0.100	0.074	0.029	0.003
10156	3,000	0.028	0.020	0.008	0.0008
10156	6,000	0.017	0.013	0.005	0.0005

high enough to yield reasonable results. Permeability measurements for Core 4161 (7.5 cm long, 0.053 md) required more than 2 hours per reading. These extremely long flow times can cause errors.

End effects, long flow times, and changes in permeability due to water saturation tend to decrease the accuracy of permeability measurements, especially at the higher water saturations.

The initial permeability of many of the dry cores used in this research was not reproducible following saturation and drying. The changes probably were caused by solution of material in the pores and by particle movement. These caused both increases and decreases in permeability. The variation, although sometimes large, usually was less than 5 percent; however, we feel that the relative permeability curves are essentially correct. To eliminate the effects of solution and particle movement, the permeability of the dry core following saturation, rather than the permeability initially measured, was used in calculating relative permeability.

A composite of the relative permeability curves for Gasbuggy cores is shown in Fig. 5. These curves are representative of permeabilities encountered in this formation. At a water saturation of 50 percent, the relative permeability of the cores ranges from 15 to 20 percent and is not affected by overburden pressure.

Similar results were obtained on cores from Project Wagon Wheel, as shown in Table 2 and Fig. 6 with data points for Core 8122. These cores were cut to a length of 3.8 cm to alleviate some of the long flow time and end-effect difficulties encountered with Gasbuggy cores. These curves are representative of the permeabilities encountered in the formation. At a water saturation of 50 percent, the relative permeability of these cores ranges from 12 to 21 percent. The data in these figures show, as do the data from Gasbuggy cores, that relative gas permeability is not significantly affected by increased overburden pressure.

Correlation with Nuclear Stimulation Projects

Many of the basin areas of the Rocky Mountain region consist of thick, low-permeability sandstones containing large quantities of natural gas. This type of reservoir has been the object of the AEC's Plowshare Program experiments, Projects Gasbuggy and Rulison, and proposed Projects Wagon Wheel, WASP, and Rio Blanco. Because most wells in these reservoirs have not been commercial, only limited reservoir-analysis and production-test data are available. Reservoir analysis is most difficult because low permeability requires long-term testing. Also, it is difficult to determine permeability and net pay from these tests. Knowledge of the gas permeability is necessary in predicting gas recovery, and because it is not economical to define the characteristics of different strata by well test, it is desirable to be able to relate laboratory-measured permeability to the true in-situ permeability.

Conventional analysis by a commercial laboratory (confirmed in our laboratory) of about 200 Gasbuggy cores gave an average initial gas permeability of 0.16 md on dry cores and an average water saturation of 48 percent. The effective overburden pressure of this

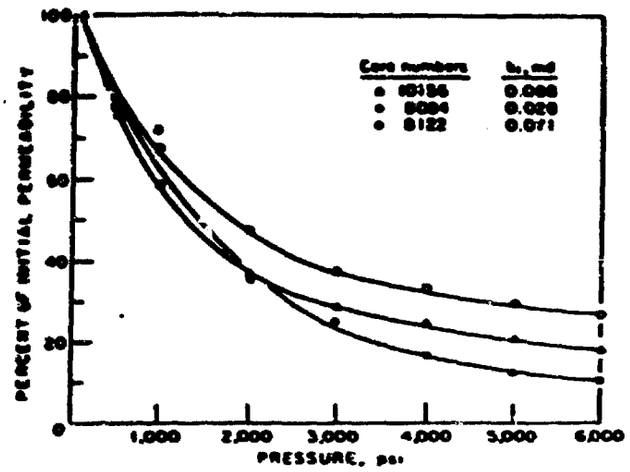

Fig. 4—Effect of overburden pressure on gas permeability of Wagon Wheel cores.

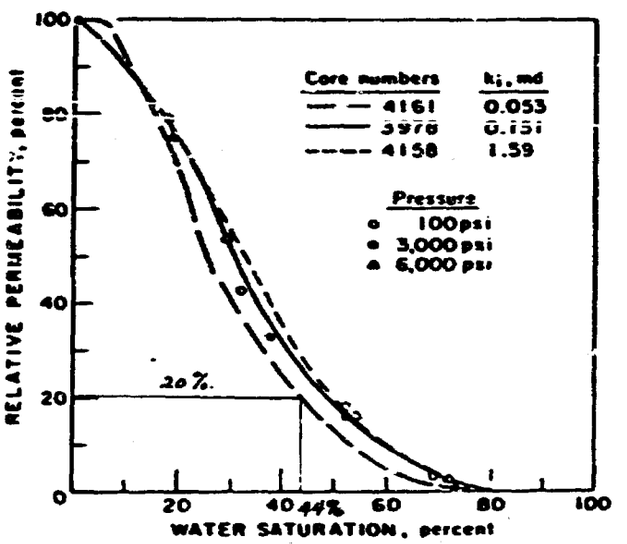

Fig. 5—Relative gas permeability of Gasbuggy cores.

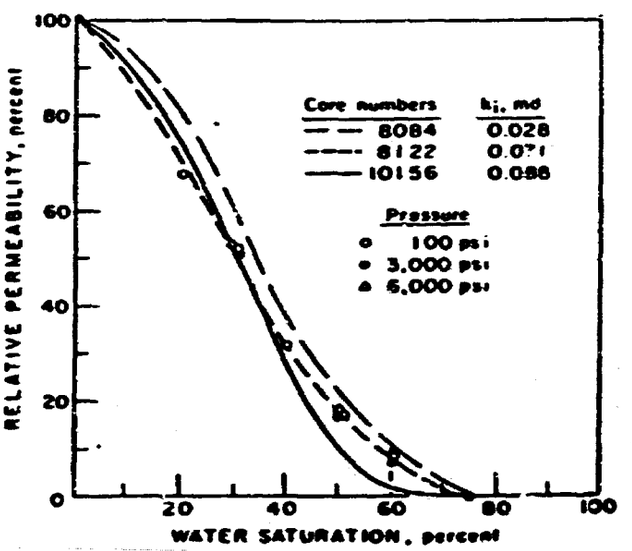

Fig. 6—Relative gas permeability of Wagon Wheel cores.

reservoir is about 3,000 psi. From Fig. 1, the reduction factor resulting from the overburden pressure is 0.25, and the reduction factor for a water saturation of 48 percent (Fig. 5) is 0.20; thus the total reduction is 5 percent of the initial permeability, or 0.008 md. This value compares favorably with permeability determinations of about 0.01 md from both preshot and postshot flow testing at Gasbuggy. The gas reservoir at Project Rulison is similar to that at Gasbuggy, having an average initial dry permeability of 0.11 md and an average water saturation of 45 percent. Simulated in-situ permeability has not yet been measured in the laboratory on Rulison cores; however, using an effective overburden pressure of 5,000 psi and curves of Gasbuggy core data (Figs. 1 and 5), the reduction factor because of overburden pressure would be 0.12 and that for water saturation 0.24. This results in a combined reduction to 3 percent of the initial permeability, or 0.003 md. Postshot production testing at Rulison is not complete, and the only preshot determination of permeability was made from tests of a 32-ft isolated zone that gave an average value of 0.008 md. No cores are available from this zone. Rulison reservoir rock is said to be less compressible than that of Gasbuggy; therefore Gasbuggy pressure-effect data would be expected to indicate a greater reduction for Rulison than actually exists.

