NEW MEXICO OIL CONSERVATION COMMISSION

EXAMINER HEARING

SANTA FE, NEW MEXICO

Hearing Date MARCH 21, 1991 Time: 8:15 A.M.

NAME	REPRESENTING	LOCATION
W. Barb Kleeduck	El Paso Natural Gas	El Paso, Tx
Norman Gilbreath	Caprock Energy	Aztec, N.M.
Loretta Gilbreath	Gilbreath Energy	
William F. Carr	Campbell and Black, P.A.	Santa Fe
Robert Dempsey	Fina	Midland Tx
Joe Plemmons		
Robert Martin		
Morris B. Jones	Benson Corp	ABQ-
Charles Gray	Oryx Energy	Dallas, Tx
Shelley Lane	"	"
Alan Beers	"	"
Maurice Trimble	Byram Co.	SF
Steve Salmon	PTA Oil Prod	Midland Tx
Steve Speer	Consultant	Farm NM
Paul Cooter	Roden Law Firm	Santa Fe
Warren Curtis	NWP/WPC	SLC
Darrell Gillen	NWP/WPC	SLC

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NAME	REPRESENTING	LOCATION
Dan Cowens	Amoco Production Company	Houston
Jim Collier	"	Denver
Mike Gubby	"	"
Bill Hawkins		
Tommy Roberts	Tansay Law Firm	Farmington
Perry Pearce	Montgomery Andrews PA	Santa Fe
Eric D. Cole	Marathon Oil Company	Midland, TX
James Bruce	Hinkle Law Firm	Albuquerque
Wally Brady	BLM	Albuquerque
Arlene Salazar	"	"
Robert Kent	BLM	
A. M. O'Hare	Maralex Resources	Denver, Co
Kevin McCord	Robert L. Bayless, Producer	Farmington
F. Chavez	OCD - Aztec	
Jack Ahlen	Stevens Oil Corp	Roswell
Jennifer Pitcher	Maralex Resources	Denver, CO

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:	
APPLICATION OF ROBERT L. BAYLESS FOR DESIGNATION OF A TIGHT FORMATION, RIO ARRIBA COUNTY, MEXICO	CASE NO. 10264

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

March 21, 1991
8:15 a.m.
Santa Fe, New Mexico

This matter came on for hearing before the Oil Conservation Division on March 21, 1991, at 8:15 a.m. at Oil Conservation Division Conference Room, State Land Office Building, 310 Old Santa Fe Trail, Santa Fe, New Mexico, before Paula Wegeforth, Certified Court Reporter No. 264, for the State of New Mexico.

FOR: OIL CONSERVATION DIVISION

BY: PAULA WEGEFORTH
Certified Court Reporter
CSR No. 264

I N D E X

March 21, 1991
Examiner Hearing

CASE NO. 10264

* * *

E X H I B I T S

A P P E A R A N C E S

FOR THE DIVISION:	ROBERT G. STOVALL, ESQ. General Counsel Oil Conservation Commission State Land Office Building 310 Old Santa Fe Trail Santa Fe, New Mexico 87501
FOR THE APPLICANT:	TANSEY, ROSEBROUGH, GERDING & STROTHER Attorneys at Law BY: TOMMY ROBERTS, ESQ. 621 West Arrington Farmington, New Mexico 87401
FOR AMOCO PRODUCTION COMPANY:	BILL HAWKINS, ESQ. Attorney at Law Denver, Colorado AND CAMPBELL & BLACK, P.A. Attorneys at Law BY: WILLIAM F. CARR, ESQ. Santa Fe, New Mexico 87501
FOR MALLON OIL COMPANY AND SCHALK DEVELOPMENT COMPANY:	TANSEY, ROSEBROUGH, GERDING & STROTHER Attorneys at Law BY: TOMMY ROBERTS, ESQ. Farmington, New Mexico 87401
FOR EL PASO NATURAL GAS COMPANY:	H.L. KENDRICK Conservation Engineer El Paso, Texas 79978

* * *

EXAMINER STOGNER: Call the hearing to order. Today's date is March 21, 1991. I'm Michael E. Stogner, the hearing officer for today's cases.

