STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

EXAMINER HEARING

IN THE MATTER OF:

Application of Santa Fe Energy Operating Partners, L.P., for compulsory pooling and an unorthodox gas well location, Lea County, New Mexico.

Case 9796

TRANSCRIPT OF PROCEEDINGS

BEFORE: VICTOR T. LYON, EXAMINER

STATE LAND OFFICE BUILDING

SANTA FE, NEW MEXICO

November 1, 1989

CUMBRE COURT REPORTING
(505) 984-2244

ORIGINAL

HEARING EXAMINER: Case 9796.

MR. STOVALL: Application of Santa Fe Operating Partners, L.P., for compulsory pooling and an unorthodox gas well location, Lea County, New Mexico.

Applicant requests this case be continued to November 15, 1989.

HEARING EXAMINER: Case 9796 is continued to the Examiner Hearing on November 15 of 1989.

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9796, heard by me on 15 November 1989.

L. Ryan, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

I, Diana Abeyta, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I caused my notes to be transcribed under my personal supervision; 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 January 3, 1990.

DIANA ABEYTA
CSR No. 267

My commission expires: May 7, 1993

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

EXAMINER HEARING

IN THE MATTER OF:

Application of Santa Fe Energy Operating Partners, L.P., for compulsory pooling and an unorthodox gas well location, Lea County, New Mexico — Case 9796

TRANSCRIPT OF PROCEEDINGS

BEFORE: DAVID R. CATANACH, EXAMINER

STATE LAND OFFICE BUILDING

SANTA FE, NEW MEXICO

November 15, 1989

ORIGINAL

A P P E A R A N C E S

FOR THE DIVISION: ROBERT G. STOVALL
Attorney at Law
Legal Counsel to the Divison
State Land Office Building
Santa Fe, New Mexico

HEARING EXAMINER: Call Case 9796.

MR. STOVALL: Application of Santa Fe Energy Operating Partners, L.P., for compulsory pooling and an unorthodox gas well location, Lea County, New Mexico.

Applicant requests this case be continued to November 29, 1989.

HEARING EXAMINER: Case 9796 is hereby continued to the November 29 hearing.

CERTIFICATE OF REPORTER

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

I, Deborah O'Bine, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I caused my notes to be transcribed under my personal supervision; 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 25, 1989.

Deborah O'Bine

DEBORAH O'BINE
CSR No. 127

My commission expires: August 10, 1990

STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
CASE 9796

EXAMINER HEARING

IN THE MATTER OF:

Application of Santa Fe Energy Operating Partners, L.P., for Compulsory Pooling and an Unorthodox Gas Well Location, Lea County, New Mexico

TRANSCRIPT OF PROCEEDINGS

BEFORE: MICHAEL E. STOGNER, EXAMINER

STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO
November 29, 1989

ORIGINAL

A P P E A R A N C E S

FOR THE DIVISION:	ROBERT G. STOVALL Attorney at Law Legal Counsel to the Divison State Land Office Building Santa Fe, New Mexico
FOR THE APPLICANT:	No Appearance

I N D E X

HEARING EXAMINER: Call next case, Number 9796.

MR. STOVALL: Application of Santa Fe Energy Operating Partners, L.P., for compulsory pooling and an unorthodox gas well location, Lea County, New Mexico.

Applicant requests this case be continued to December 13, 1989.

HEARING EXAMINER: Case number 9796 will be so continued.

CERTIFICATE OF REPORTER

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

I, Carla Diane Rodriguez Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I caused my notes to be transcribed under my personal supervision; 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 December 3, 1989.

Carla Diane Rodriguez
CARLA DIANE RODRIGUEZ
CSR No. 91

My commission expires: May 25, 1991

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9796, heard by me on 29 November 1989.

, Examiner
Oil Conservation Division

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

EXAMINER HEARING

IN THE MATTER OF:

Application of Santa Fe Energy Operating Partners, L.P., for compulsory pooling and an unorthodox gas well location, Lea County, New Mexico — Case 9796

TRANSCRIPT OF PROCEEDINGS

BEFORE: DAVID R. CATANACH, EXAMINER

STATE LAND OFFICE BUILDING

SANTA FE, NEW MEXICO

December 13, 1989

ORIGINAL

A P P E A R A N C E S

FOR THE DIVISION:	ROBERT G. STOVALL Attorney at Law Legal Counsel to the Divison State Land Office Building Santa Fe, New Mexico;
FOR APPLICANT, SANTA FE ENERGY OPERATING PARTNERS:	HINKLE, COX, EATON COFFIELD & HENSLEY Attorneys at Law 218 Montezuma Santa Fe, New Mexico 87504-2068 BY: JAMES G. BRUCE, ESQ.
FOR MITCHELL ENERGY, MANZANO:	KELLAHIN, KELLAHIN & AUBREY Attorneys at Law 117 N. Guadalupe Santa Fe, New Mexico 87504 BY: W. THOMAS KELLAHIN, ESQ.
FOR TEXACO, INC.:	CAMPBELL & BLACK, P.A. Attorneys at Law Post Office Box 2208 Santa Fe, New Mexico 87504 BY: WILLIAM F. CARR, ESQ.

I N D E X

EXHIBITS FOR SANTA FE ENERGY:

EXHIBITS FOR MITCHELL ENERGY, MANZANO:

HEARING EXAMINER: Call Case 9796.

MR. STOVALL: The application of Santa Fe Energy Operating Partners, L.P., for compulsory pooling and an unorthodox gas well location, Lea County, New Mexico.

HEARING EXAMINER: Appearances in this case?

MR. BRUCE: Mr. Examiner, my name is Jim Bruce from the Hinkle law firm in Albuquerque, representing the applicant, and I have three witnesses to be sworn.

HEARING EXAMINER: Other appearances?

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin, Kellahin & Aubrey. I'm appearing on behalf of Manzano Oil Corporation and Mitchell Energy Corporation. I have two witnesses to be sworn.

MR. CARR: If it please the Examiner, my name is William F. Carr with the law firm of Campbell & Black, P.A., of Santa Fe. I represent Texaco, Inc., and I do not intend to call a witness.

HEARING EXAMINER: Any other appearances?

Can I get all the witnesses to stand and be sworn in at this time?

(Witnesses sworn.)

MR. BRUCE: I'll first call Mr. Tower to the stand.

PATRICK J. TOWER,

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

DIRECT EXAMINATION

BY MR. BRUCE:

Q. Mr. Tower, would you please state your full name and your city of residence.

A. My name is Patrick J. Tower, and I reside in Midland, Texas.

Q. And who do you work for and in what capacity?

A. I work as a landman for Santa Fe Energy Operating Partners, L.P.

Q. And have you previously testified before the OCD as a petroleum landman?

A. Yes, I have.

Q. Are you familiar with the land matters involved in this Case No. 9796?

A. Yes, I am.

MR. BRUCE: Mr. Examiner, are the witness's credentials acceptable?

HEARING EXAMINER: They are.

Q. (BY MR. BRUCE) Mr. Tower, would you please state briefly what Santa Fe seeks in this application.

A. Santa Fe Energy Operating Partners, L.P., seeks an order pooling all mineral interests from the surface to the base of the Morrow formation underlying the east half of Section 22, Township 19 South, Range 33 East, in Lea County, New Mexico.

Santa Fe proposes to drill its Amethyst 22 Federal Comm. No. 1 well to test Morrow formation at a depth of approximately 13,800 feet, and will dedicate the east half of Section 22 to the well.

Santa Fe also seeks approval to drill the well in an unorthodox location 660 feet from the north and the east lines of Section 22 as to all formations based on 320-acre spacing. Santa Fe requests consideration of the costs of drilling and completing the well, and the allocation of the costs thereof, as well as actual operating costs and charges for supervision.

Santa Fe asks that it be designated as the operator of the well and charges for the risk involved in drilling the well be assessed.

Q. Would you please refer to Exhibit Number 1 and just describe it briefly.

A. Exhibit Number 1 is a land plat in red

showing the outline of the proposed unit and the proposed well location. Santa Fe, within the proration unit, or the red outline area, controls 62-1/2 percent of the interest with Harvey Yates Company; Spiral Company, Inc., and Explorers Petroleum Corporation controlling the other collective 37-1/2 percent.

Q. Who are the interest owners of Santa Fe seeking to force pool?

A. The interest owners are Harvey E. Yates Company, Explorers Petroleum Corporation, and Spiral, Incorporated.

Q. Could you please describe your efforts to get those interest owners to join in the well. And I refer you to Exhibit No. 2.

A. Yes. Exhibit Number 2 is a letter addressed, collectively, to the three entities being force pooled, dated October 18, 1989, wherein Santa Fe proposed the drilling of this test, submitted an AFE, and also invited to either join or farm out with regard to this well.

Subsequent to that, they were notified, about a week before this letter went out, of our plans. We've met twice in Roswell, New Mexico, and have had numerous conversations concerning this matter

since the early part of October.

Q. And regarding the unorthodox location portion of the application, would you please identify the offset corners or offset operators. And I would ask you to limit it to the north-northeast, at least.

A. Okay. I'll point out that we did notify on all sides, both to the west and east. However, to the north in Section 15, the offset owners are in the west half of Section 15; Chevron, in the east half of Section 15; Manzano's the operator of the well with Mitchell, and some other parties involved.

To the northeast, Texaco is the offset owner in Section 14; however, we understand there's an option agreement, format agreement to the Mitchell-Manzano group wherein they're required to drill a well or have some form of option there below Seven Rivers.

To the east, the operator of that property is Mitchell Energy Corporation among its partners.

Q. Please move on to Exhibit No. 3, and describe it for the Examiner.

A. Exhibit Number 3 is a generalized well cost estimate, or AFE, for the drilling of Santa Fe's proposed Amethyst well. The total dry hole cost is $499,079, with a completed well cost of $890,330.

Q. Is this well cost in line with those formerly encountered of drilling wells to this depth in this area?

A. Yes, it is.

Q. And do you have a recommendation as to the amount which Santa Fe should be paid for supervision and administrative expenses?

A. We would request a rate of $6400 per month drilling well rate, and $575 per month on a producing well rate.

Q. Where is this coming from?

A. Primarily, this is from an exploration and drilling agreement that we have involved with Amoco, and these rates are prescribed in that particular agreement.

Q. What type of operating agreement do you propose using?

A. We propose using the AAPL Model Form 610, 1982 form.

Q. And what penalty do you recommend against nonconsenting interest owners, as far as the compulsory pooling goes?

A. It would be our recommendation that it be cost plus 200 percent, and this is the same rate that we've submitted in the operating agreement to the

parties involved.

Q. Were Exhibit Nos. 1 through 3 prepared by you, under your direction, or compiled of company records?

A. Yes, they were.

Q. And, in your opinion, will the granting of this application be in the interest of conservation, prevention of waste, and the protection of correlative rights?

A. Yes, it will.

MR. BRUCE: Mr. Examiner, at this time, I move the admission of Exhibits 1 through 3.

HEARING EXAMINER: Exhibits 1 through 3 will be admitted as evidence.

MR. BRUCE: I have no further questions of this witness at this time.

I would also like to submit as Exhibit No. 4, and move its admission, a notice affidavit regarding notice given to the force pooling interest owners and to the offset interest owners regarding this application.

HEARING EXAMINER: Exhibit No. 4 will be admitted into evidence.

Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr. Examiner.

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Tower, do you happen to have a copy of the application that your attorney filed for the compulsory pooling unorthodox location application before the Examiner today?

A. Yes, I do. Right here.

Q. Would you turn with me, sir, to page 2 of that application, and examine with me paragraph 5.

A. (Witness referred to document.)

Okay.

Q. Paragraph 5 says, "The applicant seeks approval to drill a well at an unorthodox location 600 feet from the north line." Is that a typographical error, or is that what you have proposed for the well location?

A. Oh, I'm sorry. The intent of that is 660 feet. I believe that is a typographical error.

Q. The proposed unorthodox location 660 then from the north line and 660 from the east line of Section 22, did you participate as a landman in the formulation of the decision by which to locate a well in this section?

A. To some extent, yes; however, as our geological witness will testify, the predominant

consideration was based on the geological and the engineering factors, and primarily the geology.

Q. As a landman, did you determine if there were any surface issues that affected or influenced Santa Fe's pick of the location?

A. Could you rephrase the question? I'm not sure I understand what you're asking.

Q. Yes, sir. As a landman, you would potentially be responsible for determining whether or not there were any surface or topographical restrictions that your company would have to cope with in locating a well within the section, would you not?

A. Generally I'm informed about those. However, our drilling engineering and drilling department handles the actual surface inspections and determinations like that on the ground.

Q. As a landman, would you be familiar then with whether or not there were any leasehold restrictions on the orientation or spacing of wells or whether or not the agencies that issued those leases placed any restrictions on the location of the wells or the orientation of the spacing?

A. Yes, generally, I would be.

Q. When I look at the map, it appears that some portion of Section 22 is in fact one or more

federal leases; is it not?

A. Yes, it is.

Q. Was a decision made by your company affected by how the BLM made a judgment for you on the determination of the orientation of that spacing unit?

A. I'm not sure I understand. Could you rephrase the question?

Q. Within that section, were you required to orient the spacing unit so that it overlay one single governmental lease?

A. I think the general ruling or the ruling by the federal government states that when you have one lease, you cannot develop it independently of a separate lease. Then you have some problems other than your geology will allow for some exceptions. But generally they require you to drill it one lease, yes.

Q. And was that an issue within Section 22?

A. In this case, it's not because we have -- Santa Fe -- as to the breakdown of the individual lease in the east half, Section 22, Santa Fe owns 100 percent of the record title interest in the northeast quarter and has a contractual right on the northwest quarter of -- the southeast quarter of Section 22. There's an agreement -- through our Amoco agreement,

we were assigned the northeast quarter, and, therefore, that lease is basically going to be a segregated lease.

Q. I think you've answered my question. Am I clear in understanding that, as a landman, there is not either a topographical reason, as you understand it, or a leasehold issue that has determined where the well is to be located?

A. No. The determination is based on the geology.

Q. In your response to Mr. Bruce, you indicated that your initial first contact with Harvey Yates and these other parties to be pooled was your letter of October 18, 1989?

A. Actually, the first contact was approximately October 10th or somewhere in there. It was prior to the letter being sent.

Q. Was it on or before October 10th?

A. It was -- I don't recall exactly. It was somewhere around that period of time. I don't know the exact date.

Q. My copy of the compulsory pooling application, Mr. Tower, indicates a date stamp of receipt by the Oil Conservation Division of October 10, some eight days prior to the letter you sent to

Heyco.

A. Yes. The letter was hand delivered. When we advised Heyco of this, I had a meeting in Roswell the following week, and we agreed, instead of mailing out the documents, we would just meet personally. I would bring an operating agreement, proposal letter -- I believe we faxed an AFE the date we talked, around October 10th, with the follow-up paper to be hand-delivered to be discussed with Heyco in person.

Q. Do you have a recommendation on behalf of your company as to the penalty to be assessed against the well at the unorthodox location if the Examiner should approve that language?

A. We'll state it in our discussion. We did have a few discussions with Mitchell and the predominent offset owner to the north and the east, and they had expressed concern, said they would contest this. So when we found out those concerns, we offered as a settlement to take penalty on this well. And, without getting into the specifics of the penalty, our engineering witness will testify as to the amount and the calculations and so forth.

Q. You do have a proposed penalty to place on the well?

A. Yes.

Q. And that's the subject of another witness's testimony?

A. That is correct. And we basically offered that to Mitchell, and they chose not to accept it.

MR. KELLAHIN: Thank you, Mr. Tower.

HEARING EXAMINER: Mr. Carr.

CROSS-EXAMINATION

BY MR. CARR:

Q. Mr. Tower, what is the status of Santa Fe's ownership in the northeast quarter of Section 22?

A. Okay. We currently -- there's been an assignment filed, but we own -- or Santa Fe Energy Partners owns 100 percent of the record title interest.

Q. You have 100 percent of the working interest in that --

A. Yes. Northeast quarter.

Q. I think, in a response to a question from Mr. Kellahin, you indicated you had, I thought you said, a contractual line in the northwest quarter?

A. No, no, no. I was referring to the northwest quarter of the southeast quarter, within the proration units.

Q. What is the status of the ownership in the northwest quarter of the section?

A. Okay. In the northwest quarter, as well as the balance of the west half, Santa Fe and Amoco jointly own an interest over there. Again, Santa Fe has -- there's an assignment due, it hasn't been filed, on part of it, to Santa Fe from Amoco, with the balance being under a contractual nature under a large agreement with Amoco.

Q. Would Santa Fe represent 100 percent of the working interest in the northwest quarter of 22?

A. The answer is yes; however, we have a pending deal with Yates Energy, where we have, on a select trade, agreed to let them acquire a percentage. However, that's not been done at this point. It's a verbal trade.

Q. Could you have designated the north half of 22 to a well in the north half without being required to go to forced pooling?

A. If the choice was to lay it down, and, again, the testimony on the technical side will justify why we do not want to do that, but, to answer your question, subject to that, yes, we could.

Q. And there is no existing Morrow well at this time in Section 22; is there not?

A. No, there is not.

MR. CARR: That's all I have. Thank you.

CROSS-EXAMINATION

BY HEARING EXAMINER:

Q. Mr. Tower, can you give me a breakdown of the amount of interest that each of the poolees --

A. Yes. Harvey E. Yates Company will have 31.875 percent. Explorers Petroleum Corporation will have 2.8125 percent. And Spiral, Inc., will have 2.8125 percent, which collectively should add up to 37-1/2 percent.

