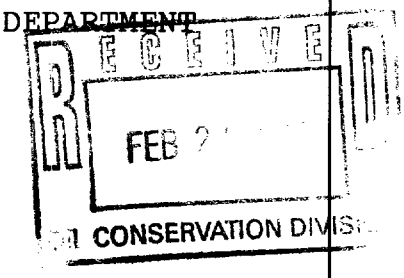
STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION



IN THE MATTER OF THE HEARING CALLED BY THE OIL CONSERVATION DIVISION FOR THE PURPOSE OF CONSIDERING:	
APPLICATION OF PARKER AND PARSLEY DEVELOPMENT, L.P., FOR STATUTORY UNITIZATION, LEA COUNTY, NEW MEXICO	CASE NOS. 11,703
APPLICATION OF PARKER AND PARSLEY DEVELOPMENT, L.P., FOR A WATER INJECTION PROJECT FOR SECONDARY RECOVERY OF HYDROCARBONS AND FOR QUALIFICATION FOR THE RECOVERED OIL TAX RATE PURSUANT TO THE ENHANCED OIL RECOVERY ACT, LEA COUNTY, NEW MEXICO	and 11,704
	(Consolidated)

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: MICHAEL E. STOGNER, Hearing Examiner

February 6th, 1997

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, MICHAEL E. STOGNER, Hearing Examiner, on Thursday, February 6th, 1997, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

* * *

I N D E X

February 6th, 1997
Examiner Hearing
CASE NOS. 11,703 and 11,704 (Consolidated)

* * *

E X H I B I T S

Applicant's	Identified	Admitted
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Exhibit 2A	9	58
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Exhibit 22	79	89

* * *

A P P E A R A N C E S

FOR THE APPLICANT:

HINKLE, COX, EATON, COFFIELD & HENSLEY
218 Montezuma
P.O. Box 2068
Santa Fe, New Mexico 87504-2068
By: CONRAD E. COFFIELD

* * *

WHEREUPON, the following proceedings were had at 10:18 a.m.:

EXAMINER STOGNER: At this time I'll call 11,703, which is the Application of Parker and Parsley Development, L.P., for statutory unitization in Lea County, New Mexico.

At this time I'll call for appearances.

MR. COFFIELD: Mr. Examiner, I'm Conrad Coffield with the Hinkle law firm in Santa Fe, New Mexico, appearing on behalf of the Applicant.

And we would respectfully request the Examiner's indulgence in combining that with the next case on the docket for purposes of hearing.

EXAMINER STOGNER: With that, I will call at this point Case Number 11,704, which is also the Application of Parker and Parsley Development, L.P., for a water injection project for secondary recovery of hydrocarbons and for qualification for the recovered oil tax rate pursuant to the Enhanced Oil Recovery Act, Lea County, New Mexico.

MR. COFFIELD: Mr. Examiner, Conrad Coffield for the Applicant, appearing on behalf of Parker and Parsley Development.

EXAMINER STOGNER: Are there any other appearances in either of these matters?

Mr. Coffield, do you have any witnesses?

MR. COFFIELD: Mr. Examiner, I have four

witnesses to be sworn.

EXAMINER STOGNER: Okay, will all four witnesses please stand to be sworn at this time?

(Thereupon, the witnesses were sworn.)

EXAMINER STOGNER: Mr. Coffield?

MR. COFFIELD: Mr. Examiner, our first witness will be Mr. Steven Owen. Call Mr. Owen to the stand.

STEVEN K. OWEN,

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

DIRECT EXAMINATION

BY MR. COFFIELD:

Q. Mr. Owen, would you please state your name and city of residence?

A. My name is Steven K. Owen. I reside in Midland, Texas.

Q. And what is your occupation, Mr. Owen?

A. Petroleum landman.

Q. What is your relationship to the Applicant in this case, Parker and Parsley Development, L.P.?

A. I am an employee of Parker and Parsley. The State of New Mexico is my main geographic area of responsibility. My current position is a landman specialist.

Q. Have you previously testified before the Division

as a landman?

A. No.

Q. Would you please outline for the Examiner your educational background and work experience?

A. I began my career in the oil and gas industry in Midland, Texas, in 1979 by checking legal records at various courthouses under the supervision of the president of Bush Exploration Company and local landmen.

In 1980 I was hired by McCarthy and Michaelson, Incorporated, as a petroleum landman. I was responsible for acquiring oil and gas leases and conducting title curative.

In 1982, I resigned from McCarthy and Michaelson and established an office and client base for conducting all aspects of land work.

In 1984 I was hired by one of my clients, Indian Wells Oil Company, as a district landman, responsible for acquisition, management, development and divestiture of oil and gas interests in New Mexico, Texas, Oklahoma and Louisiana.

In 1987, Parker and Parsley acquired Indian Wells, and I was hired as a staff landman. I've had various positions and land responsibilities with Parker and Parsley.

I'm a current member in good standing with the

Permian Basin Landmen's Association.

Q. Mr. Owen, are you familiar with the land matters material to these cases?

A. Yes.

MR. COFFIELD: Mr. Examiner, we tender Mr. Owen as an expert landman.

EXAMINER STOGNER: Mr. Owen is so qualified.

Q. (By Mr. Coffield) Mr. Owen, would you please state briefly what it is that Parker and Parsley seeks in these cases?

A. In Case 11,703, Parker and Parsley seeks to statutorily unitize all interests in the Delaware formation underlying all or part of three sections of land described on Exhibit 1. The unit area covers 1520 acres, and it is all comprised of federal acreage.

In Case Number 11,704, Parker and Parsley seeks approval of a secondary recovery waterflood project for the unit and certification of the project for the recovered oil tax rate.

Q. What is the interval for the injection?

A. The interval in which we plan to inject water is the 6400-foot zone. The unitized formation is the interval from 6474 feet to 6508 feet in the Delaware formation as found in the Lusk Deep Unit A Well Number 17, located at 330 feet from the north line and 330 feet from the east

line of Section 20, Township 19 South, Range 32 East, Lea County, New Mexico.

The unitized formation will include all subsurface points throughout the area, correlative to these depths.

Q. Okay, Mr. Owen, would you please refer to Exhibit 1 and describe its contents for the Examiner?

A. Exhibit 1 is a land plat which depicts the geographic boundaries over the proposed unit, which is comprised of six tracts totaling 1520 acres.

The land plat differs from the land plats in the various other exhibits. It has been revised as to the Southern California Federal Number 6 well, in the southeast quarter of the southwest quarter of Section 29, which was formerly an injection well and is now reflected as a producer.

Q. Mr. Owen, would you refer to what we've marked as Exhibit 2A and describe its contents for the Examiner?

A. Exhibit 2A is the proposed unit agreement. The unit agreement is a standard form, except for a few minor revisions, previously approved by the BLM, and similar to ones approved by the Division.

The unit agreement describes the unit area and the unitized formation. The unitized substances include all oil and gas produced from the unitized formation. The

designated unit operator is Parker and Parsley.

Q. Okay, refer to Exhibit 2B now and describe its contents.

A. Exhibit 2B is the proposed unit operating agreement of the Lusk West Delaware Unit. This is a document which follows substantially the general terms and provisions of other unit operating agreements, previously presented to the Bureau of Land Management and to the OCD. It also specifies the designated operator is Parker and Parsley Development, L.P.

It also apportions expenses between the working interest owner and sets forth the authority and duties of the unit operator.

Q. Mr. Owen, in your opinion, do the unit agreement and unit operating agreement documents together provide a fair and equitable plan of unitization and comply with the requirements of the New Mexico Statutory Unitization Act?

A. Yes.

Q. How many interest owners are there in this unit, and how was the ownership determined?

A. There are five working interest owners, one royalty interest owner, and 35 overriding royalty interest owners.

Ownership was determined by title opinions and review of Parker and Parsley's lease files.

Q. As to these working interest owners, do you seek to statutorily unitize any of those working interest owners?

A. No, the Shackelford interest -- Shackelford working interest was acquired by Parker and Parsley on February 4th. Mr. Examiner, please see Exhibit 3 for a copy of that assignment. Exhibits B and D of the unit documents were amended to reflect the change in ownership.

Q. Okay, how about the royalty, the royalty and overriding royalty interest owners? Do you seek to statutorily unitize any of these parties?

A. Yes. First of all, the royalty interest owner throughout the entire unit is the United States of America, and that royalty interest is committed by way of the approval of the BLM.

As to the overriding royalty interest owners, Exhibit B to the Application and Exhibit B to the unit agreement is a list of all overriding royalty interest owners.

We seek to unitize the owners who have not ratified the unit, and they are listed on Exhibit 4.

Q. With reference to this Exhibit 4, list of individuals, Mr. Owen, what efforts did you make to obtain joinders from those parties?

A. Pursuant to telephone and person-to-person

conversations with the individuals identified on Exhibit 4 as numbers 1, 2, 3, 5, 6, 7, 10, 11, 12, 13 and 15, I was informed that they will execute the ratification and joinder of the unit agreement as soon as possible.

Numbers 4, 8 and 14 are believed to be deceased. However, I believe I have identified most if not all of the heirs and am waiting on legal documentation, i.e., wills and affidavits of heirship.

Number 9 was not delivered and was stamped "return to sender". I've discovered that her revenues have been garnished by the Texas Attorney General's Office, Child Support Division. The Attorney General's Office would not provide Ms. Henry's address, and I was informed by the caseworker -- I believe her name was Irene Warren -- that Ms. Henry would contact me with her address.

Q. Mr. Owen, what percentage of working interest, royalty interest and overriding royalty interest owners have ratified the agreement?

A. 100 percent of the working interest owners; 100 percent of the royalty interest owners, upon approval by the Bureau of Land Management; and 94.2035 percent of the overriding royalty interest owners have ratified the unit.

Q. Okay. Mr. Owen, do you seek to unitize these parties who are listed on this previous exhibit, some of whom may potentially turn out to be unlocatable?

A. Yes.

Q. Now, has the BLM preliminarily approved this unit?

A. Yes, Exhibit 5 is a copy of the BLM's letter of designation for the unit.

Q. After receiving this BLM approval and subsequent to your conferences with them, were there any changes made in the unit documents?

A. Yes.

Q. And what was the nature of those changes?

A. The changes were to clarify matters of form and correct clerical errors.

Q. So did the changes that thus resulted have any substantive effect on the allocations of the two parties as specified in the unit documents before the Examiner?

A. No.

Q. Has Parker and Parsley, in your opinion, made a good-faith effort to obtain voluntary unitization?

A. Yes.

Q. Has written notice of the unitization hearing been given to all locatable parties who did not voluntarily join the unit?

A. Yes, copies of the notice letter to the two unit interest owners, as well as the notice required for parties under Form C-108, and certified return receipts, are

attached to my affidavit regarding notice submitted as Exhibit 6.

MR. COFFIELD: Okay. Mr. Examiner, at this point I would appreciate some guidance from you with respect to what you would like to have us present.

In anticipation of this being a contested matter, we are fully prepared to go down item by item as to the required factors that are set out in 70-7-6 of the New Mexico Statutes, statutory unitization, and we can give you a chapter-and-verse and item-by-item quotation as to which of these requirements are satisfied and where they're satisfied.

Would you like to have that done?

EXAMINER STOGNER: If you can do it in a Reader's Digest version, as far as -- I'm assuming what you're talking about is first notification, when they were -- what kind of efforts were made in trying to get parties to volunteer and such as that.

MR. COFFIELD: Yeah, we've done that, of course, from the testimony that was just given by Mr. Owen.

But for example, Subsection A, which requires legal description of the terms of the -- of the surface area of the pool, or the part the pool that's going to be operated as a unit, where that is, we have Mr. Owen testify as to where that's found in the unit documents, we can have

him testify as to Subsection B, exactly where that's found, et cetera, down through J.

EXAMINER STOGNER: I don't think that's necessary, just that these are in there.

MR. COFFIELD: I could tender the question to Mr. Owen in this fashion, that, has he satisfied himself that all of the statutory factors are covered fully by the unit agreement or the unit operating agreement?

THE WITNESS: Yes.

EXAMINER STOGNER: Why don't we do that? You've already asked the question. If there's any particulars, then I can direct him toward that, because I do have a couple of particulars.

MR. COFFIELD: All right.

EXAMINER STOGNER: So are you through with him at this point?

