STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

17 August 1988

EXAMINER HEARING

IN THE MATTER OF:

Application of Jerome P. McHugh & Associates for amendment to Division Order No. R-6369-B and extension of the horizontal limits of the West Puerto Chiquito-Mancos Oil Pool, Rio Arriba County, New Mexico. CASE 9451

BEFORE: David R. Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division: Robert G. Stovall
Attorney at Law
Legal Counsel to the Division
State Land Office Bldg.
Santa Fe, New Mexico

For the Applicant:

MR. CATANACH: Call Case 9451. Application of Jerome P. McHugh & Associates for amendment to Division Order No. R-6469-B and extension of horizontal limits of the West Puerto Chiquito-Mancos Oil Pool, Rio Arriba County, New Mexico.

This case was heard August 3rd, 1988, and had to be readvertised and are there any additional -- is there any additional evidence or testimony at this time?

There being none, this case will be taken under advisement.

(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 (Commission) 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

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9451, heard by me on August 17 19 81.

David R. Catanach, Examiner
Oil Conservation Division

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ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
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3 August 1988

EXAMINER HEARING

IN THE MATTER OF:

Application of Jerome P. McHugh & Associates for amendment to Division Order No. R-6369-B and extension of the horizontal limits of the West Puerto Chiquito-Mancos Oil Pool, Rio Arriba, County, New Mexico.	CASE 9451

BEFORE: Michael E. Stogner, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Division:	Robert G. Stovall Attorney at Law Legal Counsel to the Division State Land Office Bldg. Santa Fe, New Mexico
For Jerome P. McHugh:	W. Thomas Kellahin Attorney at Law KELLAHIN, KELLAHIN & AUBREY P. O. Box 2265 Santa Fe, New Mexico 87504

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I N D E X

I N D E X Cont'd

I N D E X Cont'd

E X H I B I T S

MR. STOGNER: Call next Case Number 9451.

MR. STOVALL: Application of Jerome P. McHugh and Associates for amendment to Division Order No. R-6369-B and extension of the horizontal limits of the West Puerto Chiquito Mancos Oil Pool, Rio Arriba County, New Mexico.

MR. STOGNER: We'll call for appearances.

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

MR. STOGNER: Additional appearances?

MR. HALL: Scott Hall from the Campbell and Black law firm on behalf of Benson-Montin-Greer Drilling Corporation.

MR. STOGNER: Any other appearances?

MR. BULLER: Galen Buller, Santa Fe Office Montgomery and Andrews on behalf of Mobil Exploration and Producing.

MR. LUND: I'm Kent Lund, appearing on behalf of Amoco in association with New Mexico

counsel.

MR. STOGNER: Okay. Any other appearances?

Are there any opening remarks that any attorneys would like to make at this time before we proceed.

Appearing there isn't none, I guess we'll just proceed with Mr. -- proceed with Mr. Kellahin.

MR. STOVALL: Witnesses, we need to swear in witnesses.

MR. STOGNER: Oh, yeah. All witnesses please stand and be sworn at this time.

(Witnesses sworn.)

MR. KELLAHIN: Mr. Examiner my first witness is Mr. Dick Ullrich. He spells his last name U-L-L-R-I-C-H.

Mr. Ullrich is a consulting geologist retained by the Applicant to make the geologic presentation on behalf of that applicant for this case.

RICHARD L. ULLRICH,

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

DIRECT EXAMINATION

QUESTIONS BY MR. KELLAHIN:

Q Mr. Ullrich, for the record would you please state your name, sir?

A Richard "Dick" Ullrich.

Q You say "Rick" as opposed to --

A Richard, Richard. Dick, Dick.

Q All right. Mr. Ullrich, would you summarize for the examiner what has been your professional education with regards to the subject matter of petroleum geology?

A I've a Bachelor's degree in geology and engineering from the University of New Mexico. I was an engineer with El Paso Natural Gas. I've been a geologist, Senior Geologist, Geologic Manager, Exploration Manager, and I retired as Exploration Manager for Meridian Oil and now I'm a consulting geologist.

I worked and supervised the geological operations for the western part of the United States and particularly the San Juan Basin.

Q Would you describe how many years and what particular range of years you've been involved in studying geology and production in the San Juan Basin?

A For 32 years. I started 32 years ago.

Q When did you retire from your

involvement with Meridian Oil?

A A year and a half ago.

Q And at the point of your retirement what was your position with that company?

A I was Exploration Manager.

Q Subsequent to that time have you continued to the involved in reviewing geology and looking at production in the San Juan Basin?

A Yes. I am concentrating in my consulting on the San Juan Basin and I work for several people in the capacity.

Q And currently where to you reside, sir?

A In Farmington.

Q Would you describe for us with some specificity what is your background of information with regards to Niobrara production or what we generalize to be Mancos production?

A Yes. I started, when I started 32 years ago I had an intimate relationship with it because I was working the Gallup and the Dakota. They were in some of the formative stages of development and so I was out -- I was a geologist out on the wells, pulling the cores, looking at them, and then subsequently through the years I supervised the same operations.

Q As a consultant for the Applicant in

this matter, what were you asked to study, sir?

A I was asked to study the area from the Laguna Colorado, this general area, and to determine if it was a common source of supply, if there was continuity in the geological formations, and to what opinion I had of that.

MR. KELLAHIN: At this point, Mr. Stogner, we tender Mr. Ullrich as an expert geologist.

MR. STOGNER: Mr. Ullrich is so qualified.

Q Mr. Ullrich, throughout the presentation of this case we're going to be discussing particular key wells within the Niobrara formation and within a particular portion or an area just south of the current boundary for the West Puerto Chiquito Mancos Pool. You're obviously familiar with that area?

A Yes, I am.

Q Are you familiar with the geologic information that has been derived by Nassau Resources and Jerome McHugh with regards to the Laguna Colorado Well which is in Section Number 2?

A Yes, I am.

Q And are you also familiar, sir, with McHugh or Nassau Resources Wishing Well, which is in the section immediately to the north of the Laguna Colorado

well?

A Yes, I am.

Q And as we continue on to the north, are you also familiar with the geology surrounding the Amoco wells; in particular the Amoco State CC Well in Section 26?

A Yes.

Q And then at that point we get into what is has been called Mr. Greer's Canada Ojitos Unit. Are you familiar with that unit and the boundary of that unit?

A Yes.

Q Have you examined the geology that's available for certain wells within the unit area itself?

A Yes, I have.

Q The applicant has requested you to determine whether or not you had sufficient geologic information upon which to form an opinion as to whether or not Section 2 in -- that's the subject of this application is in the same common source of supply with the pool designated as the West Puerto Chiquito Mancos Pool, is that not correct?

A That is correct.

Q When we look at the West Puerto Chiquito Mancos Pool, what of those vertical formations are we discussing within that pool?

A The -- are you -- the Gallup Niobrara --

Q Yes, sir.

A Yeah, that --

Q What formations?

A Yes, the -- and again, terminology is what I'm -- the Gallup or Niobrara from the top of the Gallup to the Niobrara from the A zone through C zone is the main point that we're looking at here.

Q And in terms of vocabulary, when we occasionally lapse into talking about the Gallup, we in fact are talking about the Niobrara members of the Mancos formation.

A That is correct.

Q Do you have an opinion about whether or not Section 2 is in the same common source of supply as the West Puerto Chiquito Mancos Pool?

A After my -- and I'd like to state here that I was asked what my opinion was and I was not told what it was. My -- I came to this conclusion as a geologist and with experience and I can very conclusively say yes, that it is in the same common source of supply from geological correlation and from log determination and from the presentations that I will make, I came to this conclusion.

Q Based upon your wealth of experience and your dealing with the Niobrara formation, Mr. Ullrich, did

you have any doubts as to whether or not you had sufficient geologic information to form a basis for your belief and your opinion?

A No, I had the information I needed.

Q There was no doubt in your mind you had sufficient geologic information.

A There was no doubt.

Q And you have concluded, then, that it is in the same common source of supply?

A Yes, I have, definitely.

Q And were you asked to study any other aspects of this particular application from a geologic perspective?

A No.

Q In addition to looking at Section Number 2, have you also looked at the geology for each of the adjoining sections to Section Number 2?

A Yes. I have studied the entire area, not just this. This is a focus but I have studied this whole area, as I have the whole San Juan Basin, but particularly, yes, this area.

Q Do you see any geologic basis upon which to take Section 2, place it into the West Puerto Chiquito Mancos Pool and then treat all other adjoining sections around it differently?

A I see none. They should be all treated the same.

Q Let me turn, sir, to the basis upon which you have reached those conclusions and opinions and ask you to first identify for us what is marked as McHugh Exhibit Number One.

A That's a structure contour map contoured on the top of the Niobrara A marker.

Q When you use the top of the Niobrara A marker, Mr. Ullrich, is that a readily identifiable geologic marker for geologists such as you to then map the structure for the Niobrara A member?

A Yes, I feel like it is.

Q There is no significant disagreement between you and other geologists upon where to pick that marker when you look at logs and correlate logs?

A There could be a few feet or maybe one, but not -- nothing that's of any magnitude.

Q When we look at the display, this is your work product, is it?

A Yes, it is.

Q Before we get into the details of your reasoning and your interpretations of the contour lines on the structure map, let's take a moment and orient the Examiner as to the key wells.

Could you first find, sir, the McHugh Laguna Colorado 2 Well that's the subject of this case?

A Yes.

Q Where is that?

A That's in Section 2, Township 23 North, Range 1 West, and it's at the bottom of cross section A-A' line on the map.

Q All right, just below that well spot, then, is an A' letter?

A Yes. Yes.

Q You have prepared a cross section, a structural cross section?

A I have two cross sections, geologic cross sections.

Q All right, we'll come to those in a moment. Would you give us a roadmap before you go with your cross section and take us from the Laguna Colorado No. 2 Well in Section 2 and show us then the next wells that you have put on your cross section?

A All right, I have two cross sections. You see a dashed line and a solid line. I originally went to try to determine if there was a geological continuity from the Laguna Colorado Well up into the Canada Ojitos Unit. So I went from that well in Section 2 up to the well in Section 14, and I saw without question geological con

tinuity correlation, but out of fairness, I didn't want to leave any points out in between, so I went from the Laguna Colorado to the Wishing Well, to the Amoco State CC, up to the A-14 in 14, and then I went up even into the unit further to determine if there still was continuity, and through all of this, all of the exhibits and all of my examination, I see continuity and geological correlation.

Q Describe for us in some detail, Mr. Ullrich, the information, or the major points from Exhibit Number One, that support your opinion that Section 2 is in fact the same common source of supply as the formation identified in the West Puerto Chiquito Mancos Pool.

A Okay. Structurally it is a very close measure -- notice, Mr. Examiner, on this map for the Laguna Colorado Well, I put a little hole in there and I put the words "crooked hole", because that hole was drilled and that they had deviation problems up to 7-3/4 degrees, I believe, and if you would take and relate that hole back and take the -- the extension of the hole out, you could bring that back 60 to 100 feet, or so, back to a true depth.

I didn't do that. I left the actual depth from the log on there but it still doesn't materially hurt the structure contour map, but you can see if I would, say, take, 80-90 feet off of that, that would

straighten that line out, but still that does not eliminate, or that doesn't do anything damaging to a structure contour because we can see that going up to the well in Section 14, that is fairly close to the same contour level as the well in -- the Wishing Well.

Then it isn't that much further off from the Laguna Colorado Well and if you would put it back to true depth, it would be very close.

So, but even as it is, it is not damaging structurally. You're still on a fairly close structural datum point.

Q Apart from the data examined and utilized by you in constructing the cross sections, have you taken other well information and honored the data points for all of that geologic information and integrated it into your interpretation of the structure?

A I have used all wells, and this map is from the whole area, I have used wells from the whole area but I just concentrated on that every well that went through the Niobrara is on this map. I used this plus, again, the wells, all the wells in the area, not just on this map.

Q When we look at the structural contouring as we move to the east of Section 2 --

A Yes.

Q -- what begins to occur as we move through Section 1?

A We'll notice the contour interval from 900 to 1000 is 100 feet and then from 1000 to 2000 is 1000, so the structure contours go from 100 feet to 1000 feet interval and we are coming up on the outcrop there. The (unclear) are dipping very rapidly and you're coming out to the outcrop, and as you can see, over on the right side, on the east side of the map there, is where the outcrop -- the outcrop follows on the east side of the 700 -- 7000 foot contour.

Q Have you interpreted any structural closures or significant structural features that would cause you to isolate Section 2 from any of the adjoining sections surrounding Section 2?

A No, I have not and I cannot.

Q Is there anything else about Exhibit Number One before we go on to Exhibit Number Two?

A No, I believe that's all.

Q Let me have you describe for us, Mr. Ullrich, how your contouring of the structure in this immediate area compares and ties back in to the West Puerto Chiquito Mancos and the Canada Ojitos Unit?

A That is why I included this next exhibit, which is from the Oil and Gas Fields of the Four

Corners Area, and it's a Benson-Montin-Greer Drilling Company article from that published guide book.

Those contours do tie in. The values used on this map are the same or very close, and this is the question you asked me before, I think it is, there can be a few feet difference according to where your picks are, but I did it independently, I came to this, and it was very close. So I feel like they do tie in very closely.

Q Is this publication a recognized publication by geologists that are practicing in this area and relied upon by geologists in forming opinions about the geology?

A Yes, it is.

Q And have you done so in this case?

A Yes. Well, I've incorporated, I've used it to confirm my work, if you will.

Q And does it confirm your work?

A Yes.

Q All right, sir, let's turn to, then, the first of the two cross sections, which is marked as McHugh Exhibit Number Three.

A All right.

Q Again, so that we are with your analysis, identify for us again the two wells on the cross section.

A All right, this is the original where I said I went from the Laguna Colorado Well in Section 2 up to the Canada Ojitos well in Section 14. You can see, just below the top of the A Zone there, the A-A', there is continuity. You can go across in the sand and from my experience in the Gallup Niobrara interval in the Mancos, I think that this is a very good correlation. You don't have, as I think everyone that has worked with it knows, you can't have exactly sand for sand because of the depositional nature of the -- of the Gallup Niobrara, but on here it shows, if you'll go down on the Canada Ojitos well to the zones that has -- essentially 300 feet, and you go across, you can correlate pretty well the main sand, siltstone, the main pays.

Go down into the zone below it at 6350 and you can even correlate that that shale zone.

Then go down in the zone that is equivalent to the 6400, you can correlate that across very well.

So I think that this shows very conclusively that there is geologic, depositional correlation.

Q It's common among operators and people dealing with the Gavilan Mancos, the West Puerto Chiquito Mancos, to identify the various members, if you will, of the Niobrara by an A, B and C reference.

A That's correct.

Q Can you help us do that with your Exhibit Number Three and in a general way pick for us the A, the B, and the C zones?

A Okay. I did not go entirely on the B and the C zones because I was trying to show correlation in different ways, but the B zone would be approximately on the second line down at 6240 on the Canada Ojitos, and the C zone would be approximately the line above 6400, but this is roughly because I was trying to show more of a correlation in some of these sands, but that is roughly.

Q When you have taken the 2-well cross section, this is a structural cross section that you've utilized here?

A Stratigraphic cross section.

Q This is a stratigraphic cross section.

A It was put on the -- on the top of the structure, yes, but I was correlating the stratigraphic -- I was trying -- I was showing the stratigraphic correlation.

Q Within the stratigraphy for this formation can you as a geologist correlate between the Unit A-14 Well and the Laguna Colorado 2 Well, the A zone in the Niobrara?

A Yes.

Q Can you do that for the -- for the B and

the C zone, as well?

A Yes, I can.

Q When we go to Exhibit Number Four, which is then the 5-well cross section?

A Yes.

Q This is also a stratigraphic cross section?

A Yes.

Q What have you determined from this analysis in terms of the continuity or discontinuity of the various members of the A, B and C formations, if you will, in the Niobrara?

A Well, on this one I wanted to show primarily the -- between the Amoco CC, the Wishing Well, and the Laguna Colorado, starting up in the A zone you can see in that first bracket it correlates very well in the lower part and starting with the Amoco State CC at 64, just above the line there, just above 6550, you can correlate that zone. And then if you go on down you can see correlation very well of all of the sands and the stratigraphy matches very well.

So what I was showing here is that there is continuity from wells within the West Puerto Chiquito Pool to the Laguna Colorado.

Q Can you see any increase, if you will,

between the quality of the continuity between the Amoco CC Well and the Wishing Well as we move farther south?

A I see correlation. I see continuity.

Q Does -- does that -- the quality, if you will, of the continuity, does that diminish as we move south or does it stay the same or does it increase? What does it tell you?

A To me it's the same. It doesn't -- it is exactly the same from this Amoco CC to the Wishing Well, the Laguna Colorado, the formation is the same.

Q And so when we get to the Laguna Colorado we have not lost the formation by the time we get outside of the current boundaries for the West Puerto Chiquito Mancos Pool.

A That is correct, we have not.

Q I will leave the subject matter of drainage to the engineer, Mr. Ullrich, but geologically do you see any discontinuities to such a magnitude that you as a geologist would recommend to your client that they've got to drill wells in this immediate area at denser -- densities closer than 640-acre spacing?

