STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

CASE 9882, CASE 9888, CASE 9889, CASE 9892

CASE 9893, CASE 9881, CASE 9894, CASE 9895

CASE 9897, CASE 9898, CASE 9884, CASE 9885

EXAMINER HEARING

IN THE MATTER OF:

CONTINUED AND DISMISSED CASES

TRANSCRIPT OF PROCEEDINGS

BEFORE: MICHAEL E. STOGNER, EXAMINER

STATE LAND OFFICE BUILDING

SANTA FE, NEW MEXICO

March 21, 1990

A P P E A R A N C E S

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

EXAMINER STOGNER: This hearing will come to order for Docket 9-90. Today is March 21, 1990. I'm Michael E. Stogner, appointed hearing officer for today's cases. I call all the continued and dismissed cases at this time. First I'll call Case No. 9882.

MR. STOVALL: Application of Controlled Recovery, Inc., for an oil treating plant permit, for surface water disposal, and an exception to Order No. R-3221, Lea County, New Mexico.

Applicant requests this case be continued to April 4, 1990.

EXAMINER STOGNER: Case No. 9882 will be so continued.

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EXAMINER STOGNER: Call next case, No. 9888.

MR. STOVALL: Application of Conoco, Inc., for compulsory pooling, Lea County, New Mexico.

Applicant requests this case be continued to April 4, 1990.

EXAMINER STOGNER: Case No. 9888 will be so continued.

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EXAMINER STOGNER: Call next case, No. 9889.

MR. STOVALL: Application of Meridian Oil, Inc., for temporary well testing allowable for certain wells in the Parkway-Delaware Pool, Eddy County, New Mexico.

Applicant requests this case be continued to April 18, 1990.

EXAMINER STOGNER: Case No. 9889 will be so continued.

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EXAMINER STOGNER: Second page. I'll call Case No. 9892.

MR. STOVALL: Application of Pacific Enterprises Oil Company (USA) for compulsory pooling, Eddy County, New Mexico.

Applicant requests this case be dismissed.

EXAMINER STOGNER: Case No. 9892 will be dismissed.

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EXAMINER STOGNER: Call next case, No. 9893.

MR. STOVALL: Application of Pacific Enterprises Oil Company (USA) for compulsory pooling, Eddy County, New Mexico.

Applicant requests this case be continued to April 4, 1990.

EXAMINER STOGNER: Case No. 9893 will be so continued.

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EXAMINER STOGNER: Call next case, No. 9881.

MR. STOVALL: Application of Richmond Petroleum, Inc., for compulsory pooling, unorthodox coal gas well location, and a non-standard gas spacing and proration unit, San Juan and Rio Arriba Counties, New Mexico.

Applicant requests this case be continued to April 4, 1990.

EXAMINER STOGNER: Case No. 9881 will be so continued.

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EXAMINER STOGNER: Call next case, No. 9894.

MR. STOVALL: Application of Richmond Petroleum, Inc., for compulsory pooling, unorthodox coal gas well location, and a non-standard gas spacing and proration unit, San Juan and Rio Arriba Counties, New Mexico.

Applicant requests this case be continued to April 4, 1990.

EXAMINER STOGNER: Case No. 9894 will be so

continued.

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EXAMINER STOGNER: Call next case, No. 9895.

MR. STOVALL: Application of Richmond Petroleum, Inc., for compulsory pooling and an unorthodox coal gas well location, San Juan and Rio Arriba Counties, New Mexico.

Applicant requests this case be continued to April 4, 1990.

EXAMINER STOGNER: Case No. 9895 will be so continued.

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EXAMINER STOGNER: Call next case, No. 9897.

MR. STOVALL: Application of Siete Oil & Gas Corporation for a waterflood project, Eddy County, New Mexico.

Applicant requests this case be continued to April 4, 1990.

EXAMINER STOGNER: Case No. 9897 will be so continued.

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EXAMINER STOGNER: Call next case, No. 9898.

MR. STOVALL: Application of Doyle Hartman for compulsory pooling, a non-standard gas proration unit and simultaneous dedication, Lea County, New Mexico.

Applicant requests this case be continued to April 4, 1990.

EXAMINER STOGNER: Case No. 9898 will be so continued.

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EXAMINER STOGNER: Call next case, No. 9884.

MR. STOVALL: Application of OXY USA, Inc., for compulsory pooling, non-standard gas proration unit and simultaneous dedication, Lea County, New Mexico.

Applicant requests this case be dismissed.

EXAMINER STOGNER: Case 9884 will be dismissed.

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EXAMINER STOGNER: Call next case, No. 9885.

MR. STOVALL: Application of Doyle Hartman for compulsory pooling, a non-standard gas proration unit and simultaneous dedication, Lea County, New Mexico.

Applicant requests this case be continued to April 4, 1990.

EXAMINER STOGNER: Case No. 9885 will be so continued.

CERTIFICATE OF REPORTER

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

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

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

WITNESS MY HAND AND SEAL March 21, 1990.

Carla Diane Rodriguez

CARLA DIANE RODRIGUEZ
CSR No. 91

My commission expires: May 25, 1991

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9897, heard by me on 26 March 1990.

Michael E. Stogner, Examiner
Oil Conservation Division

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

CASE 9897

EXAMINER HEARING

IN THE MATTER OF:

Application of Siete Oil & Gas Corporation for a waterflood project, Eddy County, New Mexico

TRANSCRIPT OF PROCEEDINGS

BEFORE: DAVID R. CATANACH, EXAMINER

STATE LAND OFFICE BUILDING

SANTA FE, NEW MEXICO

April 4, 1990

ORIGINAL

A P P E A R A N C E S

FOR THE APPLICANT:

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I N D E X

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E X H I B I T S

APPLICANT'S EXHIBITS:

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WHEREUPON, the following proceedings were had at 1:18 p.m.:

EXAMINER CATANACH: At this time we'll call the hearing back to order, and we're going to skip Case 9882 for now and call Case 9897, Application of Siete Oil and Gas Corporation for a waterflood project, Eddy County, New Mexico.

Are there appearances in this case?

MR. PADILLA: Mr. Examiner, my name is Ernest Padilla -- Padilla and Snyder -- for the Applicant in this case, and I have one witness to be sworn.

EXAMINER CATANACH: Other appearances?

MR. CARR: May it please the Examiner, my name is William F. Carr with the law firm of Campbell and Black, P.A., of Santa Fe. We represent Arco Oil and Gas Company, and I have one witness.

EXAMINER CATANACH: Okay. Any other appearances?

Would the two witnesses please stand and be sworn in?

(Thereupon, the witnesses were sworn.)

ROBERT S. LEE,

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

EXAMINATION

BY MR. PADILLA:

Q. Mr. Lee, for the record, please state your full name.

A. Robert Steven Lee.

Q. Mr. Lee, who do you work for?

A. I'm employed by Siete Oil and gas.

Q. As what?

A. As a reservoir engineer.

Q. Mr. Lee, have you previously testified before the Oil Conservation Division and had your credentials accepted as a matter of record as a petroleum engineer or reservoir engineer?

