STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION COMMISSION

29 May, 1985

COMMISSION HEARING

IN THE MATTER OF: Application of Chama Petroleum Company to limit the Lea-Pennsylvanian Gas Pool Rules, Lea County, New Mexico.	CASE 8447 (DE NOVO)

BEFORE: R. L. Stamets, Chairman

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division:

Jeff Taylor
Attorney at Law
Legal Counsel to the Commission
State Land Office Building
Santa Fe, New Mexico 87501

MR. STAMETS: The hearing will come to order. Call Case 8447.

MR. TAYLOR: Case 8447, application of Chama Petroleum Company to limit the Lea-Pennsylvanian Gas Pool Rules, Lea County, New Mexico, being heard De Novo at the request of Chama Petroleum Company. The applicant has requested that this case be continued to the next Commission hearing.

MR. STAMETS: This case will be continued to the Commission hearing to be held on June 12, 1985. The hearing is adjourned.

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
State Land Office Building
Santa Fe, New Mexico

12 June 1985

COMMISSION HEARING

IN THE MATTER OF:

Application of Chama Petroleum Company to limit the Lea-Pennsylvanian Gas Pool Rules, Lea County, New Mexico. CASE 9447

BEFORE: Richard L. Stamets, Chairman
Ed Kelley, Commissioner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation Division: Maryann Lunderman
Attorney at Law
Energy and Minerals Dept.
Santa Fe, New Mexico 87501

For Chama Petroleum: William F. Carr
Attorney at Law
CAMPBELL & BLACK P. A.
P. O. Box 2208
Santa Fe, New Mexico 87501

For BTA Oil: Karen Aubrey
Attorney at Law
KELLAHIN & KELLAHIN
P. O. Box 2265
Santa Fe, New Mexico 87501

I N D E X

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E X H I B I T S

MR. STAMETS: We'll call next Case 8447, being the application of Chama Petroleum Company to limit the Lea-Pennsylvanian Gas Pool Rules, Lea County, New Mexico.

MR. CARR: May it please the Commission, my name is William F. Carr with the law firm Campbell and Black, P. A., appearing on behalf of Chama Petroleum Company.

I have four witnesses.

MR. STAMETS: Other appearances?

MS. AUBREY: May it please the Commission, Karen Aubrey, Kellahin and Kellahin, representing BTA Oil Producers.

I have one witness.

MR. STAMETS: Any other appearances?

I'd like to have all of those who will be witnesses in this case stand and be sworn at this time.

(Witnesses sworn.)

MR. CARR: At this time I'd call Mark Nearburg.

MARK NEARBURG,

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

DIRECT EXAMINATION

BY MR. CARR:

Q Would you state your full name and place of residence?

A Mark Nearburg, Dallas, Texas.

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

A Chama Petroleum Company, landman.

Q Have you previously testified before this Commission and had your credentials as a landman accepted and made a matter of record?

A Yes.

Q Are you familiar with the application filed in this case on behalf of Chama?

A Yes.

Q Are you familiar with what Chama seeks in this matter?

A Yes.

MR. CARR: Are the witness' qualifications acceptable?

MR. STAMETS: They are.

Q Mr. Nearburg, would you state briefly what Chama seeks in this case?

A Chama seeks an order limiting the rules governing the Lea-Pennsylvanian Gas Pool to the present pool boundaries.

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

A Exhibit Number One shows -- is a general land map of the area.

The acreage shaded in yellow is Chama acreage.

The acreage in green is the Lea-Penn Pool; acreage in red is the West Lynch Morrow Pool, Lea-Penn Morrow.

Berry North Morrow is shaded in blue in the lower right.

Q When was the Lea-Penn Morrow Pool created?

A The Lea-Penn Pool was created November 1st, 1961.

Q And when were the South Lynch and the Berry North Morrow Pools created?

A The West Lynch Morrow and the Berry North

Morrow were both created effective February 1st, 1981.

Q Now the acreage shaded in yellow, I believe you indicated was Chama acreage?

A Yes.

Q When did Chama start acquiring its interest in this area?

A Chama began its first lease acquisition in June of 1983 and it has continued through the present.

Q And at the time you started acquiring acreage in this area, what were the Lea-Pennsylvanian Pool boundaries?

A The southernmost extent of the pool boundaries at that time in 1983 was the south section line of Section 13 and the southeast -- south line of the southeast quarter of Section 14.

Q And so what was the spacing at the time you acquired the land shaded in yellow for those lands?

A The spacing at that time with the leases we had was 320-acre spacing.

Q And when was the Lea-Pennsylvanian Gas Pool extended?

A The pool was extended in December, 1984.

Q Has there been recent drilling activity in this area?

A Yes, there has.

Beginning last year in late May or early June BTA spudded their No. 1 Well in the northwest southeast quarter of Section 24.

On December 28th, 1984, Chama commenced re-entry of the 1-L in the southeast quarter northwest quarter of Section 25.

I don't know the exact spud date of BTA's No. 2 Well, but I think it was in late 1984, early 1985.

Q And that's located in Section 24?

A And that's in Section 24 in the northeast quarter southwest quarter.

And on June 8th, 1985, Chama began drilling a new hole in the southeast quarter southeast quarter of Section 23.

Q Are all of these wells indicated on Exhibit Number One?

A Yes.

Q Does Chama have any further drilling plans in the immediate area?

A Yes. We would like to develop the northeast quarter of Section 25; however, on I believe it was February 27th of this year we had a forced pooling hearing on which there has been no order.

Q At the time of that pooling hearing did BTA also appear with a parallel pooling application seeking

an order pooling those lands?

A Yes, they did.

Q And designating them operator of the well?

A Yes.

Q What are the spacing requirements and well location requirements for the Lea-Pennsylvanian Gas Pool?

A The Lea-Pennsylvanian Gas Pool is spaced on 160-acre units with no well located closer than 330 feet to the inner quarter quarter boundary, or 660 feet from the outer boundary.

Q Are these spacing requirements the result of special pool rules?

A No. The only reason that the pool is on this spacing is because it was created prior to June 1st, 1964.

Q So they're spaced this way under statewide rules?

A Yes.

Q When did Chama Petroleum Company discover that the acreage that they were proposing to develop needed to be developed on 160-acre spacing?

A In June or July of 1984 we submitted Form C-101 and 102 to the Hobbs District Office and we were in-

formed by them that the pool would probably be extended in such a manner that our re-entry of the 1-L would be within the one mile buffer zone of the extended pool limits.

In asking the Commission how we should proceed, they suggested that we have a hearing to limit the pool rules, put our acreage on 320 and BTA would not object to that.

That was per the Hobbs Commission Office.

Q And then that matter did come on for hearing?

A That matter came on for hearing earlier this year. We do not -- or we did have an order in that hearing. That's why we're here today.

Q And the Commission denied -- the Examiner denied your application.

A Right.

Q And you've appealed it.

A Yes.

Q Would you just summarize why Chama is seeking to limit the pool rules to the present pool boundary?

A Basically there are -- the main reason is that the only reason the Lea-Penn Pool is on 160-acre spacing is because it was created prior to June 1st, 1964, created in 1961.

Additionally, the 320-acre units for the Morrow formation are standard now and have been for over 20 years. Also, 320-acre spacing is a standard statewide spacing for the Morrow wells.

Additionally, we feel that development on the 160-acre tracts would result in much higher drilling requirements, obviously, in terms of dollars and capital expenditure; the drilling would be unnecessary and it would result in waste, and would leave the wells drilled on too dense a pattern for the initial development.

Q Could you just explain to the Commission what the actual impact in terms of dollars would be if, in fact, Chama is required to develop their acreage on a 160-acre spacing pattern?

A With Chama's acreage position in the area, if we were forced to develop on 160 acres, it would, of course, double our drilling budget to the tune of about $8,000,000.

Q Is this a prorated pool?

A No, never has been.

Q To your knowledge is there anything that would prevent the drilling of more than one well on any 320-acre unit?

A No.

Q In your opinion will granting this appli-

cation impair correlative rights?

A No. We feel that if the application is not granted in Chama's favor that Chama's correlative rights will be impaired, because we will lose the opportunity to develop this acreage without the waste of having to drill unnecessary wells.

Q Mr. Nearburg, was Exhibit Number One prepared by you or under your direction and supervision?

A Yes.

MR. CARR: At this time we would offer into evidence Chama Exhibit Number One.

MR. STAMETS: Without objection it will be admitted.

MR. CARR: That concludes my examination of this witness?

MR. STAMETS: Are there questions of Mr. Nearburg?

MS. AUBREY: Yes, Mr. Stamets.

CROSS EXAMINATION

BY MS. AUBREY:

Q Mr. Nearburg, I know that you are awaiting the birth of a child and I will try to go through this quickly with you.

Mr. Nearburg, do you have your Exhibit

One in front of you?

A Yes.

Q Okay. When did Chama acquire an interest in the acreage that is dedicated to the Chama 1-L in Section 25?

A That was the first acreage we acquired. That was in June of 1983.

Q And when did Chama acquire its acreage in the southeast quarter of the southeast quarter of Section 23?

A That was acquired by farmout. Negotiations began in, I believe, May of '84, early -- April to May of '84, and the farmout was finalized in November of '84.

Q And when did Chama acquire its acreage in Section 26?

A In Section 26, that acreage was acquired in late April, 1984. I think the date of the agreement is May 3rd, 1984.

Q Do you hold the acreage in Section 25 under a Federal lease?

A Part of it we do and part is under farmout, but the farmout is based on a Federal lease, also.

Q And how many acres does that lease cover?

A That would be -- which one? The one that we hold?

Q The one that you hold in the --

A It covers --

Q -- north half of 25?

A It covers all of the north half with the exception of the east half northeast quarter, 240 acres.

Q And do you hold the acreage in Section 23 under a Federal lease?

A That's a combination of KGS leases, simultaneous leases, and farmouts on Federal leases.

Q Can you tell me what effect, if any, the Commission's decision to continue the established spacing on 160 acres will have on your leases?

A And you're asking what effect the decision will have on the leases?

Q Yes, I am.

A That's really -- it's unclear to me what you're asking me, because I need a little more specific --

Q Okay, Mr. Nearburg, will you lose your leases if you do not develop -- if you do not drill two wells under each of those leases?

A No, we will not lose the leases.

Q As I understand it from our last hearing, Chama has sold an interest, which is still unspecified, in the acreage in, I believe, Section 25 and possibly Section 23, to some partners, is that correct?

A It sold to working interest owners as is standard.

Q Okay, and is it correct that at the time you sold the deal Chama believed that the acreage was based on 320's?

A No, that's not correct.

What happened is when we purchased the acreage and we started our acreage acquisition, we believed that the acreage was on 320-acre spacing, which at that time it was.

By the time we sold the prospect covering the 1-L, BTA drilled their well, we knew that we were in the 160-acre situation, and that was presented to all the investors; they had full knowledge of it.

Q So at the time -- your testimony is that at the time you sold the deal, you knew that spacing was 160 acres because you were within a mile of the Lea-Penn Pool?

A That's right.

Q You testified a few minutes ago about a well which you have begun in the southeast quarter of the southeast quarter of Section 23.

A Yes.

Q To what depth will that well be drilled?

A The Morrow formation.

Q The same formation as -- the same forma-

tion that we're talking about in connection with the Lea-Penn Pool?

A Well, yes.

Q And how many acreas do you propose to dedicate to that well?

A Tnat depends on what the Commission rules.

Q Is it located at a standard location for a 320-acre spacing unit?

A No, it is standard for a 160-acre.

Q Have you applied for or obtained permission from the Oil Conservation Division for an unorthodox location for that well?

A Yes, we have applied for that in the past but I'm unclear as to the status of that request. I don't think we've had an order on it.

Q Do you know when that hearing was held, Mr. Nearburg?

A No, ma'am. May I refer to Bill?

MR. CARR: I don't remember when it was.

A I think it was in late '84 or very early 1985.

Q So you've drilled or begun drilling that well at a standard location for a 160, is that correct?

A We put the well where it is based on geology.

MR. CARR: Karen, if my recollection is correct, there was an application to approve unorthodox locations. That was Case 8446.

It was consolidated for hearing with the original case for limiting the pool rules.

Then an order was entered in this case, denying the application limiting the pool rules.

No action was taken on the other case inasmuch as on 160 they were standard locations and no order has to date been entered.

MS. AUBREY: That would be under Case 8447, then?

MR. CARR: Yes. It was early this year.

Q Let me ask you some questions now about the Chama 1-L.

A Uh-huh.

Q Have you re-entered that well?

A Yes, we have.

Q When did you begin work on that well?

A December 28th, 1984. That's within a day. I think that's close.

Q Have you recompleted that well?

A Yes, we have.

Q In what formation?

A In the Morrow formation.

Q Are you now producing that well?

A Yes, we are.

Q Do you have logs for that well which you'll have available for us today at the hearing?

A I don't know. We can get them. They're next door.

Q And do you know, Mr. Nearburg, what kind of production you've achieved from the Chama 1-L?

A Well, it has just been on line so it continues to improve its production, but when it went on line on a 10/64ths choke it was producing right at 800,000 cubic feet of gas per day with about 35 barrels of condensate and we had some load water for treatment the first few days but that's dropped off to two or three barrels, so we think the water production will decrease to virtually nothing.

Q Do you know from what footage depth you're producing that well?

A No, I don't.

Q Do you know what --

A It is in the Morrow but I don't know the exact perforated depth.

Q Do you know whether or not your geologist

you have here today knows -- knows that?

A Yes, he does.

Q Okay. How many acres are dedicated to the Chama 1-L?

A 160 acres at the present time.

Q Do you have an application pending before the Oil Conservation Division to change that?

A I assume that's what we're here to do today.

Q Specifically directed to the Chama 1-L?

A No. We're limiting the Lea-Penn Pool's boundaries.

Q When did you formulate your plans for acquiring the acreage in Section 25?

A Well, that would have to have been in 1982.

Q And at that time do you know what the limits of the Lea-Penn Pool were?

A Yes. As I previously testified, the southern limits in Sections 13 and 14.

Q Has Chama drilled any well in the Lea-Penn Pool with the exception of the well located in the southeast quarter of the southeast quarter of Section 23?

A Yes. We re-entered the 1-L and we are drilling the well in Section 23, and we have substantial ac-

reage left to develop.

Q Well, you have re-entered the old Shell well which is in Section 25.

A Yes.

Q And you are now drilling a well in Section 23?

A Yes. We also have an application to drill a well in the northeast quarter of 25.

Q Yes, we'll get to that in just a second.

Can you tell me what depth you presently are in the well in Section 23?

A I don't know the present depth.

Q The well is presently drilling? Is has not been completed?

A That's right.

Q To date, Mr. Nearburg, how much money has Chama Petroleum spent in developing acreage in the Lea-Penn Pool?

A By development I assume you're not talking about lease acquisition cost, only drilling costs.

Q Only drilling costs, Mr. Nearburg.

A I would have to look at the final figures on the 1-L re-entry and our AFE on the well we've just begun is $1.2 to $1.3-million.

So close to $2-million, $2.5-million.

Q In your opinion have you spent roughly a million dollars re-entering that old Shell Well?

A Well, that's a very -- I really don't know the exact figure so I don't want to represent anything, but the new wells are very expensive.

Q Let's talk now about the east half of the northeast quarter of Section 25.

Both BTA and Chama have filed applications for compulsory pooling with different well locations on that acreage, is that correct?

And those applications, as far as we know, have not been acted on.

A That's correct.

Q That would have been the February 27th hearing.

A Right.

Q Is your proposed location in the north -- I'm sorry, the east half of the northeast quarter of Section 25 --

A Our proposed location is in the west half northeast quarter.

Q Is that at a standard location for 160-acre spacing?

A Yes, it is.

Q I believe you testified that if the Com-

mission retains the established spacing in the Lea-Penn Pool that Chama would be required to double its drilling budget, is that correct?

A Absolutely.

Q Is there anything that requires you to drill two wells instead of one well?

A At the present time there is.

Q And what is that, sir?

A The 160-acre spacing, when you look at the rest of New Mexico.

Q Assuming the wells were spaced on 160 acres, is there anything that would require you to drill a well in each of those spacing units?

A Well, you have to earn the acreage. You can't let it expire, so you have to drill it.

Q And your leases are on 320 acres -- I'm sorry, 240 acres in Section 25, is that right?

A In Section 25; also 320-acres in the south half.

Q Is that a separate lease in the south half?

A Yes, it is.

Q When did you acquire that lease?

A May 3rd, 1984.

Now, which lease are you -- yeah, the

south half --

Q I'm sorry, Mr. Nearburg, south half of Section --

A Yes.

Q -- 25. That would have been May, '84?

A May 3rd, 1984.

Q Were you aware of the existence of the Lea-Penn Pool when you acquired your acreage in Section 23, 26, and 25?

A Yes, because we became aware of the problem with the acreage in Section 25.

It would be hard to pinpoint exactly what acreage we had when, you know, when we learned of the spacing. The acreage acquisition has been a continual on-going process.

Q Now, as I understand it, you want to limit the 160-acre spacing to the present pool boundaries.

A That is correct.

Q And that would be the line that runs along the south section line of Section 24 and 25 --

A That's right.

Q -- and the east line between Section 24 and 23 -- I'm sorry, the west line.

A Right, west line of Section 24.

Q In the event that the Commission limits

the pool boundaries to those locations, what effect is that going to have on Chama's acreage? Will you still be within a mile of the Lea-Penn Pool?

A Well, we would, obviously, we'd be right next to the Lea-Penn Pool, so we would be within a mile of it.

Q Mr. Nearburg, do you intend to put on a geologist today to produce some geologic testimony for the Commission to justify limiting these boundaries?

A Yes, we do.

Q Now you testified that granting your application will not affect BTA's correlative rights.

A That's correct.

Q Isn't it a fact, Mr. Nearburg, that granting the application will dilute BTA's interest in the east half of the northeast quarter of Section 25 and give them only 20 percent of a well drilled in that acreage as opposed to 50 percent?

A Well, if it was on 320 acres that's correct.

Q So it will affect their correlative rights to some extent.

A Well, I'd like to defer that to Mr. Nutter, as far as --

Q You don't -- you don't want to answer

that question?

