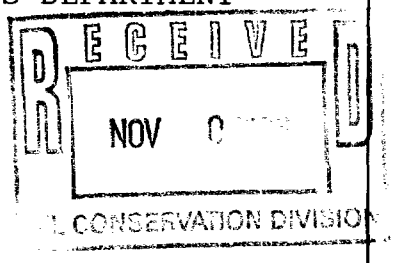
STATE OF NEW MEXICO

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 MATADOR OPERATING COMPANY FOR AN EXCEPTION FROM RULE 2.B OF THE SPECIAL RULES AND REGULATIONS FOR THE WHITE CITY-PENNSYLVANIAN GAS POOL, EDDY COUNTY, NEW MEXICO	CASE NOS. 11,636
APPLICATION OF MURCHISON OIL & GAS, INC., FOR AN EXCEPTION TO THE EXISTING FIELD RULES FOR THE WHITE CITY-PENNSYLVANIAN GAS POOL, EDDY COUNTY, NEW MEXICO	~~and~~ 11,624
	(Consolidated)

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

November 7th, 1996

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, MICHAEL E. STOGNER, Hearing Examiner, on Thursday, November 7th, 1996, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

November 7th, 1996
Examiner Hearing
CASE NOS. 11,636 and 11,624 (Consolidated)

* * *

E X H I B I T S

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* * *

Matador	Identified	Admitted
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A P P E A R A N C E S

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By: CONRAD E. COFFIELD

* * *

WHEREUPON, the following proceedings were had at 8:17 a.m.:

EXAMINER STOGNER: At this time I'll call Case Number 11,636, which is the Application of Matador Operating Company for an exception from Rule 2.B of the special rules and regulations for the White City-Pennsylvanian Gas Pool, Eddy County, New Mexico.

I'll call for appearances.

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing on behalf of the Applicant.

Mr. Examiner, we would request that you consolidate this case with the next case for purposes of taking testimony and hearing the evidence from the witnesses.

EXAMINER STOGNER: Any other appearances in 11,636?

MR. CARR: May it please the Examiner, my name is William F. Carr with the Santa Fe law firm Campbell, Carr, Berge and Sheridan.

I would like to enter our appearance in the consolidated cases for Chevron, USA, Inc.

EXAMINER STOGNER: Any other appearances in 11,636?

Okay, at this time I'll call Case Number 11,624.

Are there any additional appearances in this matter, other than Mr. Kellahin -- Excuse me, Mr. Kellahin, are you representing Murchison Oil and Gas, Inc., at this time?

MR. KELLAHIN: No, sir, Mr. Coffield is.

EXAMINER STOGNER: Oh, okay, I'm sorry.

MR. COFFIELD: Mr. Examiner, I'm Conrad Coffield with the Santa Fe law firm of Hinkle, Cox, Eaton, Coffield and Hensley, appearing on behalf of Murchison Oil and Gas, Inc.

EXAMINER STOGNER: Mr. Coffield, you're just entering an appearance in Case 11,624 --

MR. COFFIELD: Yes, sir.

EXAMINER STOGNER: -- is that correct?

MR. COFFIELD: Yes, sir.

EXAMINER STOGNER: Okay. Are there any other appearances in 11,624?

MR. KELLAHIN: If you'll note my appearance in 11,624, Mr. Examiner.

EXAMINER STOGNER: Mr. Kellahin, so noted.

MR. CARR: And also mine, Mr. Examiner.

MR. COFFIELD: Mr. Examiner, please note my appearance for Case Number 11,636.

EXAMINER STOGNER: Okay, that way we'll have everybody represented in both cases.

Well, Mr. Coffield, Mr. Kellahin, how would you

like to proceed in this matter?

MR. KELLAHIN: Mr. Examiner, both companies are appearing in support of each other's Application. This is not a contested matter.

Mr. Coffield and I have agreed that he'll make the first presentation, and then I'll make the second presentation. I'm not sure how many witnesses he has. I have two to be sworn, Mr. Examiner.

EXAMINER STOGNER: How many witnesses do you have, Mr. Coffield?

MR. COFFIELD: Two witnesses.

EXAMINER STOGNER: Two apiece.

Mr. Carr, do you have any witnesses?

MR. CARR: No, sir, I do not.

EXAMINER STOGNER: Will all four witnesses please stand at this time to be sworn?

(Thereupon, the witnesses were sworn.)

EXAMINER STOGNER: Mr. Coffield, you may continue.

MICHAEL S. DAUGHERTY,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. COFFIELD:

Q. Mr. Daugherty, would you please state your full

name, address and occupation?

A. Michael S. Daugherty, 6716 Garlinghouse, Texas [*sic*]. I'm a petroleum engineer employed by the Applicant, Murchison Oil and Gas, Inc. I hold the position of vice president of operations for Murchison.

Q. Mr. Daugherty, are you a registered professional engineer?

A. Yes, I am. I'm a registered professional engineer in the State of Texas.

Q. And have you previously had your credentials accepted as a matter of record and have you testified before the New Mexico Oil Conservation Division --

A. Yes.

Q. -- as a petroleum engineer?

A. Yes, I have.

Q. Are you familiar with the Application of Murchison Oil and Gas, Inc., in this Case Number 11,624, and have you made a study of the engineering matters with which this case is involved?

A. Yes, I have.

MR. COFFIELD: Mr. Examiner, we tender Mr. Daugherty as an expert petroleum engineer.

EXAMINER STOGNER: Any objections? Mr. Daugherty is so qualified.

Q. (By Mr. Coffield) Mr. Daugherty, would you

please explain to the Examiner what relief Murchison is seeking by its Application in this matter?

A. Murchison is a working interest owner in and operates the Ogden State Number 1 and the Ogden State Number 2 wells, located in Section 2, Township 25 South, Range 26 East, Eddy County, New Mexico, and these are both completed in the White City-Pennsylvanian Gas Pool. The Ogden State Number 1 well is completed and producing from the Morrow formation. The Ogden State Number 2 well is completed and producing from the Atoka formation.

For well-spacing purposes in this field, both the Morrow and the Atoka formations are treated as being a single formation within the broad designation of the Pennsylvanian formation.

The field rules for this pool require or provide for 640-acre spacing with an option to drill a second well on each proration unit. The field rules permit two wells to be drilled and completed in the same formation, in one proration unit.

Murchison requests an exception to the field rules to allow the drilling of a third well in Section 2, Township 25, Range 26 East.

Q. Mr. Daugherty, Murchison has prepared several exhibits which you have there before you. Would you please refer to what we've marked Exhibit 1 and explain that

exhibit?

A. Exhibit 1 is a land map prepared to show Section 2 and the surrounding eight sections. It was prepared by enlarging a standard Midland Map Company map and marking and annotating it to reflect the well locations and other important features for the purposes of this presentation.

Q. Thank you, Mr. Daugherty. Would you please point out the location of our proposed well and advise the Examiner whether this would be an orthodox location?

A. This will be -- The proposed location is an orthodox location. It will be drilled 1650 feet from the south line and 1650 feet from the west line of Section 2. It is marked on the map of Exhibit 1 by an arrow.

In addition to this map, I would like to use Exhibit Number 2, which will be authenticated by our next witness. It also shows the wells in Section 2 and the surrounding eight sections, but it is further color-coded to show which producing formations the wells are producing from.

Q. Okay, Mr. Daugherty, am I to understand, then, that all of the wells that produce from the Pennsylvanian formation are represented here on the -- what is now marked Exhibit 2?

A. To the best of my knowledge, that's correct.

On this map, we've shown or are showing all the

active producing wells in the nine-section area. The map is color-coded.

The blue dots represent Permian Delaware producers, which are not part of the Pennsylvanian Pool and would not enter into this hearing.

The dark purple dots are Wolfcamp production, which also are not part of the Pennsylvanian field rules.

The yellow dot -- There's one well producing in Section 36 that's a Strawn producer. That would come under the jurisdiction of the Pennsylvanian Strawn field rules.

The green dots are Pennsylvanian-Atoka completions. There is one Atoka completion in Section 11, one in Section 10, one in Section 3, and one in Section 2.

The red dots represent Pennsylvanian Morrow production. There are approximately eight -- It looks like eight and a half. There's a slight -- There's a half a dot up to the top. But not counting it, there are eight producers in this nine-section area. Two wells are actively producing in Section 12, one well in Section 11, one well in Section 2, two wells in Section 35, and two wells in Section 34.