At this time we'll call the first case, No. 10264.

MR. STOVALL: Application of Robert L. Bayless for designation of a tight formation, Rio Arriba County, New Mexico.

EXAMINER STOGNER: Call for appearances.

MR. ROBERTS: Mr. Examiner, my name is Tommy Roberts. I'm with the law firm of Tansey, Rosebrough, Gerding & Strother in Farmington, New Mexico, and I'm appearing on behalf of the applicant, Robert L. Bayless. I have one witness to be sworn.

EXAMINER STOGNER: Any other appearances?

MR. HAWKINS: I'm Bill Hawkins with Amoco Production Company from Denver. Amoco has no witnesses for this case. We are a working-interest owner in part of the acreage to be included in this application. We'd like to be a party of record.

We'd also like a copy of the order and the exhibits that are presented in the case.

MR. CARR: May it please the examiner, we'd like the record to reflect that Campbell & Black has filed its appearance in this case for Amoco.

MR. ROBERTS: Mr. Examiner, Tommy Roberts with the Tansey law firm of Farmington, New Mexico. I'm also appearing on behalf of Mallon Oil Company and Schalk Development Company. We have no witnesses to be sworn for those parties in interest; however, they would like me to read a statement into the record.

EXAMINER STOGNER: Are there any other appearances?

MR. BUCKINGHAM: Point of order. We have four people, and I see there's no place to sit. Can we stand in the hall and you put in a loudspeaker or something?

EXAMINER STOGNER: Is there anybody in here that's not interested in this case that maybe can afford some seats for these gentlemen?

For the record, Mr. Buckingham, would you identify yourself?

MR. BUCKINGHAM: L.L. Buckingham, Bureau of Land Management, Albuquerque District Office, and there's three more coming.

MR. KENDRICK: H.L. Kendrick with El Paso Natural Gas Company. No witnesses.

EXAMINER STOGNER: Let's go off the record for this time.

(Discussion off the record.)

EXAMINER STOGNER: Mr. Roberts, you may proceed.

* * * * *

KEVIN H. McCORD,

the Witness herein, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. ROBERTS:

Q. Would you state your name and place of residence for the record, please?

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

Q. What is your occupation?

A. I'm a petroleum engineer. I'm a consultant.

Q. How long have you been in that profession?

A. I've been a consultant for ten years. I've been a petroleum engineer for 14 years.

Q. What is your professional relationship to the applicant in this case?

A. I oversee a considerable portion of Robert L. Bayless' operations.

Q. Have you testified before the New Mexico Oil Conservation Division on any previous occasion?

A. I have.

Q. In what capacity?

A. As a petroleum engineer.

Q. Have your qualifications been accepted as a matter of record?

A. They have.

Q. Are you familiar with the operations of the applicant in this case in the area of interest?

A. Yes, I am.

Q. Have you made a study of pertinent data for purposes of providing testimony in this case?

A. Yes, I have.

Q. Have you been involved in other tight-gas-formation applications before?

A. I have.

MR. STOVALL: Mr. Roberts, let's take care of one little technicality. I don't think we got the witness sworn on this case.

MR. ROBERTS: That's right.

(At this time the witness was duly sworn.)

Q. (By Mr. Roberts) Could you describe your involvement in those previous tight-gas applications?

A. I believe I did a total of seven or eight different applications in the San Juan Basin with various formations for various operators.

Q. And during what period of time?

A. 1980 to 1983.

MR. ROBERTS: Mr. Examiner, I would tender Mr. McCord as an expert in the field of petroleum engineering.

EXAMINER STOGNER: Mr. McCord is so qualified.

Q. (By Mr. Roberts) Mr. McCord, would you briefly

describe the purpose of this application?

A. Robert L. Bayless is applying for portions of the East Blanco, Choza Mesa and Gobernador Pictured Cliffs gas pools to be designated as a tight formation under Section 107 of the Natural Gas Policy Act of 1978. The proposed Cabresto tight gas area is located in the northeastern portion of the San Juan Basin. The area is located in Rio Arriba County, approximately 45 miles northeast of the town of Bloomfield in northwestern New Mexico.