A I'm not sure the way it's asked I can answer it. If you'd like to rephrase it, I'd like -- I'll try.

Q When did you become --

A I don't understand what correlative right is being impaired.

Q When did you become aware of BTA's activity in this area?

A At the time, I believe, that we filed our C-101's and C-102's. It was either when we received the Hobbs Commission montly report on locations and we noticed where the well was staked, or it was shortly thereafter at about the same time when we applied, sent our C-101's and C-102's to the Hobbs Office.

MS. AUBREY: I have no more questions, Mr. Stamets.

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Nearburg, if I understand your application correctly, you're not necessarily just seeking to limit the boundaries of the pool, in fact not limit the boundaries of the pool at all, limit the application of the pool rules to the defining boundaries.

A That's correct. Elimination of the buffer zone.

Q Okay. Now, looking at the pool, if we did that it appears as though there'd be a couple of orphan 160-acre tracts in Section 10 in the northwest quarter that would be left out and in Section 14 the southwest quarter would be left out.

Would you suggest that if we did go along with your request that we square off the pool by including those two quarter sections?

A Yes, that would not bother me at all. I have no objection to that.

MR. STAMETS: Any other questions of this witness?

MR. CARR: No further questions and we'd ask that Mr. Nearburg be excused. He may have to leave Santa Fe. We're not sure yet.

MR. STAMETS: He is excused and we wish you good luck.

MR. NEARBURG: Thank you.

MR. CARR: At this time I'd call Louis Mazzullo.

LOUIS J. MAZZULLO,

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

DIRECT EXAMINATION

BY MR. CARR:

Q Would you state your full name and place of residence?

A My name is Louis Mazzullo and I reside in Midland, Texas.

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

A I'm employed as a geological consultant by Chama Petroleum Company in Dallas.

Q Would you summarize your educational background for the Commission, please?

A I have a Bachelor's degree in geology and a Master's degree in the geophysical sciences from the University of Chicago.

Q And when did you obtain your Master's in geology?

A Master's was obtained in 1976.

Q Would you review your work experience since graduation?

A Since graduation I worked as an explora-

tion geologist for various companies beginning in the uranium industry as a sedimentary uranium exploration geologist.

I worked in that capacity for five years in sedimentary environments, mapping, subsurface mapping and defining of -- of uranium reservoirs.

I then moved to Midland where I was employed by Superior Oil Company for a short time as an exploration geologist in the Permian Basin and in 19 -- early 1982 I went into business as a geological consultant, where I've been ever since.

Q Have you performed any particular studies of the Morrow formation?

A I have done an extensive regional study of the Morrow formation for the GeoMap Company, wherein I mapped the entire Lea and Eddy County depositional extent of the Morrow as part of a large scale engineering study that they brokered.

I've also published numerous papers on mapping the Morrow, published in the AAPG, American Association of Petroleum Geologists Southwest Section transactions and West Texas Geological Society, and I've presented the same type of papers to various professional organizations.

Q Are you familiar with the application filed in this case on behalf of Chama?

A I am.

Q Are you familiar with the subject area?

A Yes, I am.

MR. CARR: We offer Mr. Mazzullo as an expert witness in petroleum geology.

MR. STAMETS: He is considered qualified.

Q Mr. Mazzullo, have you prepared certain exhibits for introduction in this case?

A I have three exhibits.

Q Would you refer to what's been marked as Chama Exhibit Number Two, identify this, and review what it shows?

A Exhibit Number Two is a structure map drawn on the top of the Morrow Clastic section. Wells which produce from the Morrow formation are indicated in yellow.

The fault that we see bounding the east part of the Lea-Pennsylvanian Field was defined by old Marathon seismic data to which we had access.

The Morrow is primarily a stratigraphic clay but it is structurally enhanced to a great extent and this map shows that a major anticlinal trend exists across the Lea-Pennsylvanian Field into the area of Chama's acreage around the 1-L Federal and southward beyond those locations.

Q What do the yellow spot indicate?

A Again, the yellow spots indicate all

wells which are producing or have produced from the Morrow formation.

Q When was this exhibit originally prepared?

A This exhibit was originally prepared in late 1983 and subsequently updated in last month, May of 1985, with the inclusion of BTA's new well data.

Q Would you now refer ot what has been marked as Chama Exhibit Number Three and identify this, please?

A Chama Exhibit Number Three is a log, sonic log section, through the U. S. Smelting and Refining Federal No. 2 Well in the southwest quarter of Section 11.

It is a Lea-Pennsylvanian Field well and this is a log section which merely -- which merely indexes two major productive horizons which we will be showing here on subsequent Isopach maps.

I reference Zone No. 7, which is colored in green, and Zone No. 11, which is colored in blue.

Q Is Zone No. 11 what is also referred to as in the Middle Morrow?

A Yes. Zone No. 11 will be referred -- is in what we refer to as the Middle Morrow productive unit, the middle -- it is part of a Middle Morrow horizon which accounts for over two-thirds of production in the Lea-Pennsylvanian Field.

Q Are there other producing horizons that you might have mapped?

A Yes, there are several different productive horizons that could have been mapped.

We chose these two as representative of the best reservoir zones in the area.

Q But Exhibit Number Three is not intended to show that these are the only zones that would be capable of production.

A Not by any means.

Q Would you now go to Chama Exhibit Number Four, identify that, and explain what it shows?

A Exhibit Number Four is a gross sandstone Isopach map of the aforementioned Zone No. 7, which we've just seen on the log section.

All the wells that are highlighted in yellow pay from this particular horizon, from this particular genetic unit, that is this particular pay reservoir unit.

I have shown in publication and through numerous studies that I've done on behalf of Chama Petroleum and other clients, that the Morrow -- that the Morrow can be mapped on this basis and that individual genetic units, that is individual pay sand units, can be mapped and shown in this example to extend across the Lea-Pennsylvanian Field

and southward into the 1-L Federal area and beyond.

This is a major Lower Morrow pay horizon.

Q Would you now go to Exhibit Number Five and review that, please?

A Exhibit Number Five is the Isopach map drawn in a similar fashion to the Zone 7 map but this time for Zone No. 11, which is also captioned on Exhibit Number Three.

Zone No. 11 is part -- is included within an interval in the Middle Morrow which accounts of over two-thirds of production in the Lea-Pennsylvanian Field, as we will show in subsequent testimony.

This map also shows this zone can be mapped across the Lea-Pennsylvanian Field and southward out of the area of -- the immediate area of the Lea-Pennsylvanian Field, including Chama's acreage.

Q Now, Mr. Mazzullo, what general conclusions can you reach from your study of the Morrow in this general area?

A The study of the Morrow in this general area, I could conclude that there are major productive horizons in the Morrow which extend from one end of the Lea-Pennsylvanian Field to the other and, in fact, which extend from end of the structure that we saw in Exhibit Number Two, clear down southward beyond the limits of the Lea-Pennsyl-

vanian Field.

Q I believe you testified that the reservoir was basically stratigraphic.

A That's right.

Q And what part does structure play?

A Structure plays a part in localizing -- localizing hydrocarbon accumulation within the stratigraphic units as they develop.

Q Do you have anything else to add to your testimony?

A I have nothing else further than that.

Q Were Exhibits Two through Five prepared by you?

A They were.

MR. CARR: At this time, Mr. Stamets, we would offer into evidence Chama Exhibits Two through Five.

MR. STAMETS: Without objection, these exhibits will be admitted.

MR. CARR: That concludes my direct of Mr. Mazzullo.

MR. STAMETS: Any questions of this witness?

MS. AUBREY: Thank you, Mr. Stamets.

CROSS EXAMINATION

BY MS. AUBREY:

Q Let me refer you to your Exhibit Number Three, Mr. Mazzullo.

Can you tell me where the perforations are in this well?

A The gross perforated intervals are indicated by the yellow bar. The exact perforated intervals I do not know exactly, but I know that they include Zones No. 11 and 7, but if I -- I could get that information for you, if you need it.

Q Is this well presently producing?

A To the best of my knowledge, I believe it is, but I'd have to defer to Mr. Haas' testimony.

Q Do you know from which zone this well produced?

A Again, I -- it's producing from that gross perforated interval, but I can't say. All I know is that each of those two major zones were perforated.

Q Do you know, and I'm not trying to trap you now, I'll ask the next witness if you don't, I'm just trying to find out, do you know whether or not this well produced from both zones or the green zone or the --

A I would suspect they -- it produced from

both zones, or else they probably would have squeezed the zones off that weren't productive.

Q Mr. Mazzullo, does your green colored zone on Exhibit Number Three, that correlates to Zone No. 7, is that right?

A Zone No. 7, right.

Q And the blue colored zone on Number Three correlates to the Zone --

A Zone No. 11.

Q -- No. 11.

And can you tell me again, Mr. Mazzullo, where this well is located in Section 11?

A This well is located 760 feet from the south line of the section and 20 -- 2080 feet from the west line of the section, Section 11.

Q Mr. Mazzullo, I believe you testified on -- in February on -- in connection with the forced pooling cases that were -- were heard between Chama and BTA, is that right?

A That's right.

Q And at that time do you recall which pay zones you identified as the productive zones in this well?

A I didn't address that issue in this particular well.

Q But it's your present opinion that the

well shown on Exhibit Number Three is producing from both your Zone 7 and your Zone 11.

A To the best of my knowledge.

Q Did you perform a log analysis, Mr. Mazzullo?

A Of this particular well?

Q Yes, sir.

A No, I haven't but that might come up in subsequent testimony.

Q So you're not testifying from a log analysis you have performed?

A No.

Q Let me have you look now at your Exhibit Number Five.

A Okay.

Q I believe you testified that this was originally prepared in 1982, 1983?

A 1983; late 1983.

Q And is this essentially the same Isopach which you produced for the Examiner in February of 1985 at the hearing which was held on the forced pooling case?

A It's been revised as of last month because at that time I may not have had one or both of the BTA wells. So there have been revisions made to it.

Q Do you know what revisions have been made

other than the addition of the BTA wells?

A There may have been some revisions made in the actual contouring based upon those wells.

(REPORTER'S NOTE: At this time Mr. Charles Roybal arrived and replaced Ms. Lunderman as Counsel for the Commission.)

Q On Exhibit Number Five you have indicated certain numbers of feet of pay beside the well symbol, is that correct?

A That's not feet of pay. That's gross feet of -- feet of gross sandstone.

Q So this is a gross Isopach, then.

A Uh-huh.

Q Was the Isopach submitted to the Commission in February a gross Isopach or a net Isopach?

A Oh, I may have -- I may have submitted a net Isopach. I don't remember.

There are two different ways you can map it. It depends on -- when you map sedimentary features like this you can map it in several different ways and I may have presented another way before. I don't recall.

Q Well, would you describe how you mapped it this time?

A This is a feet of gross sand from the base of -- from the top of the marker horizon to the base of another marker horizon; in this case gross feet of what I consider to be sandstone based upon log character and sample analysis.

Q Let me hand you a copy of what I've marked as BTA Exhibit Number One, and I'm sorry, I'm rather short of these copies. This is a photocopy of your Exhibit Number Five from Cases 8478 and 8505.

Do you recognize that exhibit, Mr. Mazzullo?

A Yes, I do. I do.

Q Okay. That is the exhibit which you prepared for the last hearing, or I think it was the last hearing in this matter, the one in February.

A Okay.

MR. CARR: That's right.

Q I notice that your Exhibit Number Five today does not -- I'm sorry, extends down into an area which is not shown on your Exhibit Number Five from the last hearing.

A That is true.

Q Why is that?

A I may have prepared this exhibit for -- when I originally prepared this exhibit it may have been for

use in a prospectus for someone to deal, and we don't just commonly show everything.

Q You're referring to what I've marked as BTA Number One, then?

A BTA Number One,

Q May have been part of a prospectus --

A That's right.

Q -- to sell a deal? Would that have been the prospectus to sell the deal that Mr. Nearburg testified about this morning?

A I don't recall.

Q Can you go -- I'm sorry, Mr. Mazzullo, to take you back over this, but can you tell me again whether or not BTA Number One is a net Isopach or a gross Isopach?

A BTA Number One appears to be almost the same map as I'm presenting here today, a gross Isopach map.

Q On BTA Number One in the southeast quarter of Section 24 we have the BTA Lynch No. 1 Well. Can you locate that on your map?

A Yes, I do.

Q And you show 53 feet of gross sands, is that your testimony?

A Those are gross sands.

Q Okay. Where did you obtain that number?

A I obtained that number from correlating

well by well across the Lea-Pennsylvanian Field.

I think I know what you're leading at, 53 feet of gross sand is in connection with a particular genetic unit that I have chosen to map.

It might differ from what BTA might map. I think they may map it as 90-some odd feet of sand, but the particular interval, the particular sand package that I'm looking at relative to all other wells around there is 53 feet thick in that particular well.

Q So I understand you, is it your testimony that the genetic unit which you have selected --

A Uh-huh.

Q -- that sand thickness is the productive interval in the BTA No. 1?

A In that particular -- in this particular well, the well was perforated within the 53 feet that portray over here.

Q So it is your testimony that that particular 53-foot gross interval is the productive interval in the BTA Lynch No. 1.

A That's right.

Q And where did you get that information?

A I got that information from -- from scouting information that was provided to me.

Q Have you reviewed any logs, cross sec-

tions, or anything from the BTA No. 1 Well?

A I've looked at logs. I've looked cross sections, correlated those logs with other logs in the area.

Q Have you performed a log analysis on that well?

A I am not qualified to perform log analyses.

Q All right, let's move over to the west to the BTA No. 2. Can you locate that on the -- on the --

A Yes, I can.

Q -- exhibit in front of you? Okay. Now, on your new Exhibit Number Five you show 36 feet. Again that would be 36 feet of gross sand?

A That's true.

Q And on the Isopach prepared for the hearing back in February you do not show anything.

A These data were not available to me at the time.

Q What data did you review to obtain your number of 36 feet?

A I was provided with logs, I believe, by BTA.

Q Let's move on up into Section 13.

A Uh-huh.

Q The well in the southwest quarter.

A Uh-huh.

Q You show 13 feet?

A That's right.

Q Now is that 13 feet of gross sand?

A That's right.

Q And do you know, or can you testify as to whether or not that 13-foot interval that you've identified is the productive zone in that zone?

A I -- it does not appear to be perforated across that zone, so I would say that it's not productive.

Q And how did that correlate, perhaps you can explain this to me, how does that correlate with the 53 feet of gross sand in the BTA No. 1?

A In what way do you mean, how does that correlate?

Q That's what I'm trying to figure out. You're not sure that is the productive interval, is that correct?

A It does not -- it was not perforated in that well.

Q Okay. Does it constitute the same genetic unit, and I'm referring to the 13 feet in the well in the southwest quarter of Section 13, is that the same genetic unit as the 53 feet which you have mapped in the BTA No. 1?

A That's what I'm saying on the document, on the map.

Q That's what I'm trying to understand, Mr. Mazzullo.

A Yes, exactly.

Q Okay. Let's move on up to Section 13 to the well in the northwest quarter where you have 10 feet --

A Uh-huh.

Q -- mapped. Is it your testimony that that 10-foot interval is the same genetic unit as the BTA No. 1 Well?

A That's what I'm saying.

Q Did that well produce or was it perforated in the interval which you have mapped?

A I don't know whether -- I can't recall whether it was perforated but it does not produce if it was ever perforated, but it was not productive from that particular horizon.

Q Is that well currently producing, Mr. Mazzullo?

A I believe that well has been shut in in the Morrow and is producing up hole, to the best of my knowledge.

Q Do you know whether or not it did ever produce in the Morrow?

A Yes, it did produce in the Morrow.

Q But you don't know whether or not it was from the sands that you have mapped?

A From the reports, the completion reports that were available to me, it was -- it was not productive from that horizon.

Q So what you're saying is that, just so I can understand this, is that you've mapped a gross sand in the well in the northwest quarter of 13 --

A Uh-huh.

Q -- which is not the productive zone in that well.

A That's right.

Q Which is the same genetic unit as the unit that you have mapped for the BTA No. 1.

A That's what I'm saying.

Q Which is in fact producing in that well.

A That's what I'm saying.

Q So we have that -- that sand is productive in the BTA No. 1 --

A Uh-huh.

Q -- and not productive in the well in the northwest quarter of Section 13.

A That's right.

Q And to go back to the well in the south-

west quarter, that is -- the interval which you have mapped is a nonproductive interval in that well.

A To the best of my knowledge.

Q But it is, in your opinion, the same genetic unit as the interval you've mapped in the BTA No. 1 Well.

A Yes.

Q Okay. Let me move on up here to Zone -- I'm sorry, to Section 11, to the well in the northwest quarter.

A Okay.

Q Okay, you show that, and you have BTA Exhibit Number One, which is the old Isopach in front of you, I believe you show that as productive from Zone 11 on your former exhibit.

A That's right.

Q Is that -- is that --

A Not from Zone -- yeah, that's right.

Q Does that continue to be your opinion?

A That's still my opinion, as I've presented on our Exhibit Number Five.

Q And that is the well for which we have the log, is that correct?

A No, that's not the one. It's the one marked 16.

Q Okay. Now, you have 25 feet of gross sand --

A Uh-huh.

Q -- for that well?

A That's right.

Q Is that the same sand unit as the sand which you have mapped in the BTA No. 1?

A As far as I can tell, yes, it is.

Q Is that zone productive in that well?

A Yes, it appears to be.

Q The next well down, the one in the southwest quarter of Section 11 --

A Uh-huh.

Q -- you show 15 feet of gross sand. Is that the zone which you have mapped in the southwest quarter of Section 11 the productive zone in that well?

A That's one of several productive zones in that well.

Q You have that, I believe, colored in red on your BTA Exhibit Number One, indicating that it produced from your Zone No. 11?

A That's right.

Q Is it your opinion that it also produces from other zones?

A It's my opinion that it also produces

from at least Zone No. 7 in addition to Zone No. 11 and it does produce from other smaller zones.

Q And you have not colored those on the log, is that correct?

A Colored what on the log?

Q I'm sorry, I don't want to confuse you. I'm taking you back to your Exhibit Number Three, which is your log.