MR. COFFIELD: Yes.

Q. (By Mr. Coffield) Mr. Owen, were Exhibits 1 through 6 prepared by you or under your supervision?

A. Yes.

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

A. Yes.

MR. COFFIELD: I have no more questions of Mr. Owen at this time, Mr. Examiner.

I would tender him for cross-examination.

EXAMINER STOGNER: Thank you.

EXAMINATION

BY EXAMINER STOGNER:

Q. Mr. Owen, you testified that the overriding royalty of 94.2035 percent overriding royalty have ratified so far. Is there a separate list of those somewhere, of all 35 of the overriding royalty interests? You have them probably on a tract-to-tract basis, but do you have them in consolidated form somewhere?

A. No, sir, they're -- Other than being listed on Exhibit B to the unit agreement and the unit operating agreement.

Q. Okay. But on Exhibit Number 4, these are the only 15 overriding royalty interests that have not ratified at this time?

A. Yes, sir.

Q. And you have already mentioned that you're hopeful that a good percentage of these will indeed ratify --

A. Yes, sir.

Q. -- shortly.

Does that indeed show out to be -- what? A

little over 5.8 percent?

A. Yes, it does.

Q. Or a little under?

A. Yes.

Q. When were these parties first notified? I'm talking about overriding royalty interests. When did you first try to get some sort of a written confirmation from them to join in on this thing?

A. On December 10th, 1996.

Q. Is that letter included, or those letters?

A. I believe the letter that's included to the affidavit is the December 18th letter. I do have the December 10th letter attached with the 15 parties who have not joined in the unit.

Q. I'd like that a part of the record, of those 15 parties, if you do have that December 10th letter.

And essentially what does that December 10th letter state, or what did you submit along with it?

A. I sent the unit agreement and the unit operating agreement to them along with a ratification and joinder for their execution, and I believe that's attached to my affidavit of notice.

Q. Okay. Now, that was December 10th that they were notified, and this matter has been continued a couple of times, or at least once; is that correct?

A. Yes, sir.

Q. So Parker and Parsley really haven't been planning this waterflood that long, then, it doesn't sound like, from what you tell me of trying to get all the joinders in?

A. We've been planning the waterflood, actually, for years. Part of the problem with the whole project has been title problems.

Q. Well, maybe -- Okay, what kind of problems, what title?

A. We've had -- Tract 1A, for example, has been operated by Parker and Parsley for a number of years. We have a number of the overriding royalty owners in Tract 1A in suspense, because we have not been able to locate them.

Q. But you said there was a title problem. What -- other than not being able to locate them --

A. "Title" actually meaning that a number of these individuals are deceased and there are numerous errors at this time. We have not received any documentation as far as wells and affidavits of heirship to try to prove up where a title lies.

Q. But you've got these parties as joinder, or are they part of the force-pooling -- I mean, of the statutory unitization today?

A. Part of the statutory unitization.

Q. But you've only started looking for them since December 10th?

A. Well, now, we've had -- Our Division order department at Parker and Parsley has been trying to determine ownership for a number of years, to no -- with no success. I just got involved, basically, in early December. We had title opinions ordered months in advance to that, and the title opinions were difficult to put together.

Q. Has any of the parties that you stated that you're hopeful to get joined at this point, have they stated why they haven't at this time?

A. Yes, sir.

Q. Okay, what were some of the -- some of their responses?

A. Number one, Gretchen Walter, did not think her interest was relevant to the unitization, and she indicated she will execute the joinder in return.

Number two, Mildred Bowman, she did not understand that there was a document she should execute and return, and she will do so as soon as possible.

Her mother, Lena Bowman, number three, lives in a nursing home, and Mildred Bowman will execute the joinder as her guardian.

Number ten, Robert Waller, has had medical

emergencies and will execute the joinder as soon as possible.

And then number four, number eight and number 14 are deceased, and I've been talking with some of their heirs.

Number five, six and seven have been unlocatable. However, I did locate their brother, Bernard Freeman, and he came over to Parker and Parley's office in Midland, Texas, and informed me of where they were and that he would be able to obtain their execution to the joinders.

Q. Have any of them -- Well, you haven't mentioned the Shackelfords' interest, number 11 and 12, at this time, yeah, and 13.

A. I have a letter agreement signed by Don Shackelford, Wilbur Shackelford, Bob and Annette Shackelford, that states they will execute the joinder and ratification. They have not done so at this time.

Q. Okay. Has any of them stated that they needed more time as far as to understand the -- what's involved in it?

A. No, sir.

Q. Do you have a list of the working interests? You said there were five of them?

A. Yes, sir, they're identified on Exhibit B to the unit agreement. I do not have a separate list.

Actually, I think Exhibit D clearly shows that they are --

MR. COFFIELD: That's Exhibit D to the unit operating agreement?

THE WITNESS: Yes.

Q. (By Examiner Stogner) Now, I count seven on here.

You said there were five working interests, or are you doubling up on the Shackelfords?

A. Yes, sir, I have revised the exhibits, which I have a revised copy with me, to reflect the change in ownership from Wilbur Shackelford and Bob Shackelford into Parker and Parsley.

Q. Okay. So the Shackelfords are really tied in with Parker and Parsley at this point, and that would -- those three lines would just need to be amended; is that correct? Or added together to reflect Parker and Parsley?

A. Yes, sir --

Q. Okay.

A. -- that's correct.

Q. So the other four parties is Kathleen Irwin, Wallace Irwin Trust, Scope Energy and Amity?

A. Yes, sir.

Q. Who has current operations in the area which you're proposing at this time?

A. Parker and Parsley is operator of all tracts in our proposed unit at this time.

Q. Are there actually six tracts, or -- You have a -- what? One in B; is that one single federal tract, or how is that cut out?

A. There are actually three leases, and I've divided it up into six tracts due to diversity of ownership, both working and royalty.

Q. Do you wish to have Exhibit 2A and 2B at least made a part of the order by reference in any order to be issued by this Division as far as statutory unitization?

A. Yes.

Q. Okay. Now, you mentioned that as far as that one -- what? -- Exhibit D needed to be amended, or you have had an amended -- Are there any other amendments to it?

A. Other than the clerical errors that were pointed out by the BLM, which I have a corrected Exhibit B and D with me at this time.

Q. Are there any other amendments that you need to make, other than the -- Or did that include also the technical or graphical errors that the BLM discovered?

A. It's all-inclusive.

EXAMINER STOGNER: Okay. I'd like for that to be made a part, at this time, because usually a statutory unit order refers back to those, and the more complete one that

we have at the time, the more easier -- or the easier, I should say.

So the exhibits I have do not include this; is that correct?

MR. COFFIELD: Do not include the corrections?

THE WITNESS: That's correct.

EXAMINER STOGNER: Right.

MR. COFFIELD: That's correct.

Q. (By Examiner Stogner) But you have them ready to go?

A. Yes, sir.

Q. Okay. Why don't you go ahead and pass those over to me, and we'll make the appropriate changes. These are the ones you're going to leave with me?

A. Yes, sir. If I may point out, this was not identified by the BLM. I noticed that.

Q. Okay, well, you'll need to refer to that so we can get it on the record.

A. Okay.

Q. Okay, what you have handed me is an Exhibit B, and this is to replace on which exhibit? Exhibit 2A or 2B, the unit agreement or the unit operating agreement?

A. Both.

MR. COFFIELD: 2A has only been reproduced one time, though, the unit agreement. It's referred to in the

unit operating agreement.

Q. (By Examiner Stogner) How many pages is that? It's just the Exhibit B?

A. Exhibit B and Exhibit D.

Q. But how many new pages need to be transferred? I'm trying to get this document so I can relate it to it. Now, I could give it back to you and have you do that for me, Mr. Coffield, other than trying to do it on the record, because there seems to be a problem here.

MR. COFFIELD: If that's what you prefer, we certainly will, Mr. Examiner.

EXAMINER STOGNER: Yeah, why don't I do that? I was trying to make it easier for you, but we'd better do that.

MR. COFFIELD: Mr. Examiner --

EXAMINER STOGNER: I will now refer -- I will now hand back Exhibits 2A and 2B.

MR. COFFIELD: Okay, Mr. Examiner. Then we will --

EXAMINER STOGNER: Before I take this under advisement today, that will be corrected, the copies will be distributed accordingly.

I will need two, as will Mr. Brenner, will need a copy also, and I expect that to be clear and correct, and that will be what will be admitted as part of the record

and referred to in the order.

MR. COFFIELD: All right, Mr. Examiner.

EXAMINER STOGNER: Okay, let's see. Is this witness prepared to talk about the formula issued or covered as far as the --

MR. COFFIELD: No, sir, the formula, as far as how it was calculated to determine the share of participation within the unit, is going to be covered by another witness.

EXAMINER STOGNER: Okay.

Q. (By Examiner Stogner) With the current operations, naturally I guess some of these parties that couldn't be found in this instance, were they also carried under compulsory pooling orders, as far as their interest in the current operations out there in those leases?

A. No, Mr. Examiner, these wells were drilled years ago, and the title problems didn't originate until recently.

Q. So how has their interest been divvied out before now?

A. Their interest is based on our lease files and how they're carried by our predecessor in title, Damson Oil Corporation, and they are suspensed.

Q. Were they entitled to such payments prior to now, as far as their interests carried out in that current lease

operation?

A. Yes, sir.

Q. But they weren't being received compensation; is that correct?

A. Well, the revenues are accounted for in a suspensed account at Parker and Parsley.

EXAMINER STOGNER: Okay.

MR. COFFIELD: Mr. Examiner, if I may ask you something here --

EXAMINER STOGNER: Okay.

MR. COFFIELD: -- on the aspect of compulsory pooling, these wells, I believe, are all -- it was unnecessary to cross lease lines with any of these wells.

EXAMINER STOGNER: Okay, so they were all 40-acre tracts, and everybody -- that was 100-percent participation at the time?

MR. COFFIELD: Is that correct?

THE WITNESS: That's correct.

Q. (By Examiner Stogner) Okay. Well, if you had 100 percent participation until now, I was just wondering why 15 of them didn't want to join in on this project at this time.

A. Well, the 100-percent participation was working-interest ownership.

Q. Okay.

A. The -- We previously did not request, or it was not necessary to receive approval from the royalty owners.

Q. Okay, including override, right?

A. Yes, sir.

EXAMINER STOGNER: Okay. I have no further questions at this time of this witness.

MR. COFFIELD: Mr. Examiner, I would move the admission of Exhibits 1 through 6.

EXAMINER STOGNER: Exhibits 1 through 6, with, right now, the exception of 2A and 2B, until they are reformatted --

MR. COFFIELD: -- with corrections.

EXAMINER STOGNER: -- and corrections are inserted and the others are taken out, and hopefully before we take this under advisement today, I'll need to get those back.

So at this time I will suspend accepting those, but I will accept the others, 1, 3, 4, 5 and 6, I believe, at this time?

MR. COFFIELD: Correct.

EXAMINER STOGNER: Okay, you, may be excused.

THE WITNESS: Thank you, Mr. Examiner.

EXAMINER STOGNER: Mr. Coffield?

MR. COFFIELD: Thank you, Mr. Examiner. The next witness we will call is Larry Brooks.

LARRY L. BROOKS,

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

DIRECT EXAMINATION

BY MR. COFFIELD:

Q. Mr. Brooks, would you please state your name and city of residence?

A. My name is Larry L. Brooks, and I live in Midland, Texas.

Q. What is your occupation?

A. Senior petroleum geologist.

Q. And for whom do you work?

A. I work for Parker and Parsley and have been employed there since 1996.

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

A. I have.

Q. And were your credentials as an expert petroleum geologist made a matter of record and accepted by the Division?

A. They were.

Q. Are you familiar with the geological matters related to the proposed West Lusk-Delaware waterflood project?

A. I am.

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

EXAMINER STOGNER: Mr. Brooks is so qualified.

Q. (By Mr. Coffield) Mr. Brooks, why are you proposing unitization? Why is Parker and Parsley proposing this unitization?

A. We propose unitization to perform secondary recovery operations through waterflooding, by injecting produced water into the lower Delaware Brushy Canyon formation, locally known as the 6400-foot sand, for secondary recovery purposes.

Water injection is projected to recover an additional 1.1 million barrels of incremental secondary oil.