Q. Those are the only three other interest owners besides Santa Fe in the proration unit?

A. At this time, Yates Energy, the plans are that they will be involved with 12-1/2 percent, and Santa Fe would retain 50; however, that trade's currently pending; so it's our anticipation that Yates Energy Corporation will have 12-1/2 percent taken out of Santa Fe's 62-1/2. We do not seek to force pool Yates Energy.

Q. Do you anticipate an agreement with any of those other three parties at this point?

A. Not at this time. We've discussed it with them, but at this point we have no volunteer agreement.

Q. The agreement that you cited that you had with Amoco as to the overhead rates, can you explain

that to me?

A. Those are just -- basically, under this contractual agreement with Amoco, those are the set rates in that particular agreement, based on negotiations of Amoco's versus Santa Fe's rates. And I will say that generally we go by Ernst & Whinney, and these may be a little bit higher, but they are normal rates we've seen in certain areas.

Q. Do you know what the Ernst & Whinney rates are?

A. I believe the Ernst & Whinney would be about $5500 on our drilling well rate and approximately $500 -- or $550, excuse me -- on producing oil rates. Our attempt was to keep those rates in line with the existing contracts in the area; however, we would not be opposed to using Ernst & Whinney rates if the Commission felt that was applicable.

Q. Well, there's no contractual agreement concerning the east half, is there?

A. Not at this time, no. We have submitted those same rates, the $6400 and the $575, to the three parties being force pooled, and, to my knowledge, there was no objection to those rates.

HEARING EXAMINER: Mr. Bruce, will your

geologic witness go into more detail on the risk penalty?

MR. BRUCE: Yes, sir.

HEARING EXAMINER: I have no further questions of the witness.

MR. BRUCE: Call Mr. Thoma.

JOHN THOMA,

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

DIRECT EXAMINATION

BY MR. BRUCE:

Q. Will you please state your full name and city of residence.

A. My name is John Thoma, and my residence is in Midland, Texas.

Q. Who do you work for and in what capacity?

A. I'm a geologist for Santa Fe Energy Operating Partners.

Q. Have you previously testified as a geologist before the OCD?

A. Yes, I have.

Q. And are you familiar with the geological matters involved in Case 9796?

A. Yes, I am.

MR. BRUCE: Mr. Examiner, are the witness's credentials acceptable?

HEARING EXAMINER: They are.

Q. (BY MR. BRUCE) Mr. Thoma, I refer you to Exhibit No. 5, and discuss these contents.

A. Exhibit No. 5 is a production map for the immediate area surrounding the proposed location in Section 22. The producing wells are color-coded by producing formation. The red wells denote Morrow production, undifferentiated Morrow production; the purple indicates Atoka production; the green, Wolfcamp production; and the orange, Seven Rivers and Delaware production.

The two wells of particular interest in this case are the Manzano well, located in the northwest quarter of the southwest -- I'm sorry -- the northeast quarter of the southeast quarter of Section 15, and the Mitchell Energy Sapphire Federal well, located in the northwest of the southeast quarter of Section 23.

Q. Thank you. Would you please move on to Exhibit No. 6, the cross-section, and discuss this map.

A. Exhibit No. 6 is a cross-section which traverses the prospect area, crosses the proposed

location, and proves wells on either side as the proposed location, those being the Mitchell Energy Sapphire Federal in 23, the Pan American Laguna Plata Federal No. 1 in Section 22, and the Manzano Wynell Federal in Section 15.

The sands, which I will be discussing in a moment, are highlighted on this cross-section. The two sands of particular interest to Santa Fe Energy Operating Partners in this prospect is the Morrow Lower Sapphire Sand, which is highlighted in yellow at the bottom of the map, and the Atoka Wynell Sand, which is highlighted in yellow in the upper portion of the cross-section.

The structure map, which I'll be referring to in a moment, was constructed on the middle Morrow marker, which is a dashed line within the Morrow section.

Q. Thank you. Would you please move on to Exhibit No. 7.

A. Exhibit No. 7 is an isopach map of the Lower Sapphire Sand. What I'm mapping is sand, clean sand within this interval, less than or equal to 60 gamma ray units.

The interpretation shows a northwest-southeast trending Morrow channel, which

crosses through the Sapphire Federal well and runs northwest across the northeast quarter of Section 22. We're interpreting the Morrow sand in this position to be a channel sand deposited in a fluvial environment.

Q. Is the Morrow the primary target of Santa Fe's well?

A. Yes, it is.

Q. What other wells produce from the Morrow or were tested from the Morrow in this area?

A. Well, as I mentioned, the Mitchell Energy well is completed within the Morrow. My understanding is that it's completed across several sands, the Wynell Sapphire being one of those.

The Laguna Plata Federal No. 1 in Section 22 did test, both by drill stem test and through perforations. The Lower Sapphire Sand, however, proved noncommercial and was plugged back and subsequently completed in the Wolfcamp.

There is no other production, to my knowledge, from the Sapphire sand, as I have correlated it, in this area.

Q. Does the Manzano well in Section 15 produce from the Sapphire sand?

A. No, it does not.

Q. Please move on to the structure map,

Exhibit 3.

A. This is a structure map constructed on the middle Morrow marker, and it essentially shows two north-south plunging structural anticlines, one which crosses Sections 14, 23 and 26 on the east side of the mapped area, the other on the west side of the mapped area through Sections 16, 21 and 28. The location, as we have it positioned in Section 22, is the most structurally favorable position along this anticline on Santa Fe Energy leasehold in Section 22.

Q. Is there a secondary objective of Santa Fe's well?

A. Yes, there is.

Q. Would you please refer to Exhibit No. 9, and discuss the secondary objective.

A. The secondary objective is the Atoka Wynell Sand, which we interpret as a marine bar sand with a northeast-southwest orientation. Production from this sand to date is limited to the Wynell Federal well, which is located, again, in Section 15. However, prospective production tests through a DST were achieved in the Sun Bright Federal No. 1 in Section 21, southwest of the prospect area. They did achieve commercial rates during a drill stem test from the Wynell sands in that well.

The location in Section 22 was positioned where it is in the northeast quarter in the Atoka, primarily because in the Laguna Federal well -- I'm sorry -- the Laguna Plata Federal No. 1, while there is four feet of sand in that well, there is no porosity present; therefore, the sand is tight in that well. And it was our desire to distance ourselves from that well, not really having a good feel for how the porosity is distributed around that well.

Q. So, to summarize, your opinion is Santa Fe's proposed location is the optimum location for drilling this Morrow test well?

A. The optimum location for this test well is in the northeast-northeast of Section 22.

Q. Now, regarding the compulsory pooling aspect of this case, do you have an opinion as to the risk penalty which should be assessed against nonconsenting interest operators?

A. Yes. I believe that the penalty should be cost plus 200 percent.

Q. And on what do you base that?

A. On several factors. First, looking at the Morrow, the nearest Morrow production is one mile away, approximately one mile away in the Mitchell Sapphire Federal. And from pressure tests which we've

recently received information on from Mitchell, there's a significant pressure draw down in that well which could be interpreted to be indicating a limited reservoir.

Based on that and on the fact that there is no other production from that Sapphire sand in this area, we feel that's one reason that the risk in the Morrow is fairly considerable in this area.

Two, the Morrow, both to the north, at least in the Sapphire interval, goes to the north end of the south of the proposed location. It's essentially tight. We have sand present in the Wynell Federal and some present in the Laguna Plata well. It has not been proven to be productive and does not appear to be productive in the Wynell Federal from log analysis and in the Laguna Plata well it has been tested and is not productive. It has proven to be not productive in that well also. Also, there is limited well control in Section 22 and in Section 15 and over into Section 21, abutting Santa Fe leasehold from the Morrow, and this adds risk as well.

And, finally, the depth of the test, 13,800 feet, represents considerable investment of Santa Fe money, and there are, certainly, mechanical risks involved in drilling a well to such a depth. We feel

that those factors, within the Morrow itself, lend -- well, basically we feel that those factors combined should allow us to -- I'm not making myself very clear. Essentially, we feel that those factors should require a penalty of significant proportion from parties who are interested in this unit.

Q. Are there many Atoka wells in this general area?

A. From our assessment, there are five producing Atoka wells within a ten-mile radius of this location. Two of those wells appear to be commercial producers. The other two at this point appear to be noncommercial.

Q. In your opinion, is the granting of this application in the interest of conservation, prevention of waste, and the protection of correlative rights?

A. Yes.

Q. And were Exhibits 5 through 9 prepared by you or under your direction?

A. Yes, they were.

MR. BRUCE: Mr. Examiner, I move the admission of Exhibits 5 through 9.

HEARING EXAMINER: Exhibits 5 through 9 will be admitted as evidence.

MR. BRUCE: Pass the witness.

HEARING EXAMINER: Mr. Kellahin.

MR. KELLAHIN: Thank you, Mr. Examiner.

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Thoma, I want you to look at Exhibit Number 5, which is the production map. It indicates that you prepared this on about August 31st of this year?

A. That is correct.

Q. What was the purpose that you prepared the display, sir?

A. The display was prepared as part of a regional -- not a production analysis, but we were doing it on all horizons.

Q. Is that the same approximate time that you prepared the rest of your displays? I think they're all dated about that time.

A. Yes. Actually, let me back up and make a correction. That is why the maps were drafted. The production map actually was prepared probably prior to that. The maps were probably prepared in August, early August, late July.

Q. When did you, sir, first begin your investigation and study of the geology for the

determination of the location for the well in Section 22?

A. The actual study of the Morrow in this area that I undertook began probably in August 1987.

Q. All right. Look in the area identified in all these displays, am I correct in understanding that Santa Fe Energy does not operate any of the Morrow wells shown on these displays?

A. That is correct.

Q. Do you have any working interest in any of the Morrow wells shown on these displays?

A. No, we do not.

Q. Do you have operations or working interests in any of the Atoka producers on the display?

A. Not on this display, we do not.

Q. In reading the application that was filed in this case, the application, in paragraph No. 5 -- and I'll share that with you. This is my only copy, Mr. Thoma. It says, "The applicant seeks approval to drill its Amethyst 22 Federal Comm. No. 1 well at an unorthodox location, 660 from the north, 660 from the east. In order to drill it, the most structurally advantageous position is in an area more likely to intercept the Morrow channel sands and thereby increase the likelihood of obtaining commercial

production."

A. Correct.

Q. Is it your opinion that the structural position of the Morrow channel within Section 22 is the critical geologic factor by which you judge where to locate the well?

A. I think it is a critical factor.

Q. Are there any other factors expressed in paragraph No. 5?

A. I believe so. It says, "In an area more likely to intercept the Morrow channel." The position of the channel is equally important.

Q. When you look at the structure map, Mr. Thoma, your Exhibit Number -- I've lost track. I think it's 7? 8? The Morrow structure map, sir?

A. Um-hm.

Q. Number 8?

A. That's correct. That's 8.

Q. The method by which you chose to map the structure on the middle Morrow marker, would that be the same way that you would map the structure for looking at what would be the structural position for an Atoka penetration?

A. If I interpret your question correctly, you're asking me essentially if this structure map

reflects Atoka structure at the Atoka level?

Q. Yes, sir.

A. I believe that this would very closely reflect structure at the Atoka level, although I have not mapped structure specifically at the Atoka level.

Q. When we look at the structure map, one of the predicates to justify the unorthodox location is to gain structure in the Morrow channel; is that not true?

A. Yes.

Q. When we look at the structure map, your unorthodox location is placed at a midpoint between the -9500 and the -9450 line, I believe. Did I read that right, or is that backwards?

A. That's backwards.

Q. The heavy dashed line to the west of the well location is a -9500 contour line; is it not?

A. Yes. Yes, it is.

Q. To the east of the well location is a 50-foot contour line which is at -4950; is it not?

A. -9450.

Q. -9450. Okay. The objection then, or the goal you're seeking to accomplish is to get at a high structural point in the channel; is it not?

A. The highest achievable structural point on

our leasehold is in Section 22, yes.

Q. Maintaining the same structural position as you have with the unorthodox well location, follow that contour down, and can you not maintain the same structural position by going 1,980 from the north line and 660 from the east line of the section?

A. Structurally, you could. You are moving closer to a lower well. That is true. Based on this interpretation, you could move south.

Q. Look at the Lower Sapphire Sand isopach map. And you'll have to help me again because my copies are not numbered with exhibit numbers.

When we look at this Lower Sapphire Sand, Mr. Thoma, that's only a part of the Morrow channel; is it not?

A. It is a part of the Morrow complex.

Q. Will the isopach map change in any material way if you had used the same criteria that mapped the entire Lower Morrow Sand rather than just select this portion that you've identified as the Sapphire Sand?

A. No, it probably would not change appreciably; however -- you know, I really can't answer that question in all fairness because I have not mapped the entire lower section. So, you know, you're asking me to speculate on something on a map

which I have not prepared.

Q. When we look then on the isopach that you did prepare, I believe the criteria you identified in describing the display was a 60 gamma ray cutoff?

A. Yes.

Q. Why did you use a gamma ray cutoff as opposed to some porosity cutoff?

A. Because generally I've found that a porosity cutoff -- rather, a gamma ray cutoff is more useful in defining the depositional trend of any given sand rather than the porosity.

Q. Did you prepare an isopach using a porosity cutoff or value and see how that might be compared to an isopach using the gamma ray cutoff?

A. No, but I can tell you based on what I do know about the Sapphire sand in these wells that the Laguna Plata well would be thinner than it is, the Sapphire Federal probably would not change appreciably, and the Wynell well would probably be thinner than it is at four feet.

Q. Would you then look at Exhibit No. 7. We can move that well location south and still stay within the 40-foot or greater thickness contour interval within the display; can we not?

A. Correct. Within the clean sand, you can;

however, you are moving closer to a well which has close to 20 feet of clean sand which was nonproductive, and you are moving out of the heart of the channel.

And it is our opinion that the best Morrow wells and the best porosity development within the Morrow, within any given channel within the Morrow, is located at the heart of the channel. And that is a critical element in choosing this location. You can move it south and still have 40 feet, but (a) you're moving closer to a nonproductive well with low porosities; and (b) you're moving out of the heart of the channel.

Q. The well you're moving away from in the southeast quarter of Section 22, what's the well name, please?

A. The Pan American Laguna Plata Federal No. 1.

Q. Have you determined by any method, whether in your assessment or the number of acres that underlie the east half of Section 22 that would be included in the Morrow reservoir?

A. We have. That will be addressed by another witness.

Q. Did you aid the engineer in preparing the

geologic displays by which he can make his volumetric calculations?

A. He based them on these interpretations.

Q. Which ones?

A. On the Exhibit No. 7.

Q. No. 7?

A. Exhibit No. 7.

Q. So the engineering witness's calculations are predicated then upon your geologic interpretations of the Lower Sapphire Sand isopach map? Is that what you gave him to work with?

A. That is some of the data that he incorporated into his reserve analysis, yes.

Q. Did you also aid the engineer in making an assessment of the reserve potential of the Atoka Wynell Sand?

A. Yes.

Q. And was your isopach, your Exhibit No. 9, prepared by you and provided to the engineer for the purpose of making those type of calculations?

A. Yes.

Q. When we look at Exhibit No. 7, which is the isopach of the Lower Sapphire Sands, what in your judgment as a geologist represents the extent of the reservoir within the east half of the section?

A. Could you repeat the question, please.

Q. Yes, sir. When we look at the east half of the Section 22 on Display 7, that whole east half is not underlaying by the reservoir, is it? You've got a zero line.

A. That is correct.

Q. If we look at that display and we see at 18 feet the Laguna Plata well is not a success, what is your judgment as a geologist about what thickness you need in order to have sand that is going to contribute to a well in the east half of the section?

A. Well, all of the sand will contribute to the well. The Laguna Plata had productive rates. That well tested, from my information, at rates of 358,000 cubic feet a day. So you will drain reserves from as far out -- you will drain reserves potentially out to that zero line.

That may not be correct, assuming certain parameters. We're getting into the areas beyond my expertise. What I can say is that everything I am showing -- the east half of 22 I was having sand thickness -- will contribute, or can potentially contribute production to a given well in the east half.

Q. Can we find within the area investigated by

you on these displays successful Morrow completions with less than 18 feet of sand?

A. There are Morrow completions, not necessarily from the Sapphire sand. There are Morrow completions in this map area, successful Morrow completions from less than 15 feet of sand, yes.

Q. In fact, when we look to the west in Section 21, in the northwest quarter of that section, there is a very good Morrow well producing with only 15 feet of sand.

A. That is producing from a lower Morrow sand, not the same mapped here. That 15 feet is from the Sapphire, and it has not been tested in that zone to date.

Q. So an operator can be successful with the Morrow attempt in this immediate area with less than 40 feet of sand?

A. One can be successful with less than 40 feet of sand; however, we are in a situation here where we have a well with 18 feet of sand which is nonproductive. So there may be something peculiar to this particular Morrow deposit which requires greater thickness to achieve a commercial completion.

Q. What are the risk assessment parameters used by your company to determine whether or not

they're going to drill a prospect through the Atoka or Morrow in southeast New Mexico?

MR. KELLAHIN: Mr. Examiner, may the record reflect that Mr. Bruce is taking the opportunity to have an off-the-record discussion with his witness during my cross-examination.