A No, I do not, because, well, we come up again, we've got a township line here and we don't have a township fault, if you will. This is an arbitrary line and the geological information or data does not stop there. It

goes across the township line. And so I see nothing to say that we should drill any more intensively than one well per section at this point.

Q Based upon your geologic study, do you believe that there is a reasonable geologic basis to remove the boundary for the West Puerto Chiquito Mancos Pool and allow, then, the extension of those pool rules to the sections within a mile of that boundary?

A Yes, I do, because as I repeat, that's an arbitrary thing. That's a township line and with proof that we have here that this extends beyond it, yes, that should be changed.

Q And as we move then to the south of Section 2 and look with, specifically at Sections 12, 11 and 10 on your structure map, do you see any geologic feature there, structural feature that would cause you to want to treat any of those sections differently than you are now treating or propose to treat Section 2?

A From all the information in the area I see none.

Q Let me ask you sir, to turn to Exhibit Number Five.

What were you investigating when you studied the information that forms the basis upon which you prepared this structure map?

A This is a structure map on the base of the Greenhorn and what I was trying to determine here if there were some structural features below the Niobrara that would indicate to me that there was some structural change or that there was something that could change my thinking on the Niobrara, and there isn't. There is nothing that would do this.

Now, the Dakota has a lot fewer wells drilled and the intensity of the drilling is shown here by the datum points, and there is nothing to the north until you get a township away, so this is the bulk of the -- or the total Dakota information in this area and so -- but I see nothing here to indicate anything any differently that there's any structural change that would take any continuity out of the structure extending up into the West Puerto Chiquito Field.

Q When we go back to Exhibit Number One, Mr. Ullrich, I believe we've talked specifically about the Laguna Colorado Well No. 2, and you conclude there's a similarity with the Wishing Well geologically. My question is whether or not in more detailed examination of the relationship between the Unit Well A-14 and the Amoco CC Well in 26, whether or not you see any difference to treat the wells in the Unit differently from the wells outside the Unit but within the current boundaries of the West Puerto

Chiquito Mancos Pool?

A No, I think on this whole map, the cross section, rather, I would not treat them any differently because I think because of the continuity of the geological information, the structural and the stratigraphic information, there is nothing to say that there is not continuity there. There is continuity.

MR. KELLAHIN: That concludes my examination of Mr. Ullrich.

We move the introduction of Exhibits One Through Five.

MR. STOGNER: Are there any objections?

Exhibits One through Five will be admitted into evidence.

Mr. Lund, your witness.

MR. LUND: Thank you.

CROSS EXAMINATION

BY MR. LUND:

Q Mr. Ullrich, in studying the geologic continuity of this entire area, did you look at some of the other pools in the area as well, such as Gavilan, East Puerto Chiquito, those pools? Did you examine those?

A Yes. I'm very familiar with those,

yes.

Q So as I understand it, for example, the East Puerto Chiquito Pool is a separate pool from West Puerto Chiquito, is that correct?

A Yes.

Q And it's produced under different rules, is that correct?

A That's what I understand, yes.

Q Are the West Puerto Chiquito and East Puerto Chiquito Pools in the same common source of supply as you've testified today?

A I feel like there is geological continuity there.

Q There is geological continuity between those two pools but yet they're treated differently by the OCD in terms of production and development, isn't that right?

A That's what I understand, yes.

Q What about the Gavilan Pool, is that Gavilan, comparing Gavilan to West Puerto Chiquito, is there geologic continuity to those two pools?

A Yes. The thing is we're talking about geologic continuity. Any place you're going to have there is going to be some reservoir differences but in general there is continuity. You can correlate the formation.

There is geological correlation in this whole general area.

Q Even though there is that geologic correlation, there are separate pools established by the OCD which have different producing rules.

A That's correct.

Q Do you disagree with that?

A All that I'm saying is the geological continuity of the correlation and what I see as -- there's more to it, as you know, than just that, but I'm just speaking for the geological aspect of it.

Q Okay. You cannot depend on well productivity from logs, can you?

A Well, yes, we do as geologists. We make estimates, yes.

Q Now the well productivity on the logs that you presented show different wells. Those wells have different productivity, isn't that right?

A That's correct.

Q And in fact dramatic differences in productivity, isn't that right?

A I'm not sure I understand what you're saying by "dramatic". What is your -- what is your question?

Q Some wells produce quite well. Some wells don't produce well at all.

A Well, of course, (not clearly understood) in the San Juan Basin. Any place in any geological province you that and what determines that, I think, the continuity, I mean how long the well has produced, how it's completed, so there are different factors other than geological factors, that can determine this.

So, yes, there are differences but wherever you go, wherever you drill a well there's a difference.

Q Right, and because of those differences, the productivity is governed by different factors other than just geologic continuity. Correct?

A Well, yes, that's correct.

Q Can we determine if there's a permeability barrier between certain wells in this area that you've studied, just based on log analysis?

A I have not determined -- I could not determine that.

Q You could not or you couldn't do it from log analysis?

A I've looked a lot at what we have and with the information available I could not determine that there is any differences between these wells.

Q Did you try to determine that?

A Oh, yeah. As a geologist we always look

to see what the reservoir characteristics, if there is anything that is outstanding or if there's anything that would be detriment, yes, we always do that as a geologist.

Q But you couldn't find information one way or another as to permeability --

A Not from my investigation, no.

Q Does geologic communication mean -- or excuse me, does geologic continuity mean that a reservoir across an area would be in communication?

A Yes, and this could be from either the correlation of stratigraphy, fractures, whatever, yes, and fractures could be a determining point which is necessary. Fractures are always necessary in the San Juan Basin. If it wasn't for fracturing, fractures, there would be no production or very low production.

So, yes, continuity would be -- I would use that with fracturing in there, to, which I had not brought up previously.

Q Well, that's a good point. You may have a continuous reservoir geologically but you may not have fracturing that would make an area productive, isn't that correct?

A That's true, yes, it could be.

Q And the fracturing, the extent of natural fracturing that there is varies from place to place,

isn't that true?

A Any place in the San Juan Basin that's true.

Q So you're not saying that your testimony, for example, on your A-A', would indicate that all the wells on that A-A' are in communication.

A I'm saying that there's geological correlation on those.

Q But not necessarily communication.

A Well, the implication is, and I -- I would say yes, if just because of the study and because of the geological information, and again, the knowledge in the area, and so forth, yes.

So I'm not again. But if you say absolutely, and I going -- well, you know, you can't, but yes, I'm saying yes. there is, there should be communication.

Q There should be communication among all those wells?

A Well, I will say that there is. There will be testimony coming later to show that.

Q Is Section 36 covered by your -- on the application of McHugh today?

A No. No.

Q It is not?

A No.

Q Is there any reason that Section 36 is excluded? Geologically?

A Well, one of the things about that, you are going -- you are going up on the steeper dip and I am not as favorable when you're coming up on a steeper dip, and I would say that from your 1000 foot contour up your -- I contoured it as 1000 foot intervals, so you can see those little tics in there, how fast that's going from 100 feet to 1000 feet and I do not look at it as favorable when you're coming up on the steeper dip.

Q Is Section 36 geologically continuous to the area you described on your A-A'?

A Correlationwise, yes, it would be, but then your -- just correlation stratigraphically, yes, it would have the same formations, if that's what you're asking, and the same -- same --

Q Forgive me if I'm being dense. Then why is 36 not included?

A Because, personally, when you're coming up on the steeper dip and you -- I don't -- again it could be but I don't think that you're going to get the productivity because of the thinning of the rocks; fracturing, could be getting more fractures, or too much fracturing, and it could be, it could be an area where the fracturing is detrimental because of too much fracturing.

Q And you've included Section 12 in the expansion, is that correct?

A Yeah.

Q Is that the outcrop that you have diagrammed?

A To the east, yes.

Q So 75 percent of Section 12 is basically outcrop?

A Well, half of it, yes.

Q Is 640 acres in Section 12 productive?

A Well, it obviously isn't, but this is a different situation when you're coming on the outcrop.

Q Did you calculate the C zone tops on these wells? In particular I have a question about the five wells that are --

A This is what I said. I did not specifically go, I was trying to show more of a continuity of the sands and it was approximate, but I did not the A zone, I said these are more of a stratigraphic cross section.

Q All right, so you didn't come up with a C zone top.

A Specifically, no, I did not.

Q Thank you. Nothing further.

CROSS EXAMINATION

BY MR. BULLER:

Q A follow-up to Mr. Lund's question.

Does a stratigraphic correlation create reservoir pressure, fluid flow continuity? Is there a correlation between those?

A I don't have that information.

Q Okay, maybe we can save that for the engineer.

A Uh-huh.

Q Is the production, or the production rates in the Niobrara controlled by fractures?

A From my -- Gary may say differently, you know, but in my opinion, in the Niobrara, you have to have fracturing in order to have good production and that fracturing does control the good production.

Q Okay, does the cross section log that you've prepared show the fractures?

A No. Now, you're -- what magnitude of fracturing are you talking about? I'm talking about just the fracturing of the formation. I'm not talking about faulting or something like this, if this is where you're heading.

Q Uh-huh.

A I'm talking about inherent fracturing,

just breaking of the rocks, but I'm not talking -- I'm not saying faulting or major lineaments, L-I-N-E-A-M-E-N-T-S.

Q So your cross section shows stratigraphic similarity and not fracture continuity? Is that correct?

A That's correct.

Q Did you take directional surveys or just inclinational surveys?

A Both.

Q You took both? Are copies available?

A We have them.

MR. JOHNSON: We have them but they're irrelevant right now.

MR. BULLER: We'd like to have copies of those.

MR. KELLAHIN: We haven't brought those with us today.

MR. BULLER: Okay. All right.

Q Mr. Ullrich, would the well tend to deviate in the preferred direction, in your opinion?

A Yes, and Gary could maybe speak to that.

Q Is that a question you think I should probably save for Gary?

A Yeah, right.

Q Okay. Referring to Exhibit One -- oh,

I'm sorry, Exhibit Five that I'm referring to, the line that you have drawn across Sections 3 and 2 near the Laguna Colorado No. 2 Well, indicates 331 feet, is that correct?

A That's correct.

Q Would your opinion or conclusions change if that number was a negative 331 feet?

A A negative 331, I don't see how it could be a -331.

Q Your answer is you don't see how it could be a negative 331 feet?

A Yes.

MR. BULLER: I would like to introduce the log from Laguna Colorado No. 6. It's Mobil Exhibit Number Four, I guess. We've already prenumbered our other three exhibits. Would that be all right?

MR. KELLAHIN: Well, if you have a copy we'll take a look at it and see if there's any objection to it.

MR. BULLER: Yeah. I believe we've only made the one but maybe we could --

MR. STOGNER: Mr. Buller, would you rather wait until you've introduced your witness, or --

MR. BULLER: We could do that if we could bring -- bring him back on to question him on

this exhibit.

MR. KELLAHIN: I'd rather have him finish his cross with this witness and if it requires one of their exhibits to do it, I'm happy to have them make copies and complete their cross examination of my witness now.

MR. STOGNER: If you have no objection, that's all right. Mr. Buller?

MR. BULLER: Well, may be take a few minutes and Xerox the exhibit?

MR. STOGNER: Okay, we'll take about a five minute recess at this point.

(Thereupon a recess was taken.)

MR. STOGNER: Mr. Buller, please continue.

CROSS EXAMINATION CONTINUED

BY MR. BULLER:

Q I'll show you what's been identified as Mobil Exhibit Number Four. Are you familiar with -- I guess maybe I ought to check with Mr. Kellahin on Exhibit Four and --

MR KELLAHIN: Well, I have no

objection to asking the witness questions about Exhibit Number Four, Mr. Stogner.

Q All right. Are you familiar with what we've identified as Mobil Exhibit Number Four?

A Yes, I am.

Q Can you tell me what Exhibit Four is?

A It's a log, Nassau Resources Laguna Colorado 2 No. 6.

Q Have you seen this before?

A Yes, I have. Let me, maybe I could cut across a little bit of conversation here.

While we had the break --

Q Uh-huh.

A -- I looked at my raw data and I have a -331, and then in the process of drafting a map, the minus got left off, so I agree to the -331.

MR. STOGNER: Okay, for -- where is this -331? I mean this kind of data is --

A Okay, this is Exhibit Five. So looking at the, Mr. Examiner, looking at the contours, that would bring the 200 and 300 line, just swing it around, you have to come down here and if you bring the 200 foot contour line around the --

MR. STOGNER: The -200 foot contour line.

A Yes, the -200 contour foot line, (sic), bring it down --

MR. STOGNER: I'll tell you, why don't you go back and explain it to me here as I ask.

A Okay.

MR. STOGNER: You said the -200 contour line, you needed to swing it where?

A Around the well in the southeast of Section 34, southeast of 34 --

MR. STOGNER: Okay.

A -- and bring it to the northeast of the Laguna Colorado in Section 2 and then bring it down, and then you could put a 300-foot line in and parallel it to that and bring it -- swing it around. That would, essentially correct it.

MR. STOGNER: Now that 300, would that go to the north of the Laguna Colorado 2 or to the south of the Colorado 2?

A Well, it would go to the north as it is. If you -- if you took out the deviation, it probably would come to the south, but seeing as we're going by true values it would have to come to the north of it.

MR. STOGNER: Essentially what we have would be a 200 and a 300-foot contour line taking a swing around the Schmitz --

MR. STOVALL: Mr. Stogner, may I interrupt this proceeding for a moment?

Mr. Kellahin, I would ask you, would you object to having your witness take a colored pen of some sort, perhaps, and mark the exhibits in that way? Would that be --

MR. KELLAHIN: Let me suggest this to you.

If you could go back to Exhibit One, Mr. Ullrich --

A Yes.

MR. KELLAHIN: -- and find the 900-foot contour line, do you see how that one moves around to the north and east of Laguna Colorado?

A Yes.

MR. KELLAHIN: And then comes in close proximity to the Mobil Shipp well --

A Yes.

MR. KELLAHIN: -- is that what you're trying to tell us about the re-contouring for the structure on the base of the Greenhorn, that it will take a similar shape?

A Yes, that is correct, and that actually proves my point more of what I was trying to prove by this map, because there is continuity there at the section, but

yes, that would conform pretty much to the structure contour map on the top of the Niobrara A marker.

MR. STOVALL: And that would be the -200 foot line, if we're doing that way?

A No, sir, if you take the -900 foot line, if you will, on Exhibit One --

MR. STOVALL: All right, Mr. Ullrich, I follow that. Which line on the Greenhorn are we doing that to?

A The -200 where you're swinging it around the well in the southeast of Section 34 and then swinging it to the northeast of the Laguna Colorado Well, and then swinging it around, so that the Laguna Colorado Well would be inside with the up side, the high side of the 200, -200.

Q Okay. I just wanted to make sure I had the right line.

A Right, and then the 300, you'd have to do the same thing; if you wanted to go 300 you'd swing it the same way. So it doesn't change my thinking or it isn't detrimental at all to the -- to the testimony.

MR. LUND: I agree with you it would be helpful if we re-drew the line.

MR. KELLAHIN: All right, let's do that.

Do we have a copy of Exhibit of

Exhibit Five that we haven't scribbled on?

MR. STOGNER: I've scribbled on mine.

A I've got my own pencil if you can read pencil marks.

MR. KELLAHIN: We've got one here, Mr. Examiner.

Let me ask you to take a red pen, Mr. Ullrich, and take Exhibit Number Five, then, and if you'll take your time and re-contour that honoring the -332 number, was it?

A Correct.

MR. KELLAHIN: For clarity in the record, Mr. Examiner, perhaps we could mark Mr. Ullrich's modification of Exhibit Number Five, as Exhibit Five-A, with a red line showing on that exhibit showing the modification by -- of the structural contours when he takes into consideration the corrected value for the -- for the base of the Greenhorn on that structure map.

MR. STOVALL: Mr. Kellahin, I would request for the record purposes primarily that the witness should mark the depths of those two lines to the southern end of those contour lines.

MR. STOGNER: Are there any objections to Exhibit Number Five-A and has everybody had a

chance to take a look at it?

MR. LUND: I have no objection for my client.

MR. BULLER: For clarity in the record could I move for inclusion of Mobil Exhibit Number Four as back-up data for these changes, as well?

MR. STOGNER: Okay, and before we got off on this Exhibit Number Five and Five-A, weren't we -- didn't we have a question on Exhibit Number Four that hasn't been answered yet?

MR. BULLER: Well, I think it's been clarified now.

MR. STOVALL: Let me, if I may again to be sure it's been clarified in the record, do I understand, briefly, that it was your intent, Mr. Buller, to put Exhibit Four-A, or Exhibit Four, a Mobil Exhibit Four, to refute Exhibit Five as originally presented by Mr Ullrich, and Mr. Ullrich has gone back and corrected Exhibit Five to conform to the information in Mobil Exhibit Four?

MR. BULLER. That's correct, and in light of that, it's not really correct that Exhibit Four be admitted; however, since we've had this discussion on the record it might make sense to go ahead and include it as an exhibit.