The average initial permeability of dry Wagon Wheel cores is 0.068 md, with an average water saturation of 50 percent. An estimated effective overburden pressure of 3,000 psi gives a reduction factor of 0.28 (Fig. 4). Water saturation further reduces permeability by a factor of 0.18 (Fig. 6). Therefore, the total reduction in permeability is to approximately 5 percent of the initial permeability, or 0.0034 md. This value can be used to predict postshot gas recovery from the proposed Wagon Wheel experiment.

Cores are not yet available from Projects Rio Blanco and WASP.

Original manuscript received in Society of Petroleum Engineers office June 16, 1971. Revised manuscript received Dec. 20, 1971. Paper (SPE 3634) was presented at SPE 46th Annual Fall Meeting, held in New Orleans, Oct. 3-6, 1971.

Conclusions

The gas permeability of tight sandstone cores is markedly decreased with increasing overburden pressure. Most of the decrease takes place at pressures to 3,000 psi. At 3,000 psi, the permeability of unfractured samples ranges from 14 to 37 percent of the initial permeability. In fractured samples, permeability may be reduced to as low as 6 percent of initial permeability.

Water saturation also reduces the gas permeability greatly; however, the relative permeability does not change significantly with overburden pressure.

Permeability calculated from laboratory results are in good agreement with in-situ permeabilities determined from production test data. Although not confirmed, predictions for other projects appear to be reasonable.

References

1. Fatt, I. and Davis, T. H.: "The Reduction in Permeability with Overburden Pressure," *Trans.*, AIME (1952) 195, 329.
2. McLatchie, L. S., Hemstock, R. A. and Young, J. W.: "Effective Compressibility of Reservoir Rocks and Its Effects on Permeability," *Trans.*, AIME (1958) 213, 386-388.
3. Vairogs, Juris, Hearn, C. L., Dareing, D. W. and Rhoades, V. W.: "Effect of Rock Stress on Gas Production from Low-Permeability Reservoirs," *J. Pet. Tech.* (Sept., 1971) 1161-1167.
4. Wilson, J. W.: "Determination of Relative Permeability Under Simulated Reservoir Conditions," *AIChE Jour.* (1956) 2, 94.
5. Fatt, I.: "The Effect of Overburden Pressure on Relative Permeability," *Trans.*, AIME (1953) 198, 325-326.
6. *API Recommended Practice for Core-Analysis Procedure*, API RP 40, Dallas (1960) 35.

JPT

EXHIBIT NO. 14

DETERMINATION OF IN SITU FORMATION PERMEABILITY FROM LABORATORY CORE ANALYSIS DATA IN THE WESTSIDE TIGHT GAS AREA

The relationship needed to determine in situ permeability from core analysis data is published in a technical paper by Rex D. Thomas and Don C. Ward entitled "Effect of Overburden Pressure and Water Saturation on Gas Permeability of Tight Sandstone Cores", which is presented as Exhibit No. 13. The authors' studies involved taking routine laboratory air permeability measurements at the normal 100 psi or less external pressures. To simulate the effect of in situ conditions, these permeability measurements were then made at external pressures ranging from 500 to 6000 psi. The results of these tests were then plotted on a graph of Percent of Initial Permeability (ratio of permeability at 100 psi to a permeability at a higher pressure) vs. Pressure.

Figure 1, on page 51 of Exhibit No. 13, is one such graph which presents results of tests run on cores taken from the Pictured Cliffs formation. These cores were taken from Project Gasbuggy, located in Choza Mesa Pictured Cliffs field, T28-29N, R3-4W, Rio Arriba County, New Mexico. Cores from the Pictured Cliffs formation in the Gasbuggy area and from the Dakota formation in the Westside Tight Gas Area can be expected to have the same or very similar characteristics in that both formations are composed of low permeability sandstone.

The average laboratory air permeability for the Westside Tight Gas Area is 0.07 millidarcy. This value compares to a laboratory permeability value of 0.076 millidarcy for core 3927 as presented in Figure 1 of Exhibit No. 13. Because of the close agreement in laboratory permeability values, core 3927 was chosen to represent Dakota formation characteristics in the Westside Tight Gas Area.

The net confining pressure due to overburden at a depth of 5952 feet in the Westside Tight Gas Area is approximately 4110 psi. Entering the graph in Figure 1 at 4110 psi results in a permeability reduction factor of 0.18, which is caused by the overburden pressure on the Dakota formation.

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Four Corners EXHIBIT NO. 14
CASE NO. 7516
Submitted by Meloro
Hearing Date 3-16-82

The water present in the reservoir also causes the in situ permeability to be less than laboratory permeability as discussed in Exhibit No. 13. The 0.18 permeability reduction factor resulting from overburden pressure was determined from cores having 100% gas saturation. Figure 5 on page 53 of Exhibit No. 13 indicates relative permeability changes that occurred with changes in water saturation within the sample cores. For the Westside Tight Gas Area, the average core water saturation was 44%. Entering Figure 5 at 44% water saturation results in a permeability reduction factor of 0.20 for in situ water saturation.

The total permeability reduction factor used on laboratory core data to approximate reservoir conditions is obtained by multiplying the overburden reduction factor by the water saturation reduction factor. This product is 0.036 for the Dakota formation in the Westside Tight Gas Area. Therefore, the average in situ permeability for this area is 3.6% of the 0.07 millidarcy laboratory determined permeability or 0.003 millidarcy.