The Pictured Cliffs formation in the Cabresto area meets the criteria established in Section 107 of the Natural Gas Policy Act of 1978 to be designated as a tight gas formation in that the estimated average in situ gas permeability throughout the pay section is expected to be 0.10 millidarcy or less. The stabilized gas production rates, without stimulation, at atmospheric pressure of these gas wells are not expected to exceed the maximum allowable production rate of 105 MCF of gas per day for an average depth of 3,715 to the top of the Pictured Cliffs formation in this area, and no well drilled into the Pictured Cliffs formation in this area is expected to produce more than five barrels of crude oil per day prior to stimulation.

Q. Would you briefly describe or summarize the

ownership interests of Robert L. Bayless in the proposed Cabresto tight gas area?

A. Robert L. Bayless has a substantial leasehold operating rights position in this proposed tight gas area. He also operates over 30 wells in the area.

Q. Refer to what's been marked as Exhibit No. 1 and identify that exhibit and explain its significance to this case.

A. Exhibit No. 1 displays the proposed Cabresto tight gas area on a map showing the Pictured Cliffs formation wells in the San Juan Basin. The Cabresto tight gas area includes approximately 193,090 acres described as follows:

In Township 29 north, 2 west -- all sections;

Township 29 north, 3 west -- all sections;

Township 29 north, 4 west -- all sections'

Township 30 north, 2 west -- all sections;

Township 30 north, 3 west -- all sections;

Township 30 north, 4 west -- Sections 1 and 2, 11 through 14, 23 through 26 and 35 and 36;

Township 31 north, Range 2 west -- Sections 2 through 36;

Township 31 north, 3 west -- all sections;

Township 32 north, 2 west -- Sections 7 through 10, 15 through 22 and 27 through 35;

and Township 32 north, Range 3 west -- all sections.

And that total is 193,090 acres.

Q. Refer to what's been marked as Exhibit No. 2 and identify that exhibit.

EXAMINER STOGNER: Excuse me; before we leave Mr. McCord's Exhibit No. 1, there's a line designated in the upper left-hand corner and the lower left-hand corner as the Pictured Cliffs outcrop. There is also an unmarked line on the far eastern side of this map.

Is that also the outcrop?

THE WITNESS: That's correct.

EXAMINER STOGNER: Okay. And there's also well designations in there, and those are the present wells in the Pictured Cliffs?

THE WITNESS: That's correct.

EXAMINER STOGNER: Just some preliminary things I needed to cover.

THE WITNESS: No problem.

EXAMINER STOGNER: Thank you, sir.

Q. (By Mr. Roberts) Redirect your attention to Exhibit No. 2.

A. Exhibit No. 2 is a Pictured Cliffs formation completion and production map of the proposed Cabresto tight gas area. Shown on this map are all the wells that

penetrated the Pictured Cliffs formation in this area. The production figures presented for each Pictured Cliffs producing well are date of initial potential, initial gas potential in MCF per day, the current production capability of the Pictured Cliffs well in MCF per day and cumulative production for the well in MCF as of November 1st, 1990. If the Pictured Cliffs well produced any oil or condensate, this production data is presented also.

Exhibit No. 2 also presents completion and production data from some Pictured Cliffs wells surrounding the proposed tight gas area.

Q. Now I direct your attention to what's been marked as Exhibit No. 3, and identify that exhibit; explain its significance to this application.

A. Exhibit No. 3 is a list of well name, operator and production data for Pictured Cliffs wells within the Cabresto tight gas area. The Cabresto tight gas area contains 124 wells which have penetrated and evaluated the Pictured Cliffs formation. At this time 53 wells are capable of production, producing from the Pictured Cliffs formation. The average depth to the top of the Pictured Cliffs formation in this area is 3,715 feet.