MR. STOGNER: Okay, if there's no objection, Exhibit Number -- I'm sorry, Mobil Exhibit Number Four will be admitted into evidence.

MR. BULLER: Thank you for clarifying that, Mr. Ullrich.

A Thank you for bringing it to my attention.

Q And once again, the error on Exhibit Five doesn't change your opinions?

A None at all.

Q Have you run any dipmeters in the well and had the data electronically interpreted?

A No. We have run a dipmeter but not had it interpreted.

Q Not the structural interpretation?

A No.

Q Do you know what the rate of flow is on the Laguna Colorado Well?

A I do not.

MR. BULLER: I don't have any other questions.

MR. STOGNER: Mr. Hall, your witness.

MR. HALL: No questions.

MR. STOGNER: Mr. Kellahin,

any rebuttal?

MR. KELLAHIN: No. sir.

MR. STOGNER: Are there any other questions of Mr. Ullrich?

MR. LUND: Real quickly.

MR. STOGNER: Mr. Lund.

RECROSS EXAMINATION

BY MR. LUND:

Q Mr. Ullrich, did you testify that you did not interpret the existence of any faults in this area?

A Rephrase it?

Q In examining this area, did you conclude that there were any faults in this area that would be shown on your Exhibit Number One?

A Subsurface, no.

Q And I'm sorry, I've got to ask you one more question about the exclusion of Section 36.

Was it your testimony that you're using an approximately 950 foot contour to take Section 36 out?

A I cannot answer myself why that was not included. Geologically. I phrased it before, which I'll repeat, that when you're coming up out of the Basin, when you start coming into the steeper dips, I feel like that is detrimental to production, which I think is shown by the

well in the southeast of 36 that has produced only 7200-some barrels of oil since its -- since it was drilled.

I do not personally as a geologist think that on the steep dips of the Basin that there is going -- that it is going to be as productive as when you are down on the flatter line, which it shows the Laguna Colorado, the Wishing Well, the Schmitz, the State CC, and so forth.

So I don't know if I'm answering your question. This is geological, so before you said about, you know, Section 12, personally I don't think as a geologist Section 12 is good, if that's answering your question more specifically.

Q So as a geologist you would exclude Section 1 and Section 12 from the area requested by the application?

A From a geological aspect?

Q Yes.

A Yes, I would.

Q Thank you.

MR. STOVALL: Mr. Examiner, I do have a question of Mr. Ullrich.

CROSS EXAMINATION

BY MR. STOVALL:

Q In regard to, I think it was Mr. Lund that was questioning you before regarding the continuity, stratigraphic continuity and correlation --

A Uh-huh.

Q -- across these sands, and a discussion with respect to the issue of a common source of supply.

Did I understand your testimony correctly that you, based upon the stratigraphic continuity and correlation alone, that you cannot express an opinion as to whether different areas of this formation are within a common source of supply and cannot be operated under similar pool rules?

A Okay. I was trying to stay strictly geologically, which obviously we can't, and I think that the --

Q Well, I'm asking you on that --

A Right.

Q -- geological issue alone.

A Right. Okay, well, with that you have to incorporate the other, and because of the pressure data, which will be -- will come in, that's what confirms that there is continuity. So geologically correlationwise there is and then with the testimony that will be coming up it will show it.

MR. STOGNER: Are there any

other -- further questions of this witness?

Mr. Kellahin?

MR. KELLAHIN: Mr. Examiner, Mr. Lund's raised some questions.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q I want to distinguish some vocabulary on fracturing.

A Uh-huh.

Q When we look at fracturing and faulting, we're looking at two different geologic phenomena, are we not?

A That's correct. You're looking at a lot different intensity.

Q When we look at the issue of faulting, do you see any faulting in this area so that you have sufficient structural displacement of the reservoir to give you permeability or reservoir restrictions or discontinuities between one area and another?

A No, I do not, not in the area of the wells in question, Laguna Colorado, the Wishing Well, the Schmitz, the State CC.

Now, when you go further east, and I have done some surface work, there is some inferred

faulting or fracturing, but it's further to the east. It's up on the outcrop more, and that was -- this is not an outcrop map. This is a subsurface map, so that's why it's not as good, but there is nothing, there is nothing to show at all that there's anything, say, from the 900 or -- yeah, I mean the 1000 foot contour line west. There is nothing to show that, that there's any problem or intensive major fracturing there.

Q Let's go to Mr. Lund's subject about Sections 1 and 12 and whether or not they should be in or out of the West Puerto Chiquito Mancos Pools.

If you'll look at 1 in relation to 2, and let's assume the operator puts a well in Section 1 660 out of the north and west corners of that section, and he's not in the West Puerto Chiquito Mancos Pool. He's drilled on 40 acres. Are we going to have wells in Section 1 at that location that are going to be competing for the same reserves that you find the well in Section 2 producing from?

A Yes. I feel like they would be competing for the same reserves.

Q Can you geologically --

MR. LUND: Is that a drainage -- is that a drainage, engineering type of a question?

MR. KELLAHIN: I thought not,

but I'll try it again.

MR. STOGNER: I don't think so. I think it's a geological question.

Q Geologically do you see any reason to treat those wells completed in correlative intervals any differently?

A No, I do not, but again, I repeat, when you're coming up out of the Basin on the steeper out-thrust or the steeper dip, I believe that because of the more intense fractures, I think it could be detrimental, but geologically, correlationwise, stratigraphically, no, I see no -- no difference and I think it would be from the same common source.

MR. KELLAHIN: Nothing further.

MR. STOGNER: Are there any other questions of this witness?

There being none, he may be excused.

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A My name is Gary J. Johnson and I'm a petroleum engineer employed by Nassau Resources, Incorporated.

Q Describe for the record so there's no further confusion about Nassau Resources and Jerome P. McHugh and Associates. When we talk about the two can we talk about them interchangeably insofar as this case is concerned?

A Yes, they are interchangeable. Nassau Resources is a wholly owned subsidiary of Jerome P. McHugh and it has been set up as his operating entity.

Q By filing the application in the name of Jerome P. McHugh and Associates we have nominated the appropriate applicant, have we not?

A Yes, we have.

Q Some of your exhibits are marked Nassau Resources, and that is the relationship between Nassau Resources and McHugh?

A Yes. As I stated, the company Nassau Resources, is the operating entity that is a wholly owned subsidiary of Mr. McHugh.

Q Have you previously testified before the Oil Conservation Division Examiner for the Commission, Mr. Johnson?

A Yes, I have.

Q Have you previously been involved in the Gavilan Mancos proceedings?

A Yes.

Q And in fact you did some of the engineering work that resulted in the initial Gavilan Mancos hearings on the reduced allowables, did you not?

A Yes, I did.

Q Describe generally what has been your specific involvement as an engineer on behalf of Mr. McHugh with regards to the development of the wells, the Wishing Well and the Laguna Colorado Well.

A I've been involved for Mr. McHugh as the drilling engineer responsible for getting both of these wells drilled and for getting them completed and on production, and involved in the continuing development of this area surrounding the Wishing Well on the Laguna Colorado 2-6.

MR. KELLAHIN: At this time, Mr. Examiner, we tender Mr. Johnson as an expert reservoir engineer.

MR. STOGNER: Are there any

objections?

MR. LUND: No objection.

MR. STOGNER: Mr. Johnson is so qualified.

Q Mr. Johnson, let me, before we direct your attention to the balance of the exhibits in the package book, let me ask you some -- some questions about opinions and the basis upon which you hold those opinions.

First of all, sir, do you believe there is a sufficient basis of information by which you as an engineer can make a study of and reach conclusions about the communication of the Laguna Colorado State Well to the Wishing Well?

A Yes. There is data available to make those correlations.

Q And in making that correlation have you reached an opinion?

A Yes, I have.

Q And what is that opinion?

A It's my opinion that the Laguna Colorado is in pressure communication and is in a common reservoir with the Wishing Well 35-7 and is also in a common reservoir and in pressure communication to the State CC No. 1.

Q Have you had an opportunity to study the issue of spacing in relation to the ability of the Laguna

Colorado Well to drain a certain number of acres?

A Yes, I have.

Q What have you concluded as a reservoir engineer is the appropriate spacing to apply to the Laguna Colorado Well?

A In my opinion, after studying the data available for proper spacing for the Laguna Colorado 2-6, is 640 acres or more.

Q Do you have an opinion or have you formed an opinion with regards to what procedurally the Division should do with regards to sections adjoining your Section Number 2?

A Yes, I have.

Q And what is that opinion?

A It's my opinion that there will be no reason whatever to treat the sections that are contiguous to Section 2 any differently than we treat Section 2.

Q What is your concern as a reservoir engineer if those adjoining sections are treated differently or operated under rules that are different from the West Puerto Chiquito Mancos rules?

A It's my concern that the operators of the adjoining sections to Section 2 would not be limited in their spacing and would be able to, under current statewide spacing, drill on 30-acre spacing in Sections 1, 3 and

10, 11 and 12, and would be able to therefor surround our Section 2 sort of like a picket fence and drain the Section 2 from the outside.

Q Let me direct your attention now to Exhibit Number Six.

A Okay.

Q Is that your work product?

A Yes, it is.

Q Before you explain in detail what your conclusions are, give us an explanation of what it is that we're looking at.

A Okay. What this is is a plat showing the location of the wells that I have studied for pressure communication. I have arranged my pressure study to match the cross section that was presented earlier by Mr. Ullrich.

Q And what do you conclude from analyzing the pressure information shown shown on display Exhibit Six?

A It's my conclusion from analyzing this pressure data that there is pressure communication between the Laguna Colorado 2-6, the Wishing Well 35-7, and the State CC No. 1.

it's also my conclusion that there is strong evidence to extend that pressure communication to

the Canada Ojitos Unit A-14 and on into the Canada Ojitos Unit.

Q Let's start at the northern portion of the exhibit, Mr. Johnson, and have you start with the information on the Canada Ojitos Unit Well C-34.

A Right.

Q What are we looking at when we see that pressure?

A The pressure data that's presented on the map for Well C-34 indicates that on the date November 21 of 1987 the bottom hole pressure in the C-34 was at a value of 1402 psi.

Q Have you determined from the unit operator, Mr. Greer, of the Canada Ojitos Unit what the C-34 Well is currently utilized for?

A Yes. The pressure data that I've presented here was given to me by Mr. Greer and he indicated that this Well C-34 is used as a pressure observation well in the Unit.

Q What is the information upon which you've relied to determine what the initial virgin pressure was for the -- this portion of the Unit?

A The original virgin pressure that we've utilized is published in the Four Corners Geological Society

work on the Canada Ojitos Unit.

Q And what is that number?

A That number is 1600 psi.

Q The C-34 Well now in November of '87 has some 200 pounds less than virgin pressure in it?

A Yes.

Q And it's being used as an observation well?

A That's correct.

Q As we move from that pressure data point down to -- is it the G-1 Well --

A That's correct.

Q -- are we still in the Unit boundary?

A Yes, we are.

Q And what information do you have on that well?

A Here again the information was supplied to me by Mr. Greer. It indicates that on November 28th, 1987, the bottom hole pressure in the G-1 was 1581 psi.

Q What do you as an engineer conclude in studying the pressure relationship between those two wells, the C-34 and the G-1?

A It's my conclusion in looking back on what the wells are used for, the G-1 is a gas injection well which was shut down for approximately 10 days when

the pressure was taken. It's my conclusion that they're in the same reservoir and that the pressures are correlative, given the drawdown in other areas of the unit.

Q What explains the fact that you see a pressure in the injection well of 1581 versus 1402 in the observation well?

A That, as I stated, is drawdown in the rest of the unit to the north, which is off my map. This data has been presented before the Commission a number of times, which indicates that as you go across the Canada Ojitos Unit the pressure on the west side is in the 1500 to 1600 pound range and as you proceed -- I'm sorry, on the east side, and it as you proceed to the west the pressure is decreased by production in the wells on the east side and so what you see here would be correlative to all of that data; that the pressure is higher on the east side of the unit where they're being -- gas is being injected and is lower on the west side where gas and oil are being withdrawn.

Q Those wells are in the same unit in the same pool?

A They are.

Q And subject to 640-acre spacing rules?

A Yes.

Q When we move now to the next well to the

south, that's the A-14 Well?

A That's correct.

Q Are we still in the Unit and still within the West Puerto Chiquito Mancos?

A Yes.

Q What do you see with that well?

A Here again from data supplied to me by Mr. Greer, in the A-14 Well on November 28th, 1987, the bottom hole pressure was 1454 psi. This pressure is correlative to what we see in the C-34 and the G-1.

Q What do you conclude, then, about the relationship of A-14 and C-34 in terms of whether or not they're in the same common source of supply?

A It's my conclusion that these two wells are in the same common reservoir, same common source of supply.

Q And are they in pressure communication with each other?

A Yes.

Q When we go from the A-14 out to the south we get to the Amoco State CC Well?

A That is correct.

Q And at this point we are a mile, approximately south of the Canada Ojitos Unit but within the West Puerto Chiquito Mancos Pool?

A That's correct.

Q And what do you find from the information shown on the display for that well?

A Okay. The data that I show for the State CC No. 1 is data that was used as an exhibit by the Oil Conservation Division in the hearing approximately a month ago. It indicated on February 15th of 1988 the bottom hole pressure in the Amoco State CC Well was 1460 psi.

Now this data was supplied to me from the OCD over the phone and so I've drawn it in by hand. I don't have that as hard copy data but I have reason to rely on the OCD as providing truthful information.

Q Okay, what does that show you in relation to the Amoco State CC Well as we relate that back to the other three wells we've just discussed?

A It would indicate to me that the pressure in the State CC and the A-14 are very correlative, nearly the same pressure; that the two wells are in pressure communication, and that they are in the same common source of supply.

Q When we look at the map and compare the distance between the A-14 and the Amoco State CC Well, we're looking at approximately, well, another two miles, are we not?

A That's correct.

Q All right, then as we move farther south we get to the McHugh Wishing Well?

A That's correct.

Q And what pressure information do you have on that well?

A Okay, the pressure information that we have on the Wishing Well 35-7 are from bottom hole pressure bombs that we ran, one on March 1st of 1988, which indicated the bottom hole pressure was 1315 pounds per square inch and a subsequent pressure on May the 13th, 1988, which indicated the bottom hole pressure was 1252 pounds per square inch.

Q The 5-13-88 date is taken in what relationship to the completion of the well?

A Both of these pressures were taken after the well was completed and put on production. The pressure from March 1st, 1988, was after approximately 720 barrels of withdrawals from the Wishing Well and the pressure on May the 14th was after approximately 16,000 barrels of withdrawals from the Wishing Well 35-7.

Q What did the initial pressure information from the Wishing Well tell you in terms of whether or not you had encountered a reservoir that was not depleted?

A Looking to the 1315 psi that we measured after the completion of the Wishing Well and comparing that

to the original pressure data, the 1460 in the Amoco Well and the 1600 that was published for Canada Ojitos, would indicate to me that the area around the wishing well had been depleted under 1600 pounds by some production.

Q When we go now to the Laguna Colorado Well, you have some pressure information; in fact, two pressure data points?

A That's correct.

Q Describe for us what you have.

A Okay. In the Laguna Colorado 2-6 following completion, after the well was successfully placed on production, we measured the bottom hole pressure by use of fluid levels on July the 8th, 1988, at 1127 pounds per square inch, and then later on July the 26th of 1988 at 896 pounds per square inch.

Q During the 18-day period from July 8th to July 26th, was the Laguna Colorado Well producing?

A No, it was not. It was shut in.

Q And you show a pressure differential, a drop of some 231 pounds during the period of time that this well is shut in?

A That's correct.

Q And during that 18-day period if you're not producing this well what accounts for 231 pounds of pressure depletion?

A That's accounted for by the production from the Wishing Well 35-7, which is in pressure communication and is indeed interfering with the Laguna Colorado 2-6.

Q How far apart are those wells, Mr. Johnson?

A About a mile; just a little over a mile.

Q And what does that tell you about the communication and spacing that ought to apply to the Laguna Colorado Well?

A It indicates to me that the drainage in the area exceeds 640 acres and that spacing should not be allowed to be any smaller than 640 acres.

Q Let's go on to Exhibit Number Seven, Mr. Johnson.

A Okay.

Q That's also your work product, is it not?

A Yes, it is.

Q What is this called? Exhibit Number Seven?

A Where is that number? Here it is. Okay, it would probably be better if I discussed both Exhibits Seven and Eight more or less concurrently, if that would be all right.

Q Let's do that.

A Exhibit Number Seven is a bottom hole pressure versus time plot and Exhibit Number Eight is a bottom hole pressure versus cumulative recovery plot.

Q Why would you, as a reservoir engineer prepare a bottom hole pressure versus time plot and compare it with a pressure versus cumulative history plot?

A Trying to establish the reserves of our wells in this area it's important to know the amount of barrels of recovery versus the pounds per square inch of pressure drop and the relevance of the time, of course, is over what time period that change in pressure occurs.

Q This is a traditional, commonly utilized method of analyzing data by reservoir engineers?