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Exhibit No. 15
CASE NO. 7525
Submitted by McCord
Hearing Date 3-16-82

EXHIBIT NO. 15

SUMMARY OF CORE PERMEABILITY DATA
(Only Perforated Intervals Used)

	WELL NAME	LOCATION	TOTAL SAMPLE FOOTAGE (ft)	TOTAL LABORATORY PERMEABILITY (md)	AVERAGE LABORATORY PERMEABILITY (md)	COMMENTS
1.	Benson-Montin-Greer Bayview No. 1	NE/NE Section 18 T27N, R12W	33	1.42	0.04	
2.	Alex N. Campbell Western No. 1	SW/NE Section 25 T27N, R12W	15	0.59	0.04	
3.	Benson-Montin-Greer Douthit No. 1	NE/NE Section 5 T27N, R13W	25.5	1.24	0.05	
4.	Benson-Montin-Greer Ginther No. 1	NE/NE Section 13 T27N, R13W	43	3.64	0.08	Well outside of Tight Gas Area
5.	Benson-Montin-Greer Fullerton No. 2	SE/SE Section 28 T28N, R13W	12	1.26	0.11	
6.	Benson-Montin-Greer Fullerton No. 1	NE/NE Section 34 T28N, R13W	23	1.43	0.06	Well outside of Tight Gas Area
7.	SunRay Mid-Continent Oil New Mexico Federal I No. 2	NE/NE Section 1 T29N, R14W	41	2.99	0.07	
		TOTAL:	192.5	12.57		

Average laboratory permeability = $\frac{12.57}{192.5}$ = 0.07 md

Average in situ permeability (3.6% of laboratory permeability) = 0.003 md

EXHIBIT NO. 6

FOUR CORNERS GAS PRODUCERS ASSOCIATION
WESTSIDE TIGHT GAS AREA
DAKOTA FORMATION
SAN JUAN COUNTY, NEW MEXICO

Calculation of Formation Permeability Using Darcy's Law

Darcy's Law: $Qg = .703\ Kh \dfrac{(Pe^2 - Pwf^2)}{Ug\ T\ Z\ \ln\ (.61\ re/rw)}$

where:

Qg = gas flowrate, mcf/day
k = permeability of formation, millidarcies - calculated to be 0.003 md from core analysis study
Ug = average gas viscosity - calculated to be 0.018 centipoise
T = bottom hole temperature - calculated to be 150°F - 610°R
Z = average gas compressibility factor - calculated to be 0.860
re = drainage radius for 160 acre spacing - 1320 feet
rw = wellbore radius - 0.17 feet
h = net pay height - average of 40 feet for the producing wells in the Westside Tight Gas Area
Pe = bottom hole pressure at drainage radius re - average of 2320 psi for wells in the Westside Tight Gas Area
Pwf = flowing bottom hole pressure - assumed equal to atmospheric pressure for maximum flowrate - 12.2 psi surface, 14.0 psi bottom hole
Gg = gas gravity - .7 - used for calculations of Ug and Z
Pc = pseudo critical pressure - 668 psi used for calculation of Ug and Z
Tc = pseudo critical temperature - 392°R used for calculation of Ug and Z

$$Qg = .703\ (0.003)(40)\ \frac{(2320^2 - 14^2)}{(0.018)(610)(0.860)\ \ln\ (.61\ \frac{1320}{.17})}$$

Qg = 5.682 SCFGPD = 5.7 MCFGPD

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Four Corners EXHIBIT NO. 16
CASE NO. 7515
Submitted by Meford
Hearing Date 3-16-82

APPLICATION OF

FOUR CORNERS GAS PRODUCERS ASSOCIATION

FOR DESIGNATION OF THE WESTSIDE AREA OF THE BASIN DAKOTA FIELD

AS A TIGHT GAS FORMATION

SAN JUAN COUNTY, NEW MEXICO

Case No. 7515

March 16, 1982

BEFORE EXAMINER STAMETS
OIL CONSERVATION DIVISION
Four Corners EXHIBIT NO. 17
CASE NO. 7515
Submitted by McLord
Hearing Date 3-16-82

Prepared by:

KEVIN H. McCORD
Petroleum Engineer

APPLICATION OF FOUR CORNERS GAS PRODUCERS ASSOCIATION FOR DESIGNATION OF THE WESTSIDE AREA OF THE BASIN DAKOTA FIELD AS A TIGHT FORMATION, SAN JUAN COUNTY, NEW MEXICO

The Four Corners Gas Producers Association is applying for a portion of the Basin Dakota gas field to be designated as a tight formation under Section 107 of the Natural Gas Policy Act of 1978. The proposed Westside Tight Gas Area is located in the northwestern portion of the San Juan Basin. The area covers portions of the city of Farmington in San Juan County of northwestern New Mexico.

Exhibit No. 1 displays the Westside Tight Gas Area on a map of the Dakota reservoir in the San Juan Basin. The Westside Area includes approximately 165,120 acres, described as follows:

Township 26 North, Range 12 West
Sections 1 through 36: All

Township 26 North, Range 13 West
Sections 1 through 36: All

Township 27 North, Range 12 West
Section 8: S½
Section 9: S½
Sections 16 through 36: All

Township 27 North, Range 13 West
Section 3: W½
Sections 4 through 9: All
Section 10: W½
Sections 14 through 36: All

Township 28 North, Range 13 West
Sections 7 through 9: All
Sections 16 through 21: All
Sections 28 through 33: All
Section 34: W½

Township 29 North, Range 13 West
Sections 4 through 9: All
Sections 16 through 19: All
Section 20: W½
Section 29: W½
Sections 30 & 31: All
Section 32: W½

Township 29 North, Range 14 West
Section 1: All
Section 2: W½; SE¼
Sections 3 through 18: All
Section 19: NE¼
Sections 20 through 27: All
Section 28: N½; SE¼
Section 34: N½
Sections 35 & 36: All

Township 29 North, Range 15 West
Sections 1 through 6: All
Section 7: N½
Section 8: N½
Section 9: N½
Section 10: N½; SE¼
Sections 11 & 12: All
Section 13: N½
Section 14: N½

Township 30 North, Range 14 West
Sections 1 through 12: All
Sections 15 through 23: All
Sections 26 through 34: All

Township 30 North, Range 13 West
Sections 1 through 36: All

The Dakota formation in the Westside Area meets the criteria established in Section 107 of the Natural Gas Policy Act of 1978 to be designated a tight gas formation in that (1) the estimated average in situ gas permeability throughout the pay section is expected to be 0.1 millidarcy or less, (2) the stabilized production rates, without stimulation, at atmospheric pressure of these gas wells are not expected to exceed the maximum allowable production rate of 188 MCFPD for an average depth of 5952 feet to the top of the Dakota formation in this area, and (3) no well drilled into the Dakota formation in this area is expected to produce more than five barrels of crude oil per day prior to stimulation.