A. Yes, I have.

Q. Mr. Lee, have you prepared certain documents for introduction at these -- at this hearing, I should say, and have you made a study of the area in connection with the waterflood project?

A. Yes, I have.

MR. PADILLA: Mr. Examiner, we would tender Mr. Lee as an expert engineer.

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Padilla) Mr. Lee, let's have you first tell the Examiner what the purpose of this hearing is.

A. The purpose of this hearing is to convert our Sackett Number 2 to a saltwater disposal well -- or a saltwater injection well, and flood otherwise unrecoverable reserves to our Sackett Number 1 producer.

Q. Mr. Lee, what formations and zones are you intending to inject salt water into?

A. Primarily, initially, we're only going to inject into the Grayburg, but we would ask for permission to inject from the Yates to the San Andres.

Q. I said that, Mr. Lee, that you were going to inject salt water. Is that correct?

A. That is correct.

Q. Mr. Lee, I'd like for you to go up to what we have marked as Exhibit Number 1 and have you tell the Examiner what that is and what it contains.

A. This is a cross-section through the area with our two wells on it that we're going to inject into and also that we're going to produce out of.

The Sackett Number 2 is the third well from the left. Currently, we're completed in the Grayburg and the Loco Hills formation, and we're going to flood

to our Sackett Number 1, which is the fourth well from the left.

As you can see, the common perforations are here in the Grayburg horizon. This cross-section shows continuity in these zones through the area.

If this flood is successful in the Grayburg, we intend at that time to come in and open up other porosity stringers and sand stringers from the Yates down through the San Andres zone, get them in vertical conformance, and flood everything at that time.

Q. Is the Yates shown on that cross-section, Mr. Lee?

A. No, it's not. Our cross-section only shows the Grayburg and the Penrose because the initial injection will be into the Grayburg formation.

Q. If you had those -- the Yates and the -- Well, let me ask this question first: What formations are not shown that are included in your Application?

A. It would be the Yates, 7 Rivers, Queen, and then the San Andres below the Grayburg.

Q. Is the San Andres in the Yates part? Well, what pool, or -- What general pool are we talking about?

A. This is the Grayburg-Jackson pool.

Q. Okay, and what formations are included in

that pool?

A. Seven Rivers, Queen, Grayburg and San Andres.

Q. And the Yates is not?

A. The Yates is not.

Q. What are your -- Or why isn't Yates not included in them? Or why are you including the Yates? I should ask that.

A. When we were drilling the well, we had some shows and drilling breaks in the Yates. There are a few stray sands up there that look like they may be productive, especially if you could get a little bit of water support behind them.

A. But it's not generally a prolific producing formation in that area?

A. Not in this particular area.

Q. Is that sort of the secondary objective if you -- if it comes to that?

A. Exactly.

Q. Okay. Why don't you go over to the index map that you have on that cross-section and start at some point that's convenient for you and tell us who owns the acreage around your injection well.

A. Okay. This is our lease here. This is our --

Q. Okay, how would you identify your lease?

A. Our lease is in the southern 240 of Section 29, Township and Range 17, 29.

Q. Okay.

A. Here's our proposed injection well, our Number 2. Marbob operates a Grayburg flood directly to the south of us. Marbob operates -- This is the old Loco Hills unit. Marbob operates the Grayburg-Jackson West Cooperative Flood to the east of us, also a Grayburg waterflood to the north of our lease.

Arco has some deep Abo producers there, and Phillips has the shallow rights, and the 10-A is a Phillips producer in the Grayburg.

To the west here in Section 30, Arco has the deep rights once again, producing out of the Abo formation, and RB Operating has the shallow rights and is producing out of the Grayburg horizon there and have flooded the Grayburg in that area.

Q. So -- Now, who operates the property in the southeast, or southeast of your lease?

A. The shallow rights are held by RB Operating. That's also part of their Grayburg flood there in that area.

Q. What communications have you had with the various operators around that area that you have just identified?

A. With Marbob, we've been in fairly close communication with them because one of the things we're going to do here is to tie into one of their injection wells and get pressurized water from them for our injection well. That way I don't have to put in facilities, because this is kind of a economically marginal project here. They're all in favor of the project.

I've talked to Phillips which operates the 10-A well here. They have no objections to the flood. Talked to RB Operating. They, you know, had no problems with the flood. And I've talked to Arco who has this Empire Abo unit, and they have a problem with us converting our Number 2 to an injection well.

Q. What's your understanding of what's the problem that Arco has with your wells?

A. In their wells, in the Number 49 well they do not have cement across the shallow horizons. And I guess there's a fear there that we're going to damage their casing.

Q. Okay, what else do you have on that exhibit? Are you done with that?

A. Pretty much, other than to show in Section 30, as I'll show you in better detail later -- As I mentioned, RB Operating does operate a Grayburg flood

in this section, and that there are some injection wells which are much closer to the Abo producers than my injection well will be.

Q. Okay, let's go on now. Why don't you resume your seat, and let's have you discuss what we have identified as Exhibit Number 2. What is Exhibit Number 2?

A. It's a Form C-108 here.

Q. Okay. Let's go immediately to the third page of that and have you identify or tell the Examiner what is contained on that page.

A. This is a wellbore diagram of our Sackett Number 2 as it is currently completed, currently producing well out of the Grayburg-Jackson pool, making about 6 barrels of oil a day and no water.

Q. Okay, what's on the next page?

A. This is a wellbore diagram of our proposed injection setup once we convert the well, showing that we're gong to set a Baker AD-1 packer at 2300 feet and inject into the zones below 2300 feet.

Q. Mr. Lee, you've said that this well is currently producing six barrels a day?

A. Uh-huh.

Q. Would that six barrels be wasted if you produced -- if you made a conversion of this well to a

saltwater injection well?

A. No, it would not. The small amount of remaining reserves that this well could recover on primary will be swept to our Sackett Federal Number 1 and will be recovered there, plus additional oil.

Q. Is this area that we're -- Siete has its wells, has that area been primarily depleted by primary production?

A. Yes, our Sackett lease has been.

Q. Okay, so it's essentially depleted; I guess that's --

A. Yes.

Q. -- what I meant to say --

A. That's correct.

Q. -- or ask. Okay.

Let's go now to the next page, and we have some information on that. What is that?

A. This is the tabular data pertaining to our proposed injection well, once again stating the location of the well, what kind of tubing and packer we're going to set, and the formations we plan to inject into.

Q. Okay. Is this essentially the same information that is contained in the schematics?

A. Yes, it is, just in tabular form.

Q. Okay. Now, you have following that a couple of pages of tables. What do those contain?

A. These are the wells that fall in and near our area of review.

Q. Okay. And what's the area of review?

A. The area if review is a one-half-mile radius circle drawn around our proposed injection well, and it's shown on a map directly behind our two tables here, with the construction data.

Q. Okay. What's the significance of these two tables of information that you have? Why have you included that?

A. It's required on the Form C-108. You need to submit this to the State so that they can see what wells are in the area, what kind of casing programs and cement programs were involved when the wells were completed.

