United States Department of the Interior
BUREAU OF LAND MANAGEMENT
ALBUQUERQUE DISTRICT OFFICE
435 MONTANO N.E.
ALBUQUERQUE, NEW MEXICO 87107

TAKE PRIDE IN AMERICA

10425

3160 (015)

March 6, 1992

Marilyn L. Rand, Director
Division of Producer Regulation
Federal Energy Regulatory Comm.
825 North Capitol Street NE
Washington, DC 20426

Michael E. Stogner
Chief Hearing Officer
New Mex. Oil Conservation Div
P. O. Box 2088
Santa Fe, NM 87504-2088

Dear Ms. Rand and Mr. Stogner:

This letter is to be included with the submission to the FERC of the New Mexico Oil Conservation Division (NMOCD) Case No. 10425, Order No. R-9643, which designates a tight formation in New Mexico. The formation referred to is the Pictured Cliffs formation designated as the Tank Mountain Tight Gas Area consisting of 48,155.07 acres.

A copy of the BLM geologic review and engineering reports are enclosed.

This jurisdictional agency concurs with the NMOCD designation and hereby designates the area in NMOCD Case No. 10425, Order No. R-9643, and BLM Docket No. NM-583-91 as a tight formation.

Any persons objecting to this determination may file a protest directly with the Federal Energy Regulatory Commission, in accordance with 18 CFR Part 275.203 and 275.204, within 20 days after the notice is published in the Federal Register by the FERC.

If you have any questions contact Allen F. Buckingham at FTS 479-8765 or (505) 761-8765.

Sincerely yours,

Allen F. Buckingham

for Assistant District Manager
Mineral Resources

Enclosures

cc:
FERC Advance Cy (Marilyn L. Rand)
W. Thomas Kellahin (Conoco's Attorney)
Gregory Gazda, Conoco Inc
WO-610 (Donnie Shaw)
NM-922 (Joe Chesser)
NM-015 (ADM, Mineral Resources)

Bureau of Land Management
Minerals Division
435 Montano NE
Albuquerque, NM 87107

NGPA 107 Tight Formation Application
Tps. 31-32 N., Rs. 9-10 W., San Juan Co., N.M.
Pictured Cliffs Formation, Tank Mt. Area
NMOCD Case # 10425
Conoco, Oklahoma City Division

Geologic Review:

On December 20, 1991, Conoco came before the NMOCD in application for the designation of Tight Formation classification of the Pictured Cliffs (PC) Formations.

In summary, examination of the geologic data indicates that the Pictured Cliffs Formation in the area of the application, as revised by Jan. 10, 1992 letter, meets the NGPA classification criteria for a Tight Formation.

The principal exhibits in support of the designation are: type Log, cross sections, cores, isopleth map of cumulative production and map of PC permeability, saturation and production trends.

Pictured Cliffs production occurs in NW oriented shore-face deposits. As the intercontinental sea regressed to the northeast, periods of stable sea level occurred in which accumulations of shore-face sand deposits were created. A coarsening upward of grain size is typical of this type deposit indicating that better reservoir conditions will occur in the upper most section. The permeability values supplied in the application are derived from the upper, production portion of the PC. Seaward of the shore-face sand, texture becomes finer and less permeable. This is shown in Cross section A-A' by increasing clay/shale content from south to north.

This depositional environment, as it relates to the PC has been extensively studied and is fairly well understood. The absence of direct data in much of the application area, has caused Conoco to rely largely on this depositional model as support for designation.

Information from four cores was available in the study area which show the permeability is less than .1 md. at atmospheric pressure. Consequently, no corrections were made for in-situ conditions. The cores are from wells located along the north eastern extent of the major PC productive trend. Applying the depositional model, reservoir conditions are expected to deteriorate on the seaward side of the shore-face deposition. There are nine wells offsetting the currently defined productive limits. These wells, indicated on exhibit 1-B as "non-commercial", support the depositional interpretation. Although there are numerous reasons why a well may be unsuccessful,
Exh. 5 (Pictured Cliffs Production, Saturation an Permeability

Trends) locates Tank Mountain in a gas saturated, low permeable area.

In view of Exh. 5, (from Cumella, S.P. 1981 Master's Thesis, Univer. of TX @ Austin) and as supported by the core data, it is reasonable to assume that reservoir conditions, specifically permeability, have deteriorated in the application area.

Further northeast, beyond the undeveloped strip containing the application area, are two small pods of PC production (Exh. 1-B). Whether these are part of another productive shore face or isolated sands is not certain. However, calculated permeabilities of three wells in the larger pod indicate values of less than .1 md along the northern boundary of the proposed area.

Since the application area was contracted by letter dated January 10, 1992 an estimate of average PC depth in the revised area was determined from office records. It was found that the original value of 3,500 is still valid.

Fresh water formations will be protected in accordance with State and Federal regulations.

The data submitted supports the interpretation that the application area lies between two productive PC trends. Permeability values along the edges of the trends are less than .1 md and indicate low permeabilities across the application area. The presence of non-commercial wells, the interpretation of the cross sections and the trends and characteristics defined in Exh. 5, geologically support approval of the proposed Tank Mountain Tight Formation area.

Jane Clancy
1/15/92

Bureau of Land Management
Minerals Division
435 Montano NE
Albuquerque, NM 87107

Bureau of Land Management
Minerals Division
435 Montano NE
Albuquerque, NM 87107

Engineering Report- Application of Conoco, Inc. For Designation Of The Pictured Cliffs Formation In The Tank Mountain Area As A Tight Formation

Conoco's original application requested that the area in Sec. 7-36, T.32 N., R.9 W., Sec. 9-16, 21-28, 33-36, T.32 N., R.10 W., all of T.31 N., R.9 W., Sec. 1-4, 9-16, 25-28, 33-36, T.31 N., R.10 W., Sec. 1-6, T.30 N., R.9 W., Sec. 1-4, T.30 N., R.10 W. containing 71,192 acres, be designated as a Tight Formation in the Pictured Cliffs formation. An NMOCD hearing was held in Albuquerque on December 20, 1991. Following the presentation of the direct testimony by the applicants, numerous questions were asked by the BLM and NMOCD representatives and additional information was requested. By a letter dated January 10, 1992, Conoco amended their application to eliminate the lands in T.30 & 31 N., R.10 W., and certain lands in T.30 & 31 N., R.9 W. The amended area now contains approximately 48,155 acres. The area eliminated is roughly the SW\4 of the original area. This area is almost completely developed and contains only a few undeveloped spacing units.