MR. BRUCE: I would object insofar as any information that Mr. Thoma's being requested to give may be confidential and privileged information for Santa Fe Energy, and request that he not be required to divulge such information.

MR. KELLAHIN: I think it's relevant, Mr. Examiner.

MR. STOVALL: Would you like to offer, Mr. Kellahin, the purpose for us?

MR. KELLAHIN: Certainly. By way of explanation, Mr. Stovall, I'm interested to know what the geologic factors or criteria are that Mr. Thoma may or may not utilize for assessing the risk, and whether a location is drillable within the section. I want to know what parameters he or any other exploration geologist does to decide that he cannot drill the closest standard location and needs a more unorthodox location from which his own displays demonstrate that it looks like you could drill a

standard location. And I want to know what the factors are that make him judge the difference between the magnitude of moving from a standard to an unorthodox location. I think it's a fair, relevant question.

MR. STOVALL: Are you asking that as a matter of Santa Fe's company policy, or are you asking it in his professional geological opinion?

MR. KELLAHIN: His professional geologic opinion with regards to whether or not they could adequately develop the reserves that underlie this tract at a more conventional standard location. I thought that's what the purpose of his testimony was. I'm testing the competency of the witness. The witness should be allowed to answer that question.

THE WITNESS: I don't have a problem answering that question.

HEARING EXAMINER: Do you remember the question?

THE WITNESS: Yes, I more fully understand the question now.

I mentioned previously that one of the important parameters to us in locating and determining whether or not we have a viable Morrow objective at any location is where the part of the channel is

that's where we feel the best place to locate the lowest risk place, to locate any given exploratory well. That's where we've located here. In addition, we've located it in a structurally -- in as advantageous a position as we could locate or find on our lease. The two coincide -- those two facts or elements coincide or come together in the northeast-northeast.

Q. (BY MR. KELLAHIN) I understand. It's a question of degree, Mr. Thoma. I understand what your position is, that you want to be at the structurally highest or most advantageous position at the greatest thickness.

My question is: Quantify for me the degree of change in structure and thickness between the closest standard location and the unorthodox location, and tell me why your company won't drill the closest standard location.

A. The closest standard location would put us at a position of less than 40 feet, approximately less than 40 feet of sand, out of the heart of the channel.

What happens when you get out of the heart of the channel, if you look at the cross-section, you move from sand development such as you have in the Mitchell Energy Sapphire No. 1 where you have

excellent porosity development and a very thick, clean sand. You have essentially 30-plus feet of continuous porosity within the Morrow.

Moving over to the Pan American well, you can see you have clean sand, but it's broken up into stringers. You're essentially looking at overbank deposits within the Morrow.

So while the thickness may be roughly the same, when you step out of the channel, the center of the channel, you move from channel center deposits into overbank deposits. And the difference is that rather than having one continuous, thick, porous reservoir, you have a series of stacked thinner, lower quality reservoirs.

That's the primary reason for wanting to locate it in the heart of the channel, as I have it now, rather than moving it itself and compromising what looks to be very little numerically, or quantitatively. Qualitatively, it could be a significant difference.

Q. I'm correct, then, in understanding your Exhibit 8 and Exhibit 7, that you could move to a standard location, still maintain the same structural relationship, and that the trade-off is that you might be at 30 feet of thickness or greater, as opposed to

being at 40 feet of thickness or greater?

A. In terms of thickness, that's correct, but, again, I have the site that you are moving out of the center of the channel.

Q. And your controls, your geologic control for determining your interpretation of the location of the center of that channel is predicated on the information available from the Manzano well in Section 15 and the Laguna Plata well in Section 22, plus the additional well in 23?

A. Plus the Mitchell Sapphire well, that's correct.

Q. Now, you will agree with me that the disciplines of your profession are not going to give you the degree of accuracy that you subscribe to the display?

A. No, I would never argue that. But what I can say is that every time I recommend a location, I put forward what I believe to be the best interpretation that I can give the area based on my understanding. And that's what I'm presenting here.

We drill and place our wells based on that analysis. Certainly there is a wide range of interpretations.

Q. And based on these interpretations, you and

other geologists sometimes successfully drill commercial wells and sometimes drill dry holes?

A. That's correct.

Q. When we look at the structure map now, the basis or the data upon which you have constructed the structure map is the subsurface geologic information from an examination of the logs?

A. Yes.

Q. Did you integrate or utilize any seismic information to help you refine or define the structure?

A. No, we have not.

Q. When we look at Exhibit No. 9, this is the isopach on the Atoka Wynell sand? Can you tell me, sir, whether or not you would have a materially different isopach if you had mapped the entire Atoka interval as opposed to confining your examination to this Wynell sand?

A. I cannot tell you what an isopach of the entire Atoka interval would look like.

Q. Isn't this Atoka potential the real primary objective for the well as opposed to the Morrow, Mr. Thoma?

A. No.

Q. The unorthodox well location moves closer

to the only Atoka producer in the immediate vicinity; does it not?

A. Yes, it does. But if the Atoka was the primary objective, we could have avoided this whole process by going with a lay-down, and our drainage would not be -- we would be draining approximately the same area. And we may get into this later. This is, again, beyond my area of expertise. But we might, in fact, be draining --

Q. Well, let me suggest that you don't testify beyond your expertise about drainage.

A. All right.

Q. When we look at the four feet of thickness on this isopach in Exhibit No. 9 attributable to the Laguna Plata well --

A. Yes.

Q. -- was that tested in this Atoka Wynell sand?

A. No, it was not.

Q. The operator chose to abandon that without even testing it?

A. That's correct. That's correct. Log analysis indicates that the zone is tight.

Q. What is your judgment as a geologist about the number of net thickness that you need in this

Wynell sand to make a commercial well out of the Atoka?

A. Clearly, eight feet is a reasonable number. The Wynell well appears at present, to our knowledge, to be a commercial Atoka producer.

Q. Do you, Mr. Thoma, have a recommendation as a geologist about a penalty factor to assess against the well that you propose to locate in Section 22?

A. Yes. I believe I already testified to that.

Q. I have confused you. The penalty was the risk factor penalty in a pooling case. My question, sir, is with regards to the unorthodox nature of the well, being 660 from the north line as opposed to 1,980. Did you participate in formulating an opinion or a conclusion with regards to any potential risk factor penalty -- I'm sorry -- location penalty?

A. That was essentially left up to the engineer.

Q. Help me understand the process by which you assist the engineer in preparing the type of geologic display that he needs to conduct his work to determine the amount of reserves in place underlying a tract. What do you give him?

A. He used the isopach map before you, Exhibit

9.

Q. Exhibit No. 9, if I understand correctly, is an isopach that has not incorporated --

A. Let me back up. I prefer to beg out of this because he will go into all this and explain how he made his calculations and what the basis was. He will answer these questions.

Q. I want to know your participation though. Why did you not give the engineer a net pay porosity map from which he can conduct his calculations?

A. No particular reason. No particular reason.

Q. But you did not give him a net pay porosity map?

A. No, I did not give him a net pay porosity map.

MR. KELLAHIN: No further questions.

CROSS-EXAMINATION

BY MR. CARR:

Q. Mr. Thoma, I have just a couple of questions. I'll try not to repeat anything that Mr. Kellahin has covered.

If I've understood your testimony, your isopachs, your structure map were based on well control information; is that correct?

A. Correct.

Q. And you didn't have the benefit of seismic to integrate into these plats; is that right?

A. Yes, sir.

Q. If we take a look at the isopach on the Wynell sand, which is your Exhibit No. 9, could you tell me what you intend to show by the area that you have shaded in yellow?

A. What am I showing?

Q. Yes.

A. You mean with the color?

Q. Yes.

A. Simply that that is the thickest anticipated development of the Wynell sand in that area.

Q. And then the area that is shaded in orange shows what?

A. It's not showing anything specifically geologic. It's simply to show the pattern of the channel and where the depositional axis is. The yellow would show essentially the axis.

Q. And if I understood your testimony, it was your opinion that anything within your zero line on the isopach map could contribute production to a well at the proposed location?

A. That's right. That's correct.

Q. If I look at where you've placed your 10-foot contour on Exhibit No. 9, what data were you using in placing that 10-foot contour?

A. License. Geologic license.

Q. And you were --

A. Let me back up. Regional mapping in the area suggests and does indicate that this particular sand develops upwards of 15 to 20 feet thickness, or can. The way I've mapped this shows a considerable area for potential additional development of the sand between the Wynell and the Laguna Plata. And based on that, I added one additional contour which there is not specific justification, well control justification for.

Q. And so this is just basically your interpretation based on the, I guess, log information on the Laguna Plata well in 22, and, I guess, really no other information until you get up to the well in 15; is that right?

A. That's correct.

Q. When I look at your placement of the zero line, if we look at it as it goes across the southern or the southeast quarter of Section 10, again, what data have you utilized in placing that where you did?

A. The zero?
Q. Yes.
A. Available well control.
Q. Which would be the well in --
A. The Sapphire Federal, Section 23.
Q. In 23?
A. Correct.
Q. Is there any particular reason that when you pull the zero line, you take it almost to the Sapphire well in 23, instead of more or less splitting the difference between that and the nearest well that shows the formation?
A. There is no particular reason, no.
Q. Would it be just as reasonable to pull that back, say, perhaps halfway between that and the Laguna Plata well?
A. Sure.
Q. And if you did that, there would be less reservoir, would there not, under the southeast quarter of 22 that would contribute production to your proposed well?
A. No, there really wouldn't be.
Q. If you moved your zero line?
A. Honestly, if you moved the zero line -- because I've made several different interpretations on

this -- if you move the zero line off of that Sapphire well, you really don't appreciably change the drainage area in Section 22.

Q. And so you would leave the zero line in 22 where you place it, no matter how you honor the data on the well in 23; is that what you are saying?

A. Essentially. You could move that well to the northwest in 23, but you just affect the drainage area in 23, primarily because of the four feet in the Laguna Plata well.

Q. When you talk about the Laguna Plata well as being nonproductive, you mean that it is noncommercial; isn't that what you mean?

A. As far as I know, it is, yes. It is nonproductive, noncommercial. It wasn't tested; so I don't know that you can say it's noncommercial. It's nonproductive.

Q. Do you believe there would be reserves though that could in fact be produced by the well at the proposed location; isn't that right?

A. There could be, yes.

Q. When did you tell Mr. Kellahin you initially started studying this area?

A. In August of 87.

Q. And prior to the preparation of these

particular isopach maps, did you prepare other maps on the area, or were these the first isopach maps that you prepared?

A. I'm not quite sure what you're asking me. We prepared other maps on the area.

Q. Or did your earlier interpretation --

A. Oh, I see. On the Atoka Wynell in this area, the Wynell sand, no. This sand -- this map was probably the first interpretation in this area.

Q. What about the Lower Sapphire Sand? Did you make earlier interpretations of this?

A. Yes.

Q. Did you bring them with you?

A. No.

Q. If I look at just the maps that you've prepared, if we look now at the isopach of the Lower Sapphire Sand, generally the southeastern portion of the southeast quarter of 22 could not be expected to contribute reserves to a well for a proposed location; isn't that right?

A. From the southwest of the southeast?

Q. Yes.

A. That's correct.

Q. If you had proposed a lay-down unit, you would have the southwest of the northeast that

wouldn't be contributing based on this interpretation; isn't that correct?

A. Could you repeat the question?

Q. I'm sorry. If you have a lay-down in the north half, the southwest of the northwest wouldn't be contributing, would it?

A. Not from the Sapphire sand, no.

Q. If we look at the Atoka, however, if you had a lay-down unit in the north half, the entire proration unit could be expected to contribute reserves to the proposed well?

A. Yes.

Q. I believe you testified that the location was necessary to enable you to best drain your lease. Is that a correct statement of your position?

A. In the Morrow, yes.

Q. Would that also apply to the Atoka-Wynell sand?

A. To my knowledge, yes.

Q. By moving to this location that best enabled you to drain your lease, you're also locating in the well that enables you to better drain the reservoir on lands that are not covered by your lease; isn't that also correct?

A. I'm answering questions here that really

are not in my realm of expertise. I'm answering. I'm going through and answering them, but I'm thinking I really shouldn't be answering these questions.

Q. Well, do you have an opinion as to whether or not this location better enables you to drain your lease?

A. I believe that this location best enables us to drain our lease in the Morrow, which is the primary objective.

Q. And then let me shift my next question a little and ask you if it doesn't better enable you to drain the reservoir?

A. I'm sorry?

Q. Doesn't this location better enable you to drain the reservoir as well as just your lease?

HEARING EXAMINER: You're asking about the Morrow?

Q. (BY MR. CARR) Yes. We'll say first the Morrow.

A. Yes. Overall, it will.

Q. And it better enables you to drain the Atoka too -- the Wynell sand; isn't that correct, by moving to this location?

A. In the Atoka it really doesn't matter if you're comparing between this exceptional location or

an unorthodox location on a lay-down location. If you're comparing it between the unorthodox location and the orthodox stand-up location, the location where we have it better enables us to drain --

Q. The reservoir?

A. -- the Atoka reservoir.

Q. And as you have mapped the reservoir, the substantial portions of the reservoir -- as you have mapped it in the Atoka, it extends to the south half of Section 15; isn't that correct?

A. Yes, it does.

Q. And by moving to this location then you're better able to drain reserves from the south half of Section 15 as well as your own tract; isn't that correct?

A. Yes, but there will be testimony presented later on that will attempt to quantify this fact.

Q. And by moving to the unorthodox location in the Morrow, you also are better able to drain reserves from the Morrow from the south half of 15; isn't that also correct?

A. To the extent that they may exist there.

MR. CARR: That's all I have.

HEARING EXAMINER: Redirect?

REDIRECT EXAMINATION

BY MR. BRUCE:

Q. Mr. Thoma, Mr. Kellahin asked you a couple questions about Santa Fe Morrow wells in this area. Overall in southeast New Mexico how many Morrow wells has Santa Fe drilled or participated in since 1983?

MR. KELLAHIN: Objection. Irrelevant.

MR. BRUCE: Apparently, before he was questioning Santa Fe's capability in platting and drilling Morrow wells.

HEARING EXAMINER: Go ahead, Mr. Bruce.

THE WITNESS: Santa Fe has drilled approximately 51 Morrow wells in southeast New Mexico in this area.

Q. (BY MR. BRUCE) And Santa Fe drills these wells in large part based upon the recommendations of its geologist; does it not?

A. Yes, it does.

Q. Looking at any one of the plats, what is the approximate distance between the Manzano-Mitchell Wynell well and Santa Fe's proposed location?

A. The approximate distance would be 2,000 to 2,100 feet.

Q. Isn't it true that if you look at Section 14 -- refer to Exhibit No. 9. If someone desired to drill a west half stand up form or west half stand-up

unit in the west half of Section 14, they could drill an offset well to the Manzano well, which would only be approximately a quarter of a mile away from the Manzano well?

A. Yes.

Q. One thing I do want to clarify on Exhibit 9, is it correct, in response to Mr. Carr's questioning, that based upon your mapping of the Atoka, there are several other locations for the Atoka in the north half of Section 22 that are just as favorable, maybe even more favorable than Santa Fe's proposed location?

A. Yes.

MR. BRUCE: I have nothing further, Mr. Examiner.

HEARING EXAMINER: I have no questions of the witness. He may be excused.

MR. BRUCE: I call Mr. Fulton to the stand.

WILLIAM D. FULTON,

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

DIRECT EXAMINATION

BY MR. BRUCE:

Q. Would you please state your full name and

city of residence, please.

A. My name is William D. Fulton, and I reside in Midland, Texas.

Q. And who do you work for and in what capacity?

A. I work for Santa Fe Energy Operating Partners, L.P., and I'm a reservoir engineer.

Q. And have you previously testified before the OCD as a reservoir engineer?

A. No, I have not.

Q. Would you please outline your educational and work experience.

A. Yes. I graduated in 1980 from Texas Tech University with a Bachelor of Science degree in petroleum engineering. I worked originally for Petrol U.S. Corporation for six-and-a-half years, through February of 87. I then went to work for Hondo Oil and Gas Company in Roswell, New Mexico. I was there approximately two-and-a-half years. I've been with Santa Fe since the first of October.

Q. Does your area of responsibility include southeast New Mexico?

A. Yes, it does.

Q. And are you familiar with the engineering matters involved in Case 9796?

A. Yes, I am.

MR. BRUCE: Mr. Examiner, are the witness's credentials acceptable?

HEARING EXAMINER: They are.

Q. (BY MR. BRUCE) Mr. Fulton, would you first please outline your opinion, before we get into the figures in the exhibits -- please outline your opinion as to any penalty which Santa Fe may recommend on the unorthodox location?

A. Yes. We feel, first, in the Morrow formation that since there is no production, current production offsetting us to the north nor to the northeast, we feel no allowable penalties should be issued. We further feel that an orthodox location as a stand-up would drain more acreage in Section 23 than our unorthodox location.

Q. And as to the Atoka, what is your opinion?

A. The Atoka, by various methods that we have calculated, which I'll go into later, we feel an equitable penalty would be in the range of 18 to 29 percent.

Q. Would you please now refer to Exhibits 10A and 10B, and just briefly discuss them for the Examiner.

A. Exhibit 10A is a blown-up portion of a land

plat with wells and proposed locations spotted on it. You can see the Wynell Federal No. 1, which is an Atoka producing well, in Section 15. In Section 22 you see our proposed unorthodox location northeast-northeast of that section. You also see a legal stand-up location in the southeast of the northeast in Section 22. And Sapphire Federal No. 1, which is a Morrow producing well operated by Mitchell in Section 23.