Q. Mr. Lee, which are the Arco wells? Are the Arco wells in this tabulation?

A. Yes, they are. They are the third from the top on the first sheet, the Green A-8 and the Green A-9. I called them those names because that's what they were originally drilled as by General American. I did not include the new Empire Abo designation, unit designations in there.

Q. Okay. What is peculiar about this particular well as far as the casing program or the cement program?

A. On the Green A-8, which is the Empire Abo Number 49 well on my map, it does not have cement across the zones that I plan to inject salt water into.

Q. Okay. Are there any wells, any other wells as shown on this tabulation that would have the same type of problems?

A. Yes, there are.

Q. Which are those?

A. I have included a list of wells in the back where I actually go through and calculate the top of the cement.

Q. Is this what we have marked as Exhibit Number 3, Mr. Lee?

A. Yes, it is.

Q. Okay. Would you discuss that in brief, please?

A. It would appear that the Green A-7 does not have -- The top of the cement on that well is about 3400 feet, which would be below our injection interval. And according to the initial completion data in the Green A-9, which is Well Number 50 and falls within the area of review, it would appear that that well does not

have cement past the zones that we're going to inject into.

Q. Okay. Do you consider that a problem, Mr. Green -- I mean, Mr. Lee?

A. No, I do not. Those wells are substantially far away from my proposed injection well, and I don't feel that I would be damaging them at all.

Q. How about the Arco well?

A. No.

Q. Why? What's -- Why do you make a conclusion of that sort?

A. Well, like I said, I'm pretty far away from the two -- the well in question, and if you look at precedents in the area, in Section 30, RB Operating -- or, originally it was Reading and Bates before it became RB Operating -- they operated a flood there where they had injection wells much closer to Abo wells than my well will be, and the wells that they were very close to also calculate to not have cement across the injection interval.

Q. How about the concern about some kind of casing failure on their well? What's your reaction to that type of concern?

A. I don't -- I just don't see that as being a big problem from a pressure standpoint, as far as

collapsing their casing. If you were to assume that they had ran J-55 grade pipe in the hole -- and according to the completion cards they had 15-1/2 pounds per foot pipe there -- the collapse on that pipe would be 4000 pounds.

Now, I agree that those wells have been there for a while, but even if it were half of that, the collapse would be 2000 pounds. My maximum injection pressure that I would see at my injection well over time, you know, a year or so down the road, would probably be close to 1000 pounds at the surface, maybe 400 or 500 pounds of hydrostatic head.

So at my injection well, the maximum pressure there at the reservoir face is going to be 1500, 1600 pounds below what a 50-percent safety factor on J-55 15-1/2 pound pipe would be.

Q. Will that pressure of 1600 pounds dissipate as you move into the formation?

A. Absolutely. With the pressure sinks that we have in the area, our Number 1 Sackett well, the Phillips 10-A, Marbob's producing wells to the south of us, I just can't see that would ever pressure up the reservoir in the area of their wells.

Q. Can you show those pressure sinks through that index map on Exhibit 1?

A. Yeah. This is our Sackett Number 1 there. This is going to be the Phillips 10-A. This is the Marbob 25 Number 4, this Number 1 well here.

Q. And you've circled those wells?

A. Yes, I did, and so I've got one, two, three, four, five pressure sinks around my one injection well, and they're all closer -- and much closer than the two Arco wells to the north that are in contention.

Q. Describe how a pressure sink would work. How would water or pressure be affected by such a pressure sink?

A. As I inject water into my injection well initially, it's going to come out in a radial manner, looking like a circle. As it gets out far enough to see the pressure sinks here, it will start to finger towards those pressure sinks and ending up looking like the classical flower diagram that you see in the water-flooding textbooks.

Q. Now, in connection with the Arco wells, how would those pressure sinks affect pressure of the wellbore of the Arco wells?

A. They would essentially prevent pressure from coming out into this part of the reservoir to any great degree.

Q. When you say this part of the reservoir, what

do you mean?

A. I mean the part of the reservoir that the Arco wells are in.

Q. Are you saying that there is interference between the -- your injection well and the Arco wells?

A. Absolutely, interference from the nearby pressure sinks that my injection well will seek.

Q. How about direct interference from your well? How is that affected by that Phillips well between the Arco well --

A. With the 10-A Phillips well acting as a pressure sink there, it would basically keep virtually all the pressure from bypassing that well. It's going to be acting as a pressure sink. All the water, oil being pushed that way will be produced in that well and will minimize the effect that you would ever see on the Number 50 well to the north.

Q. Is Phillips currently producing that well, Mr. Lee?

A. Yes, they are.

Q. Do you know of any plans that Phillips may have to discontinue production from that well?

A. No, I haven't. In my conversation with the Phillips engineers, you know, they're in favor of me converting these wells. They may see a little bump in

production. Currently the well is very marginal, very depleted.

Q. Okay, that's all I have on that, Mr. Lee.

A. Okay.

Q. Have you completed your testimony on the tabulation of well data that you have here?

A. Yes, I have.

Q. Okay. And do you want to bypass now the -- Well, essentially the map is supposed to have some kind of a circle on it; isn't that correct?

A. Yes, it is. There is a half-mile radius circle around our Sackett Well Number 2. The copy quality was rather poor. You can vaguely make out the outline.

Q. But you've included all the wells inside that half-mile circle in your tabulation?

A. Yes, I have.

Q. How about the wells on Exhibit Number 3? Are those wells also included in that half-mile circle?

A. On Exhibit Number 3, with the heading of Section 30 Abo wells, those wells are not included within the half-mile radius. Those are wells in Section 30 that I calculated tops of cement on as part of my analogy of Abo wells near RB Operating injection wells.

But the page behind that where it says the heading, Sackett Waterflood, those wells are included within the half-mile circle, or at least they are included on my table that I have in front of here.

Q. So you've included more wells than just the wells in the half-mile circle?

A. Absolutely.

Q. Okay. Let's go on now to the page following your map, Mr. Lee. And can you tell us what that is?

A. Okay, this is a wellbore diagram of a plugged well that falls within our half-mile radius circle. It's south and a little east of our Sackett Number 2.

And directly behind it is the plugging report that was filed.

Q. Mr. Lee, in your opinion is the plugging of this -- the method of plugging of this well sufficient to contain water, injected water, in the proposed injection zone?

A. Yes, it would be.

Q. Okay, let's go on, now, to the next schematic that you have on that, and what well is that?

A. Okay, this is the Leonard State 1-29 well. This is a wellbore diagram of that well, followed by its plugging report also.

Had some trouble gathering data on this well

as far as the recent plugging operations. At the time this plugging report was filed, they had only plugged -- Of course they had casing ran in the hole, but they only had a plug at 4000 feet, and they had turned the well over to Leonard Oil.

Since then I have driven out to the location and have found that this well is plugged and has a Marbob sign above it.

Actually, also, I've included this well because it's in the area close to the injection well that we're talking about, our Sackett Number 2. And actually, kind of -- If you look at my circle, it falls within the half-mile radius.