Core data exists for three wells in the amended proposed area. Two wells near the center (SJ 32-9 #106 and #108) and one well on the upper western edge (EALUM #1). Analysis of the laboratory core reports shows an uncorrected (uncorrected for water saturation and over burden pressure) permeability of .013md, .011md, .028md for the wells respectively. Because the Pictured Cliffs formation in this area requires stimulation to produce in paying quantities and coring is expensive, cores are seldom taken on these wells. There is no other data available in the proposed area. Three wells were completed in the Pictured Cliffs formation just north of the proposed area. No cores were available for these wells either, but an estimated permeability was calculated using the Infinite Acting Radial Flow Equation. Initial reservoir parameters were used and some assumptions had to be made. The calculations yielded permeabilities of .069md, .083md, .051md. These values are about twice the values that were measured in the lab, but they are still less than .1md. A possible explanation is their higher value may be due to the assumptions that had to be made in order to do the calculations. All of the available data indicates that the in situ permeability for the area is expected to be less than .1md.

As mentioned earlier, all of the wells in the area require stimulation to establish production at commercial rates. There are no DST's or pre-stimulation pressure build up tests for any of the existing wells in the area except for one. The SJ 32-9 #106 was completed in the SE\4 of section 17, T.31 N., R.9 W., on June 19, 1991. The well was perforated and then shut in for 27 days. The SICP reached 340 psi. The well was flow tested using an 8\64 choke to the atmosphere. The rate went from 130 mcfpd to 0 in four hours. This would indicate a stabilized pre-stimulation rate of less than 1 mcfpd. This information along with a pressure and rate graph are presented in exhibit #6.

The wells in the area produce dry gas with no oil or water. The wells in the area produce an average of less than one barrel of condensate per month.

Although there is not alot of information available for the proposed area, based on the information presented in the application and other additional published information, this area appears to meet the requirements for designation as a Tight Formation. It is recommended that this application be forwarded to FERC for designation.

Robert Kent
12 Feb 92

Bureau of Land Management
Minerals Division
435 Montano NE
Albuquerque, NM 87107

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

March 10, 1992

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

Federal Energy Regulatory Commission
825 N. Capitol Street, NE
Room 6300, Mail Stop PR-25
Washington, D.C. 20426

Attention: Marilyn L. Rand, Director
Division of Producer Regulation

RE: Division Case No. 10425. Application of Conoco,Inc. for designation of a tight formation, San Juan County, New Mexico.

Dear Ms. Rand:

Pursuant to FERC Rule 271.703(c)(3), please find enclosed two copies of Division Order No. R-9643, issues in said Case No. 10425 and dated March 9, 1992, recommending to the Federal Energy Regulatory Commission that the Pictured Cliffs formation underlying the proposed Tank Mountain Tight Formation Area in San Juan County, New Mexico, be designated as a "tight formation" under Section 107 of the Natural Gas Policy Act of 1978.

Enclosed, also find copies of the hearing transcript and exhibits presented by the applicant at the December 20, 1991 public hearing.

Please note the concurrence of the U.S. Department of Interior, Bureau of Land Management with our recommendation for said area by letter dated March 6, 1992 from Allen F. Buckingham, Manager of the NGPA Section, Albuquerque District Office.

Should you have any questions or require additional information, please contact me.

Sincerely,

Michael E. Stogner
Chief Hearing Officer/Engineer

MES/ag

cc: Case File: 10425
W. Thomas Kellahin - Santa Fe
USBLM - Albuquerque, Allen Buckingham
NMOCD - Aztec

UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

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

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

Conoco, Inc., pursuant to Section 107 of the Natural Gas Policy Act of 1978, 18 CFR §271.703 of the FERC regulations and the New Mexico Oil Conservation Division's Special Rules and Procedures for Tight Formation Designations under Section 107 of the Natural Gas Policy Act of 1978, as promulgated by Order No. R-6388-A, petitioned the New Mexico Oil Conservation Division for tight formation designation of the Pictured Cliffs formation underlying the proposed Tank Mountain Tight Formation Area in San Juan County, New Mexico.

After notice and hearing on the application of Conoco, Inc., the New Mexico Oil Conservation Division hereby recommends that portion of the Pictured Cliffs formation as described on page 2 and 3 of Exhibit "A", being New Mexico Oil Conservation Division Order No. R-9643 attached hereto and incorporated by reference, be designated a tight formation. Additionally, the New Mexico Oil Conservation Division submits herewith Exhibit "B", a copy of the transcript and exhibits presented to the Division in Case No. 10425; Exhibit "C", a copy of a letter from Amoco Production Company dated December 19, 1991 supporting the subject application; Exhibit "D", a letter from Conoco, Inc.'s general counsel dated January 10, 1992, to the New Mexico Oil Conservation Division and the US Bureau of Land Management (BLM) requesting an amendment to the proposed tight formation area and Exhibit "E", a copy of a letter from the BLM, dated March 6, 1992, attached hereto and incorporated herein by reference, which are supporting data required under 18 CFR §271.703 of the FERC regulations, respectively.

Respectfully submitted this 10th day of March, 1992.

Michael E. Stogner
Chief Hearing Officer/Engineer

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

March 4, 1992

US Bureau of Land Management
Albuquerque District Office
435 Montaño Road
Albuquerque, NM 87107

Attention: Allen Buckingham

RE: Division Case No. 10425. Application of Conoco, Inc. for Designation of a Tight Formation, San Juan County, New Mexico.