Q. Please refer to what we've marked as Exhibit 7 and discuss that for the Examiner.

A. Okay, Exhibit Number 7 is a structure at the top of the 6400-foot sand.

The 6400-foot sand is a lobate submarine turbidite channel fan complex occupying a stratigraphic position in the Brushy Canyon lower Delaware formation. This sand occurs at a subsea depth from minus 2812 to minus 2902. This is structure at the top.

The sand is highly permeable, ranging from 20 to 200 millidarcies, and porous with an average field porosity

of 18 percent.

Exhibit 7 shows a conspicuous northwest-to-southeast-trending structural nose running across Section 18 to Section 31, Township 19 South, Range 32 East. Along the eastern flank of this nose, structural contours widen in three areas: in Sections 15 and 16, which is at the northwest corner of your map; Sections 20 and 21; and Section 29.

Associated with this widening or flattening of structural contours are two prominent re-entrants located in the southwest quarter of Section 16 and the east half of Section 20. The contour widens as a function of sand or reservoir fill. As the contours compress, reservoir fill thins, and there are reservoir facies changes. The re-entrants are important as they represent the separation of three distinct fan lobes.

The yellow boundaries on the map are the perimeters of the reservoir-quality sand.

Q. Okay. Go next to Exhibit -- what is marked Exhibit 8, and describe that for the Examiner.

A. Exhibit Number 8 is a structural map at the top of the 6400-foot sand, which shows the historical production superimposed on that structure.

The West Lusk Delaware field 6400-foot sand was discovered in 1986 by Texaco, Inc. The well is the New

Mexico CR State Number 1, located in the northwest quarter northwest quarter, or Unit D, of Section 32, Township 19 South, Range 32 East. This lease is currently held by Parker and Parsley. The well is currently temporarily abandoned.

28 wells in Sections 16, 17, 20, 21, 29, 30, 31 and 32 have been perf'd or produced from the 6400-foot sand.

The first phase of development was from 11-86 to 12-87 and consisted of four wells. Those wells are located in the southeast quarter southeast quarter of Section 30, southwest quarter southwest quarter of Section 29, northeast quarter northeast quarter of Section 31, and the northwest quarter northwest quarter of Section 32, which was the discovery well. This is colored purple on Exhibit 8.

The second phase of development was from 1-88 to 12-88 and occurred into two areas, Section 29 and the northwest quarter of Section 21.

The next development, from 1-89 to 12-89, was split into three areas, the southwest quarter of the southeast quarter of Section 20, the south half of the southeast quarter of the northeast quarter of Section 20, and the northeast quarter northwest quarter of Section 21, the southeast quarter southeast quarter of Section 17, and

the west half of the southeast quarter of Section 16.

The final development of the West Lusk-Delaware field was from 1-90 to 7-90 and filled in acreage in the north half of the southeast quarter of Section 20, the north half of the northeast quarter of Section 20, and the northwest quarter of the southwest quarter of Section 21.

Any wells perf'd or produced from the 6400-foot sand are included in the four phases, with the exception of our last well that we drilled, which is the Southern California Federal Number 9, which is located in the northwest quarter of the southwest quarter of Section 29, which was drilled in 1996.

Timing of the field development was superimposed on the structure map, and one can deduce that the highest area of the field was drained first, and then successionally downdip.

Q. Okay. Our next exhibit is Exhibit Number 9. Would you please discuss that exhibit for the Examiner?

A. Exhibit Number 9 shows the distribution of the best reservoir performance and highest formation water production from the 6400-foot sand. The best oil production is where the structural contours on the top of the 6400-foot sand flatten the most. It must be emphasized that at the yellow contour on the westernmost portion of the map, the exhibit, is the updip pinchout of the 6400-

foot sand reservoir. Okay.

Where the contours begin to compress, water production increases. The Lusk Deep Number 12 Well, located in the southwest quarter of the northeast quarter of Section 20, has produced 381,000 barrels of water. It is one of the upmostdip wells in the reservoir.

One of the highest wells in the field, located in the northeast quarter of the northeast quarter of Section 31, has produced 212,000 barrels of water.

The amounts of water production are unexpected at the updip margin by conventional wisdom. However in turbidite systems, reservoir quality decreases away from the high-energy portions of the reservoir. Those areas are updip pinchout margins, downdip facies changes and lateral reservoir changes.

The areas of higher water production are within the pinchout margin where porosity and permeability changes along with mineral content. This map infers a structural component to trapping the 6400-foot sand and a hydraulic dynamic component in the updipmost positions of the sand.

Q. Exhibit Number 10 is our next exhibit. Would you please discuss that for the Examiner, Mr. Brooks?

A. Exhibit Number 10 is the structure on the base of the 6400-foot sand. This exhibit shows the known water contact within the 6400-foot sand, either by calculation or

drilling and development.

The southernmost water contact hugs the 2900-foot contour, while the northernmost water contact traverses from 2820 subsea to 2920. This water contact represents an area of transition from high-energy porous and permeable sands to clay- and dolomite-rich siltstones, which have higher capillary pressures and effectively lower porosity and permeability. Areas like this are common at the peripheries of individual sand lobes.

And another point of variable transition is the re-entrant in the east half of the southeast quarter of Section 16. Core analysis in that particular area indicates high amounts of clays and lowering of the effective porosity.

All wells that have either tested wet or has calculated wet, water saturation values are annotated by a blue W. The blue water on the north and south contacts indicate the highest known water and the lowest known oil. The 6400-foot sand reservoir appears to be a mixture of partially structural and hydrodynamic trapping mechanisms.

Q. Our next exhibit is Exhibit 11, Mr. Brooks. Would you describe the features of that exhibit?

A. Exhibit 11 is a fourth-order residual map on the base of the 6400-foot sand structure. This exhibit takes out the present-day regional dip of the 6400-foot sand and

restores this surface to its original paleotopographic condition at time of deposition.

One can readily see that the sand deposition would be confined within a north-to-south-trending low. That is -- that is, expected deep marine sands deposited in loess and talus slope.

The exhibit also shows confining highs to the west and east, which would cause the sand either to be absent by nondeposition or thin.

The seals of the Delaware reservoirs are updip sand pinchout, facies changes downdip, and downdip facies changes into shales.

So basically what we have here is a big trough in the center where the max- -- best sand reservoir, and this conforms to the yellow boundaries that you've seen on the maps to this point, with the reservoir, the 6400-foot sand, being pinched out on the lease lines of Section -- the western side of Sections 20 and basically 29.

Q. Okay. The next exhibit is 12. Would you discuss that, please?

A. Okay, this is the isopach. This is constructed by subtracting the base of the structure of the 6400-foot sand from the top.

The isopach shows three distinct fan lobes, the northernmost, which is wet, and the other two lobes which

are productive. The fan lobes show operation in the south half of the southeast quarter of Section 20 and in the middle of Section 16.

At the margins of these sand lobes, water saturation increases as previously mentioned. The values on the map depict the total isopach from updip shale facies, reservoir sand facies and the downdip shale reservoir facies equivalent.

On the maps, the sand facies is again outlined in yellow. The overall trend is a mirror image of the fourth-order residual.

Within the 6400-foot sand, porosity and permeability, like a majority of Delaware sand fields, are best distributed within the widest and longest axises of sand deposition.

Detrital clays within the turbidite systems are pushed from the center of the highest energy toward lateral and distal basinal edges. Basically, this means the clays are deposited with greater frequencies on the outer perimeters of a fan system. In the case of the West Lusk-Delaware field, this would be diagonally between Sections 16 and 17, and also in Section 20 the southeast quarter, and Section 21, the 4XO well.

The reservoir has pinched out in the west half of the west half of Section 20, southwest quarter and north

half of Section 17, the south half and the southeast quarter of Section 16, the east half and south half of the southwest quarter of Section 21, and the west half of the northwest quarter of Section 29. Also, in the north half, the southwest quarter; west half of the southeast quarter of Section 30; all of Section 28; south half, northwest quarter; west half, northeast quarter; and southeast quarter of the northeast quarter of Section 30.

Q. Okay, Mr. Brooks, the next exhibit is Exhibit Number 13. Would you please discuss that one?

A. This is the water saturation map, and this exhibit shows the definable areas of lower water saturation that we wish to flood. This exhibit was made by calculating water saturations using electric logs and core transform data for the values on the map.

The values that I used for cementation factor due to special core analysis for A, that component of the cementation factor was 1. The M component of the cementation factor was 1.84, and the saturation exponent, the water saturation, S_w, to the nth, was 1.36.

The water saturation values are shown to three decimal places on the contours. The contour value of .650 equals 65-percent water saturation. The gray area on the contour map between 65 and 60 indicates an area of high transition, and blue areas are effectively wet.

Oil production from these perimeters have been marginal to nonproductive. The areas of green to orange are the desired floodable turbidite fans, which we feel that 1.1 million barrels of secondary oil recovery is possible. The water saturation map conforms to the unit proposal.

EXAMINER STOGNER: Is that 1.1 or 1.4?

THE WITNESS: 1.1. What did you have?

MR. HIRTH: Yes, it's 1.1.

THE WITNESS: 1.1.

EXAMINER STOGNER: Well, what did you just say --

THE WITNESS: 1.1

EXAMINER STOGNER: -- that's what I'm asking.

THE WITNESS: 1.1.

EXAMINER STOGNER: Okay.

Q. (By Mr. Coffield) Okay, Mr. Brooks, your last four exhibits, now, are Exhibits 14, 15, 16, and 17. Would you please describe the features of those exhibits?

A. Basically Exhibit 14 is a plat showing three cross-sections which are with my exhibits, of which two are dip and one are strike. These are extremely large cross-sections.

Basically what I've testified to with the updip correlations, my isopach values on the isopach map that extend outside of the sand fairway will show -- This is a

huge one. Basically what I'm trying to show with all dip and cross and strike sections is the fact that as the reservoir goes updip, there is a transition from the clean turbidite sands to the shales and a downlapping and facies change into the shales. My isopach values even within the shales respect that interval between top and bottom. Okay.

However, where the gamma ray -- where the hot peak drops out and the gamma ray cleans up is where the sand reservoir becomes apparent. So my maps on isopach reflect the total thickness, here, here, here, here. Sand fairways have been delineated by log-to-log correlations up both sides of the boundaries.

EXAMINER STOGNER: Okay, when you said "here", you're referring to the eastern side of cross-section A-A', when you were discussing the shales, and we haven't even moved into the cross-section yet, Mr. Brooks.

THE WITNESS: I know, I was just explaining how it was working.

EXAMINER STOGNER: Okay.

THE WITNESS: Okay. Basically, there are three cross-sections.

A-A' is a dip cross-section that traverses from the southeast across Sections 18, 17, 20, 21 and 22.

B-B' is also a dip cross-section that traverses from northwest to east, across Sections 30, 29 and 28.

Section 17 is a strike cross-section traversing from the southwest to northeast across Sections 31, 29, 20, 21, 16 and 15.

Q. (By Mr. Coffield) Mr. Brooks, is, then -- Exhibit 15 is the A-A' identified here on Exhibit 14?

A. Yes.

Q. Is Exhibit 16 the B-B' described on that exhibit?

A. Yes.

Q. And is Exhibit 17 the C-C'?

A. That's correct.

In all three of -- Well, in the two dip cross-sections, A-A' and B-B', the key thing was to show -- this is a structural -- They're all hung structurally at minus-2300-foot subsea. They show the updip facies changes and the downdip facies changes and the terminations of the sand and what wells were perforated and the initial potential. And these three cross-sections with the conjunction of all the other exhibits define the boundaries of the proposed unit boundary.

EXAMINER STOGNER: Are you going to go through each one of them separately, or how are you going to do that, Mr. Brooks?

THE WITNESS: Good question.

Q. (By Mr. Coffield) Your features that you want to point out on -- Let's take --

A. I would like to go--

Q. -- A-A' first.

A. A-A'? Okay. The furthestmost --

EXAMINER STOGNER: Mr. Brooks, you're not proposing to have your back to the reporter to testify, are you?

MR. COFFIELD: Can you testify from the other side, over here?

THE WITNESS: Yeah --

EXAMINER STOGNER: And speak loudly and clear and please refrain from saying "here, here and here".

THE WITNESS: Okay.

EXAMINER STOGNER: I might remind you, Mr. Brooks, since you haven't testified in some time, that we need to make a clear record, so anytime you refer to something on the cross-section, you will need to identify that.