But if you were to calculate the distance out, it falls a little bit outside of -- It's a little bit over a half mile away from my injection well. It's just kind of the inaccuracies of drawing the circle around that well that made it fall within there, but I did want to include it to make an examination of the well.

Q. Okay, what's on the last two pages of this C-108?

A. This is the -- On the first page is the injection data as required by the C-108, saying that our average injection rate will be 300 barrels a day,

with a maximum of 500 barrels a day.

Initially we plan to inject at 400 p.s.i. This is below the .2 p.s.i.-per-foot gradient as required by the OCD. At a later date I would fully anticipate, based on experience in the area, the need to run some step-rate tests and to get our injection pressure increased. But this will probably be a good pressure through the time it will fill up.

There's a discussion on the geologic data in the area. Then on the second page, we plan no additional stimulation at this time. We're just going to convert our well and begin injecting.

We have submitted logs to the Commission. And as I said, the Sackett Number 2 makes about six barrels of oil and no water.

Also as required by the State, Form C-108, we did make an examination for fresh-water wells in the area, and we did find a fresh-water well in the southeast corner of Section 29. The -- Went by the State Water Board there in Roswell, and they did have a test on that well. It showed that it had 440 parts per million chlorides.

And then there's also a statement that I have examined the area for any hydrological connection between our injection formation and any fresh-water

zones, have found none, there's not any faulting there in the area that's shallow.

Q. Mr. Lee, from your examination of the available well data, have you determined or do you have an opinion as to whether or not there is any likelihood that you would impair or pollute any fresh-water aquifers in the area?

A. No, I don't believe there is.

Q. Do you feel that the integrity of the well casing is sufficient to prevent any contamination of fresh-water aquifers?

A. Yes, I do.

Q. Mr. Lee, how much oil do you anticipate, or does Siete anticipate to recover as a result of this waterflood?

A. Conservatively, we anticipate recovering an additional 50,000 barrels of oil. I also think -- And I don't have a number, but I think there's a good chance that Phillips to the north may receive some benefit and that Marbob to the south may receive some additional benefit also from our injection well.

Q. As far as the Siete recovery of the estimated 50,000 barrels of oil, would this be oil that would not otherwise be recovered except with type of waterflood program?

A. Yes, it is.

Q. Let me hand you now what we have marked as Exhibit Number 7. We'll take that out of order. And please identify that.

A. This is a -- some pages from the R.W. Byram book with Grayburg-Jackson waterfloods listed on them, and there are quite a few Grayburg-Jackson waterfloods listed on these -- in the Byram book.

Q. What does this indicate to you, Mr. Lee?

A. That the Grayburg-Jackson is a very large and very floodable formation and field.

Q. Mr. Lee, let's now come back to Exhibits 5, 6 and 7, and I'd like for you to identify for the Examiner all of those exhibits and tell him what they contain.

A. As I say, I have examined wells in the area looking for a similar situation to set some precedents to have my injection well offsetting some Abo wells that don't have cement across the injection interval.

And in Section 30 we have a cross-section between the Atsel Federal Number 2 and this well, which I believe is the C-47 or C-48 well, which also calculates that it does not have cement across the injection interval.

And as you can see, we put these on a

horizontal scale. These wells are 220 feet apart. And looking back through the records here at the Commission, I can find no evidence of any kind of casing leaks or cement squeezes in this well.

Q. Which well is that, now?

A. It's Number 8 on the map. I believe it's the C-47 well or the C-48 well in the Empire Abo Unit. That would be the unit designation.

Q. Is that a well operated by Arco at this time?

A. Yes, it is.

Q. Is it one of the wells that Arco has some concerns about?

A. No, it is not. The wells that they have concerns about would be these wells over in section 29.

This is to demonstrate -- Here's my zone of injection. This is to demonstrate the close proximity to an additional -- or to an Abo producer, 220 feet.

Exhibit Number 5, once again, is a cross-section with a horizontal scale, six inches to a hundred feet between the Continental Number 4 injection well, and to the well designated on this map as being S-2. I believe the Empire Abo designation of this well is 46 -- That's B-46.

Once again, the horizontal scale is six inches equal to a hundred feet. I'm five -- I'm 657

feet away from that well.

On the wall is Exhibit Number 6, with the Arco well and my proposed Sackett Number 2 well, showing that I am over 1800 feet away from their well, and I just -- I just can't see that I'm going to be damaging their well, since precedence is set in the area.

Q. You have found nothing to indicate that these other injection projects or waterflood projects have damaged any of the Arco wells?

A. No, I have not.

Q. Do you know what pressures this waterflood project is injected at?

A. No, I don't. I don't know what the pressure was that they injected at. Kind of based on experience in the area, the Marbob flood, their injection pressures are close to 1000 pounds at the surface.

As time goes on and the reservoir pressures up and probably pump a little trash down there, I would anticipate that the Reading and Bates flood would have been operated at a similar pressure, but I don't know that for a fact.

Q. Insofar as your proposed injection pressures are concerned, have you followed -- Have you made any studies to determine whether or not, from these other

water projects in the area, whether or not this is an appropriate injection pressure?

A. the 400 pounds that we have requested will be -- For my injection well, you mean?

Q. Yes, sir.

A. Yes, the 400 pounds that we have requested will be sufficient initially to reach fill-up. And once I start pressuring up, I'll run some step-rate tests and request that permission be granted to increase the injection pressure at that time.

Q. Would you want the injection pressure to be monitored by the Oil Conservation Division District Office in Artesia and that you work with that office in order to increase any pressure?

A. Yes.

Q. Okay. Mr. Lee, what kind of system are you going to use to inject water? Is that -- My question is directed in terms of an open or closed system. What I'd like for you to do is describe how -- what kind of water you're going to take and inject into the formation and that sort of thing.

A. We'll be taking water from Marbob to the south, which is produced water out of the Grayburg-San Andres Horizons. It is a closed system. I will be taking that produced formation water and injecting it

back into the formation so that there will not be a problem with compatibilities.

Q. How about in terms of -- Does a closed system prevent oxidation of wellbores, or how does that work?

A. It prevents the water from coming in contact with the atmosphere and allowing oxygen to mix with the water and -- which can result in a corrosive environment.

Q. And does that guarantee that you won't create a problem for the Arco Wells?

A. Yes.

Q. Mr. Lee, in your opinion is this application in the best interests of conservation of oil and gas?

A. Yes, it is.

Q. How about with regard to the prevention or protection of correlative rights?

A. It's very important.

Q. Why is that?

A. It's important that we be able to convert this well and to recover our oil, which is otherwise unrecoverable, to protect our correlative rights.

Q. In terms of protecting correlative rights in the area, do you have an opinion as to whether you will impair anyone's correlative rights? That is, an opportunity to recover their fair share of oil?

A. No, it will not impair anybody's correlative rights.

MR. PADILLA: Mr. Examiner, that's all I have. The only thing I have is Exhibit Number 8, which is the Notice of the Hearing, together with the certificates of mailing or -- We had a supplemental list that we Federal Expressed as opposed to sending registered mail, so I'll hand you that as Exhibit Number 8.