A Yes, it is.

Q Before you describe your conclusions, show us what you've plotted.

A Okay. If we would look first at the Exhibit Number Eight, the bottom hole pressure versus cumulative recovery plot. I took two data points, the 1315 pound pressure, which correlates to 721 barrels of withdrawal and plotted that, and then plotted the 1252 psi point versus the 16,020 barrels of cumulative recovery, and then projecting that slope, or that decline in pressure versus barrels of production, I then extended that slope

out to the current cumulative recovery from the well, which is in excess of 45,000 barrels.

And I calculated two pressure -- or two pressure points which I think would occur if there were no other increases on the reservoir other than the production of the 35-7.

Q Those are indicated with the --

A With the stars? With the stars, calculated data points.

Q And the assumption is that you removed the influence of the Laguna Colorado Well?

A Yes. This would be if there were no other outside influences on this reservoir other than the production of the 35-7.

Q What happens to those calculated data points when you take into consideration the Laguna Colorado production?

A Okay. That shows -- really there's no production from the Laguna Colorado. The correlation goes the opposite direction.

What I tried to show here on the pressure versus cumulative recovery plot is that at a proven time of approximately 35,000 barrels of recovery from the Wishing Well, I wanted to project what I would think the bottom hole pressure should be in the reservoir surrounding

the 35-7. It was my conclusion that that would be approximately 1180 pounds. The reason I correlated that is that was the time at which we measured the bottom hole pressure on the Laguna Colorado 2-6. The pressure that we measured then was 1127 pounds and these pressures are correlative. We would expect the pressure in the Laguna Colorado to be approximately 1180 if these wells were in pressure communcation and indeed the essentially 50 pounds pressure differential between the two wells would be within the realm of what I would expect.

Q Let me make sure I understand. When you look at Exhibit Seven and you see the data points for the Wishing Well, and you look at the dot for May and the dot for August, then you have two lines --

A Okay, what I did there --

Q -- one line above the other, what's -- what's going on here?

A What I did there is I took the calculated data point from the pressure versus cumulative recovery plot and put it back onto the bottom hole pressure versus time plot and then connected the dots, if you will, from the March 1st pressure data through the May pressure data and then to the August 1st pressure data point and what the upper line signifies is what you would expect the pressure point to be if there were no other influences on

the 35-7, when in actuality the pressure shown by the dot is lower than that.

Q In analyzing this pressure information, Mr. Johnson, is there any other source by which you could obtain pressure depletion in the Laguna Colorado Well that's shut-in other than from the Wishing Well and/or the Amoco State CC Well?

A Okay. The wells that were on production when I was making these plots include the Amoco Schmitz Well, the Southern Union -- I guess it's the Mobil Federal No. 1 --

Q The well in 36?

A Yes, the well in 36.

Q Okay.

A And those are the wells I think are influential in the pressure data here.

Now, --

Q My question is --

A Okay.

Q -- the combination of wells that are on, all those wells that -- the nearest well is more than a mile.

A That's correct.

Q There are no other wells that could impact or pressure influence the Laguna Colorado Well other

than those wells that you've described?

A Nothing that I would count as relevant. I want to point out a couple of things here.

On the bottom hole pressure versus time plot, shown by the triangles are the two data points for Laguna 2-6 and it shows the pressure drop that we referred to earlier over a period of less than a month as 241 pounds.

Now I've projected that same data onto the pressure versus cumulative recovery plot and showed that the points that are correlative to the recoveries in the Wishing Well 35-7, rather than showing them back on the zero line, which -- they really should show up on the zero line, but would mean nothing, but the impact of this is that there has been 241 pound pressure drop in the Laguna Colorado 2-6 with no production.

Okay, the other implications of these graphs, if you go back to the bottom hole pressure versus time and the two lines there, this would indicate that there is, in addition to the Wishing Well 35-7, there is some other withdrawal source that's affecting this well, and it's my conclusion since there was no production from Laguna 2-6, that that additional pressure depletion had to come from the Amoco State CC 1.

Q Have the operators, McHugh for the

Wishing Well and the Laguna Colorado, and Amoco for the State CC Well, have -- have they completed their wells in the same correlative intervals in the Niobrara?

A Yes. The Amoco -- or the McHugh Wishing Well and McHugh Laguna Colorado 2-6 are completed in the A, B and C zones of the Niobrara, and it's my understanding that the Amoco well was originally completed in the C zone and subsequent to the completion of our 35-7, that they re-completed their well to include the A and the B along with the C.

Q Do you see any operation practices that might account for the pressure data that you see recorded on the reports?

A I guess I don't understand the question.

Q Do you see any operational factor that would take into consideration and explain the pressure depletion you see in the Laguna Colorado Well other than drainage from the wells a mile or more apart?

A I see nothing else from our records, nothing mechanically, nothing that I would see operationally, other than drainage from the wells to the north of the 2-6 that would cause that pressure depletion.

Q Let's to go Exhibit Number Nine, Mr. Johnson.

A Okay.

Q Is Exhibit Number Nine also part of your work product in analyzing the production from this immediate area?

A It is.

Q Before you discuss it, explain to us what we see.

A Okay. The Exhibit Number Nine is a production plot, a daily production plot from field data of the production, oil production from the Wishing Well 35-7.

Q All right, and what do you see as an engineer?

A What I'm demonstrating here is that in the month of June, excuse me, the Wishing Well was produced for the first 22 days; then looking at the production level you can see that the production average approximately 500+ barrels per day.

We were -- we then shut the well in for several days as a result of meeting our allowable and brought the well back on on the 9th of July and what you would expect after a period of shut-in is some flush production from the well. When the production exceeded 600 barrels it quickly dropped and leveled off at approximately 400 barrels.

Now the only difference between what was happening in June and what was happening in July was that

the Amoco State CC No. 1 was placed on production somewhere around the 7th of July and we feel that the depletion or the drop in our production was caused by interference from the Amoco State CC Well.

Q The magnitude of drop is approximately 100 pounds -- I mean 100 barrels a day?

A That's correct.

Q Mr. McHugh, as the applicant, Mr. Johnson, has asked for the Division to put in place several administrative or procedural remedies to solve the concerns that you have.

One of the issues is whether or not the granting of this application would avoid the drilling of unnecessary wells. Do you have an opinion on that subject?

A It's my opinion that based on the data that we have here, that one well per 640 acres is probably more than is needed to deplete this reservoir and that any tighter spacing would be a waste of money and a waste of resources, actually.

Q In order to protect correlative rights what is your recommendation to the Examiner with regards to how to integrate Section 2 and make it part of the same type of rules and procedures that govern the Wishing Well and the Amoco State CC Well?

A It's my recommendation to the Commission

that the Section 2 in the Laguna Colorado 2-6 be included n the pool and it's obvious to me that it's in the same pool as the other two wells that we've discussed and that it should be treated in the same manner and should be included in the same pool rules.

Q Mr. McHugh has proposed that one of the administrative ways to solve your concerns is simply to delete that portion of the West Puerto Chiquito Mancos rules that places those rules up to but not beyond the current boundary of those pools. He asks to have that removed.

A That's correct.

Q What is accomplished by doing that?

A What's accomplished by doing that is it allows us, allows the operators in the area to develop their wells on a 640-acre spacing which appears to be adequate and protects the operators that are currently producing from having someone come in and drill on 40-acre spacing, forcing them to drill unnecessary wells, or violating their correlative rights by draining oil off of their lease.

Q When we look at Exhibit Number One, Mr. Johnson, when we look at Section No. 1, do we have any currently producing Mancos or Niobrara wells in that section?

A No.

Q And we look at Sections 10, 11 and 12, do we have any Niobrara Mancos wells producing in any of those sections?

A No, we don't.

Q In Section 3 do we have any?

A No.

Q When we look at Section 36, there in fact is a well.

A There is.

Q And what is the status of that well?

A The well that's shown on Exhibit One as the Southern Union Mobil Federal No. 1 is on production.

Q What is your understanding of what is to occur with Section 36 in terms of additional potential development?

A It's my understanding that there is a well currently being drilled in Section 36 by Amoco Production, the location of which is in Unit letter F of Section 36. It's shown on my map as No. 1 Southern Union or abbreviated SO. U..

Q Is that projected to be a Mancos well or a Dakota well?

A It's my understanding that its permitted to be a Mancos well.

Q Other than Section 36 where we have the

potential for two Mancos wells in the section, are there any other sections in this immediate vicinity where we already have in place two wells?

A There are none.

MR. KELLAHIN: That concludes my examination of Mr. Johnson, Mr. Stogner.

We would move the introduction of his exhibits, I believe they're Seven through Nine.

THE REPORTER: Six.

MR. KELLAHIN: I'm sorry, Six through Nine.

MR. STOGNER: Are there any -- are there any objections?

Exhibits Six through Nine will be admitted into evidence.

CROSS EXAMINATION

BY MR. STOGNER:

Q Before I begin cross examination or allowing cross examination, let me get some things clarified here.

Let's go to your Exhibit Number Six.

A All right.

Q And in Section 36 you have showed a well, No. 1 South -- Southern Union. Now that well is

presently drilling, correct?

A It's my understanding that it's being drilled right now.

Q Okay, now, the Mobil Federal Well No. 1 is presently producing?

A That's my understanding of it, yes, sir.

Q And is that from the same Mancos formation?

A That's correct.

Q And do you know when that well was put on production?

A No, I don't. It's been on production for a number of years.

Q Now I want to go to Exhibit Number Eight.

Now the information that you're showing on the Laguna Colorado 2-6, and this one you say is, oh, how would you say it?

A It's been shifted to the right to make it correlative on the pressure curve to the data from the Wishing Well.

In actuality on a pressure versus cum plot for that well both of those points would need to be on the zero line to the left.

Q Both of the points.

A Yes.

Q So this --

A Because there is pressure depletion but no -- no recovery.

Q Okay, that was some clarification things I had.

MR. STOGNER: Mr. Lund, your witness.

MR. LUND: Thank you.

CROSS EXAMINATION

BY MR. LUND:

Q Mr. Johnson, starting with Exhibit Number Six, and again referring to the wells that are located now in the Canada Ojitos Unit, starting at the top, the B-34 Well, I believe you testified that's now a pressure observation well?

A That's correct.

Q And was that ever produced?

A I don't really have any idea. The data that I was supplied said that it's currently a pressure observation well and that's the history I ever went into.

Q You didn't ask Mr. Greer whether they had ever produced that well?

A No.

Q Do you know what zones it's open into?

A Yeah, I do. I'd have to dig that out. Excuse me a minute.

The data that I have would indicate that that well is open in the -- looks like the A, B and C zones, or at least the A and B.

Q What data is that?

A That's incorporation data that was obtained from the OCD office.

Q So you think it's open to the A and B zones?

A Yes.

Q But you don't know whether it ever produced or was intended to produce?

A No, I don't have any idea.

Q Going to your next well down south, the G-1 Well, what about that well? Do you know if that's ever been produced or intended to be produced?

A I have no idea. The only data that I have is that it's a gas injection well.

Q Do you know what zones that well is open into?

A My information indicates that well is perforated in the C zone.

Q The C zone only, so it's injecting only

into the C zone?

A That's the information that I have.

Q All right, then going further south to the -- I guess on your Exhibit Six you've labeled it as the A-14 Well but that's also the same well as the Canada Ojitos No. 19 Well, isn't it?

A Okay. I'm going to step back and qualify. I was looking at this data.

Your question on the C-34 as to where it's perforated, I can't answer because the data that I was looking at is for the G-1 Well, which is, from my data, is completed in the A and B and possibly in the C.

Q You don't know where it's --

A No, I don't have any idea where it's perforated.

Q So the G-1 is in A, B or C?

A Let me correlate this here. I guess I'd have to say into the A and B.

Q So the G-1 is injecting only into the A and B sands.

A As far as I know.

Q And then going down in the south, the A-14 Well, that's the same well and the Canada Ojitos No. 19 Well.

A That's correct.

Q Has that ever produced or attempted to produce?

A There again I can't answer that question. The only data that I have is that's a gas injection well.

Q And the same question, what zones is it open up to?

A Our data indicates that's open in the C zone.

Q C zone only?

A Correct.

Q And you don't know whether it was ever tested for production?

A No, I don't.

Q Now, if you go farther down your Exhibit Number Six, in Section 24 there's not a legend on your map but are you ware that there's a well in Section No. 24 in the southeast quarter?

A I didn't put it on my map.

Q It's shown on Exhibit Number One.

A Oh, yeah.

Q Do you know whether that well was productive?

A I have no idea.

Q It indicates it's a dry hole on Number

One. That is Mobil's Exhibit Number One?

A Yes.\

Q You don't know one way or the other when --

A No, I don't have any idea.

Q Then continuing down here on Exhibit Number Six, the Schmitz Well is located in Section 34, isn't it?

A I would say it's -- the Schmitz Well is located in Section 25. There's a Schmitz dry hole in 34.

Q And in Section number 25 you don't have any data on that well in your Exhibit Number Six.

A That's correct.

Q Why is that?

A I never could get Amoco to supply me with any data. I've asked for data from their State CC Well, from an interference test that was ran in February, and some other pressure data and I was never supplied with that data.

I can't report on data I don't have.

Q You didn't look at the State filings for that well?

A I looked at all the completion data. I didn't look for any pressure data.

Q What about data on the (not clearly

understood) in Section 36, do you have any pressure data or information about that area?

A No, I don't.

Q Now, I guess it's kind of confusing because going down from the north to the south, it would seem to me it was irrelevant to see what the information is in Section 25.

Would you consider that information to be relevant on that Schmitz Well?

A It would be nice to have but I don't think it's relevant to what I'm trying to point out.

Q Would it be relevant to the Examiner to determine whether this reservoir is continuous and what are the production capacity and characteristics of the sands?

A Oh, yeah, that would be very relevant. I think we've pointed that out.

Q Do you have any producing GOR data on any of these wells that you've listed on Exhibit Number Six?

A We have producing GOR data on our own wells.

Q What are they?

A I'm not prepared to answer that right now. What I've got is field data that hasn't been integrated or anything like that yet.

I can give you field estimates.

Q Sure. I'd like to know.

A Just a minute, I'll get some different type of data on that.

What would you like? I've got data from day one.

Q Do you have any producing GOR data on the CC or the Wishing Well or the Laguna?

A Like I said, I've got data on our producing wells; on the Wishing Well. There's very little data available on the Laguna 2-6 because it hasn't been produced.

Q Okay. What's the producing GOR data that you have on the Wishing Well?

A On what date?

Q How about initially and current?

Or your first measurement and current.

A Okay, yeah, whatever is easiest for you to swallow, I guess.

Is this kind of evidence admissible, calculated on the spot? Okay.

MR. STOGNER: Gentlemen, let's proceed.

A The GOR that I calculate for the last seven days of March is 1328. Remember this is field data

and it hasn't been integrated on the gas. The GOR that I calculate for July is 1213. Here again this is field data and subject to integration on the gas.

Q So you're not comfortable that either of those figures is truly representative?

A They're pretty representative but that they're not exact.

Q But you think they're in the ballpark, right?

Is it fair to say that the focus of your evidence today was basically the evidence comparing the Wishing Well to the Laguna Well?

A That's what I tried to focus on but I did try to bring in to that what limited data that I have on the Amoco State CC No. 1.

Q That would seem to be my next question. It appeared like you were concluding that the Wishing Well and the Laguna were the ones that were the ones that were interfering with each other without really factoring in the State CC Well to the north.

A Now, your assumption on that is incorrect. I did factor in the State CC.

Q So is it your testimony that the Laguna is interfering with the Wishing Well but not the --

A No, that's not my testimony. The Laguna

has not been produced. It cannot interfere with anybody right now.

It's my testimony that the Wishing Well is interfering with the Laguna 2-6 and that in addition the State CC is also interfering.

Q With the Laguna?

A With the Wishing Well 35-7.

Q Again, I'm still a little confused about why Section 36 is not involved in that issue.

A The guess the only thing I could say to clarify that is that when we put together our application we had assumed that Section 36 was in the spaced area for the West Puerto Chiquito and didn't need to be spaced.

And so we spaced what was relevant that was already outside of that of that.

Q But you know now that it's a separate pool as defined by Division order?

A Yes, I know that now.

Q Have you ever looked at the order in that case?

A No, I haven't specifically.

Q Well, the order in that case indicates that Section 36, the Regina Gas Pool, is a separate common source of supply from West Puerto Chiquito, and if that's the case, subject to being checked, would you agree with

that?

A I agree with what you say about the order. I can't dispute that because I've never read the order, but I would dispute the conclusions of that order.

Q You don't think that that's a separate common source of supply from the West Puerto Chiquito Pool?

A Not in my opinion.

Q I think you testified earlier that you worked on the Gavilan case and are you familiar with this entire area?

A Yes.

Q Are you also familiar with the East Puerto Chiquito Pool?

A Yes.

Q And do you understand that's a separate common source of supply and is produced differently than West Puerto Chiquito?

A I understand that it's produced differently and it's covered by different rules. I haven't drawn a conclusion as to whether it's a separate source of supply. I've never really studied it from that angle.