Q. Mr. McCord, would you describe the geology found in the proposed Cabresto tight gas area?

A. The Pictured Cliffs sandstone is a marine,

clay-filled, fine-grain sandstone. This sandstone was deposited as a beach, and as near shore, generally aligned northwest-southeast with a source generally to the southwest. These deposits represent the last marine strata in the northeasterly regression of the Cretaceous sea.

There are two main zones within the Pictured Cliffs sandstone. Each zone represents a regressive sequence separated by a marine tongue of Lewis shale which represents a transgression. Production of gas in the Cabresto tight gas area is from stratigraphic entrapment.

Sample examination indicates that the Pictured Cliffs formation in this area consists of very fine to fine-grained, fairly well-sorted, subrounded to subangular, slightly calcareous, salt-and-pepper sandstone. The dark grains are predominantly glauconite, mica and carbonaceous shale. Interbeds of the Lewis shale are present in the lower part of each main zone but become fewer and thinner upward.

Microscopic examination of the Pictured Cliffs formation reveals that the sandstone grains are coated with mixed layer illite-smectite authigenic clay. These clay coatings are pervasive throughout the vertical extent of the Pictured Cliffs. The clay coatings of the sandstone grains reduce the effective permeability of the sand in this area.

Q. Now direct your attention to what's been marked as Exhibit No. 4 and identify that exhibit.

A. Exhibit No. 4 is a type log of the Pictured Cliffs formation in the Cabresto tight gas area. This well is the Robert L. Bayless Jicarilla 464 No. 4 well located in the northwest-southeast of Section 31, Township 30 north, 3 west, in Rio Arriba County, New Mexico.

This type log is representative of potential pay in both the upper and lower zones of the Pictured Cliffs formation. The lower zone of the Pictured Cliffs is blanket-like in the southwest portion of Cabresto tight gas area but thins and pinches out a few miles northeast of the Jicarilla 464 No. 4 well. In contrast, the upper zone of the Pictured Cliffs is much more lenticular in nature.

Q. Now refer to what's been marked as Exhibit No. 5. Identify that exhibit and explain its significance to this case.

A. Exhibit No. 5 is a cross section A-A' illustrating Pictured Cliffs sandstone development across the Cabresto tight gas area. The datum for this cross section is the top of the Pictured Cliffs formation. The cross section shows that the Pictured Cliffs sandstone is a continuous lithologic unit throughout the Cabresto tight gas area.

MR. ROBERTS: Mr. Examiner, would it be helpful to put

those on the wall?

EXAMINER STOGNER: I know we should have done that before, but let's continue on.

MR. ROBERTS: Okay.

Q. (By Mr. Roberts) Mr. McCord, direct your attention to what's been marked as Exhibit No. 6 and identify that exhibit.

A. Exhibit No. 6 presents a natural, unstimulated production test taken on the Robert L. Bayless Jicarilla 31-3-32 No. 1 well located in the northwest-southwest of Section 32, Township 30 north, Range 3 west -- excuse me; that is 31 north, 3 west -- in Rio Arriba County, New Mexico.

The average unstimulated net -- excuse me. Obtaining stabilized unstimulated gas production rates for Pictured Cliffs wells is not a standard procedure used by operators when completing their wells in the San Juan Basin. Past experience has shown that these low-permeability Pictured Cliffs wells must be stimulated to obtain commercial production. However, in preparation for this tight gas area study, Robert L. Bayless performed a natural gas production test on this well before it was fracture stimulated.

The average unstimulated natural gas production rate for this well is 22 MCF of gas per day. This rate is

considered representative for the Cabresto tight gas area and is well below the 105 MCF of gas per day allotted for tight-formation gas wells having an average depth of 3,715 feet.

It should be noted that this production test was taken after stimulation of the formation with acid. Acid was used to insure that the perforations in this well were open. Therefore, true, unstimulated natural gas production within its strict definition would be less than this recorded gas flow rate.