THE WITNESS: A-A', the number one well on the cross-section, is the Middleton Federal "A" Number 1 well, located in Section 18, 19 South, Range 32 East, and that's 1980 from the north and 990 from the south -- from the east. This well is the updipmost well I used in the cross-section, which shows the updip shale equivalent.

Okay, moving southeast into Section 17, well -- cross-section number two well is the Lusk Deep Unit Number

11. This well is located 1650 from the south, 990 from the west, Section 17, 19-32. Also shows shale facies.

Between this well and the west -- the Lusk Deep Unit A Number 19, located 330 from south and 1656 from east of Section 20, 19 South, Range 32 East, the reservoir is intercepted. The reservoir is about 20-some foot thick in this well and made a producer from the 6400-foot sand. So between the well number two and the well number three is where the reservoir onlaps or pinches out and changed into the shale basin.

Okay, from cross-section wells four, five, six, seven, these wells cross Sections 21 and 20. They are still in the heart of the reservoir facies.

And then in Section 22, located 660 from north, 660 from west, towards Section 22, 19 South, 32, well number eight on the A-A' on the cross-section, the shale facies is again seen in the downdip position.

So between section -- I mean cross-section well number seven and number eight, also, there is a transition from sand to shale which represents the downdip limits of the 6400-foot sand.

Q. (By Mr. Coffield) Mr. Brooks, now going to the exhibit reflecting the B-B' axis, would you please discuss that?

A. B-B' is the southernmost cross-section, which

extends from Section 30, Township 19 South, Range 32 East, through Sections 30, 29 and 28 of Township 19 South, Range 32 East.

The southernmost well in the cross-section, being B, is located 1980 from west and 660 from north of Section 30, also has a shale facies or an updip pinchout.

Cross-section well number two, the Texaco Federal J Number 3, which is located 1990 from the south and 330 from the east of Section 30, is also shale, whereas within 600 feet is the -- 900 feet is the Parker and Parsley Southern California Federal Number 9, which incurred 14 foot of reservoir-quality sand with up to 18-, 19-percent porosity. The transition between well number two and well number three represents the westernmost boundary of the reservoir at this point.

Across cross-section logs, four, five, six is the heart or the breadth of the sand fairway, and in between 1650 from south and 990 east in Section 29 of 19 South, Range 32 East, and the Plains Unit Number 3X well, located 1980 from south and 760 from west of Section 28, there is a transition again from the sand to the downdip shale equivalent, and that continues out through B' of the cross-section.

So both cross-sections show updip transitions into shale and downdip transitions into shale, delineating

the western- and easternmost boundaries of this reservoir fairway.

Q. Mr. Brooks, now let's go to Exhibit 17, which is the C-C' axis, and describe --

A. C-C' --

EXAMINER STOGNER: Let me get mine unfolded here. Is this life scale or what?

THE WITNESS: This particular cross-section had 14 wells to intercept and to define the reservoir accurately.

The number one well in the C-C' cross-section is the Middleton "A" Federal Number 3, which is located 660 from north and 660 from east, Section 31. The net pay thickness is about six, seven feet thick at this point. It's one of the higher structural wells.

As we go east across cross-section well two, three, four, up through 14, I have tried purposely to intercept the sand reservoir to show the orientation of three separate distinct fans, okay, in their structural position.

So this cross-section basically goes through the heart of the reservoir and terminates at the updip changes in the northwest quarter of Section 15. All the wells that have either perforated or tested or produced out of 6400-foot sand are labeled.

Q. (By Mr. Coffield) Any features that you want to point out to the Examiner on this cross-section?

A. No, sir.

Q. Mr. Brooks, in your opinion, does the data support those unit boundaries --

A. It does.

Q. -- geological?

Has the pool been adequately defined by development?

A. It has.

Q. Are there any freshwater wells in this area?

A. There were five stratigraphic test holes that were drilled in the north half of Section 19 for the EPA by Phillips Petroleum at the Lusk plant, to try and evaluate groundwater -- if there was any groundwater presence or contamination. All wells were subsequently dry and plugged, no groundwater was intercepted. So the answer to the question is no.

Q. Are there any faults or hydrologic connections between freshwater sources and the injection formation?

A. No.

Q. In your opinion, will the unitization and waterflood operations be in the interest of conservation, the prevention of waste and the protection of correlative rights?

A. They would.

Q. Were Exhibits 7 through 17 prepared by you or under your direction or assembled from company records?

A. They were.

MR. COFFIELD: I have no other questions of this witness at this time, Mr. Examiner.

I tender him for cross-examination.

EXAMINATION

BY EXAMINER STOGNER:

Q. In referring to Exhibit Number 13, this is your water-saturation plat; is that correct?

A. That's correct.

Q. Okay. So whenever I look at the dark blue areas, those, I'm assuming, are watered out in this zone?

A. Or calculate wet in that zone.

Q. Okay. When you say "calculate wet" --

A. By log analysis. All penetrations were analyzed and water saturations calculated. Anything that went deep enough to intercept the 6400-foot sand or had a quality sand present were calculated. Wells that have no value have no sand.

Q. And those were your cutoffs on the cross-section, especially your A-A' and B-B'?

A. They were.

Q. And you show no shale on the C-C'?

A. Because it is a strike cross-section, it's made to show correlation of reservoir from A -- the first pod, to the second pod, to the C pod. So it should show all the 6400-foot sand. It was designed to show only the sand.

Q. Okay. And that essentially stays within the middle of your fairway that you're showing?

A. That's correct.

Q. Exhibit Number 11, this is the -- I believe you identified that as a topo map, essentially what a topo map would look like during deposition; is that correct?

A. That's correct.

Q. And the deposition of this sand was what kind of environment?

A. These are turbidite-type fan depositions, basically talus-slope-type deposition, coming down a slope. Any rivulets in the slope, any lows, would accumulate slope. The slope for this particular sand exists to the north and to the west. We're kind of wrapping around. At this particular juncture it is due north.

Q. In this particular deposit, have you been able to look at the whole picture? And what kind of marine depth would this have been?

A. Oh, in the whole total picture these are great. Some were in the essence of greater than 600 meters of water. Some people -- There's evidence to prove that

there's probably 600 to 800 meters of depth. There is some calculations as shallow as 200, but it's unlikely with the slopes that you have to the north. Immediately north where these sands would be coming from, you have up to 2000 foot of relief or 600-plus meters of relief. So these are definitely deep-water sands.

They're analyzed -- They exhibit all Bouma sequences, A, B, with the exception of a pebble conglomerate at the top. They are true fining upward sequences. These are definitely deep marine sands; they can be measured. The Brushy Canyon does occur in the outcrop in western Eddy County and in Texas, at the Guadalupe Mountains.

Q. This is in the Brushy Canyon portion?

A. This is the Brushy Canyon.

Q. What kind of cumulative time are we looking at, as far as the deposition and -- Your thickest portion of the thin sand is how many feet?

A. It is about -- before it pinches out, about 13 feet.

Q. About 13 feet. So the middle or the main part of your fairway is about 13 feet of actual pay sand?

A. Right. This particular sand represents a singular turbidite event, from top to bottom. You can see a continuous -- a beautiful grading of the sequences. We

have six cores, full cores, completely from the top of the transition, above the sand, through the base of the sand, and you can see a continuous fining upward sequence. This represents one event.

Q. And what kind of a time frame are we looking at during that event?

A. Cessation of these events are less than a year. I mean, when these turbidites come down, all of a sudden they're loaded up on the slope, and when they come down it's a continuous rain, like the transatlantic cable break in 1979, when it had moved something on the order of 60 to 75 miles an hour. So this is a continuous event over a very short period of time.

It's one of the reasons why the gamma ray is so clean also. If you notice, the siltstones above and below the gamma ray is much hotter. Those represent millions of years of events, stacking sequences, whereas this is a stacking sequence. Everything that came down was very clean at that time.

Q. Had this been penetrated before the Texaco discovery well?

A. Probably with a couple Strawn wells, but no one had ever perforated it. There's some deep -- The Lusk field goes back to 1965, and most of those are deep Strawn tests.

There are a few Strawn wells that have been plugged back. There is still one active Strawn well, the Number 4, which is 1980 from the south and 660 from the east in Section 29, which is still a 40-barrel-a-day Strawn producer.

Q. Okay. As far as the material above the main sand zone, what is the cap of this reservoir?

A. Basically, you grade from updip shales, downdip shales are your seals, and that thin low porosity streak, which is also a shale, right at the top, is basically about a four-foot section, four- to six-foot section, which is a -- capping shales.

These things are totally encapsulated, each individual sand -- probably the reason why the thing is even productive. Otherwise, with that much sand above you there had to be a vertical permeability restriction to even have production in this reservoir, with a thousand foot of sand above you or below you.

So the boundaries, the barriers, the top, bottom -- top seals and bottom seals, are very thin, but they are very present. There has been some testing done with these type of seals. They can withstand considerable stress. When I was working with a previous company, we actually perforated the seals and tested them and tried to break them down and each -- actually tried to squeeze cement to

get a better frac job through the boundaries.

So these -- We had found that a thickness of two foot was a competent seal. Anything less than that, we got pretty ratty. If these things are frac'd, they're probably breached. But a lot of these are natural completions.

Q. Going back to the deposition, this particular interval, as you call the 64-foot sand --

A. 6400-foot sand.

Q. -- 6400-foot sand, is that pretty much deposited within the Delaware Basin region?

A. There are actually very local deposits, but wherever this Strawn re-entrant to the west, it obviously -- I mean, this Strawn structural nose to the west on the structural map, it will be gone --

Q. What exhibit are you referring?

A. This would be Exhibit 7, the top.

Q. I've buried it with my --

A. Okay.

Q. Hang on just a second, I buried it with my deposition of paper here.

A. You might say it was a basal --

Q. Okay, in referring to Exhibit Number 7 --

A. Exhibit Number 7 shows that Strawn north-to-south structural nose running across the center of Section 18, all of 19, and down through the east half of Section 30.

The fans developed on the eastern flank of that. Okay?

Okay, this prominent feature was also prominent when I did the fourth-order residual map, taking out all Laramide dip and all existing present-day dip. So there's going to be events throughout the whole Delaware Basin, moving across the Basin, circumferentially, you will have highs and lows. In the lows you will find the sands, in the highs you will find thinning and balding of the sands. And this goes all the way through Parkway, Avalon and all the way down this front. This is a Parkway, Delaware, Avalon, South Taylor, Taylor fields all produce from similar sands in Brushy Canyon.

Q. This single event, as you call it, is it evident anywhere else in this general area as far as today's production?

A. Not in this general area, this is it. The sand dies out immediately across Section 15. Where the sand is present in Sections 15 and 16, it is too low structurally and wet, and the sand does die out before you get off of Sections 15 -- into the -- in 19 South, 32 East. It then is not present in Sections 31 and to the west, and then reappears in the Parkway field.

Q. What would be the origin of the sand, as far as age? Are we looking at Precambrian or what?

A. No, we're looking at Delaware, Delaware-age,

which is Permian, Leonardian. The sand is probably coming off the Pedernal landmass to the northwest, which was a Precambrian feature, which would have been a prominent exposed feature during the Penn up through Wolfcamp time. It also -- The Central Basin Platform, which was also emergent, would have been supplying sand into other parts of the Delaware Basin on the eastern margin.

Q. Was it Texaco that discovered this field?

A. Yes, the CR State Number 1.

Q. Was this their main objective at the time? Have you been able to --

A. No. They had drilled a couple Strawn tests and some deeper objectives first, and they just happened to have good shows.

Actually, they had drilled a deeper well to a 7000-foot sand, but that sand is even lower structurally and a total different fan system, and that was -- They had plugged back because they had good shows.

Q. Referring to Exhibit Number 10 --

A. Okay.

Q. -- is this an actual gas-oil -- I'm sorry, an oil-water point or line that you're depicting with the blue marks down to the south and up to the north?

A. Yes, they are. The transition to the north is due to the changes of the reservoir in which capillary

pressures are greater due to the adding of the clays and other cements, in which case you're actually tilting the water table, because the capillary pressure is greater in the siltstones than they are in the actual clean sandstones.

So therefore, that water boundary comes up, and that's proved by the drilling of all those wells in the northern boundary, whereas the southern boundary, hugging the 2900-foot contour, still in the center of a clean sand fairway, represents a more conventional water contact.