Our proposed well on this map is shown with the black arrow, and that's 1660 feet from the south line and 1660 feet from the west line of Section 2.

Q. Okay, Mr. Daugherty, would you explain why you

are requesting this exception to the field rules?

A. The Ogden State Number 1 well was drilled and completed in the Morrow formation on February the 7th, 1977. It was perforated in selective intervals from the depth of 10,984 feet to 11,416 feet. It has recovered over 3.8 BCF of gas and is still producing about 140 MCF per day.

The Ogden Number 2 well was drilled and completed in November, 1982. This well was completed in selected intervals from 11,049 feet to 11,453 feet, in the Morrow formation, and recovered almost 1.1 BCF of gas before being recompleted.

On September 12th, 1990, this well was plugged back and recompleted by perforating the Atoka formation in selected intervals from 10,320 feet to 10,372 feet. This Number 2 well has produced almost 1 BCF of gas from the Atoka formation and currently makes about 300 MCF and 5 barrels of condensate per day.

These two wells are now producing from two distinct reservoirs. Since the field rules allow two wells to produce from the same reservoir and the same 640-acre proration unit, the granting of our request would simply allow us to add a second completion to either the Morrow or the Atoka formation underlying Section 2.

If our request is granted, the third well would

be drilled within the proration unit but would only add a second completion within either or other of the currently producing formations.

Q. Mr. Daugherty, do you and other petroleum engineers who are experts with respect to petroleum engineering aspects of southeastern New Mexico and this area generally consider the Pennsylvanian system to be one reservoir?

A. No, the Pennsylvanian system consists of several formations, which include the Morrow, Atoka, Strawn and Cisco/Canyon groups. Each of these are identifiable and separate. There is no known communication between hydrocarbon deposits found within one of these formations and any other formation.

Q. Does the New Mexico Oil Conservation Division recognize these formations as being separate in other fields in New Mexico?

A. Yes, I am aware of other fields in which a horizontal plane is established which essentially -- which separates -- a horizontal plane within the same surface acreage which essentially divides the Morrow and the Atoka Pools. For instance, the Logan Draw-Morrow Pool and the Logan Draw-Atoka Pool are reported as separate fields or pools in the production reports for the State of New Mexico.

Q. Would the granting of your request alter or modify the existing field rules?

A. No, I do not believe so. The existing field rules permit two completions in one reservoir. It may be noted, for example, as a hypothetical case that if Murchison could plug its Number 2E well, which is producing from the Atoka formation, this would allow us to -- this would leave the Ogden 1 as the only producing well in the Morrow formation. We could then drill the Ogden Number 3 and complete it so that it would produce from the Morrow formation.

This could be done without seeking an exception to the field rules. The existing field rules are clearly based on the fact that two wells are appropriate in order to ensure the recovery of hydrocarbons that would not otherwise be recovered by only one well.

Q. Is it your expert opinion, then, that if Murchison's Application is denied, that there will be hydrocarbons underlying Section 2 which would not be recovered?

A. Yes.

Q. So are you seeking to amend the current field rules?

A. No, we are only seeking an exception to the limitation of two wells per proration unit as it applies to

Section 2. We are not suggesting that this type of exception must be applied throughout the entire field.

Q. In your opinion, Mr. Daugherty, would the granting of Murchison's request and the drilling of this proposed well be in the interest of protection of correlative rights, the prevention of waste and generally be in the interest of conservation?

A. Yes, it would.

Q. What additional testimony do you have?

A. I do not have any further evidence to offer, but I would like to request an expedited ruling in this matter, if that's possible. If the Division is receptive and so wishes, Murchison will have a proposed order prepared for the Division's consideration in this case.

It was our intent to drill this well in the fourth quarter of 1996. Our Application for this hearing was submitted on September the 18th. The original hearing was continued until November the 7th. Year-end drilling activity is substantial now. We're experiencing difficulty in scheduling a rig and casing and wellsite supervision without an approval of an application and a definite date on which operations may commence.

Murchison is willing to assist in any way possible to facilitate the earliest final order and would very much appreciate any consideration and assistance of

the OCD.

Q. Does that complete your testimony?

A. Yes, it does.

Q. Was Exhibit 1 prepared by you or under your supervision?

A. Yes, it was.

Q. Mr. Examiner, we move the admission of Exhibit 1 and pass the witness at this time.

EXAMINER STOGNER: Exhibit 1 will be admitted into evidence.

Mr. Kellahin, your witness.

MR. KELLAHIN: Thank you, Mr. Examiner.

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q. Just a couple questions, Mr. Daugherty.

The Ogden 1 well is the first Morrow producer in your section, and it was drilled in 1977?

A. That's correct.

Q. And it currently has cum'd about -- I think you said 3.8 BCF?

A. That's correct.

Q. The second well, then, is the Number 2 well up in the northeast quarter of your section. It was drilled in 1986. It produced out of the Morrow, I think you said 1.1 BCF, before this Morrow was abandoned?

A. It produced -- Just a second. The Number 2 well was completed in 1982.

Q. 1982, okay.

A. Okay. Now, go ahead with your question, please.

Q. From 1982, then, to September of 1990, it was producing out of the various Morrow perforations in that wellbore, and it cum'd about 1.1 BCF?

A. That's correct.

Q. And then you abandoned all Morrow and moved up into the Atoka?

A. That's correct.

Q. Do you have an engineering explanation as to why that well only produced 1.1 BCF, when the other well in the other 160 acres has currently cum'd 3.8?

A. Just the quality of the sands. The well was -- We had worked with that well quite a bit with soapsticks and various procedures to try to keep it on production. It would not make enough gas to sustain commercial production and we plugged it. Obviously, the quality of the sands weren't as good as they are in the Number 1 well, and it was not as much gas in place.

Q. Okay, so to the best of your knowledge, it wasn't a mechanical problem with the well?

A. No, it was not.

Q. All right. Thank you, sir.

What is the reason that Murchison has chosen to propose the third well in the section, in the southwest quarter as opposed to perhaps the southeast quarter?

A. Based on geologic interpretation.

MR. KELLAHIN: Okay. Thank you, Mr. Examiner.

EXAMINER STOGNER: Thank you, Mr. Kellahin.

Mr. Carr?

MR. CARR: No questions.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Daugherty, are there any other -- Well, let me rephrase that or let me go back a little bit.

What other formations are present in the Pennsylvanian formation or the Pennsylvanian system in this area?

A. To the best of my knowledge, and I think my geologist would probably be better suited to answer your question, but I believe that the Strawn, Atoka and Morrow are the only producing horizons. I do not believe the Cisco/Canyon produces in this area.

Q. Okay. Are there any Strawn producers within this nine-section interval that you --

A. Yes, sir, up in Section 36 you'll see a yellow dot.

Q. I've got a black-and-white map.

A. Yes, sir, I'm looking at Exhibit 2.

Q. Oh, okay. Exhibit Number 2, okay. And that's the only Strawn producer?

A. In this nine-section area that I'm aware of, yes, sir.

Q. Has there been any Strawn production in any of your wells in Section 2?

A. No, sir.

Q. Okay. The Number 1 well, when was it completed in the Morrow again?

A. In February, 1977.

Q. Did you review any of the pressure data available to that well?

A. Yes, sir.

Q. Did you see the same pressures or see in the data presented that the Number 2 experienced -- Was it virgin pressure?

A. I don't believe so. I do not -- I did not have a bottomhole pressure measurement on the Number 2 well. We purchased these properties from Mesa petroleum. I found a bottomhole pressure of -- actual bottomhole pressure measurement on the Number 1 well. It had 5023 pounds measured pressure. In the Number 2 well, I don't have a measured pressure. In my opinion, the Number 2 well's pressures were relatively virgin pressures when it was

completed.

Q. Is there any evidence of communication between the Number 1 and the Number 2 in the Morrow?

A. No, sir, I wouldn't think so. The Number 2, we recompleted it because it was depleted. The Number 1 well was still making a little over 200 MCF a day. So I was able to produce gas out of the Number 1 well, while I couldn't produce out of the Number 2. If they had been in communication, I would have thought the Number 2 would stay on production.

Q. Okay. Now, you testified that the Number 3 was needed to prevent waste, if it wasn't allowed to be drilled at this time then additional production would not otherwise be recovered. Are you saying at this time, or would the Number 1 and Number 2 eventually drain the Morrow formation in that southern portion of Section 2?