Q. (By Mr. Padilla) Mr. Lee, do you have anything further to add to your testimony?

A. No, I do not.

MR. PADILLA: We'll pass the witness at this time and we'll move the admission of Exhibits 1 through 8.

EXAMINER CATANACH: Exhibits 1 through 8 will be admitted as evidence.

Mr. Carr?

EXAMINATION

BY MR. CARR:

Q. Mr. Lee, if I understand your testimony, this is a one-well waterflood project; is that correct?

A. That's correct.

Q. And what you're proposing to do is inject initially into the Grayburg formation --

A. That's correct.

Q. -- is that right?

A. Uh-huh.

Q. And that you're hoping to sweep production from the injection well toward offsetting Siete operating wells?

A. That's correct.

Q. How far away are those Siete-operated wells?

A. About 1650 feet.

Q. 1650 feet? And how soon would you anticipate some sort of a response from your waterflood project in the Grayburg?

A. Probably eight to ten months.

Q. And that is at what injection volume? 300 to 500 barrels?

A. That's correct.

Q. When you talked about your future plans for this waterflood project, you indicated that you initially inject into the Grayburg, but you might want to open up other zones?

A. That's correct.

Q. When you talked about how long it would take you to reach fill-up, are you talking about how long it would take you to fill up the Grayburg formation alone?

A. Yes, it is.

Q. And if you open up other zones in the well --
A. Uh-huh.
Q. -- they're not in vertical communication with each other, are they?
A. No, they're not.
Q. And so we're not looking at trying to fill up an interval that runs all the way from the top of the Yates to the base of the San Andres?
A. No.
Q. We'd be looking at individual -- individual sand stringers?
A. That's correct.
Q. And those sand stringers are present throughout the area; isn't that correct?
A. That's what my cross-section shows.
Q. And the Abo wells would intersect the Penrose as well as the Grayburg?
A. Yes, that's true.
Q. Is there any Penrose production on the north or north and west of the injection well?
A. I'm not sure if some of the RB wells were perforated in the Penrose also or the Grayburg only.
Q. Are there any, say, in the Yates north and west of the injection wells?
A. I'm not aware of any.

Q. If you opened it, say, in the Yates or the Penrose, you wouldn't have the situation where you would have pressure sinks that would affect a radial pattern out from the well, would you?

A. I would have a pressure sink once I opened up that zone in my producing well.

Q. But in terms of having these pressure sinks around the well that would cause the injected water to go toward them, if you haven't produced from the Yates, you wouldn't have a pressure sink that would draw the injection water in that direction; isn't that right?

A. Not initially, but once I open my producing well that will create a pressure sink, and that's where the injected water should reach the oil.

Q. And your producing wells are east and west of the injection well; isn't that correct?

A. My producing well is only to the west.

Q. Only to the west. So it would be drawn that way, but it also -- That wouldn't take all the water that direction, would it?

A. Initially, like I drew there in my other zones, you know, the water is going to go out radial until it sees the pressure sink, and then it will finger and go in that direction.

Q. You'd have more of an ellipse than a circle,

wouldn't you?

A. Yes, right.

Q. But this example of a flower pattern is really something that you see when we're looking primarily at the Grayburg?

A. That's correct.

Q. Okay, and that wouldn't necessarily apply to other zones?

A. That's correct.

Q. When we look at the flower that we're drawing in the Grayburg, we have one finger going off north-northeast --

A. Uh-huh.

Q. -- we have another finger going off west-southwest --

A. Uh-huh.

Q. -- and nothing really in between those toward the Arco property; isn't that right?

A. That's correct.

Q. So that's sort of the biggest gap in the petals, isn't it?

A. Uh-huh.

Q. And this flower is sort of toward the Arco property.

Now, when you present this exhibit from

Byram's, it shows the number of waterfloods. Have you done any research as to whether or not any of the waterfloods that are set forth on Exhibit 7 might be posing problems to deeper wells that are drilled through those water-flooded zones?

A. No, I --

Q. Is this just an example of the number of them that we would find?

A. This is an example of the number of the floods in the area.

Q. If all of a sudden there started to be casing leaks and problems that resulted from shallow, or from shallower waterfloods over a large unit like Empire Abo unit, that would be something that would be an appropriate concern for the Oil Commission, wouldn't you agree with me on that?

A. It would need to be considered on a case-by-case basis, looking at how close injection wells were to the Abo producers, what kind of casing they had originally ran in them, things of that nature.

Q. Now, this is salt water that's going into -- that you're going to be injecting; isn't that right?

A. That's correct, it's produced formation water.

Q. And that produced formation water has a -- is

corrosive in character, isn't it?

A. We -- In our producing wells in the area, we have not had any corrosion problems.

Q. Over what period of time?

A. Three to four years.

Q. Now, if you had corrosion going on the outside of your casing because of the water that's been injected and that is being pushed up against it --

A. Uh-huh.

Q. -- you might not know that in three or four years; isn't that right?

A. That's true.

Q. You would know that when you had a leak?

A. That's true.

Q. And at that time you've got a real problem; isn't that correct?

A. You need to do a remedial cement-squeeze job, that's correct.

Q. All right. Now, if the water that -- <u>If</u> the water --

A. Uh-huh.

Q. -- that's being injected was the cause of that, that would be damage by one operator to an offsetting property; isn't that true?

A. If it could be demonstrated that it was due

to that injection and not just due to the formation water sitting there naturally.

Q. And in that situation, with a previously approved injection project, then it would be the duty of the person who has the problem to prove it, not the guy who wants to put the water in the formation?

A. That's correct.

Q. I think you indicated you weren't aware of fresh water in the area, or is that a misstatement --

A. That may have been a misstatement, because I --

Q. -- on my part?

A. Okay. No, I said that there was fresh water. I had located a fresh-water well down in the southeast corner of Section 29.

Q. That's the southeast, southeast and southeast, isn't it?

A. Yes.

Q. And you've seen a water sample on that well, have you not?

A. I haven't seen the sample. There was some data at the Water Commission of a sample taken back, I think, in 1983.

Q. Was that potable water, do you now?

A. Yes, it was.

Q. Had a relatively low chloride content?

A. That's right.

Q. At what depth was that water? Do you know?

A. No, I don't. The documents at the Water Commission did not have a depth on it.

Q. And you don't know what formation it was producing from?

A. No, I don't.

Q. In fact, the chlorides on that were 440 parts per million, were they not?

A. 444, yes, sir.

Q. 444. Now, if when you start injecting water, say, into the Yates zone and reach one of these wellbores that doesn't have cement outside the casing, that wellbore might be a channel up which that water could move; isn't that true?

A. That would be true.

Q. And if that water zone is somewhere where you might be able to reach it with that, you could in fact impair the quality of the water; isn't that right?

A. If it hasn't already been impaired by the RB flood.

Q. You have Grayburg production north, south, east and west, right, pretty much?

A. Yes.

Q. Do you have any other deeper wells that go through the injection interval, other than the Arco wells that, say, offset you within a mile, or say a half mile?