Exhibit No. 2 is a Dakota formation completion and production map of the proposed Westside Tight Gas Area. The production figures presented for each producing well are initial potential, date of initial potential, average daily production for 1980, and January 1, 1981 cumulative production of gas and oil. Exhibit No. 2 also presents completion and production data from several wells surrounding the proposed tight gas area. The Westside Tight Gas Area contains 36 producing Dakota formation gas wells, while 69 wells in this area are abandoned in the Dakota at this time. These 105 wells drilled in the area represent only 20% development of all possible drillsite spacing units, while only 7% of these units have producing Dakota formation wells. A list of the Westside Tight Gas Area wells and their production figures is presented as Exhibit No. 3. Examination of these

figures indicate that these Dakota wells have not produced great quantities of natural gas, suggesting that low permeability reservoir rock is present in the area.

Exhibit No. 4 is a type log of a Dakota well found in the Westside Tight Gas Area. This log is from the Tenneco Oil Company "USA Scott No. 1" well, found in Section 28, T28N, R13W. This well is in the east-central portion of the Westside Tight Gas Area. The eastern portion of the Westside Tight Gas Area has exhibited better producing characteristics than the remainder of the area. Wells in the remaining sections of the Westside Area would be expected to have the same or poorer log characteristics than this type log.

The type log presented shows the entire Greenhorn and Dakota formation. The State of New Mexico has defined the Dakota producing interval in the Basin Dakota Field to begin at the base of the Greenhorn limestone and extend to a point 400 feet below the base of the Greenhorn. The formations covered in this 400 feet are the Graneros Shale, Dakota Sandstone, and Morrison formations. The Graneros Shale and Dakota formations are productive in this area, while the Morrison formation is generally water bearing.

The Dakota formation has an average depth of 5952 feet in the Westside Tight Gas Area, and has approximately 250 to 300 feet of gross thickness. The Dakota sandstone formation is Late Cretaceous in age with deposition occurring under both marine and nonmarine conditions. The Dakota sandstone is the basal sequence of the southwesterly transgressing Cretaceous Sea.

The Upper Dakota sand consists of barrier beach deposits about 40 to 60 feet thick, composed of fine grained, quartz-rich sandstones characterized by an increase in grain size upward and low angle crossbedding. The next highest unit is transitional between fluvial and marine sedimentation containing dark carbonaceous shales, thin mudstones, siltstones, and sandstones. This unit represented a lagoonal type environment. The Basal Dakota was deposited by a system of meandering streams creating deposits of carbonaceous shales, thin coal seams, siltstones, and thin channel sandstones. The basal unit of Cretaceous strata in the Four Corners Area is the Burro Canyon formation. This formation was deposited in a braided

stream system and is sometimes considered part of the Dakota formation. An unconformity exists between the Burro Canyon formation and the Morrison formation represented by a sharp erosional contact between the two formations.

Overall, the Dakota sand has a porosity range from 2% to 16% in the Westside Area, with the average pay porosity being approximately 9.5%. Silt and clay sized matrix material is present throughout the Dakota sand sequence and represents a significant portion of the bulk rock composition. This matrix material reduces the effective permeability of the formation, making it difficult to produce.

Exhibit No. 5 presents two log cross sections through the Westside Tight Gas Area showing the continuity of the Dakota formation using the base of the Greenhorn formation for a datum line. Other wells in the vicinity of the Westside Area are included in these cross sections for comparison purposes. These cross sections show that wells in the Westside Area exhibit poorer log characteristics than wells outside of the area.

Permeability

The Dakota formation in the San Juan Basin is dependent on stimulation techniques to be commercially productive due to the low permeability of the reservoir rock.

Exhibit Nos. 6 through 12 present core analysis data taken from seven producing wells, which was used to determine the average laboratory permeability to air for Dakota formation pay zones in the Westside Area. Five of these cored wells lie inside the tight gas area, and two lie just outside the area. The exhibits contain the actual core analysis reports plus summary tables showing the analysis of cores taken from only the productive portion of the Dakota formation for each well. The cored intervals chosen for permeability averaging were determined by log examination of the interval cored for each well. Only cored intervals of sand that were perforated by the operator of the well were considered pay intervals and were then used for permeability averaging. The average laboratory permeability to air determined in this manner was 0.07 millidarcy. The actual in situ permeability of the Dakota formation in this area is less than the laboratory

determined value due to water saturations and net confining pressures found under reservoir conditions.

Exhibit No. 13 presents a technical paper entitled "Effect of Overburden Pressure and Water Saturation on Gas Permeability of Tight Sandstone Cores" written by Rex D. Thomas and Don C. Ward of the U.S. Bureau of Mines. This paper presents relationships between laboratory determined permeability in cores and actual in situ permeability found in reservoirs. Exhibit No. 14 explains how in situ permeability is calculated from the core analysis using the technical paper presented.

Exhibit No. 15 is a summary of all laboratory core analysis results for the Westside Tight Gas Area. An average in situ permeability value of 0.003 millidarcy was calculated from the average laboratory permeability value of 0.07 millidarcy for the Westside Area. This in situ permeability value is well below the 0.1 millidarcy tight gas cutoff. These permeability measurements substantiate that the Dakota formation is very tight in this area and must be stimulated to obtain commercial gas production.

Stabilized Unstimulated Gas Production Rate

Obtaining stabilized unstimulated gas production rates for Dakota formation wells is not a standard procedure used by companies when completing their wells in the San Juan Basin. Past experience has shown that these low permeability Dakota wells must be stimulated to obtain commercial production. However, a three-hour unstimulated gas production test was performed on Curtis Little's Federal Com No. 2E well located in the SE/SW of Section 11, Township 28 North, Range 13 West. This well is located just outside the Westside Tight Gas Area, but is considered to have very similar flow characteristics to wells inside the area. The unstimulated natural gas production rate from this test well was 6.7 MCFGPD. This rate is well below the 188 MCFGPD allotted for tight formation gas wells having an average depth of 5952 feet.