The purpose of the illustration is to show the acreage based on theoretical radial drainage, 320 acres, with a radius of 2,106 feet. The acreage that would be drained by the proposed unorthodox location over and above what is permitted at the legal location. And this would be in either formation.

What we have done is then gone into Exhibit 10B as a calculation of an allowable factor based on a double circle method which has been used in previous Commission hearings. Among other orders, Order No. R-7952 was used to calculate identically to the way that their allowable penalty was calculated.

Would you like for me to go ahead and go through those?

Q. Yes. Just briefly outline what that penalty is.

Q. Okay. That penalty comes out to 29 percent or an allowable factor, which would be a production limitation of 71 percent. It's based on three factors. The first factor being an east footage factor, and that factor as it relates to a production limitation, not a penalty, but an allowable or production limit that is allowed, that factor is one, because we are not unorthodox with respect to the east line.

The north footage factor is 0.33 or one-third, and that is arrived at by saying that if the proposed unorthodox location is two-thirds closer to the lease line to the north than a legal location would be, the acreage encroachment factor is calculated by taking the area outside of the proration unit that is drained by the unorthodox location over and above what is permitted at a legal location. And that factor would be 109 acres, shaded in the tan, minus the 43 acres shaded in yellow. That acreage is 66 acres. And subtracting that from 320 acres gives 254 acres or approximately 79 percent of the theoretical drainage lying within the area permitted. Those factors added up and divided by three, giving each one equal weight, gives the allowable factor of 71 percent or an allowable penalty of 29 percent.

Q. Have you made some alternate calculations on penalties on Atoka production for this year?

A. Yes, we have.

Q. And are they based on assuming that radial drainage would appear?

A. That's right. We feel it's an acceptable theory. It's the basis for pressure transient analysis, and, in this case, with the availability of data that we have it's the best theory that we have to use.

Q. Would you please refer to Exhibit No. 11 and discuss your proposed penalty on Santa Fe's unorthodox location as to the Atoka formation.

A. Another way to calculate this is by drawing the theoretical radial drainage areas for all of the affected wells. The Wynell Federal No. 1 was used. It is the only producing Atoka well in this immediate area.

Our proposed unorthodox location is again shown in its radial drainage area as well as a legal location being, again, southeast quarter of the northeast quarter of Section 22.

The overlap between the Wynell Federal No. 1 and our proposed unorthodox location totally lies outside the area of the permitted legal location.

That area, when it was planimetered, came out to be 59 acres.

Q. And for that 59 acres you're talking about that football shaped area between the circles of overlap between the Wynell and Santa Fe as well?

A. That's correct. Extending from Section 15 even into Section 14. The other portion -- well, that 59 acres divided by, again, a theoretical radial drainage area of 320 acres would yield a penalty in the neighborhood of 18.4 percent.

Q. Okay. Assuming the Wynell existed and also there was a well in Section 14, what do your calculations come up with?

A. There is no well in Section 14, but assuming a well was drilled in Section 14 at a legal location 1,980 from the west line, 660 from the south line, again using the radial drainage theory on 320 acres, the total acreage, incorporating the Wynell overlap, the football shape with the acreage line outside of the permitted proration unit or the permitted legal location is in total 91 acres. And that would be the entire shaded portion minus a very thin football-shaped piece lying within the area permitted by legal location.

Q. Why did you choose for a Section 14 well a

well located 1,980 from the west line and 660 from the south line?

A. Well, there were two reasons in doing that. The first would be that if the -- with no spacing already dictated for Section 14, that unit could be either a stand-up or lay-down -- there would be three possible locations.

A location in the northwest of the southwest quarter would only be 1,320 feet from the Wynell Federal and would encroach heavily upon its production. We didn't feel that that was a likely case.

The most likely case we felt was -- and, also, I might add, the hardest case as far as a calculation of allowable penalty would be 1,980 from the west line and 660 from the east line.

Q. Do you mean least favorable to Santa Fe?

A. Least favorable to Santa Fe.

Q. Okay. So you are recommending a penalty from 18-1/2 to 29 or so percent on the Atoka; is that correct?

A. Right. That 91 acres, I might say, is divided, again, by 320 acres, and would yield a penalty of approximately 28.4 percent. So we're still within the range of the 18 to 29 percent.

Q. And in your opinion should the penalty be based upon the well's deliverability?

A. Yes, it should.

Q. And, in your opinion, would the draining of this application with the penalty you have recommended be in the interest of conservation, and the prevention of waste, and the protection of correlative rights?

A. Yes, it would.

Q. And were Exhibits 10A and 10B and 11 prepared by you?

A. Yes, they were.

MR. BRUCE: Mr. Examiner, I move the admission of Exhibits 10A, 10B and 11.

HEARING EXAMINER: 10A, 10B and 11 will be admitted as evidence.

MR. BRUCE: I pass the witness.

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Fulton, you've explained to the Examiner your recommendation that the unorthodox location of your well with regards to the Morrow should not be penalized because there is an absence of a producing Morrow well in either 15 or 14. Was that your testimony?

A. That is correct.

Q. And is that your position?
A. In an adjacent proration?
Q. Yes, sir.
A. Yes.
Q. Can you give me an example of any prior Commission decision by either the Commission or the Division in which they have chosen not to penalize a well because there was an absence of a producing well as you have described?
A. I cannot.
Q. When we look at Mr. Thoma's Exhibit No. 7, which is his isopach of the Morrow -- and let me share one of those with you, sir -- when you look at Exhibit 7, is there any doubt in your mind as a reservoir engineer that in fact the Morrow with a thickness of at least 40 feet extends up into Section 15?
A. No, I believe it does show that it does extend into Section 15.
Q. Have you examined the information available for the Wynell Federal No. 1 well to determine whether or not it has production potential within the Morrow interval in that well?
A. I have only seen the CNL-FDC log that is on the cross-section in the Wynell well.
Q. And that log shows sufficient potential

that it ought to be perforated at some point prior to the operator abandoning that well; is that not true?

A. I would have to look at it. In the lower Morrow Sapphire sand, porosity is approximately 8 percent over four feet of clay. Probably would be a completion attempt at some point down the road, yes, sir.

Q. When I look at your Exhibit 10B, it says double circle method, but in fact this is the formula to some extent utilized by the Division when they entered that Pennzoil order you cited to, which was 7951, I think, was the number.

A. 7952.

Q. 7952. That's where you got the proposed method of calculating this penalty shown on Exhibit 10B?

A. Um-hm.

Q. When we look at Exhibit 10A -- do you have that before you, sir, your Exhibit 10A?

A. Yes, I do.

Q. In coming up with the acreage encroachment factor, the 66 acres, am I correct in understanding you took the 109 acres in brown, subtracted the 43 acres in yellow, and got the 66 acres?

A. That's correct.

Q. They didn't do that in the Pennzoil order, did they?

A. Based on the amount -- based on what we had and going back and trying to recalculate, it appears that they did.

Q. The Pennzoil order took the scribed circle for a 320-acre area, the 2,106-feet radius, scribed the circle around the closest standard location, then took that same radius, put the point at the unorthodox location, and scribed a second circle; did it not?

A. We didn't feel that that's what it did, only because we didn't have all the data from Pennzoil. We had the order and the wording of the order itself, but I did not see exactly how that was done.

Q. Did you examine the transcript or any of the exhibits presented in that case?

A. Not the transcript, just the final orders.

Q. If we use your proposed 29 percent penalty, Mr. Fulton, and I look on your Exhibit No. 10A, what will that do to the drainage pattern of your well if your location is approved with the 29 percent on your producing rate? What's going to happen to the drainage rates?

A. Well, if a penalty is assigned to it --

again, you still have to go with the radial drainage theory -- it would make the drainage radius smaller to the north side because we're in a competitive situation with the Wynell.

Q. Have you attempted to quantify the volume of gas reserves that would be reduced with a penalty of 29 percent?

A. No, sir. That cannot be done unless you know what rate at which the well is capable of producing.

Q. If you presumed a competitive rate with the Wynell Federal No. 1 well, and used that as a basis for projecting the rate for the unorthodox location well, you could make a calculation like that; could you not?

A. Yes, you can.

Q. Have you attempted to calculate the no flow boundary that would exist between the two properties?

A. No.

Q. Have you attempted to quantify the volume of gas in place in the east half of Section 22 for the Morrow formation?

A. For the Morrow formation?

Q. Yes, sir.

A. No, I've not done that.

Q. Have you attempted to quantify volumetrically the volume of gas in place for the Atoka formation in the east half of 22?

A. No, because we did not have the data to arrive at a volume in either the Morrow or the Atoka.

I will say, especially in the Morrow formation, I think you will find that other factors that cannot be represented volumetrically appear in this reservoir similar to the pressure buildup that was run on the Sapphire well. That particular well, if you used 43 feet of net pay in a volumetric calculation, would probably yield quite a bit greater volumetric recovery than it will actually achieve, knowing what kind of pressure drawn-down it has over the relatively short period of production.

Q. What is this well going to cost? What does a completed well cost like this?

A. I believe $890,000.

Q. What's your assessment of the volume of gas that you need to produce in order to make this well economic?

A. Volume of total gas would be somewhere in the neighborhood of 1.2 Bcf, more than likely.

Q. Do you have an opinion as a reservoir engineer whether or not your ability to recover that

volume of gas would materially change if you moved to a standard location?

A. Volumetrically?

Q. You tell me, Mr. Fulton.

A. Okay. If you bring in -- moving to a standard location south, it would appear that you would be moving closer to the Laguna Plata well. In the Morrow we feel that's a detriment because there is no porosity in the -- or very little porosity in the Morrow in the Laguna Plata well. That would greatly affect the amount of reserves that you could produce in the Morrow.

Q. Have you attempted to quantify for the Morrow production the difference in volume of gas produced between a well at the proposed unorthodox location and the closest standard location?

A. No, we have not.

Q. Have you attempted to do that for the Atoka?

A. No, we have not. That would be because we don't have all the available data to make that determination.

Q. Do you have anything available to you to tell you that the presumed or assumed drainage radius of 2,106 feet for 320 gas spacing is other than

appropriate?

A. No, I do not.

Q. The presumption that we need to make with the current available data is that a well, regardless of where it is located, is going to be presumed to be able to drain unless limited by the reservoir some 2,000 feet?

A. Based on radial drainage, that's the only assumption you can make.

MR. KELLAHIN: Thank you.

(Thereupon, a recess was taken.)

HEARING EXAMINER: Call the hearing back to order, and turn it over to Mr. Carr.

CROSS-EXAMINATION

BY MR. CARR:

Q. Mr. Fulton, did you review the geological presentations prepared by Mr. Thoma?

A. Yes, I have.

Q. If I look at your Exhibit No. 10A and compare that to Mr. Thoma's Exhibit No. 7, which is his isopach on the Morrow, when I compare the area that is shaded brown on Exhibit A, that's the additional drainage area that is gained by moving a well to the proposed unorthodox location; isn't that correct?

A. That's correct.

Q. And if I compare that to Exhibit No. 7, it appears to me that all the areas shaded in brown on 10A would lie over acreage that is shaded either yellow or orange on Mr. Thoma's map; is that correct?

A. Yes, I believe that would be right.

Q. So is it fair to say that all of that additional drainage area is actually based on the geological data available to you underlain by commercial or lands that could contribute Morrow production to the well at the unorthodox location?

A. If I understand your question right, that was not a determining factor in how we drew the circle.

Q. But if we go the other direction and look at the circle and go back to your geology, the additional drainage area includes acreage, all of which you would reasonably expect to be productive in the Morrow?

A. That's correct, to different degrees, yes.

Q. And you are suggesting that there should be no penalty in the Morrow because there is no offsetting Morrow production to the north and the northeast; is that correct?

A. We are not currently affecting any Morrow

production. And the Wynell well, if it is in fact spaced on the north half, is the location at which they would currently most logically complete that zone at some point in time.

Q. But my question is this: You are recommending no penalty on the Morrow; isn't that correct?

A. That's correct.

Q. And it is because you're not affecting, as you stated, any Morrow production to the north or the northeast, because there is none at this time?

A. That is a portion of the reason, yes.

Q. And if we look at Exhibit No. 7, you would agree with me, however, that there are Morrow reserves under the tracts to the north and the northeast?

A. According to the map, yes.

Q. And this is the map prepared by your geologist; correct?

A. That's correct.

Q. Do you have any reason to think this isn't accurate?

A. No, I have not.

Q. All right. And if we go to your Exhibit No. 10A, we can see that all of the additional drainage area you have mapped that is in a 320-acre

radius would be productive at the Morrow based on the data you have presented?

A. Please repeat the question.

Q. Well, all of the area shaded brown is productive in the Morrow; right?

A. Is potentially productive in the Morrow.

Q. And, based on your geology, should have Morrow reserves under it?

A. Yes. Whether or not they would be produced from the Wynell well or not is a question I can't answer.

Q. But whether or not they would be produced from the well that you're proposing, if it drains 320 acres, you would assume it would produce from the well at the unorthodox location; isn't that right?

A. Yes.

Q. And you're not suggesting that the reserves are not there on the offsetting tract, are you?

A. No, I'm not suggesting that.

Q. And you're not suggesting that you could produce any of those reserves in the area shaded brown on 10A with a well at a standard location, are you?

A. No, we're not.

Q. And so by moving to this unorthodox location in the Morrow, you are producing the reserves

under the area shaded brown, and those are reserves owned by somebody else; isn't that right?

A. That is correct.

A. And they are reserves that you couldn't produce if you were at a standard location; isn't that right?

A. That's correct.

Q. And so you are gaining advantage on the offsetting operator by being able to produce those reserves; isn't that correct?

A. That is correct.

Q. And yet you think no penalty should be applied?

A. That's correct.

Q. How have you integrated Mr. Thoma's geology into your calculations? At all?

A. No we haven't.

Q. And so if I understood your answer to Mr. Kellahin, you have not made any volumetric calculations to determine what reserves could be produced from a well at a standard location in Section 22 as opposed to the reserves that would be produced by a well at the unorthodox location in 22. Was that what you told Mr. Kellahin?

A. Yes, it was. And we have no data. You

don't know that until you get a well.

Q. You won't know what?

A. You won't know what volumetric reserves will be produced from either location until you drill the well and find out what your porosity and your saturation is going to be.

Q. And so you can't even estimate based on the information available to you what reserves could be produced if you integrate this geology into your engineering study, and determine what you ought to be able to produce from a well at the unorthodox location as contrasted with a well at the standard location?

A. If you make some assumptions, yes, you can.

Q. And as an engineer, when you evaluate prospects, haven't you been called on periodically to make assumptions concerning wells that have not yet been drilled into reservoirs?

A. Yes.

Q. And you've made assumptions about temperature, haven't you, on occasion, and factors like that? Well, in this case you have the logs, don't you, on the wells in the area?

A. Yes.

Q. You have pressure data, do you not?

A. We only have pressure data on the Sapphire

well.

Q. And you have an isopach map?

A. Yes, we do.

Q. From this, using standard engineering assumptions, couldn't you make some volumetric calculations that would tell you what the reserves might be produced from a well at the proposed unorthodox location?

A. You could, but you'd have to have porosity. That's the one missing factor that you do not have.

Q. And you cannot come up with any information you have available a porosity figure?

A. Not at that location. You can make some assumptions again, but not at that location.

Q. And in your experience as a petroleum engineer, have you, in making volumetric calculations in the past, made porosity assumptions?

A. Yes.

Q. And you could have done that here; could you not? But you did not do that?

A. We did not do that.

Q. And so you don't have volumetric calculations on the well that would show you in fact what you estimate it might be able to produce in terms of volume figures?

A. Not in front of me, no, sir.

Q. Now, I'd like to take a look at Exhibit No. 11. And I've got to tell you going in I don't understand it, I don't think. Mr. Kellahin doesn't think I understand it.

If you drilled a well at a standard location 1,980 feet from the north line of Section 22 and 660 feet from the east line of 22, that would be a well located in the center of the lowermost circle on Exhibit No. 11; is that correct?

A. Correct.

Q. Okay.

A. It's the same circle on Exhibit 10A.

Q. Okay. And that circle includes, if I understand this, the acreage that would be 320 acres, and you're assuming radial drainage; is that right?

A. That's correct.

Q. And then we go to the well to the north, the circle due north of that, and it is centered around the proposed location?

A. That's correct.

Q. And it again includes 320 acres?

A. That's right.

Q. If the well is drilled at a standard location, that circle goes off the proration unit;

isn't that correct?

A. Slightly, yes, sir.

Q. Slightly to the north. If you go to the one at the unorthodox location, it goes off the proration unit to the north substantially more?

A. Yes, sir.

Q. The area you shaded brown on this exhibit, is that the area upon which a penalty should be based? I don't understand the area shaded brown. What is that designed to show?

A. There are two things, as I've previously said, that the portion of the acreage shaded in brown, being just the point at which -- or just the area at which the circle around the Wynell and the orthodox -- or the unorthodox location, which is shaped in the form of a football, is roughly 59 acres. The remaining acreage outside of the lowermost circle at a legal location is -- well, you have that circle at the legal location and that is -- you're permitted that to drain off of your lease line at a legal location under the rules and regulations of the State of New Mexico.

You also have a portion of the area shaded in brown, which is an overlap between that permitted area and a theoretical circle if a well were drilled at an orthodox location in Section 14. Subtracting --

the total area in brown is 104 acres, and subtracting off the area overlapped from the legal location in Section 22 and the legal potential location in 14, you arrive at 91 acres.