Not all of the natural production tests taken from this area were used to calculate the representative, unstimulated, natural production rate for the Cabresto tight gas area. John E. Schalk conducted natural production tests on the Schalk 29-4 No. 6 and the Schalk 29-4 No. 10 wells in 1981 and 1982, respectively. These wells are located in the southwest-southwest of Section 25 and the southwest-southwest of Section 23 of Township 29 north, Range 4 west, Rio Arriba County, New Mexico.

Although both of these wells made some gas naturally, it was such a small amount that it was too small to measure. Rather than average in these two zero values, the value of 22 MCF of gas per day from the Bayless well was used as the most representative, natural, unstimulated production rate for the Cabresto tight gas area.

Q. Mr. McCord, does the production history of wells located in the proposed Cabresto tight gas area indicate significant oil production?

A. No, it doesn't. The natural gas produced from the Pictured Cliffs formation in this area is virtually dry gas. There has been very little oil or condensate recorded for the wells that have produced in this area. Some of the wells will have small amounts of oil or condensate production with the gas, but significant oil production is not common.

Examination of the production data supplied in Exhibit No. 3 support these statements. These dry gas production figures indicate a well drilled in the Pictured Cliffs formation in the Cabresto tight gas area is not expected to produce, without stimulation, more than five barrels of crude oil per day.

Q. What can you say regarding the natural permeability of the Pictured Cliffs formation in the San Juan Basin in general and more specifically in the Cabresto tight gas area?

A. The Pictured Cliffs formation in the San Juan Basin is dependent on stimulation techniques to be commercially productive due to the low permeability of the reservoir rock. Exhibits No. 7 through 10 present core analysis data used to determine the average laboratory

permeability to air for the Pictured Cliffs formation in the Cabresto tight gas area.

The exhibits contain the actual core analysis reports plus selective analysis of the cores taken from only the productive portion of the Pictured Cliffs formation for each well. The cored intervals chosen for permeability averaging were determined by examination of the individual core analysis reports for each well. Only cored intervals of sand which had greater than 10 percent porosity from the core analysis were used for permeability averaging.

The average permeability value determined for each well in Exhibits No. 7 through 10 are average laboratory-determined permeability values. The actual in situ permeability of the formation is less than this laboratory-determined value due to water saturation and net confining pressures found in the Pictured Cliffs reservoir.

Exhibit No. 11 is a summary of all the laboratory core analysis results for the Cabresto tight gas area. The average laboratory permeability to air obtained for the Cabresto tight gas area from the four wells is 0.66 millidarcy.

Q. Refer to what you have marked as Exhibit Nos. 12 and 13 and identify those exhibits and describe their contents.

A. Exhibit No. 12 presents a technical paper entitled "Effect of Overburden Pressure and Water Saturation on Gas Permeability of Tight Sandstone Cores" written by Thomas and 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. 13 explains how in situ permeability is calculated from the core analysis using the technical paper presented.

An average in situ permeability value of 0.035 millidarcy was calculated from the average laboratory permeability value of 0.66 millidarcy for the Cabresto tight gas area. This 0.035 millidarcy permeability value calculated from core data is well below the 0.10 millidarcy cutoff for tight gas reservoirs.

Q. Refer to Exhibit No. 14 and identify that exhibit.

A. Exhibit No. 14 is another method of determining reservoir permeability which was performed as a check, making use of the representative unstimulated natural production tests taken in the area. The average unstimulated gas flow rate of 20 MCF of gas per day along with other Pictured Cliffs reservoir data for the Cabresto tight gas area was used to calculate a reservoir

permeability using Darcy's Law. The use of Darcy's Law calculates an average reservoir permeability value of 0.017 millidarcy for the Cabresto tight gas area.

This permeability value compares to the 0.035 millidarcy permeability value determined by core analysis methods. These two methods produced fairly similar permeability values, both of which are well below the 0.10 millidarcy tight gas limitation.

From examination of the two sources of permeability data, the reservoir permeability data value of 0.035 millidarcy determined by core analysis methods is thought to be the best estimate of reservoir permeability for the Cabresto tight gas area because it uses actual core data from the Pictured Cliffs formation. Therefore, the estimated average in situ gas permeability throughout the Pictured Cliffs formation pay section is expected to be 0.10 millidarcy or less in this area.