And all the wells that are south of that water -- of that contact, have tested wet, with the exception of the Number 1 well in the northwest northwest of 32.

Q. Can that oil-water contact have been mapped historically as moving or, encroaching -- Well, let me rephrase that.

The southern oil-water contact, has that been able to be mapped over time with production? Has that moved substantially?

A. That's stayed very similar over time, the southern contact.

The northern contact, probably, with a function of some drainage, but still it's really more resultant to that re-entrant that's sitting up there in 16. You're really changing the reservoirs. That one probably -- That

is a transitional contact, and it goes right up to your pinchout.

The southern contact seems to be very similar, because the well -- You'll see the Number 4 well, located 1980 feet from the west and 330 from the north, was drilled within -- they were attempting a completion for the 6400-foot sand, and it was 100-percent water.

And by the same token, the well offset 1980 from east and 660 from north, very distinct contact.

Q. And when was that number four drilled?

A. That well would have to have been drilled in 19- -- I would have to go back and look at my records on that. I'd have to look -- It had to be ninety- --

Q. Just to your best recollection, within the last five, ten years?

A. Within the last four years.

Q. Four years.

A. Those were the two most recent wells, number four and the number one, other than ours, in Section -- the Southern California Federal Number 9.

Q. How uniform is the sand grains that make up this reservoir?

A. Very uniform. With all the cores within the center, the variance was 2.65 to 2.67 grams, grain density, a very continuous sand.

As you move to the outer boundaries, you start picking up a higher density to the dolomite and clays that you're incurring.

And within the actual sand, 200-millidarcy sand for this kind of a grain size, which is a very, very fine grain sand, is really phenomenal permeability. I even had some of this data retested to prove the permeability, because I thought they were aberrantly high.

Q. Was there much shale content between the grains?

A. Very little shale, very little shale in the sand. Now, above and below in typical Delaware reservoirs, siltstone reservoirs, there are shales. As you get to the outer boundaries or near the updip or downdip pinchouts, yes, you pick up shale.

But in the center of the fans, no, these are very clean sands. They're devoid of any kind of lamellar structure. You don't see any kind of -- you know, they're just a clean channel-sand-looking --

Q. But on two of your cross-sections you show a distinct sand and shale -- How would you say?

A. Interfingering at the boundaries, yeah, at the actual boundaries and the peripheries.

But in the center of the fans, where I have the core data, no, they're very clean sands.

Q. Now, were those shales at that same interval that

you're showing on your cross-section, were those deposited at the same time the sand was?

A. They would be really a post-depositional remnant. They were either --

Q. It's more of a pinchout?

A. Yeah, it's a pinchout. You had shale, but these things are -- basically the bottom -- the stuff that's coming down, raining into shale, so there's going to be some mixing at the peripheries and the thickest part is going to be clean.

After the sand was deposited, then, you had the fines redeposited above it. So you're going to have -- in close contact with shales, but the sand quality itself in the reservoir is very good.

EXAMINER STOGNER: No other questions of Mr. Brooks. You may be excused.

MR. COFFIELD: Mr. Examiner, I move the admission of Exhibits 7 through 17.

EXAMINER STOGNER: Exhibits 7 through 17 will be admitted into evidence at this time.

Let's take about a five-minute recess at this time. Let me clear my desk of -- And congratulations, Mr. Brooks, I think this is the biggest exhibit I have ran into so far in my 16-year career here.

With that, we'll go off the record for about five

minutes.

(Thereupon, a recess was taken at 11:39 a.m.)

(The following proceedings had at 11:58 a.m.)

EXAMINER STOGNER: Hearing will come to order, back in consolidated Case 11,703 and 11,704.

Mr. Coffield?

MR. COFFIELD: Yes, Mr. Examiner, before we present our next witness, I would like to hand to you the revised Exhibits 2A and 2B, which are the unit agreement and unit operating agreement with the amended exhibits to those, Exhibits B and D, and move the admission of these corrected exhibits.

EXAMINER STOGNER: Corrected Exhibits 2A and 2B will be admitted into evidence at this time and made a part of the record for 2.

MR. COFFIELD: And Mr. Examiner, we will then call our next witness. We call Gregory M. Pace.

GREGORY M. PACE,

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

DIRECT EXAMINATION

BY MR. COFFIELD:

Q. Mr. Pace, would you please state your name and city of residence?

A. My name is Gregory M. Pace. I reside in Midland,

Texas.

Q. What is your occupation and by whom are you employed?

A. I am a senior reservoir engineer employed by Parker and Parsley Development, L.P.

Q. Have you previously testified before the Division?

A. No.

Q. Would you outline for the Examiner your educational and employment history?

A. I received a bachelor's of science degree in geology from Richard Stockton College of Pomona, New Jersey, in May of 1979.

Beginning in June of 1979 I was hired by the University of Oklahoma as a research assistant. I collected and compiled oil and gas reservoir engineering and geological data for incorporation into a computer database.

After about two years with the University, I was hired by Cities Service Company as an evaluation analyst, in October of 1981. In that position I evaluated reserves and economic impact of exploration and development drilling projects.

After five and a half years with Cities Service Oil and Gas Corporation, I was hired by Parker and Parsley

as a reservoir engineer. Currently I am the senior reservoir engineer assigned to the southeast New Mexico Delaware Basin team. I've been in this assignment for four and a half years.

Previous assignments include reservoir engineering positions in the San Angelo district, about three years; reservoir engineering, responsible for reserve reporting and other corporate functions, about two years.

I have over 16 years' experience in the oil and gas industry, and I am a member of the Society of Petroleum Engineers.

Q. Mr. Pace, are you familiar with the engineering matters related to this Lusk waterflood project?

A. Yes, I am.

MR. COFFIELD: Mr. Examiner, we would tender Mr. Pace as an expert reservoir engineer.

EXAMINER STOGNER: Mr. Pace is so qualified.

Q. (By Mr. Coffield) Mr. Pace, would you please refer to what you've marked as Exhibit 18 and 19 and explain those exhibits, please?

A. Exhibit 18 is a summary of the Lusk West project, incorporating input from geology and operations engineering.

Exhibit 19 is the supporting tables, graphs, figures and exhibits to this Exhibit 18.

I will be referring mostly to Exhibit 19 for my testimony.

Q. Is this portion of the Lusk West-Delaware Pool suitable, in your opinion, for unitization and waterflood --

A. Yes, it is. Parker and Parsley believes that the West Lusk-Delaware field is an ideal candidate for secondary recovery via waterflooding operations.

Lusk West field was an undersaturated reservoir at original conditions. No gas cap has been evident. The reservoir exhibits a depletion-type drive mechanism. The initial reservoir pressure was about 2250 p.s.i.g., and the initial bubble-point pressure was 1103 p.s.i.g. Currently, as of August, 1996, the pressure was estimated at 350 p.s.i.g.

As shown on Graph 1 from Exhibit 19 --

EXAMINER STOGNER: I'm sorry, which one -- Figure 19?

THE WITNESS: Exhibit 19, Graph 1.

EXAMINER STOGNER: Graph 1, Graph 1.

THE WITNESS: Yes, sir.

EXAMINER STOGNER: Okay.

THE WITNESS: It's about the middle of the way.

EXAMINER STOGNER: Got you.

THE WITNESS: The field's GOR starts at about 650

standard cubic feet per barrel. The GOR then rises to approximately 3500 standard cubic feet per barrel by 1991.

Then the GOR declines to approximately 1500 p.s.i.g. -- I'm sorry, 1500 standard cubic feet per barrel, by 1996. During that time the pressure has significantly declined. This suggests that unless the secondary project is initiated, the reservoir could become uneconomic to produce.

Q. (By Mr. Coffield) What is the estimated primary recovery from this pool, Mr. Pace?

A. I estimate the primary recovery of the wells in the proposed unit to be 2,180,000 barrels of oil. That equates to approximately a 21-percent primary recovery factor.

EXAMINER STOGNER: I'm sorry, what percentage?

THE WITNESS: Twenty-one percent.

I estimate the original oil in place is 10.4 million barrels, based on volumetrics. See Table 2 in Exhibit 19 --

EXAMINER STOGNER: Table 2.

THE WITNESS: -- which is the previous page. That runs down the calculations of original oil in place via the porosity calculations, water saturations and acres.

Primary performance was based on decline-curve analysis. The projection is as shown on Graph 1. The

economic reserves as of 1-1-97 is 369,000 barrels and 405 million cubic feet.

Q. (By Mr. Coffield) Mr. Pace, was an engineering study done to determine how best to recover the additional reserves?

A. Yes, the team initiated an internal study which is represented by Exhibits 18 and 19.

Q. Refer, then, to Exhibit 19 and tell about how you project production for this pool under water injection conditions.

A. Secondary reserve potential is based on the analogy to the old Indian Draw unit. The old Indian Draw unit is operated by Amoco Production Company and appears to have similar reservoir characteristics as to our proposal.

The old Indian Draw unit was also used to model the time required for fill-up, time required to see the peak production and provide an estimate of what the peak production capacity could be.

A comparison of the old Indian Draw Unit to Parker and Parsley's proposal is shown on Figure 9 from Exhibit 19.

EXAMINER STOGNER: Figure 9.

THE WITNESS: Graph 2 from Exhibit 19 shows my estimate of total recovery, primary plus secondary, and primary recovery.

Based on my analysis, I estimate a total recovery at about 4 million barrels and primary recovery at 2.3 million barrels.

The estimate of secondary-to-primary ratio calculates to 0.704 secondary reserves to one barrel of primary reserves. However, to be conservative, a 0.5 secondary to 1-barrel primary reserves was used to calculate -- to justify the West Lusk project.

For the Lusk West project, a secondary-to-primary ratio of 0.5 yields secondary reserves of about 1.1 million barrels. That's shown on Table 2. That would be column L.

I'd like to point out here that since we have six proposed drilling locations, those provided -- those primary reserves have been shifted over into the incremental secondary reserves for simplicity. So the number now, based on the run, is about 1.345 million barrels to run the -- to justify the project.

In addition to the analogy, we have internal information, corporate information dealing with whole core analysis, fluid analysis, water-oil relative perm analysis, and waterflood analysis from Dykstra-Parsons analysis, in Figures 5, 7, 8 and 11.

Q. (By Mr. Coffield) Are there any additional development wells planned?

A. Yes. As I said before, there are six additional

development wells planned. Three are planned as injectors and three as producers. This will aid in implementing a -- as close to an 80-acre fivespot pattern. This pattern is similar to how the old Indian Draw unit was developed and the -- established the water injection function.

Q. Okay, Mr. Pace. Would you please further describe why you're seeking to institute a secondary recovery water injection project and discuss the economics of the project?

A. Based on my economic analysis, Figure 14 -- The secondary portion of the project should deliver a rate of return of 29 percent, a discounted ROI of 2.5 to 1, payout in about five years and present worth at 10 percent of $5.3 million.

This is based on a capital expenditure of $3.6 million and an oil price of $18 a barrel and a gas price of $1.15 per MCF.

Bottom line, this project would provide an economic benefit of about $12.6 million, which is reflected in the C-108.

Q. Okay, Mr. Pace, will the oil and gas recovered by unit operations exceed the unit cost, then, plus a reasonable profit?

A. Yes.

Q. And what is the estimated life of the project?

A. Approximately 23 years.

Q. Do you believe it's prudent to apply for this enhanced recovery program --

A. Yes.

Q. -- in this pool at this time?

And is the water injection application economically and technically reasonable at this time?

A. Yes.

Q. Will water injection operations prevent waste?

A. Yes.

Q. Will the operations result in increased recovery of substantially more hydrocarbons from the pool than would otherwise be recovered?

A. Yes.

Q. Is the unitized management, operation and further development of the pool necessary in order to effectively carry out secondary recovery operations?

A. Yes.

Q. Will unitized operations increase the ultimate recovery of oil from the pool?

A. Yes.

Q. Will unitization and secondary recovery benefit the working interest owners and royalty interest owners, as well as the overriding royalty interest owners within the unit area?

A. Yes.

Q. And what do you request for this initial water injection project area?

A. It is requested that the project, pursuant to Division Rule 701, encompass the entire unit area.

Q. In your opinion, will the granting of this Application be in the interest of conservation, the prevention of waste and the protection of correlative rights, based on all the things you've just said?