Q. The 104-acre number that is set forth in this brown area down in the southeast of 14, does that include all of the acreage that is shaded brown on this exhibit?

A. Yes, it does.

Q. How are you utilizing that 104-acre figure in computing a penalty?

A. I'm not.

Q. At all?

A. Not at all. I'm taking roughly 14 -- 13.5 acres from -- that is the overlap, again, between the legal location of 22 and a proposed or a potential legal location in 14. That overlap is 13-1/2 acres. Taking that out, that is the area -- that's the only area that is affected by the unorthodox location over and above what's allowed at a legal location that overlaps the two theoretical circles from the Wynell and the potential location in 14.

Q. Tell me what significance these theoretical circles around the Wynell and the proposed unorthodox location have.

A. Well, if you assume radial drainage, and you assume that each well is going to drain 320 acres, as is the prescribed proration unit for both zones, the overlap of those circles would be the encroachment that our well at an unorthodox location would affect one well that is currently producing and one well which may be drilled at some point in time. But I stress maybe. It's not there yet.

Q. Then take me to the next step. Translate that into a penalty. Did you use any of this information in projecting a penalty?

A. Yes. That 91 acres, which is the 104 acres minus 13-1/2 acres divided by 320 acres, yields a 28 percent penalty.

Q. And so my confusion is coming from how we handle the small area that is football-shaped coming right off the corner where 14, 15, 22 and 23 meet.

A. That's right.

Q. So you use the 91-acre figure in computing the penalty?

A. That's correct.

Q. So, in other words, if we go into the southeast of 15, there is an area that is within the circle around the proposed location that is not shaded in brown. It is the south half of the south half,

A. Well, it would be applied against or as an allowable penalty that would be calculated as a penalty on deliverability of the well.

Q. And so you're recommending that the penalty be assessed against the deliverability test?

A. That's correct.

Q. And how often do you think the deliverability test should in fact be taken on the well?

A. I think once every six months is reasonable. That was what was ordered in the 7952.

Q. Have you made any kind of calculations or estimates as to what sort of deliverability you would anticipate from a well at this location?

A. No, we -- again, if -- you have to make assumptions. If you make the assumption that it's exactly like the Wynell well, they tested rates up to 6.4 million on a four-point test.

Q. And if you utilize that and apply your recommended penalty, do you have any estimate as to what sort of a producing rate you're looking at based on your recommendation to the Examiner?

A. Well, 20 percent of 6.4, or 80 percent of 6.4 million is going to be roughly 5 million. These aren't exact figures. And 30 percent, roughly, of 6.4

probably, of the southeast, and it is a nonshaded piece. You are not suggesting that any penalty factor should be attributed to that acreage which is not shaded brown; is that right?

A. This is only used as another method. That is saying that based on a 320-acre radial drainage, the Wynell will not drain that acreage either.

Q. And yet you are not suggesting, are you, that -- again, we're getting back sort of to the questions that I had on 10A -- that there are reserves under that area that isn't shaded brown?

A. No, I'm not suggesting that at all.

Q. And that those are reserves that you are able to produce only by virtue of the fact that you're in an unorthodox location?

A. That is correct. But, again, they will not be produced from the Wynell well either.

Q. But those are reserves that you can now produce off of your neighbor's tract by moving to the unorthodox location?

A. Yes.

Q. You, Mr. Fulton, are recommending a penalty, and the question I have is against what do you propose this penalty be applied? How does it work?

million -- I guess 70 percent of 6.4 million is going to be 4.3 million.

Q. If we look at the geology on the Morrow formation, if the geology is correct, don't you expect a substantially better well at the proposed unorthodox location than the Wynell well?

A. Than the Wynell well?

Q. Isn't that the one you were comparing it to? Wouldn't you expect a substantially better well at this location if in fact the geology is correct?

A. Yes.

Q. And the same would apply in the Atoka, would it not, if we look at the geology that's been made available on the Atoka?

A. It would depend on -- like the Morrow, it would depend on the porosity, permeability, things like that.

Q. But if we look at just the isopach and nothing else, it would suggest that the proposed location will be better than the Wynell well; isn't that fair?

A. In referring to the map, yes, sir.

Q. Have you attempted to calculate or estimate what sort of a producing rate you would need to be able to produce the 1.2 Bcf you said was necessary to

justify the well?

A. If the well were drilled, and it were -- logs came in, for instance, similar to the Wynell well, you could produce 1.2 Bcf with a rate of probably 2 million a day.

Q. And in what period of time would you get to that?

A. I'd hate to speculate on that. It would be something over seven years, I would imagine, based on like declines of other wells in the area. We have no data on the Wynell well; so it's hard for me to say what --

MR. CARR: All right. I have nothing further.

HEARING EXAMINER: Anything further, Mr. Bruce?

MR. BRUCE: I have a few follow-up questions.

REDIRECT EXAMINATION

BY MR. BRUCE:

Q. Mr. Kellahin asked you a few questions based on Order R-7952 and the double circle method. Are you basing your penalty recommendation on that method?

A. It was just one of the methods that we used

to base the penalty. It just gave us a range of penalties.

Q. And if you added in, and I forget the exact figures, 40-some acres to the factor used in that order, what would be the net effect on the penalty using that method?

A. Well, moving to a legal location, a closest legal location with a stand-up proration unit in Section 15, without a planimeter I couldn't tell you what that would be, but I would think if the entire football is 59 acres -- excuse me, not the football, but the area bounded in Section 15 is 66 acres -- moving 330 feet south to the closest legal location, if a well were to be drilled there, it might recover another 40 acres or see an additional 40 acres encroachment. And that, when put back into the penalty, I don't think would affect the penalty by more than 4 percent. Now, that's just speculation. But I don't think it would have a tremendous effect, because that's just one of three factors used in calculating that number.

Q. For this particular situation for this well, in your opinion, is volumetrics the only tool to use?

A. No. Volumetrics is certainly one of them,

provided you are comfortable with all the data you have. The decline curve analysis of wells in the area can also be used to do a statistical calculation of what you feel those reserves might be if you base it purely on statistics.

Q. Can you get erroneous results by using volumetrics, for instance, the presence of a limited reservoir?

A. Sure, you can, because it doesn't take into account all of the factors unless you're able to determine where your boundaries are from your pressure buildup data.

Q. Are there other instances of limited Morrow reservoirs in Lea County or Eddy County?

A. Yes.

Q. Mr. Kellahin also asked you about the Morrow in the Wynell well. Can you tell from the log whether there's gas saturation in the Morrow in the Wynell?

A. In the Morrow formation?

Q. Morrow.

A. You see no gas effect on the CNL-FDC log such as you have in the Sapphire well. You see indications of porosities, but you don't see the gas effect that you see, for instance, in the Sapphire

well. It may also mean that -- it could potentially mean that you would have a -- change even.

Q. Mr. Kellahin and Mr. Carr were both basically trying to get you to say that an unorthodox location would only harm the offset operators. Now, there's no well either at Atoka or Morrow in this Section 14, is there?

A. No, that's correct.

Q. There's no Atoka or Morrow well in the west half of Section 23, is there?

A. That's correct.

Q. So if Santa Fe drills a successful well either in the Atoka or the Morrow at its location, it will, in effect, help prove up that acreage on it?

A. Yes, it will.

MR. BRUCE: I have nothing further, Mr. Examiner.

HEARING EXAMINER: Witness may be excused.

MR. KELLAHIN: Gentlemen, on behalf of Mitchell Energy Corporation and Manzano Oil Corporation, I'd like to call Mr. Ted Gawloski, who spells his last name G-a-w-l-o-s-k-i. Mr. Gawloski is an exploration petroleum geologist.

TED GAWLOSKI,

the witness herein, after having been previously sworn

upon his oath, was examined and testified as follows:

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Gawloski, for the record, would you please state your name and occupation.

A. My name is Ted Gawloski. I'm a petroleum geologist for Mitchell Energy.

Q. Would you give us some of your background and describe when and where you obtained your various degrees in geology.

A. Yes, sir. I obtained my B.S. degree in geology in 1978 from Baylor University, and a master's degree in geology in 1981, also from Baylor University.

Q. Subsequent to graduation, Mr. Gawloski, would you describe for us what has been your employment experience as a geologist?

A. I worked three-and-a-half years for Amoco Production Company, and then I've been employed for Mitchell Energy for a little over five years.

Q. During that period of employment with Mitchell Energy, would you describe for us what has been your personal involvement with exploring for and drilling wells into the Atoka and Morrow formations in Lea County, New Mexico?

A. For the entire time that I've been working at Mitchell Energy, I have been working Lea County and the Atoka and the Morrow and the other horizons in that area.

Q. When we look with you at the specific geologic displays that you have prepared today, what was the source of the information utilized for those displays?

A. We used all available log data in here to construct the structure maps and the isopachs. In addition to that, in the structure maps we used seismic that we had available. I believe there's seven lines of seismic that we have on the structure map that we used.

Q. Is this a geologic interpretation or investigation that you commenced after recognizing that Santa Fe was seeking an unorthodox well location in Section 22?

A. No, sir. For the past couple of years, our management has been working, specifically working on a regional Morrow, Atoka Morrow study in Lea County, and this is actually part of that regional study. In fact, the Sapphire well was drilled using this data that we have here.

Q. When we look at the Sapphire Mitchell well

in Section 23, that's the one you're discussing?

A. Yes, sir.

Q. That was drilled based upon your recommendations as a geologist, was it not, sir?

A. That's correct.

Q. Did your company or any other company drill any other prospects to the Atoka or Morrow formation in this area described on your Exhibit No. 1 in which you have recommendations about the well location?

A. Yes, sir. The Manzano Wynell Federal No. 1, which Mitchell has a majority interest in, was participated in by Mitchell Energy under my recommendation.

Q. Let's look at Exhibit No. 1. Is this a geologic display that you have prepared based upon your file of interpretation of geology in this general area?

A. Yes, it is.

Q. And based upon your study, have you reached certain conclusions and recommendations to the Examiner that apply to this particular application?

A. Yes, I have.

MR. KELLAHIN: At this time, Mr. Examiner, we tender Mr. Gawloski as an expert petroleum geologist.

HEARING EXAMINER: He is so qualified.

Q. (BY MR. KELLAHIN) Let me have you take a moment, sir, and take Exhibit No. 1 and identify it for us.

A. Exhibit Number 1 is a structure map that was constructed on the top of the Morrow formation and in and around the East Gem Field area.

Q. When we look at the display and we see the area that's shaded in the yellow hatch lines, what does that represent?

A. That represents Mitchell Energy's leasehold interest in the area.

Q. The area identified by the green outline is the spacing unit that Santa Fe's seeking for this well?

A. That's correct.

Q. You have a line of cross-section. What's the purpose of the cross-section line that you have shown on the display?

A. The cross-section will give a graphical representation of this structure map and the isopach maps that will be the geological exhibits.

Q. On this display in the southwest corner of Section 14, there is this fluorescent orange arrow. Do you see that?

A. Yes, sir.
Q. What does that represent?
A. That is a proposed Atoka Morrow well that Mitchell Manzano has staked, and we will currently be drilling before the end of the month.
Q. Mr. Gawloski, have you had an opportunity to review Mr. Thoma's geologic presentation?
A. Yes, I have.
Q. You saw his displays?
A. Yes, sir.
Q. You heard his testimony?
A. Yes, sir.
Q. Do you agree with him?
A. No, sir.
Q. If you look at his geologic interpretation, would you drill the well you propose to drill in the southwest quarter of Section 14?
A. No, sir.
Q. What do you conclude from looking at his exhibits about the prospects for a well in the south half of 14?
A. It would be pretty scary. It did not show any sand in the Morrow, maybe just a little in the Atoka, and a poor structural position.
Q. How many dry holes have been drilled in

this area based upon your geologic recommendations, Mr. Gawloski?

A. None.

Q. And your company proposes to go ahead and drill, based upon your geology, the well in the south half of 14?

A. Yes, sir.

Q. When we look at the structure map, what importance is it to you in determining whether or not there is a viable, standard location in the east half of 22 from which to penetrate and test the Morrow channel?

A. From this exhibit here, it would show that there are two orthodox locations located in the northwest quarter of Section 22 that will be in a more structurally favorable position than the proposed unorthodox location located in the northeast-northeast of Section 22.

Q. Your structural interpretation is significantly different than Mr. Thoma's; is it not?

A. Yes, sir, it is.

Q. One of Mr. Thoma's criteria was to gain structural position in the Morrow channel; was it not?

A. Yes, sir.

Q. Well, why is your map so different than

his?

A. One of the reasons is that we used a lot of seismic structural information in here, which we have closely tied into the well control.

Q. Show me in a general way how you did that.

A. Well, what we would do -- in one of the examples with our well in Section 23, we ran a sonic log and constructed a synthetic that we tied into our seismic logs -- I mean seismic lines, to help us interpret these and closely tie in with the other wells in the area.

Q. Are you satisfied as a geologist, Mr. Gawloski, that you have sufficient seismic information by which to help define and refine the presence of structures in the Morrow in this immediate area?

A. Yes, sir.

Q. To what extent have you confirmed then the accuracy of the seismic data with well information other than the well in Section 23?

A. We use all the available wells in here, and there's a well in Section 35, which we also have a synthetic constructed on that, which has been tied into the seismic as well, and the well in Section 13.

For your information, those are the wells that have the triangles around them. Those are wells

that we have synthetics on that we've tied into the seismic.

Q. One of Mr. Thoma's geologic justifications for his requested unorthodox location is that he wanted to maximize his location and thickness within the Morrow channel. Have you also mapped the Morrow channel?

A. Yes, sir.

Q. Let's turn to Exhibit No. 2. Would you identify that for me, please.

A. Yes, sir. This is a net sand isopach of a Morrow "C" sand, what has also been phrased as the Lower Morrow in this area. We're using a density porosity of 7 percent.

Q. Mr. Thoma also mapped for us a portion of the Lower Morrow sand which he identified as that Sapphire sand?

A. That would be part of the next exhibit; that would be the Morrow "B."

Q. So when we look at Morrow "C," that's mapping a Morrow sand that Mr. Thoma did not map on his isopach?

A. That's correct.

Q. Show me the significance to you of your mapping of the Morrow "C" sand on Exhibit No. 2.

A. One of the first things that you see is all the wells there with the blue dots on them are Morrow "C" producers. They produce out of sands in that lower part of the Morrow; so there's significant production from that particular zone in this area. And it's one of the zones that we actually look for in this area and is one of the zones that we perforated in our Sapphire Federal No. 1 well.

Q. If you're looking for that as one of the primary producing Morrow sands in the area, what does that tell you about locating a well in the east half of Section 22?

A. It shows that I would rather be in the west half of Section 22 to match my potential in this Morrow "C" horizon.

Q. Looking within a context though of the east half of 22, where would you place your well?

A. In an orthodox location, 1,980 from the north and 1,980 from the east.

Q. Why would you do that as opposed to the unorthodox location 660 out of the quarter?

A. The unorthodox location, according to my interpretation, would not have any productive sand in the Morrow "C," and the location, 1,980 from the north and east would have approximately 15 feet of potential

pay.

Q. Do you have an opinion as to whether or not either one of the two closest standard locations are the preferable geologic location in which to develop the Morrow reserves in the east half of Section 22?

A. Yes, sir.

Q. And what is that opinion?

A. That you should drill in the orthodox locations to maximize your potential for this horizon.

Q. Let's look at the Morrow "B" map now, which is your Exhibit No. 3. Take a moment and describe in what ways this map differs from what Mr. Thoma mapped when he looked at the lower Sapphire. And I'm going to hand you his Exhibit No. 7 so that you have that before you.

A. First of all, on Mr. Thoma's map, he was mapping a single sand within this Morrow "B" zone. There are numerous sands within this horizon that produce in the area. And you can see, again, the blue dots represent wells that produce out of this section of the Morrow. Almost all the operators will perforate all the sands in there that have potential in it, not just one particular sand.

As far as a difference between the maps go, they both show preferred dip orientation in here;

however, the thickness in Section 22 differs broadly in these interpretations. My interpretation shows that there will be an increase in sand thickness in the -- as you go west in Section 22.

Q. Having extensively reviewed the geology in this area, Mr. Gawloski, what, in your opinion, is the more probable interpretation that will result in a commercial well drilled in the east half of Section 22?

A. I believe the interpretation, if I use these and the porosity as a factor, would more closely resemble a net pay map, and I would feel much more comfortable using my interpretation based upon that, and would drill the orthodox locations which would be much more preferable locations.

Q. Have your methodology and interpretations been used then in the drilling of the Manzano well in Section 15, as well as your well in Section 23?

A. Yes, sir.

Q. This is the same technique, same methodology and same analysis?

A. Yes, sir.

Q. Let's take a look at the Atoka now. Would you prepare any other type of structure map if you wanted to examine the structure in the Atoka like what

you prepared when you examined the structure of the Morrow on your Exhibit No. 1?

A. No, sir. The top of the Morrow, which is the top of the Morrow line in this area, is in very close proximity to the Wynell Atoka sand pay and is a very good regional marker that we use in the area.

Q. Let's look at Exhibit No. 4 now and have you identify and describe that.

A. Exhibit No. 4 is a gross sand isopach of the Wynell Federal No. 1 Atoka sand pay.

Q. Okay. Let me hand you Mr. Thoma's Exhibit No. 9, which is his map of the Wynell portion of the Atoka pay, and describe for us in what ways those differ.