Q. Mr. McCord, in your opinion, will the development of the Pictured Cliffs formation in the proposed Cabresto tight gas area adversely affect or impair any fresh water acquifers in the area?

A. It will not. Existing state and federal regulations will assure that the development of the Pictured Cliffs formation will not adversely affect or impair any fresh water aquifers that are being used or are

expected to be used in the 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 of the ground to the base of the Ojo Alamo formation.

Most Pictured Cliffs wells drilled in the Cabresto tight gas area are drilled with natural mud that will not contaminate fresh water zones. A normal casing design consists of eight-and-five-eighths-inch O.D. surface casing being set from the surface to a depth of 150 to 250 feet. The production casing normally used is four-and-a-half-inch or five-and-a-half-inch 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 down hole contamination. The production casing is cemented from total depth to the surface or to a depth sufficient to cover the Ojo Alamo formation in the older wells. The newer wells are required to circulate cement to the surface. This process protects the Pictured Cliffs and other hydrocarbon-bearing formations from contaminating any fresh water aquifers. Therefore, productive and fresh water zones are protected

by both casing and cement.

Stimulation of the Pictured Cliffs formation involves varied fracture treatments, depending on the operator. Fracture treatments usually consist of a one or two percent potassium chloride water-base fluid with sand, or a nitrogen-water foam-base fluid in sand. Either treatment will not harm a fresh water aquifer.

Fresh water protection is assured during these fracture stimulation treatments due to zone isolation caused by cementation. A distance of well over 500 feet between the Pictured Cliffs formation and the closest fresh water aquifer in the well bore is additional insurance that an existing fresh water zone will not be contaminated by stimulation of Pictured Cliffs wells in this wear.

Therefore, New Mexico and federal regulations will protect fresh water aquifers from the drilling, completing and producing of the Pictured Cliffs in this area.

Q. What conclusions do you draw from the information that's contained in the exhibits you have prepared in this case?

A. Evidence presented in this case substantiates the following for the Cabresto tight gas area proposed by Robert L. Bayless:

Number one, for an average Pictured Cliffs well

depth of 3,715 feet, the stabilized production rate at atmospheric pressure of wells completed in the Pictured Cliffs formation, without stimulation, is not expected to exceed the maximum allowable rate of 105 MCF of gas per day.

Two, no well drilled into the Pictured Cliffs formation in the Cabresto area is expected to produce, without stimulation, more than five barrels of crude oil per day.

And three, the estimated average in situ gas permeability throughout the Pictured Cliffs pay section is expected to be 0.10 millidarcy or less.

The proposed Cabresto tight gas area meets all the specifications required as stated and should be designated a tight formation in the Pictured Cliffs formation under Section 107 of the Natural Gas Policy Act of 1978.

Q. Is the Pictured Cliffs formation in the proposed Cabresto tight gas area authorized to be developed by in-field drilling?

A. It is not.

Q. Mr. McCord, in your opinion, will the granting of this application be in the best interests of conservation and result in the prevention of waste and the protection of correlative rights?

A. It will.

Q. Were Exhibits No. 1 through 14 either prepared by you or at your direction and under your supervision?

A. They were.

MR. ROBERTS: Mr. Examiner, I would move the admission of Exhibits No. 1 through 14.

EXAMINER STOGNER: Exhibits 1 through 14 will be admitted into evidence at this time.

(Whereupon Exhibits 1 through 14 were admitted into evidence.)

MR. ROBERTS: I have no other questions for this witness on direct.

EXAMINER STOGNER: Let's take a five-minute recess.

(At 8:45 a.m. a recess was taken.)

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. McCord, in looking at particular Township 30 north, Range 3 west, which is on the west side of the Jicarilla Apache Indian Reservation -- I'll let you get that open.

A. Yes, sir.

Q. Especially that line -- the line of wells in the two sections bordering the western boundary of the Jicarilla Apache Reservation, the current production capability is somewhat high, in particular over the 105 MCF

cutoff. Are these wells indeed stimulated?