A Uh-huh.

Q Okay. You've only colored in two productive zones.

A I colored in the two zones that I -- that I show on the Isopach maps.

Q And you have -- you believe, though, so that I can understand your testimony, that there are other productive zones in that well?

A As far as I -- as far as I can tell, there were other zones besides Zones 7 and 11 which were perforated, along with Zones 7 and 11.

Q And where would those be?

A I can't tell you offhand, but the information is readily available next door.

Q Let's go down now, Mr. Mazzullo, and look at Section 25.

A On which map?

Q On either of your Exhibit Five.
A Okay.
Q I'm going to refer you specifically to the Chama 1-L.
A Uh-huh.
Q You show 19 feet of gross sand.
A That's correct.
Q Is that interval the same genetic unit as the productive interval in the BTA well?
A It is.
Q B -- I'm sorry, the BTA No. 1?
A According to my correlations it is.
Q Is that interval in the Chama 1-L productive in that well?
A No, it's not. We're not producing from it right now.
Q Is the well perforated in that interval?
A Not right at the moment.
Q Has it ever been perforated in that interval?
A No, it's never been perforated.
Q Let me refer you now to your -- your new Isopach.

Do you have an opinion as to whether or not the 19 feet of gross sand which you've mapped in the

Chama 1-L is the same interval as the 36 feet of gross sand you've mapped in the Lynch No. 2?

A It appears by my correlation that they are the same genetic unit.

Q Do you know whether or not that unit, that genetic unit is productive in the Lynch No. 2?

A I don't have that information. I don't have any completion information on that well.

Q Mr. Mazzulo, would you look at your new Isopach, Number Five, Exhibit Five, and select for me a well which is productive in the same genetic unit as the BTA No. 1, which you have mapped on here?

Do you understand the question? Was that a little vague?

A I think I've already explained that all the yellow highlighted wells on this map are productive from that horizon.

Q Okay, I'm sorry, Mr. Mazzullo, I missed that.

And you, referring you to Section 14, it's your opinion that the well in the northwest quarter, with 20 feet of gross sand, is productive from the same genetic unit as the BTA No. 1, then.

A That's my belief based on my correlation.

Q Let me take you on down here to the well

in Section 6, it looks like.

A Uh-huh.

Q Which is new to this exhibit. You have that colored in yellow. Are you saying that well is producing from the same gross sand?

A That's what I'm saying.

Q And you found 12 feet of gross sand?

A Uh-huh, yes.

Q Do you have any opinion about net pay in that well?

A About net pay?

Q Uh-huh.

A No, I don't.

Q I notice that that depth, the 12 feet, is significantly -- or I won't use the word, I will simply say is less, to save Mr. Carr an objection, is less than the number of feet of gross sands as you go farther north.

A In that particular well.

Q In that particular well. You show 53 in the BTA No. 1.

A I show 10 and I show 9 in these.

Q Well, what I want to do is bring you back to what you said about your exhibit, which is that these wells which are colored yellow --

A Uh-huh.

Q -- in your opinion are the same genetic unit as the BTA No. 1.

A That's right.

Q Okay. So up here we have 53 feet. We have 20 feet. We have 16 feet. We have 25 feet.

A Uh-huh.

Q And we have 12 feet in the well in Section 6.

A That's right.

Q Do you have an opinion, Mr. Mazzullo, as to whether or not these sands are continuous throughout the area following up from the well in Section 6 through the BTA No. 1 to the well you colored in Section 14 and up into Section 11?

A The red lines indicate that I believe the trend to exist and follow through into the Lea-Penn Field from the well marked 12 feet. It's not -- it's not uncommon in this area, based upon my regional work that I described previously, that that should happen.

Q And that red line goes through the Chama 1-L. It appears to from my copy here.

A The red line merely outlines the -- the trend of the major sand body. It's not intended to imply anything other than that.

Q So you are not implying that this exhibit

shows that that sand body is present or productive in the Chama 1-L?

A I'm not implying that at all.

Q In fact, that -- that sand is not presently producing or has not produced in the Chama well.

A It's never been tested.

Q Let me take you on up now to Sections 13 -- 24, 13, and 12 following -- running north.

A Uh-huh.

Q Your red line goes past the well in the southwest quarter of 13.

A Uh-huh.

Q Past the well in the southeast quarter, up past the well in the southeast quarter of 12.

A Uh-huh.

Q Is the sand that you're referring to, which I'm assuming is the one you have mapped as 53 feet in the BTA No. 1, is that present in any of those wells?

A Yes, it is. I've indicated that the net sand thickness, the gross sand thickness in those wells.

Q Is it productive in any of those?

A As far as I know it has never been produced from those zones. Whether or not it's productive is another question.

Q Do you know whether or not the well in

the southeast quarter of Section 13 is presently producing?

A Producing from what?

Q From anything?

A I believe it's producing from either the Devonian or the Bone Spring formation. It's an oil well now.

Q Do you know whether or not it has ever been productive of gas in the Pennsylvanian?

A I believe it is, but that's on another exhibit that's forthcoming; that information is on an exhibit elsewhere.

Q You don't have that presently in front of you?

A Oh, wait a minute, the structure map. It should be on the structure map.

Yes, it had been productive at one time from a horizon other than Zone 11, or horizons other than Zone 11.

Q In the Pennsylvanian, is that right?

A From the Morrow.

Q Okay, and Zone 11 is what we're talking about as being present in the BTA No. 1.

A That's right.

Q So it's not -- it's not -- was not productive of gas in the same zone as the BTA No. 1.

A As far as I can tell, it wasn't.

Q Even though your red line runs through it.

A The red line is not meant to imply productive trend. It's meant to isolate and to show the trend of the thickest part of the sand unit.

Q Let me have you look now at your Exhibit Number Two, Mr. Mazzullo, which is the structure map.

A Okay.

Q Okay? And that is, as I understand your previous testimony, of your Zone 11.

A No. This is a structure map on top of the Morrow Clastic Zone --

Q Okay.

A -- which is indexed in Exhibit Number Three.

Q So the yellow dots are all Morrow?

A Those are Morrow wells productive of any --

Q Okay.

A -- Morrow horizon.

Q In Section 11, looking at your Exhibit Number Two, you show four Morrow wells?

A That's right.

Q And in Section Number 12 you show three

Morrow wells?

A Uh-huh. That's right. These, again, are wells that either are presently producing or -- and/or had produced at one time and are now either plugged or producing from another horizon.

Q But at one time or another they --

A One time or another they are productive from the Morrow.

Q In Section 13 you show four Morrow wells?

A Uh-huh.

Q In Section 24, the two BTA wells, Nos. 1 and 2.

A That's correct.

Q And you show the Chama 1-L as a Morrow producer in Section 25.

A That's right.

Q I believe you testified, Mr. Mazzullo, that structure is not as important here as stratigraphy?

A Structure is secondary. You need the stratigraphic trap to provide a structural -- or to provide the reservoir so that structure can isolate the hydrocarbons, or could contribute the hydrocarbons.

Without the -- without the stratigraphic trap you have nothing to structure.

Q You've added another well here, a well in Section 5 at the bottom?

A Yes.

Q That was not on your Isopach, was it?

A I believe the -- yes, it was. There.

Q Okay, you show that colored as a Morrow producer --

A That's right.

Q -- on your Exhibit Number Two.

A Right.

Q Okay, and it's not colored in on your Exhibit Number Five.

A It's not productive from that particular horizon --

Q Okay, what --

A -- nor is it productive from the other horizon.

Q What horizon is it productive from?

A I don't know offhand. I'd have to check the completion reports.

But it is productive from somewhere in the Morrow.

Q Is it presently a Morrow producer?

A Yes, that one is. Yes, it is.

Q Do you have any production figures on

that well?

A On that particular well?

Q Yes, sir.

A I believe it's produced in excess of 166,000 MCF of gas as of 1-85.

Q Do you know how old a well it is?

A It was completed, I believe, in early 1981; about -- just prior to the establishment of the Berry North Pool.

Q Let me ask you some -- just briefly, Mr. Mazzullo, you said you'd mapped, you've prepared exhibits and mapped two productive horizons, your 7 and 11?

A That's correct.

Q Do you have an opinion as to how many productive horizons you put in there?

A Oh, you could map, I don't -- I can't give you an exact number, but when you're dealing with -- with sandstone reservoirs of this type that were deposited under the conditions that they were deposited, I've mapped up to 22 different horizons, depending on how you break out your genetic units.

Q Would that be 22 in one well or 22 over this area?

A 22 over the area.

Q And are those -- do you know whether or

not those 22 horizons are present in every well?

A In every well? No, they're not present in every well.

MS. AUBREY: I have no more questions of this witness.

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Mazzullo, on Exhibits numbered Four and Five, the two Isopach maps, the well in Section 25 has a blue triangle around it. What's the significance?

A Oh, yes, that, I can explain that. That was just to call attention to Chama's No. 1-L Federal, just to give a quick idea of where Chama's acreage was.

Q Okay. Now, the -- what was the depositional environment in the Morrow in this area?

A The depositional environments varied vertically through the section. They range anywhere from fluvial, stream-deposited type sands to marginal marine or trans -- what's considered transitional marine environments, estuaries, possibly small deltas, and there are some sandstones towards the top of the reservoir section that were deposited in shallow marine environments.

Q Okay. Was that the type of environment which promotes continuity of reservoirs or discontinuity of

reservoirs?

A Generally in the Morrow the best reservoirs are developed, the best continuous reservoirs are developed in the transitional marine environment, and that's typical whether you're in Eddy County or in Lea County, and the sands that I have indicated here are transitional marine sands.

Q But you've indicated that there are other sands productive as well, and they might be --

A That's right.

Q -- from one of these other --

A They might be, you know, from one of these other types of environments.

Q Okay. Also on these two exhibits you've put some thick sections. Let's take Exhibit Number Five. You've put a thick section in Section 23 in the east half.

A That's right.

Q And what is that based on?

A That's based upon the fact that I see a trend coming in from northwest of that part of Section 23 and a trend coming in from the east. I believe there to be a confluence of two different trends at that point, and through my experience in mapping these types of environments, this type of confluence usually results in this type of depositional build-up.

Q Now, on Exhibit Number Four you've shown a series of highs that runs down from Section 14 on down to Sections 35 and 36.

A Uh-huh.

Q Again, I'm curious about what you based those on.

A Okay. I based that on the presumed depositional environment that I -- that I see from running detailed sample evaluations vertically in well -- separate wellbores and then comparing lithologies across the field.

I believe this to be a type of distributary channel system that's in a marginal marine environment, perhaps a deltaic environment, and I based those trends on the Isopach character, the thickness of the sands, and on the sample descriptions.

Q Back on Exhibit Number Five, I believe you indicated that that Middle Morrow section in the area, and if I understood -- let me clarify this.

You said it accounted for two-thirds of the production in the pool, and I presume you're only talking about the Lea-Pennsylvanian Pool and not any of the others.

A That's correct. I said that Zone 11 is part of the Middle Morrow interval that produces over two-thirds of the gas in the Lea-Penn Field.

Q So there are other zones in the Middle Morrow besides 11.

A Yes, but they are not as substantial as Zone 11. Zone 11 is a major thick sand unit in that area.

MR. STAMETS: Are there other questions of the witness?

He may be excused.

Let's take about a fifteen minute recess.

(Thereupon a recess was taken.)

MR. STAMETS: The hearing will come to order.

Mr. Carr?

MR. CARR: We'll call now Mr. Robert Haas, H-A-A-S.

ROBERT W. HAAS,

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

DIRECT EXAMINATION

BY MR. CARR:

Q Will you state your full name and place

of residence, please?

A Robert W. Haas, Lancaster, Texas, office in downtown Dallas, Texas.

Q Mr. Haas, by whom are you employed?

A Haas Petroleum Engineering Services.

Q And by whom are you employed in this case?

A Chama Petroleum Company.

Q And are you -- have you been employed as a petroleum engineer?

A Yes, I have.

Q And you do consulting work as a petroleum engineer?

A Yes. We -- I consult with a partner under the name Badgewell and Haas.

Q And how do you spell that first name?

A B-A-D-G-E-W-E-L-L.

Q Have you previously testified before this Commission?

A No, I have not.

Q Would you summarize for the Commission your educational background, please?

A I attended the University of Texas at Austin and received a Bachelor of Science, an engineering science degree in 1971, and did two years of graduate work

at Texas A & M University in ocean engineering, Master's program.

Q And following your formal education, would you summarize for the Commission your work experience?

A Went to work for Amoco Production Company in Levelland, Texas; spent a year in that area office doing production engineering work in the Levelland Unit Waterflood Project.

Was transferred to Houston, Texas, where I performed a reservoir engineering study on a field in West Texas.

Was transferred to New Orleans and spent three years in off-shore operations and reservoir engineering groups.

Left Amoco and went to work as a consultant with James A. Lewis Engineering in Dallas for one year, at which time I went into the consulting business on my own and have been consulting for the last five years.

Q Do you belong to any professional associations?

A Society of Petroleum Engineers.

Q Mr. Haas, have you been qualified as an expert witness in petroleum engineering in other jurisdictions?

A In the State of Texas.

Q Have you testified before the Railroad Commission?

A Yes, I have.

Q Are you familiar with what Chama is seeking in this case?

A Yes, I am.

Q Are you familiar with the subject area?

A Yes.

MR. CARR: We tender Mr. Haas as an expert witness in petroleum engineering.

MR. STAMETS: He is considered qualified.

Q Mr. Haas, would you state what Chama asked you to do?

A They asked me to look at the Lea-Penn Field in Lea County, New Mexico, and perform a gas reserve analysis and depletion study of the wells in that field.

Q And when were you contacted by Chama and asked to make this study?

A Oh, approximately three or four weeks ago.

Q In studying the Lea-Penn Pool, what data or information did you review?

A Oh, I reviewed production and pressure data that was obtained from public sources and the available

scout ticket information, State completion, recompletion filings and log information that was provided to me.

Q Did you review drill stem tests?

A Not the tests themselves; the reports on the scout tickets of the drill stem tests.

Q Would you just explain to the Commission how you approached your study?

A Most of the wells in the study area were the wells that are depleted in the Morrow section. A few of the wells still produce at low rates.

We looked at the production and tied that back to volumetric calculations by performing log analysis and to back compute drainage area for each of the wells, and I also used the pressure data to see if there was indications of wells that had come on later in the life of the reservoir experiencing lower pressures or partially depleted sands.

Q Mr. Haas, what conclusions did you reach concerning drainage in the Lea-Penn Pool?

A We determined that the drainage area was 241 acres on the commercially successful wells.

Q And is this an average or a maximum figure or a minimum figure?

A Yes. It's an average figure and since it was based on the actual production from the production to

that individual well, and we did find evidence of lower pressures in some of the offset wells, it probably is a low number because if that production had been attributed to the original wells that were drilled, the drainage areas would have been somewhat larger.

Q You're saying that the drainage area would have been larger if you had had wells that had not also -- were in zones that were depleted?

A It was my conclusion that since there were offset wells that exhibited lower than original pressures, production that subsequently came from those wells might have been reduced in the other wells contributing to a larger drainage area.

Q Did you determine how much gas in place would actually be required to make a commercially successful well in this area?

A Yes. We assumed that it would take 1.8 BCF of gas to make a commercially successful well.

Q And how did you reach this 1.8 BCF figure?

A I assumed the well cost of about $1.5-million and assumed a net revenue lease of 80 percent, and assumed a $3.00 gas price and the requirement that a 2-1/2 return on investment was minimally acceptable.

Q Are these standards which are acceptable

in the industry and in line with what other industry --

A I believe they are.

Q -- people would rely on?

A Yes.

Q And then you took this 1.8 BCF figure and you compared it to the wells in the Lea-Penn Pool.

A Yes, I did.

Q How many of those wells, using this figure, were capable of commercial production?

A I studied 18 wells and 7 of the wells exceeded the 1.8 BCF.

Q Do you have any opinion as to why so few of these wells were in fact commercial successes?

A Well, some of them were drilled into small reservoirs that had limited porosity and permeability.

Others indicated from the early drill stem test information that they had experienced some pressure depletion.

Q Would you identify what has been marked Chama Exhibit Number Six, please?

A This is our report that we were retained by Chama Petroleum Engineering -- I mean Chama Petroleum Company to perform, addressed to William F. Carr, dated June 6, 1985.

Q And does this set forth your conclusions

that you reached based on your study?

A Yes, it does.

Q Mr. Haas, what did you recommend Chama do in terms of further development in the area?

A I recommend, based on our conclusions, that future step out drilling in the Lea-Penn Field area be done on -- initially on 320-acre spacing units to prevent waste.

Q In your opinion would drilling on 160-acre units result in drilling unnecessary wells?

A It appears that it has in the past, yes.

Q Was Exhibit Number Six prepared by you?

A Yes, it was.

MR. CARR: At this time, Mr. Stamets, we would offer into evidence Chama Exhibit Number Six.

MR. STAMETS: Without objection it will be admitted.

MR. CARR: That concludes my direct examination of Mr. Haas.

MR. STAMETS: Are there questions of this witness?

MS. AUBREY: Thank you, sir.

CROSS EXAMINATION

BY MS. AUBREY:

Q Mr. Haas, you've assumed that in order to be a commercially successful well, a well must produce 1.8 BCF, is that correct?

A That's correct.

Q And at what point in time is that assumption made?

A Based on today.

Q Based on today's economics?

A Yes.

Q Are you saying that wells which in the past produced less than 1.8 BCF were commercially unsuccessful at the time they were drilled and completed?

A No.

Q So the 18 wells which you believe are capable of commercial production are wells which would be capable of commercial production if they were drilled today at today's cost.

A I'm sorry, can you restate that?

Q Sure. I believe you said, and correct me if I'm wrong, that there are only 18 wells in the Lea-Penn Pool which are capable of commercial production. Did I get that wrong, Mr. Haas?

A I said that 7 out of the 11, based on this economic assumption at today's criteria, would be commercial.

Q I'm sorry, you looked at 18 wells.

A Yes.

Q So out of those 18 wells we have 7 which would be capable of commercial production if they were drilled today.

A Yes.

Q Which 7 wells are those?