Dear Mr. Buckingham:

Enclosed please find a copy of Division Order No. R-9643 to be issued in Case No. 10425 recommending to the Federal Energy Regulatory Commission that the Pictured Cliffs formation underlying the "Tank Mountain Tight Gas Area" in San Juan County, New Mexico, be designated as a "tight formation" under Section 107 of the Natural Gas Policy Act of 1978.

Enclosed for your files is also a copy of the December 20, 1991 hearing transcript of this matter.

Should you require additional information, please contact me at (505) 827-5811.

Sincerely,

Michael E. Stogner
Chief Hearing Officer/Engineer

MES/ag

cc: Case File 10425
W. Thomas Kellahin - Santa Fe

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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

Case No. 10425
Order No. R-9643

APPLICATION OF CONOCO, INC. 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 9:00 a.m. on December 20, 1991, at Albuquerque, New Mexico, before Examiner Michael E. Stogner.

NOW, on this _____ day of February, 1992, the Division Director, having considered the testimony, the record, and the recommendations of the Examiner, and being fully advised in the premises,

FINDS THAT:

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

(2) The applicant, Conoco, Inc., initially requested that the Division, in accordance with Section 107 of the Natural Gas Policy Act of 1978 and 18 C.F.R. Section 271.701-703, recommend to the Federal Energy Regulatory Commission (FERC) that the Pictured Cliffs formation underlying 71,192.87 acres, more or less, of lands in San Juan County, New Mexico, as described in Exhibit"A" attached to this order, hereinafter referred to as the Pictured Cliffs formation, be designated as a "tight formation."

(3) The area described in said Exhibit "A" can best be described as a rectangle measuring approximately 10 miles longitudinal and 11 1/2 miles latitudinal. Approximately one-third of the proposed area has experienced extensive development within the Pictured Cliffs formation while the remaining geographical area has almost no production and only a nominal number of bore-holes in which to obtain data. This producing area is entirely within the Blanco-Pictured Cliffs Pool and can best be described as a right triangle extending approximately 6 1/2 miles east and 8 miles north from the southwest corner of

the entire area. The resulting hypotenuse, which extends 10 1/2 miles in a northwesterly/southeasterly direction is the boundary line within the original proposed area where development of the Pictured Cliffs formation occurs.

(4) At the time of the hearing, the applicant presented extensive geological data of the surrounding area utilizing subsurface data from the producing Blanco-Pictured Cliffs Pool, data from the "tight formation area" designated as "NM-7", a small Pictured Cliffs gas producing structure just north of this area in Colorado, and data available from several wellbores in the expansive "barren area."

(5) The applicant presented evidence showing that the Pictured Cliffs formation within the proposed tight formation area has been penetrated by approximately 148 wells, most of which are situated within said developed triangular area. At the time of the hearing, the applicant concentrated its engineering support data from information obtained on wells located along the periphery of the developed and barren regions of the proposed tight formation area.

(6) At the conclusion of the hearing proceedings, Conoco, Inc. was requested to submit additional engineering data from wells within the developed area to supplement its application. The record in this case was to remain open until this additional information was submitted for review.

(7) On January 22, 1992, by letter from general counsel, Conoco, Inc. requested the Division consider an amendment to its application ("the amended area") reducing the proposed tight formation area to that portion of the Pictured Cliffs formation underlying 48,155.07 acres, more or less, of lands in San Juan County, New Mexico as described in Exhibit "B" attached hereto and made a part hereof, which comprises the barren northeastern two-thirds of the original area.

(8) The Pictured Cliffs formation underlies all of the lands described in the amended area; the formation consists of fine to very fine grain sands classified as litharenite with significant amounts of digenetic minerals formed in the intergranular pore spaces resulting in porosity which has been significantly reduced due to compaction and mineralization of the intergranular spaces. The top of the formation is found at an average depth of 3500 feet below the surface and the gross thickness of productive sand is approximately 150 feet.

(9) The deposition of the Pictured Cliffs formation in the immediate area consists of near shore bars which are lenticular, ribbon-like deposits oriented northwest to southeast; that better production is encountered on the crests of these near shore bars where the sands appear to be better developed than the areas off the bar crests where the sands become siltier and more mineral-filled and the amended area is off the northeast side of a bar crest in largely undeveloped exploratory area.

(10) The Division and the U.S. Bureau of Land Management have previously recommended to and the Federal Energy Regulatory Commission has previously approved other portions of the Pictured Cliffs formation in this general area as "tight formation designation."

(11) The type section for the Pictured Cliffs formation is found at a depth of approximately 3500 feet, with the productive portion being the upper 70 feet of a 150-foot section as described by the State of New Mexico on the Dual Induction-SFL log from the Amoco Production Company's San Juan 32-9 Unit Well No. 102 located in the SW/4 NW/4 of Section 17, Township 31 North, Range 9 West, NMPM, San Juan County, New Mexico.

(12) The original area of application, as described in Exhibit "A", included some 133 wells which produce from the Pictured Cliffs formation, all located in the southwestern third of the area, and all required fracture stimulation to achieve commercial rates of production.

(13) According to the applicant, the amended area contains a total of fifteen wells, six of which are non-commercial Pictured Cliffs attempts.

(14) The amended area is to the northeast of the Pictured Cliffs trend and is expected to be a lower productivity area. The northern boundary of this area is correlative to Pictured Cliffs wells in Colorado with calculated in-situ gas permeability of 0.083md, 0.051md and 0.069md. The eastern boundary of this area is correlative to the previously approved "NM-7" tight formation designation recommended by Division Order R-6594 and subsequently approved by the FERC. The western boundary is defined by off trend non-commercial Pictured Cliff well attempts. The southern boundary is the Picture Cliff trend running generally northwest to southeast.

(15) Within the amended area, there are three core analysis which measured in-situ permeability of 0.014md, 0.028md and 0.007md.

(16) Within the amended area, a pressure buildup analysis on the San Juan 32-9 Unit Well No. 106 located in the SE/4 of Section 17, Township 31 North, Range 9 West, San Juan County, results in a calculated in-situ permeability of 0.007md.