A. Yes, they are. Every -- I don't know if I want to say "every well." I know every well in 30 and 3 -- because I'm very intimate with those -- was fracture stimulated.

Q. And in what method or manner? Could you be a little more specific on that?

A. Sure. Each one had a water-foam stimulation job, approximately 100,000 pounds of sand, I believe it was about 50,000 gallons of foam fluid, pumped at 30 barrels a minute, I believe.

Q. So we can make the record a little bit more clear, Mr. McCord, in particular the ones that I have here have 251 average production. That appears to be in Section 19.

A. Yes, sir.

Q. And then the one above it, 171.

A. Uh-huh.

Q. Then I go further down, in Section 29, 164, and then I go up to Section 7; there's 250. Could you please provide me with some well records showing the stimulation on those wells?

A. I'd be happy to.

Q. The more the better.

A. Okay.

Q. Also, while we're on that same subject, down in Section 32, 29 north, 4 west, there's one that's producing 218 MCF a day. You'll provide me that information, too, on that stimulation program?

A. Okay. 29, 4, Section 32, southeast, correct?

Q. Yes.

A. 218. Okay. And just so I get everything right, 30 and 3, Section 7, the No. 8 well, which is 250; the Section 19, the number 4 well, 251.

Q. Correct.

A. Section --

Q. How about the one in Section 30, the No. 1?

A. Section 30, No. 1 well, 262. Is that all? Those four wells?

Q. Let's go with the one in Section 29, the No. 7.

A. 164. Okay.

Q. And how about Section 20, No. 2?

A. Okay.

Q. And looking at your core data -- or your data in particular, could you be a little more specific on your correlation between the porosity and permeability in the Pictured Cliffs formation in this area, and in particular why do you use a ten percent cutoff on your porosity?

A. Generally speaking, once again from my knowledge, my intimate knowledge, of the wells we've

completed in 30 north and 3 west, that's our -- that porosity cutoff is what we use on the logs to indicate which zones to perforate and not to. In many cases, as is consistent with coring, you want to core the Pictured Cliffs interval, you get an awful lot of Pictured Cliffs interval which you would not normally perforate.

Therefore, I use the criteria we normally use to be classified a productive well to give myself a good knowledge of whether -- rather than just averaging the whole thing, which would make the numbers considerably lower, I'm using productive -- I'm confident that those would be productive portions of the Pictured Cliffs interval due to our porosity cutoffs.

Does that answer your question?

Q. Are there any times where you perforate a zone that has less than ten percent?

A. Yes, it's possible. But, generally speaking, ten percent is our cutoff.

There have been specific cases in wells where -- let's just say it's a lesser well -- that we'll reach a little bit and use a lesser porosity cutoff to see if we can get some gas out of the zone. Generally speaking, those are probably poorer wells.

Q. Is it accurate to say or assume that the permeability will naturally go down when the porosity goes

down in this area?

A. Generally speaking, yes.

Q. You were a little bit hesitant. How about some of the exceptions?

A. Well, you've always seen exceptions to that correlation. It's certainly not a straight-line correlation at all with porosity and permeability. It depends on different areas.

We've used porosity as a cutoff or as a productive cutoff because porosity is easy to look at the logs. Permeability is very difficult. As I stated before, natural production tests calculating permeability or getting the core data to even get to permeability is all expensive, and you know you have to fracture stimulate the well anyway, so it's not commonly done. So it's very difficult to get permeability information, but porosity you can get.

And generally speaking, if you get a lot of high porosity, you tend to get a better well. It's not always the case. But I think, as a general correlation, I feel comfortable saying that the higher the porosity, the better the permeability, and lower porosity, lower permeability.

Q. Are these phenomena where this doesn't occur, is it widespread? Are we looking at stringers? Or do they appear -- what might be the geological phenomenon that

would cause this?

A. Oh, I would think the -- the -- probably the thing that comes to mind, if you have a -- let's just say you have a very good producer, but your logs indicate you have poor porosity. The good producer would indicate that you have better permeability. That could be either established through the frac job, establishing better permeability. It may be opening your fracture into a better zone than the logs indicate, or possibly just indicate into some natural fracturing, which is certainly always possible; very, very difficult to predict.