A Those would be the Lea Unit Wells 3, 6, 10, 11, and the National Co-op Refinery Nos. 1 and 2 and the Southwestern Natural Gas No. 2.

MR. CARR: Those are set out on the first three lines of page 3 of Exhibit Six.

MS. AUBREY: Thank you, Mr. Carr.

Q Mr. Haas, do you have before you any drilling and completing information on those wells so that we can tell the Commission how old they are?

A I did not bring that study information with me.

Q On the 11 wells that you've concluded are not capable of commercial production, do you have any data which you can refer to to tell the Commission when those

wells were drilled and completed?

A No, but I think the data is available next door.

Q How many wells are there, Mr. Haas, within the Lea-Penn Pool?

Let me limit that for you, completed in the Morrow.

A Completed to the Morrow? I believe there are 18 wells that are in the Lea-Penn Unit, if you're not including any of the recent wells by Chama or BTA.

Q So which wells did you exclude from your study?

A I looked at -- I have a base map here I can refer to. We looked at the Greathouse, et al, Federal Nos. 1 and 2; Estoril Union Fed 1 and 1-A.

Q What section are those in, please?

A Sections 3, 9, 10.

Then in Section 11 the National Co-op Refining Federals 1 and 2; Marathon Lea Unit 4 and 6.

Q So you looked at all four wells in 11?

A Yes.

Q Okay.

A Marathon Lea Units 5, 7, and 8 in Section 12.

Q Okay.

A Marathon Lea Units 3, 9, 10, and 11 in Section 13.

And Southwest Natural Gas Aztec Federals 1 and 2 and the Grace Whitten Fed in Section 14.

Q So you did not include in your study either the Lynch No. -- BTA Lynch No. 1 or 2?

A No.

Q Or the Chama recompletion of the Shell Federal 1-L?

A No.

Q Why is that?

A Primarily I was looking at the mature data that could give us information on what the drainage areas had been and these were recent completions.

Q Those three wells are the three newest wells in the area, is that correct?

A Yes, I believe so.

Q With the exception of those three wells, can you tell me which of the 18 wells you looked at was the most recently completed?

A Not without checking my notes, no. I would, I believe one of the more recent completions was on Section 14 in 1980. I think there is some reference to some dates here in the text.

Yes, the Grace Petroleum No. 1 Whitten

Federal was drilled in 1980.

Q And you were able to perform drainage calculations on that well?

A Yes.

Q But you've performed no drainage calculations for any of the wells in Section 24 or 25.

A Of most interest in that particular well was the fact that the drill stem test of the Morrow had reported a low initial pressure.

Q And that was the Grace Petroleum Well?

A Yes.

Q Now you concluded, I believe, in Exhibit Number Six that future step out drilling in the Lea-Penn Pool be initially done on 320 acres, is that right?

A Yes.

Q I notice that you've used the word "initially" there. Is that limiting your conclusion to suggest something other than it should always be on 320-acre spacing?

A As I look back at the data here I see in situations where you have low reserve wells that would not be economic today, some wells that have indicated drainage that were drilled late in the life of the reservoir, and believe on today's economics that initially going in with 320 acres would be the prudent thing to do.

At that time you would have more data to examine the character of the sands in the reservoirs on step out drilling and could make a better determination of future spacing.

Q At what time?

A Once additional data is collected.

Q Can you give that to me in terms of years?

A No, I think it would have to be on an examination of the new data as it comes in.

Q And by future step out drilling I assume you mean wells which have not yet been drilled, is that correct?

I just want to be sure we're talking about the same thing. I'm just reading your report here which says "future step out" --

A My comments are strictly related as to reservoir engineering. I'm not sure of the complications of any current spacing conditions.

But, yes, I would say that wells that have been drilled now are as they've been drilled and that future drilling should be on 320 acres.

Q Have you looked at any data for the BTA Lynch No. 1?

A Yes. The log was provided to me and I

glanced at the log.

Q Do you have an opinion as to whether or not that is a commercially -- I'm sorry, a well capable of commercial production?

A I've only seen the log section and have not seen any test information from the well. The log section in comparison to the wells to the north looks very commercial.

Q Have you examined any data on the BTA Lynch No. 2?

A The log section was provided to me but I have not even really looked at that log.

Q So you -- do you have an opinion then --

A I don't have an opinion on No. 2.

Q Do you have an opinion as to whether the Chama 1-L is a commercial well?

A I really -- I have not examined that log.

Q In the examination, whatever examination you've done of the BTA Lynch No. 1, in your opinion to me that it's a commercial well, have you taken into consideration that it's spaced on 160?

A No.

Q Are you aware that it is?

A Yes.

Q Have you made an examination, and I just

want to suggest a couple of sections to you, of the wells in Section 13 and 11, as to whether or not at the time those wells were drilled and completed they were commercially -- they were capable of commercial production?

A No, I have not taken an historic look at economics.

Q Do you know which of the wells in Section 13 are currently producing?

A Not without referring to my notes.

Q Do you know which of the wells in Section 11 are currently producing?

A No. As I recall, there were very few wells left producing in the unit as a whole.

Q Do you mean very few in absolute numbers or very few in terms of the number of wells which have been historically drilled in the section?

A Total drilled.

Q Now, you testified, I believe, that in your opinion wells in the Lea-Penn Pool drain an average of 241 acres, is that correct?

A The commercially successful wells.

Q The commercially successful wells, and that would be the 7 that you have identified.

A Yes.

Q What is the average, and as we discussed

before, those are commercially successful wells based on today's economics?

A Yes.

Q What is the average of the other 11?

A I did not compute an average but it's significantly smaller.

Q Can you give me some idea of how much smaller?

A A rough average would be 120, maybe, maybe half, 120 to 150.

Q Less than 160 acres?

A It may be very close to 160 but it could be less.

Q And I believe you also testified that you have not made at this time an examination of either of the BTA wells in Section 24 or the Chama well in Section 25.

A No, I don't have enough data to determine drainage radiuses.

Q And the most recently drilled well before those three wells was, I believe you stated, drilled in 1980?

A Yes. Well, I said that's the one that I can recall.

Q Okay. In creating this average of 241 acres, Mr. Haas, can you tell me what your high number was

and what your low number was?

A They ranged from 117 acres to 420-something acres.

Q Do you recall for the Commission now which well drained 100 -- of commercially, the wells capable of commercial production, which one drained 117 acres?

A I have some notes I could refer to.

Q That would be great.

A The Southwest Natural Gas No. 2 drained 117.

MR. STAMETS: What's the location of that well?

A That would be towards the center section of Section 14; probably be in the southeast corner of the northwest section of 14.

MR. STAMETS: Thank you.

A And then the Lea Unit No. 11 was on the other end of the spectrum at 423 acres and that is in the -- the southernmost well in Section 13 on this map.

MR. STAMETS: 400 and how many acres?

A 23.

Q Okay, if you have your notes in front of you, maybe we can just go through these 7 wells and --

A Certainly.

Q -- locate them on the map for the Commission --

A Yes.

Q -- and talk about the acreage each of them drained.

A Certainly. The National Co-op Refining No. 1 calculated 209.

Q And where is that located?

A That would be -- that would be in the southwest corner of the north -- excuse me, southeast corner of the northwest section of 11.

MR. STAMETS: That's where again?

A In Section 11, in the southeast corner of the northwest corner.

MR. STAMETS: The acres now?

A 209.

MR. STAMETS: 209. It might be helpful if we'd start out with the section and the quarter quarter and then the drainage.

A Okay, I'll be glad to.

The next well is the Southwestern Natural Gas No. 2 and we just posted that one at 117 acres.

Q That's in Section 14, is that right?

A Yes, that was the first well that we

We've done No. 11.

The Lea Unit No. 3, which is just in Section 13, is just northeast of that 11 well we just posted, and that is 211 acres.

Q So just north of the well which your calculations show drainage 423, the next one up is --

A Yes.

Q -- 213 or 211?

A 211.

In Section 10, no, excuse me, Lea Unit No. 10, which is also in Section 13, and it is northwest of the No. 3 Well that we just posted, and it had 148 acres.

Q And that again is a well capable in your opinion of commercial production?

A Yes, it produced about 5 BCF.

The Lea Unit No. 6, that's in Section 11, and is in the southeast northwest, 293 acres.

Q I'm sorry, I lost that location while you were talking.

A Okay, in the southeast northwest of Section 11.

Q Okay.

MR. STAMETS: I mis-plotted that 209 --

Q Yeah, I've got 209 --

MR. STAMETS: -- in Section 11. Would you tell me where that well is again?

A The --

MR. STAMETS: There was a 209 that you mentioned --

A Okay.

MR. STAMETS: -- and I have it plotted with the southeast of the northwest.

A Okay, that would be northwest of No. 6, in the southeast northwest.

MR. STAMETS: Okay, and the --

MR. CARR: Mr. Stamets, I thought this was going to be easier than it' turned out to be and what I have is, I have a copy of his notes --

A The notes here.

MR. CARR: -- here and that might be the simpliest way to handle this, to have all of it before you, and I don't mind, it's marked as Six-A, and I'll be happy to offer that, if that's easier to work with, it's really just --

MS. AUBREY: Mr. Stamets, we only have two more wells to go. Possibly the witness could locate those last two wells for us.

MR. STAMETS: These don't have a section, township, and range on them --

MR. CARR: Okay. All right, I'm sorry, then. I --

MR. STAMETS: We're still lost on two wells, one --

MR. CARR: -- thought it might help there.

MR. STAMETS: -- in the northwest quarter. You gave me two different figures here, 293 and 209.

A May I approach you and show you the map?

MR. STAMETS: Yes.

MS. AUBREY: I'm going to come around and look, too, if I can find it.

A If we may, why don't we just start with the first one and we'll be coordinated on that.

The No. 1 National Co-op Refining I show as this well.

MR. STAMETS: Okay, that's the one that's southeast of the northwest of 11.

A Yes. Southwest Natural Gas No. 2 I show in Section 14 with 117.

MR. STAMETS: Okay.

A The Lea No. 11 in Section 13 with 423.

Lea Unit No. 3, 211.

MR. STAMETS: Okay.

A Lea Unit No. 10 in Section 13, 148.

Lea Unit No. 6 in Section 11, 293.

MR. STAMETS: Okay, that's the one that's in the northwest of the southeast.

A And the last one is National Co-op Refining No. 2 in Section 11, and the acreage is 288.

MR. STAMETS: And that's in the southeast of the southwest.

Q Thank you, Mr. Haas.

A Yes. If it would help I could explain Six-A, the exhibit.

MR. STAMETS: It probably would.

A This is our reservoir data sheet calculated on each of the Morrow completions in the commercially successful --

We performed log analysis on these wells, looked at the pressure gradient to come up with a pressure for each well, and cumulated the reservoir data.

Then on these wells which are either depleted or very close to depletion, posted the reserves at the bottom and from the log calculations and calculations of the recoveries, were then able to back calculate the productive acres, that first item under the reserve subtopic.

Q And you've done that for each of these.

That would be for each of the 7 wells that we've talked about?

A Yes.

Q Do you have an exhibit which shows these calculations for the other 11 wells?

A No, I have those calculations back with the study papers.

Q These are estimates, aren't they, Mr. Haas?

A Oh, yes. Lot os assumptions go into this type of analysis.

Q Who performed the log analysis that you testified about in deriving these numbers?

A I did.

MS. AUBREY: May I have a moment?

MR. STAMETS: Certainly.

Q I may have asked you this question, but do you have any cumulative production figures?

A I posted the cumulative production as of January '85 on these data sheets for the 7 successful wells.

Q That would be in your Exhibit Number Six-A?

A Yes. It would be at the bottom, gas reserve recoverable is the cumulative production for those

wells as of January, 1985.

Q All right, Mr. Haas, I'd like you to look at Section 14. Do you have an exhibit in front of you that has the wells on it?

A Yes.

Q Okay, the well in the northwest quarter, which I believe is the Southwestern Natural Gas No. 2. I believe that well calculated 117 feet drainage.

A Yes.

Q And we have cumulative production of about 2.3 billion.

A Yes.

Q And then the well in Section 13, which I believe is the Lea Unit No. 3 in the southeast quarter of the section.

A Yes.

Q And for that you've calculated 211 --

A Yes.

Q -- feet -- I'm sorry --

A Acres.

Q -- acres, and approximately 3 billion.

A Yes.

Q Can you correlate those numbers for me? Can you correlate those two wells for me?

A How do you mean?

Q We have almost a difference of 100 acres in drainage.

A The recovery factors are identical. The difference in productive acres stems from a larger net pay thickness and smaller reserves in the No. 2 Southwestern Natural Gas Well.

Both those factors contributed to a smaller drainage calculation.

Q Recovery from those two wells is essentially similar, isn't it?

A Yes.

Q Are you assuming any particular shape for this number of acres that these wells are draining?

A No. The acres are just acres.

Q I was just confused that you referred to the word "radius" in your exhibit. You're not -- you're not assuming a circular drainage pattern?

A No, I'm sorry. I should not have used that term.

Q Mr. Haas, do you have enough information about the BTA No. 1, including the assumption that the well is spaced on 160-acre spacing unit, to give us some sort of opinion about how many acres that well will drain?

A No. The only -- the methods used in the report were to know the reserves in the older wells and back

calculate a drainage radius, and the only other method I know of would be to examine pressure build-up information which I do not have.

Q Did you examine any BTA data in preparing your Exhibit Six or preparing your testimony today?

A I glanced at those logs.

Q Anything beyond the logs?

A Did not do any log analysis or review any other information.

Q With regard to the 11 wells which you've described as not capable of commercial production, have you reviewed the production data in terms of volumes produced from those wells to date?

A Yes. We ordered the production data from Dwight's and were provided production decline curves from Chama.

Q For all the wells in the Lea-Penn Unit?

A The 18 studied.

Q Let me refer you to the well in the southwest quarter of Section 12. I believe that is not one of your 7 commercial producers, is that right?

A I believe you're right. The Marathon Lea Unit No. 7?

Q That's correct.

A No, it is not.

Q Now, I'm sorry, No. 5, the No. 5, southwest quarter of Section 11.

A I have it in the southeast.

Q Mr. Haas, it is the 7.

A The 7.

Q Yes.

A Yes. No, I did not have it listed as one of the commercially successful wells.

Q If that well in fact was drilled in 1962 and in fact produced 1.3 billion, do you have an opinion as to whether or not that's a commercial well?

A Was it a commercial well? I do not. I think I previously testified I did not take an historical look at the commercial success of the older wells.

Q Your cutoff point, as I recall, was 1.8.

A Yes.

Q And you cannot form an opinion for the Commission today about a well drilled 23 years ago, which produced 1.3, and tell the Commission whether or not that was a commercial well?

A Not with the information I have.

Q Did you take any production besides gas into consideration in coming to your opinion? Did you consider condensate?

A The calculation of economic well was bas-

ically very simple and I assumed that the condensate would offset operating costs, as a basic assumption.

Q So you assigned no value to the condensate production from these wells.

A Right.

Q Are you aware of the condensate production from the Lea-Penn Pool in terms of barrels? Do you know how much that is?

A I don't recall the numbers offhand. That information was available to me in the study.

Q If a well in fact produced 158,000 barrels of oil, would you consider that only -- it's only value is offsetting operating costs?

A Depend on how -- how many months of production, workovers, that type of thing.

Q Not part of your calculations. So that woud be part of your economic calculations.

A It was not.

Q If you assigned a higher value to the condensate production, would an economic or commercial, as you called it, well then drop, would the number drop from 1.8 billion to something else?

A It could.

MS. AUBREY: I have no more questions.

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Haas, looking at Section 11.

A Yes.

Q You have three wells in there and that's all been drilled on 160 acres. You've got three wells that you would consider commercial.

If that had been drilled on 320 acres, would as much gas have been recovered from that particular section?

A I'll answer as much of that question as I can. It's hard to say, but I do in a section of the report point out, if you'll excuse me a minute to find it, if you'll look on page two, the section under Study?

Q Uh-huh.

A The third paragraph.

Q Okay.

A In the middle of that paragraph, the sentence starting "The Marathon No. 4 Lea Unit --"

Q Okay.

A "-- well was drilled in 1969 and had initial shut-in tubind pressure of 823 psi."

That is in comparison with an average of 4500 psi for the rest of the wells that were to be drilled,

and that includes all 18 that were initially drilled.

So I think that based on that information, that the No. 4 did encounter some sand members that were being drained and I have to assume it was from these three wells that are in a very tight density, in close proximity to the No. 4 Well.

Q Is the Marathon Lea Unit No. 4 the fourth well on that section?

A Yes, it was drilled in 1969 and I know at least two of those wells were drilled in 1961 or 62.

Q Okay, and I believe on conclusion number one you indicated that there were three wells which showed three -- one, two, three -- yes, three wells which showed depleted Morrow sands, and we've already talked about the Marathon Lea Unit No. 4.

What are the locations of the other two wells?

A Okay. Reading on in that same paragraph, the other wells -- the other wells are in Section 14, the Southwestern Natural Gas No. 1 Aztec Well was drilled in 1969. It had an initial shut-in tubing pressure of 1526 psi.

Q Okay.

A And the Grace Petroleum No. 1 Whitten Federal was drilled in 1980, 1980, and the drill stem test

of the Morrow recorded 4104 psi and initial shut-in tubing pressure of 2312.

The other bottom hole pressures that I had that were taken from drill stem tests on wells drilled early in the unit life were up around 6700 to 6900.

Q What's the location of that Grace Well?

A Both those wells are in close proximity.

Q But the other well is just --

A Due east.

Q -- due east, so we've got two wells on 80-acre spacing.

A Yes.

Q And the first one of those was drilled in 1969 and the second one was in 1983.

A Yes, sir.

Q Okay.

A One other thing I might point out is some of the drainage patterns, for instance, the No. 11 Well, 423 acres, if you just assumed a radial pattern, you could come in here and several of the wells that are the better wells and in close proximity, those drainage patterns would overlap significantly. So.

Q Did you not detect any other wells that indicated drainage besides those three?

A Most of the other wells had been drilled

in 1961 or 62 and therefore initial pressures were early in the life of the reservoir.