(17) The typical Pictured Cliffs well in the San Juan Basin produces dry methane gas with little or no well head condensate and no water. No Pictured Cliffs well in the area is known to produce volumes of oil or condensate greater than one barrel per day.

(18) The evidence presented in the Case demonstrated that no well formerly or currently completed in the Pictured Cliffs formation within the amended proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the following parameters:

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

(b) stabilized gas production rate, without stimulation, against atmospheric pressure, of 91 MCFPD, the FERC maximum allowable production gas rate for an average formation depth of 3500 feet; and

(c) crude oil production rate of 5 barrels per day.

(19) Based on analysis of available data from existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) the estimated average in-situ gas permeability, throughout the pay section of the Pictured Cliffs formation, is expected to be 0.1 millidarcy or less; and

(b) the stabilized production rate, against atmospheric pressure, of wells completed for production in the Pictured Cliffs formation, without stimulation, is not expected to exceed 91 MCFPD, the FERC maximum allowable production rate for an average formation depth of 3500 feet; and

(c) no wells drilled into the Pictured Cliffs formation is expected to produce, without stimulation, more that 5 barrels of crude oil per day.

(20) Within the amended area the deepest fresh water aquifer that is expected to be used as a domestic or agricultural water supply is the Ojo Alamo which is found at an average depth of 1900 feet; and existing State of New Mexico and Federal regulations relating to casing and cementing of wells will assure that development of the Pictured Cliffs formation will not adversely affect the fresh water zones.

(21) The Pictured Cliffs formation within the amended area is governed by statewide rules which require 160-acres spacing for gas wells. Currently, no special rules authorizing infill drilling exist in the area.

(22) Based on evidence and testimony submitted by the applicant, the Pictured Cliffs formation within the vertical intervals described in Finding Paragraph No. (6), underlying the area described in Exhibit "B", meets the criteria set forth in the FERC Regulations in Title 18 CFR, Section 271.703 and should therefore be recommended for designation as a "tight formation".

IT IS THEREFORE ORDERED THAT:

(1) 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 FERC Regulations in Title 18 C.F.R. Section 271.703 that the Pictured Cliffs formation within the vertical limits described in Finding Paragraph Nos. (8), (9), and (11) of this order, underlying certain lands in San Juan County, New Mexico, as shown on Exhibit "B" attached to this order, be designated a tight formation.

(2) That jurisdiction is hereby retained for 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

Original Signed by William J. LeMay

WILLIAM J. LeMAY
DIRECTOR

SEAL

Exhibit "A"
Case No. 10425
Order No. R-9643

Original area requested by Conoco, Inc. for the designation of the Pictured Cliffs formation as a Tight Formation.

SAN JUAN COUNTY, NEW MEXICO

TOWNSHIP 30 NORTH, RANGE 9 WEST, NMPM
Sections 1 through 6: All

TOWNSHIP 30 NORTH, RANGE 10 WEST, NMPM
Sections 1 through 4: All

TOWNSHIP 31 NORTH, RANGE 9 WEST, NMPM
Sections 1 through 36: All

TOWNSHIP 31 NORTH, RANGE 10 WEST, NMPM
Sections 1 through 4: All
Sections 9 through 16: All
Sections 21 through 28: All
Sections 33 through 36: All

TOWNSHIP 32 NORTH, RANGE 9 WEST, NMPM
Sections 7 through 36: All

TOWNSHIP 32 NORTH, RANGE 10 WEST, NMPM
Sections 9 through 16: All
Sections 21 through 28: All
Sections 33 through 36: All

The proposed "tight formation" as described above includes portions of the Blanco Pictured Cliffs Pool. Said area comprises a total of 71,192.87 acres, more or less, and consists of the following (more or less):

Federal:	56,322.97 acres
State:	8,769.76 acres
Fee:	6,100.14 acres

Exhibit "B"
Case No. 10425
Order No. R-9643

Amended area requested by Conoco, Inc. for the designation of the Pictured Cliffs formation as a Tight Formation.

SAN JUAN COUNTY, NEW MEXICO

TOWNSHIP 30 NORTH, RANGE 9 WEST, NMPM
Sections 1 through 3: All
Section 4: Lots 1 and 2, S/2 NE/4 and SE/4 (E/2 equivalent)

TOWNSHIP 31 NORTH, RANGE 9 WEST, NMPM
Sections 1 through 6: All
Sections 8 through 17: All
Sections 21 through 27: All
Section 28: Lots 1, 3, and 4, N/2 N/2, S/2 NE/4, SE/4 NW/4 and N/2 SE/4 (N/2 and SE/4 equivalent)
Section 33: Lots 1, 2, 7 through 10, 15, and 16 (E/2 equivalent)
Section 34 through 36: All

TOWNSHIP 31 NORTH, RANGE 10 WEST, NMPM
Sections 1: All

TOWNSHIP 32 NORTH, RANGE 9 WEST, NMPM
Sections 7 through 36: All

TOWNSHIP 32 NORTH, RANGE 10 WEST, NMPM
Sections 9 through 16: All
Sections 21 through 28: All
Sections 33 through 36: All

The amended proposed "tight formation" as described above includes portions of the Blanco Pictured Cliffs Pool. Said area comprises a total of 48,155.07 acres, more or less, and consists of the following (more or less):

Federal:	38,089.09 acres
State:	5,766.48 acres
Fee:	4,299.50 acres

KELLAHIN, KELLAHIN AND AUBREY
ATTORNEYS AT LAW
EL PATIO BUILDING
117 NORTH GUADALUPE
POST OFFICE BOX 2265
SANTA FE, NEW MEXICO 87504-2265

W. THOMAS KELLAHIN*
KAREN AUBREY†

*NEW MEXICO BOARD OF LEGAL SPECIALIZATION RECOGNIZED SPECIALIST IN THE AREA OF NATURAL RESOURCES-OIL AND GAS LAW
†ALSO ADMITTED IN ARIZONA

JASON KELLAHIN (RETIRED 1991)

TELEPHONE (505) 982-4285
TELEFAX (505) 982-2047

January 24, 1992

Mr. Michael E. Stogner
Hearing Examiner
Oil Conservation Division
310 Old Santa Fe Trail
Room 206
Santa Fe, New Mexico 87501

HAND DELIVERED

RECEIVED
JAN 24 1992
OIL CONSERVATION DIVISION

RE: Application of Conoco, Inc. for Designation of a Tight Formation Area for Pictured Cliffs formation
San Juan County, New Mexico
NM OCD Case No. 10425

Dear Mr. Stogner:

On behalf of Conoco, Inc., please find enclosed for your consideration, the original of Mr. Steven C. Klein's affidavit concerning the acreage within the proposed tight formation area.