The natural unstimulated production rate provided is not truly an unstimulated production rate from the Dakota formation. This well was acidized with 500 gallons of 7½% hydrochloric acid as a production aid to induce a flow channel from the wellbore to the formation through the

perforations. This acidizing cleans up the flow path so gas can move more freely to the wellbore. True unstimulated natural production would not have the aid of this formation cleanup procedure to assist in gas production, and could be expected to be even lower than this rate.

In order to test the validity of this natural production figure. Darcy's Law of fluid flow through a porous medium was used to calculate an unstimulated gas flow rate using the average in situ permeability value of .003 millidarcy calculated for the Dakota formation in this area from core analysis study. Exhibit No. 16 presents this calculation and shows that an initial unstimulated gas flow rate of 5.7 MCFGPD is associated with the average in situ permeability of 0.003 millidarcy for the Westside Area. The close agreement of this calculated rate and the actual natural production test indicates that the 6.7 MCFGPD natural flow test is a good average rate for the Westside Tight Gas Area.

The calculated unstimulated gas production rate and the average actual unstimulated gas production rate are both much less than the 188 MCFGPD limit for a tight gas reservoir in the Westside Area. As a result of these calculations, the unstimulated natural gas production rate from the Dakota formation in the Westside Area is not expected to exceed 188 MCF of gas per day.

Stabilized Unstimulated Oil Production Rate

As stated previously, only one natural production test was taken in the vicinity of the Westside Tight Gas Area. This test produced virtually dry gas, therefore no associated oil or condensate was reported for the test. However, production figures for Dakota wells in the Westside Area show that some oil is produced in this area. It should also be noted here that condensate is also reported as oil to the State of New Mexico, so oil production figures represent both oil and condensate, which is not in liquid form at reservoir conditions.

To examine the extent of the oil production in this area, the cumulative oil production per MCF of gas was averaged for wells in the Westside Area. This average value was 0.026 barrels of oil per MCF of gas produced. Applying this figure to the 6.7 MCFGPD natural production

rate obtained for the area results in an average initial unstimulated oil production rate of approximately 0.2 barrels of oil per day.

Both actual unstimulated and calculated unstimulated oil production rates do not exceed five barrels of oil per day. Therefore, no well drilled in the Westside Tight Gas Area is expected to produce, without stimulation, more than five barrels of crude oil per day.

Fresh Water Protection

Existing State and Federal regulations will assure that development of the Dakota formation will not adversely affect or impair any fresh water aquifers that are being used or are expected to be used in the foreseeable future for domestic or agricultural water supplies. Regulations require that casing programs be designed to seal off potential water bearing formations from oil and gas producing formations. These fresh water zones exist from the surface to the base of the Ojo Alamo formation. The maximum Ojo Alamo depth is 1088 feet in the Westside Tight Gas Area.

Wells drilled in the Westside Area are drilled with natural mud that will not contaminate fresh water zones. Normal casing designs in this area consist of 8-5/8" O.D. surface casing being set from the surface to a depth of 300 to 350 feet. Production casing is either 4-1/2" or 5-1/2" O.D. and is set from surface to total depth.

The surface casing is cemented in place by circulating cement to the surface, protecting the near surface formations from downhole contamination. The production casing is cemented from total depth to a depth above the Mesa Verde formation or to a point approximately 2000 feet above total depth. This cement covers the Dakota and Gallup oil and gas bearing formations. Diverting tools, such as a D.V. tool are placed in the production string below the Pictured Cliffs formation, and below the Mesa Verde formation if the zone was not planned to be covered by the primary cement job. After cementation of the bottom cement stage, cement is diverted through these tools, individually, to place cement across the Mesa Verde formation, and to circulate cement from below the Pictured Cliffs formation to the surface. This process

protects the Mesa Verde, Pictured Cliffs and other shallow formations from contaminating the Ojo Alamo acquifer. If cement is not circulated, a temperature log or cement bond log is run to determine the top of cement and assure that all necessary zones are covered. Therefore, all productive and fresh water zones are protected by both casing and cement.

Stimulation of the Dakota formation involves large fracture treatments, usually consisting of a one or two percent potassium chloride water base that will not harm a fresh water acquifer. Fresh water protection is adequate even with these larger stimulation treatments due to zone isolation caused by cementation. The large distance of over 4800 feet between the Dakota formation and the Ojo Alamo fresh water acquifer is additional insurance that no existing fresh water zone will be contaminated by stimulation of Dakota wells in this area.

Therefore, New Mexico and Federal regulations will protect any fresh water supply that may be affected by drilling, completing, and producing the Dakota formation in the Westside Tight Gas Area.

Conclusion

Evidence presented in this report substantiate the following for the Four Corners Gas Producers' proposed Westside Tight Gas Area:

(1) The estimated average in situ gas permeability, throughout the Dakota pay Section is expected to be 0.1 millidarcy or less;

(2) For an average Dakota well depth of 5952 feet, the stabilized natural production rate at atmospheric pressure of wells completed for production in the Dakota formation is not expected to exceed the maximum allowable rate of 188 MCF of natural gas per day without stimulation;

(3) No well drilled into the Dakota formation in the Westside Area is expected to produce, without stimulation, more than five barrels of crude oil per day.

The proposed Westside Tight Gas Area meets all the specifications required as stated above, and should be designated a tight formation in the Basin Dakota pool under Section 107 of the Natural Gas Policy Act of 1978.

CAMPBELL, BYRD & BLACK, P.A.
LAWYERS

JACK M. CAMPBELL
MARL D. BYRD
BRUCE D. BLACK
MICHAEL B. CAMPBELL
WILLIAM F. CARR
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TELEPHONE: (505) 988-4421
TELECOPIER: (505) 983-6043

March 29, 1982

HAND DELIVERED

Mr. Joe D. Ramey
Director
Oil Conservation Division
Post Office Box 2088
Santa Fe, New Mexico 87501

Re: Case 7515: Application of Four Corners Gas Producers Association for Designation of a Tight Formation, San Juan County, New Mexico

Dear Mr. Ramey:

Case 7515 was continued and readvertised from the March 16, 1982 examiner hearing due to an error in the legal advertisement. We have learned that El Paso Natural Gas Company may desire to present economic testimony when the case is open pursuant to this readvertisement. Inasmuch as the case was originally heard by examiner Stamets, it is our opinion that it would be desirable for him to hear the additional testimony. We also have only learned of El Paso's definite intention to present the additional testimony on this date and desire an additional period of time in which to prepare for this hearing.

We are, therefore, requesting that the case be continued from the March 31, 1982 examiner hearing to the hearing scheduled before examiner Stamets on April 14, 1982.