A. I don't believe that's the case, no, sir. Well, obviously the Number 1 well is not -- The Number 2 well is not draining any Morrow production at this time. The Number 1 well is producing at 140 MCF a day. That's about 5000 MCF a month. We're not getting -- that's not -- That would not be commercial production for a new well.

We believe that the Number 3 well will find -- Although there may be a zone that sees some drainage from the Number 1 well, we think we can find sands that have not

been drained by the Number 1 or the Number 2. We think we'll find, if we can measure them separately, virgin pressures in the Number 3 well.

Q. Are you aware of any other sections in the White City-Pennsylvanian Gas Pool that have more than two producing wells?

A. Not in the Strawn. I mean, there are sections that have more than two producing wells, but not from the Strawn Pennsylvanian.

Q. Well, I'm talking about --

A. I mean --

Q. -- the Pennsylvanian system.

A. Yes, sir, Pennsylvanian system, and I'm not aware of that, no, sir.

Q. Okay.

A. And that's not the case on this nine-section area.

Q. Are you familiar with the White City-Pennsylvanian Pool rules?

A. I believe I am.

Q. Okay, could you maybe go back historically when it was first designated, and what was the spacing and when did it go to 640? Do you know?

A. Bear with me.

To the best of my knowledge, the first hearing in

the White City-Pennsylvanian Pool was held in March 20th, 1963. At that time the field was established with 640-acre spacing units, providing for one well per section.

In 1981, March of 1981, a hearing was held to cause the field to have 320-acre spacing. I don't have that transcript of that hearing with me. I have read that transcript. There was a fair amount of testimony put on dealing with drainage radiuses. The drainage-radius calculation supported going to 320-acre spacing, and the Commission ordered that the field go to 320-acre spacing in Order Number R-2429-C.

Very shortly after that, in July of 1981, the Commission reheard or -- I'm not sure my terminology is correct, but they had another hearing. That was Case 7295, and they issued a new order, 2429-D.

And at that hearing, for various reasons and to protect correlative rights, there were some sections that really didn't -- would not have benefitted from a second well on a section. And for whatever reasons, the Commission re-issued a new order saying that the spacing would be at this point 640-acre proration units with the option to drill a second well on any proration unit, which allowed operators to come in and propose a second well at their discretion if they felt it was necessary and drill -- and have two wells on the -- in each 640-acre proration

unit.

A little twist in the difference between 320-acre spacing and 640-acre spacing is that the distance requirements for wells under the most recent order was that the wells had to be 1650 feet from either side line, whereas 320-acre spacing allows you to get 660 feet from a section line and 1980. So the -- What I'm trying to say is, the spacing distance requirements are 640, but it allows for two wells per section.

Q. So it was on 640, then went to 320, then went back to 640 with an infill provision?

A. With an optional well, yes, sir.

Q. Was that flip-flop from a 320 back to a 640, was due more, with what you researched, due more for protection of correlative rights or drainage? Or I should say science in this instant.

A. I believe -- Well, I read the transcript, and basically, the operators in the field preferred to go back to the 640-acre spacing with an optional well. They didn't want to prevent somebody from drilling a second well, but they didn't feel obligated to drill -- They didn't want to be obligated to drill a second well, if that answers your question.

Q. I guess what I was getting at, once it went from 6- -- once it went down to 320, people that had been

getting royalties for many, many years, weren't getting them anymore?

A. That -- I believe that may have been the case.

Q. Probably a pretty good summation of why 2429-B was issued. Okay.

Now, in the completion, your proposed completion for this Number 3 well, are you planning to go in and open up both the Atoka and the Morrow if it looks productive?

A. I wouldn't expect that I would open both of them up at the same time. My experience in this area is, the Morrow formation is normally pressured around 5000 pounds at this depth. The Atoka formation has higher pressures, in the 7000-pound -- 6000- to 7000-pound range. It becomes difficult mechanically to complete the Morrow and then come back and get the Atoka formation and be able to control the well, and I wouldn't expect that.

But by the same token, if the Morrow performance is not satisfactory or if it depletes in a year or two, I would plan on going to the Atoka formation. I would expect to try and produce both formations in this well, although not at the same time.

Q. Will it ever be, or do you feel it might be advantageous in the Number 1 and/or the Number 2 well at some time in their futures to downhole commingle the Atoka and the Morrow once the production -- or once the pressure

is more equalized?

A. In Section 2 that's probably not the case. We permanently abandoned the Morrow formation in the Number 2 well, so that's not an option. It's depleted.

In the Number 1 well we do not believe we have any Atoka -- viable Atoka completions.

EXAMINER STOGNER: Okay, that's all the questions I have of Mr. Daugherty.

Are there any other questions of this witness?

Thank you, sir. You may be excused.

Mr. Coffield?

MR. COFFIELD: We call Mr. Marion Causey for our next witness, Mr. Examiner.

MARION E. CAUSEY,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. COFFIELD:

Q. Mr. Causey, would you please state your full name, address and occupation?

A. Marion E. Causey, 3913 Fairwood Court, Midland, Texas. I'm an independent petroleum geologist.

Q. Are you a certified petroleum geologist, Mr. Causey?

A. Yes, by the American Association of Petroleum

Geologists.

Q. And have you previously had your credentials accepted as a matter of record and have you testified before the New Mexico Oil Conservation Division as a petroleum geologist?

A. Yes.

Q. Are you a consulting petroleum geologist for the Applicant, Murchison, in this case?

A. Yes.

Q. And are you familiar with the Application of Murchison in this Case Number 11,624, and have you made a study of the geological matters with which this case is involved?

A. Yes.

MR. COFFIELD: Mr. Examiner, we tender Mr. Causey as an expert petroleum geologist.

EXAMINER STOGNER: Mr. Causey is so qualified.

Q. (By Mr. Coffield) Mr. Causey, you have before you several exhibits which have been prepared for Murchison in this case. It's my understanding that you feel in your testimony that you will find it most logical to make reference rather simultaneously or collectively to the features found in all three, so would you please refer to what have been marked as Exhibits 2, 3 and 4, and explain the pertinent features in those exhibits as they relate to

Murchison's Application in this case?

A. These exhibits, which are marked 2, 3 and 4, demonstrate by structure map, the two cross-sections, the relationship of the proposed location for the Ogden State Number 3 well and the producing formations within Section 2, Township 25 South, Range 26 East, and the producing formations in the wells offsetting Section 2.

Mr. Examiner, I'd refer you to Exhibit Number 2, which is a structure map, on a Morrow datum, and this datum is indicated in Exhibits 3 and 4, the cross-sections, as marked by datum, heavy-mark lettering as datum. The scale of this map is one inch equals 2000 feet. The contour interval is 50 feet.

Mr. Examiner, on Exhibits 3 and 4, which are stratigraphic cross-sections, the vertical scale is one inch equals 40 feet, and there's no horizontal scale. The cross-sections are indicated on the structure map as A-A', Exhibit 3; and B-B', Exhibit 4.

The structure map depicts the structural relationship of the proposed location to wells in Section 2 and the offset wells. The producing formations are color-coded on the structure map, Exhibit Number 2, as follows: The Permian Delaware is blue, the Permian Wolfcamp is purple, the Pennsylvanian Strawn is yellow, the Pennsylvanian Atoka is green, the Pennsylvanian Morrow is

red.

The logs on the wells drilled to the Morrow formation in Section 2 and the offset wells are displayed on cross-sections A-A', Exhibit Number 3; B-B', which is Exhibit Number 4.

These logs are correlated to conform to the tops recommended in 1974, to the New Mexico Oil Conservation Commission, by the Industry Pennsylvanian Vertical Nomenclature Committee. The vertical limits of the White City-Pennsylvanian Gas Pool have been defined by the New Mexico Oil Conservation Commission as comprising all of the Pennsylvanian system.

The Pennsylvanian in this area is subdivided into four recognizable formations. The Cisco and Canyon is lumped as one, the Strawn, the Atoka and the Morrow. The Murchison Oil and Gas Number 1 Ogden State Well in the northwest quarter of Section 2 is producing from the Pennsylvanian-Morrow formation at 10,984 to 11,416.

The Murchison Oil and Gas Number 2 Ogden State well in the northeast quarter of Section 2 is producing from the Pennsylvanian Atoka formation at 10,320 to 10,372.