Very truly yours,

W. Thomas Kellahin

WTK/jcl
Enclosure
xc: Gregory Gazda - Conoco, Inc.

ltrt124.089

STATE OF NEW MEXICO

ENERGY AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

IN THE MATTER OF THE
APPLICATION OF CONOCO, INC.
FOR DESIGNATION OF A TIGHT
FORMATION, SAN JUAN
COUNTY, NEW MEXICO

Case No. 10425

AFFIDAVIT OF STEVEN C. KLEIN

STATE OF OKLAHOMA)
) SS.
COUNTY OF OKLAHOMA)

STEVEN C. KLEIN, being first sworn upon oath, deposes and states:

1. I am a Petroleum Landman and I obtained a BBA degree from the University of Central Oklahoma in 1980, and an MBA from the University of Central Oklahoma in 1988.

2. I am knowledgeable about oil and gas mineral title in San Juan County, New Mexico.

3. Based upon review of public documents which I believed to be correct and reliable, it is my opinion that the ownership of the oil and gas mineral interests underlying the Conoco initial application area in this case as set forth on Exhibit A is as follows:

Federal Acreage:	56,322.97 acres
State Acreage:	8,769.76 acres
Fee Acreage:	6,100.14 acres
TOTAL	71, 192.87 acres

4. In addition, it is my opinion that the ownership of the oil and gas minerals underlying the Conoco proposed amended application area in this case as set forth on Exhibit B is as follows:

Federal Acreage:	38,089.09 acres
State Acreage:	5,766.48 acres
Fee Acreage:	4,299.50 acres
TOTAL	48,155.07 acres

Steven C. Klein

On this 17TH day of January 1992, Steven C. Klein personally appeared before me, and is known to be the person described herein and who executed this instrument and acknowledged that he executed the same as his own free act and deed.

PEGGY S. CORBIN
NOTARY PUBLIC
CANADIAN COUNTY
In And For State Of Oklahoma
My Commission Expires July 19, 1995

Notary Public

My Commission Expires:

7-19-95

SCK\Afft625.wpd\pc

KELLAHIN, KELLAHIN AND AUBREY
ATTORNEYS AT LAW
EL PATIO BUILDING
117 NORTH GUADALUPE
POST OFFICE BOX 2265
SANTA FE, NEW MEXICO 87504-2265

W. THOMAS KELLAHIN*
KAREN AUBREY†

*NEW MEXICO BOARD OF LEGAL SPECIALIZATION RECOGNIZED SPECIALIST IN THE AREA OF NATURAL RESOURCES-OIL AND GAS LAW
†ALSO ADMITTED IN ARIZONA

JASON KELLAHIN (RETIRED 1991)

TELEPHONE (505) 982-4285
TELEFAX (505) 982-2047

January 22, 1991

Mr. Michael E. Stogner
Hearing Examiner
Oil Conservation Division
310 Old Santa Fe Trail, Room 206
State Land Office Building
Santa Fe, New Mexico 87501

HAND DELIVERED

Re: Application of Conoco Inc. for Designation of a Tight Formation Area for Pictured Cliffs formation, San Juan County, New Mexico
NMOCD Case 10425

Dear Mr. Stogner:

On behalf of Conoco Inc, please find enclosed for your consideration, a draft order for entry in this case. I have enclosed a floppy disk with this document on it for your convenience.

In addition, please find enclosed three complete sets of the required exhibits for submittal to the FERC.

Please let me know if there is anything I can do to assist you in expediting the processing of this case.

Very truly yours,

W. Thomas Kellahin

WTK/jcl
Enclosure
cc: Mr. Gregory Gazda (Conoco)

ltrt122a.089

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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

CASE No. 10425
ORDER No. R-

APPLICATION OF CONOCO, INC.
FOR DESIGNATION OF A TIGHT
FORMATION, SAN JUAN COUNTY
NEW MEXICO

ORDER OF THE DIVISION

BY THE DIVISION:

This Case came on for hearing at 9:00 a.m. on December 20, 1991 at Albuquerque, New Mexico, before Examiner Michael E. Stogner.

NOW, on this _____ day of January 1992, 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 over this Case and the subject matter thereof.

(2) That the Applicant, Conoco, Inc., initially requested that the Division in accordance with Section 107 of the Natural Gas Policy Act of 1978 and 18 C.F.R. Sect. 271.701-703 recommend to the Federal Energy Regulatory Commission (FERC) that the Pictured Cliffs formation underlying 71,192.87 acres, more or less, of lands in San Juan County, New Mexico, as described in Exhibit "A" attached to this Order, hereinafter referred to as the Pictured Cliffs formation, be designated as a tight formation in the Federal Energy Regulatory Commission's regulations.

(3) The applicant, thereafter, amended its application ("the Amended Area") reducing the area of its application to that portion of the Pictured Cliffs formation underlying 48,155.07 acres, more or less, of lands in San Juan County, New Mexico as described in Exhibit "B" attached to this Order.

(4) The amended area described in Exhibit B, is the northeastern portion of the original area.