Q You haven't looked at whether that should be part of -- East Puerto Chiquito should be part of West Puerto Chiquito?

A Never really considered it.

Q What about comparing Gavilan to West Puerto Chiquito? Do you think that they should be separate common sources of supply and produced differently?

A It's my opinion that they're in a common source of supply and should be produced the same and my testimony in past cases has shown that; that we believe that Gavilan should have been drilled on 640-acre spacing.

Q Let's talk about a little bit of production on these wells in here.

In your opinion what makes a well in the area we've been discussing on Exhibit Number Six either a productive well, a good productive well, or a poor producer?

Why are some wells good and some wells bad?

A It's my opinion that the productivity of wells in this area is dependent upon the intensity of the fracturing in the Gallup formation.

Q And it's not dependent alone on whether the reservoir itself is continuous.

A Well, sure it is. If you have very intense fracturing that extends for three or four inches, you're not going to get much oil.

Q Well, you've heard the testimony of the geologist earlier saying that this is the same continuous

sand throughout this area, didn't you?

A The same continuous source of supply.

Q You heard that testimony and you --

A Yes.

Q -- agree with him.

A Yes.

Q All right. So my question is, given the well variability, the determinative factor is not whether the common source of supply is continuous, the determinative factor is whether you've got natural fracturing, isn't that right?

A The determinative factor is the intensity of the natural fracturing and the length of those fractures.

Q In fact there are areas in the area you've mapped on Exhibit Six that don't have natural fractures, isn't that right?

A Well, yeah, I guess you'd have to say that. There's areas in there that don't have any.

Q Is it fair to say that the production is going to be in pockets, if we will, in this area, the pockets being the areas that have natural fracturing?

A Now, if you would define pockets as areas with high intensity of natural fracturing and good length of fractures, I'd define it that way, yes.

Q It's not your opinion that these natural fractures go continuously for miles and miles throughout this area, is it?

A There is some evidence to support that, that there are some fractures that do extend for miles.

Q And would that mean that those -- that wells connected miles and miles away would be in the communication?

A That's correct. That data's been presented starting back in the Canada Ojitos unitization days, that there were wells in direct communication through fractures over 2 or 3 miles.

Q Is it important as an engineer to review data from an area that shows no or low productivity wells separating productive zones?

A Well, you want to look at all the data you can that's relevant to what you're looking for.

Q Well, would that indicate to you that the fractures don't extend over that particular area where there's no or little production?

A I would say that you'd have to say that the intensity of the fractures is -- is not there. You could still have communication through very, very small fractures.

Q In your study of the area have you seen

any permeability barrier or permeability restrictions throughout this area?

A Nothing that I would swear to.

Q What do you mean by that?

A I mean that I haven't seen anything that I would consider to be a permeability barrier.

Q But you've seen areas that are productive in different extents, right?

A In different amounts.

Q Different amounts.

A Yes.

Q And the zones, some of those factors, are different, are -- let me rephrase that for you.

A I'd appreciate that.

Q Are some areas in this particular area that you've been discussing productive in, for example, the C zone and not in the A and B zones?

A I don't think I could reach that conclusion. There are some wells that are completed only in the C and some wells that are completed only in the A and B, but I don't think you can conclude from completion that they were nonproductive in the C if they were not completed in the C or that they were nonproductive in the A and B if they were completed in the A and B.

Q In studying this area are you aware of

any wells being tested selectively to see if they are productive in the A and B? Are you familiar with those?

A Yes, I am. I understand and I haven't been supplied the data that Amoco in their State CC Well completed that well in the C zone initially and I understand that subsequent to our completion of the Wishing Well 35-7 that they completed their well, recompleted their well to include the A and B. What I would conclude from that is that Amoco concluded that our well with the higher rate of production was a better well because of the A and B and that they would have been better to recomplete into the A and B to take advantage of the better reservoir in the A and B.

Q For example, the Canada Ojitos No. 19 Well is completed only in the C zone, right?

A Let me look at my correlation so I can see which one is the 19.

Q That's what you call the A-14.

A Yes, well, that's the data that I have.

Now I want to point out to you that the data that I have from the A-14 being completed in the C zone is 1454 psi.

The data that I have from the State CC No. 1 is completed only in the C zone at that time and is 1460 psi, two data points that are so close as to defy

differentiation within their -- the run of the gauges that they're measured with. And both completed in the C zone simultaneously.

Q But the data on the Schmitz Well in Section 25 is missing, isn't it?

A I don't have access to that data.

Q And you don't have that on your exhibit, do you?

A I don't have access to it or I would have it on the exhibit.

Q In Section 36 it's indicated that there is a well being drilled in the northeast quarter. Do you know what the setbacks are for that well?

A Well, as I understand it the setbacks are 1650/1650 as it was staked.

Q And 1650 is the current setback for the West Puerto Chiquito Pool, is that --

A Yes.

Q -- correct? And you wouldn't have any objection to the location of that well in Section 36?

A No, I wouldn't have any objection to the location. What I have objection to under our application is two wells in the same section.

Q Do you have a concern over payment of royalties in Section 2?

A Yeah, I do.

Q What is that concern?

A The concern that we have right now is that with the Section 2 being spaced on statewide 40's and the drainage obviously being greater than 40 acre spacing, we could be forced to drill wells on each 40-acres in there.

Q So you don't want to -- you don't want to pay royalties on 40-acre spacing?

A It doesn't really bother me how you pay the royalties; I just don't want to have to drill a well on every 40 acres.

Q Not if you think one well will drain the whole 640.

A That's correct.

Q You are only concerned about the southern boundary and you're not concerned about the north or the east or the west boundaries in this application?

A The only boundary I'm offsetting is the south. I don't have any acreage on the east or the west or the north.

Q Has the Canada Ojitos Unit ever been contracted, the unit boundary?

A I can't answer that question. I don't know.

Q You don't know if the southern end of the Canada Ojitos Unit has been contracted?

A I don't know that.

Q If a well were in communication with another well and one well was structurally higher to the other, would you expect the structurally higher well to have a higher GOR?

A There's a lot of other factors I'd have to take into account other than just structurally higher before I could make that conclusion.

Q Maybe I can be a little bit more specific. For example, on the Canada Ojitos No. 19 Well, which is an injector in the C zone, if it were in communication with another well that was structurally higher, wouldn't you consider -- wouldn't the well that it was connected to be expected to have a higher GOR?

A There's too many qualifiers to put on that. I wouldn't expect it unless you had something like gravity drainage conditions; huge, thick sands; there's just too many other factors to just categorically say if one is higher than the other it would have a higher GOR.

Q Any other factors you can think of?

A Well, if one was in a gas cap it would have a higher GOR, you know, if the higher structurally well were in a gas cap.

Q How was the pressure measured on the Canada Ojitos No. 19 Well?

A The pressures were measured on surface pressure and then gas gradients were calculated to bring it down to the datum that I used for correlating these.

Q Did you use fluid levels?

A There isn't a fluid level in the 19 or A-14. It's a gas gradient, gas -- I guess gas technically is a fluid, so --

Q But you didn't use a fluid level type test?

A Fluid level sounder, no. These data were supplied to me by Mr. Greer and he explained to me in a letter how he measured those.

Q At what datum are the pressures based on?

A I've brought all of my pressure data back to a pressure datum of +685 mean sea level.

Q And how -- I'm sorry, how did you get the pressures from the Laguna Well?

A We used a fluid level sounder and my pressure gradient for the well.

Q Did you have any problems with the foam in the annulus?

A No.

Q You're sure of that?

A Positive.

Q On Exhibit Number Seven you're attributing the change in the slope to the CC Well, right?

A That's correct.

Q On Exhibit Number Seven you're attributing the change in the slope to the CC Well, right?

A That's correct.

Q But it's not the Laguna because you don't have any pressure information?

A That's correct. Well, not because we don't have any pressure information, because we don't have any withdrawals.

Q If these -- if the State CC Well, the Wishing Well, the Laguna Well, were in pressure communication with those wells to the north, and in particular the Canada Ojitos No. 19 Well, wouldn't you expect the GOR's of those wells to the south to be higher or equate to the GOR in the 19 Well?

A Based on the data that we've seen in the Gavilan Area, there's a wide variation of GORs in wells that are exactly in the same reservoir, conclusively the same reservoir, so I don't see what you're -- what you're driving at for a GOR correlation.

Q Well, for example, in Section 25, where

the Schmitz Well is located, would you expect the Schmitz Well to receive pressure support from the Canada Ojitos No. 19 Well?

A Yes.

Q I mean, that's -- that's the point I'm trying to get to, you know, you've got the 19 Well and I think what your testimony is, there's communication, there is some sort of effect from the 19 down through the wells to the south. Is that fair to say?

A Well, I don't knonw what you mean by "effect".

What I'm saying is that they're in pressure communication.

Q Okay, given that conclusion, wouldn't you expect those wells in the south to be receiving some pressure support from the COU 19 Well, which is an injector?

A I think we've demonstrated that by the correlation between the A-14 and the CC 1.

Q Finally, and thankfully, in Section 36, the Mobil Federal Well, and are you aware what it produced in barrels of oil?

A Approximately 1700 barrels.

Q And would you say that that well is draining 640 acres?

A No, I wouldn't say that.

Q It's production has been too small to drain 640 acres.

A To date. If the well lasted 150 years, or so, it might get it.

Q But it's not draining it right now.

A Not effectively draining it.

Q Effectively and economically draining it? No?

A No.

Q Thank you.

MR. STOGNER: Mr. Lund, does that conclude your cross examination?

MR. LUND: It does. Thank you.

MR. STOGNER: Mr. Buller, your witness.

CROSS EXAMINATION

BY MR. BULLER:

Q A few questions; Mr. Lund has been fairly comprehensive, I think.

If an area doesn't have any fractures present can it produce?

A Well, that's a pretty generic question.

We have some real, real good sandstone reservoirs that don't have a fracture in them that produce very well.

Q The area that you testified to earlier that don't, perhaps, have fractures within the unit, can they produce?

A They could produce very limited quantities, I should suspect.

Q Would you call those nonfractured areas permeability barriers?

A Yeah, I guess. depending on what you -- how you define a permeability barrier.

Q How do you define a permeability barrier?

A My definition of a permeability barrier would be a barrier that fluid would never flow across.

Q A couple of questions on the testing that's gone on.

On Laguna Colorado 2-6, were there any production tests; have any production tests been taken?

A Yeah, we've tested the well very preliminarily.

Q How have you tested it?

A We've pump tested it; tested it in test tanks.

Q What are the results of those tests?

A It indicates to us that the productivity of the well in total fluid is in the realm of 80 barrels a day.

Q Aside from the bottom hole pressure test that you've already alluded to were any other pressure tests taken on that well?

A On the Laguna 2-6? No.

Q Have you compiled any PVT or other fluid data on the Colorado Laguna 2-6?

A No.

Q On the pressure tests, was any well produced prior to the first test?

A On which pressure tests?

Q On the Laguna Colorado 2-6 pressure tests?

A Yes. There was approximately -- let's see, I'm trying to think of one of those -- about 800 barrels, give or take a few barrels.

Q A-14 is an injector, right?

A That's my data.

Q If it's an injector, why is the 1 State CC pressure higher than the A-14?

A The difference in pressure is inconsequential. That's within the realm of pressure gauge accuracy. If you say that one is within 6 pounds of the other,

you're going to hang your hat on that difference, you're not being real scientific.

Q Do you believe that similar pressure in different wells at the same point in time is conclusive evidence that the wells are in communication?

A Oh, you have to have other data. I mean if you have similar pressures at the same point in time and the wells are in a different state, that wouldn't be conclusive data, but when the wells are offsetting one another and you have similar pressures at similar times measured in the same reservoir, I would say it's conclusive data that they're in communication.

MR. BULLER: I don't have any other questions.

MR. STOGNER: Thank you, Mr. Buller.

Mr. Scott, your witness.

MR. HALL: Hall.

MR. STOGNER: I'm sorry, Hall.

MR. HALL: No questions.

MR. STOGNER: Mr. Kellahin, do you have any redirect?

MR. KELLAHIN: Just a couple of questions, Mr. Examiner.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q The Laguna Colorado 2-6 Well, Mr. Johnson, when that well was completed, as part of the completion was that well fracture stimulated in any way?

A Yes, it was.

Q And how was that done? Were all three zones, the A, B and C, open prior to fracture stimulation?

A Yes.

Q And what was the magnitude of the fracture treatment?

A The fracture treatment that we put in there was approximately 2400 barrels of water and 200,000 pounds of sand. We injected at approximately 60 barrels a minute.

Q Approximately when did that occur?

A The completion of the Laguna Colorado was -- or the fracture -- well, let me take a look here. Just a second. The well was fraced on April the 15th, 1988.

Q Is it typical to fracture stimulate the Mancos wells prior to production?

A Yes, it is.

Q What was done on the Wishing Well? That was a McHugh well. Did that well also receive a fracture

stimulation?

A Yes, it did. The fracture stimulation in the Wishing Well was approximately the same size as far as barrels of water and pounds of sand, and pressure and rate.

Q Do you have records to tell us when that fracture treatment --

A Yes.

Q -- was conducted on the Wishing Well?

A Yes.

Q What was the date?

A That well was fractured on February the 12th of 1988.

Q And both those fracture treatments are conducted within the day of the frac treatment?

A Yes.

MR. KELLAHIN: No further questions.

MR. STOGNER: Thank you, Mr. Kellahin.

Are there any further questions of this witness?

Mr. Chavez.

QUESTIONS BY MR. CHAVEZ:

Q Mr. Johnson, have you noticed in your studies of the Mancos reservoirs that there are differences in fracture densities across the reservoirs yet they still form one common source of supply?

A That's correct.

Q In your studies of the reservoir, did you notice whether there might be directional permeabilities, permeabilities better in some directions than others throughout the reservoirs?

A I don't think we can conclude that yet because all of the wells that we're dealing with here run in north/south directions and we don't have much in the line of east/west, the data that I have, so I wouldn't reach that conclusion yet.

Q Can wells within these pressure -- within these fractured reservoirs be in pressure communication over large distances without being in a direct interference over the same large distances?

A No, I wouldn't think so.

Q Did you compare the -- the completion of the Mobil Federal No. 1 Well in Section 36 to the completions of the other wells in that area to determine whether or not the productivity level might be different because of the difference of the completions?

A Yes. Looking at the data on that, it was a much smaller frac treatment in that, or stimulation treatment.

Q How much smaller is "much" smaller?

A I don't remember the size of that thing.

Q Would you expect to find foam in the annulus of a well that's not producing whenever you're doing a pressure calculation using a liquid level and casing pressure?

A If you're referring to the Laguna Colorado 2-6, I wouldn't because the surface casing pressure on both measurements was in the order of 800-to-900 pounds. I don't think there's a bubble around that can survive that kind of pressure.

Q Thank you.

MR. STOGNER: Thank you, Mr. Chavez.

Any further questions of this witness.

MR. STOVALL: I do have a couple of questions real quick.

CROSS EXAMINATION

BY MR. STOVALL:

Q You stated in response to a question from somebody at one point that you would be concerned with respect to wells essentially offsetting on a 640-acre basis -- proration unit offsetting your -- let me back up and start -- try that again.

Assuming Section 2 were on a 640-acre basis and the offsetting wells were not under that same rule but were rather on a statewide rule, you expressed some concern as to that differentiation, being 40 acres offsetting 640. Would that concern be -- is that concern limited to the area around Section 2, recognizing, of course, that you don't have interest in the other area, necessarily, but would that be generally along any boundary of a 640-to-40 acre pool, particularly in this area with these characteristics?

A Well, I figure it would be generic to an area of these characteristics. Anywhere that you had a 640 acre unit, spacing unit, and it was offset by 40 acre spacing units, that would be of concern to me as an operator in the 640-acre spacing unit.

Q Well, that concern would extend, say, all along the southern boundary of the West Puerto Chiquito Mancos Pool?

A Yeah, it would for me.

Q Well, is that the reason that your --

part of your application includes a -- to, in effect, amend the rules to allow the -- to bring wells within one mile of the boundary in under those rules?

A Well, the concern that we had is that if we spaced just Section 2, that we could be offset by statewide spacing all the way around it except in the West Puerto Chiquito spaced area.

The other concern was that we wanted to make sure that we notified everybody that would be affected within the one-mile radius, which brought in the Sections 1 and 3, 10, 11 and 12, and it doesn't make sense to us to amend half of a boundary and to have half of a boundary amended and the other half of statewide 40-acre spacing where you would have the same concern that we have in 2 and 3.

Q One other question. It may be as much out of curiosity, looking at your pressure data in the Wishing Well, your data, the pressure that you're showing roughly in August, the first of August, and roughly at 45,000 barrels, isn't calculated, is it?

A That's correct.

Q Would you anticipate that that might actually be closer to a 900 (unclear), just a professional guess?

A Based on the change in slope and things

like that, it wouldn't surprise me it were less than what I calculated, if we went in and actually measured it.

MR. STOVALL: Nothing further.

MR. STOGNER: Any further questions of this witness?