The Chevron Marquardt Federal Number 1 in the northwest quarter of Section 1 was originally completed from the Morrow formation, perforations 11,139 to 11,548. It was recompleted January the 25th, 1995, from the

Wolfcamp formation perforations, 9609 to 9745.

The Murchison Ringer Number 1, in the northwest quarter of Section 3, was originally completed from the Morrow formations, perforations 11,098 to 11,448. It was recompleted 10-14-80 from Atoka-formation perforations, 10,266 to 10,384.

The Murchison Oil and Gas Moore Fed Com Number 1, which is located in the southwest quarter of Section 35, is producing from the Morrow formation perforations, 11,097 to 11,434.

The Matador Petroleum Corporation Grynberg Federal Com Number 11-1, in Section 11, northeast quarter of Section 11, is producing from Morrow formation perforations 11,097 to 11,434.

Section 2, Township 25 South, Range 26 East presently has one gas well producing from the Atoka formation and one gas well producing from the Morrow formation.

Q. Mr. Causey, in your opinion are the Murchison Oil and Gas Number 1 Ogden State and the Murchison Oil and Gas Number 2 Ogden State producing from two separate reservoirs?

A. Yes, in my opinion, these two wells are now producing from two distinct and different reservoirs.

Q. And in your opinion would the granting of

Murchison's request and the drilling of the proposed well be in the interest of conservation, the prevention of waste and the protection of correlative rights?

A. Yes.

Q. Mr. Causey, do you have any further testimony to offer?

A. No.

Q. Were Exhibits 2, 3 and 4 prepared by you or under your supervision?

A. Yes, they were.

MR. COFFIELD: Mr. Examiner, we move the admission of Murchison Exhibits 2, 3 and 4 and pass the witness at this time.

EXAMINER STOGNER: Exhibits 2, 3 and 4 will be admitted into evidence at this time.

Mr. Kellahin?

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Causey when you look at the structure map -- I simply have it here as a locator for me -- what's the geologic reasons for proposing the third well in the southwest quarter, as opposed to the southeast quarter of Section 2?

A. Structural relationship. Also, we anticipate maximum sand development, or the better sand development in

the southwest quarter of the section.

Q. Southeast quarter of Section 2 is higher structurally, is it not, than the southwest quarter?

A. The southeast quarter, not on this map.

Q. So your preference for your location has a structural component to it?

A. It does.

Q. And so -- Is that structural component an issue in all of the Pennsylvanian zones, the Morrow and the Strawn and the Atoka?

A. No.

Q. Just in the Morrow?

A. These are combination structural-stratigraphic-type traps, so they both -- they're two components.

Q. All right. The structural component, though, is it of significance in all three of those reservoirs?

A. It does appear to be.

Q. And so the strategy for you as a geologist is to try to position yourself stratigraphically but also structurally, and the structural component is to be higher in the structure?

A. You have to consider both equally.

Q. When you deal with the stratigraphic nature in here, what does your cross-section show in terms of the distribution of the Morrow across the section? Is it

continuous or discontinuous? How would you characterize it?

A. Well, as you look at the cross-sections on Exhibit 2 and 3, or 3 and 4, the two cross-sections, you can see a multitude of sands, and you have to consider that each one separately, to map it, has to -- its geographical distribution here. So all of those components have to be considered, and some obviously are not continuous over the whole section or across the whole field. Others are.

Q. Is it common in this southern portion of the White City-Penn Pool to have a Morrow well on 160 acres and move to the adjoining 160 acres and find that Morrow sand package to be substantially different?

A. That is possible, yes, in some of the wells.

Q. Okay. What's the deposition of the Morrow here? It's a sand system, is it?

A. The Morrow is -- yes, predominantly -- The producing intervals are sandstones.

Q. And the sandstones, is this a river-channel system, or are you on a beach? What is the deposition?

A. The Morrow sands here are deposited as beach-bar strand-line sandstone depositional deposits, which have a predominantly northeast-southwest component.

Q. If you were to create an isopach of a general distribution of the sand package in the Morrow, how would

that be configured as it moves across Sections 11 and 2?

A. They would have a northeast-southwest trend. Each one varies. You have to map each one individually.

Q. I understand that, but there would be a general trend to the deposition?

A. Of each sand lens, yes.

Q. Yes, sir. And it's a general trend, northeast-southwest?

A. That is correct.

Q. What happens when you move up into the -- I guess the Atoka?

A. The Atoka is -- Part of it is carbonate and some of it is sandstones here. And there is a distinct difference from the Morrow. The predominantly mapped zone that produces in the Ogden well that we have recompleted has a northwest-southeast component to it. It is different from the Morrow.

Q. As you move up into the Strawn, characterize the Strawn for us in comparison to the Atoka and the Morrow.

A. The Strawn doesn't produce in any of these fields, and I haven't mapped it in here, individually or separately, since it's not a producing reservoir.

Q. So the operators in here would be looking for Morrow and Atoka?

A. That is correct, predominantly.

MR. KELLAHIN: Thank you, no further questions.

EXAMINER STOGNER: Thank you, Mr. Kellahin.

Mr. Carr?

MR. CARR: No questions, Mr. Stogner.

EXAMINATION

BY EXAMINER STOGNER:

Q. Did you map those two intervals like Mr. Kellahin was questioning you?

A. Yes, I did.

Q. I was curious why you didn't bring them in today.

A. Well, it's a whole series of maps of individual sand lenses. We could have, but we didn't.

Q. Not just --

A. I didn't feel, Mr. Examiner, that it would add that much to the testimony, but we could have.

Q. Mr. Daugherty's testimony suggested that this well was needed to adequately drain additional acreage or additional production that would not otherwise be produced.

Taking a look at your B-B', in the Atoka interval between the Ogden State Number 1 well and the well to the south, the Grynberg Federal Com Number 1, what's your opinion of the likelihood of Atoka production occurring in this -- in that -- or in this quadrant, since neither zone has been completed at this point?

A. Yes, it is my opinion that the proposed location

Number 3 has a good chance to have Atoka production, to encounter Atoka production.

The Ogden Number 1 well encountered a zone, but it was tight; it was not productive. If you notice, the Grynberg well at the very top of the Atoka does indicate a zone of porosity.

Q. And where in particular are you saying?

A. That would be right at the top of the Atoka, about 10 feet -- the top 10 feet of the Atoka in that well, just below the Atoka at -- I can't read the fine print in the cross-section, but it's about 11,325 to about -40, which appears to be -- the log indicates it to be porous in the Atoka.

Q. Now, on both -- or the perforations in the Morrow interval, on the Ogden State Number 1, they appear to be mistakenly individualized to correspond with stringers. Is that -- Was the intent of those perforated intervals in this section, in the Morrow, to pick up sand stringers that appear throughout here?

A. Yes.

Q. Okay. Do these sand stringers -- because I notice you don't have particular perforations in your offsetting wells. Do they extend across, or are they pretty muchly isolated sand stringers?

A. Some of the sandstone stringers have continuity

from well to well, others do not. And as you go from well to well and map them, some of the sands will be present, but they will be tight and nonproductive, even though they're present.

EXAMINER STOGNER: Mr. Coffield, I have no other questions of this witness at this time. You may be excused.

I may, subsequent to Mr. Kellahin's witnesses, recall Mr. Daugherty, your first witness.

MR. COFFIELD: Mr. Examiner, the only other thing we have to add to this case at this time is to have entered in the record the affidavit with respect to complying with notice provisions of Division Rule Number 1207, reflecting that the Applicant has conducted an investigation as to the names and addresses of the parties to be notified, and this is reflected in the affidavit marked as Exhibit 5, and we would move the admission of that exhibit, if you please.

EXAMINER STOGNER: Were there other additional parties besides just the operators of offsetting wells that were notified pursuant to this affidavit, Mr. Coffield?

MR. COFFIELD: I understand all the parties I was able to find are operators. Just a minute, Mr. Examiner.

(Off the record)

MR. COFFIELD: Mr. Examiner, for the sections which are shown on the exhibits here as Murchison-operated

properties, all working interest owners were notified. On the non-operated sections only the operators were so notified.

EXAMINER STOGNER: Say that again.

MR. COFFIELD: The sections where Murchison is the operator of the wells, which includes the gray-shaded area.

MR. DAUGHERTY: Section 35, 34, Sections 2 and 3 and 10, Murchison is the operator. We know who the non-operators are. We notified all those folks.