A. There's an Amoco well to the south. I'm not sure exactly what formation it's producing out of.

Q. Does it have cement behind the casing?

A. It has a cemented surface.

Q. If you want to increase the pressure, you would run step-rate tests first?

A. That's correct.

Q. What do step-rate tests show you?

A. Step-rate tests will show me the point at which the formation will fracture or that the water will part the formation. This is done by running several injection rates, measuring the pressures and the rates. And you can construct a series of points, and at some point you will get a breakover. That's your fracture pressure. And then you maintain your injection below that fracture pressure.

Q. And so the purpose of that would be to show that you're able to confine the injection fluid to the injection zone?

A. That's correct.

Q. But if you get -- Then if you don't have the

confining strata separated, then there -- and you were able to get a higher pressure, then you'd be putting more water in under higher pressure. Isn't that the objective of that whole process?

A. That's correct, without fracturing the formation, part of the formation.

Q. And so all that would show you is you're not going to fracture the formation, but you would then be creating a situation where you would put more water into the same zone under more pressure. And it would then, isn't it logical, move out farther from the injection well?

A. That could be the case. That could be the case. Generally, in my experience, what generally precipitates needing higher injection pressure is that sometimes we don't have the best filter system in the world out there, and you end up injecting some fines, a little bit of paraffin down the well, that your produced water is, you know, sometimes not the best quality, you know.

And you can create a barrier of skin damage, of low permeability around the wellbore. And you need to inject at a higher pressure in order to get past that barrier.

Q. Have you had an analysis done of the

injection water?

A. No, I have not.

Q. You would not know what the chloride content of that would be?

A. No, I wouldn't. It would be whatever the chloride content of the formation water would be --

Q. And --

A. -- probably 120 -- If I was to guess, I would say 125 to 150 parts per million, something like that, but that's merely a guess.

Q. That would be the injection water?

A. That would be my injection water, correct.

Q. So you would be injecting fresh water?

A. No, 125,000 parts per million, I'm sorry.

Q. I was going to say, you might make more money selling water.

If problems should develop with the casing and it could be established it was from the waterflood, do you think it would be appropriate to have to shut down the waterflooding operation?

A. In this instance, I would say no. My reason for that is this: The two wells to the north are salt-water disposal wells. They're not producing any oil or gas, and they're not contributing to revenue and taxes of the state, as per se, where my waterflood, by

producing additional oil, would be.

Q. What do you -- Do you produce -- Do the wells out here produce much water? I think you indicated the subject well was producing -- What? Six barrels a day and no water?

A. That's correct.

Q. Is that typical for a well out in this area?

A. In an unflooded part, in an unflooded area it would be. If you're in the middle of the waterflood, you're going to be making quite a bit more water.

Q. What is the reservoir-drive mechanism out here?

A. Primarily a solution gas drive, primarily.

Q. Do you operate any wells that produce substantial volumes of water?

A. You mean at Siete?

Q. Yes, sir.

A. Yes.

Q. Isn't it true that if you don't have an economical way of disposing that water, that also can reduce ultimate recovery from a reservoir?

A. That's true.

MR. CARR: That's all I have.

EXAMINER CATANACH: Anything else?

MR. PADILLA: I have one question.

FURTHER EXAMINATION

BY MR. PADILLA:

Q. Mr. Lee, do you know of any corrosion problems that Marbob or R&B Operating or anyone who's done a waterflood in that area has encountered?

A. Not really to my knowledge. Due to the age of the wells, I'm sure there's mechanical problems over time, will develop. But in my conversation with Marbob they've never really indicated that they have a tremendous amount of mechanical problems there.

Q. How about -- My question is directed to corrosion. Do you know of any corrosion problems in this area as a result of waterfloods?

A. Not that I'm intimately aware of, no.

MR. PADILLA: Okay, that's all I have, Mr. Examiner.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Lee, what is the current producing rate from the Number 1 well?

A. It's about the same. It's about six barrels a day, also. Six to seven barrels a day.

Q. Mr. Lee, both the wells are located in the south half of the southwest quarter; is that correct?

A. Yes, that's correct.

Q. Why do you propose to include the -- Do you plan to drill a well in the quarter quarter section to the east?

A. No, I do not. The Number 2 was a rather poor well compared to our Number 1, and we felt that it kind of defines the eastern limit of the reservoir there, on our acreage at least. And so we wouldn't drill a well to the east of that injection well.

Q. Is there any reason to leave that 40 acres within the project area?

A. Other than just being part of the base lease, no, not that I would see.

Q. Looking at your Exhibit Number 2, Mr. Lee, looking at the proposed injection setup in the Number 2 well, is there any reason why that packer needs to be 342 feet away from the perforations?

A. No, there's not. In fact, initially we would probably have it lower than that. When I instructed my technician to construct the diagram I told him to put it up above the top curve, and so that's what was done.

Q. Generally -- I don't know if you're aware. The Division generally requires the packers sit within 100 feet of the perforations.

A. Okay, I wasn't aware of that, no.

Q. On the plugging schematic that you have for

the Green B-8, as near as I can tell, production casing was not run in that well?

A. That's correct.

Q. It's just open hole.

A. Uh-huh.

Q. Mr. Lee, the proposed injection interval of 2642 to 3217 -- Is that right?

A. On which form are you looking, Mr. Examiner?

Q. Well, I'm looking at the proposed injection well again.

A. Okay.

Q. Perforated interval 2642 to 3217.

A. Okay. What we're conveying there is -- Initially that's not correct. We would only inject into the Grayburg horizon.

We do have some lower San Andres perforations and -- in the Sackett Number 2 -- that are little stringers that are not perforated in the Sackett Number 1. And we would set up -- We would isolate only the Grayburg.

That should have been better demonstrated on that exhibit. But, you know, what we wanted to demonstrate here was that eventually we want to be able to inject into those zones also. We would need to go over and recomplete our Sackett Number 1.

Q. The 2642, the 3217, includes everything that you might eventually want to inject into?

A. No. That includes everything that is currently open in the wellbore that we might want to inject into. We have unopened pay in both the Number 1 and the Number 2 uphole in the Seven Rivers-Queen horizons.

Q. Mr. Lee, I'm going to need something more specific on what you initially -- what interval you initially plan to inject into.

A. Okay.

Q. And what the total interval is that you might eventually want to inject into, if you could get me that specific information.

A. All right.

Q. Would it be safe to say that there is a portion above 2642 that you --

A. Yes.

Q. -- might want to inject into?

A. Yes, there is.

Q. About how shallow might that be?

A. Up to probably about 1000, 1200 feet.

Q. Where did you say the fresh water occurred in that well that you talked about, that fresh-water well? Do you know the depth of that fresh water?