RECROSS EXAMINATION

BY MR. STOGNER:

Q One quick one. Let's refer to Exhibit Number Six. Obviously, you have some information on the Mobil Federal No. 1 because you did present a little bit of cross examination question on it.

Is it your opinion that this particular well is in the same reservoir but did not intercept the fracture either by the stimulation method or this drilling?

A It would be my opinion that it is in the same reservoir, the same common source of supply, and that either it didn't intersect the fractures or the fractures weren't don't exist there.

Q Thank you.

MR. STOGNER: I have no further questions of this witness.

Are there any other questions? He may be excused.

KENT CRAIG,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q For the record would you please state your name and occupation?

A Yes. My name is Kent Craig and I'm the Land Manager for Jerome McHugh and Nassau Resources.

Q Mr. Craig, have you previously testified as a landman for Mr. McHugh and Nassau Resources?

A Yes, I have.

Q Have you made a study of the ownership that is involved with regards to this application and identified for -- to your satisfaction the various working interest owners and operators that might be affected by this application?

A Yes, sir, I have.

MR. KELLAHIN: We tender Mr. Craig as an expert landman.

MR. STOGNER: Are there any objections? Mr. Craig is so qualified.

Q Mr. Craig, would you take a moment and look at the tabulation on Exhibit Eleven and turn to

Exhibit A of that attachment. Is this a list of the operators and interest owners that you've prepared from your search of the information of the -- of the area?

A Yes, sir.

Q Let's go back and look at Exhibit Number Ten. What have you shown on that display?

A Exhibit Number Ten is simply a little land map that we put together showing our Laguna Colorado in Section 2 of 23, 1, and the eight sections surrounding Section 2, Sections 34, 35 and 36 of 24, 1 to the north are included at the southernmost end of the West Puerto Chiquito Pool.

And then Sections 1, 2, 3, 10, 11 and 12, of course, lie directly south of the pool boundary.

Q Have you caused notice to be sent to all those operators or working interest owners in the absence of an operator to those sections that adjoin Section 2?

A Yes, sir, I have.

Q And have you had notice sent or caused notice to be sent to all those operators or interest owners that have sections immediately adjacent to the southern boundary of West Puerto Chiquito Mancos Pool?

A That's correct.

Q And that's shown as a certificate marked as Exhibit Number Eleven?

A That is correct, yes, sir.

MR. KELLAHIN: That concludes my examination of Mr. Craig.

We'd move the introduction of Exhibits Ten and Eleven.

MR. STOGNER: Are there any objections? Exhibits Ten and Eleven will be admitted into evidence.

Mr. Lund, your witness.

CROSS EXAMINATION

BY MR. LUND:

Q Mr. Craig, did you notify Southern Union vis-a-vis (unclear) Mobil in Section 36?

A I don't see Southern Union on the list, no, sir.

Q So you did not notify everybody?

A No, Southern Union is not on the list.

MR. LUND: Thank you.

MR. STOGNER: Mr. Buller, your witness.

CROSS EXAMINATION

BY MR. BULLER:

Q Are you aware the agent for the operator

for Mobil Producing is located in Denver, not in Houston?

A I'm -- would you repeat the question?

Q Are you aware that the agent for the operator Mobil Producing is located in Denver and not in Houston?

A I'm not aware of where any of Mobil's agents are.

The reason we sent this to Houston is that the Mobil leases of record in the sections described have the Houston address.

Q Have you ever seen this letter sent to New Mexico Energy and Minerals Department dated July 20, 1987, in which there's a notice that Mobil Exploration and Producing U. S. is acting as an agent for Mobil Producing Texas and New Mexico and that its address is in Denver?

A May I see it? I might have seen it but I do not recall seeing it, no, sir.

Q Have you had any dealings with the Land Department?

A Yes, sir.

Q Mobil Land Department in Denver?

A Yes, sir.

Q And you've worked with Denver, not in Houston --

A Yes, sir.

Q In working with them.

A Yes, sir.

Q Okay.

MR. BULLER: I don't have any other questions.

REDIRECT EXAMINATION

BY MR. KELLAHIN:

Q Mr. Craig, in fact you've had meetings with representatives of Mobil in Denver with regards to this very application.

A We've had meetings with Mobil in regard to the Wishing Well and another proposed well, but not specifically for this application.

Q Well, I don't mean you individually but I mean --

A Yes.

Q -- during the years Jerome McHugh has met with technical people of Mobil prior to this hearing to discuss this very subject, have they not?

A To discuss this, yes, sir.

Q And there was no claim by any member of the Mobil staff that they did not know or were not notified of this application?

A Not to my knowledge, no, sir.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Craig, is there really a Tidewater Oil Company or is that the old Getty?

A There's -- there is a Tidewater Oil Company. It was first Tidewater, who became Skelly, who became Getty, who became Texaco, who, you know, of course, was sued by Pennzoil. But, yes, sir, there is a Tidewater Oil Company in Durango, Colorado, and it's not the one that was involved in the lawsuit.

Q Okay. In your searches for this Mobil question that Buller had these questions earlier, you looked at the well files, did you not?

A No, sir, we checked the records of the county.

Q The records of the county?

A And the BLM. That's where we get our addresses.

Q And the records at the BLM showed the Houston address?

A The records at the BLM that we checked and at the county have the Houston address.

Q I'm sorry, the Houston address, and how

about the plugging bond with the OCD, are you familiar with that?

A I'm familiar with it but we don't -- we don't check those.

Q Okay.

MR. STOGNER: Anybody else have anything of this witness?

RECROSS EXAMINATION

BY MR. KELLAHIN:

Q For Section 36, Mr. Craig, who is shown as the lessee for that acreage in 36? How is that divided?

A 36 of 24 North, 1 West, the north half north half is Amoco, it's a Federal lease, and the remaining portion of the section is Southern Union Exploration.

MR. KELLAHIN: Thank you.

MR. STOGNER: Mr. Chavez.

QUESTIONS BY MR. CHAVEZ:

Q Yes. One question. Will the approval of this application affect any of the operations going on in Section 36?

A As proposed, no, sir, I don't believe so.

Q Then you don't feel it necessary to ac-

tually notify Southern Union.

A Well, we -- Southern Union is an oversight on my part. I do feel it was necessary to notify anyone within a mile of our well, irregardless of whether they're affected or not.

Q Thank you.

MR. STOGNER: Any other questions?

MR. STOVALL: Yes, I think I do.

CROSS EXAMINATION

BY MR. STOVALL:

Q In -- I want to make sure I understand your application -- in your application you are asking that a procedure be adopted for automatic extension of the southern boundary of the West Puerto Chiquito Mancos Oil Pool. I'm reading paragraph eight of your application and you're familiar with it, I assume.

A Familiar with the application?

Q Yes, sir.

A Okay, to include any well completed or recompleted within one mile of that boundary?

A Right.

Q Is what you're proposing a change to the

rules of the West Puerto Chiquito Mancos Oil Pool?

A Well, a change in the rules, as to the rules, Mr. Stovall, insofar as -- as far as we know West Puerto Chiquito the only boundary around it which did not have a one-mile buffer zone was the southern boundary when the pool was established. We want to extend the pool by one mile to include the first tier of sections across the north half of 23, 1, or a well that falls within a mile of that extension.

So amend the rules to that effect.

Q Are you aware of the provisions of Rule 1207 with respect to the notice requirements for the amending of pool rules?

A No, sir, not off the top of my head.

Q The only people that were notified at this time, the only ones that you have notice of, are those operators and working interest owners listed on your list that's shown on your Exhibit Ten, Exhibits Ten and Eleven, I'm referring to?

A Yes, but there are on Exhibit A to the notification certificate of mailing, many of the companies which are involved or hold a working interest in Sections 1 through Six of 23 North, 1 West, were given mailings.

Q Oh, okay.

A All six sections.

Q Okay.

A All six sections; not just the 9 sections that's on the map.

MR. STOVALL: I have nothing further.

MR. STOGNER: Any further questions of this witness?

He may be excused. Let's take a 10-minute recess.

(Thereupon a recess was taken.)

MR. STOGNER: The hearing will come to order.

Mr. Buller?

JOHN J. FAULHABER,

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

DIRECT EXAMINATION

BY MR. BULLER:

Q Mr. Faulhaber, would you state your full name and place of residence for the record, please?

A My name is John J. Faulhaber. I live in

Denver, Colorado.

Q By whom are you employed and in what capacity?

A I'm employed by Mobil Exploration and Producing U. S. as -- my current job title is Senior Staff Production Geologist.

Q Have you previously testified before the Division and had your credentials accepted on the record?

Q Yes. I testified at the Gavilan hearings in 1986 and 1987.

Q And were you qualified as a geologist at that time?

A Yes.

MR. BULLER: Are the witness' qualifications acceptable?

MR. STOGNER: Is there any objection to Mr. Faulhaber's qualifications?

There being none, he is accepted.

Q Mr. Faulhaber, are you familiar with the geology along the south boundary of the West Puerto Chiquito Mancos Pool?

A Yes, I am.

Q Yes, I am.

A And the area directly to the south of the pool?

A Yes. Mobil has a fairly large acreage position in that area and I've been evaluating it for Mobil.

Q Did you evaluate the geology in preparation for this hearing?

A Yes, I did.

Q And as a result of that did you prepare some exhibits?

A Yes, I did.

Q Would you pull out what's been identified as Mobil Exhibit Number One?

A Okay.

Q Does this represent work that you did in preparation for the hearing?

A Yes, it does.

Q Would you identify the exhibit and review the information contained in it?

A The primary purpose of this exhibit is -- is to show the structure on top of the Gallup A Zone in the southern portion of the West Puerto Chiquito Mancos Pool.

With regards to the structural aspects, I should note that the structure contours are on top of

Gallup A Zone. If you compare this with -- against structure map of the previous geologic witness, you will probably notice a few differences in picks but geologists wouldn't have jobs if they didn't have differences.

As far as contour intervals, I used a similar approach.

At the 100-foot contours on the western -- or lefthandmost approximately half of the map, the black contours are at 100-foot intervals. Starting at 1000 feet, and I've -- on up through the outcrop on the east, the contours are spaced at 1000-foot increments, so we have an order of magnitude increase in contour interval between the left and righthand sides of the map.

This is simply to prevent -- to keep from cluttering up the map with too many lines by creating a consistent structure interval on the map, contour interval, rather.

Other features of note is the -- on the righthand side there's a heavy black line that's labeled "Approximate top of the Gallup (El Vado A Zone)". That's essentially the -- the top of the Niobrara as previously mentioned as interpreted by me.

Other structural features is that down in the southern -- in Section -- in 23 North, 1 West, Section 2, you'll notice that I've mapped several faults and

I'll get into those in a little bit.

Other features of note is I've indicated, the current boundary of the West Puerto Chiquito Mancos Pool and also the boundary of the Regina Gallup Pool.

The wells posted on this map are wells that have penetrated the Gallup and I've underlined those that are completed in the Gallup.

Q What does Exhibit One illustrate to you as a geologist?

A A number of features are important on Exhibit One. One is the steep dip on the eastern side of the basin, where the Gallup goes from a depth of 1000 feet, or less, from an elevation relative to sea level of 1000 feet or less and within the distance of a few miles outcrops at an elevation in the 7-to-8000 range.

We have very steep dips on the eastern side. We feel that these dips are in some way related to faulting, north/south trending Basement faults, and that these -- the corresponding dips are related to accommodation of the section to that movement.

In that regard in Section 2 I've indicated a north/south fault going essentially -- bisecting the section into an east and west half.

The exact position of that fault is

somewhat interpretive at this time. It's essentially my best judgment of the available data.

Other interesting features, as you'll notice in the low dip portion, the black contour line portion of the map on the eastern side, you'll notice in the northeastern quarter we've started a structural elevation on top of the Gallup of 500 feet and we've slowly come up to where it's about -- near 800 feet near the Amoco 1 State CC, and if we start looking at contour values, what we're seeing is there's a structural gradient rising to the south.

Then if we look some detailed structural values in the southern part of 24 North, 1 West, in Section 26 in the Amoco 1 State CC, we have an elevation of 828 feet. In Section 34, the old Magnolia No. 1 Henry Schmitz, we have an elevation of 862 and in Section 35 with the Nassau Resources No. 7 Wishing Well we have an elevation of 883 feet.

Then if we go to the south, the structural trend changes abruptly. We go to the top of the Gallup A of 743 feet and this radical change in structural trend I've interpreted as being due to faulting and it's my best judgment that the faulting would approximate this northwest/southeast trending fault that I've highlighted in yellow, and indicated with -- down on the south side and

north on the up side and being near the present boundary, southern boundary of the West Puerto Chiquito Mancos Pool.

Q You've indicated one of the dotted or dashed lines as a possible fault. What do you mean by that?

A What I mean is I've begun doing some surface geology out there and I've identified what appeared to me on the surface to be a fault of unknown displacement and magnitude at approximately that location. I don't know its orientation at depth or really not if it's present at depth.

Q Is it a significant fault?

A It could be.

Q You also have indicated here by the dark line A-A', what's that?

A That's the cross section that we'll show on Exhibit Number Two. That's the direction of the cross section.

Q Why don't we turn to that now?

A Okay.

Q Unless there's something else that you could show us on this.

A No.

Q Would you identify and review for the Commissioner Exhibit Two, Mobil Exhibit Two?

A This is a structural cross section running from north on the left to south on the right, looking east into the plane of the section, and on this I've shown the principal horizons in the Niobrara, or Gallup, whatever you want to call it, zones, A, B and C zones, and their structural relationships to each other, and the location of the -- of the fault, and you can see just between the Amoco State CC No. 1 on the left, we've got rising structure to the right to the Nassau Resources Wishing Well 35 No. 7, and then when you get to the Laguna Colorado 2 No. 6, then that -- that trend is abruptly reversed and this abrupt reversal we've interpreted as a fault. I've interpreted it as a fault.

Q That's essentially what Exhibit Two illustrates?

A That's right.

Q You were in the room, were you not, when Mr. Ullrich gave his testimony earlier today?

A Yes.

Q And you have in front of you McHugh Exhibit Number One.

A Yes, I do.

Q How would you compare McHugh Exhibit One to Mobil Exhibit One?

A The structural values and the general

form are very similar between the two maps. The major difference comes into their treatment of the structural value of -- for the Laguna Colorado No. 2 in that they apparently do not interpret faults in the area. I probably follow a different philosophy. I feel faults are very important in this area. And they've chosen to draw, I guess, a sink hole around that particular structure value rather than to fault it down as I have done.

Q Based on your geologic studies in the area and given the information that you've compiled and -- prepared and compiled for us in Exhibits Number One and Two, in your opinion are the Laguna Colorado 2-6 and the Wishing Well geologically within the same pool?

A I do not believe that, no.

Q What are the reasons for your opinion?

A The faulting. There's a significant amount of apparent throw on that fault, on the order of 200 feet, and that puts the formation on the downthrown side, quite -- quite a bit separate from the upthrown side.

Q In your opinion, from a geologic standpoint, will the Laguna Colorado 2-6 effectively drain the 640-acre area?

A I don't believe it will drain all of Section 2.

Q Why not?

the southernmost extension of the West Puerto Chiquito Mancos Pool to the south was not based on the traditional methods of pool expansion of expanding pools through drilling. This expansion was based pretty much on, I guess, apparently on geologic conjecture or interpretations at the time as being an area that might have spacing requirements similar to the area to the north.

But it was not based on -- on progressive drilling from north to south.

Q In your experience is this the normal way for a lease to expand?

A I've never seen a pool expanded to this large an extent in New Mexico without any -- without establishing production.

Q Given the manner in which the initial boundaries were established, was there a need for a buffer zone, in your opinion to protect the southern boundary of the West Puerto Chiquito Mancos Pool?

A No, there was no need. The buffer was implicit and internal to the expanded area.

Q Based on the development scheme between 1970, the date of the Exhibit Number Three and the present as depicted on Exhibit Number one, is there currently a need for a buffer zone, in your opinion, to protect the southern boundary of the West Puerto Chiquito Mancos Pool?

A I don't believe so, no.

Q Why not?

Q Well, just taking it a piece at a time, if we go from west to east, the development, the producing wells in the southern boundary, there are no production -- there is no production along the southern boundary of the West Puerto Chiquito Mancos Pool in Sections 31, 32 or 33 or 34, so there's no need to have a buffer zone offsetting those.

When we get to Section 35 we come upon what appears to be a situation, an actual physical pool boundary, geologically established through the drilling of the Laguna Colorado No. 2 and establishing the presence of a fault.

As we come around and go up into 24 North, 1 West, and look at Section 36, that area has already been addressed and the Regina Gallup Pool has -- was found to be appropriate for that area, along with the consequent attraction of the West Puerto Chiquito Mancos Pool.

Continuing on in 24 North, 1 East, offsetting Section 30 in the pool, there is no production there and so Section 31 obviously doesn't need protection or does not require the buffer zone.

Q Is there anything else of significance that we should cover on Exhibits One through Three?

A Not that I can recall.

Q Were Mobil's Exhibits Number One through Three prepared by you or under your supervision and direction?

A Yes.

MR. BULLER; At this time, Mr. Examiner, we would offer Mobil's Exhibits Number One through Three into evidence.