(5) That the Pictured Cliffs Formation underlies all of the lands described in the Amended Area; that the formation consists of fine to very fine grain sands classified as litharenite with significant amounts of diagenetic minerals formed in the intergranular pore spaces resulting in porosity which has been significantly reduced due to compaction and mineralization of the intergranular spaces; that the top of the formation is found at an average depth of 3500 feet below the surface; and that the gross thickness of productive sand is approximately 150 feet.

(6) That the deposition of the Pictured Cliffs Formation in the immediate area consists of near shore bars which are lenticular, ribbon-like deposits oriented northwest to southeast; that better production is encountered on the crests of these near shore bars where the sands appear to be better developed than the areas off the bar crests where the sands become siltier and more mineral filled; and that the amended area is off the northeast side of a bar crest in largely undeveloped exploratory area.

(7) The Division has previously recommended to and the Federal Energy Regulatory Commission has previously approved other portions of the Pictured Cliffs formation in this general area as "tight formation designation."

(8) That the type section for the Pictured Cliffs Formation is found at a depth of approximately 3500 feet, with the productive portion being the upper 70 feet of a 150 foot section as described by the State of

New Mexico on the dual Induction-SFL log from the Amoco Production Company's San Juan 32-9 Unit #102 well located in the SW/4NW/4 of Section 17, Township 31 North, Range 9 West, San Juan County, New Mexico.

(9) The original area of application described in Exhibit A included some 133 wells which produce from the Pictured Cliffs formation, all located in the southwestern third of the area, and all required fracture stimulation to achieve commercial rates of production.

(10) The amended area contains six non-commercial attempts to complete Pictured Cliffs formation wells. (Applicant's Exhibit 1B)

(11) The amended area is to the northeast of the Pictured Cliffs trend and is expected to be a lower productivity area. The northern boundary of this area is correlative to Pictured Cliffs wells in Colorado with calculated in situ gas permeability of 0.083md, 0.051md and 0.069md. (Applicant's Exhibits #12, #13 & #14). The eastern boundary of this area is correlative to the previously approved "NM-7" tight formation designation recommended by Division Order R-6594 and subsequently approved by the FERC. The western boundary is defined by off trend non-commercial Pictured Cliff well attempts. The southern boundary is the Picture Cliff trend running generally northwest to southeast.

(12) Within the amended area, there are three core analysis which measured in situ permeability of 0.014md, 0.028md and 0.007md. (Applicant's Exhibits #8,#9 and #10).

(13) Within the amended area, a pressure buildup analysis on the San Juan 32-9 Unit well #106 results in a calculated in situ permeability of 0.007md. (Applicant's exhibit #15)

(14) The typical Pictured Cliffs well produces dry methane gas with little or no well head condensate and no water. No Pictured Cliffs well in the area is known

to produce volumes of oil or condensate greater than one barrel per day.

(15) That the evidence presented in the Case demonstrated that no well formerly or currently completed in the Pictured Cliffs formation within the amended proposed area exhibited permeability, gas productivity, or crude oil productivity in excess of the following parameters:

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

(b) stabilized gas production rate, without stimulation, against atmospheric pressure, of 91 MCFPD, the FERC maximum allowable production gas rate for an average formation depth of 3500 feet; and

(c) crude oil production rate of 5 barrels per day.

(16) That based on analysis of available data from existing wells within the proposed area and utilizing generally and customarily accepted petroleum engineering techniques and measurements:

(a) the estimated average in situ gas permeability, throughout the pay section of the Pictured Cliffs formation, is expected to be 0.1 millidarcy or less; and

(b) the stabilized production rate, against atmospheric pressure, of wells completed for production in the Pictured Cliffs formation, without stimulation, is not expected to exceed 91 MCFPD, the FERC maximum allowable production rate for an average formation depth of 3500 feet; and

(c) no wells drilled into the Pictured Cliffs formation is expected to produce, without stimulation, more that 5 barrels of crude oil per day.

(17) That within the amended area the deepest fresh water aquifer that is expected to be used as a domestic or agricultural water supply is the Ojo Alamo which is found at an average depth of 1900 feet; and that existing State of New Mexico and Federal regulations relating to casing and cementing of wells will assure that development of the Pictured Cliffs formation will not adversely affect the fresh water zones.

(18) That the Pictured Cliffs formation within the proposed area as amended and described on Exhibit B 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. Sect. 271.703 that the Pictured Cliffs formation underlying certain lands in San Juan County, New Mexico, as shown on Exhibit "B" attached to this Order, be designated a tight formation.

(2) That jurisdiction of this Case is hereby retained for 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

WILLIAM J. LeMAY
DIRECTOR

SEAL

ordt115.089

EXHIBIT "A"
ORIGINAL AREA

Township 30 North, Range 9 West

All of Sections 1-6

Township 30 North, Range 10 West

All of Sections 1-4

Township 31 North, Range 9 West

All of Sections 1-36

Township 31 North, Range 10 West

All of Sections 1-4, 9-16, 21-28, 33-36

Township 32 North, Range 9 West

All of Sections 7-36

Township 32 North, Range 10 West

All of Sections 9-16, 21-28, 33-36

consisting of:

Federal:	56,322.97 acres
State:	8,769.76 acres
Fee:	6,100.14 acres

and containing a total of 71,192.87 acres, more or less.

EXHIBIT "B"
AMENDED AREA

Township 30 North, Range 9 West

Sections: 1,2, and 3
Section 4: E/2

Township 31 North, Range 9 West

All of Sections: 1-6, 8-17, 21-27,34-36
Section 28: N/2 and SE/4
Section 33:L E/2

Township 31 North, Range 10 West

All of Section 1

Township 32 North, Range 9 West

All of Sections 7-36

Township 32 North, Range 10 West

All of Sections 9-16, 21-28, 33-36

consisting of:

Federal:	38,089.09 acres
State:	5,766.48 acres
Fee:	4,299.50 acres

and containing a total of 48,155.07 acres, more or less.