A. No, I do not. The records at the State Water Board did not list a depth for that well.

Q. Tell me about Marbob's injection setup or how you plan to use Marbob's equipment to utilize your injection well.

A. They have an injection well directly south of our Number 2, Sackett Number 2 well, and we will tie into their injection lines there and take pressurized water from them. And, as I believe I've mentioned, their injection pressures are quite a bit higher than the 400 pounds. So we would choke that back at the wellhead to keep our injection pressure below 400 pounds initially, and then increase it with step-rate tests later on.

And then we will take our produced water and run a line to Marbob's production facilities and give them our produced water so that they can run it through their facilities, pressure it up, and give us pressurized water back.

Q. Mr. Lee, the additional zones that you may want to open up later on --

A. Uh-huh.

Q. -- why haven't those zones been opened up as of this time?

A. We really didn't feel like the expense of

perforating and acidizing them justified the amount of production that we may get out of them. They may be -- You know, maybe five to ten barrel-a-day type of zones in the Penrose-Yates on uphole.

Like I say, we had good drilling breaks, good show, we feel there's a better than reasonable chance that they would be productive. You know, we've been producing down here in the Grayburg, and up till now the Grayburg wells have been very profitable, but if this flood was to be successful it would make sense to us to go in and try to open up those other zones and inject water into them also, try to maximize our recovery from those wells.

Q. So the -- What is the benefit of flooding those zones without having them primarily depleted to begin with?

A. Acceleration of the producing of the reserves.

Q. Any waste?

A. No. If I'm sitting there and have a -- and could recover, you know, maybe 10,000, 15,000 barrels from those zones on primary, I could reasonably expect to produce another maybe 10,000 barrels on secondary; whereas maybe the recompletions doesn't warrant, doesn't justify the primary reserves. I can justify

that work with the primary plus the secondary.

Q. So you're not going to get any loss of reserves by going directly to a waterflood-type situation in those zones?

A. No.

Q. Let me ask that again. You're not going to -- You're not going to have any less recovery than you would if you went to primary and then secondary, as opposed to just going -- just flooding them out initially?

A. Generally, whenever you come into a reservoir, you want to start your waterflood as soon as possible to prevent gas coming out of solution, lowering the viscosity of the oil, basically keep the V sub O as high as possible.

So in order to maximize my recovery from those zones, I would want to try to get my injection going as soon as possible.

Q. Okay. Mr. Lee, I'm looking at your Exhibit Number 3. Which wells will be a problem in that cement will not cover the injection zones? On page 2 of that exhibit.

A. Within the area of review, the second one and third one, the Green A-8 and the Green A-9.

Q. Mr. Lee, what was the purpose of putting

these other wells that were not in the area of review on this exhibit?

A. They came close to my half-mile-radius circle around my injection well, and I felt it would be prudent to include them also.

Q. Now, as I understand it, the Green A-8 and the Green A-9 are Empire Abo producing wells; is that right?

A. They're disposal wells, saltwater disposal wells.

Q. These are the wells that Arco is trying to protect or is concerned about; is that right? These two wells?

A. Yes.

Q. Mr. Lee, you also testified that there were -- there was Grayburg injection closer to these two wells, these two Arco wells, than you will be. Where is that originating from?

A. If I did, I misspoke. What I was saying was that there are -- The analogy is in Section 30 where I have -- not I but RB Operating had injection wells closer to Abo producers than my wells are to the wells in Section 29.

Q. I see. But you will be the closest injection to these Arco wells?

A. Yes.

Q. Mr. Lee, is there a Yates pool out here?

A. No, there's not. We included the Yates because we have plans down the road to possibly use it as an injection zone, and the object was to ask for everything so that at a later date that might be done merely administratively, without the need of another hearing.

Q. Is it your opinion, Mr. Lee, that the injected water may not even reach the Arco wells, or do you think it will?

A. I do not think it will. That's my opinion.

EXAMINER CATANACH: I think that's all I have at this time.

MR. PADILLA: Mr. Examiner, I noticed our Exhibit 8 doesn't have a waiver from RB Operating Company. I'd like to tender that as Exhibit 8-A.

EXAMINER CATANACH: Okay. Did we already enter your other exhibits, Mr. Padilla?

MR. PADILLA: That's all I have.

EXAMINER CATANACH: Did we enter your exhibits?

MR. PADILLA: Yes, you did.

EXAMINER CATANACH: Okay, Exhibit 8-A will be also admitted as evidence in this case, and the witness

may be excused.

THE WITNESS: Thank you, Mr. Examiner.

GARY B. SMALLWOOD,

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

EXAMINATION

BY MR. CARR:

Q. Would you state your full name for the record, please?

A. Gary Brooks Smallwood.

Q. Mr. Smallwood, where do you reside?

A. Midland, Texas.

Q. By whom are you employed and in what capacity?

A. By Arco Oil and Gas as a petroleum engineer.

Q. Have you previously testified before the New Mexico Oil Conservation Division?

A. No, I have not.

Q. Would you briefly review your educational background and then summarize your work experience for Mr. Catanach?

A. I graduated in 1975 from the University of Missouri at Rolla with a BS degree in chemical engineering.

I've worked since that time as a petroleum

engineer in the petroleum industry, approximately nine years for Arco Oil and Gas and about five years with an independent in Dallas. I worked in Louisiana, Texas, Oklahoma, California, New Mexico and Alaska during that 14-year period.

Q. Does your area of responsibility with Arco include the portion of Eddy County, New Mexico, which is involved in this case?

A. Yes, it does.

Q. In fact, is your assignment confined primarily to the Empire Abo unit and that immediate area?

A. Yes, it is.

Q. Are you familiar with the application filed in this case on behalf of Siete Oil and Gas Corporation?

A. Yes, I am.

Q. And are you familiar with the proposed injection well proposal?

A. I am.

MR. CARR: I would tender Mr. Smallwood as an expert witness in petroleum engineering.

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Carr) Mr. Smallwood, why is Arco appearing in opposition to this Application?

A. Because we're concerned about possible damage to our wells that we operate in the offset to the injection well, and we're concerned about possible future damage to -- by resultant damage to such water zones that might occur from that.

Q. From migration of drilled wellbores?

A. That's correct.

Q. Have you prepared certain exhibits for presentation in this case?

A. Yes, sir, I have.

Q. Would you refer to what has been marked for identification as Arco Exhibit Number 1? Identify this and then review it for Mr. Catanach.

A. This is just a plat of the area that shows the location of the Sackett Federal Number 2, the proposed Siete injection well, and the closest Empire Abo unit wells to this injection well, to this proposed injection well, and it marks their relative distance from the proposed injection well.

Q. Anything else on Exhibit 1?

A. It shows an outline of the -- a partial outline of the Empire Abo unit.

Q. Let's go now to Exhibit Number 2, and I would ask you to identify that first and then explain to Mr. Catanach what this exhibit is designed to show.

A. Exhibit Number 2 is the tabulation of data about individual wells in the Empire Abo unit. The ones -- A few of the wells that are shown on Exhibit 1 are included as tabular data in Exhibit Number 2.

The first page of Exhibit Number 2 refers to Empire Abo well C-49. It shows the well's former name as the General American Green A Tract Number 1 -- Tract 1, Number 8 well.