There are cases -- one in particular, the No. 8 well you talked about -- I happen to know it pretty well. The logs don't look very good on that well, and it's been a very good producer.

Q. Which one is No. 8?

A. In Section 7 of 30 and 3.

We were quite disappointed with the logs, and it's turned out to be a pretty decent producer, so that's one of those phenomena where you think you've done something through your fracture stimulation where you've enhanced your reservoir more than the logs would indicate.

EXAMINER STOGNER: Are there any other questions of this witness?

Mr. McCord, do you have anything further?

THE WITNESS: I believe that's it.

MR. ROBERTS: We have nothing further.

EXAMINER STOGNER: Would anybody like to make any statements at this time?

MR. ROBERTS: Mr. Examiner, I have two statements to read into the record, if I may.

EXAMINER STOGNER: Please.

MR. ROBERTS: This is a letter addressed to the attention of Mr. William LeMay, director of State of New Mexico Energy and Minerals Department, referencing Case No. 10264, application of Robert L. Bayless for designation of the Cabresto area of the Pictured Cliffs formation as a tight formation.

"Gentlemen: We have reviewed in detail the Application of Robert L. Bayless for designation of the Cabresto Area of the Pictured Cliffs Formation in Rio Arriba County, New Mexico, as a tight formation.

"As an operator with a number of wells in the area we are very familiar with the Cabresto Pictured Cliffs formation. Based on that experience we are in full support of the referenced Bayless Application.

"Thank you for your consideration.

Yours very truly, Schalk Development Company, John E. Schalk, Operator."

Signed by Steve Schalk, agent.

The next statement is in the form of a letter, dated March 19th, 1991, addressed to the attention of Mr. William LeMay, State of New Mexico, Energy and Minerals Department, referencing Case No. 10264, application of Robert L. Bayless for designation of the Cabresto area of the Pictured Cliffs formation as a tight formation, Rio Arriba County, New Mexico.

"Gentlemen: Mallon Oil Company has reviewed the above referenced Application of Robert L. Bayless and fully supports the designation of this area for classification as a tight sand area.

Mallon Oil Company has a significant acreage position in the proposed area with interests in 29 Pictured Cliffs wells. Engineering and geologic data reviewed in detail by Mallon indicates that in this area the Pictured Cliffs Formation meets the criteria established in Section 107 of the NGPA of 1978 for designation as a tight sand.

"Again, Mallon fully supports this Application.

"Sincerely, Mallon Oil Company, Kevin M. Fitzgerald, President."

EXAMINER STOGNER: Is that all you have, Mr. Roberts?

MR. ROBERTS: Yes.

EXAMINER STOGNER: Mr. Roberts, I might add, any additional information that you'll be providing to me

today, would you also send a copy of that to the U.S. Bureau of Land Management in Albuquerque in care of Mr. L.L. Buckingham?

MR. ROBERTS: Yes.

EXAMINER STOGNER: Does anybody else have anything further in this case at this time?

If not, then this case will be taken under advisement.

(The foregoing hearing was concluded at the approximate hour of 9:05 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10264 heard by me on 26 March 1991.

Michael E. Stogner, Examiner
Oil Conservation Division

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

REPORTER'S CERTIFICATE

I, PAULA WEGEFORTH, a Certified Court Reporter and Notary Public, DO HEREBY CERTIFY that I stenographically reported these proceedings before the Oil Conservation Division; and that the foregoing is a true, complete and accurate transcript of the proceedings of said hearing as appears from my stenographic notes so taken and transcribed under my personal supervision.

I FURTHER CERTIFY that I am not related to nor employed by any of the parties hereto, and have no interest in the outcome hereof.

DATED at Santa Fe, New Mexico, this 26th day of March, 1991.

Paula Wegeforth

PAULA WEGEFORTH
Certified Court Reporter
CSR No. 264, Notary Public

My Commission Expires:
April 25, 1993