Facsimile Transmission

Date: 12/19/91	Time Sent:
This transmission consists of: 2 pages	
TO: MICHAEL STOGNER	FROM: BILL HAWKINS
NMOCD	AMOCO
SANTA FE, NM	DENVER, CO
FAX Number: 505 827-5741	FAX Telephone Number
FAX Operator's Number for Confirmation	Voice Telephone Number: 303-830-5072
	Mail Code: 2456

Notes:

Amoco Production Company

Southern Rockies Business Unit
Amoco Building
1670 Broadway
Post Office Box 800
Denver, Colorado 80201
303-830-4040

December 19, 1991

William J. LeMay, Director
New Mexico Oil Conservation Division
P. O. Box 2088
Santa Fe, New Mexico 87504

File: CAW-393-986.511

NMOCD Case 10425
Conoco's Application for Tight Formation Designation
Pictured Cliffs Formation
Tank Mountain Area
San Juan & Rio Arriba Counties, New Mexico

Amoco Production Company is an owner of leasehold interests in the application area and an affected party in this case. We have reviewed the application by Conoco and are in agreement with their assessment of the reservoir characteristics of the Pictured Cliffs formation. We recognize that there is only limited data to determine in situ permeability and pre-stimulation flow rates. This is primarily due to the tight formation characteristics of the Pictured Cliffs. Many of these wells are marginally economic. Almost without exception, they must be fracture stimulated to achieve commercial production. In many cases the stimulation costs are equal to the drilling costs of the well. For precisely this reason, most operators forego pre-stimulation testing and proceed with fracture stimulation in the most timely and cost effective manner possible.

Amoco supports the application for Tight Formation designation for the following reasons:

1. The available Picture Cliffs reservoir data in this area meets the guideline criteria from the FERC for tight formations.

2. The regional geology indicates that as you progress northward in the San Juan Basin, the Picture Cliffs reservoir permeability and productivity deteriorates.

3. The Pictured Cliffs wells in this general area exhibit low permeability characteristics requiring significant fracture stimulation to achieve commercial production.

Sincerely,

J. W. Hawkins

JWH/jmc

cc: Tom Lapinski
Mike Cuba
Sandy Braun
Eric Nitcher

KELLAHIN, KELLAHIN AND AUBREY
ATTORNEYS AT LAW
EL PATIO BUILDING
117 NORTH GUADALUPE
POST OFFICE BOX 2265
SANTA FE, NEW MEXICO 87504-2265

W. THOMAS KELLAHIN
KAREN AUBREY

JASON KELLAHIN
OF COUNSEL

TELEPHONE (505) 982-4285
TELEFAX (505) 982-2047

November 26, 1991

Mr. Michael E. Stogner
Oil Conservation Division
310 Old Santa Fe Trail
State Land Office Building
Santa Fe, New Mexico 87501

HAND DELIVERED

10425

RE: Proposed Tight Formation
Application of Conoco, Inc.

Dear Mike:

Last Friday you brought to my attention the possibility of coordinating the Conoco tight formation application with others you were working on. The idea is that we may be able to include the Conoco case with those that are being scheduled for a joint OCD-BLM preliminary review.

Towards that end, I have enclosed a draft OCD application for Conoco and a set of exhibits. I am prepared to file the original so that it could be set on the December 19th OCD docket.

I appreciate your continued suggestions on how we should proceed. Please call me.

Best regards,

W. Thomas Kellahin

WTK/jcl
Enclosure

ltrt1126.089

Case File

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

New Mexico DRUG FREE It's a State of Mind!

November 26, 1991

BRUCE KING
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

Conoco, Inc.
c/o W. Thomas Kellahin
P.O. Box 2265
Santa Fe, NM 87504

RE: Proposed Tight Formation Application

Dear Mr. Kellahin:

I am in receipt of your application today for designation of the Pictured Cliffs formation in Townships 30, 31 and 32 North, Ranges 9 and 10 West, NMPM, San Juan County, New Mexico, as a "Tight Formation" under Section 107 of the Natural Gas Policy Act of 1978.

Said application is set for the December 19-20, 1991 Examiner Hearing. At this time, three tight formation applications have already been set for hearing on Friday, December 20, 1991 at the Albuquerque District Office of the Bureau of Land Management located at 435 Montaño Road, NE. These arrangements were made prior to your filing.

At this time is not a requirement of the OCD, but I would *strongly suggest* a preliminary review of this application with the BLM prior to a hearing. If my schedule permits, I would also like to attend this meeting. If this is not possible between now and the hearing date, I would suggest continuation of this matter to the hearing set on January 23, 1992.

Should you have any questions or comments concerning this matter, please contact me.

Sincerely,

Michael E. Stogner
Chief Hearing Officer/Engineer

MES/ag

cc: Oil Conservation Divison - Aztec
US Bureau of Land Mangement - Allen Buckingham

CONOCO

REQUEST FOR FACSIMILE TRANSMISSION

12-18-91

Date

Clark 10425

To: Michael Stogner -	
Location: NMOCD - Santa Fe	**Dept.:** NM OCD
FAX No.: 505-827-5741	**Tel.:** 827-5811

From: Ben L. Sargent	
Location: EPNG/NA, Oklahoma City	**Dept.:** Production
FAX No.: (405) 948-3145	**Tel.:** 948-4811

7 + Cover

No. Pages + Cover

MESSAGE: Exhibits For Friday

FORMS\FAX.WPD\mel

NMOCD CASE #10425

San Juan #32-9 Tight Gas Sand Credit Analysis

EXHIBIT #12

Southern Ute 13-1
NE 13-32N-9W
La Plata Co., CO

An evaluation of the reservoir permeability was made for the nearest Pictured Cliffs production North of the area proposed for qualification. Based upon initial reservoir conditions and calculated Reservoir Rock and Fluid Properties an order of magnitude estimate of reservoir permeability was made using the equation for infinite acting radial flow. The equation, data input, and results are listed below. The first month's production average was used to compute the daily rate expected from the parameters used in the equation. The well analysis resulted in a permeability magnitude less than 0.1 millidarcy (md).