A. Well, they actually show the same preferred orientation; however, I think Mr. Thoma has split his Atoka sand, and my orientation is a little bit more northeast-southwest than his interpretation. Other than that, they're pretty similar.

Q. Let's take for a moment in the examination of the best location, regardless of the Morrow, of where to test for the Atoka production; that is, the potential in the east half of Section 22. Where would you put the well?

A. I would again put it at the orthodox

location at 1,980 from the north and east, Section 22.

Q. Why?

A. The sand's thicker in that direction.

Q. When you have to integrate the choice to maximize the potential for both the Morrow and the Atoka, would that alter your recommendation about a well location for the Atoka?

A. No, sir. You'd use all the available data you had.

Q. In your opinion as a geologist, can you successfully test at the optimum location for both the Atoka and the Morrow in the east half of 22 by either one of the standard locations you've shown on your display?

A. Yes, sir.

Q. And in each instance those locations are better for you as a geologist than Santa Fe's proposed unorthodox locations?

A. That's correct.

Q. Let me have you turn to Exhibit No. 5. Do you have that?

A. Yes, sir.

Q. Would you identify that for us?

A. This is a net sand isopach of the Wynell Federal No. 1 Atoka pay, using a density porosity of 7

percent.

Q. Why did you use 7 percent?

A. 7 percent has been our -- essentially the number we use to establish a pay cutoff for the Morrow, a porosity pay cutoff. During our regional study, we have found that most of the best producers in here would have to have a density porosity of 7 percent; so we make our regional maps using this porosity cutoff.

Q. This is the type of a map that Mr. Thoma did not prepare?

A. That's correct.

Q. To what purpose do you use this map?

A. Well, sir, if I was going to drill for -- either the Morrow or the Atoka, I would use a net sand map. A gross sand map will just essentially tell me the orientation of the sand. I would in fact do that first, but if I was going to go into our management and propose a well, I would have a net map in front of me because they want to know not only where the sand is but where the good sand is.

Q. Is this the kind of net pay sand map that you took to your management to get authority to drill the well in the southwest of 14?

A. That's correct.

Q. If you're utilizing the net thickness isopach map for picking a location for the east half of Section 22, what does it tell you?

A. It again tells me that the orthodox location at 1,980 from the north and east is a preferable location.

Q. In your opinion as a geologist, Mr. Gawlowski, is the unorthodox location necessary in order to allow Santa Fe the opportunity to produce the Atoka-Morrow gas reserves underlying the east half of Section 22?

A. No, sir.

Q. What happens with a well at the unorthodox location?

A. What happens to it?

Q. If that's approved.

A. It would unfairly drain the acreage to the north and northeast.

Q. Geologically speaking then, the same reservoir in the Atoka and the Morrow extends up into Sections 15 and 14?

A. That's correct.

Q. Let's examine on your net pay map the various relationships of the reservoir between the east half of 22, the east half of 15, and Section 14,

and in a general way quantify for us the relative value of those spacing units one to another.

A. Could you rephrase that for me, please.

Q. Yes, sir. When we look at Section 14, do we have a viable spacing unit for the Atoka?

A. Yes, sir, we do.

Q. And is that also projected for the Morrow?

A. Yes, sir.

Q. And you have sufficient reservoir thickness and quality at that location to drill a well?

A. That's correct.

Q. And that will be the same reservoir that would be penetrated by the Santa Fe well at its unorthodox location?

A. That's correct.

Q. And geologically there's no reason to believe that those wells are anything other than in the same Atoka reservoir?

A. That's correct.

Q. When we look at the potential for the Wynell well in Section 15, currently producing in the Atoka, but what's your assessment as a geologist about the potential for that well in the Morrow?

A. When we drilled that well, we evaluated the Morrow as well as the Atoka. Our petrophysical group

has pay calculated in the Morrow, but uphole we had DST'd the Atoka zone at a very prolific gas rate; so it was decided amongst all the partners in the well that it would be more prudent for us to come uphole and produce the Atoka first with the intent of going down and testing more before we leave the well.

Q. If the Santa Fe unorthodox location is approved, what is the potential that they'll produce your share of the Morrow gas reserves before you get the opportunity to produce those reserves?

A. If the Wynell produces for a long time, then they will, in fact, drain some of our Morrow reserves.

Q. You don't see any geologic reason that the reserves in the Morrow in your spacing unit are not going to extend to the Santa Fe well, do you?

A. No, sir.

Q. They in fact will, won't they?

A. Yes.

Q. Let's look at Exhibit No. 6. I think I'll have you put this up on the wall, if you don't mind.

(Thereupon, a recess was taken.)

Q. (BY MR. KELLAHIN) Mr. Gawloski, let me ask you to go to the display on the board, which is marked as Exhibit No. 6, and identify and describe that for

us.

A. Exhibit No. 6 is a structural cross-section showing the East Gem area in the west through the two orthodox locations within the northeast quarter of Section 22 through the proposed unorthodox location and up to the Wynell Federal No. 1 well.

Q. Why did you want to examine the structural relationship of the various possible locations in the east half of Section 22?

A. Well, sir, as was stated even in the application, that structure is a factor that's used in here and one of the factors that we use when we try to determine a viable location for the Atoka and Morrow.

Q. If we examine the structural relationship of the Santa Fe proposed unorthodox location, where do we find that in relationship to the two closest standard locations within that spacing unit?

A. In the proposed unorthodox locations in the structurally lower or unfavorable position has to be two orthodox locations located in the northeast quarter of Section 22. This interpretation is following the Exhibit No. 1, the structure map at the top of the Morrow.

Q. What wells did you use to determine the structural interpretation on the cross-section?

A. I used all available wells in here. On the cross-section I used the Sun Bright well to the west and the Pan American Laguna Plata well, Section 22, and the Manzano Wynell Federal No. 1.

Q. When we look at the Laguna Plata Well No. 1, that's the well in the east half of 22, this is the well that Mr. Thoma wanted to move away from?

A. That's correct.

Q. Describe for us what the operator did with that well.

A. The operator of this is Pan American. I believe it was drilled in 1962; so it's been a long time ago, especially as far as the Morrow goes. They drilled this well into the Morrow. Both the Morrow "B" and "C" on drill stem test recovered hydrocarbon gas on their drill stem test. I believe the highest rate added to 576 Mcf a day on the test on, I believe, the Lower Morrow.

Subsequent to the DST, they came back and perforated these zones down here in the lower Morrow and in the Morrow "B." They then proceeded to frac these zones in a very unorthodox manner, and, in my opinion, these zones were damaged and were not able to get commercial quantities of gas after that.

Q. Mr. Thoma, on at least two different

occasions during his testimony said that he wanted to move away from that well. Would you, as a geologist, make it an essential criteria to get as far away as you could from that Pan Am well?

A. No, sir. And, as a matter of fact, this was one of the wells that keyed us into drilling our Sapphire well. We knew we had significant hydrocarbon shows within this well, and based upon our other data we felt that this was a significant show of hydrocarbons in the Morrow.

MR. KELLAHIN: Mr. Examiner, that concludes my direct examination of Mr. Gawloski. I would move the introduction of Exhibits 1 through 6.

HEARING EXAMINER: Exhibits 1 through 6 will be admitted as evidence.

CROSS-EXAMINATION

BY MR. BRUCE:

Q. Mr. Gawloski, you said -- is it Mitchell has staked the location in the southwest quarter of Section 14?

A. Mitchell-Manzano. I believe Manzano is the actual operator of this area.

Q. When was it staked?

A. I'm not quite sure of the exact staking time of that or the group that's actually doing the

staking of that well. Actually, Manzano is doing that.

Q. Is that on federal acreage?

A. I believe it is.

Q. Are you aware there's a 30-day waiting period between filing the application for the permit and the time you drill the well?

A. I'm not aware of that.

Q. Looking at that Pan Am well, how much gas did that produce in total?

A. Like I say, it produced gas on the drill stem test. The production test, after the fracs, did not yield any commercial quantities of gas. And there is no production listed in the production books.

Q. Looking at your Exhibit No. 2, are you basically saying then that there's no -- there's nothing worthwhile in the Morrow at the proposed unorthodox location; is that correct?

A. In this horizon in the Morrow "C."

Q. In the Morrow "C"?

A. Yes, sir.

Q. Should be a dry hole in the Morrow "C"?

A. At least from my interpretation, yes, sir.

Q. And it also shows that the Morrow potential for most of Section 15 is very limited, doesn't it?

A. The lower half of it.

Q. So what's the need for a penalty on the Morrow?

A. Well, you're just looking at one of the zones here. There's many other zones in the Morrow that produce in this area.

Q. Looking at your Exhibit 3, to the west of the Pan Am well you have a 60-foot line drawn which covers most of the northwest quarter of Section 22. What was that based on? What is the justification for that line?

A. Well, that's based upon -- we have a 42-foot well over here and approximately 40 feet here.

Q. Forty-two feet where?

A. In Section 16. What is that, the southeast quarter of 16. Based on keeping the same isopach interval that I've used in the area, I have projected that the sand thickened up to 60 feet in the west half of Section 22.

Q. There could easily be much less than that, could there not?

A. Based on my interpretation, I believe it would be about 60 feet in there.

Q. You won't know until you drill a well?

A. No, of course not.

Q. It also shows that the Morrow is not very -- as you move further to the north, the Morrow gets worse and worse; is that correct?

A. To the due north. To the north and east, it's still a pretty favorable position.

Q. Looking at your Atoka maps, either one, based on your interpretation, and assuming a north half lay-down unit and a well at any standard location, Santa Fe could place a well 660 feet from the north line of Section 22; could it not?

A. Yeah, if it's 1,980 from the shore end of the proration unit, that's correct.

Q. So it could be 660 feet from -- as little as 660 feet away from the unit containing the Wynell well?

A. If it was a lay-down proration unit.

Q. What is the orientation of the wells in this immediate area?

A. Wells?

Q. Yes, the orientation of the well units?

A. The well units?

Q. Yes. Section 15, 22, 23, 27.

A. 15 is a stand-up proration unit. Section 14 is dictated, because of the leasehold in there, it will have to be a stand-up proration unit of our

proposed well.

Q. West half stand-up?

A. That's correct. We do not have that acreage -- it's not shaded there in Section 14 under farmout. As far as several of the other ones to the south, I believe there's some lay-down and some stand up proration units.

Q. How about the Mitchell Sapphire well?

A. That proration unit could have either been a lay-down or a stand-up. I believe we chose to put it as a stand-up.

Q. So that means that all of Sections 14 and 15 and 23 will have stand up units; is that correct?

A. That's correct.

Q. And Section 22, if Santa Fe drills this well?

A. That's correct.

Q. Now, looking at both Exhibits 4 and 5, what is the justification for your thickening to the southwest in the Atoka?

A. Well, there's a well in Exhibit No. 4, a well down to the south in Section 33 that has the same Atoka sand in it and gave me that preferred orientation to the southwest. I believe it's that Union Madera No. 3 in Section 33.

Q. I believe you also stated that you thought that Santa Fe Oil would unfairly drain Mitchell's and Manzano's acreage; is that correct?

A. Yes.

Q. Are you an engineer?

A. No. It's a geologic opinion.

Q. So you didn't conduct any engineering studies?

A. No, no.

Q. Are you aware of any other prospects which Santa Fe has developed which Mitchell has bought into?

A. Yes, sir.

Q. And how many are you aware of?

A. Two that I've been closely associated with.

Q. And were any wells drilled on those prospects?

A. Yes, sir.

Q. And what was the result?

A. One was a Bone Spring oil producer; the other two wells are currently being tested.

Q. And they look good?

A. Yes, sir, they do.

Q. Were those originally developed based on Santa Fe geology? Were the original prospects developed by Santa Fe?

A. Yes, sir. My management asked me to do the geology before rendering -- joining in on any of those operations.

MR. BRUCE: I have nothing further, Mr. Examiner.

CROSS-EXAMINATION

BY HEARING EXAMINER:

Q. Mr. Gawlowski, in preparing your structure and isopach maps, is it a big advantage as a geologist to have seismic data available to utilize?

A. Yes, sir, I believe it is.

Q. Have you used this seismic data in this area in preparing prospects?

A. Oh, yes, sir. We have a pretty extensive grid of seismic in this portion of Lea County which we use in our prospecting throughout this area.

HEARING EXAMINER: That's all I have for the witness.

Anything further?

The witness may be excused.

MR. KELLAHIN: Mr. Examiner, I would like to call at this time Mr. Greg Frazier.

GREG FRAZIER,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Would you please state your name and occupation.

A. My name is Greg Frazier. I'm a senior staff reservoir engineer from Mitchell Energy Corporation.

Q. Mr. Frazier, would you describe your educational background?

A. I graduated from the University of Houston in 1972 with a Bachelor of Science Degree in mechanical engineering. I went to Oklahoma State and acquired a master's degree in mechanical engineering in 1973. I went to work for Texaco Research and worked for them for five years and took their development work as a reservoir and production engineer and worked in both capacities in the five years that I was with Texaco.

In 1978 I went to work for Mitchell Energy Corporation. I've worked for them for 11 years, seven years -- nine years as a reservoir engineer and two years as a production engineer.

Q. In performing your duties as a production or a reservoir engineer for your company, do you, in a regular course during the performance of those duties,

make calculations about potential reserves for wells?

A. Yes, I do.

Q. Do you customarily as an engineer make calculations to determine the reserves in place for Morrow and Atoka wells?

A. Yes, I do.

Q. In addition, have you made a specific study of a recommended penalty to be assessed against the Santa Fe proposed unorthodox location if the Examiner chooses to approve that location?

A. Yes, I have.

MR. KELLAHIN: We tender Mr. Frazier as an expert reservoir engineer.

HEARING EXAMINER: He is so qualified.

Q. (BY MR. KELLAHIN) Let's, first of all, address what you did as a reservoir engineer in analyzing the potential reservoir values for the area in question in the Atoka formation. What did you first do?

A. The first thing I proceeded to do was to do a biometric reserve calculation based on what the geologist had given me as a representation of what the net sand would look like.

Q. What geologist gave you the net sand representation?

A. Mr. Gawloski.

Q. And have you as a reservoir engineer relied with confidence on his interpretations of the net pay thickness isopachs?

A. Yes, I have.

Q. And have they proved accurate in the past?

A. They have proved accurate in the past.

Q. What was the reason for examining on a reserve basis the area in question? What did you want to know?

A. Well, the main thing I wanted to know was why they were wanting to build an unorthodox location. Would they have sufficient reserves to economically justify a well at an orthodox location.

Q. So you wanted in a reserve analysis, as a reservoir engineer, to determine whether or not there was any material difference to Santa Fe between the closest standard location and the requested unorthodox location?

A. That is correct.

Q. What was the method you used to make the analysis?

A. I used a biometric reserve calculation.

Q. Where did you get the data to plug into the parameters to make the calculation?

A. First, I had the net sand isopach from Mr. Gawloski. Then I had information from Atoka, and also I've done this for Morrow. I had information from Atoka and Morrow producers in the area to come up with what I felt the typical values would be for an Atoka or a Morrow producer in Section 22.

Q. In order to come up with a calculation in which you had confidence, was it necessary to have actually drilled a well at either the standard or the unorthodox location in the east half of 22?

A. Once you drill a well, and after that when you start producing it, you do get better information, but at this point, before you pick a location, this is the best available method to me at this time.

Q. You had the data from the Atoka producing well in the adjoining Section 15?

A. That is correct.

Q. And you had data from the Morrow producing well in adjoining Section 23?

A. That is correct.

Q. That's as good as it gets?

A. That's not bad.

Q. What did you find out?

A. Okay. My Exhibit, I guess, No. 7 --

Q. Yes, sir.

A. -- the purpose of this exhibit was just to come up with a unit recovery factor. I've averaged the properties that I've used in this to come up with this unit recovery factor noted on this exhibit: average porosity, water saturation, gas gravity, temperature and so forth. But you basically plug these numbers into an equation, and you can come up with a unit recovery factor, which for the Atoka I'm using -- the calculation result is 1,350 Mcf per acre foot of net sand for the Atoka reservoir.

Q. You've got that numbered. Now, how do you take the analysis to come to any conclusions about the preference of the unorthodox location to either one of the closest standard locations?

A. Then we have to go to the next exhibit.

Q. That's Exhibit No. 8?

A. That's correct. Exhibit No. 8 shows just a small portion of Mr. Gawloski's net sand isopach. I've drawn 320-acre drainage circles around the proposed unorthodox location and one of the choices as an orthodox location. This radius is the 2,106 feet that was noted before.

I want to calculate the volume of net sand that exists within those circles according to this map for each location. Once I have that volume in units

of acre feet, I then multiply that by my unit recovery factor that I determined on the previous exhibit, and the product of those two is my RGIP that I have listed, the recoverable gas in place, using the volumetric method.

The results of these show that -- I've split it out for the total acre feet within the drainage area of the unorthodox location, the 1,024 acre feet, and it results in the 1.39 Bcf reserves.

For the orthodox location, I've come up with a total net acre feet of 1,131, which results in an expected reserve for the orthodox location of 1.45 Bcf.

The other columns that I show there I've also calculated the net acre feet within those drainage circles that exists within the east half of Section 22, just to determine how much of this reserve I expect these wells to recover from the east half of Section 22.