By copy of this letter we are advising owen Lopez, attorney for El Paso Natural Gas Company of this request for continuance.

Very truly yours,

William F. Carr

WFC:jh
cc: Owen Lopez, Esq.

BEFORE THE

OIL CONSERVATION DIVISION

NEW MEXICO DEPARTMENT OF ENERGY AND MINERALS

IN THE MATTER OF THE APPLICATION OF FOUR CORNERS GAS PRODUCERS ASSOCIATION FOR DESIGNATION OF THE WESTSIDE AREA OF THE BASIN DAKOTA FIELD AS A TIGHT FORMATION, SAN JUAN COUNTY, NEW MEXICO.

CASE 2515

CERTIFICATE OF FILING

Comes now FOUR CORNERS GAS PRODUCERS ASSOCIATION, by and through its undersigned attorneys, and hereby certifies that a copy of the complete set of all exhibits which applicant proposes to offer or introduce at the hearing on the above-referenced application, together with a statement of the meaning and purpose of each, has been mailed to the United States Geological Survey in Albuquerque, New Mexico, on this 26th day of February, 1982, as required by Section D of the Oil Conservation Division's Special Rules and Procedures for Tight Formation Designation under Section 107 of the Natural Gas Policy Act of 1978.

CAMPBELL, BYRD & BLACK, P.A.

By William F. Carr

William F. Carr
Attorneys for Applicant
Post Office Box 2208
Santa Fe, New Mexico 87501
Telephone: (505) 988-4421

CAMPBELL, BYRD & BLACK, P.A.
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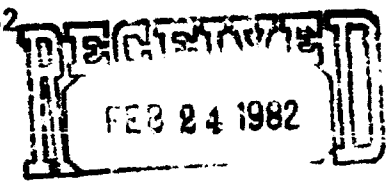
February 23, 1982



Case 7515

Mr. Joe D. Ramey
Director
Oil Conservation Division
New Mexico Department of
Energy and Minerals
Post Office Box 2088
Santa Fe, New Mexico 87501

Re: Amended Application of Four Corners Gas Producers Association for Designation of Tight Formation, San Juan County, New Mexico

Dear Mr. Ramey:

Enclosed in triplicate is the Amended Application of Four Corners Gas Producers Association in the above-referenced matter.

The applicant requests that this matter be included on the docket for the examiner hearing scheduled to be held on March 17, 1982.

Very truly yours,

William F. Carr

WFC:lr

Enclosure

cc: Mr. Kevin McCord

BEFORE THE

OIL CONSERVATION DIVISION

NEW MEXICO DEPARTMENT OF ENERGY AND MINERALS

IN THE MATTER OF THE APPLICATION OF FOUR CORNERS GAS PRODUCERS ASSOCIATION FOR DESIGNATION OF TIGHT FORMATION, SAN JUAN COUNTY, NEW MEXICO.

CASE 7515

AMENDED APPLICATION

Comes now FOUR CORNERS GAS PRODUCERS ASSOCIATION, by and through its undersigned attorneys, and as provided in the Oil Conservation Division's Special Rules and Procedures for Tight Formation Designations under Section 107 of the Natural Gas Policy Act of 1978 promulgated by Oil Conservation Division Order No. R-6388 on June 30, 1980, hereby makes application for an order designating certain portions of the Dakota formation (West Side Dakota Tight Gas Area) as a tight formation under Section 107 of the Natural Gas Policy Act of 1978 and in support of its application would show the Division:

1. Applicant is the owner and operator of certain interests in the Dakota formation underlying the following described lands situated in San Juan County, New Mexico:

Township 26 North, Range 12 West, N.M.P.M.
Sections 1 through 36: All

Township 26 North, Range 13 West, N.M.P.M.
Sections 1 through 36: All

Township 27 North, Range 12 West, N.M.P.M.
Section 8: S/2
Section 9: S/2
Sections 16 through 36: All

Township 27 North, Range 13 West, N.M.P.M.
Section 3: W/2
Sections 4 through 9: All
Section 10: W/2
Sections 14 through 36: All

Township 28 North, Range 13 West, N.M.P.M.
Sections 7 through 9: All
Sections 16 through 21: All
Sections 28 through 33: All
Section 34: W/2

Township 29 North, Range 13 West, N.M.P.M.
Sections 4 through 9: All
Sections 16 through 19: All
Section 20: W/2
Section 29: W/2
Sections 30 through 31: All
Section 32: W/2

Township 29 North, Range 14 West, N.M.P.M.
Section 1: All
Section 2: W/2, SE/4
Sections 3 through 18: All
Section 19: NE/4
Sections 20 through 27: All
Section 28: N/2, SE/4
Section 34: N/2
Sections 35 through 36: All

Township 29 North, Range 15 West, N.M.P.M.
Sections 1 through 6: All
Section 7: N/2
Section 8: N/2
Section 9: N/2
Section 10: N/2, SE/4
Sections 11 through 12: All
Section 13: N/2
Section 14: N/2

Township 30 North, Range 14 West, N.M.P.M.
Sections 1 through 12: All
Sections 15 through 23: All
Sections 26 through 34: All

Township 30 North, Range 15 West, N.M.P.M.
Sections 1 through 36: All

Containing a total of 165,120 acres, more or less.

2. The Dakota formation in the subject area is expected to have an estimated average in situ gas permeability throughout the pay section of less than 0.1 millidarcy per foot.

3. The average depth of the top of the Dakota formation is 5952 feet and the stabilized production rate, against atmospheric pressure, of wells completed for production

in said formation, without stimulation, is not expected to exceed 188 mcf of gas per day.

4. No well drilled into the Dakota formation in the above-described area is expected to produce, without stimulation, more than five barrels of crude oil per day.

5. A complete set of Exhibits which applicant proposes to offer or introduce at the hearing on this application, together with a statement of the meaning and purpose of each exhibit, will be filed with the Division and the United States Geological Survey at least 15 days prior to the hearing date as required by the Oil Conservation Division's Special Rules and Procedures for Tight Sand Formation Designation under Section 107 of the Natural Gas Policy Act of 1978.

WHEREFORE, Applicant prays that this application be set for hearing before a duly appointed examiner of the Oil Conservation Division on March 17, 1982 and that after notice and hearing as required by law, the Division enter its order recommending to the Federal Energy Regulatory Commission that pursuant to 18 CFR, Section 271.701-705, that the Dakota formation underlying the above-described lands be designated a tight formation, and making such other and further provisions as may be proper in the premises.