MR. STOGNER Are there any objections?

MR. KELLAHIN: No objection.

MR. STOGNER: Exhibits One through Three will be admitted into evidence.

Mr. Kellahin, your witness.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Faulhaber, am I correct in understanding that by comparing your structure map with a draft of Mr. Ullrich's, that each of you have honored the available geologic data points that are known to both of you?

Am I correct?

A Yes, I believe so.

Q And that we do not have any physical evidence of any of these wellbores cutting a fault.

A Not to my knowledge.

Q So the difference which lies between you two experts is that you've taken the same basic information and you disagree as a matter of how to interpret that information.

A That's correct.

Q When we look at your Exhibit Number One, am I correct in understanding that we look at Section Number 2, the Laguna Colorado section, where that well is?

A Yeah, where that well is.

Q And as we move to the section to the west, Section 3 --

A Yes.

Q -- do you agree or disagree with Mr. Ullrich in his opinion that geologically both of those two sections are in the same common source of supply?

A I have not had an opportunity to study that.

Q When we look at the relationship of Section 2 to the diagonal offset to the southwest, Section 10, have you studied that to determine whether or not geologically you can separate out Section 10 from Section 2?

A Okay, is that meant to be a question similar to your previous one?

Q Yes, sir.

A Okay, could you restate your previous question?

Q Yes, sir. I want you to go around Section 2 with me --

A Right.

Q -- and find out at what points you have studied that geologically to a point where that you're comfortable with an opinion and if you have an opinion, whether that opinion tells you the adjoining section is in or out of 2.

A Okay. Okay, let's --

Q The relationship between Section 2 and 3 to the west.

A Okay. I have studied it into the -- to the extent of doing some limited surface geology, and the possible fault I've indicated would lend me some concern that maybe Section 3 is not in communication with Section 2.

Q Okay, other than that we do not yet have enough geologic data in your opinion to take Section 3 and separate it from a source of supply with the Section 2 production.

A No. We'll continue to have the problem but --

Q When we look to Section 10 and the rela-

tionship to 2, you're telling me you don't have geologic data at this point to separate out Section 10 from Section 2.

A The data I have which would suggest that the faults I've shown in Section 2 extend to the south, the data I have suggest to me that 10 and 3 are not in communication with Section 2.

Q And that's a result of the interpretation of the vertical faulting line that runs north/south into the dashed line to the west of --

A That's correct.

Q -- the Laguna Well?

A That's correct.

Q When we go to a relationship in Section 2 and the section to the north where we have the Wishing Well, the Section 35 Well?

A That's correct.

Q That is a matter of interpretation where you have interpreted the fault that we see shown on this structural cross section, Exhibit Two?

A That's correct.

Q The displacement of that fault in the top of the A in the Wishing Well and the top of the A in the Laguna Well is approximately 100 feet, is it?

A Maybe a little more than that. Let's

see. It's about 140 feet if you want to go well-to-well.

Q Well-to-well it's about 140 feet?

A Yes.

Q And have you concluded from your interpretation that that throw to that fault is of a significant magnitude that we are not going to have fluid or gas migration across that fault?

A That's what I would suspect from the geologic evidence.

Q How do you reconcile that interpretation, Mr. Faulhaber, with Mr. Johnson's testimony that for an 18-day period in July 8th of 1988, to July 26th, 1988, in the Laguna Well that's not being produced, he experiences 231 pounds of pressure loss?

A I'm not qualified as a reservoir engineer. My reservoir engineering experts that I rely on inform me that there's a lot of mitigating factors that could go into that observation and so I cannot integrate that observation with all of its mitigating factors into my geologic observations.

Q Your geologic observation, though, is one, and I want to make sure I'm clear, it is your conclusion that the displacement is so great that we in fact geologically have separated the source of supply with the fault.

A Yes.

Q And in the absence of a fault, then, you can do what Mr. Ullrich did and that is to stratigraphically correlate the A and B and the C zones.

A The strata correlate across the fault, yes.

Q And but for the existence of the fault, then, you would in fact have the same common source of supply between the two areas.

A I'm not quite sure I understand what you want me to conjecture on.

Q Well, I don't want you to conjecture on anything. I want to understand what it is that causes you as a geologist to tell me and the Examiner that you've concluded that between the Nassau Wishing Well and the Nassau Laguna Colorado Well you now have separate sources of supply.

A Okay. Yeah, that conclusion is based on the existence of a fault. The fault is based on the existence of a reversal of structural trend, which is a pretty accepted technique in geology for recognizing the occurrence of faults.

Q And you have agreed with me that Mr. Ullrich has taken that same data and has interpreted the difference in structure and not inferred a fault between

the two wells.

A He does not appear to have inferred a fault, no.

MR. KELLAHIN: No further questions.

MR. STOGNER: Mr. Lund, your witness.

MR. LUND: No questions, thank you.

MR. STOGNER: Mr. Hall, your witness.

MR. HALL: No questions.

MR. STOGNER: Are there any other witnesses -- I'm sorry, any other questions?

MR. CHAVEZ: May I ask some questions?

MR. STOGNER: Mr. Chavez.

QUESTIONS BY MR. CHAVEZ:

Q Mr. Faulhaber, is it your opinion that the Laguna Colorado Well is producing from the fractured Mancos Shale?

A Probably from the Niobrara A, B and C zones, yes.

Q Do you believe it's producing because

it's in the fractured shale or that it wouldn't produce unless there were fractures?

A That's correct.

Q What is your general opinion of the spacing required for fractured Mancos Shale wells in this area?

A It varies. I think that for the (unclear) No. 1 Well Mobil Federal, I think 40 acres is probably a good spacing.

For some of the others, for the No. 1 State CC and the 7 Wishing Well, it appears to date on the evidence we have that 640-acres is appropriate.

Q Thank you.

MR. STOGNER: Mr. Kellahin, do you have rebuttal?

MR. KELLAHIN: No, sir.

MR. STOGNER: I'm sorry, Mr. Buller, any rebuttal on this?

MR. BULLER: No, I have no rebuttal.

CROSS EXAMINATION

BY MR. STOGNER:

Q Mr. Faulhaber, is there any reason besides faulting for this particular phenomenon which you

have referred to showing that the dip had changed directions?

A You, if you -- if you -- you might be able to do it with folding as Mr. Ullrich did, but based on my studies in the area and the brittleness of the formation, the formation fractures very easily, I don't think the folding is an appropriate mechanism for showing this displacement. That, based on regional studies I've done, there's a very major north/south tending fault immediately to the south of this area that's moving the Nacimiento Uplift; I think that high angle normal faulting is the mode of deformation that's showing us that it produces the change in structure in this area.

Q Now you mentioned just now that in your opinion the Laguna Colorado Well --

A Uh-huh.

Q -- could be adequately drained with 40-acre spacing.

A Say that again.

Q That the Laguna -- I'm sorry, that the Laguna Colorado Well is adequately draining 40 acres, is that correct?

A I don't think it's been produced long enough --

Q Okay.

A -- to know what its drainage area is going to be.

MR. STOGNER: Any other questions? You may be excused.

Mr. Lund?

MR. LUND: I have one witness and one exhibit.

G. RICHARD JONES, JR.,

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

DIRECT EXAMINATION

BY MR. LUND:

Q Mr. Jones, would you please state your name, your business address and by whom you are employed?

A My name is G. Richard Jones. My business address is 1670 Broadway in Denver, Colorado. I'm employed by Amoco Production Company. I'm employed as a production engineer and Senior Petroleum Engineer.

Q Have you ever testified as an expert witness before the OCD?

A No, I have not.

Q Very briefly, then, please give your educational background from college on and your relevant work

experience to date.

A I graduated from Tulsa University in 1982 with a Bachelor of Science in petroleum engineering.

I had worked for Amoco since 1974 in the capacity of doing core studies for tertiary recovery.

After receiving my engineering degree in 1982 I moved to Denver in the capacity as a production operations engineer.

Q Now, you've studied this area for purposes of this case.

A Yes, I have.

Q And you're prepared an exhibit for purposes of the case?

A That's correct.

MR. LUND: I offer Mr. Jones as expert in petroleum engineering.

MR. STOGNER: Are there any objections?

MR. BULLER: No objections.

MR. STOGNER: Mr. Jones is so qualified.

Q Before we turn to Exhibit Number One, Mr. Jones, does Amoco hold acreage that's going to be affected by this application?

A Yes, we do.

Q Just generally where is that?

A In Section 3 for the majority and then a little bit to the south.

Q Would you please turn to your Exhibit Number One and state what that says and why it's relevant?

A Essentially what we're trying to do is compare the Canada Ojitos No. 19, or A-14, to the Schmitz Well and the State Com CC, and essentially to show variability in reservoir performance between the three wells.

Essentially on the first line we're going to show a pressure of 1360 pounds for the State CC on February of 1988. That was measured via the bottom hole pressure test and we essentially corrected it to 750 to account for what we believe is the gradient during running the pressure test to account for the difference between 6687 and 750, roughly.

Q How far away are these wells from each other and they've already been talked about on the exhibits but just real quick tell us.

A Essentially, the Schmitz Well, the Amoco Schmitz, is located about 3/4 of a mile away from the State CC and --

Q And that's in Section --

A No, in Section 20 -- well, I'm not real sure without a map in front of me which section that's in.

Q Is that Section 25?

A It should be 25. Yes, the Amoco Schmitz Well is located in Section 25.

Q We haven't seen any data on that yet.

A Haven't seen any? No, we have not during this -- this hearing.

Essentially what we'd like to present at this point is the pressure that we took on 2 of 88 for the Amoco Schmitz Well of 602 psi. We essentially obtained that through a fluid level measurement.

As you can see, the pressure difference between the Schmitz Well and the CC, as well as No. 19, are significantly different.

Q What does that tell you?

A What that tells me is essentially they are not in communication with each other, at least on a pressure measurement.

Q So the CC and the Schmitz are about 3/4 of a mile apart the CC and COU No. 19 are about 4 miles apart.

A That's also that correct.

One additional point I'd like to make at this time is the Southern Union well, the Mobil Federal in Section 36, in June of 1981 it was -- presented a pressure of 430 pounds surface pressure for that well, which is

again significantly different than any other pressures you see on this exhibit.

Q All right, turn from the pressure, then to the GOR information and what does that show?

A What we have here is -- I'll start with the center column for Canada Ojitos No. 19. Essentially that producing GOR is for the pressure maintenance area only, and that information is based as of February, 1988, and you can see the 6651 is an order of 10 difference between the State CC at 526, and that -- that measurement was taken on first delivery to El Paso Natural Gas, so that indeed is probably going to be the highest GOR that we will see. In fact, we have shown after that that the GOR has now reduced about 100, so it's on the order of 425, which is more like the Schmitz Well at a 377 and more like a Southern Union well at 424, and much different than a Canada Ojitos at 6651.

Q And do you have some information on the Southern Union Well's GOR in Section 36, also?

A Yes, I do. The GOR was 424.

Q Where is that from?

A That is from the State records, C-115's, and it's as of May, 1988.

Q If there were reservoir continuity between the COU No. 19 and, for example, the Schmitz Well,

what would you expect as a petroleum engineer?

A We would anticipate similar type producing GOR's.

Q And the Schmitz Well I think Mr. Faulhaber testified is structurally high?

A Yes.

Q And structurally up dip of the No. 19?

A That's also correct.

Q Based on your study is the Canada Ojitos No. 19 Well, it's an injection well, and do you see any effect by that injection on these wells?

A We have not seen any effect at this time from the Canada Ojitos No. 19 on the Schmitz or the CC, and in particular the Schmitz, assuming that the producing characteristic, and the reason that Al Greer is injecting gas in the West Puerto Chiquito Field. using gravity segregation to sweep oil downward, we would anticipate that the Schmitz Well would have a high GOR.

One additional point I'd like to make at this time is the Canada Ojitos No. 19 was actually fracture stimulated and essentially it never recovered the load oil that it was fracture stimulated with. In fact, at 22 months after it had been stimulated, it had not recovered the load oil and still had over 1000 barrels of load oil to recover, which would imply that the well is definitely non-

commercial and probably nonproductive.

Q Have you seen any gas breakthroughs in the CC or Schmitz from the Canada Ojitos No. 19 Well?

A No, we have not.

Q Let's talk about producing rates now.

A Producing rates, essentially we have a 520-barrel a day rate for the State CC. The average for the producing wells in Canada Ojitos Pressure Maintenance Area is 40 barrels a day and on the Schmitz we have a 61-barrel a day rate.

Essentially you can see a complete variability from Canada Ojitos Pressure Maintenance producing rates and the State CC, and a difference between the Schmitz Well and Canada Ojitos Unit.

Q Do you believe that that shows reservoir discontinuity between the COU No. 19 and the wells to the south?

A Yes, I would believe that would be the case.

Q All right. Let's turn to the primary producing zone.

A Essentially what we're showing here is the primary producing zones in the State CC, the Canada Ojitos No. 19, which is not productive, it's an injector, but it was tested in the C zone, and then the Schmitz Well,

which is producing out of the C zone only, and we're showing a complete variability between the Schmitz Well and the CC Well, and a variability between the Canada Ojitos Well, even though technically the No. 19 has not been tested in the A and B zones.

Q Again, if the reservoir were continuous, and since the COU No. 19 is injecting into the C zone, would you expect to see some sort of effect upon --

A We would anticipate particularly the C communication in the Schmitz Well.

Q But you have not seen any?

A We have not seen any kind of GOR rise.

Q Let's refer to one of the previous exhibits and talk about some of the poor wells and dry holes from the north to the south.

Would you identify what you know about those and specifically state where they are?

A Outside of the COU No. 19 in Section 14, the Reading and Bates Duff No. 1 was DST'ed in the AB zone of the Niobrara or Mancos, whichever you would like to call it. It showed a nonproductive interval.

Q Okay, what section is that well in?

A Section 24.

Q Okay.

A And then the Mobil Schmitz Well in Sec-

tion 34, which again was DST'd through the Mancos and again showed no productivity on that particular well.

So based on, you know, the location of the Duff, the A-14, and the Mobil Schmitz, it would indicate that there is some kind of segregation of this pool down here.

Q What about the Canada Ojitos No. 27 Well, which is in Section 8? It's in the southwest portion of the unit? Do you know anything about that particular well?

A Yes, I do. The production from that -- again it's a very poor producer, a 2-barrel a day and 11 MCFD, and that's as of February. Again, that's a much different type producer than we're seeing down south.

Q Did you mention the Canada Ojitos No. 16 Well? I'm sorry.

A I did not mention the No. 16 but at this time again as of February it was 14 barrels a day and 13 MCFD, which again demonstrates a very similar producing characteristic in that area and quite dissimilar from the area that we're talking about.

Q And the No. 16 Well is located in Section 3, I believe, is that right?

A I'm going to have to get another map because I don't have it on this one.

Q I'm sorry, that's fine. Based on your analysis of this reservoir, what do you conclude by all this data?

Based on my analysis, an analysis of the entire area which we've studied for some time, they would indicate that this, this particular area, the CC, the Nassau, as well as the other producing wells, are indeed some, a separate entity in itself and should be treated as such. as such.

Q Do you have an opinion on why a buffer should be imposed on a pool in New Mexico?

A Typically the buffer is imposed as drilling is developed. What it does, it provides for an orderly development of a field and essentially it starts from a central point and expands outward, where in West Puerto they essentially started outward and now are working inward and now they feel that they need a buffer zone to protect protect something that really has not been proven to be continuous from the north to the south.

Q Did you prepare Exhibit Number One?

A Yes, I did.

MR. LUND: I offer it into evidence.

MR. STOGNER: Are there any objections?

MR. KELLAHIN: No objection.

MR. STOGNER: Exhibit Number One will be admitted into evidence.

Q Mr. Jones, let's quickly summarize what your conclusions are.

A My conclusions are that this area indeed has not been proven to be part of West Puerto Chiquito; in fact, as indicated, it is probably a separate pool. The difference in the producing characteristics between the Southern Union, the Schmitz, and the CC and the Wishing Well indicate that there may be potential for a second well and at this time we propose that the second well in our Section 36 be tested against the other producers to see if there is any communication, but until we have further information, we cannot say that 640 -- the correct spacing should be 640's.

Q Do you have an opinion about what appropriate setback should be?

A Setbacks of 1650 essentially eliminate the possibility of putting a second well on a unit because it allows them to be so close, so don't get the appropriate drainage area.

We have looked at the area. 790 seems a little bit close but we felt to compromise that maybe a 990 and there's no technical basis on that, it's just kind of a

reasoning basis.

Q So you'd like to gather some more data and study it a little bit more to see if eventually an infill well would be needed and what the setbacks?

A That's correct. I think it's premature to say that this area should be set up as West Puerto and that further data should be acquired before we make that kind of decision.

MR. LUND: I have nothing further and will tender the witness for cross examination.

MR. STOGNER: Mr. Kellahin, your witness.

CROSS EXAMINATION

BY MR. KELLAHIN:

Q Mr. Jones, I need some help with your definition of "this area".

A Yes, sir.

Q By "this area" what are you saying?