A. Yes.

Q. Now, with respect to the allocation and production to the unit tracts, would you describe how that's done?

A. Calculation of ownership for each tract was based on the acre-footage method.

Estimate of net pay and areal extent was based on the geological mapping of the Lusk West field. That's Exhibit 12 that Mr. Brooks provided.

The areal extent incorporated in the calculation of the ownership is based on the updip side as the facies change and the silted oil-water contact on the downdip side, unless bounded by a lease line.

That information was then incorporated into a computer CAD program, C-A-D, so that the data could be planimetered. Then these contour intervals, acre-footage

was calculated and summarized to represent the acre-footage by tract.

The allocation of the tract's participation was based on the ratio of the tract's acre-footage to the total acre-footage.

To calculate the ownership within the tract, each tract's acre-footage was then multiplied by the owner's interest to calculate the owner's acre-footage.

Each owner's portion of the project is calculated by dividing each owner's acre-footage by the total acre-feet. If an owner has interest in several tracts, then the owner's interests across the various tracts are summarized.

Q. Mr. Pace, you're familiar, are you not, with the descriptions in the unit agreement as to the manner of calculating tract participation with the formula?

A. Yes.

Q. Is what you've just described the manner in which that formula was applied?

A. Yes.

Q. Okay, Mr. Pace, would you please identify Exhibit 20?

A. We offer Exhibit 20 as to the fairness in the calculation of participation in the West Lusk unit.

In addition to the acre-footage method, other methods, including primary EUR, current production, ϕh and

a weighted average blend were sampled.

Q. Okay, Mr. Pace, do you have anything else to add to your testimony here?

A. I would like to refer to Exhibit 19 just for additional reference. Figure 1 is the same as Exhibit 12.

Q. Exhibit 12 introduced by --

A. -- Mr. Brooks.

Figure 2 is a mineralogic and petrographic analysis.

Figure 3 is the same as Exhibit 7, offered by Mr. Brooks as testimony.

Graph 3 is a Dykstra-Parsons graph showing the time to fill-up and the time to CP graphically.

Figure 12 is a total proved economic summary.

And the last page, which is Exhibit 8, is the same as Exhibit 1, as provided by Mr. Owen.

Q. Okay. Were Exhibits 18, 19 and 20 prepared by you --

A. Yes.

Q. -- ore under your supervision or from company records?

A. Yes.

MR. COFFIELD: That's all the questions I have for this witness at this point, Mr. Examiner.

I tender him for cross-examination.

EXAMINER STOGNER: Okay, Exhibits 18 --

MR. COFFIELD: Excuse me, I didn't move their admission, but I move their admission.

EXAMINER STOGNER: Okay, Exhibits 18, 19 and 20 will be admitted into evidence.

EXAMINATION

BY EXAMINER STOGNER:

Q. (By Examiner Stogner) Mr. Pace, when you were describing the participation parameters and formula, you referred to Exhibit B through D, if I remember right. Are you referring to the unit operating agreement when you talk about Exhibits B and D?

A. Yes.

Q. Okay. So that method that you described is in that documentation?

A. Yes.

Q. Okay, so I can -- Now, I'm referring out of Graph 1 and Graph 2.

A. Okay.

Q. That is your primary -- Okay, Graph Number 1, it depicts your primary production; is that correct?

A. That's correct.

Q. Okay. And the estimated -- what -- On this particular graph, what is the -- what would be the economic limits that this well -- or that this area would have to be

shut in on the present, if present primary production continued? What would be the economic limit, and what would be the production rate for that?

A. The economic limit, based on our $18 pricing, was that it would go down the production curve to produce 369,000 barrels. Does that answer your question?

Q. I believe it does. Which would -- what? -- put it in -- ending in about a year; is that correct?

A. Yes.

Q. Was secondary operations -- You have an incremental increase of what? One million three hundred --

A. Secondary reserves associated to waterflooding is 1.1 million barrels, which is represented on Table 2, column -- I believe it's L, which is taken 0.5, the secondary times the primary, to calculate column L.

Q. So I don't want to take that bottom number; I want to take the upper number?

A. Right, that's where the 1,090,000 barrels is -- those reserves associated with the secondary portion of the -- for the waterflood.

And the -- right at the bottom I have a comment here, Injector location primary reserves moved to secondary. That's approximately 255,000 barrels, and that's represented by drilling the six wells. And what I did was to move those reserves into the secondary portion,

per se.

Q. Okay, I was just trying to line the numbers up that you show in Exhibit Number 18, page 6, with primary and secondary recovery. And then there you have, on page 6, on Exhibit Number 18, 1347 million barrels of estimated secondary recovery. That was the figure I was talking --

A. What was that page again?

Q. Page 6 of Exhibit 18.

A. That is the projection, taking it down to a three-barrel-per-day-per-well basis. The reserves that are represented are based on my economics at the $18-per-barrel and $1.15-per-MCF. I included that, so -- because currently we're in a higher pricing environment, and I didn't really want to potentially cut ourselves off as our company management allows us to increase our oil-pricing policy.

Q. Okay. Now, where do I need to refer to, to get the cost of injection -- of the new -- what, injection facilities? And what's this project going to cost?

A. It's going to cost basically about $3.6 million, and Mr. Britt Hirth will be the next witness to delineate those dollars.

Q. Okay. In referring to Graph Number 2, I want to make sure -- I want to refer back to these figures that you used for your -- Is that your total oil in place? Is that

what you're referring to there? or total recovery -- recovered oil, both due to primary and secondary?

A. That's correct, that is my projection of the primary and secondary. After the -- Amoco implemented their waterflood, they put the project on pilot in about 1982. It was on pilot for about three years. They converted all their required wells to injectors at about 1984 to 1985.

Based on my analysis there, I project that they saw fill-up within about a year and a half. And then from there they saw the peak in one year.

Q. And did you submit a similar graph for the proposed project for this Lusk West?

A. Yes, sir, that would be Graph 4 --

Q. Okay.

A. -- where we start injection. We had planned to start injection in May of 1997. Fill-up time was, to be conservative, 21 months. We would see peak in an additional 18 months, for a total 39 months. And the projection that you see there in the year 2001 is about equal to 786 barrels a day.

EXAMINER STOGNER: I don't believe I have any other questions of this witness.

I'll hear your -- I'm assuming your other -- Do you have a production engineer at this point?

MR. COFFIELD: Yes, sir.

EXAMINER STOGNER: We'll hear what he has to say, then I can either -- if I have any questions I can open it up to whichever is more applicable to answer it.

MR. COFFIELD: Okay.

THE WITNESS: Thank you, Mr. Examiner.

EXAMINER STOGNER: Thank you.

MR. COFFIELD: Mr. Examiner, our last witness is Mr. J. Britt Hirth.

J. BRITT HIRTH,

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

DIRECT EXAMINATION

BY MR. COFFIELD:

Q. Mr. Hirth, for the record, would you please state your name and city of residence?

A. My name is J. Britt Hirth. I reside in Midland, Texas.

Q. What is your occupation and by whom are you employed?

A. I'm a senior operations engineer, employed by Parker and Parsley Development, L.P.

Q. Have you previously testified before the Division?

A. No, I have not.

Q. And for the Examiner, would you give a resumé of your educational background and work experience?

A. Yes, I will. I received a bachelor of science degree in chemical engineering from New Mexico State University in Las Cruces, New Mexico, in December of 1979.

I began working for Mobil Oil Corporation in February of 1980 and worked for Mobil for 12 years as a gas process engineer, an operations engineer, a reservoir engineer, and also as a business-planning engineer.

In 1992 I left Mobil Oil and I worked as a contract operations engineer for five different oil and gas operating companies in Midland, Texas, in four years.

Since May of 1996 I have been employed by Parker and Parsley Development, L.P., as a senior operations engineer.

My total engineering oil and gas industry experience in the Permian Basin is 17 years. I'm a member of the Society of Petroleum Engineers and a registered professional engineer in the State of Texas, Number 76,796.

Q. Mr. Hirth, are you familiar with the operational engineering matters relating to this West Lusk-Delaware waterflood project?

A. Yes.

MR. COFFIELD: Mr. Examiner, we would tender Mr. Hirth as an expert operations engineer.

EXAMINER STOGNER: So qualified.

Q. (By Mr. Coffield) Mr. Hirth, we'll direct your attention to the Application which was filed for Case Number 11,704, relating to the waterflood part of this presentation.

Would you please explain whether there are any changes or corrections that should be made to -- on the record for purposes of this -- of -- certain matters -- that Application?

A. Yes, in the Application I had three corrections. In the Application section, the item 8A and B gives the number of initial producers and injection wells as 15 producers and 13 injection wells. I would like to change the numbers to 16 producing wells and 12 water-injection wells. The total well count is still the same at 28.

Also, item 8E in the Application, on the net value of the secondary production, there was a typo, and rather than the $21 million it should be $12,605,000 for the net value.

Q. Okay. Do these changes have any substantive effect on what Parker and Parsley is applying for today?

A. No, they do not.

Q. Okay. With reference to Exhibit 1, talk about that relative to your interests and concerns and expertise.

A. Okay, in Exhibit 1 is a plat of the proposed unit

area showing the 12 injection wells, the 12 proposed injection wells and the 16 producing wells.

Q. The Exhibit 1 we're talking about is the one that was originally presented by Owen, correct?

A. That's correct.

Q. Okay. So referring to that Exhibit 1, what will be the plan of operations for the project?

A. The plan of operation will be to convert nine wells to water injection, drill three new water-injection wells, and drill three new producing wells.

As shown on Exhibit 1, the injection wells are the green triangles for the water-injection well, the triangles that are upright are the three new-drilled injection wells, and the green circles are for the three new-drilled producers.

EXAMINER STOGNER: Okay, I can't find green circles. Which exhibit are you referring to?

MR. COFFIELD: It's the first exhibit that was presented by our first witness, Mr. Examiner.

THE WITNESS: It should be Exhibit 1 or Exhibit A, should be the same. You may have a copy.

MR. COFFIELD: Okay, this is in Exhibit --

EXAMINER STOGNER: Oh.

THE WITNESS: At the very back.

MR. COFFIELD: -- Exhibit A to that --

EXAMINER STOGNER: Okay, let's see --

MR. COFFIELD: Would you like that restated, Mr. Examiner?

EXAMINER STOGNER: Yeah, let's restate that. We're referring to Exhibit Number 19 and Exhibit A of that particular document.

MR. COFFIELD: Okay, very good.

THE WITNESS: All right.

Q. (By Mr. Coffield) Exhibit A is the plat to which you have reference; is that correct?

A. That is correct.

Q. And would you please explain the features that you wanted to bring to the Examiner's attention?

A. Yes, the legend at the bottom with the upside-down triangle shows the nine proposed conversion wells within the unit, and the right-up triangle identifies the three new-drilled injection wells, and the circle in the legend identifies the three new producing drill wells that are proposed.

Q. Okay, Mr. Hirth, would you then, now, explain which of the wells in the unit are currently producing?

A. Each well is currently producing an average of 15 barrels of oil a day and 15 barrels of water per day, plus 23 MCF per day of gas. That is an average.

Q. What additional facilities are you going to need

to install for the unit in the injection project?

A. Parker and Parsley will install waterflood pump facilities and also a fiberglass distribution line system out to the injection wells, as seen in Exhibits 21A and 21B.

The 21A describes -- shows a schematic of the proposed surface facilities from a top view, and listed below is the itemized material and the estimated cost.

And in Exhibit 21B shows the proposed fiberglass distribution system out to the proposed injection wells, also with the itemization of the materials below it and the costs, estimated costs.

Q. Okay, Mr. Hirth. Would you now refer to what's been marked as Exhibit 22 and explain what that exhibit entails?

A. Exhibit 22 is Form C-108 and its attachments, which is the same as submitted with our Application.

MR. COFFIELD: Mr. Examiner, I will interject here and ask you this question, if you want a well-by-well discussion, the various wells that are reported here in this C-108, or would you prefer my questioning Mr. Hirth as to the regular nature of most of the wells and what the unusual wells may be here for your edification?

EXAMINER STOGNER: I don't intend to go well by well, but -- I don't think you -- probably be a lot of

people in this room that would kill me.

No, if you would stick to the highlighted areas, any potential problem wells, perhaps referencing me at this point to call to the attention of what the new producers are going to be drilled as, as is the new injectors, how they're going to be completed and drilled, just to highlight it.