Respectfully submitted,

CAMPBELL, BYRD & BLACK, P.A.

By _____
William F. Carr
Post Office Box 2208
Santa Fe, New Mexico 87501
Attorneys for Applicant

CAMPBELL, BYRD & BLACK, P.A.
LAWYERS

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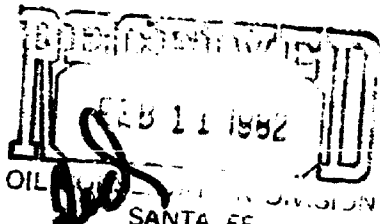
February 11, 1982

Mr. Joe D. Ramey
Division Director
Oil Conservation Division
New Mexico Department of
Energy and Minerals
Post Office Box 2088
Santa Fe, New Mexico 87501



Re: Application of Four Corners Gas Producers Association for Designation of Tight Formation, San Juan County, New Mexico

Dear Mr. Ramey:

Enclosed in triplicate is the application of Four Corners Gas Producers Association in the above-referenced matter.

The applicant requests that this matter be included on the docket for the examiner hearing scheduled to be held on March 17, 1982.

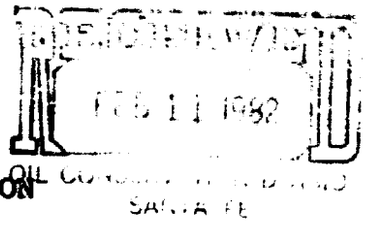
Very truly yours,

William F. Carr

WFC:lr

Enclosures

cc: Mr. Kevin McCord



BEFORE THE

OIL CONSERVATION DIVISION

NEW MEXICO DEPARTMENT OF ENERGY AND MINERALS

IN THE MATTER OF THE APPLICATION OF FOUR CORNERS GAS PRODUCERS ASSOCIATION FOR DESIGNATION OF TIGHT FORMATION, SAN JUAN COUNTY, NEW MEXICO.

CASE _____

APPLICATION

Comes now FOUR CORNERS GAS PRODUCERS ASSOCIATION, by and through its undersigned attorneys, and as provided in the Oil Conservation Division's Special Rules and Procedures for Tight Formation Designations under Section 107 of the Natural Gas Policy Act of 1978 promulgated by Oil Conservation Division Order No. R-6388 on June 30, 1980, hereby makes application for an order designating certain portions of the Dakota formation (West Side Dakota Tight Gas Area) as a tight formation under Section 107 of the Natural Gas Policy Act of 1978 and in support of its application would show the Division:

1. Applicant is the owner and operator of certain interests in the Dakota formation underlying the following described lands situated in San Juan County, New Mexico:

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Sections 1 through 3: All
Sections 7 through 8: All
Section 9: S/2
Sections 10 through 36: All

Township 27 North, Range 13 West, N.M.P.M.
Sections 1 through 36: All

Township 28 North, Range 13 West, N.M.P.M.
Sections 7 through 11: All
Section 12: W/2 W/2
Sections 15 through 22: All
Sections 27 through 34: All

Township 29 North, Range 13 West, N.M.P.M.
Sections 1 through 12: All
Sections 14 through 22: All
Sections 27 through 34: All

Township 29 North, Range 14 West, N.M.P.M.
Sections 1 through 18: All
Section 19: NE/4
Sections 20 through 27: All
Section 28: N/2, SE/4
Section 34: N/2
Sections 35 through 36: All

Township 29 North, Range 15 West, N.M.P.M.
Sections 1 through 6: All
Section 7: N/2
Section 8: N/2
Section 9: N/2
Section 10: N/2, SE/4
Sections 11 through 12: All
Section 13: N/2
Section 14: N/2

Township 30 North, Range 14 West, N.M.P.M.
Sections 1 through 36: All

Township 30 North, Range 15 West, N.M.P.M.
Sections 1 through 36: All

Containing a total of 192,480 acres, more or less.

2. The Dakota formation in the subject area is expected to have an estimated average in situ gas permeability throughout the pay section of less than 0.1 millidarcy per foot.

3. The average depth of the top of the Dakota formation is 5952 feet and the stabilized production rate, against atmospheric pressure, of wells completed for production in said formation, without stimulation, is not expected to exceed 188 mcf of gas per day.

4. No well drilled into the Dakota formation in the above-described area is expected to produce, without stimulation, more than five barrels of crude oil per day.

5. A complete set of Exhibits which applicant proposes to offer or introduce at the hearing on this application, together with a statement of the meaning and purpose of each exhibit, will be filed with the Division and the United States Geological Survey at least 15 days prior to the hearing date as required by the Oil Conservation Division's Special Rules and Procedures for Tight Sand Formation Designation under Section 107 of the Natural Gas Policy Act of 1978.

WHEREFORE, Applicant prays that this application be set for hearing before a duly appointed examiner of the Oil Conservation Division on March 17, 1982 and that after notice and hearing as required by law, the Division enter its order recommending to the Federal Energy Regulatory Commission that pursuant to 18 CFR, Section 271.701-705, that the Dakota formation underlying the above-described land be designated a tight formation, and making such other and further provisions as may be proper in the premises.

Respectfully submitted,

CAMPBELL, BYRD & BLACK, P.A.

By _____
William F. Carr
Post Office Box 2208
Santa Fe, New Mexico 87501
Attorneys for Applicant

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION

IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:

CASE NO. 7515
Order No. R-7021

APPLICATION FOR FOUR CORNERS GAS PRODUCERS ASSOCIATION FOR DESIGNATION OF A TIGHT FORMATION, SAN JUAN COUNTY, NEW MEXICO.

ORDER OF THE DIVISION

BY THE DIVISION:

This cause came on for hearing at 9 a.m. on March 16, 1982, at Santa Fe, New Mexico, before Examiner Richard L. Stamets.

NOW, on this ____ day of June, 1982, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS:

(1) That due public notice having been given as required by law, the Division has jurisdiction of this cause and the subject matter thereof.

(2) That the applicant Four Corners Gas Producers Association requests that the Division in accordance with Section 107 of the Natural Gas Policy Act, and 18 C.F.R. §271.703 recommend to the Federal Energy Regulatory Commission that the Dakota formation underlying certain lands situated in San Juan County, New Mexico, ~~hereinafter referred to as the Dakota formation~~ be designated as a tight formation in said Federal Energy Regulatory Commission's regulations.