A "This area" I'm talking about Section 2 and the surrounding producers of 26, 25, 35, 36, and Section 2.

Q When we look specifically at Section 2 with the Laguna Colorado Well, are you telling me that is not producing out of the same common source of supply as

the Amoco CC Well and the Nassau Wishing Well?

A What I can indicate is that it is perforated and completed in the A, B and C. Now, whether it's the same common source of supply is a little bit different.

One thing I'd like to inject at this point is the comment about the pressure on the Laguna Federal being obtained via fluid level, now we had temporary information from PVT analysis on the State CC, the AB section shows that the bubble point is at a minimum of 1200 psi and a casing pressure of 800 will not compress all of the gas into the liquid to be compressed on fully to a zero level.

Therefore, the pressure indicated from the initial rate is probably high.

Q Let's go to Section 26 and the Amoco State CC Well.

A Okay.

Q That well is, you said the current rate is about 520 barrels a day?

A Yes, it varies quite a bit, though.

Q Is there any doubt in your mind as engineer that that well in fact is capable of draining 640 acres?

A Right now the information is still -- the jury is still out, essentially. One, I don't have

further pressure data to show cum recovery and we're only talking about a few months of production at this time. So I'm not sure what the (unclear) per PSI draw-out is going to be. So, no, I don't know what the correct spacing should be.

Q Well, have you given us all the pressure information on the State CC Well?

A I have given you the pressure for the C zone.

Q You've given me an initial pressure in the C zone of 1360.

A That's correct.

Q Would not an indication of a pressure response between the State CC Well and the Wishing Well tell you whether or not those two wells are in communication?

A It would tell me that they are in communication; however, it does not tell me that they're draining 640 acres.

Q Well, those wells are approximately a mile apart, are they not?

A That's absolutely correct.

Q And, in fact, Amoco has that information, don't they?

A Yes, we do.

Q You had a pressure bomb in the State CC Well when the Wishing Well was fraced on February 12th, 1988.

A That's correct.

Q And within an hour of that frac treatment you got a response in your well.

A That is also correct.

Q Okay. When we look at the Nassau Wishing Well, do you have any pressure information from that well that is different or in addition to the information Mr. Johnson provided for us earlier today?

A No, sir, I do not. Essentially I would say that those wells definitely were in communication; however I have no information to tell me that the Nassau Laguna Colorado is in communication with the Wishing Well.

Q On Exhibit Number Six Mr. Johnson has shown us a pressure from February 15th, 1988, for the State CC Well. Do you have that?

A Excuse me, what date was that again?

Q Well, he's put in pencil on his Exhibit Six, do you have his Exhibit Six?

A Well, I believe I do. Is that on a plot or is it on a map?

Q It's on Exhibit Six. It's on a map.

A Okay, yes, I see the pressure.

Q Mr. Johnson has given us a pressure in February of 1460 psi.

A That's correct.

Q Is that an accurate number?

A No, sir, it is not.

Q What is the right number.

A Essentially what that number reflects is a number at a datum different from the 750. In addition to that, it's the pressure at the end of the pressure test post frac. Now the pressure prior to the stimulation had peaked out and all that peaked out was flat at 1429, and essentially correcting that to the 750 gives us the 1360. So we show no further build-up on the State CC at that time.

Q Okay, so when we get a corrected pressure for the State CC from you, I'm down from 1460 Mr. Johnson gives me, to 1360?

A That's correct.

Q Well, compare 1360 with what he shows us on the Wishing Well, he's got 1252 in -- in May it is and -- but look at his March number, he's got 1315.

A Correct. You're only 45 pounds apart.

Q That's also correct, and I have not indicated that the CC and the Wishing Well were not in communication. I have indicated that the Wishing Well and the

Laguna Colorado is not -- the information does not tell me that they are in communication. In fact, the information suggests that they are not.

Q Well, you're jumping ahead of me for a minute. Bear with me, let's stay with the State CC and the Wishing Well.

A Okay.

Q Mr. Johnson has concluded from his information that those wells are in fact in communication.

A That's correct.

Q You don't mean to disagree with that, do you?

A No, no, I absolutely agree.

Q Within 15 days of each other they've got pressure measurements that are about 45 pounds apart.

All right, no problem with that.

A Well, now I have not corrected his measurement to -- to the 750 subsea, so it's actually going to go up, his number is.

Q Mr. Johnson gives us some measurements on his exhibit for July 8th of '88. He's got a pressure of 1127.

A Correct.

Q Eighteen days after that his pressure in that well is down to 896.

A That's also correct.

Q Eighteen days, no production on the Laguna Colorado Well.

A That's correct. Let me point out what --

Q Well, let me ask my question.

A Okay.

Q My question to you, sir, is if that well is not being depleted by the Wishing Well in combination with the State CC, where is the pressure going?

A Because the first pressure was erroneous. Essentially the second fluid level that he took was after a period of shut-in time and therefore, essentially, he could get an equilibrium, but the first one, if I'm not mistaken, it was after a producing time.

Q And you think that accounts for the difference?

A I think it could account for the difference, yes. We have seen that fluid levels are not a reliable source of bottom hole pressure.

Q If Mr. Johnson is correct about there being a pressure drawdown in this well, assume that as a given for a minute, is there any other source by which that production pressure can be depleted unless it comes from the north from the Wishing Well?

A Let me ask one question. How much production has come off the well? I realize that --

Q Let's assume zero.

A Well, I don't think we can because you did have production off the lease.

Q Of course we can. You're talking about the Laguna Colorado Well, how much production came off the well? Assume that between the two pressure points, zero production was taken from the well. Zip. Nothing. Is there any other likely candidate for the pressure depletion other than the Wishing Well and the State CC Well?

A Other than the Mobil Federal would be the only well.

Q That's the one in 36.

A Or the Schmitz, which I think structurally they're fairly similar, aren't they?

Q Those four wells in some combination, looking at Sections 25, 26, 35 and 36, those are the four candidates by which, if Mr. Johnson is correct in his pressure depletion, those are the sources by which that pressure is being depleted.

A That would the inference on that, yes.

Q No further questions.

MR. STOGNER: Mr. Buller, your witness.

CROSS EXAMINATION

BY MR. BULLER:

Q Is it possible for a higher pressure well to deplete a lower pressure well?

A Typically you'll see flow go from high to low instead of the reverse.

MR. BULLER: I don't have any other questions.

MR. STOGNER: Mr. Hall.

MR. HALL: No questions.

MR. STOGNER: Mr. Chavez.

QUESTIONS BY MR. CHAVEZ:

Q Yes, sir, Mr. Jones, do you find that the A and B zones have a different GOR than the C zone in that area?

A Yes, we do.

Q Are they high or low?

A The C zone is slightly higher.

Q The C zone GOR is higher than the A and B zones?

A That's correct. Excuse me, the AB is a little bit higher than the C.

Q Okay. So could that possibly account for a lower GOR in the Schmitz No. 1 than the State Com CC

because the State -- the Schmitz is perforated only in the C zone and the GOR you show for the State Com CC is A, B and C?

A That's correct. 677 to 526, yes, that could account for that.

Q Is the pressure you're showing at 1360 on the State Com CC, is that what you'd call virgin reservoir pressure?

A I'm -- I'm not sure. Our indication is that that's the initial pressure on the well. Whether it's a virgin pressure or not I can't say.

Q What would you anticipate would be the pressure, bottom hole pressure, on that well had there not been any production from that area previously?

A One of the things you look at is initial pressure, for instance, on the Southern Union Well at 1000 pounds on the surface, and comparing the 1000 to what we have at 1360 is within the realm of possibility for an initial pressure, so you'd probably anticipate it to be higher but not necessarily to be true.

Q Would you anticipate that the Canada Ojitos Unit No. 19, referred to as the A-14 Well, that the bottom hole pressure on that would perhaps be relative to virgin reservoir pressure for this area?

A As far as the virgin reservoir pressure

that's been shown in exhibits in all of the Gavilan hearings, they've stated something around 18 - 1900. Now, the pressure I see on the A No. 14, let me just relate this to you. The pressure, brought -- 1000 pounds on the surface brought the well down initially, which told me that the pressure is somewhere around -- somewhere over 1000 pounds initially in that well.

Q That's all I have.

MR. STOGNER: Thank you, Mr. Chavez.

Mr. Lund, is there any redirect?

MR. LUND: Just one.

REDIRECT EXAMINATION

BY MR. LUND:

Q Mr. Kellahin was asking if you look at Exhibit Number Six (unclear) was asking you a lot of questions about those wells to the south that are listed there by Mr. Johnson. What's your real point? Is it that -- that the wells to the south are different than the area to the north or just -- just sum up.

A To summarize, looking at the completion attempt on the Canada Ojitos A-14, the testing of the Duff in 24, it would imply that there is some kind of reservoir

discontinuity, for instance, just say a permeability barrier of some type between Canada Ojitos and this area.

Q So because of that reservoir discontinuity you don't think that those wells to the south should be in West Puerto Chiquito.

A No, I do not.

Q Thank you.

MR. STOGNER: Thank you, Mr. Lund.

Any further questions? Mr. Chavez?

MR. CHAVEZ: Just one.

QUESTIONS BY MR. CHAVEZ:

Q Mr. Jones, how will Amoco be adversely affected if this application is approved?

A Adversely affected in the sense that it restricts us to one well per 640 and to a 1650 setback which we definitely do not feel is appropriate at this point, and that way would limit us from adequately and fully developing our land to maximize recovery.

Q Okay, this is in the area proposed that's already outside the --

A We have -- we have 480 acres in Section 1, or excuse me, Section 3 at this time, and I believe we

have a little bit of acreage in here. I don't have that exact number.

Q Okay.

MR. STOGNER: Is there any further questions of this witness?

I have no questions. You may be excused.

MR. LUND: We have nothing further.

MR. STOGNER: Thank you, Mr. Lund.

Mr. Kellahin, do you wish to recall any of your witnesses at this time?

MR. KELLAHIN: I don't think so, Mr. Stogner.

MR. STOGNER: I believe we're ready for closing statements.

Mr. Hall -- I'm sorry, hang on just a second.

Mr. Hall? Closing statement?

MR. HALL: No, sir.

MR. STOGNER: Mr. Buller?

MR. BULLER: A short one; the time's getting late.

seeks an order creating special pool rules, thereby causing the automatic expansion of the southern boundary of the pool and further seeks inclusion of Section 2.

We don't believe that it has been established sufficiently that the subject well in Section 2 is in the same reservoir as those in Section 35 and the others to the north. We don't believe that there is sufficient data. We don't believe that sufficient data was presented to establish that 640-acre areas are appropriate for drainage or spacing.

The West Puerto Chiquito Mancos Oil Pool and exploration area, it was already set up to be an exploration area and not a pool as typically defined by New Mexico law and regulations.

The boundaries have never been defined by production and buffer zones aren't really appropriate in this kind of situation.

For these reasons we simply feel the application ought to be denied.

MR. STOGNER: Thank you, Mr. Buller.

Mr. Lund?

MR. LUND: As might be expected, I agree with Mr. Buller and think there's been a lot of confusion, you know, we're talking about the same

common source of supply. Well, apparently, the same reservoir goes all over northwestern New Mexico but yet there are different areas that produce differently and it's based on a number of factors, and I think that the bottom line in our case is that we think that the West Puerto Chiquito rules were adopted for that particular producing area which has been shown by the evidence presented today to be very different to the area to the south. It looks like to us that that might be a separate pool. It may be separated. There are some dry holes between and there are different producing characteristics, and so the answer isn't this is the same common source of supply or it's the same sand or it's the same reservoir, anything like that. That's not the -- that's not the situation. There are differences in producing (unclear).

And as Mr. Buller stated, West Puerto Chiquito is different than, as far as I know, any other pool in New Mexico because they haven't established a buffer based on development. It started big and it just hasn't been developed, and there's a big gap of land in the pool boundary right now that has exhibited either dry holes or poor, poor wells, and there's just no reason for the (unclear) to be expanded down in this area. In fact, it looks like it's a separate pool.

This Commission established

the Regina Gallup Oil Pool in an order in 1981, and Finding Number Five of that order, which is Order R-6748 in Case Number 7208, stated that Section 36 that we've talked about was a separate common source of supply from the West Puerto Chiquito.

So this Division has already been aware of the reservoir variability. As I said, I wouldn't just talk about reservoir discontinuity. It's just a different pocket and it shouldn't be lumped into West Puerto Chiquito without any additional data.

There are better options available to Mr. McHugh. They (unclear) Section 2 -- they should expand, you know, just one section, say, on a temporary basis, state that on a temporary basis that West Puerto Chiquito rules ought to apply in Section 2. I think it's overkill. Now, there's just no development and we're using a nuclear bomb to kill a fly here. It's just inappropriate.

And the bottom line is that the (unclear) pool in New Mexico that doesn't have automatic buffer expansion and things like that. Well, that's because it started way too big, and a buffer isn't appropriate for undeveloped land, and we respectfully request that the application be denied.

MR. STOGNER: Thank you, Mr.

Lund.

Mr. Kellahin.

MR. KELLAHIN: Mr. Examiner, with all due respect to these gentlemen, their science and their position, 95 percent of what I have heard this afternoon and what you have heard, is their concern about the extension of the Canada Ojitos Unit and its relationship with the State CC Well, the Wishing Well, and the Laguna Colorado area.

They talk about that as "this area" and what they're talking about is their concerns with Mr. Greer and what happens in the southern portion of his unit.

They have not given us one shred of viable explanation to show us why the well in Section 2 should not be treated like the well in 35 and the well in Section 26.

It's interesting to note that this is probably the only pool that we can find that has one of these unusual provisions where Mr. Chavez can't automatically expand this pool boundary with a nomenclature application as the development occurs in a pool.

It's a (unclear) rule that needs to be taken out of the pool rules, and the reason is obvious. The Laguna Colorado Well is connected to the

Wishing Well just as sure as it can be. You might as well lay a pipeline on the surface. That sucker is connected and it's connected on to the other wells, the Wishing Well, the State CC Well. Mr. Jones told us he had a pressure bomb in that well when the Wishing Well was fraced, and in an hour he got pressure response.

You don't have to do any volumetric drainage calculations, any material balance calculations, to show you when you stack those three wells in the position they're in, each one is approximately a mile apart and each one is communicating one with the other.

I don't know what better proof you're going to get. If that's not good enough, you're never going to get a section line this into a pool.

The rule needs to be changed. It's an arbitrary political boundary that does not separate this reservoir. We are in the same common source of supply and the only way Mr. Faulhaber can get us out of the West Puerto Chiquito is to infer 140-foot displacement in a fault. It's just not there. We've got pressure communication across his inferred fault. It won't happen.

I'd like you to compare that geology, if you will. You can look at Mr. Ullrich's explanation of that geology and look what he's done on his

Exhibit Number One. He says that Laguna Colorado is a crooked hole. He went to great length awhile ago to explain the significance to him of a crooked hole. There's enough displacement and deviation in that crooked hole to account for Mr. Faulhaber's fault. It's not there if you take into consideration the crooked hole, and he's done that and he doesn't show a fault that separates it.

We've got one common source of supply. You just can't get around that.

What are we going to do? Well, we need to put Section 2 into the appropriate spacing 640 acres, and if you do that and leave out the rest of the undeveloped acreage, you only (unclear) the rest of Mr. McHugh's acreage.

You do what you always do, Mr. Stogner, look at Sections 1, 12, 11, 10, 9; there's not another well producing out of the Gavilan in any of those sections and in order to avoid the drilling of unnecessary wells, you expand those areas to the greatest usable possible spacing that's appropriate and let them come in after they've drilled that first well in the section and prove that the spacing ought to be something different.

If you don't do it, then I think it's not prudent. We have got to have all these sections in the same source of supply, marching by the same

rules and you can't carve out Section 2 and pretend it's not in 35 because it sure is and you put 2 in 35, you might as well get rid of the fiction of that phoney rule about the buffer. If that worries you, take it out and let's all play on a level field by the same rules.

We ask that you grant our application because we think it's fair and equitable.

MR. STOGNER: Thank you, Mr. Kellahin.

Does anybody have anything further in Case Number 9451?

MR. LUND: Are we going to do anything about that notice filing?

MR. KELLAHIN: I don't know. Do you represent Southern Union?

MR. LUND: Well, I think you as the applicant have the burden under Rule 1207 to provide proper notice and I think it's been omitted.

MR. KELLAHIN: Well, you got notice and you're here and you don't represent that company, so I guess that's between me and the Commission.

MR. LUND: Well, are you stating that you complied with Rule 1207?

MR. KELLAHIN: As far as your client goes, yes, unless you're here to represent Southern

Union, it doesn't matter to you, does it?

MR. LUND: Well, I think it does and I think that's a point that Mr. Stovall has to consider and you also.

(Thereupon a discussion was had off the record.)

MR. STOGNER: Let's go back on the record.

In light of the question about notice this case will be continued to the Examiner's Hearing scheduled for August 17th, 1988, and for that purpose the record will be left open.

(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 (Commission) 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

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9451, heard by me on [illegible] 1988.

[illegible], Examiner
Oil Conservation Division