INFINITE ACTING RADIAL FLOW EQUATION

$$Q_g = \frac{k_g h(P_i^2 - P_{wf}^2) * [\log(k_g t/\phi\mu c_t r_w^2) - 3.23 + .87\ S]^{-1}}{1638\mu\ T\ Z}$$

Reservoir Rock and Fluid Properties

	S. UTE 13-1
Sp Gr	.60
T (R)	580
μavg (cp)	.014
Zavg	.86
Pi (psig)	1350
Pwf (psig)	300
S (Stimulated Skin)	-3
h (feet)	74
ct (psi-1)	$.9277 \times 10^{-3}$
rw (ft)	17.5
Based upon Fracture length	
t (hrs)	360
lst month	385
avg rate (mcfd) State Report	
CALCULATION RESULTS	
Permeability (Md)	.069

EXHIBIT 12
Page 2

EXHIBIT 12

Assumptions used to determine physical parameters used in the infinite acting radial flow equation. To determine an effective wellbore radius for a hydraulic fractured well the following correlation was used.

$L = 2R_w e^{-s}$

L = Fracture half length

R_w = Effective wellbore radius

S = Skin

The skin was assumed to be -3.0 since the well had been stimulated. The fracture length was estimated from data obtained from scout ticket data. From the fracture half length and skin an effective wellbore radius was calculated.

NMOCD CASE #10425

San Juan #32-9 Tight Gas Sand Credit Analysis

EXHIBIT #13

Southern Ute 24-2
NW 24-32N-9W
La Plata Co., CO

An evaluation of the reservoir permeability was made for the nearest Pictured Cliffs production North of the area proposed for qualification. Based upon initial reservoir conditions and calculated Reservoir Rock and Fluid Properties an order of magnitude estimate of reservoir permeability was made using the equation for infinite acting radial flow. The equation, data input, and results are listed below. The first month's production average was used to compute the daily rate expected from the parameters used in the equation. The well analysis resulted in a permeability magnitude less than 0.1 millidarcy (md).

INFINITE ACTING RADIAL FLOW EQUATION

$$Q_g = \frac{k_g h (P_i^2 - P_{wf}^2) * [\log(k_g t / \phi \mu c_t r_w^2) - 3.23 + .87\ S]^{-1}}{1638 \mu\ T\ Z}$$

Reservoir Rock and Fluid Properties

	S. UTE 24-2
Sp Gr	.60
T (R)	580
μavg (cp)	.014
Zavg	.86
Pi (psig)	1300
Pwf (psig)	300
S (Stimulated Skin)	-3
h (feet)	50
ct (psi-1)	$.9277 \times .0^{-3}$
rw (ft)	18.6
Based upon Fracture length	
t (hrs)	360
Ist month	262
avg rate (mcfd)	

CALCULATION RESULTS

Permeability (Md)	.083

EXHIBIT 13
Page 2

EXHIBIT 13

Assumptions used to determine physical parameters used in the infinite acting radial flow equation. To determine an effective wellbore radius for a hydraulic fractured well the following correlation was used.

$L = 2R_o e^{-s}$

L = Fracture half length

R_o = Effective wellbore radius

S = Skin

The skin was assumed to be -3.0 since the well had been stimulated. The fracture length was estimated from data obtained from scout ticket data. From the fracture half length and skin an effective wellbore radius was calculated.

NMOCD CASE #10425

San Juan #32-9 Tight Gas Sand Credit Analysis

EXHIBIT #14

Southern Ute 15-4
SE 15-32N-9W
La Plata Co., CO

An evaluation of the reservoir permeability was made for the nearest Pictured Cliffs production North of the area proposed for qualification. Based upon initial reservoir conditions and calculated Reservoir Rock and Fluid Properties an order of magnitude estimate of reservoir permeability was made using the equation for infinite acting radial flow. The equation, data input, and results are listed below. The first month's production average was used to compute the daily rate expected from the parameters used in the equation. The well analysis resulted in a permeability magnitude less than 0.1 millidarcy (md).

INFINITE ACTING RADIAL FLOW EQUATION

$$Q_g = \frac{k_g h (P_i^2 - P_{wf}^2) \div [\log(k_g t / \phi \mu c_t r_w^2) - 3.23 + .87\ S]^{-1}}{1638 \mu\ T\ Z}$$

Reservoir Rock and Fluid Properties

	S. UTE 15-4
Sp Gr	.60
T (R)	580
μavg (cp)	.014
Zavg	.86
Pi (psig)	1250
Pwf (psig)	300
S (Stimulated Skin)	-3
h (feet)	29
ct (psi-1)	$.9277 \times 10^{-3}$
rw (ft)	23
Based upon Fracture length	
t (hrs)	360
lst month avg rate (mcfd)	98
CALCULATION RESULTS	
Permeability (Md)	.051

EXHIBIT 14
Page 2

EXHIBIT 14

Assumptions used to determine physical parameters used in the infinite acting radial flow equation. To determine an effective wellbore radius for a hydraulic fractured well the following correlation was used.

$L = 2R_o e^{-S}$

L = Fracture half length

R_o = Effective wellbore radius

S = Skin

The skin was assumed to be -3.0 since the well had been stimulated. The fracture length was estimated from data obtained from scout ticket data. From the fracture half length and skin an effective wellbore radius was calculated.

NMOCD CASE #10425

EXHIBIT #15

Summary of all measured and calculated reservoir permeabilities presented in this application

	Average Permeability (md)
Ealum B #1 Section 33-T32N-R10W San Juan Co., NM	.028
San Juan 32-9 #106 Section 17-T31N-R9W San Juan Co., NM	.007
San Juan 32-9 #108 Section 10-T31N-R9W San juan Co., NM	.008
Vandewart E #3 Section 11-T29N-R8W San Juan Co., NM	.014
Southern Ute 13-1 Section 13-T32N-R[illegible] La Plata Co., CO	.069
Southern Ute 24-2 Section 24-T32N-R9W La Plata Co., CO	.083
Southern Ute 15-4 Section 15-T32N-R9W La Plata Co., CO	.051