Township 26 North, Range 12 West
Sections 1 through 36: All

Township 26 North, Range 13 West
Sections 1 through 36: All

Township 27 North, Range 12 West
Section 8: S/2
Section 9: S/2
Sections 16 through 36: All

Township 27 North, Range 13 West
Section 3: W/2
Sections 4 through 9: All
Section 10: W/2
Sections 14 through 36: All

Township 28 North, Range 13 West
Sections 7 through 9: All
Sections 16 through 21: All
Sections 28 through 33: All
Section 34: W/2

Township 29 North, Range 13 West
Sections 1 through 9: All
Sections 16 through 19: All
Section 20: W/2
Section 29: W/2
Sections 30 and 31: All
Section 32: W/2

Township 29 North, Range 14 West
Section 1: All
Section 2: W/2; SE/4
Sections 3 through 18: All
Section 19: NE/4
Sections 20 through 27: All
Section 28: N/2; SE/4
Section 34: N/2
Sections 35 and 36: All

Township 29 North, Range 15 West
Sections 1 through 6: All
Section 7: N/2
Section 8: N/2
Section 9: N/2
Section 10: N/2; SE/4
Sections 11 and 12: All
Section 13: N/2
Section 14: N/2

Township 30 North, Range 14 West
Sections 1 through 12: All
Sections 15 through 22: All
Sections 26 through 34: All

Township 30 North, Range 15 West
Sections 1 through 36: All

Containing a total of 165,120 acres, more or less.

(3) That the area proposed for tight formation designation lies within the horizontal limits of the Basin Dakota Gas Pool, which is a very large area previously defined and described by the Oil Conservation Division in San Juan County, New Mexico.

(4) That within the Basin Dakota Gas Pool are large areas of extensive development and large areas of very limited development.

(5) That the Dakota formation has been approved for infill drilling which permits the subject area to be developed with one Dakota well on each quarter section or 160 acre tract.

(6) That the area for which a tight formation designation

(7) That no proration unit within the proposed area contains an infill well

is sought is one of very limited development comprised of approximately 516 320-acre proration units of which 105 are developed by well; 36 of which are producing wells and 69 are nonproducers.

(8) That the area proposed for tight formation designation is largely undeveloped exploratory area.

(9) ~~(8)~~ That the Dakota formation underlies all the ~~above~~ described lands; that the upper Dakota sand consists of barrier beach deposits about 40 to 60 feet thick, composed of fine grained, quartz-rich sandstones characterized by an increase in grain size upward and low angle crossbedding. The next highest unit is transitional between fluvial and marine sedimentation containing dark carbonaceous shales, thin mudstones, siltstones and sandstones. The basal Dakota consists of carbonaceous shales, thin coal seams, siltstones, and thin channel sandstone.

(10) ~~(9)~~ That the top of the Dakota formation is found at an average depth of 5952 feet below the surface of the area set out in Finding No. (2) above, and has approximately 250 to 300 feet of gross thickness.

Compass Exploration Inc. Gulf Farmington Well No 1 located in Unit B of Section 4 Township 29 North Range 13 West San Juan County New Mexico

(11) ~~(10)~~ That the type section for the Dakota formation for the proposed tight formation designation is found at a depth of from approximately ~~6021~~ 5902 feet to ~~6321~~ 6270 feet on the log from the ~~Tennaco Oil Company, USA Scott No. 1 Well located in Unit F of Section 28, Township 28 North, Range 13 West, San Juan County, New Mexico~~

(12) ~~(11)~~ That the technical evidence presented in this case demonstrated that the predominant percentage of wells which may be completed in the Dakota formation within the proposed tight formation area may reasonably be presumed to exhibit permeability, gas productivity, or crude oil productivity not in excess of the following parameters:

(a) average in situ gas permeability throughout the pay section of 0.1 millidarcy; and

(b) stabilized production rates, without stimulation, against atmospheric pressure, as found in the table set out in 18 C.P.R. §271.703(c)(2)(B) of the regulations; and

(c) production of more than five barrels of crude oil per day.

(13) ~~(12)~~ That within the proposed area there is a recognized aquifer being the Ojo Alamo, found at a maximum depth of 1088 feet or approximately 4800 feet above the Dakota formation.

(14) ~~(13)~~ That existing State of New Mexico and Federal Regulations relating to casing and cementing of wells will assure that development of the Dakota formation will not adversely affect any overlying aquifers.

(15) ~~(14)~~ That the area described on Exhibit "A" to this order should be recommended to the Federal Energy Regulatory Commission for designation as a tight formation.

IT IS THEREFORE ORDERED:

(1) That it be and hereby is recommended to the Federal Energy Regulatory Commission pursuant to Section 107 of the Natural Gas Policy Act of 1978, and 18 C.F.R. §271.703 of the regulations that the Dakota formation underlying those lands in San Juan County, New Mexico, described on Exhibit "A" to this order, be designated as a tight formation.

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

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

STATE OF NEW MEXICO
OIL CONSERVATION DIVISON

JOE D. RAMEY
Director

S E A L

EXHIBIT A

Township 26 North, Range 12 West
Sections 1 through 36: All

Township 26 North, Range 13 West
Sections 1 through 36: All

Township 27 North, Range 12 West
Section 8: S/2
Section 9: S/2
Sections 16 through 36: All

Township 27 North, Range 13 West
Section 3: W/2
Sections 4 through 9: All
Section 10: W/2
Sections 14 through 36: All

Township 28 North, Range 13 West
Sections 7 through 9: All
Sections 16 through 21: All
Sections 28 through 33: All
Section 34: W/2

Township 29 North, Range 13 West
Sections 4 through 9: All
Sections 16 through 19: All
Section 20: W/2
Section 29: W/2
Sections 30 and 31: All
Section 32: W/2

Township 29 North, Range 14 West
Section 1: All
Section 2: W/2; SE/4
Sections 3 through 18: All
Section 19: NE/4
Sections 20 through 27: All
Section 28: N/2; SE/4
Section 34: N/2
Sections 35 and 36: All

Township 29 North, Range 15 West
Sections 1 through 6: All
Section 7: N/2
Section 8: N/2
Section 9: N/2
Section 10: N/2; SE/4
Sections 11 and 12: All
Section 13: N/2
Section 14: N/2

Township 30 North, Range 14 West
Sections 1 through 12: All
Sections 15 through 23: All
Sections 26 through 34: All

Township 30 North, Range 15 West
Sections 1 through 36: All

Containing a total of 165,120 acres, more or less.