On Sections 36, 1, 12 and 11 we have no way of knowing who the non-operators are, or the working interest owners. We only could notify the operators of those sections and rely on them to make their working interest owners aware of the hearing.

EXAMINER STOGNER: And all of those sections, 36, 1, 12 and 11 that are non-Murchison operating, there are producing wells in those sections?

MR. DAUGHERTY: I believe in Section -- In Section 1, there's not one in this particular field. That's a Wolfcamp completion. There is a Pennsylvanian Strawn producer in Section 36, and then in Section 12 and 10. There are producing wells in all those sections, but Section 1 doesn't have one in this field that's subject to these field rules.

EXAMINER STOGNER: So do you feel that notifying Chevron and the interests just in Section 1 was adequate for this instance, just for that section?

MR. DAUGHERTY: Yes, sir, I -- Yes, sir.

EXAMINER STOGNER: Mr. Daugherty, while I've got you up front here, is this pool prorated?

MR. DAUGHERTY: I do not believe so.

EXAMINER STOGNER: Okay. By allowing a third well in this section, while the others still have two, and it's still being unprorated, is correlative rights still being protected and the fairness of all within the pool by its still remaining unprorated?

MR. DAUGHERTY: I would think so. My logic and the basis of our Application, is that there are sections that have two wells producing from the same formation, and we're attempting to put a second completion in the Morrow formation. And in Sections 34 and 35 there are two Morrow wells producing. We're merely adding a second well. We have two take points, those sections have two take points.

EXAMINER STOGNER: You keep referring to two reservoirs. Is it your advocation that perhaps the White City-Penn should be split up to two pools?

MR. DAUGHERTY: No, sir, I testified I didn't think there was any need to change the field rule. But I think it's appropriate to recognize that the Atoka and the

Morrow are separate formations and that if we deal with -- in this instance we're asking for an exception to the field rules in this section, where we think we have a viable -- an additional Morrow location that we can drill and produce gas that won't be produced from the Number 1 well, that we be allowed to do that.

EXAMINER STOGNER: Do you feel it may be advantageous sometimes in the future with this Application, and then I believe there's another one today which is asking for similar -- perhaps including an addition in the pool rules to allow for a third or possibly a fourth well, within the pool rules where you wouldn't have to come to hearing every time for such a matter?

MR. DAUGHERTY: I have not looked at a lot of production beyond this nine-section area, because we don't have wells in the north part of this. This is a fairly large pool. I think there's -- at one time, 25 to 30 wells completed in this field.

I think the incidence of the Atoka and the Morrow being stacked on top of each other and both zones being productive in this field are somewhat isolated to this area that we're looking at.

In Section 3, that was an originally -- the well in that section was originally attempted in the Morrow and was unsuccessful, there was only Atoka.

There could possibly be a Morrow location in Section 3, but it wouldn't require a hearing to do that. There's only one well in this section. The same thing with Section 10.

And we're dealing with Sections 2 and 11 today, and I don't believe this question -- I don't think this question will crop up frequently in the field.

Now, that's my opinion. I haven't looked at the production to the north, but I don't think the Atoka is that prevalent -- is that present up in the north part of the field.

EXAMINER STOGNER: Okay, I appreciate that. Thank you.

Mr. Kellahin, I believe we're ready for you now.

MR. KELLAHIN: Mr. Examiner, I've distributed our geologic and engineering exhibits to the parties and to you, sir.

I also have made a copy of all the Division orders that deal with this pool in terms of the pool rules. There are a number of them. They start with Mr. Uhden's order back in 1963 and go forward.

EXAMINER STOGNER: Thank you, Mr. Kellahin. A study in correlative rights.

MR. KELLAHIN: Mr. Examiner, our first witness is a petroleum geologist, Mr. Ken Macho.

KEN MACHO,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Macho, for the record, sir, would you please state your name and occupation?

A. Yes, sir, my name is Ken Macho. I'm a petroleum working for and representing Matador Petroleum, located in Dallas, Texas.

Q. On prior occasions, Mr. Macho, have you testified as a geologist before this Division?

A. I have, a long time ago.

Q. As part of your work as a geologist, have you made a study of a portion of what we're discussing today in the White City-Pennsylvanian Pool of Eddy County, New Mexico?

A. Yes, sir.

Q. As part of your study, does it include a review of the geologic information, particularly around Sections 2 and 11 that we're discussing today in Township 25 South, Range 26 East?

A. Yes, sir.

Q. As part of that study, do you now have recommendations and opinions to share with the Examiner

concerning the appropriateness of having the opportunity to drill a third well in Section 11, as an exception to the pool rule?

A. I do.

MR. KELLAHIN: We tender Mr. Macho as an expert petroleum geologist.

EXAMINER STOGNER: Are there any exceptions?

Mr. Macho is so qualified.

Q. (By Mr. Kellahin) By way of background, Mr. Macho, let's go through a couple of these displays, and then I will get down to asking you about your conclusions, and then we'll look at the additional data that supports those conclusions.

By way of orientation, let's start with Exhibit 1 and have you identify for the Examiner the data shown on Exhibit 1.

A. Exhibit 1, it is a production cum map. It shows the cumulative production in the immediate area for Morrow-Atoka completions, and it shows those through 3-96, and it simply shows the cumulative production from those wells through that date.

Q. What's the significance of the yellow outlined area?

A. The yellow represents acreage that Matador has an interest in, and where our acreage is located.

Q. Within Section 11, there is a location that says "proposed location". What is that intended to represent?

A. That is the proposed 1650-1650 third well, the Grynberg Number 3.

Q. And then --

A. I'm sorry, that's -- I believe it's the Grynberg Number 4. I believe there's a shallow well already there.

Q. All right. So --

A. Yes, it's the Grynberg Number 4, I believe, that that is the third well that we are asking for an exception for to be able to drill.

Q. Let's set aside the cum production map and go to the next display and have you identify and describe that display.

A. Exhibit Number 2 is a cross-section identification map, and it refers to the cross-section that is attached, running through the two deep Morrow wells in Section 2, and then down into and including the two deep wells in Section 11.

Q. All right. Let me have you fold out the cross-section -- it's Exhibit 3 -- and after we get it unfolded, then let me ask you some questions.

When we read from A to A', we're starting with Murchison's Ogden State 1. It goes to what they've called the Ogden State 2. Your header refers to it as the River

State 1, but in fact that's the same well --

A. That is the same well, that is correct.

Q. All right. And then we move down into your Section 11, you pick up the northeast quarter of 11 with your Grynberg 1. And then down in the southeast quarter of 11, the final well is the Grynberg 2?

A. That's correct.

Q. All right. Let's take a moment to explain to the Examiner whether you and Murchison's geologist have any differences in nomenclature so that the Examiner understands if there is any differences of opinion with regards to what he previously saw and what he's about to see in your work.

Let's start first of all with the datum point where you've marked the top of the middle Morrow on the cross-section.

A. Yes, sir.

Q. How does that compare to the Murchison display?

A. I believe that correlates with the data point that has been picked on the Murchison exhibit, the same line. That is a correlation point that I used and I've broken out in calling the top of them. The middle Morrow interval on my map, correlates to their datum point on their exhibit.

Q. So when Mr. Stogner gets around to looking at

your isopach of the middle Morrow, what interval have you isopached on that subsequent display?

A. That exhibit will show sand below this top of the middle Morrow marker or this datum.

Q. As we look at that portion of the Morrow below the top of the middle Morrow datum point that you've isopached, that isopach is going to include a summation of numerous stratigraphic intervals within that particular portion of the pool; is that not true?

A. That is correct.

Q. All right. Give us an explanation as to your geologic interpretation of the deposition and the environment in which this Morrow has been deposited.

A. It -- from the -- And I'll qualify this right at the beginning. I have not done a detailed, individual, zone-by-zone correlation.

It is my opinion that these Morrow sands are channelized sands, that are being sourced from a north to northwesterly location. They are coming down and flow across and along the major White City structure that has already been proposed, the structure map.

The isopach maps that you will see do not necessarily follow or align the depositional trends, simply because they include a number of stratigraphic intervals, and they apply a porosity cutoff to these.

But it is my interpretation that the Morrow down in this area is a channel sand orientation, and it is orienting in a north-south, slightly northwest-to-southeast direction.

Q. Let's deal with the two Ogden State wells. In what you identify to be the middle Morrow portion, these wells are obviously 160 acres apart, side by side, in the north half of the section?