And for the unorthodox location I come up with -- of its 1.39 Bcf, .59 Bcf of that will come within the east half of Section 22. Well, that represents 42 percent of the reserves for that well comes from the east half of Section 22, which leads you to believe that 58 percent of the reserves from

that well will come from outside of that east half of Section 22 unit.

For the orthodox location, the same calculation results; that 48 percent will come from within the unit in the east half of Section 22, which is a greater percentage of that gas will come from that unit from an orthodox location than will come from the unorthodox location. And, also, you have a better well, can expect a better well at the orthodox location.

Q. Santa Fe's criteria for a successful well is judged by 1.2 Bcf, if I remember the testimony.

A. That's true.

Q. And under your analysis, what is your estimate of the recoverable gas at the closest orthodox location? That's the 1.54 --

A. 1.54 Bcf.

Q. So what does that tell you as a reservoir engineer about your choice between the unorthodox or the standard location?

A. There's no reason why they shouldn't drill the orthodox location, actually. It's a better location.

Q. Let's now turn to the Morrow. Mr. Frazier, in Exhibit No. 9 did you apply the same methodology to

come up with Mcf per acre feet for the Morrow?

A. Yes, sir, I have.

Q. And you adjusted the parameters and values to fit the Morrow?

A. That is correct.

Q. What did your calculations show that number to be?

A. On a unit basis, I expect to recover 512 Mcf per net acre foot of reservoir.

Q. When we turn to Exhibit No. 10, show us how you've analyzed that to determine whether or not you would recommend a standard versus an unorthodox location for testing the Morrow.

A. Okay. Here I'm using the net sand isopach for the Morrow "B," the Upper Morrow. That was supplied to me by Mr. Gawloski. That's where we expect the bulk of the reserves from the Morrow to come from; therefore, I've just used that net sand isopach. But doing a similar analysis and assuming that we will have 320-acre drainage circles about these wells, I calculate that from the unorthodox location, I expect 6.45 Bcf, and from the orthodox location, I expect 8.36 Bcf, and also a greater, much greater percentage of the 8.36 Bcf will come for the orthodox location -- will come from the east half of

Section 22; 68 percent than if they were to drill the unorthodox location; 51 percent of the reserves for a Morrow well would come from the east half of Section 22.

Q. What then is your conclusion as a reservoir engineer with regards to the Morrow?

A. For the Morrow, an orthodox location is the location of choice.

Q. Mr. Fulton described a theoretical penalty formula and suggested that as a possible penalty for his unorthodox location. Have you examined how the Commission or the Division might come up with a penalty by which the well could be approved at this location if they choose to take that risk, and yet penalize the well in such a way that there is no opportunity for uncompensated drainage between the two spacing units?

A. Yes, sir, I have.

Q. In the absence of a penalty, will there be uncompensated drainage, in your opinion?

A. Definitely.

Q. To whose detriment?

A. To Mitchell Energy Corporation, Manzano, and also the Texaco acreage in Section 14.

Q. And that would also apply to the acreage in

Section 15; would it not?

A. That is correct.

Q. How did you attempt to address the resolution of that issue with the penalty?

A. Well, in my mind -- can we go on to the next exhibit?

Q. Exhibit No. 11?

A. Exhibit No. 11. We have the right to the gas that is within our 320-acre drainage circle under a legal location. Nobody else should be able to produce any of that gas, or it would be uncompensated drainage.

Q. How are you going to adjust then a penalty that would take into consideration the actual probabilities within the reservoir of what the wells will do one to another as they compete, based upon location?

A. You would have to restrict a well such that its outer unit of drainage or its no-flow boundary would not penetrate over our drainage area, 320-acre drainage circle.

Q. That's not a high-tech engineering calculation, is it?

A. It's pretty simple.

Q. Yes, sir. And what did you do?

A. Exhibit 11 shows me -- now I'm using Exhibit 11 for what would be the closest orthodox location, and that would be 660 from the east line and 1,960 from the north line in Section 22, with a 320-acre drainage circle around that well I've drawn in. And it shows that the north end of that drainage circle is 126 feet over the north line of Section 22. Okay?

I've also drawn a 320-acre drainage circle around our Wynell well. In this case, they do not overlap. That radius is 2,106, feet and they happen to intersect very close to this point, 126 feet north of the north line of Section 22. Therefore, the closest orthodox location -- that is the most northern limit for the drainage radius of that well. If they are granted any other allowable that would result in larger drainage than that, then there would be net uncompensated drainage for our Wynell Federal well.

The hatch line shows what their drainage area for their unorthodox location would be without a penalty. The small circle shows what their drainage area must be in order for there to be no net uncompensated drainage.

Now then, we must take that drainage circle and calculate what the penalty would be. And the way

I've calculated that, I first know that drainage area, that small circle has a radius of 660 from the -- okay. There is a small error here. I have used 600 feet because that's what I saw your application to say. I've since corrected it to what this would be with the actual 660 location from the north line.

But what you see here is a calculation using 600 feet, the well spaced 600 feet from the north line. Its drainage radius, in order to be in that circle, would include an additional 126 feet. So its total drainage -- its drainage radius would be 726 feet.

To calculate what its drainage area would be in simple geometry, I calculate 38 acres. And, therefore, I believe that well, its allowable penalty should result in only 38 acres of drainage in order to prevent uncompensated drainage on our tract. Therefore, its penalty or its allowable factor would have to be 38 divided by 320 for an allowable factor of .119. The penalty would be 88 percent.

Q. Is that your recommendation of the most appropriate penalty to apply in this particular fact situation?

A. That is correct. I have evaluated others, but that's the one I think would most apply in this

situation.

Q. Let's look at some of the other ways in which we might approach penalties. This Division has discussed numerous combinations in the past, Mr. Frazier. Let me ask you to turn to Exhibit No. 12, and ask you: The other types of penalties you've explored, in what way have you examined another one with Exhibit No. 12?

A. Exhibit Number 12, I've used some of the factors that I've heard are commonly used here at the Commission. I've used the distance number of 600 feet from the north line, and I've also used -- for the Atoka here, I'm showing that the total east half of Section 22 does not contain productive sand. By Mr. Gawloski's net sand isopach, I've calculated that only 221 acres out of the 320 acres are productive. So the two factors I've used in this formula are net productive acreage and the distance from the north line.

Q. All right. Let me make sure I understand. The 221 comes from where?

A. It's the productive area based on this net sand isopach within the east half of Section 22.

Q. If we adopt this solution for penalty, why should we use that as one of the factors?

A. Because the penalty should be based, to some degree, on the amount of gas or productive gas within that unit.

Q. You have chosen also to factor in the encroachment to the north boundary line. You've used 600 feet. You simply substitute arithmetically 660, and I think you come up with 23 percent allowable or 79 percent penalty, give or take. Why have you not done what Mr. Fulton did, and that was factor in or average in the east-west dimension?

A. Okay. There's a good reason for that. When you have factors that are detrimental to what an allowable should be, they're not -- you shouldn't average them. This 600-feet factor is a detrimental factor. That has a certain penalty associated with it. The fact that it doesn't have enough productive acreage within that unit is an additional factor that makes the first factor even worse. So they compound each other. They should be multiplicative.

When you start averaging in other factors, it only takes the effect of diluting what the penalty should be. As long as I use my product, I can bring in that east half factor. That allowable factor is 660 over 660. That's acceptable. It's just a product one times what I've done here. And as long as you

compound things, you can bring in those other factors. But once you start averaging factors, it only tends to dilute what the real issue and detrimental problems are that you have by moving the location.

Q. Let me ask if you've prepared a display that illustrates the point you're trying to make about factoring in the dimension that is the standard distance east-west. Have you done that?

A. Yes, I have.

Q. Let me show you what is marked as Exhibit No. 13, Mr. Frazier.

A. Okay. The first allowable factor that I have come up with is what happens when you do average in the distance from the east line, the distance from the north line, and then some acreage factor.

Here I've used net productive acreage. I think Santa Fe has used the crescent method to come up with acreage. But what happens here is, when you add those three factors together and divide by three, you only get a penalty of -- you get an allowable factor of .66, a penalty of 34 percent.

Q. Let me see if I'm clear on the methodology. The using of the three factors, in averaging them allows a well to be two-thirds closer to the N boundary and yet only be reduced by approximately a

third in terms of the penalty?

A. That is correct.

Q. Have you examined what the penalty would be if Santa Fe had moved its location to ten feet off the line with Section 15 to see what it would get for an allowable?

A. Yes, I have.

Q. What did you find out?

A. The penalty would only be 43 percent. You could essentially drill it on that lease line and have only a 43 percent penalty.

Q. As a reservoir engineer, do you find that acceptable?

A. I found that as rather amazing.

Q. Do you believe it's fair and appropriate?

A. Well, if I were them, I would also put in the distance from the south line. It's legal from the south line, and it's legal from the west line. And I'd try to dilute it even further, I guess.

Q. Same logic would apply then; would it not?

A. Same logic. It's legal from those two lines as well.

Q. In terms of the magnitude or the potential impact of Santa Fe's proposed penalty of approximately 29 percent, have you also prepared a display to

illustrate what would potentially happen to their drainage pattern with this penalty as they propose?

A. Yes, I have.

Q. Let me show you what's marked as Exhibit No. 14. Do you have that?

A. I've got a copy. Okay. What I've shown on Exhibit 14 is, around their proposed unorthodox location, I've put -- first, I've put the 320-acre circle. Then the second circle I've drawn is what their drainage area would be if their 29 percent penalty went into effect.

Their drainage area would essentially be reduced by 29 percent. But because it's proportional to the square of the radius, it drains in that drainage limit very little. And I think that it would end up giving them the opportunity to drain that brown area that they had on their map as showing that that was our acreage to drain. But by their penalty, they would essentially be draining the bulk of that acreage. It would limit their drainage area very little.

My recommendation is the 88 percent case. I've shown a 79 percent case, which was the case of my Exhibit No. 12, to show that if we went with something like 79 percent or even the 88 percent that we're

proposing, the drainage radius of that well would be limited to what it should be. It should not be allowed to drain acreage within the drainage radius of our Wynell Federal well.

Q. Let's talk for a minute, Mr. Frazier, about how the penalty is implemented. What is your understanding of how the reduced allowable or penalty is actually applied against the well?

A. Well, if the penalty -- the penalty is multiplied -- well, one minus the penalty is multiplied by the deliverability of that well, and that's what you are allowed to produce your well at.

Q. If the Santa Fe well gets a deliverability in the Atoka comparable to what Manzano experienced in the Wynell Federal No. 1 well for its initial potential or initial deliverability, what was that deliverability?

A. We actually floated up in excess of six million cubic feet per day during our four-point test.

Q. If we have six million a day times the 88 percent penalty, what is still the producing rate on a daily basis that the penalized well gets to produce?

A. If we use our 88 percent penalty?

Q. Yes, sir.

A. Well, that would be able to produce 12

percent of that six million cubic feet per day, which would be 720 Mcf per day.

Q. Can you think of any other way to apply the penalty as you've proposed in order to avoid uncompensated drainage between the properties?

A. I can't think of any other way to do it that would be fair.

MR. KELLAHIN: Thank you, Mr. Examiner.

We move the introduction of Exhibits 7 through 14.

HEARING EXAMINER: Exhibits 7 through 14 will be admitted as evidence.

MR. CARR: I have no questions.

HEARING EXAMINER: Mr. Bruce.

CROSS EXAMINATION

BY MR. BRUCE:

Q. Mr. Frazier, looking at your Exhibit 8, where you have the acre feet, how did you get the 4311 number and 544 number?

A. That looks like a typo.

Q. Could we get a correct number?

A. Sure. The 4311 is the typo. Okay? It should be 431. Sorry about that.

Q. Now, assuming radial drainage, which you have done here, and which Mr. Fulton also did -- is

that correct?

A. That's correct.

Q. And looking at just 320 gas well spaced on 320 acres, virtually every well will drain, theoretically, acreage outside the units?

A. That is correct.

Q. And if Santa Fe drilled, let's say, had a lay-down, drilled at a standard location 660 from the north and 1,980 from the east line of the section, it would probably drain a heck of a lot more of Section 15 than it will at its proposed unorthodox location; is that correct?

A. And it would legally be allowed to do so.

Q. Have you done any volumetric calculations on the Sapphire well?

A. Yes, I have.

Q. What did you come up with?

A. That particular well will probably not drain 320 acres.

Q. How much will it drain?

A. I don't remember the exact number.

Q. Roughly.

A. Well, it's a function of what you -- right now, based on the buildup, it looks like it's only going to drain, oh, less than 100 acres. The

assumption is based on net sand to determine what your final acreage figure is.

Q. So if Santa Fe drilled in the Morrow and got a similar well, it would have much less effect on any offsetting acreage than you've proposed here in your exhibits?

A. That's not correct. We're primarily concerned with the Wynell Federal, the Atoka, reserves in the Wynell Federal and the Sapphire, and the Morrow reserves in the Wynell Federal.

Q. If the Santa Fe well only drilled somewhat under 100 acres, it wouldn't have near the effect on the Wynell well, would it?

A. Well, overall the Morrow is expected to drain 320 acres, and until we show otherwise, I'm going to believe that our Wynell Federal will drain 320 acres from the Morrow.

Q. I'm saying assuming Santa Fe's well only drained 100 acres.

A. Oh.

MR. KELLAHIN: I think that's an inappropriate question. I'm going to object. He's asking this technical witness to assume the fact. It's not even an issue here. The presumption is 320-acre gas spacing. We've talked about that all day

long. There's no application before you to change the spacing pattern --

MR. BRUCE: And he has just testified that the only other Morrow well in this area is only draining less than 100 acres.

HEARING EXAMINER: I'll allow the question, Mr. Bruce.

Q. (BY MR. BRUCE) So if you just look at the Santa Fe well -- if Santa Fe got a similar well draining somewhat less than 100 acres -- I'm not sure of the exact figure -- it would have a substantially less effect on Manzano's and Mitchell's acreage in Sections 14 and 15?

A. I have not testified that the only Morrow producer in the area is going to drain 100 acres.

Q. The nearest Morrow producer?

A. The nearest, that is correct.

MR. KELLAHIN: Mr. Examiner, if Mr. Bruce will stipulate that his well will only drain 100 acres, we'll go away. If he will limit his production to only 100 acres, we can leave right now.

Object to the line of the question.

MR. BRUCE: We know the games that are played here, Mr. Examiner. But Mitchell is claiming at one point that these wells only drain less than 100

acres, but you have to assume that Santa Fe's going to drain 320, and that the Wynell is going to drain 320 in the Morrow.

MR. KELLAHIN: Mr. Examiner, I resent the implication that this is a game. This is very serious business with very serious people for very serious money.

HEARING EXAMINER: Mr. Kellahin, let me interrupt you. We've got an objection on the floor. I'll do the same thing with Mr. Bruce as we did with Mr. Kellahin.

What are you trying to prove with the question? What is your objective? Why are you asking it?

MR. BRUCE: He's already stated that the closest Morrow well drains less than 100 acres, but he has based all of his calculations on adverse effect on Sections 14 and 15 based on 320 acres.

I'm merely asking that if the Santa Fe well is similar, what would the effect be on the offset acreage. I think it's a fair question.

HEARING EXAMINER: Mr. Bruce, if I asked you to provide me with some premises, would you reach the conclusion I seek?

MR. BRUCE: I'll withdraw the question. I

think the point has been made.

Q. Let's turn to Exhibit 11, Mr. Frazier. I find this one quite interesting. I believe you stated that, just looking at the Wynell well, assumed to drain 320 acres, and we're not going to dispute you on that, but then you stated no one should be allowed to drain anything from the Wynell well's area of drainage.

A. Well --

Q. You stated that, did you not, or words to that effect?

A. From a stand-up unit in the east half of Section 22, that is correct.

Q. That's not what you stated. I don't want to get into an arguing match with you here, but you stated that no one should be allowed to drain anything from the Wynell well's area of drainage; so, in effect, that means if you look at Section 14, Manzano and Mitchell drills a well at its proposed location in the southwest quarter of Section 14, that's going to have to have a penalty on it, isn't it?

A. I'll be glad to correct myself.

Q. Thank you.

A. I meant specifically a stand-up unit in the east half of Section 22, as the fuel rules allow, a

well in that unit should not drain the area within that 320 circle around the Wynell Federal No. 1.

Q. What has Mr. Gawloski stated, that there is a new well proposed by Manzano and Mitchell in the southwest quarter of Section 14; is that correct?

A. That's correct.

Q. What is the footage location of that well?

A. There have been some minor adjustments due to land problems, but it's basically 1,980 from the west line and 1,980 from the south line. It's not exactly that. I think it's 2,000 something, but it's basically the 1,980/1,980 location.

Q. Assuming it's roughly 1,980/1,980, what's the distance from that proposed well from the Wynell well?

A. It would be approximately 1,980 plus the 660 that the Wynell is from the east line.

Q. So that's a half a mile; right?

A. Approximately.

Q. What is the distance between Santa Fe's proposed well and the Wynell well?

A. About the same distance.

Q. So they're both going to be about -- assuming Santa Fe drills its well and Manzano drills its second well, they're going to be approximately the

same distance from the Wynell well?

A. But our well will be an orthodox location.

Q. Has Mitchell ever drilled a well when it's had an 88 percent penalty assessed against it?

A. No, I don't believe we have.

Q. Assuming the need arose for a Mitchell or Manzano well to be unorthodox in the southwest quarter of Section 14, would you recommend to management that a well be drilled with an 88 percent penalty assessed against it?