Q And you don't --

A There may have been one or two other wells, I don't recall, that were drilled late in the life of the reservoir. These three were the only ones that I found that indicated depletion.

MR. STAMETS: Any other questions of this witness?

Mr. Carr?

REDIRECT EXAMINATION

BY MR. CARR:

Q Mr. Haas, was Exhibit Six-A prepared by you?

A Yes.

Q Those are your work sheets for the 7 commercially successful wells?

A Yes.

Q These show your calculations based on assumptions that you made for the wells depicted on each of these sheets?

A That's correct.

MR. CARR: At this time I'd offer into evidence Exhibit Six-A.

MR. STAMETS: It will be admitted.

Any other questions of this witness?

MS. AUBREY: I have no questions.

MR. STAMETS: He may be excused.

MR. CARR: And I would request that he also be excused from the rest of the hearing, if that's all right.

MR. STAMETS: Any objection?

MS. AUBREY: No objection.

MR. STAMETS: He may be excused.

MR. CARR: Could I have just one second and then I'll --

DANIEL S. NUTTER,

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

DIRECT EXAMINATION

BY MR. CARR:

Q Would you state your full name and place

of residence?

A Dan Nutter, Santa Fe, New Mexico.

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

A I'm a consulting petroleum engineer in Santa Fe, and am employed by Chama Petroleum Corporation in this particular case.

Q Mr. Nutter, have you previously testified before this Commission and had your credentials as a petroleum engineer accepted and made a matter of record?

A I have.

Q Are you familiar with the application of Chama in this case?

A I am.

Q Are you familiar with the subject area?

A I am.

MR. CARR: Are the witness' qualifications acceptable?

MR. STAMETS: Yes.

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

A Yes, I have.

Q Would you please refer to what has been marked as Exhibit Number Seven and review this for the Commission, please?

A Yes. Exhibit Number Seven is a tabulation of the status of the Morrow gas pools in southeast New Mexico.

It shows the pool's name, the number of wells, and the spacing that is attributed to that -- that particular pool.

The data is from the Engineering Committee Annual Report, and all of the pools that are listed with the name "Morrow" in their suffix and are producing -- and were producing in the 1984 book are shown here.

Also, there are certain of the older Pennsylvanian pools that I am aware are producing from the Morrow that are included here; however, I caution you that this probably does not include all of the pools that have the suffix Pennsylvanian and are producing from the Morrow, because I didn't go and look a the logs of the wells to see what section of the Pennsylvanian they were producing from.

So there are a few on here that are producing from the Morrow but are designated as being Penn, but as I say, I caution you that this is not a complete of all the Penn pools.

It is a complete list of the Morrow wells.

Now, if we look at page one we see there the Atoka Penn, and it has an asterisk on it, which I'll ex-

plain later.

That is a Penn pool that is producing from the Morrow.

Further down, the Buffalo Valley Penn Pool is a Morrow gas pool. It also has an asterisk.

And the Bell Lake Morrow South Pool in the middle of the page has a double asterisk, which I'll get to in a moment.

All of the pools on page one of this exhibit are producing on 320-acre spacing.

We go to the second page and the first one that's different than the -- than the norm would be the Catclaw Draw Morrow Gas Pool, which has 640-acre spacing but infill drilling has been authorized.

So I'll remind you at this time that these counts of wells are from the book and I believe that those are counts of proration units and not actual wells.

So if you have infill drilling on a proration unit it would count as a one rather than two.

So I believe that where you've got infills, these numbers may be low as far as the wells are concerned but they would be the number of proration units.

Now we've got the Sinta Roja Morrow Gas Pool, 640 acres.

We've got the Dagger Draw Morrow Gas Pool

with two units and 640 acres and the Dos Hermanos Morrow with two units and 640 acres.

Page three, we have the Indian Basin Morrow with 11 units and 640 acres.

We have the Lea-Penn, which is the pool we're concerned with, has six producing wells according to the 1984 statistical report and is on 160-acre spacing.

Page four indicates that the McMillan Morrow is on 640-acre spacing and that's the only one that deviates from the norm; all the rest being 320-acre pools.

Page five, we have the Osudo Morrow North with 10 wells at 640; the Rock Tank Lower and the Rock Tank Upper having 3 wells and 4 wells, respectively, being at 640-acre spacing.

Page six, we have the White City Penn, which is one of those Pennsylvanian pools that produces from the Morrow, and it's got 38 wells, 38 units in it, it's 640-acre spacing but infill drilling has been authorized.

Now page seven, we'll get to an explanation of what those asterisks are.

The pools that show a single asterisk are those pools which special pool rules, including spacing units, have been adopted after hearing, with the spacing based on evidence presented at the hearing.

Now this includes some of the older Mor-

row gas pools that were created prior to 19 -- June the 1st of 1964, and the applicants came in to the Commission -- it was the Commission in those days -- and asked for 320-acre spacing or 640-acre spacing, and they presented evidence showing the drainage of the reservoir to justify the 320-acre or 640-acre spacing.

But all of those with the single asterisk have geological and engineering data in the files to indicate that the drainage was calculated by the Commission to warrant 320-acre spacing.

Now the ones with the double asterisks are those old pools that were created prior to 6-1-64 but which, remain on 160-acre spacing when the statewide rule was changed by Division Order R-2707.

Now, as the Commission is aware, for many of these cases where those old pools were left on 160-acre spacing, it has been the practice to adopt the findings that were in R-2707 for pools in which the operator asked that the Commission change the spacing for the old pool from 160 up to 320, and in the absence of objection, the change from 160 to 320 was more or less automatic, and the applicant didn't even have to appear at the hearing.

This has been done many times and the double asterisks throughout this exhibit indicate those pools where no appearance was made but that the pool changed

from 160 to 320.

The triple asterisk indicates those pools where the application of the spacing rules in the pool is limited to the pool boundaries but not beyond.

Now the normal, of course, in the Commission's policy, is the Commission's policy that the pool rules extend for the pool boundaries plus one mile around the pool.

These pools with triple asterisks are the pools in which those spacing rules do not go beyond the boundary of the pool. They do not include the 100 -- the one mile area.

Now the summary here shows that of the bulk of the wells, there's 1041 wells or units listed on this exhibit, 6 of them in one pool are on 160-acre spacing. This constitutes just slightly more than 1/2 of 1 percent.

933, the bulk of them, are on 320-acre spacing for 89.62 percent and 102 have 640-acre spacing, or 9.8 percent.

Q Would you now go to Chama Exhibit Number Eight and identify this, please?

A Okay. Chama Exhibit Number Eight is a copy from Byram's book. These -- this is the order which is Order No. 6197, R-6197, which limited the effect of the spacing rules for the Lusk Morrow Pool to the boundaries of

that pool.

Now here we had a 640-acre pool and the operators that were outside of the pool wanted to develop their acreage on less than 640 acres, so they came in and asked the Commission to limit the effect of those pool rules to the pool boundaries and not beyond the pool boundaries.

Finding No. 6 says no operator in the Lusk Morrow Gas Pool, nor within one mile thereof, objected to the applicant's proposal, so it was approved.

The pool has since been developed on its 640-acre spacing and the surrounding acreage has been developed on 320.

This order allowed the parties owning the acreage just outside the pool to develop their acreage on 320's rather than 640's.

Q Would you now review Exhibit Number Nine?

A Exhibit Number Nine is an order, being No. R-5829, which relates to one of the pools that has the triple asterisk on it in Exhibit Number Seven, where the McMillan Morrow Gas Pool was a 640-acre spaced pool. The operator outside the pool wanted to develop his acreage on less than 640 acres and he came in and convinced the Commission, as in Finding No. 4, that the productive limits of the McMillan Morrow Gas Pool had been defined by the wells drilled within and immediately outside the presently defined

boundaries.

So he was saying there, we've got this pool and it only extends to the boundaries and there is no reason why the pool rules should extend beyond the boundaries.

So Order No. R-5829 limited the effect of the 640-acre spacing to the pool boundaries and they're defined in the order, and allowed the operators outside the pool to develop on 320.

Now both of those exhibits allowed operators to develop their acreage on a spacing pattern that was less than the pattern prescribed. Those were both 640-acre pools and were permitted to develop outside the pool on 320.

Q Would you now to go Exhibit Number Ten and review this?

A Exhibit Number Ten is a copy of Division Order R-5621. It was entered January 17th, 1978, for the Shugart Pennsylvanian Pool.

Now that pool has been changed. The name is now the Shugart Morrow Pool.

At the time that this order, at the time that the order was entered, the boundaries of the pool were greater than the acreage that's described here in this order. These boundaries right here, the south half of Section 26, the east half of Section 27, and the northeast quarter

of Section 34, were the original boundaries when the pool was created, and those boundaries remained the same for a long time; however, there had been some extensions -- I'll take it back, there hadn't been.

This was the pool boundary at the time that the order was entered. So this limited the application of the pool rules to the boundary and the opposite of those previous two exhibits.

Those previous two exhibits were 640. They wanted to develop on less than that.

Here we had one of the old pools that was 160-acre spacing and had not been changed by Order No. R-2707 when the statewide rules were changed, and it was continued to be developed on 160, but the operators just outside tnat pool wanted to develop their lands on 320, so it's just the opposite of the previous. Here they wanted to go to a larger spacing pattern.

And again we've got that phrase in there, the operator of all wells in the pool waived objection to limiting the application of the present 160-acre spacing rules to the wells inside the pool.

Since then that pool has been expanded considerably. There were a total of 640 acres in the pool, which are the 640 acres defined in order number one of this order, being two half sections and -- no, it would be -- it

would be 700 acres, I guess, be more than 640 acres.

But the pool has been expanded. There's now over 4000 acres in the pool, so the change in the description, or the limitation of the applicability of the pool rules has permitted the development to go around the pool. The entire area that is described in Order No. R-5621 as being where those 160-acre pool rules are limited to, is completely surrounded except on one little 160-acre site by the new pool as it's been expanded.

So we've got a core of 160-acre development in the heart of the pool; all the rest of the pool is on 320.

Q Now, Mr. Nutter, based on your review of Morrow development in southeast New Mexico, what conclusions can you reach?

A Well, the only conclusion that I can reach is that any time that you've got -- you don't have uniform spacing anywhere. There's exceptions of spacing rules all over the state and there's going to be times when spacing patterns of two different sizes come up against each other, and it's either going to be inside of a pool, it's going to be outside of a pool, or it's going to be right at the boundary of a pool, and the general thing has been to try to cover the step outs by making pool rules applicable for a mile outside.

But here we've got pools, we saw on one exhibit that you've got a pool to the southwest of this Lea-Penn which is on 320-acre spacing. We've got a pool to the immediate south of it which is on 320-acre spacing. This development could just as well proceed from the south and come north and we'd have the same problem of 320-acre spacing abutting against 160-acre spacing as to have it occurring just immediately south of the border of the pool right now.

So my conclusion is that it really doesn't make much difference whether we start far away and work towards the pool with a different spacing pattern, or whether you start near the pool and work away.

It's inevitably going to happen when you have two different spacing patterns in a county if there's any continuous development, and the time to face it is when the problem comes up, and I think the problem is here right now.

Q Mr. Nutter, were you present when Mr. Haas testified?

A Yes, I was.

Q Did you hear Mr. Haas testify that only 7 of 18 wells based on his calculations were commercial successes?

A Yes.

Q Do you have any opinion as to if that's true why so many of the wells were drilled?

A Oh, sure. Economics have changed a lot. I don't know if it would take a billion and a half cubic feet or 1.8 billion, I think he said, to drill a well and make a commercial well of it back in 1961 or 62.

The price of gas was a tenth of what it is today, but -- or less, maybe a 20th, but drilling costs were much less, also.

I've always figured that a well in this footage range under today's economic conditions would have to produce about a billion and a half. He used a billion -- 1.8.

But the reason why these wells were drilled was because this was the Lea Devonian Oil Pool and this was our deepest oil pool at the time this pool was discovered, this was the first oil pool in New Mexico that went to 160-acre oil well spacing, and many of these wells were dual completions.

So it was cheap to complete them, so even if they didn't make big reserves, they were profitable because all they had to do was punch some holes in the casing and make dual completions up the annulus.

Q Were Exhibits Seven through Ten compiled under your direction and supervision?

A Yes, they were.

Q Who was the examiner in each of the hearings that resulted in Orders Eight, Nine, and Ten?

A I didn't notice.

Q I thought I'd beat somebody else to that.

A I didn't notice.

Q Who was it?

A Dan Nutter.

MR. CARR: At this time we'd offer Exhibits Seven through Ten.

MR. STAMETS: These exhibits will be admitted.

MR. CARR: That concludes my direct examination of Mr. Nutter.

MS. AUBREY: And with Mr. Carr's clarification in the last question, I have no questions of Mr. Nutter.

MR. STAMETS: We will take a recess till 1:15.

(Thereupon the noon recess was taken.)

MR. STAMETS: Mr. Carr, I presume that that last witness completed your --

MR. CARR: That concludes our

case.

MR. STAMETS: Ms. Aubrey.

MS. AUBREY: I have one witness, Mr. Commissioner.

MARVIN L. ZOLLER,

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

DIRECT EXAMINATION

BY MS. AUBREY:

Q Would you state your name, place of employment, and occupation for the record?

A Marvin Zoller. I'm Chief Operations Geologist for BTA Oil Producers of Midland, Texas.

Q Have you testified previously before this Commission and had your qualifications as a geologist made a matter of record?

A Yes, ma'am.

Q Are you familiar with Chama's application which we are hearing today and BTA's opposition to that application?

A Yes.

MS. AUBREY: Are the witness' qualifications acceptable?

MR. STAMETS: They are.

Q Mr. Zoller, will you explain for the Commission what BTA's acreage position in Section 24 and 25 are?

A We obtained a farmout from Exxon on the southeast quarter of Section 24 and one-half of the southwest quarter of Section 24, and 80 acres in the northeast quarter of Section 25.

Q When did you acquire that acreage?

A Oh, it would have been late 1983 or early 1984.

Q Have you drilled any wells on the acreage which you acquired in Section 24?

A We drilled 100 percent well in the northeast quarter of the southwest quarter -- northwest quarter of the southeast quarter of Section 24, BTA's No. 1 Lynch.

We have drilled a 50 percent well in the northeast of the southwest of Section 24.

And we have not yet drilled a well in Section 25.

Q Have you filed an application for compulsory pooling in connection with the proposed well in Section 25?

A Yes, ma'am.

Q There's been no opposition, as far as you

know on that forced pooling application.

A No.

Q You have not commenced that well?

A No.

Q Mr. Zoller, can you explain for the Commission in BTA's viewpoint how the granting of Chama's application to limit the 160-acre spacing in the Lea-Penn Pool to the pool boundary will affect BTA's correlative rights?

A In the northeast quarter of Section 25 we only own 80 acres and they own 80 acres.

If that were made into a 320-acre unit we would only own a fourth of a well instead of one-half of a well and even you solved it by drilling two wells, you'd take twice the risk in order to end up where you were.

Q On what spacing has BTA developed its acreage in Section 24 and proposes to develop its acreage in Section 25?

A 160-acre spacing.

Q Mr. Zoller, you've prepared certain exhibits for the consideration of the Commission today?

A Yes, ma'am.

Q Let me have you look at what we've marked as your Exhibit Number Two. Can you explain what that exhibit shows?

MR. STAMETS: Do you have a

copy for us?

MS. AUBREY: Oh, I'm sorry.

MR. STAMETS: Mine starts with Three here.

(Thereupon a discussion was had off the record.)

A Exhibit Number Two shows by each well an A, B, C, D, and E legend.

A is the total depth.

B is the completion date.

The C is the perforated interval followed by whatever formation that happened to have been.

D is either that is abandoned today or the cum production, no, the daily production during September of 1984.

And the thing we'll be primarily interested in, E, is the cumulative production for each well from the Morrow through October, 1984.

Now beside almost every well you will find either a red or a yellow number. We will see cross sections that will have the logs numbered, one of them of ten wells shown in red; another cross section by the nine wells shown with the number in yellow.

Q Mr. Zoller, you heard the testimony ear-

lier today by Mr. Haas in support of BTA's application, specifically about the number of economical wells there are in the area we're talking about.

Does the information contained on your Exhibit Number Two permit you to draw any different conclusion about the number of economical wells in the area?

A Well, I can't here draw any different conclusions because, as he so stated, it depends so much on when the wells were drilled and what the price of the commodity was at the time and what the drilling costs were.

I'm sure you could come up with a dozen other interpretations of the same data.

Q Does your Exhibit Number Two, your production map, include as well as natural gas production of condensates --

A Yes, ma'am.

Q -- from the wells in the area?

A I think on -- following each one of the gas figures you'll see a 17 MBO, for instance. That's thousands of barrels of oil which should have been condensate, but it is a condensate figure.

Q Does that, in your opinion does that condensate have a value?

A Well, there are wells there that have produced as much as 158,000 barrels of condensate and in

1961 that surely must have been worth somewhere around $3.00 a barrel. That's 450,000 or 500,000 barrels of condensate. Surely it would have paid more than operation costs.

By the way, if we considered about $27.00 a barrel today, I think it would be much more than operation costs.

Q Does Exhibit Number Two also indicate which of the wells in the Lea-Penn Unit have been plugged and abandoned?

A It does with the slightly longer -- slightly longer slash through the center of the well from the upper right to the lower left. We will see several exhibits later that will highlight much better than that does, and also in the -- under D in the data train you will see that it says abandoned on it, if it has any.

Q And does this exhibit illustrate all the wells which have been drilled to the Morrow in the Lea-Penn zone?

A Yes, ma'am.

Q Let me have you look now at Exhibit Number Three, the structure map. Can you review that for the Commission?

A This is a structure map contoured on the top of the Morrow Clastics. Actually, it, except in the

case of one or two sands, it has very little meaning. Most of the sands are pure stratigraphic traps filled with gas.

There are a couple of sands which, if you move down dip far enough, you will find a bottom water, not to imply it's a water drive, it's just sand is not full of gas.

Other than that, the cross -- the map shows in purple a cross section A-A'; a long red line is cross section B-B'; the long yellow line is cross section C-C'; and hardly visible down in the south part of Section 24, the little two-well cross section between the latest two BTA wells, which is cross section D-D', shown by the red line, also.