And as far as the overall injectors, perhaps touch on how they're going to be completed, what size of tubing, internal coated. Also just reference that each schematic, if it does show the cement behind the pipe in the injector zone, that it is shown and it is accurate either by well-temperature survey or calculation.

And any plugged and abandoned wells, those are the only ones we'll probably need to go through on a well-to-well basis. And if that produced -- if the plugged well didn't go into or penetrate this zone, go ahead and state it, because that will also be -- That's my recommendation to you --

MR. COFFIELD: All right, sir.

EXAMINER STOGNER: -- at this time.

Q. (By Mr. Coffield) However, first of all, Mr. Hirth, this C-108 that is now submitted as Exhibit 22, did you in preparation of that C-108 report on, in each case, all of the data required for each of the wells involved and

submit it in the detail as specified by the OCD?

A. Yes, I did.

Q. With respect to the material in the data that's reflected in each of these entries from C-108, as compared with the data as represented at the time the C-108 was done, if there's any changes that have occurred with regard to any well between the time that you completed the C-108 and now?

A. Yes, yes.

Q. Let's talk about those wells, then. Which wells are they, and what's different about the materials?

A. I have five wells to discuss. I will give the name of the well and then the description of where it is.

The SA Bowman Number 4 well, it's in the northwest quarter of the southeast quarter of the southwest quarter of Section 29. There is a mistake in the perf number. It should be 6439 instead of 6139. That is on the sketch. It is a typo.

The Southern California Federal Number 7 well, the southeast quarter of the southeast quarter of the northwest quarter of Section 29. The sketch shows only perfs in the 6400-foot zone. The well is currently producing in the upper Delaware perfs from 4684 to 4973 overall, and it does have a cast-iron bridge plug at 5047 foot. That is not shown on the sketch, but those are the

perfs that we are currently producing from, is the upper Delaware.

On the Texaco CR State Number 1, in the northwest quarter of the northwest quarter of the northwest quarter of Section 32, the sketch shows only perfs in the Strawn at 11,256 foot. This well was recompleted to the 6400-foot zone and produced. It is the discovery well in the Brushy Canyon zone. Currently the well is TA'd.

The Shackelford Amoco Federal Number 1 well, which is in the northwest corner of the northwest quar- -- I'm sorry, the northwest quarter of the northwest quarter of the northwest quarter of Section 21. The sketch shows the 6400-foot and the 4900-foot zones both open. Only the 4900-foot zone is open and producing currently.

The last well, the Shackelford Plains Federal Number 6, in the northwest quarter of the southwest quarter of the northwest quarter of Section 21, this well is shown as a Strawn producer. This well was P-and-A'd in the past. It was re-entered by Shackelford in 1996 and is a Yates -- It is a producer in the Yates zone now.

Q. Mr. Hirth, in connection with these changes that you've just enumerated, do you -- In your opinion, do these changes represent any substantive differences in the data that's submitted for the Examiner's attention?

A. No, it does not. It only clarifies more of the

information.

Q. Okay. Let's talk about the injection, the proposed injection wells and how they might be reworked.

A. All the water injection wells will be regular injection well completions, with packer and IPC tubing in the well that will be 2 3/8. I wish to point out, there are three wells in the proposed development plans I would like to discuss. These are, I guess we said, problem wells earlier: the Southern California Federal Number 4, the Southern California Federal Number 7 and the Shackelford Mobil Federal Number 1.

On the Southern California Federal Number 4 well, which is in the southwest quarter of the northeast quarter of the southeast quarter of Section 29, this well is currently an active producer in the Strawn, and we -- In our development plans, we plan to convert this well when it becomes economic. The well is currently producing 40 barrels of oil a day.

In the Southern California Federal Number 7, this is a well that we had discussed earlier. It is currently an active producer in the 4900-foot Delaware -- upper Delaware zone. We plan to complete in the 6400-foot Delaware zone. When the well goes uneconomic, we would cement-squeeze off the 4900-foot zones when they were uneconomic.

In the Shackelford Mobil Federal Number 1, which is in the northwest quarter of the southwest quarter of the northwest quarter of Section 21, this well is currently an active producer in the 4900-foot Delaware. We plan to convert this well in our development plans to an injection well when the well becomes economic.

Q. Mr. Hirth, how many wells are there in this area of review?

A. There are 61 wells within the area of review. A total of 29 wells have been completed in the 6400-foot Delaware zone at various times, and 19 current unit wells in the 6400-foot zone.

A map in the C-108 Application shows the wells, which is our Exhibit A. Schematics of the wells are also included in the C-108 Application.

The majority of the 6400-foot zone completion wells in the area of review have three casing strings. The surface casing is set at around 800 to 900 foot and cemented to surface. The intermediate string is set at 4000 to 4500 foot and cemented to surface. The production strings are set at 6600 to 7200 foot and cemented to approximately 3000 foot.

There are some P-and-A's and dryhole wells in the area of review.

Q. In line with the Examiner's comments moments ago,

are you able to point out what the P-and-A wells are and the dry holes?

A. Yes, I am. I would like to point out a P-and-A'd well that's in Section 20. That well is a Culbertson-Irwin well that was drilled back in 1943. It was only drilled down to 2820 in the Yates, so that well does not penetrate. It's the Number 4. And that well is in the south -- southeast quarter of the southeast quarter, and also the southeast quarter of Section 20.

If we would like to go over the P-and-A'd wells in the C-108, we start well by well if we desire to do that.

EXAMINER STOGNER: How many wells -- How many P-and-A'd wells are there?

THE WITNESS: There is five dry holes in this area, and that would be 16 P-and-A wells.

Q. (By Mr. Coffield) Mr. Hirth, have you included in your C-108 schematic presentation schematics of all those P-and-A'd and dryhole wells?

A. Yes, I have.

EXAMINER STOGNER: If you've got any problem ones, let's discuss them at this point. There's a lot of information to go through here, so the more you can call to my attention when I need to -- the better off.

Q. (By Mr. Coffield) Okay, Mr. Hirth, prior to

going through the list of wells that are there with your C-108, would you point out the ones that are problem wells on the P-and-A wells and the dry holes?

A. Without going well by well, I have researched all the wells, and I find all the wells to have been plugged adequately or have cement that would not provide crossflow.

We can start well by well. I can give footages. I do not have the -- We would have to work out location by location on that. I will do whatever is preferred.

Q. But are you saying -- You're stating categorically that you have researched all the P-and-A'd and dryhole wells, dry holes?

A. Yes, I have.

Q. And that you could state categorically that the cement program that was used in each of those wells is adequate and is -- presents no danger to the integrity of the project?

A. That is correct. The sundry notices and plugging notices, along with the initial scout tickets of the well were used. Some wells out here have been P-and-A'd and been re-entered, but all of those wells have been evaluated and are shown. And so the specific wells that are currently PA'd and in that status, we had the sundry plugging notices on those wells that were used to develop the sketch.

Q. And in your recollection of the research that you did, Mr. Hirth, were there any -- were there one or more of any of these plugged-and-abandoned wells or the dry holes which had anything particularly unusual?

A. No, there was not, other than the well that I pointed out earlier that was the Culbertson-Irwin Number 4 in Section 20.

I show a sketch on there that wells drilled back in the 1940s that are on federal land were not required to furnish the OCD with copies of the plugging log. So all that is available is the information on the scout ticket. And this particular well, I was able to find the scout ticket, which showed that that well was drilled to 2820-foot TD. So it never penetrated the 6400-foot zone that we're concerned with here.

Q. So notwithstanding the lack of data that you have on the other wells, because it didn't penetrate the zone, you don't see that as a problem; is that correct?

A. That's correct.

Q. Is that the only anomaly along those lines?

A. Yes, from the plugged wells.

EXAMINER STOGNER: Do you have anything further, Mr. Coffield?

MR. COFFIELD: Yes, sir.

Q. (By Mr. Coffield) Let's go on, then, Mr. Hirth.

Restating some of the things you've already stated, to the best of your knowledge, is the mechanical integrity of all the wells in the area of review sufficient to conduct the injection operation safely?

A. Yes, there should not be any cross-flow or migration of fluids to any other zone.

Q. Okay, what will the injection pressure be?

A. This surface injection pressure is estimated at an average of 1300 p.s.i.g. Initially, because of the low bottomhole pressure, we will be on a vacuum with the wells. But when we get fill-up and the project is in full swing, our average pressure we're looking at is 1300 p.s.i.g.

Q. Okay. Is the injected water that you propose to use compatible with formation water?

A. Currently, no, the water is not. But all the injection water will be continuously chemical-treated with a 15- to 25-parts-per-million scale inhibitor, and in the mixture of the Yates Seven Rivers supply water and the Delaware produced water I have here in the C-108, I have provided water analysis and water mixed at different ratios that identify the different scaling tendencies at these percentages. I have provided in Exhibit 22 a letter from Champion Chemical Company showing compatibility can be achieved by this chemical treatment, continuous chemical treatment.

Q. What project allowable are you going to -- are you requesting for this Application?

A. We request that the project allowable be 1000 barrels of oil per day for the unit.

Q. So was notice of the injection Application sent as required in Form C-108?

A. Yes, and the affidavit reflecting those mailings is Exhibit 6, which was presented by Mr. Owen.

Q. Okay, Mr. Hirth, in your opinion is the granting of this Application in the interest of the prevention of waste, protection of correlative rights and conservation?

A. Yes.

Q. And were Exhibits 21A, 21B and 22 prepared by you or under your supervision or compiled from company records?

A. Yes, it was.

MR. COFFIELD: Mr. Examiner, we move the admission of Exhibits 21A, -B and 22, and I have no other questions of Mr. Hirth at this time.

EXAMINER STOGNER: Exhibits 21A and -B and Exhibit Number 22 will be admitted into evidence at this time.

Okay, I was looking up, as far as the notification portion of this Application for the actual water injection -- Is that included in 22, or is that --

MR. COFFIELD: Yes.

EXAMINER STOGNER: -- or referring back to Exhibit Number 6?

MR. COFFIELD: No, Exhibit Number 6.

EXAMINATION

BY EXAMINER STOGNER:

Q. And who were notified, as far as what parties? Not to be identified on a one-to-one basis, but -- operators, surface owners and that such?

A. All the offset operators, and the surface owner is the BLM.

EXAMINER STOGNER: Okay.

MR. COFFIELD: And the surface owner was notified as well.

THE WITNESS: That's correct.

Q. (By Examiner Stogner) Was there any state lands as far as affected by the injection?

A. Not -- All the unitized area is federal land.

Q. How about affected by water injection?

A. The area of review did encompass the Texaco CR State Number 1 in the southwest area, and I think that would be a state land. So the actual circle...

Q. Okay, what are the requirements for notification? Everybody within a half-mile radius? Does it include surface and offset operator?

MR. COFFIELD: It does include surface, and -- We

believe the affidavit does include the surface ownership, the --

EXAMINER STOGNER: So within that area of review or within another area?

MR. COFFIELD: The area of review does not include the surface within the area of review.

Q. (By Examiner Stogner) Okay, it's just where the well was located; is that right?

A. That's correct.

Q. Okay. Bear with me here. I'm going to refer to a Lusk Deep Unit A Well Number 7. That's in Section 20 of 19 South, 32 East, as a plugged-and-abandoned well. It shows up on that map as in the southwest quarter?

A. That's correct.

Q. Okay. Whenever I look at one of the schematics and between the -- either between pipe or pipe and the open hole and it's shaded, does that mean there's cement in that area?

A. That is correct. The shaded area is the cement between the casing and the formation.

Q. Okay. On this one I show an open-hole interval, but there's cement across that. I guess I'm confused. In that particular Well Number 7. Have you got that one yet?

A. Yeah, I'm looking at it right here.

Q. Okay.

A. For some reason -- I'm showing the Lusk Deep Unit A Number 7, 1650 from the south line and 990 from the west line?

Q. Yeah.

A. This is the well that we got approval in 1996 from the BLM to re-enter and test the Yates Seven Rivers from about 2900 to 3400, which we did.

We were able to show that -- through swab tests that it appeared that we would have the sufficient volume. When -- This is the well we plan to get our supply water from for the actual waterflood. It does appear that we would be required to run a sub pump in this well.