A. Correct.

Q. When we look at the Morrow interval, from one well to the other, what do you see?

A. Well, I see a vast change in what I would consider to be producible-quality sand. In the Ogden Number 1, by the exhibit here, you can see the zones that were perforated. We've colored in the perforations in the sands and simply the quality of the sands and where those sands occur, and if you look at the Ogden State Number 2, you can see that there is quite a bit lacking of the sand quality and amount that would meet the porosity criteria that I have applied in looking at the isopach maps. But there's quite a difference in just the quality of the sand between those two.

Q. Are you able to correlate the sand, individual sand lenses, between these two wells to show that they're continuous?

A. In some instances you can follow between 160 acres. Simply in looking at this exhibit, I can correlate a sand interval that in one case is 100-percent sand, and as you move 160 acres away it appears to be maybe 50-percent sand and 50-percent carbonate.

So I think -- It would be my estimation here that you have a very difficult time correlating and carrying these sand lenses from one well to another, 160 acres away.

Q. Let's look at the two Matador wells. We have those also 160 acres apart. Draw comparisons and differences as we compare those two wells in this portion of the Morrow.

A. Well, once again, as you look at the cross-section and also as you look at the isopach map dealing with this lower zone, you can see that the amount of sand that's colored yellow appears to be somewhat similar. The amount of porosity that is colored red, just as a crossplot, it is not necessarily -- the crossplot is what has been colored red here. You can see there appears to be more crossplot porosity in the Number 1 well, versus the Number 2. But again a pretty difficult way of correlating from one well to the other, although in these two examples I think you can correlate a couple of the intervals and say that I feel like the sands in the Grynberg 1 do correlate over to the Grynberg 2, a little better than, say, from the

Ogden over to the Ogden 1.

Q. Let's move above this interval, then, and look at the next portion of the cross-section, between the top of the upper Morrow and the top of the middle Morrow. Within that lined interval, you've identified various points of potential production of each of the wells?

A. Yes, sir.

Q. When you put that together on an isopach, what are the vertical limits of the area mapped on the isopach that we'll look at later, identified as the upper Morrow and Atoka?

A. All right, as you go from -- Well, this middle interval encompasses the upper Morrow interval that I have included in the isopach. And then also you can move up -- up the section, up into the Atoka that I have simply as a correlation marker, and then just above it, and I have included sands up to -- and you'll see in the Grynberg Number 2 well that there is a small little Atoka sand way up in the top, and that zone has been also included. That would be the end of what I have included in the isopach on any of these maps, and in fact, any of the wells in the area that include what I'm calling Atoka Morrow isopach, the middle --

Q. All right, let's --

A. -- the middle isopach, middle Morrow -- or excuse

me, upper Morrow Atoka.

Q. All right, let's look at the far right side of the cross-section of the Grynberg 2 well. There's a portion high on the log of that well where you have for nomenclature purposes identified that as Atoka.

A. Yes, sir.

Q. Am I correct in remembering that the Murchison geologist referred to that as Strawn, or am I thinking of something else?

A. No, I believe that's covered also as Atoka.

Q. All right. So there is no difference in opinion between the two of you as to what you're characterizing as Atoka?

A. I believe that's correct in this case.

Q. All right. So in your wellbore, the Strawn is going to be off of this cross-section, it's going to be --

A. That is correct.

Q. -- farther uphole?

A. That is correct.

Q. Let's look at the Grynberg 1 well and have you tell us what is the current status of that well.

A. The Grynberg Number 1 is currently producing from the Morrow perforations that you see here. That well is making anywhere from 150 down to 80 MCF a day. We are in the process of running some soapsticks in that well, but

that well is producing and producing from the existing Morrow perforations that you see on the cross-section.

Q. All right. Let's turn to the Grynberg Number 2 well and have you describe for us the current status of that wellbore.

A. That well has been plugged out, you can see a bridge plug listed down here at 11,195, plugging off the lower and middle Morrow perforations. That well is currently in the Atoka sand up at the top of the cross-section. That well is currently making about 60 MCF a day.

Q. What is your expectation of the remaining life of this wellbore in terms of its ability to produce out of that Atoka perforation?

A. At current, we foresee approximately three months of additional production coming from this zone before that zone will be plugged off.

Q. And where will you go then?

A. And we would move up to -- And here's where a little difference comes in. We would move up to an interval that I would call the Strawn, which correlates to what Murchison has called the top of their Atoka, which they are perforated in at this time, and they call Atoka.

Q. Okay.

A. And we would move up to that particular upper zone.

Q. What do you see to be the justification, then, for the third well in the pool, for Matador, if the Division approves the drilling of the well in the northwest quarter of 11?

A. Well, first that, from our engineering calculations, we feel that there is recoverable gas in place on Section 11 that, without a third well, will not be recovered by the existing well or wells that are there now.

Q. In order for the engineer to arrive at those calculations, did you assist him by attempting to map the distribution of these various sand packages?

A. Yes, sir, and that is what is referred to as Exhibit Number 5 and Number 6, in preparing an isopach map dealing with sand thickness and porosity cutoff.

Q. Separate and apart from the engineering calculations of affected drainage areas from a strict geologic point of view, is there a reasonable probability that a wellbore in the northwest quarter of Section 11 is going to encounter Morrow sand lenses that have not been produced in the existing wells in the section?

A. I believe so. Just in referring back and looking at the Morrow -- at the section here, I believe it's realistic to think that you're going to find and encounter new and different reservoir sands than what has been exposed in the existing two wells in Section 11.

Q. Let's take a moment and look at the structure map, which is Exhibit Number 4. And before we talk about the details of the structure, let's just look at the pattern of the wells that have been drilled in Section 11 and 12 and in the north half of 13 and 14.

When you look at the pattern, it appears to be on a *de facto* basis, if you will, that Morrow wells have in fact been drilled on 160-acre spacing.

A. Yes, sir.

Q. When you look at the logs and the data from those various wells, are you seeing that each of these wellbores in some combination is accessing additional reserve potential, that the offsetting well has not been able to fully develop?

A. I believe so. I believe you -- Again, going back to each well, in many instances, it is perforating zones that are not present or not developed in an offsetting 160-acre spot location.

Q. Does it appear to you as a geologist that a well density of one well per 160 is too great?

A. If you are in the, quote, thick channel, the thick portion of the reservoir, the 160-acre spacing, by this right here, appears to be sufficient to be able to drain that 160 and be able to drain an effective area.

Q. Well, apart from drainage areas, though,

geologically you are accessing additional sand lenses that are not fully developed in the 160-acre offset?

A. That's correct.

Q. All right. Let's look at the structure map. Murchison's geologist had a structural component to his strategy for well locations and development of the hydrocarbons in the Pennsylvanian. Do you have a structural component in your analysis?

A. Yes, I believe -- The isopach maps do not take that into consideration, but yes, I consider that there is a structural component, certainly, to the wells and the better wells in the field, yes.

Q. Give us an example of that. Perhaps we could compare the production cum map, Exhibit 1, with structural position of wells shown on Exhibit 4 and have you give us a for-instance.

A. Well, I think just -- As you come from south to north, if you drop down into the north half of Section 14, there is a well down there that is in one of the lower positions, completed in the Morrow, that's made 2.3 BCF.

As you progress to the north, up into Section 11, you have two wells, each making 3.3 and 3.9 BCF, that are increasing in structural position.

And then finally as you move up to and get up into Section 2 where now you're up to, say, the Ogden

Number 1, the 3.8 BCF, they are in a structural high position.

And if you drop off and go to Section 3 or if you drop off and go to Section 10, you'll see those wells more on the fringes do not have quite the structural position and do not have quite the anticipated or reserve potential that these other wells do.

Now, I'll qualify that by -- You also have to take into consideration, obviously, the isopach values that play an important there also.

Q. Well, let's do that now. Let's take the structure map and take Exhibit 5, which is your isopach of this upper-Morrow/Atoka interval, and look specifically at Section 14 --

A. Yes, sir.

Q. -- where we have the Matador White City Federal well up in the northeast quarter of that section.

A. Right.

Q. Your isopach shows a combined thickness of these various Morrow intervals of 51 feet, right?

A. Yes, sir.

Q. And that's using an 8-percent porosity cutoff?

A. That is using an 8-percent density porosity cutoff, that's correct.

Q. When you look at that well's structural position

on Exhibit Number 4, you find that it is downstructure to wells in Section 11?