Q You heard the testimony this morning from Chama's geologist with regard to the structure map which he had prepared. You've had an opportunity to compare your structure map with his. Do you have any comments on the differences?

A I've seen his map. In fact, I've had a copy of it for two or three months. I think there probably are points on there that we might disagree by as much as 50 feet, but in many cases we agree to the foot, and I have no squabble with his map.

Q In your opinion is structure as important as stratigraphy in determining the limits of the Lea-Penn

Field and the continuity of the sands?

A No, ma'am.

Q Let's turn now to what's marked as Exhibit Number Five, to the cross section A to A'.

Would you like to put that up on the wall, Mr. Zoller?

MS. AUBREY: Mr. Stamets, before we go into Exhibit Number Five, in the Commission's packet there's an exhibit marked Four, which we have only one copy of.

What that exhibit consists of are the logs which will be shown on all the cross sections that we're going to be discussing, cut out so that they can be individually correlated.

You have a packet there marked Exhibit Four which contains sections of all the logs on the cross sections.

MR. STAMETS: Okay.

Q Mr. Zoller, would you look at Exhibit Number Five which you now have up on the wall? Can you locate this cross section on the section map for the Commission?

A A to A' shown by the red line here with A being north, A' being the south.

Q Okay, and the three wells which are shown

on this cross section include the Chama, what is now the Chama L No. 1, is that correct?

A Yes, ma'am. It's the well on the right side of the cross section.

Q Okay, it shows on the cross section as the Shell Federal Well No. 1?

A Right.

Q Okay. The BTA Lynch No. 1.

A It's the center log.

Q And that is the BTA well in the southeast of 24.

A The No. 1 Lynch.

Q Okay, and the last well is which one?

A It's the Marathon No. 11, which is the southernmost well in the Marathon's Lea-Penn Unit.

Q Can you tell the Commission what the various colors on that cross section mean?

A This top flesh color and the pink color are primarily there just for correlation purposes to guide the eye.

This is the top of the Morrow. Most of this is limestone, base of the Atoka, top of the Morrow.

The thing that becomes important down close to where we call the top of the Morrow Clastics, at this point, and from there down the pay zones are sand.

Above there in the wells where we have detailed information, there are a few wells perforated, in most cases they are limestones, not sands.

Down at the bottom you see a green, an orange, a pink, those again are there for correlation purposes, just to be sure that we can get this interval tied down to something we can talk about.

In between there are brown, yellow, purple zones, and even one or two zones that aren't colored anything, and that is the sands and that's the pay zone.

Q Let me refer you to the center well, the Lynch No. 1. Can you look at the exhibit and tell the Commission what the productive zone in that well is?

A In the center, the depth track of each log, if it's a producer it has a zone marked red. That is the perforated interval.

On the righthand side of the log, this being a sonic log, this is the porosity colored in red, which we believe to be -- have gas in it.

This lower porosity, according to all information we have, was wet.

But we perforated the top 14 feet of about a 30-foot zone in that well.

Q Now on the copy of the exhibit which you have there on the wall, there are some red numbers to the

right of each log. Would you explain what those are?

A These are the Isopach figures from Mr. Mazzullo's Isopach map which were told this morning was a gross Isopach map. That's all those are, the figures right straight off his map and put opposite the sand he called it Zone 11, I believe. As far as I can tell Zone 11 is the same thing that we will see all day that's marked yellow on my copy.

Q Okay, so those -- Mr. Mazzullo's Zone 11 is your yellow zone.

A As far as I can determine, that's right.

Q Have you been able to determine what his Zone 7 is in terms of the colors that you have used on your logs?

A I only looked at that one log. I think, I'd rather look at his log later. We'll have to look at it in relation to another cross section.

The one log he showed us is on cross section B-B', and I'll have to get the B-B' to be able to answer that.

Q Okay. Can you, first of all, compare the numbers from Mr. Mazzullo's Isopach which are put on your cross section with the log information on the cross section, and tell us whether or not you have an opinion as to the accuracy of those numbers?

A Well, now that I know that Mr. Mazzullo had a gross Isopach, in order for him to get 53 feet he had to have taken that 53 feet of sand and ignored that 35 feet of sand.

Q Your log shows roughly 90 feet, is that correct?

A We've got a total of about 90 feet of sand in that well.

In the well that they re-entered, it looks to me like the only place he can get 19 feet is to go to that interval that I've just marked in red and if you do that, you're including 19 feet of sand that is completely left out over here in the BTA Well.

Q So the record is clear, Mr. Zoller, you've marked a yellow zone below the 9500-foot mark, is that correct?

A Right.

Q Okay. And going over to the Lea Unit No. 11, would you correlate his 13 feet of sand with the information shown on your cross section.

A I cannot determine how you can get 13 feet of sand out of that and 19 feet out of that.

Q You're comparing for the record --

A Comparing the Marathon No. 11 with the Chama No. 1-L.

Q Now, I may have asked you this, but let me ask you again, what is the productive zone as shown on your cross section in the Lynch No. 1 Well?

A Productive zone is the yellow, the uppermost part of the yellow zone.

Q Let's move over, then, to the Chama well, the Federal "L" No. 1 and can you tell what the productive zone in that well is?

A Well, we haven't been given that figure; however, the purple sand at the time Shell drilled this well flowed at 3.49 million cubic feet of gas per day, plugged back and completed from the Bone Spring, and eventually plugged and was never produced.

I can only assume Chama completed for 800 MCF a day from what I've got colored as the purple now.

Q That well, the Chama Federal "L" No. 1 was not completed in the equivalent of your yellow zone, is that correct?

A No, ma'am. In fact, the sand that they've got in the lower part of the yellow is down dip of what we believe to be wet in our well, so I don't think it will ever be completed.

Q Let's look at the last log on the cross section, the Lea Unit No. 11. Can you tell whether or not that well was productive in the same zone as your Lynch No.

1?

A You'll notice the top part of the yellow sand there is a Number 1. They completed that well there at first. The well made over 17-million cubic feet of gas a day. Two years later it had only made 215-million cubic feet of gas total.

They plugged it back and perforated the top two intervals marked in red, rather thin intervals. From that interval it made nearly 6-billion cubic feet of gas.

In the fall of 1984 they came back, cleaned the well out, and perforated the bottom two intervals, marked Number 3, and have told me that at that time the well was capable of producing 1 to 1-1/2 cubic feet a day but at that time they had not been able to sell the gas.

Q Do you have an opinion as to whether or not the yellow zone shown in the Lea Unit No. 11 correlates with the yellow zone shown in the Lynch No. 1?

A It correlates to be the same age sand but I don't have any opinion that the two are connected, or at least connected through porosity and permeability.

Q The Lea Unit No. 11 was productive in the brown zone?

A Yes, in fact that's where it made nearly all of the gas (not understood).

Q Was that zone productive in the Lynch No. 1?

A It isn't but we did have shows, these little streaks of porosity that I show out on the right here in the brown and the gray zone. We had gas shows in all of those and I do think that they will be productive.

Q Based on the information shown on your cross section A to A', do you have an opinion as to whether or not through that line of cross section the sands are continuous or discontinuous?

A Very much discontinuous.

Q And how many productive zones do you identify in these three wells, potentially productive zones?

A Two in the brown, and the yellow, there's three in that zone, in that well, the No. 11.

We believe the brown and the gray will produce in our No. 1 Lynch, the yellow already does.

I'm assuming that the purple already does in the Chama No. 1-L.

As far as I can tell that's all because we had no shows in the purple zone in our well, even though we are structurally high to them, and the purple zone is shaled out in the Marathon and so we've got at least five.

Q Let's move for the moment to your cross section which is B-B', on to Exhibit Number Six.

All right, you have Exhibit Number Six up on the wall. Can you locate the direction of this cross section for the Commission?

A It's the one on the location plat that's shown with the red line through all the wells either colored purple or circled in purple.

You'll notice at the top of the cross section there's a 1, 2, 3, right straight across for 10 wells. Those same numbers are shown in red over on the location plat so we can go back and forth between the two.

Q Those are not the actual well numbers but are --

A Oh, no.

Q -- numbered as they are numbered on the cross section --

A The way they are on the cross section.

Q Okay. Why don't we begin, Mr. Zoller, so we don't forget to do this with comparing the Mazzullo log, which was Chama Exhibit Number Three, with your cross section B-B'?

A Well, it seems to me that what we were doing on what he was calling Zone Number 11 on the Isopach turns out to be Zone Number 7 on this Exhibit Three that we're --

Q So can you correlate his green zone to

your log?

A Yes. His green zone is now the zone I've got colored still yellow here right below 13,000 feet.

Q Okay, and the zone he calls 11, which is colored blue on his log, what color is that on --

A Well, that's up in what I've got colored the gray zone.

Q Do you have an opinion that those are two distinctly different zones?

A I've got this thing colored like an Easter egg out here. I still believe the correlations, and if my correlations are right, then I can't agree with Exhibit Three.

Q Where would you like to begin, Mr. Zoller, in talking about Exhibit Number Six?

A Well, it seems to me that the main thing that Exhibit Six shows is still the main thing that every other cross section shows, and that is as you go across the field, even those drilled three and four to a section, the pay zone is vastly different in almost every well.

The thing that seems to be different about the Lea-Penn Field, as I see it, is there's a vast number of sands to choose from. You may miss the one you went after, and we have some very firsthand experience at that, but you can find something else, and I think most of

the operators have been pretty successful at that.

We could go through every well but I think it would be kind of boring.

Up in the north end of the field you can see that the gray zone is a pretty consistent zone. It's the only consistent zone in that end and about the best consistent zone there is in the whole field.

But just to point out a direct example here, Well No. 4 produces from the brown and gray -- yeah, brown and gray. You move directly west of it, Well No. 3 produces from the gray but not the brown.

You move directly to the east of it and it produces from the brown but not gray.

It's that way throughout the field. You can just play every kind of game you want to but the exhibit speaks for itself, that we're talking about awfully, awfully erratic sands.

Even in such cases where I've got them colored, you'll see in many cases the sands are awfully thin-bedded or dirty and in a lot of cases the sands are real thick and clean but they're tight, they need porosity.

We've got very firsthand knowledge of that (not understood).

Q There are numbers in red on the copy of Exhibit Six on the wall. Are those once again numbers taken

from Chama's geologist's Isopach map?

A These numbers about the center of the cross section are taken direct from Mr. Mazzulo's map.

This NDE means it was not deep enough and the last log has nothing because his map didn't -- that I had at the time, did not extend, but it likewise is not deep enough.

There's another number at the bottom. That is the cum figure up into October of last of last year of gas and condensate for every well on the cross section.

Q Are you able to correlate the numbers from the Isopach with the information shown, that you prepared, that's shown on Exhibit Six?

A Well, the only -- well, I can't correlate the numbers. I mean it just will almost stretch your mind as to how you can get 16 feet out of this sand right here in yellow in the yellow in the No. 6 Well and go over here and get 18 feet out of all this shaley, dirty stuff in Well No. 4.

I think the most gross error on this one is once again on his map this 25 feet that's shown on Well No. 3, is shown to be a Zone 11 and therefore my yellow zone if you believe the correlation when the well actually produces from the gray zone.

Q So the well is not perforated in Mr. Maz-

zullo's Zone 11 or your yellow zone.

A Right.

Q Let's go over to the righthand side of the cross section and compare Wells No. 9 and 10 with the feet of gross sand which Mr. Mazzullo shows on his exhibit which you placed on here and your logs.

A Well, remember, Well No. 10 is the Marathon No. 11 and it's common to three cross sections. We built this thing kind of like a lean-to house. Every time we came to a hearing we built one more cross section.

So B-B' ends up at Well No. 11. C-C' end up at Well No. 11. A-A' started out at Well No. 11.

So again I couldn't there and I can't here see how you can get 13 feet of gross sand out of that well.

On the other hand, I go right next door to it and here's the Grace No. 1 Whitten which has produced more oil -- more gas than the well it replaced and yet the Whitten has 3 feet of sand and the well it replaced, Well No. 8, has 12 feet of sand.

Now, I see no corollary between the amount of yellow and the amount of production, but that's because the thing we're really interested in is where do we have porous and permeable sands and we don't have anything that tells us that.

Even here, nearly every log we've got is a sonic log. Occasionally we've got a neutron log, and frankly, both are pretty sorry logs for what we're trying to do.

The sonic log was the popular log to run in the sixties. I think it's a very sorry log, really. It's also run a lot today because if you've got any kind of hole problems it's a lot safer to run it in the holes than it is to run a deep density neutron which is a better log.

Q In fact, you ran a sonic log on your Lynch No. 1, is that right?

A We didn't, not really. You know, we've got a neutron log on it. I don't think there's anybody in the room that doesn't know that a neutron log in a gas reservoir is about as useless as anything you run. The very thing you're trying to do, the gas defeats it.

We are dealing with pretty sorry information on the right side of the log which is the porosity side.

Q In terms of identifying the productive sands from well to well, what conclusion can you draw from that, from Exhibit Number Six?

A Well, I'm perfectly happy with identifying the sands just as I have with all the different colors on them. That's the reason I colored up a copy of all the cross sections and cut them all apart so that anybody who

wants to can just sit there and slide those logs all day but I don't believe they're going to change anything I've done any more than a few feet.

Q Do you find that the sands are continuous from well to well based for the most part on 160-acre tracts?

A Not as porous, clean, permeable sands. The zone may be continuous but if it doesn't have permeability and pressure, it doesn't matter. We're not trying to produce gross sand. We're trying to produce gas and oil, and we have nothing that really tells us that except production data and you can see in numerous cases, we have six perforated intervals in Well No. 7. We have not the foggiest idea where the gas is coming from in there.

You can sit there and look and say, well, that's a cleaner sand, that must be it, but we know that that's not necessarily true.

Q Can you look over, then, at Well No. 8, the next well over, in which the same colored sands that you have colored are present, and draw any conclusions about that well?

A Well No. 8 is the only well in the field that all I could find was a top perforation and a bottom perforation. That says that the brown sand has to have a perforation in it and the yellow sand has to have a perfora-

tion in it. I colored it this way because it looks like there is some clean, gray sand that may be perforated. In every other case I found exact perforations that the operator said he perforated in the well.

On the other hand, Well No. 8 has a big, thick purple zone with not a perforation in it. The well has been abandoned, yet the offset wells produced from the purple zone.

Now, I think that tells us that either there wasn't any gas there or the operator didn't think there was and it doesn't cost that much to perforate. If he'd thought there was I believe he'd have tried that.

Q Let's move on to the next cross section, Mr. Zoller, C-C'.

On Exhibit Number Seven Mr. Zoller, would you locate the line of cross section for the Commission?

A Again it's the one highlighted in red and has the red numbers down the cross section, top to bottom, the numbers again being the same numbers that are across the top of the cross section and not the well numbers.

Q And once again that, that cross section ends with the Marathon No. 11?

A Ends with the Marathon No. 11 again.

Q Okay. The red numbers on that exhibit also review what you have previously discussed, the Isopach

map which Mr. Mazzullo has prepared, is that correct?

A That's true, but it needs a little explanation.

On the map I had at the time, I don't know about the one he presented this morning, the Marathon No. 8, Well No. 2, did not have a figure on it and I didn't want to interpret what figure he was trying to contour.

On down to Well No. 6, which is the Lea Unit No. 9, he did not have a figure on the map. He had it contoured as 16 feet.

Well No. 8 he did not have a figure on the map. It had it contoured as 18 feet and I believe his well -- his map today does have 20 feet, so it's not that far off.

Q Once again, Mr. Zoller, looking at your cross section, are you able to correlate the continuity of productive sands from well to well through the line of cross section?

A I correlated zones of sand throughout the cross section but I cannot correlate productive sands from one well to the next in almost every case.

We can go through it well by well, Ms. Aubrey, but it's obvious that Well No. 8 produces from the gray sand; Well No. 7 has a little perforation in the gray but the thickest sand there is the purple.

The next location over, Well No. 6, perforated a bunch of little, old sand zones up here in the brown and the gray and maybe even in the yellow below it. It only made 64-million cubic feet of gas.

Well No. 5 is in the gray, the purple, and maybe even the green. I think maybe that's the only well in the whole field that perforated clear down in this green section. But, obviously, you see that the section cleaned up and they're probably clean sand.

In Well No. 4 a little bit of brown, a little bit of green, nothing else.

Well No. 3 is a dry hole.

Well No. 2, oh, it's got a little up here in a zone that I didn't even color. It's got a little in the brown, a little in the gray.

And Well No. 1 was a dry hole in the Morrow and completed from the Bone Spring.

Q Let's go to Exhibit Number Eight now, Mr. Zoller, which is a D to D' cross section.

D to D' shows two wells, the Lynch No. 1 and the Lynch No. 2.

A Yes, ma'am.

Q Can you correlate the productive sands in those two wells?

A I can correlate the sands but the thing

is the great, big, beautiful sand we found in the Lynch No. 1, which flowed over 6-million cubic feet of gas a day and 660 barrels of condensate, has 25 MCF a day in the Well No. 2.

Again it's the yellow sand; we did perforate it and we, oh, I think at one time had about 100 MCF a day, 25 MCF a day, so we plugged back and perforated some sands above it.

Q Those wells are located on adjoining 160-acre spacing units, is that correct?

A 1320 feet apart.

Again a question mark on the No. 2 is because the well had not been drilled at the time Mr. Mazzullo made his map. He had it contoured as 48. I think in today's map he, I believe I'm right, he has 36, and either figure is acceptable as far as thickness is --

Q And what about the 53 figure shown next to the Lynch No. 1?

A Again it has to be the top portion -- see, we've got a little 3-foot shaley streak down, 2/3rds of the way down, and for reasons I don't know, he chose to put 53 feet, the top 53, and not the bottom 36 feet.

Q The Lynch 1 and 2, which are shown on Exhibit Number 8, D-D', are the southernmost of the wells in the Lea-Penn Pool, with the exception of the Chama recomple-

tion of the old Shell well.

A Yes, ma'am.

Q And are located on adjoining 160's.

A Yes, ma'am.