So this well, even though it is currently shown as P-and-A'd, because all we did was a temporary go-in with the BLM approval to see if we could utilize this well for supply. Until we get the waterflood facilities installed and the ability to put a sub pump in this well and start moving the water for our flood system, at that time that well will be reactivated.

Q. Okay, I was looking at the lower interval, because the injection interval is what depth? That's why I was more concerned about the cement behind the pipe or the area at the injection interval.

A. Oh, I see -- I see what you're saying. Is an open hole there?

Q. Right. But you show cement. I guess I'm confused. I'm going to have to go to each one of them and scrutinize them like this, or is this an anomaly that --

A. I think this would be an anomaly.

Q. Okay. Let's see here. On this particular -- Okay. So I show a top of cement at 7600; is that correct? As far as the long string goes?

A. Yeah, I'm looking because it does appear that it was actually cut off.

Q. Uh-huh.

A. I actually --

Q. Is this well going to be an avenue of escape for any injected fluids? That's what we're getting at.

A. In fact, if we were able to pull out where Larry Brooks' geology is, this area over here would be in the area where it starts to get into the shale area.

Q. Okay.

A. If we could -- Let me pull out one of those maps.

Q. Well, let's talk about this well right now, because if we've got this anomaly in there, how many other -- how many of these -- Maybe we need to go on a well-to-well basis.

A. Well, in this particular well --

Q. And do you understand --

A. Yes.

Q. -- what an avenue of escape is --

A. Yes.

Q. -- as far as injection zone, and what needs to be -- what needs to be protected?

A. Yeah, what I -- What I would --

Q. Why don't you tell me what needs to be protected and what we're looking at as far as an existing well within the area of review?

A. Within the area of review?

Q. Yeah, what should a well have?

A. Well, as far as escape, what I would consider as migration, would -- you would have to have a source, you would have to have a path, and you would have to have a destination.

At any point in there that you can provide a block, then you should be able to effectively stop any flow of fluids.

Q. And how is that going to be done, normally?

A. Normally, you could possibly cement-squeeze off, setting plugs as you would in a P-and-A'd wells, either above or below the zones or through the zone.

Q. Okay. So with this particular well, you're going to show me about geology, but --

A. Well, this well actually does fall outside what is shown to be the sand fairway, which would be the tight

shale of actually no-flow, 100-percent water.

And so in this particular case, I would consider that well not to be part of this fairway that we would be trying to flood.

Q. Okay. Now, they show a 25-sack cement plug at 6300, 6400. That would be in the open interval; is that correct? When you reviewed this document? Or when you reviewed the well?

A. In the Number -- The Lusk Deep Unit 8 Number 7 at this particular well?

Q. Right, yes.

A. We actually went out and -- went in and drilled these top three plugs out, and we perforated from approximately 2920 to somewhere around 3450. We tested in there, so the plug at 3774 to 3874 would be intact. And the actual intermediate casing shoe is at 3796.

Q. Okay. How are most of the existing wells, as far as cement behind the pipe, were they -- most of your data research -- were most of those calculated, or what percentage, roughly, was a temperature survey?

A. It was about half and half.

Q. Okay.

A. On the -- There was quite a few of them that were temperature surveys. Quite a few of the older wells that, say, went deeper did not have a temperature survey. Some

of the wells have since gone in and had squeeze work done.

And as far as, you know, actual calculation, it would be, depending on the well, on a fairly standard type of 30-percent loss to the hole, and in -- and calculations using, like, Halliburton's tables.

Q. You mentioned the CR State Well Number 1 well. That was the discovery well?

A. Yes.

Q. I'm looking at the schematic on that. And you said there were perforations at what depth in that well that's not shown in the schematic?

A. In the 6400-foot zone.

Q. Okay. Well, I show top of cement at 6400.

A. In that well my records are still not finalized, in that particular well.

It does appear that they came up also to the Yates in that well, and I would have had to assume, had they produced from the 6400-foot zone as the discovery, that they actually did cement work at that time.

Q. Okay. Would you consider this one of the potential problem wells?

A. It is one well that we will investigate. It is a well that Parker and Parsley owns.

What I see now is that we have possible mechanical problems from -- It appears that they've worked

their way up the hole in that well.

Q. Do you know if there's any other Delaware intervals, other than the Brushy Canyon, that are potential producers out there?

A. My understanding is, there is other sands that are somewhere in a general term from about 4700 to the top of the Bone Springs at 7200.

Q. Then with that in mind, let's take a look at the Southern California Federal Well Number 3. That is 1980 from the south, 1980 from the west in Section 29.

I would assume that that is open between, oh, 4700 feet and to the top of the cement and along string, which you have the temperature surveys on at 10,100 feet?

A. That's correct.

Q. Okay, is this a potential problem?

A. In this particular well, I show the 4-1/2-inch casing stub up at 4700 foot, with a plug at that point, that you would have mud in between there and at least casing between those points. In this particular well, you can see where it was sidetracked and re-entered at one time.

Q. That's up in the 2000-foot interval, correct?

A. Yes, in the past. In this particular well you would have to utilize something while you monitored your flood to save your pattern.

But I do know that the other Delaware zones are not as prolific and a lot less permeable than our main target zone that we have here. This well, having been re-entered before and it went outside the casing, appears to be something that would be very difficult to go back and repair if it was deemed it was needed.

Q. Yeah, that could be a problem.

But this would be a potential problem well, very serious problem well -- Would you classify it as that, since it's open between, oh, that stub at 4700 down to 10,100 feet?

A. You obviously have casing and formation --

Q. Yeah, but do you have cement?

A. -- with no -- That's what I was going to say, with no cement.

Q. Right.

A. So...

Q. But at this point, these potential wells like this will either have to be determined not to be sufficient -- I mean, not to -- not to be a factor as far as influencing any migration from that potential zone, whether they be prolific or not, or re-entered and replugged.

You're aware of that potential problem or possibility?

A. That's correct.

Q. Okay.

A. If -- From an input and withdrawal point of view, those zones would tend to have to have some kind of an outlet, plus, being tighter, would not tend to take the fluid, compared to the zone that you're actually injecting into and that you're actually withdrawing from.

Q. Okay. How -- Well, you brought that up. How far is that well from an injector?

A. It is very close to an injector.

Q. So that would make some sort of a difference, or are you telling me that that well won't receive injected fluids?

A. All I'm saying is that any zone that fluid would go into, within a reasonable area you would also have to have withdrawal at some point; if there was fluid going into another zone, you would have to have some place to be able to have withdrawal.

In our active injection area that we would be injecting and also taking withdrawals from -- This is not a situation, obviously, that you would like right here, from what we're showing, and I will actually research this in more detail to see what possibly can be done in this specific case on this Southern California Federal Number 3. But that would be my evaluation --

Q. Well, my point is that what should have been is

research before you got to this point. Now, this particular well will enter up in the order that it will either be plugged and abandoned or something will be shown --

A. Well, it is researched. I just do not know from a well that was -- tried to be re-entered at one time and came out as sidetracked that has mechanical problems in this particular case.

Q. Well, this one will have to be researched.

A. This is, to the best of my knowledge, how that well is at this time.

Q. These are the wells that I was hoping that you would bring to my attention, as opposed to me finding them.

A. Well, it was not intentional. There's a lot of data that's looked at here.

Q. Okay, what about the P-and-A'd well, the Shackelford Oil Plains Federal Well Number 4? I believe you had mentioned something in your testimony about that well, or am I remembering something -- Now, that is in Section 21, 1930 from the south, 660 from the west. That's and old P-and-A'd well?

A. That is correct.

Q. I show that well to be loaded up with mud. Is mud an adequate restricture or restraining fluid for movement of injected fluids?

A. I know that if there's mud there, that you -- some kind of solid material that you can't move the cement. Depending on the mud weight, it would be somewhat of a deterrent, but obviously not as good as cement.

Q. Okay. What is the proposed injection pressure in this operation?

A. The surface pressure is 1300 pounds.

Q. And that's right at the -- what, .2-p.s.i.-per-foot limit that we hold at this point?

A. Yes. What we looked at was some of the acid jobs that were done on the wells when the -- some of the wells in 88 range, after there was some depletion, and the instantaneous shut-in pressure on those wells was 1500 p.s.i.g.

The density -- the water -- the acid would be the same as water, which is .4333 p.s.i. per foot. That's fresh water.

Q. Okay.

A. So you would be looking at basically 6400-foot hydrostatic plus the surface pressure, to come up with your bottomhole pressure.

So what I'm saying on those ISIPs on the acid jobs of 1500 at the surface, you would also have to take the hydrostatic to get the bottomhole pressure there, which is somewhere around 4300 p.s.i.g.

Q. Okay. And the source water? What's the source of the injected fluid?

A. The source of the injected --

Q. I mean, is it fresh water or --

A. Of what we propose to put in?

Q. Yes.

A. The majority of the water will come from the Yates Seven Rivers, which is a fresher water than the produced Delaware.

Q. Are there any plans to use other than produced water?

A. We plan to use produced water plus the Yates Seven Rivers water mixed together as our injection water. Right now, there is no plans to use any other water outside of the unit.

Q. The Yates Seven Rivers, is that supply water, or --

A. Yeah, the Yates Seven Rivers supply from the Lusk Deep Unit Number 7 we had talked about earlier.

Q. Okay.

A. -- that would produce from the 2900- to about the 3400-foot, the Yates formation there.

Q. Is that considered fresh?

A. It's about 30-something-thousand parts per million chlorides.

Q. Okay, since you -- What is fresh water?

A. I would assume something under --

Q. Don't assume. Tell me what the law says. What's fresh water in this state? Surely you know that.

A. Over 3000 parts per million of solids would be nonpotable.

Q. Okay, you don't know what New Mexico considers fresh water then?

A. No, I do not. From --

Q. You really should have known, putting this Application together. Anyway, I'll inform you. It's 10,000 to 1 parts per million. Anything above that is not considered fresh.

And that's what we're trying to protect at this point. But there again, since you've made this Application, I'm sure you know that.

Okay, as far as the tubing goes, it's going to be 2 3/8 in all injection wells?

A. That is correct.

Q. And it's internally coated in what manner?

A. It will be an IPC 505, which is an internally plastic-coated tubing.

And the actual nose-in J areas, before the plastic coating is applied, will be -- will have a steel coating applied that gives a secondary barrier.

Q. Okay, in reference to Exhibits 21A and 21B, you came up with a total on 21A, as far as cost for the injection facility, of $30,000, and that was for this particular exhibit. Now, this is for each well?

A. For both of these exhibits, if you add the totals up, it will come to the $526,000 that we show as the facilities cost.

Q. Okay. And then with the addition of the six new wells?

A. The six new wells, the producers, the three producers, we have at $439,000, and the three injectors we have at $419,000.

Q. Okay. Now, is there any other costs associated, other than these three items, that you --

A. Yes, there's conversions --

Q. Conversions.

A. -- of the nine wells.

Q. And what's the cost on conversions?

A. That is close to $46,000, as I remember.

Q. Apiece or total?

A. Apiece.

Q. Apiece. And let's see, we're --

A. And then there's --

Q. -- how many?

A. There is two producer wells --

Q. Okay.

A. -- to do some work on at $39,000.

Q. $39,000.

A. And that --

Q. Does this represent the total?

A. The total is the $3.6 million.

Q. $3.6 million. Okay. Are there any stock water wells? I believe you mentioned that in your testimony. There again, there's a lot of data.

Was there any stock water wells within the area of review?

A. My understanding is, no, the only fresh water that comes through that area is through pipelines and co-ops.

Q. Okay, so there are no windmills or --

A. That is correct. I looked on the horizon, looked around the area.

And also, from Larry Brooks' testimony earlier, we do not believe that there's any active freshwater wells.

EXAMINER STOGNER: I don't have anything further at this time, Mr. Coffield.

Do you have anything further?

MR. COFFIELD: No, sir, we have nothing further.

EXAMINER STOGNER: Does anybody else have anything further in Cases 11,703 and 11,704?

Then this Application will be taken under advisement.

Mr. Coffield?

MR. COFFIELD: That's all we have in this case, sir.

EXAMINER STOGNER: All right.

(Thereupon, these proceedings were concluded at 1:20 p.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case Nos. 11701 and 11704 heard by me on February 1997.

, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

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

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

WITNESS MY HAND AND SEAL February 14th, 1997.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998