A. Yes.

Q. Draw the comparison, then, in terms of thickness, when we look at the wells in 11, that have about 24 to 27 feet, a better structural position, and yet the well in 14 has got 51 feet and a poorer structural position. What is the effect on the productivity of the well?

A. Well, obviously, you can -- The well in 14, again, made 2.3 BCF. It is basically twice as thick as the wells up in 11, yet it is in a downstructure position. So if structure played no part, then the well in 14 should have been an excellent well, and probably twice the reserves of the wells in 23 and 27.

Yet due to its structural position, I feel like that has been restricted, and therefore the sand isopach is present, but its structural position causes it to lose effective economic drainage and have less reserves.

Q. Let's go to the isopach itself, then, Exhibit 5, and have you give us your general summation and interpretation of the distribution of those multiple sand packages that you have displayed on this exhibit.

A. Again, the map represents an isopach of only 8-percent density cutoff in the sands. It shows a fairly north-south trend and counts the net pay -- or as net pay

those footages greater than 8 percent on the map, or on the -- on each log.

Q. Let's turn now to Exhibit Number 6 and look at your sand distribution for the middle Morrow interval that is shown on this exhibit.

A. Again, an 8-percent porosity cutoff from the logs, not as thick, not as many, quote, intervals, or as thick and better-better developed intervals.

Yet you can see the trend developing here, a little more of a northwest-southeast, and then it does curve back, come around to a northeast-southwest up towards the north, but again counting 8-percent density porosities.

Q. Summarize for us your conclusions, Mr. Macho.

A. Well, in preparing the isopach maps, in looking -- the structure, the availability of numerous sand packages throughout this area, it is my opinion that a -- the proposed location, third location in Section 11, it is necessary to recover new, non-recoverable reserves, again reinforcing the idea that in a three-month period we will not have a second well within approximately 600 to 700 feet of these lower Morrow intervals, producing. We will only have one well producing from them.

We anticipate being up the hole into the, quote, Strawn/Atoka interval that Murchison is in -- there will only be one zone there -- and that we could and hopefully

will be allowed to drill that third well to put two producers into the Morrow interval, and/or Atoka interval and recover these unrecoverable reserves from Section 11.

Q. Unrecoverable insofar as the existing wellbores?

A. The existing wellbores, that's correct.

MR. KELLAHIN: All right, sir. That concludes my examination of Mr. Macho, Mr. Stogner.

We move the introduction of his Exhibits 1 through 6.

EXAMINER STOGNER: Thank you, Mr. Kellahin.

1 through 6 will be admitted into evidence at this time.

Mr. Coffield, your witness.

MR. COFFIELD: We have no questions of this witness.

EXAMINER STOGNER: Mr. Carr?

MR. CARR: I have no questions.

EXAMINATION

BY EXAMINER STOGNER:

Q. Did you have an opportunity to take a look at the two or inspect closely the logs in the offsetting Section 12?

A. I worked those into my map, yes, sir.

Q. I was curious about how the perforated interval corresponded between those two wells, twinning your two

wells.

A. In going back and looking at my isopach map, there are perforations in both and would correspond similarly now, intervalwise, without having the log right here in front of me. There are perforations in the middle Morrow, what I have mapped as middle Morrow in each of those four wells, and there are perforations in the upper Morrow, in each of those four wells.

And I do not remember the specifics, but I would dare say with a thickness of 40 feet in the southerly well in 12, the southwest, I would think that it would probably have this upper development in the upper Morrow that is carrying across from the Ogden wells and coming south into Section 11.

EXAMINER STOGNER: There appears to be some very unique similarities between the two sets of wells, twinning each other.

I have no other questions of this witness, Mr. Kellahin.

You may proceed.

MR. KELLAHIN: All right, sir.

Do you want to leave the displays up there, Ken, and we'll let Tracy have them?

Mr. Examiner, our next witness is Tracy Evans. Mr. Evans is a petroleum engineer.

TRACY EVANS,

the witness herein, after having been first duly sworn upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Evans, for the record, sir, would you please state your name and occupation?

A. My name is Ronald Tracy Evans. I'm a petroleum engineer, engineering manager, for Matador Petroleum, Dallas, Texas.

Q. On prior occasions have you testified before the Division?

A. No, sir.

Q. Summarize for us your education.

A. I graduated from the University of Oklahoma with a bachelor of science in petroleum engineering in 1984. I have worked 12 years in the industry.

And my other education is, I have an MBA in 1995 from the University of Texas at Dallas.

Q. As part of your employment experience, do you on a regular basis perform engineering calculations and look at production on behalf of Matador?

A. Yes, sir.

Q. As part of your work here, did you take Mr. Macho's isopachs and attempt to analyze those and to

calculate on a volumetric basis the original gas in place for Section 2 and Section 11?

A. Yes, sir, I did.

Q. In addition, have you examined decline curves for each of those four wells?

A. Yes, sir.

Q. And based upon the decline curves, have you forecasted an estimated ultimate gas recovery?

A. Yes, sir, I have.

Q. Based upon all that information, were you able to calculate what your estimate is of affected acres being drained by the four wells?

A. Yes, sir, I did.

MR. KELLAHIN: We tender Mr. Evans as an expert petroleum engineer.

EXAMINER STOGNER: Any objection?

Mr. Evans is so qualified.

Q. (By Mr. Kellahin) Mr. Evans, I recognize that there is not enough information here to calculate the exact shape for the drainage areas, and I recognize that the calculation requires you to sum what might be individual reservoir packages.

But within those limitations, were you able to approximate what in your opinion are the general area of drainage being developed by each of the four wells?

A. Yes, sir.

MR. KELLAHIN: Let's turn and look at that information. If you'll start with Exhibit Number 7, let's have you describe for the Examiner what you have calculated and what you have concluded.

In addition, Mr. Examiner, I've made a typographical error on the original gas in place. That number should be 43,560. I think I've noted it on your exhibit.

Q. (By Mr. Kellahin) Please continue, Mr. Evans.

A. Exhibit 7 is my estimate of the original gas in place in Section 2 and Section 11. I have taken Mr. Macho's isopach maps and planimetered them. That is what is referred to as the isopach volume of the reservoir.

Q. All right, stop right there. Did you take both isopachs?

A. Yes, sir.

Q. Both the middle Morrow and then his upper Morrow/Atoka?

A. Yes, sir.

Q. You combined the total thicknesses, then, that he utilized?

A. Yes, sir.

Q. All right. So now you have a volume?

A. I have a volume of reservoir rock.

Q. Then what did you do?

A. You take the volume of reservoir rock, assuming an average porosity of 8 percent, an average water saturation of 30 percent, an original reservoir pressure estimated based on a -- just a standard gradient of 5200 pounds and an abandonment pressure of 500 pounds.

You calculate original gas in place using the equation shown below with the correction for 43,560 of 13.8 BCF in Section 2 and 12.9 BCF in Section 11 of original gas in place.

Q. All right. How did you reduce that to recoverable gas?

A. I instituted the abandonment pressure of 500 p.s.i., which gives you -- When you institute that it gives you the recovery factor, which then lowers the actual recoverable gas in place in each section of 12.4 in Section 2 and 11.6 in Section 11.

Q. Your production from existing wells was derived how?

A. From *Dwight's Data of Current Production*. The Matador wells are through 8-96, and the Murchison wells are through 3-96.

Q. All right. The information that is provided by all operators is not such that we can identify exactly what volume of gas came out of any particular portion of the

reservoir?

A. No, sir, there's multiple reservoirs all commingled.

Q. In addition, Mr. Stogner asked a while ago, data with regards to pressure information. Is there sufficient pressure information available in this area by which you could determine pressure interference between the wells?

A. Not that I have available to me, no, sir.

Q. It just doesn't exist, does it?

A. Not to my knowledge.

Q. All right. How, then, did you determine the expected ultimate recovery from the existing wells?

A. I used decline-curve analysis of each well, which are shown as Exhibits 9, 10, 11 and 12.

Q. All right. Let's turn to those now. Let's interrupt your discussion on 7 and let's turn to the decline curves.

If you'll start with Exhibit 9, let's look at that decline curve.

A. On Exhibit 9 is the production history from the Ogden State from 1985 through March of 1996.

Q. I recognize that you're not the operator of this well.

A. Right.

Q. Do you have information to show what occurred in

1990?