Q Can you conclude from the information on your exhibit whether or not the productive sand in the Lynch No. 1 Well extends into the Lynch No. 2 Well?

A It extends, but obviously, not as what you would consider a productive sand if it won't make but 25 MCF a day.

Q And these two wells are at the southernmost limit of the Lea-Penn Pool as it's now defined.

A Right.

Q You heard Mr. Haas testify this morning that in his opinion as one stepped out from the boundary to the Lea-Penn Pool, 320-acre spacing is appropriate or correct.

Can you compare that opinion of his with the information that you have derived from the drilling of the Lynch No. 1 and No. 2?

A I don't know how you can call it appropriate when we go through well after well that's on 160-acre spacing and determine that they've got different pay zones. How -- which end of the 320 are you going to drill on and who's to say you won't have to drill on both ends to get the

gas?

That's a matter you don't -- you don't know until after you've drilled the wells and then after that it's a little too late to worry about economics.

Q Do you have an opinion as a geologist, Mr. Zoller, as to whether or not it is appropriate and correct to retain 160-acre spacing within a one-mile of the limits of the Lea-Penn Pool?

A Well, one, I think the exhibits show that it's broken.

Two, we entered into everything we did here knowing that we were going to do this on 160-acre spacing. We abided by the rules that this Commission determined and we hear things today that they've gone to 640, we've got them on 320, we've got them on 160. Now I'm no more convinced that the Commission that made 640 was right than I am the Commission that made 160.

I think it's obvious by what the situation is that what's right is what's right for that area.

I'm familiar with Morrow gas rules that go clear to 1440. I think it was rather ridiculous but you just can't go out without looking at all the information and determine what the right rules are going to be, because, obviously, here we will show many cases where you would have lost -- left an awful lot of gas in the ground if you hadn't

drilled it on 160 acres.

Q Mr. Zoller, let's see if we can do this, that, as you're aware, Chama has asked for 320-acre spacing outside the present limits of the Lea-Penn Pool, and what I would like you to do now with the cross sections that you have going around the room, is to first of all refer to your location plat, identify the section, and the three or four wells in the section, and then create for the Commission either a standup or a laydown 320 and compare the amount of production that would not have been recovered had the wells -- the spacing been based on 320 acres.

A All right.

Q Start with any cross section you like, sir.

A Well, it looks to me like the three sections we've got to deal with in order to prove anything out of this is Sections 11, 12, and 13.

Section 11 has four Morrow wells. Section 12 has three, and Section 13 has three.

So, since I'm standing on this side of the room, let's take Section 11 first and we're talking about -- well, let's don't. It's the wrong cross section.

Let's take Section 12 first, and we're talking about Wells No. 2, 4, and 5.

Wells No. 2 and 4 are on the east side of

the section; Well No. 5 is on the west side.

So let's assume that we're going to divide the section north/south and see what would happen.

Well No. 2 made a million -- a billion and a half.

Well No. 4 made 245 MCF.

Well No. 5 made 1,325,000 plus 54,000 barrels of oil.

Now, obviously, if you had drilled Well No. 4 and 5 you'd have left a bunch of gas in the ground because Well No. 2 made a million and a half plus 85,000 barrels -- a billion and a half, plus 85,000 barrels of condensate.

Q And that would be assuming 320-acre spacing, two wells on the section.

A Right, and you could divide that, since there's only three -- well, if you divide it the other way, you would only drill either Well No. 4 or Well No. 5.

If you drilled Well No. 4 you'd have got 245; you'd have left out Well No. 5, you'd have left 13, 26, a million -- billion-326,000 plus 54,000 barrels of condensate.

While we're here we might as well look at Section 13, which is Wells 6, 7, 8, and 9.

Wells 6 and 8 on the east side of the

section, one of them made 6.8, that's all it made; the other made 3-billion.

Wells Nos. 7 and 9, one of them made 5-billion; the other made 6-billion. One of them made 158,000 barrels of condensate and the other made 107.

If you'd of drilled Well No. 6, you'd have got 64-million, you would have only drilled either 7 or 8, instead of 7 or 9, and you'd have left 5 or 6-billion cubic feet of gas in the ground.

So it's obvious that on 160-acre spacing you've got an awfully erratic deposition of sands and accumulation of gases.

If we go to this cross section B-B', Wells Nos. 3, 4, 5, and 6, all in Section 11 on standard 160-acre spacing.

Well No. 3 made 2.7-billion with 85,000 barrels of condensate.

Well No. 4 only made 719-million plus 7000.

Well No. 5 made 4.4-billion plus 98,000 barrels.

Well No. 6 made 4425 MMCF, 141,000 barrels of condensate.

So obviously you can sit here and divide the section north and south or east and west, and when you

take those figures plus the erratic sands, you're going to leave a lot of gas there.

Q Mr. Zoller, Chama presented an Isopach map through its geologist this morning. Let me see if I can find a copy of that and put it in front of you.

I hand you Chama Exhibit Four to today's hearing and I should be able to find for you --

A That's it.

Q -- the Isopach map from the February hearing, which has been introduced here today as BTA Number One.

A This is Zone 7. Let's have Zone 11 from this morning.

Q You put Chama Exhibit Five and BTA Exhibit Number One up on the wall.

A Yes, ma'am.

Q Would you compare those and comment on them?

A Well, essentially the same map except one of them covers more area than the other. Exhibit Five this morning (not understood.)

I've done some scratching on Exhibit Number One that I thought I might need some information out of.

Number One, here in the northwest quarter of Section 11 is the well I referred to that he gave 25 feet

of sand to, and I don't think it's even the same sand.

The thing that strikes me as so funny about this map is that here is a thick zone of sand coming down the west side, meanders down through Section 23, where it becomes extremely thick. There is not a well on there drilled in the thick part of the sand. The only one that came close is the 25 and that's a different sand in Section 11; you've got 25-foot thickness.

Q Mr. Zoller, let me stop you there. Is that the well that's shown as your Well No. 3 on your B to B' cross --

A Yes, ma'am.

Q -- section?

A If you go over on the east side, he's got another channel or distributer, channel, whatever you want to call it. Again it leads down into a terrifically thick section at the BTA No. 1, which I will venture to guess certainly did not have 53 feet of sand in that area before we drilled a well.

And right north of there is a 20-foot sand and again, there's nothing in the middle of the channel except the BTA well. It wouldn't be in the middle of the channel except it's so thick you almost had to put it in the middle of the channel and (not understood.)

There are wells all over this map. Let's

go to BTA Exhibit Number One and show you better.

The wells that are colored red, of which there are four of them, supposedly produced from what I call the yellow sand and what he's calling the Zone 11. I take exception to one.

The southeast quarter of Section 14 there are two wells. One is the Southern Production No. 1 which has been plugged out and replaced with the Grace Whitten No. 1. He gives the Southern Production 12 feet; he gave the Whitten 3 feet. The Southern Production did produce from the zone and the Whitten is still producing from the zone and neither one of them colored red -- yeah, red on this map.

However, the southwest quarter of Section 13 there's the Marathon No. 11. It not only -- it has produced from two different sets of perforations, capable of producing from a third set of perforations. It has produced from the zone that he's called 11 and I colored yellow, and it's not colored red.

I just don't know what the map is supposed to be telling us. It doesn't tell me anything.

Q Mr. Zoller, the last hearing that you testified in in this matter you testified that you had not made an Isopach and could not make an Isopach. Can you explain that, please?

A Yes, ma'am. I think to make an Isopach map or any other map, you have to put some meaningful figures down on the map. It ought to either be clean sand or it ought to be porous sand. It ought to be porous sand that's got gas in it or even porous sand that's got water in it, but they should be meaningful figures and when you get through you should contour those points and see what you can come up with in the way of a distributary pattern.

I said then that I was incapable of Isopaching these sands and I'll state again, I am incapable of Isopaching these sands, and I think everybody else is, too.

Q Do you have an opinion as to the accuracy of the feet of -- the gross feet of sand that's shown on the Isopach when you compare it to the other information that you have?

A There are wells up there that I can go to the left side of the log, which is the gamma ray, and essentially tells you where the clean sands are.

There are wells up there that I can count the clean sand on the gamma ray side of the log and approach his figures, sometimes exactly.

There are other wells up there that I can count all day and I can't come up with his figure and I couldn't come up with one of my own. There's just too much shale and if it isn't shaley, you look at the other side of

the log and it's tight.

The only thing that matters is where have you got clean, porous sand with gas in it. No one has come close to that yet.

Q Mr. Zoller, the numbers that you have written on the bottom of the logs on the cross sections that are on the wall, are those the cumulative production numbers from BTA's Exhibit Number Two?

A That's cumulative production straight off that exhibit, through October of last year.

Q Mr. Zoller, do you have an opinion as to whether or not the Lea-Penn Pool constitutes a common source of supply?

A As I understand the term common source of supply, it does constitute a common source of supply.

Q And do you have an opinion, sir, as to whether or not the boundary of the Lea-Penn Pool follows the section line between Sections 24 and 25 and Sections 24 and 23?

A I have no reason in the world to think it follows any section line.

Q Do you have an opinion as to whether or not the BTA Nos. 1 and 2 are completed in the Lea-Penn Pool?

A Well, under the term common source of supply, both wells are completed there and one's a good well

and one's not very good.

Q And moving south to the 160 south of the Lynch No. 1, do you have an opinion as to whether that proposed location is within the Lea-Penn Pool?

A The northeast quarter of Section 25? I don't have any reason in the world to think it is. If I didn't think so, I wouldn't have recommended the well.

By the way, at this time, I think I should state, though, that I do not expect the northeast quarter of Section 25 to produce from what I'm calling the yellow sand and Mr. Mazzullo's calling the Zone 11.

Q Do you expect it to produce from a sand which may be present in your well, in your Lynch Well No. 1, but which is not productive in that well?

A Since I can't make an Isopach, I'll come about as close to guessing as you can come.

It is my belief that the northwest -- northeast quarter of Section 25 will produce either from the purple sand or the brown sand, but not the yellow sand. I expect the yellow sand to be wet if it's present.

Q And the purple and brown sands are not productive in the Lynch No. 1.

A The purple canot produce in the Lynch No. 1. The brown is of this where we had shows up the hole. Two of those shows were found in what's colored the brown

sand and I expect it to produce from them.

Q And what does that tell you in terms of an opinion about the continuity of the sands in the Lea-Penn Pool?

A I think it changes every 160 acres and maybe every 80 acres.

Q Will BTA's correlative rights be protected by retaining 160-acre spacing within a mile of the Lea-Penn Pool, even if that pool steps out due to additional information and future production?

A Yes, ma'am.

Q Mr. Zoller, you prepared Exhibits Numbers Two through Eight.

A Yes, ma'am.

MS. AUBREY: Mr. Commissioner, I offer Exhibits Numbers Two through Eight.

MR. STAMETS: These exhibits will be admitted.

What happened to Exhibit Number One?

MS. AUBREY: Exhibit Number one, Mr. Stamets, is the Chama Isopach map from the February 27th hearing, forced pooling hearing, and we have marked it as BTA's Exhibit Number One.

MR. STAMETS: And you've made

no changes on that exhibit except to put the Exhibit One stamp on it?

I don't think we want to accept that in this case but we will --

MR. ZOLLER: Mr. Commissioner, we do need to point out that if it is accepted or whether it is or not, that on this exhibit I have put Zone 11, Zone 11, former Zone 11, I've put a lot of lease -- well names, lease names, and well numbers, so there have been additions added here by me but the map itself hasn't been changed.

MR. STAMETS: We will definitely accept that in this case, then.

MR. ZOLLER: Thank you.

MS. AUBREY: I tender the witness for cross examination.

MR. STAMETS: Mr. Carr, I'm going to preempt you and ask Mr. Zoller a few questions.

CROSS EXAMINATION

BY MR. STAMETS:

Q Mr. Zoller, you've got two wells there, the two Lynch wells, and they're really on 40-acre spacing.

Does it appear as though you might be able to drill a well on every 40 acres in this pool and get a different Morrow completion?

A Well, the implication is certainly there. I would hope we don't come to that, but when you see what happened to us and you're as right as you can be, it's the same as 40-acre spacing.

Q On 160-acre spacing, then, you would still have the option if you chose to, if you felt it was of economic benefit, you could go in and drill a second well on that 160 or a third well or a fourth well.

A Well, here's the way I personally look at that. If you take the structure map, and we've got the lease in the southeast quarter of Section 24. Now we've got the thickest, porous, best porosity, of any sand -- any well in that field in this sand or any other sand, I believe.

Now there's absolutely no doubt in my mind that that well is going to make a lot of money whether it drains one acre more than 160 or not. In fact I don't really think it will have to drain 160 to make money.

But I wouldn't even want to move diagonally across, a diagonal 40, and take that same risk again, because you're -- you're cutting your odds pretty thin when you start thinking that it's going to change in every direction as much as it changed when we moved one location west.

Now the reason we moved it where we did for the No. 2 Well, we knew that we had a water problem in the No. 1 Well in the good sand and we wanted to stay just

as high on structure as we could stay, and I believe we came in 17 feet lower, but you know, 17 feet wasn't what ruined us. We got the sand, we didn't have any holes in the rock.

So structure was not what hurt us.

Q If -- if later you came back and you studied the geology and you decided that there was a different channel that lay 1320 feet to the east of your Lynch No. 1 Well, you'd have the ability to go in there and take the risk to drill that well or not.

A If the reward looked like it was great enough, I'm sure somebody will take the risk. That's the whole story of risk.

Q Now, if you look at these cross sections in your exhibits, are we really looking at anything significantly different from most other Morrow pools in the southeast part of New Mexico?

A I was in Roswell for two years back when the Morrow boom first started. I was associated with the Morrow in New Mexico for 17 years after that when I was still with Union Oil Company. We were very active in the play.

I have seen studies of a number of Morrow fields but nowhere near all of them.

I would like to sit here and tell you that they are more erratic here than they were in the fields

that I'm familiar with. I know there were some developed on 320 or maybe even 640. Maybe I've been wrong. Maybe they were just erratic and we didn't have the control to say so.

But I do say this, the thing that's better here than any field that I've studied in the Morrow is that you have such a multitude of choices.

Now, you know, I've (not understood) these things, the productive ones in the gray and the brown, the yellow, the purple, the green, that's five, and one that's not colored is six, but in each of those there might be two or three perforated intervals.

So you're looking at 20 -- 20 possibilities before you drill a well, and I am personally not familiar with another Morrow field which has that opportunity.

Q If the Lea-Pennsylvanian Pool were extended to include the north half of Section 25 and the special rules or pool rules were then limited to the Division boundary of that pool, would BTA continue to have an objection to the application in this case?

A I think I can say without a doubt from anybody at BTA, as long as we get to drill our acreage, which is one more location in the northeast of 25, on 160-acre spacing, and no one is allowed to come in on the south or west sides and get twice the allowable, be allowed to produce twice the gas because they have 320-acre spacing, I

really don't think we care what anybody does, but we hesitate to want to drill on 160-acre spacing, take the same risk as everyone else, and then see someone else come in and be allowed to produce twice as much gas.

Now, one more thing I --

Q Let me follow up on that, if I might. I find that last qualification somewhat difficult to come to grips with in light of your testimony that wells in this area aren't going to drain more than 160 acres.

If that were the case, then how could you be damaged by an offset well producing more gas?

A Well, number one, I have not said that they won't drain more than 160 acres. There's no doubt in my mind if there is enough permeability and porosity, a well will drain 320.

The problem is that a lot of the sands done't extend 320 acres.

Again, to qualify what I said before, if somebody drills the south half of 25 and gets a completely different pay zone than what we've got, we don't care what they do. We consider it to be none of our business.

But if they do get the same zone, then I think until we know that the zones are separated by something we can't see betweenw wellbores, I don't think they should be allowed to drill and produce twice as much gas as

we're allowed to produce.

Q I would point out one thing here, Mr. Zoller, now assuming for a moment that we did something along the lines of such as that.

A Yes, sir.

Q Both the Oil Conservation Division and any interested operator have an opportunity to look at completion of any well outside the boundary of the Lea-Penn Pool and have the opportunity to say, well, that should or should not be the Lea-Pennsylvanian Pool, and seek an order extending the Lea-Pennsylvanian Pool which would then bring the subject well in under 160-acre spacing.

A I see what you mean.

Q Now, would that option then allay your final concerns in this matter?

A I can foresee a circumstance where they could drill in the south half of 25, complete from some zone of the common source of supply that was different from one we're from and we wouldn't care whether that's 320 or not.

Q And I also understand from your testimony that you're convinced that the north half of Section 25 is a legitimate part of the Lea-Pennsylvanian Pool.

A I don't have a reason in the world to think that it isn't.

I don't have any reason to think the

south half isn't but I won't drill under it, and I don't want any interest in it, either.

Q Okay.

MR. STAMETS: Are there other questions of this witness?

MR. CARR: Yes.

MR. STAMETS: Mr. Carr.

CROSS EXAMINATION

BY MR. CARR:

Q Mr. Zoller, and I'll try not to just repeat what we've talked about all day, but let me be sure that I understand that BTA, it is my understanding that BTA has the east half of the northeast quarter of Section 25.

A That's right.

Q And that is the only acreage that you have in this area that is outside of the Lea-Pennsylvanian Pool.

A That's right, sir.

Q And that is the only other development that you now have planned in this area.

A Yes, sir.

Q And you made your plans in this area relying on the fact that you could develop that acreage on 160-acre spacing.

A Yes, sir.

Q Now you've talked about the Lynch No. 1 and No. 2 and you probably testified to this and I just missed it, but one was a very good well, and I believe that's the Lynch No. 1?

A That's right.

Q What did the Lynch No. 2 produce?

A The last test I had on Lynch No. 2, it's making 260 MCF a day plus 16 barrels of condensate plus 13 barrels of water with a tubing pressure of 231.

Q Now if we look at your Exhibit Number Two, if I can find it, and I think the easiest way to identify these wells is probably by the colored numbers beside them.

A Uh-huh, all right, sir.

Q If we go to the well that has the yellow 2 beside it --

A Yes, sir.

Q -- that well was originally drilled to the Devonian, was it not?

A The No. 2, which is the Marathon No. 8? It wasn't, no.