A. We wouldn't recommend a well to be drilled there.

Q. You wouldn't recommend the unorthodox well, or you wouldn't recommend the 88 percent -- the well to be drilled with the 88 percent penalty?

A. I wouldn't recommend that location in the first place.

Q. Looking at Exhibit 12, if you use Santa Fe's geology instead, would it result in a somewhat different penalty proposal?

A. Are you talking a penalty for the Atoka or for the Morrow?

Q. This is the Atoka; is it not?

A. That's correct. I don't recall. I'd have to calculate based on their map, but they don't even

have a net sand map.

Q. We need not get into that, but your penalty calculations, a number of your factors here are really based on Mitchell's geologist, are they not?

A. That's correct.

Q. And would it be fair to say there's quite a difference between Mitchell's geology and Santa Fe's geology?

A. There is some difference.

Q. And if you accepted Santa Fe's instead of Mitchell's, you might come up with different results?

A. But either way you accept the geology, I think the penalty formula should not be a deleting, averaging method.

Q. Now, when you take this 221 corrective acres out of -- of course, any time you multiply fractions, you're going to get a smaller number than any other fraction that you've used; right?

A. These are compounding effects, compounding factors.

Q. Compounding downward?

A. Well, when you have two negative factors, when you put them together, they should wind up with a bigger penalty.

Q. Looking at your Exhibit 13, are you aware

of any instance --

A. Which exhibit?

Q. 13 -- any instance on a 320-acre gas well unit where the OCD allowed the well to be ten feet away from the lease line or the section line?

A. No, but if this formula is allowed, why wouldn't somebody want one there? You're probably going to see it.

Q. In looking at your Section 14, I'm really not quite sure I understand it.

A. Okay.

Q. Whether the penalty is zero or 29 percent, are you basically assuming that in the area of overlap between the Wynell well and Santa Fe's well -- Santa Fe's proposed well, that Santa Fe would recover all hydrocarbons in that area of overlap?

A. No.

Q. You're not?

A. No. There would be a competitive drainage situation for that area. But there shouldn't be a need, shouldn't be getting into that situation for the situation as it exists out here. I don't see them to have the right to any of it.

Q. But overlaps almost always occur or often occur, I should say?

A. But they try to be limited where you are -- accepted overlaps in certain directions, but overlap in all directions is not allowed.

MR. BRUCE: I have nothing further, Mr. Examiner.

MR. KELLAHIN: I do have one question, Mr. Examiner.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Are you aware of any precedent in the Division for applying an acreage factor production limitation, as well as in combination with a distance factor limitation in any situations of an unorthodox location?

A. Productive acreage?

Q. Correct, yes.

A. I'm not familiar with any in New Mexico, no. I'm familiar with other areas.

MR. KELLAHIN: No further questions.

HEARING EXAMINER: Anything further of this witness? If not, he may be excused.

(Thereupon, a discussion was held off the record, and Case 9796 was briefly adjourned.)

HEARING EXAMINER: And we'll get back to

the other case.

Mr. Bruce, I believe you wanted to call a witness.

MR. BRUCE: I would like to recall as a rebuttal witness Mr. Thoma.

R E B U T T A L

JOHN L. THOMA,

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

DIRECT EXAMINATION

BY MR. BRUCE:

Q. Mr. Thoma, did you listen to Mr. Gawloski's testimony?

A. Yes, I did.

Q. And did you review his exhibits?

A. Yes, I have.

Q. One thing he stated, I believe, was that Mitchell used seismic. Does Santa Fe use seismic?

A. We do use seismic where we feel it is useful. Integration of sonic and subsurface data is useful, and coming up with a handle on velocity variations which affect the integrity of seismic

interpretations.

However, we have found, particularly in the Morrow, that near surface velocity problems are not reliably addressed on a regular basis by integration of sonic and subsurface data. And since you are limited by those means to correcting the seismic for velocity, near surface velocity problems, we have subsequently decided that through use, through trial and error, that seismic, in our opinion, is not a reliable means of predicting structure in the Morrow.

There are frequently phase variations within Morrow formation and at the top of the Morrow formation caused by stratigraphic variations within the Morrow itself, which cause you to incorrectly -- frequently incorrectly map structure because you're not mapping equivalent points; you're mapping methodology changes.

For that reason, we have not used -- we have elected to minimize the use of seismic in the Morrow.

Q. Now, looking at Mitchell's Exhibits 1 through 5, do you agree with those interpretations?

A. No, no. The Atoka interpretation I don't disagree with, obviously. Those are very, very similar. The Morrow interpretations I would

personally disagree with, professionally disagree with, I guess is the proper way to state it.

Mapping groups of sands within the Morrow is a frequently employed technique of mapping prospective trends within the Morrow, but in terms of isolating specific producing trends within an area, we have elected to go to mapping individual sands.

Certainly by mapping a package of sands, which Mitchell has elected to do, you're similarly mapping sand trends the way I am by using a clean sand map. They are both an aggressive approach to mapping sand trend in the Morrow, but, once you've identified a specific pay in a localized area, a more useful map in terms of predicting where that sand is developing and where it's going is to map that particular sand, and that's what we have done with our isopach map.

That's why primarily we didn't show our maps. We have maps very similar to this, and certainly there are other sands in the area, but in this specific area right here where we're talking about drilling, that is the objective sand which has been proven to be productive, and I guess that's where I disagree with his maps in terms of the orientation and whatnot; that's just a matter of interpretation. But in terms of evaluating what should be looked at,

you know, specifically, in regards to any given well, I think you need to take the interpretation to a much more detailed level.

Q. Finally, Mr. Thoma, there's been talk about the Pan Am Laguna well. Regarding the performance of that well, is there anything -- and obviously performed poorly -- is there anything that anybody can point to, or is it all speculation?

A. I believe it's speculative. You can say that the well was damaged from the frac job. You can say it was damaged because it was drilled with fresh water. Fresh water typically isn't used anymore.

There are a number of different reasons, but there's also numerous Morrow wells with sands that look just as good as that that have been drilled around the basin, using proper techniques, that you can't explain the producing number, why the sand doesn't produce.

So I think that pointing to one thing in particular on that well is speculation.

MR. BRUCE: Thank you.

CROSS-EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Thoma, you mapped only one of the sands in the Morrow pool, didn't you?

A. In this particular area, I presented a map on the sand which I thought was the objective sand for the area. We have mapped other sands in the area.

Q. The map you presented today is a map of a single sand in the Morrow?

A. Correct.

Q. That's the only map you gave us?

A. That's correct.

Q. There are numerous other pay sands in the Morrow in this area?

A. To the north and to the south, yes. In this specific area, the three-mile radius or two-mile radius, there is not to date.

Q. And within the area shown on Mr. Gawloski's display, Santa Fe has yet to drill its first Morrow well?

A. In an area approximately two miles, three miles around this well, Santa Fe has yet to drill its first Morrow well. However, if you go four miles away from this well, you will find a well that we did in fact drill.

MR. KELLAHIN: Nothing further.

HEARING EXAMINER: Anything further of this witness? If not, he may be excused.

Would counsel like to give closing

statements at this time?

MR. KELLAHIN: If it please, Mr. Examiner --

HEARING EXAMINER: Let's try and keep it brief, if we can, Mr. Kellahin.

MR. CARR: Why don't you let me go first? Mine's very brief.

HEARING EXAMINER: Okay, Mr. Carr.

MR. CARR: And then we can let the real parties go at it.

Texaco Inc. is here today in opposition to the application of Santa Fe Energy Operating Partners. We're the owner of substantial and valuable mineral interest in the properties north and northwest of the proposed unorthodox location, and we believe the very best data available on the area dictates that the well should be drilled at the standard location.

If, however, Santa Fe insists on drilling at the proposed unorthodox location, we believe the producing rate from the well should be penalized, and the penalty should be substantial and in line with the recommendations made by Mitchell Energy Corporation.

We believe you should follow the recommendation of Mitchell because their penalty is based on an analysis of the technical data available

on the reservoir, unlike the recommendation of Santa Fe, which is based on nothing whatsoever except surface distances-after they came in and made a geological presentation, and then for some reason in calculating penalty elected not to follow it.

We believe if a penalty is not imposed in line with what is recommended by Mitchell, uncompensated-for drainage is going to be authorized and our correlative rights will be impaired.

HEARING EXAMINER: Thank you, Mr. Carr.

Mr. Kellahin.

MR. KELLAHIN: Mr. Examiner, it is my assessment of Mr. Thoma's geologic criteria that he identified for us that that geologic criteria has been satisfied by his own exhibits and can be fulfilled with a well at a standard location. If you look at his structure map, you can follow the contour of the same structural point he seeks for the unorthodox location and find at a closer standard location he does not lose structure. The only material difference appears to be the loss of a few feet of thickness in the Morrow channel.

It's our assessment that he has not proven through his testimony or anyone else on behalf of Santa Fe one of the basic requirements for justifying

the unorthodox location: that the unorthodox location must show an enhanced opportunity to develop the spacing unit that he cannot achieve at a standard location.

Santa Fe ought to thank us, Mr. Examiner, for showing them information that they chose not to utilize or did not otherwise have. Santa Fe has yet to drill their first Morrow test in this immediate vicinity. We have brought before you the resident expert, at least within this particular locale, the exploration geologist that has put his money where his mouth is and has successfully drilled two producing wells. He has yet to drill his first dry hole in this area. What he is doing is about to drill his third well, and he's doing it at a standard location. The development of these wells is at standard locations until Santa Fe comes up and wants to play closology and corner shoot what is the only producing Atoka well in Section 15.

The seismic information is critical. Our geologist customarily utilizes it in this particular area, and we think it's a necessary tool that he has successfully utilized and demonstrated to you that it's accurate.

If Santa Fe chooses to go ahead with the

risk of drilling at the unorthodox location, it makes absolutely no difference at all that the wells may be in fact similar distances apart when you look at the area of encroachment.

They have given you some unusual situations by which you then can judge the entire presentation, one of which is they tell you that there should be no penalty on the Morrow because we're not yet producing what we have proved to be producible Morrow reserves in the southeast quarter of 15. They say, "Just ignore that."

I have yet to see an order before this Division that you've ever chosen to do that. You always protect the undrilled acreage to give the opportunity to those people being encroached upon to protect themselves.

Mr. Bruce and his witnesses have suggested the Pennzoil order. That's something of an antique by now, Mr. Examiner. I can tell you about it longer than you care to do it because I did it. And in that case, we had some additional parameters that you as an examiner have certainly not adopted, and as best I can find have not been used in the recent past before this Division.

I will show you, because I've gone to the

trouble to find them, some of the most recent orders you have entered in similar situations. And the thing that you have not done is that you have not given them the windfall of factoring in the dimensions by which the well is standard. That's a goofy idea anyway. What you do is you give them a bonus for the encroachment. There's no sense to that. Our engineer demonstrated with good, sound engineering technique that just makes no logic at all.

One of the orders I'd like to share with you, and I'll provide a set of those to Mr. Bruce for his comment, the Nearburg order is not one that you did, but I selected it as an example because it is one that Mr. Stogner did, and Mr. Stogner entered the Pennzoil order upon which Santa Fe placed such great reliance -- the Nearburg order only factored in the dimension towards which the well was unorthodox.

The second order in the package of orders is one that you did enter in the Reed & Stevens case. Again, what you did in that case is you factored in the one dimension in which the well was encroaching.

Look at the Santa Fe Exploration order that you entered on April 12, 1989, in a similar situation, more factoring in the dimensions in which the well is unorthodox, and we don't give them a bonus or a

windfall for maintaining the distance that is standard, and we suggest that it's totally inappropriate to do so in this case.

You and I and everybody in this room that practices regularly before you has struggled to find an acceptable location for these type of cases or a penalty for these type of cases, and I think we've got a fresh idea here from Mr. Frazier that merits some consideration. That's the one where on his Exhibit No. 11, he attempts to apply engineering methodology to come up with what really will be real world penalties, and that's that no flow boundary calculation, the 88 percent.

The record is substantial before you, and I think you're justified in entering such a penalty.

What's interesting about all these penalties is this is a case where there's opportunity to the applicant to achieve a substantial advantage because the way the penalty works is not really going to affect it.

For example, if they get a well that's got the deliverability potential of the Wynell well of 6 million a day, apply any kind of penalty against that, even if it's an 88 percent penalty, they get to produce at a significant rate.

And therein lies the flaw in the system is that there is not an integration of the penalty with the actual producing rates of the wells upon which that location encroaches.

I think it's a fatal flaw, and I think what Mr. Frazier gives us is a wonderful opportunity to apply some science to what is really a theoretical, hypothetical, sometimes meaningless arithmetic solution for a penalty. And when he has carefully and thoroughly calculated no flow boundary for the encroaching well, I think there's some science to that. There's some substantial evidence to justify 88 percent penalty. And I think you can do so in this case with the comfort to realize that the best geologic evidence shows that they can drill in the standard location, and that's where they ought to be.

So if you choose to grant the opportunity to grant this location, we would request, in order to protect us and our clients, that you impose an 88 percent penalty, because without doing so, it simply will not be fair.

HEARING EXAMINER: Thank you, Mr. Kellahin.

Mr. Bruce.

MR. BRUCE: Mr. Examiner, Santa Fe has the

right under the statutes and the regulations to seek this unorthodox location. In fact, it may have a legal obligation to do so to protect the rights of the interest owners in the unit.

Now, it's a matter of dispute what matter should be considered in an unorthodox well location. If you look at the statute 70-2-16, and Rule 104G, it basically says, "The Division may give equitable consideration to such pertinent factors as may from time to time exist."

It's equitable; so a mathematical or arithmetic formula is really not all that necessary, nor in this case desirable.

Mr. Frazier presented a lot of nice numbers, but we don't think they bear any relationship to the facts of this case.

Now, we do agree that a primary factor to consider is correlative rights, but the Division must also look at the rights not only of Manzano, not only of Mitchell, not only of Texaco, but also look at the rights of Santa Fe. Santa Fe does have the right to drill a well and recover its fair share of hydrocarbons. We believe without this location it will not recover its fair share of hydrocarbons.

Regarding the order, we did use the

Pennzoil order, but our penalty recommendation isn't based on that. That was really more used as a yardstick as anything else. Mr. Kellahin says that's a relic. Maybe it shouldn't be used anymore. Well, it's strikingly similar to one of the penalty methods used by Mr. Frazier, and if the Pennzoil method is archaic, then I believe so is that method.

Just looking at the magnitude of the penalty suggested, I highly doubt that anyone would drill around here with an 88 percent penalty. In another situation, I'm not sure of the total facts of the case, but Mr. Kellahin is now appealing de novo for Marathon a case where an 80 percent penalty has been issued.

We believe, at least as far as the Atoka, a penalty is fair, but I think it has to bear some relationship to economic reality in this case.

Now, we still assert that there's really no need to give a penalty in the Morrow. There's no effect on Section 23, and really the effect on Section 14 is to prove up that acreage as to the Morrow, we believe. You're talking about experts in this area. Santa Fe has drilled 50 Morrow wells in southeast New Mexico. If anyone is the expert, Santa Fe is, and we believe that their geology should be persuasive in

this case as a result. Santa Fe's geology shows that their location is the optimum location for their Morrow test, which is the primary target of the well. The location is also necessitated by the need to get away from the Pan Am well, and to move away from the poor sand quality in the Pan Am well. And, therefore, Santa Fe does recommend that the Morrow unorthodox location be approved with no penalty.

As to the Atoka, we don't believe that this can be looked at in a vacuum. If we were 1,000 feet or 800 feet away from another well, you know, there would be serious concerns, but this well is half a mile away. That's a common distance. Many standard location wells can be closer to the Wynell well than Santa Fe's proposed location. Therefore, I think you have to look at certain factors: the half-mile distance; the fact that, once again, if Santa Fe drills a good well at this location, although Santa Fe admits there will be an effect on the Atoka in Section 14, it will also, we believe, help prove up the acreage in Section 14. It's really like there's not any benefit at all to Mitchell and Manzano by not having their acreage approved.

Then I think if you look at the drainage patterns, you see that there really is relatively

small overlap between the proposed Santa Fe location and the Manzano well. We're talking roughly 90 to 95 acres, and if you factor that in, you get roughly a 28, 29 percent penalty. We think something in that range is fair and would properly compensate Manzano for any ill effect that may occur -- Manzano and Mitchell for any ill effect that may occur from Santa Fe drilling the well.

Mr. Kellahin has submitted some recent orders here. I was not a party to any of these cases. I do understand that the Santa Fe Exploration case was unique because there was a fault involved in that case. I can't tell from the Nearberg producing case whether there were any other wells drilled in the area, and the placement of those wells with respect to the unorthodox location, etc.

Also, Mr. Kellahin would have you believe that Santa Fe is going to get a 6 million or 7 million cubic-feet-a-day well. Nobody knows. They really need this unorthodox location in order to give them a good chance at getting a good well. But even if they get a good well, penalized at 90 percent, it really doesn't make economic sense. So we would recommend that a 20 to 30 percent penalty be assessed against the Atoka. Thank you.

HEARING EXAMINER: Thank you, Mr. Bruce.

Anything further in this case? If not, Case 9796 will be taken under advisement.

This hearing is adjourned.

CERTIFICATE OF REPORTER

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

I, Freda Simmons, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I caused my notes to be transcribed under my personal supervision; 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 January 30, 1990.

Freda Simmons

FREDA SIMMONS

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. _____, heard by me on _____ 19__.

_____, Examiner
Oil Conservation Division