A. No, sir.

Q. To show a change in the decline? There's a substantial increase in production in 1990.

A. No, sir, I do not know why that production increased at that point in time.

Q. All right. You used the higher line, then, starting with 1990, from which to extrapolate an EUR for the well based upon the decline curve?

A. Yes, sir, I actually used the production data for this decline from about January of 1992 forward --

Q. Okay.

A. -- to come up with exponential decline.

Q. And so that's where the EUR came for this well?

A. Yes, sir.

Q. Let's look at the Ogden 2.

A. Yes, sir.

Q. Again, this is not a well that you operate?

A. Correct.

Q. From the data available, were you able to determine what occurred in 1990 that caused a substantial change in rate?

A. Yes, based on conversations with Murchison, that is when they recompleted their Ogden State Number 2 well up into the Strawn/Atoka formation.

Q. So production data prior to 1991, on that first portion of the display, that is the production out of the Morrow?

A. Morrow, yes, sir.

Q. And then after -- starting in mid-1990, afterwards, that's the production out of the Atoka?

A. Yes, sir, that's correct.

Q. All right. In terms of calculation of your drainage area --

A. Uh-huh.

Q. -- you have disregarded the Atoka production from this well?

A. From the Ogden State Number 2, that's correct.

Q. Yes, sir. And so you have used the fixed ultimate recovery from the Morrow portion of the Ogden 2, which was the 1.1 BCF of gas?

A. Yes, sir, I did.

Q. Let's turn now to the wells that you operate. The Grynberg Number 1, did Matador drill this well?

A. No, sir.

Q. When did you acquire it?

A. We acquired these wells in 1993.

Q. Both wells in 1993?

A. Yes, sir.

Q. All right. Describe for us how these wells have

performed.

A. These wells basically have had relatively -- or at least the Grynberg Number 1 has had a relatively stable decline. It's currently producing approximately 150 to 200 MCF a day. We are having to use soapsticks to keep it producing. That's why the production is somewhat erratic.

The Grynberg Number 2 --

Q. All right, let me ask you this: The Grynberg 1, your plan is to continue to produce this out of the current Morrow perforations?

A. Yes, sir, we plan on continuing to produce this well.

Q. All right, let's look at the Grynberg 2.

A. The Grynberg 2, when we bought the well it was dead. We tried soapsticks, swabbing. We did get a little bit of production out of it, not very successful. We then recompleted the well into the Atoka in late 1995, early 1996, made a pretty good well, but it is apparently extremely limited.

Q. What do you forecast to be the approximate remaining life of your production out of the Atoka?

A. It's in the neighborhood of probably three to six months, depending on whether or not we choose to install an additional compressor.

Q. After that, is there additional remaining

potential in this well in other zones?

A. Yes, sir, up in the Strawn, higher up in the Strawn there's additional potential.

Q. Okay. One of the challenges for you as a reservoir engineer is to determine whether or not it's necessary to drill a third well in Section 11 in order to recover remaining gas that might otherwise not be recovered?

A. That's correct.

Q. Let's finish the calculation and see what you've determined with regards to that issue.

Going back to Exhibit 7, you've calculated remaining reserves for each of the sections?

A. That's correct, taking the expected ultimate from the existing wells of the Grynberg 1 and 2 and then the Ogden State 1 and 2, I estimated that in Section 11 we'll produce approximately 7.9 BCF of gas and in Section 2 that the Ogden wells will produce approximately 5.2 BCF of gas.

That leaves the remaining reserves to be recovered, subtracting the expected ultimate from the recoverable gas in place in Section 2 of almost -- well, it's 7.3 BCF of gas, and in Section 11 it would be 3.7 BCF of gas.

Q. By your analysis, then, if the Division does not approve the third well for Murchison in 2, there's that

risk, a little more than 7 BCF of gas that might otherwise be recovered?

A. Yes, sir.

Q. Is that what you're showing?

A. Yes, sir.

Q. And for Section 11, if the Division doesn't approve the third well, then you're either putting at risk or postponing potential recovery of 3.7 BCF of gas?

A. That's correct.

Q. Is that a volume sufficient enough to support the drilling of another Morrow well?

A. Yes, sir.

Q. Let's turn to see how you have estimated drainage areas. If you'll look at Exhibit 8, identify and describe what you've done here.

A. Exhibit 8 is just the estimated drainage areas for the four wells in Section 11 and Section 2. The expected ultimates are shown based on the decline-curve analysis. The completed net pay, which is from the isopach maps -- It's only the sections that are actually perforated. There's some differences. Then we've used the average crossplot porosity for those intervals that met our net-pay cutoff.

And then simply using the original-gas-in-place, recoverable-gas-in-place equation, we back-calculated

drainage areas. In Section 1, the average drainage area is about 260 acres, and the Ogden State 1 in Section 2 is 209, the Ogden State Number 2 is 61.

Q. Is it possible to calculate the drainage areas for any of the individual lenses of the Morrow formation here?

A. Not with the data available, no, sir.

Q. Okay. The Ogden State Number 2 has a small drainage area. That's simply attributed to the fact that the Morrow perforations in that well only produce 1.1 BCF of gas?

A. That's correct.

Q. Summarize for us your conclusions and recommendations, Mr. Evans.

A. Based on my estimate of original gas in place, recoverable gas in place and remaining recoverable gas in place, I believe it's necessary that a third well be approved in Section 11 to recover the best part of that 3.7 BCF of gas.

Q. Would the drilling of a third well in each of these sections impact or adversely affect the correlative rights of the offsetting interest owners?

A. I don't believe so.

Q. The drainage areas are too small, aren't they?

A. I believe so, yes, sir.

Q. You really don't see that you're going to have a great big Morrow well with lots of nice, continuous sand that is going to drain offsetting spacing units?

A. That's correct.

Q. In fact, you're having trouble draining your own section, aren't you?

A. Yes, sir, we are.

Q. In terms of the waste issue, do you see that the existing wells in Sections 2 and 1 are going to be able to adequately develop the gas reserves that can be recovered?

A. No, I don't believe that the current four wells will come anywhere close to getting all the gas that's recoverable in those two sections.

Q. If Murchison and Matador don't do it, your successors or someone else down the line is going to have to do it?

A. That's correct.

Q. All right. Are the economic such that it's profitable for Matador to engage upon drilling a third well within this reasonable time period?

A. Under the present marketing conditions of gas prices in this area, yes, sir, it is economic to drill a well at this time.

MR. KELLAHIN: Mr. Examiner, that concludes my examination of Mr. Evans.

We move the introduction of his Exhibits 7 through 12.

EXAMINER STOGNER: Exhibits 7 through 12 will be admitted into evidence at this time.

Thank you, Mr. Kellahin.

Mr. Coffield, your witness.

MR. COFFIELD: No questions.

EXAMINER STOGNER: Mr. Carr?

MR. CARR: No questions.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Evans, in referring to Exhibit Number 10 --

A. Yes, sir.

Q. -- when did this well get recompleted from the Morrow to the Atoka? Referring to the Ogden State Number 2?

A. The Ogden State -- sometime -- It looks approximately September of 1990.

Q. 1990? In preparing Exhibit Number 8 -- This is your drainage- --

A. Yes, sir.

Q. -- area calculations?

Did you do any other calculations besides just these four wells?

A. No, sir, I did not.

EXAMINER STOGNER: I don't have any other questions at this time, Mr. Kellahin.

You may be excused.

THE WITNESS: Thank you.

MR. KELLAHIN: Mr. Examiner, the last exhibit in the package is the certificate of mailing. We notified the offset operators, and in the absence of an operator, we attempted to find the non-operating parties.

With that -- With the introduction of the certification, that concludes our presentation.

EXAMINER STOGNER: Does anybody else have anything further in either Case 11,636 and/or 11,624 at this time?

MR. KELLAHIN: No, sir.

EXAMINER STOGNER: Then these matters will be taken under advisement.

(Thereupon, these proceedings were concluded at 10:00 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case Nos. 11636 and 11624 heard by me on January 3 1996.

, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

I, Steven T. Brenner, Certified Court Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I transcribed my notes; and that the foregoing is a true and accurate record of the proceedings.

I FURTHER CERTIFY that I am not a relative or employee of any of the parties or attorneys involved in this matter and that I have no personal interest in the final disposition of this matter.

WITNESS MY HAND AND SEAL November 13th, 1996.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998