Q And the Morrow is at a depth of 14,693?

A The well with number 2 beside it, which is the Marathon No. 8, -- with a yellow 2, you mean?

Q With a yellow 2 in Section 12.

A The data train right northeast of it there says -- oh, I'm sorry, I'm looking at the perforations. You're right. You're right, I'm sorry.

Q That was a Devonian well.

A Devonian test, completed from the Morrow.

Q Okay, and the same thing would apply to the well that's got the yellow number 4 above it.

A Yes, sir.

Q And also to the number 5.

A Yes, sir.

Q And to the number 6.

A Yes, sir.

Q And to the number 7.

A Yes, sir.

Q And to the number 8.

A Yes, sir.

Q And to the number 9.

A Yes, sir.

Q If we go on the red side, the number 3.

A Okay.

Q Also the number 4.

A Right.

Q Also the number 5.

A Right.

Q Also the number 8.

A Right.

Q And the number 9.

A Right.

Q So that the Devonian was obviously a factor in drilling each of those wells.

A Yes, sir. It failed in a number of them but it was a factor.

Q Okay. Now looking at what would be an economic well in this area, you looked at only Morrow production. You didn't look at Devonian, did you?

A No, no.

Q Now when you put together a cross section, what you're looking at is you're correlating the total sand interval. Is that correct?

A Well, in this case I picked five, six, seven zones that I tried to correlate that I could carry all over the field.

Q Okay, and so we look at the yellow and go well by well, what's you're doing is looking at feet of sand, is that right?

A Yes, sir, just looking at zones, regardless of what's in that zone. In many cases the yellow is nothing in the world except sandy shale but it's still colored yellow. Yes, sir.

Q Do you know what Mr. Mazzullo meant when he said "genetic unit"?

A Oh, yeah. We can -- you can call these genetic units if you want to.

Q You sure you're talking about the same thing?

A No, but it's satisfactory.

Q I gather from your answer to Mr. Stamets' question that it is your opinion this is not a typical Morrow sand?

A What do you mean by typical Morrow sand? The development --

Q I mean to the sand, the pay zone with a number of sand stringers in it.

A Right.

MR. STAMETS: I think I referred to a typical Morrow pool.

MR. CARR: Oh, I'm sorry, then my term is wrong, not Mr. Stamets'.

Q A typical Morrow pool that is where you have a pay zone but you had these stringers within that that appear and disappear. Is this -- this is not the typical one that you encounter in your experience.

A It's not typical for ones I have encountered in my experience and I'm probably talking about, oh,

ten to fifteen, and what did the list have on it, dozens and dozens.

Q But in your experience there were more pay stringers in this one --

A Yeah.

Q -- than what you'd experienced before.

A Yes.

Q I'm not after any industry-wide description.

A You're not getting any, either.

Q Well, I just wanted to be sure.

I think you've looked at section -- a number of sections and said, you know, if we had developed in the pool on either 3-- on 320's, we would have situations where we would have, well, if we look at, say, Section 12, on that one there are three wells.

A Yes, sir.

Q No matter how you cut that, either with standup or laydown 320's, you'd have one unit, spacing unit, would have two wells in it.

You'd either have two in the east half or two in the south half.

A Oh, yeah, that's right. Yes, sir.

Q You'd also have one on 320, if you could have a 320 in the east half or a 320 in the north half.

A How do we do -- how do we -- oh.
Q Well, if you --
A East half, west half, north half, south half, you still have 320.
Q But if you had divided this with laydown units, you'd have the north half of 12 with one well in it.
A Right.
Q Or if you did it with standups, you'd have a west half unit with one well in it.
A That's right.
Q Now, talking about the reserves that would be lost if you only had the two wells, you were assuming that there was no connection between any of these zones, is that correct?
A You'd have to go to each cross section to see which -- what each of these wells is producing from --
Q But for the purpose --
A -- and if they were both in the yellow sand, as an example, they might have drained, as you're trying to imply --
Q Uh-huh.
A -- but on the other hand they might not have, either.
Q But you were assuming that they -- that had not occurred, that they hadn't drained.

A Well, I didn't go into the details to find out. We could cover this room up one more time with paper trying to decide which wells produce from which color sand.

Q I hope we don't.

A Believe me, I do too.

Q And I'm not the guy that colors, but you were assuming, you were saying you would lose these reserves if there wasn't the -- there were not communication. Is that a yes?

A That is a yes, but I will happy to go through it sand by sand.

Q You're also assuming that you weren't encountering a zone that would have suffered any pressure depletion.

A The pressure question doesn't bother me, Mr. Carr. If a man waits ten years to drill his well and he finds out his pressure depleted, that's his own fault. I'm not going to suffer for him.

Should have gone in there and drilled it sooner.

Q But you were assuming that hadn't happened.

A I hadn't really made any assumption at all.

Q All right. All right. Now, if Section 12 had been developed on 320-acre spacing, are you aware of anything that would have precluded the drilling of an additional well, or the third well in that section?

A No, I don't know of anything, reason why you couldn't.

I don't see any case here where anybody did it.

I see one case where Southwest plugged a well out and Grace came in and drilled another well on the same 300 -- on 160 acres, and by the way, has already made more gas than Southwest made before they plugged it.

Q Now, Mr. Zoller, in the northeast quarter of Section 25, what is your proposed well location?

A We've still got it right where we agreed to put it when we were squabbling two months ago and you folks wanted it in the northwest of the northeast and we had it in the northeast of the northeast.

Q So you're 660 off the line between Sections 25 and 24.

A We always have been there. We just moved it over your 80 acres instead of ours.

Q And you're concerned about drainage from a well in the south half of that section?

A Not until I see they get the same thing

there.

Q But you're concerned that might occur?

A Yes, sir, it could.

Q I think you were saying that if a well was, say, drilled in the -- on the south half unit in Section 25 that it would get a double allowable.

A If it, well, it would be allowed to produce twice as much gas if it was on 320-acre spacing as we would on 160, provided the field was prorated, but it doesn't matter to me whether the field is prorated or not.

We don't want somebody sitting down there just because you draw an imaginary line across the section and see him produce twice as much gas you're allowed to.

Q So you're not concerned with prorationing?

A I've said it every way I know, Mr. Carr. As long as we get to do what we want to do and as long as you don't get the opportunity to drain us, we don't care what happens to the south half of 25.

Q And yet your well in the northeast of 25 is as far from the south half as you can be at a standard location, isn't it?

A That's true, but I don't know what the shape of that sand body is. I know one thing, it's not round, like everybody wants to make these drainage radiuses.

MR. CARR: I have nothing further.

MR. STAMETS: Are there any other questions of this witness?

He may be excused.

Does anybody have any closing arguments?

MS. AUBREY: Thank you, Mr. Stamets.

BTA is coming once again opposing Chama's request to change the spacing in the Lea -- in the outer limits of the Lea-Penn Pool.

Once again Chama has failed to show by geologic or engineering data that there is any justification for changing the spacing within a mile of the pool limits.

Once again we see from BTA's geology that the sands in the Lea-Penn Pool and the sands in the extended Lea-Penn Pool are discontinuous, erratic, and homogeneous.

We can see from BTA's geology that the same sands are not productive in adjoining wells, even wells that adjoin one another on 160-acre tracts.

Chama has offered to you no justification for changing the spacing that has been in

existence for twenty-one years other than some suggestion that 320-acre spacing would benefit them or their partners in the term of whatever business deal it was that they made in the acquisition of their acreage.

Once again BTA has shown that BTA read the rules. BTA knew what the area was spaced on. BTA acquired its acreage, drilled its wells, and spent its money in reliance on the rules as they're written, and with an understanding of what those rules meant.

BTA's geology supports the spacing of wells on 160 acres.

Chama's geology does not support spacing wells on 320 acres.

The testimony from BTA's witness has been, and to my recollection the only testimony presented to you today has been, that the Lea-Penn Pool constitutes a common source of supply; that the limits of that pool don't end at the section line; that there is nothing geologically different about Section 25 from Section 24; that from a geological point of view there is no reason to spaced wells in Section 24 on 160's and wells in Section 25 on 320 acres.

It is clear from both BTA and Chama's geologists that we have a number of potentially productive horizons here. Mr. Mazzullo's testimony was up to

twenty-two. I believe that Mr. Zoller said ten or fifteen.

Whichever number you choose, looking at the cross sections you can see that they are numerous and they are not consistent from well to well.

We know from Mr. Haas that one of the best wells in the area by his own calculations has a drainage radius or a drainage area of 117 acres. It's clear that well cannot drain 320 acres and there has been nothing shown you by the applicant to sustain his burden of proof that there is technical justification for altering either the spacing in the Lea-Penn or the Commission's rules providing for a one-mile buffer zone around the Lea-Penn Pool.

Based on the evidence before you, it is BTA's position that the Commission must deny the application and retain the spacing within a mile of the pool on 160 acres.

Thank you.

MR. CARR: May it please the Commission, what Chama is seeking here today is an order that would limit the pool rules to the Lea-Pennsylvanian Gas Pool to the present pool boundary.

We're not talking about subsequent extensions. We're talking about stopping 160-acre development where it is.

It's been stated that we're on-

ly here because of a deal that we cut and how it would benefit our partners. This is simply not true.

We're here because our review shows that development, if it is required on 160, could lead to wasteful practices, the drilling of unnecessary wells, the impairment of correlative rights, and the waste of hydrocarbons, economic and physical waste.

The thrust of this problem is we have an old pool, a pool created June, 1964, or before June of 1964, and therefore it is spaced on 160-acre spacing instead of on 320-acre spacing.

There is, as we showed with our Exhibit One, other development in the area on 320-acre units.

Now Chama acquired this acreage at a time when the spacing in most of this acreage was 320 acres for Pennsylvanian wells, for Morrow wells.

Like BTA they read the rules. Like BTA they were acting in good faith. When they started to develop the acreage they were advised by the Hobbs Office that because of recent development in the Lea-Penn Pool and the extensions which would come thereform, that they would have to come before the Commission and get the problem resolved, and that's what they did. And when they came on for hearing in January of this year, it was at that time they

learned of the extent of the opposition to this by BTA.

BTA has come before you here today and has said that their real concern is the northeast quarter of Section 25. That's where they have 80 acres. They're concerned that if that's developed on 320, they'll have a 25 percent interest in that spacing unit instead of the 50 percent interest they would have if they were participating in a well that was dedicated to 160 acres; i.e., the northeast quarter.

If it would help resolve this dispute, Chama is here today prepared to stipulate that in addition to avoiding those other odd 160's and changing that line you could enter an order that would take in the entire east half of Section 25. That would mean the northeast quarter could be developed on 160 acres. It would mean that the spacing rules for the southeast quarter of that section would be 160 and they could drill at a standard location down there, and we submit that that's the appropriate way to go, not a north half unit, because there is a well already drilled and completed, the well off in the east -- the west half of Section 25.

We're simply going to agree that that is a way the matter can be resolved. BTA is in a position to develop all of its acreage, the only acreage it has in the area, on 160's and then we could go forward and

continue to develop on 320-acre spacing.

Mr. Stamets is concerned here about a common source of supply. What do we have here? We have a Morrow pool. If we look at our Exhibit One, we can see the Lea-Pennsylvanian Pool. If we move south we see Chama's acreage and we come down and we can see the Berry North Morrow Pool on 320-acre spacing.

If we go to our Exhibit Number Five, the Isopach of the 11th Morrow zone, and we take a look at it and compare them one to the other, you can see that this zone as mapped extends down into Section 6 and we in fact have the same Morrow zone. We have a common source of supply. We have part of it on 320; we have part of it on 160. It isn't as if we could stand here and pretend like we're going to be pure in the abstract and only have one spacing. We already have a problem. We have one common source of supply and two spacing patterns.

We submit the question isn't whether or not part should be on one or the other, because we already crossed that; we've got both spacings.

The question is where should the line be drawn. We submit you can draw the line and you can take in the northwest of Section 10. You can draw it and you can take in the southwest of Section 14, and as far as Chama is concerned, you can draw that line and you can take

in the east half of Section 25, and we submit when you do that there is no longer a dispute before you, at least not based on the kinds of arguments that have been presented to you here today.

We've had a lot of testimony. We've had Mr. Zoller admit that he's really not competent to do an Isopachous map of these zones, and I'm not trying to cast any aspersion or doubt on his qualifications as a geologist because I have none, but we also have a geologist who has published, who has worked on this and who has Isopached this, and we submit we have competent testimony before you that has only been challenged by someone who has said they're not capable of doing this themselves.

We submit what we have here is a common source of supply. We have competent data which shows you it's already spaced on two different spacing patterns, and all we're asking you to do is to let us come in and develop our acreage on 320 so that we're not up front locked into development on 160, so that if subsequent data requires 160 development down here, we can do it but that we're not required to walk in blind.

We have examples within the Lea-Penn Pool itself up in Section 13, where we have three wells -- up in Section 12, I mean, where we have three wells. No matter how you cut that section if you were on 320's, you'd have one of those -- you'd have one of those

developed with only one well on that tract.

Now if you also look at this and see what might happen, you know, this -- the -- the very north pool could be developed, I suppose, with units in 36. That would be 320 and then we could step out and move up into 25 and eventually close that gap, but the smart thing to do is not to let arbitrary spacing rules dictate how this is developed, but to, when the question comes before you, enter a decision which will solve the problem and I submit we have proposed by adding the east half to the Lea-Penn Pool, the east half of 25, we have given you a way to do that.

Now, Mrs. Aubrey, Miss Aubrey, Ms. Aubrey -- sorry-- is a hard individual to convince you have presented any evidence of merit.

We have presented evidence that shows that a commercial well, as we interpret them, the average drainage in the Lea-Penn Pool was 241 acres, and it would have been larger except certain zones have been drained and there were porosity and permeability problems, and this is a result of a reserve and a depletion study that we had a consulting engineer prepare which is in the record as Exhibit Number Six.

Miss, Ms., Mrs. Aubrey was correct when she stated that one of the wells that was a com-

mercial success had only 117 acres. You can be sure that we don't just base decisions on the worst case. We also have wells in there that drained, based on these calculations, 420 acres.

So we submit that we have shown you that this drainage alone would justify, at least in certain cases, development of 320 acres, and in those cases, 160-acre development impairs correlative rights and causes waste.

There are questions about what is an economic well. We have stated you need 1,800,000 MCF of gas, 1.8 BCF of gas to have a commercial well, and that this isn't generally available based on 160 spacing.

Now, Mr. Zoller admitted that -- or stated that you could use other figures to determine what was commercial, but he didn't do it, and in this record the only thing you have are the figures that you need 1.8 BCF to have a commercial wsell, and again we admit that that's subject to interpretation but we also submit that it is a sound, technical presentation that you can look to in making the determination of what's economic in this area and what is not.

We have a lot of data on economics and some conclusions drawn by BTA but they're also looking at wells by and large that were originally completed

in the Devonian and those were factors, we submit, that lead to the drilling of these wells in the first instance and it wasn't just the economics of the Morrow that resulted in the development which you see in the Lea-Penn Pool.

We think we have a better chance for an economic well with wider spacing and we're asking you to let us do that.

We submit that 160-acre spacing results in waste.

We think that because waste is an integral part of the definition of correlative rights, if you require us to go out and drill unnecessary wells, you're also impairing our opportunity to produce our share of reserves from the acreage which we own.

The Morrow, according to some of the information we've had on the Lea-Penn Pool may be pretty sorry for development on 320-acre units. We submit that it isn't that atypical a situation and that if this is, the area in which we own acreage, is not a typical Morrow formation and is suitable for 320 development, then perhaps the Division should take a look at all Morrow development in southeastern New Mexico.

In summary, our position is that there is only one way you can prevent waste and protect correlative rights; that you can provide for orderely devel-

opment of this area, and the way for you to do that is to grant the application of Chama and we submit that in so doing we have no objection, in fact would endorse, including the east half of 25 within that acreage that would included within the Lea-Penn Pool rules.

MR. STAMETS: Mr. Carr, I don't understand Chama's objection to including the north half of Section 25 in the pool.

MR. CARR: Well, Mr. Stamets, we already have a well, the Chama No. 1-L, in the east half. I'm sorry, in the west half.

If I understood Mr. Zoller's concern, he was concerned there might, you know, might be in the same zone. At least we know what we've got here.

It does seem to me that by going with an east half situation the Chama 1-L can have dedicated to it what -- what is existing there; that he would then be free to go ahead and develop the east half on 160's, one being in the north where they have a well they propose 660. We also are proposing a well and interested in operating that tract if we can get an order in the case that's been here for awhile.

MR. STAMETS: And yet there would not really be any particular problem with the north half being in the Lea-Penn Pool and then Chama drilling a

south half dedicated 320 at any place they want in the south half and they have to drill down there in any event.

MR. CARR: Mr. Stamets, I can't tell you. I'm just guessing, but there are two leases in 25 and it may be communitization of the west half would hold the acreage in the south. That's all I can tell you.

MR. STAMETS: Okay, let's see if the Commission can decide this before you all leave.

(There followed a Commission discussion off the record.)

MR. STAMETS: The Commission will enter an order in this case which will extend the Lea-Pennsylvanian Pool to include the northeast quarter of Section 9, the northwest quarter of Section 10, the southwest quarter of Section 14, and the north half of Section 25, all in Township 20 South, Range 34 East.

The findings in this case will include the fact that at some point those pools which are not on statewide 320-acres will abut against the pools which are on 320, and that some mechanism has to be -- has to deal with this issue.

The finding will also indicate that the Oil Conservation Division has the ability to place wells which are subsequently completed within a mile of the

boundaries in the Lea-Pennsylvanian Pool in such pool if the completion information indicates that they should be in there or to leave them out if the completion so -- information so indicates.

There will be no one-mile buffer on the Lea-Penn Pool. The 160 will apply only within the boundary of such pool as it is defined in this particular period of time.

Does anybody care to write an order that says that; anybody interested in getting this out quick enough, do that or wait on me to write it?

Suit yourself, and since we have rendered a decision in this case, I don't believe we're taking this under adivsement, and I believe the hearing is simply adjourned.

(Hearing concluded.)

C E R T I F I C A T E

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

Sally W. Boyd CSR