And it shows the location of the well in the tabular data. It shows that the well is currently an Abo water disposal well. The well's completed with 5-1/2 inch casing, and they used 570 sacks of cement to cement that casing. And the calculated top of that cement is at 2412 feet.

That indicates that there were no remedial cement jobs done on this well and that the unprotected casing on this well is from the surface casing at 776 feet down to 2412 feet.

Q. Now, this is a well that is used to dispose of water produced from the Empire Abo unit?

A. That's right.

Q. And the water is being injected back into the Empire Abo unit?

A. Yes, it's being injected below the oil-water contact into the water portion of the sand.

Q. And this is a pressure-maintenance project. Is there any intent to derive any pressure support from this injection, or is it just strictly a disposal operation?

A. It's a disposal operation.

Q. Let's go to the second well on Exhibit Number 2.

A. The second well is Empire Abo Unit Well Number C-48 with the former name, the Depco Leonard Federal Number 8.

Its location is noted. Its current status is being held for a future Abo water disposal well, which will be needed as the water production continues to increase in the unit.

The well has 5-1/2 inch casing set at 6360 feet. 425 sacks of cement were used. The calculated top is 3810 feet.

The remedial treatment, there was no -- there have been no secondary cement squeezes done on this well, and currently the unprotected casing amounts to the area from the surface casing at 765 feet down to 3200 feet.

Q. All right, let's now go to the B-49 well.

A. The B-49, former name General American, Green A Tract Number 1 -- Tract 1, Number 7.

The current status is an Abo water disposal well. Calculated top of cement is at 2418 feet.

There was a remedial treatment on this well. The cement was circulated from perfs at 1980 feet to the surface, meaning that the unprotected casing on this well is from 2200 feet down to 2418 feet.

Q. And now to the last well in this exhibit.

A. The last well in this exhibit is Well Number C-50, former name General American, Green A 1 Number 9.

This well had a calculated top of cement at 5183 feet, but since the primary job there were remedial squeeze jobs, several remedial squeeze jobs, as you can see, listed. They have perforated at 4890, 3480, 3130, 2220 [sic] until they got cement -- on top of cement, to 300 feet. And there is no unprotected casing in this particular well.

Q. So this well does have adequate cement behind the casing to protect it?

A. Yes, it does.

Q. Let's go now to Arco Exhibit Number 3, and I would ask you to identify this exhibit and explain this exhibit to the Examiner.

A. This is a letter written from our Mr. Steve Smith, who is the area production superintendent in Hobbs, New Mexico, to Mr. Mike Williams at the New

Mexico Oil Conservation Commission describing a problem -- or a problem in wells G-17 and G-18 that we encountered recently.

Q. What was the nature of this problem?

A. The problem was encountered due to other shallow floods in the area. We found the pressure between our production casing and our surface casing, and as mentioned in the letter here, when the pressure casing was bled no liquids were recovered from G-18, but while bleeding pressure off of G-17 we recovered a small volume of crude and water which appears to be originating from the San Andres formation.

Q. So what does this tell you?

A. It tells us that problems from shallow floods can occur and do occur.

Q. What was actually done with the problems with the G-17 and G-18?

A. In this particular well it was turned over to the operator. These two wells were turned over to the operator of the shallow flood, because the Empire Abo unit was completed in the three with these two wells and they had no more use for these two wells.

Q. Would such a solution be satisfactory to resolve problems that might result from the waterflood project that's proposed here today?

A. No. We need our wells for disposal of water. And while we have some somewhat excess capacity, momentarily we expect -- Our water production is increasing every day, and we're going to need the wells we have, plus further wells in the -- more wells in the future.

Q. Does the problem with injection in shallow floods seem to have been confined in the G-17 and G-18 wells, or is it a broader problem that seems to be developing in the Empire Abo unit area?

A. We think it's a broader problem.

Q. Is it currently a topic under discussion by Arco, an investigation by Arco?

A. Yes, it is.

Q. What would Arco recommend be done with this Application?

A. We recommend that it either be denied or that Siete be required to pay for the expense of cementing our wells.

Q. Without one of these alternatives being adopted by the Commission, do you believe that Siete's proposed injection can damage your offsetting properties in the Empire Abo unit?

A. I'm sorry, would you repeat the question?

Q. Unless the Commission adopts your

recommendation, is it your opinion that damage will occur to your wells?

A. Oh, yes, it is.

Q. What would it cost to go in and run cement behind the casing in each of these wells?

A. We estimate it would be between $20,000 and $25,000 each. That assumes that two squeeze jobs, on the average, are required to complete the squeezes successfully.

Q. Would Arco -- Does Arco have a position on any subsequent proposal to increase injection pressures or volumes in this well?

A. Yes, we would like to be present and not allow that such -- such increases in pressure be granted administratively.

Q. Were Exhibits 1 through 3 prepared by you or compiled at your direction?

A. Yes, they were.

MR. CARR: At this time, Mr. Catanach, I would offer Arco Exhibits 1 through 3.

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

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

EXAMINER CATANACH: Mr. Padilla?

EXAMINATION

BY MR. PADILLA:

Q. Mr. Smallwood, with regard to Exhibit Number 1 in your testimony, you propose that Siete cement all of these wells that are shown on this exhibit, with the exception of the C-50 well?

A. No, sir, I don't. C-50 is cemented. That's the one that we, of course, do not require. And in my judgment B-48 is rather far from it. It is not reasonable to expect you to cement that well this far from your proposed injection well.

Q. How about C-48?

A. Yes.

Q. Why -- Why is that necessary to cement that well?

A. It's based on my estimates that water will reach both B-49 and C-48 within two years of start of injection in the Siete Federal Number 2.

Q. Is that a plugged well, or what is that symbol on that?

A. That's a temporary abandoned well that's being held for future Abo injections, water disposal.

As I mentioned, as the water production increases in our unit, we're going to need more wellbores to dispose of water in there.

Q. How long do you -- what -- You've stated that you have an excess capacity now. What are your plans for converting that? What's the time period, in other words, that you seek to -- or that you have for converting that well to a saltwater disposal well?

A. I tried to make an estimate of that before I came, but we're currently -- Today we're not exactly sure what our capacity is with the wells that we have on production, so it's difficult to estimate that.

Q. How long has that well been temporarily abandoned?

A. I'm not sure of that.

Q. Now, how about the C-49 well? What do you do with that well?

A. C-49 has unprotected casing from 776 feet, which is the base of the surface casing, to an estimated top of 2412, so it would require cement squeezing in that interval.

Q. Are you currently using that well as a saltwater --

A. Yes --

Q. -- disposal well?

A. Yes, it is used as an Abo water disposal well.

Q. Are you required to cement this well -- Let's

go back to the C-48. Should you ask for that well to be converted as saltwater disposal well, what would you be required to do to that?

A. We would be required to isolate our zone from any freshwater zones, our zone of injection.

Q. You wouldn't be required to cement the well based on the particular casing that you may have on that well?

A. I'm not that familiar with the requirements, with those requirements.

Q. How familiar are you with the requirements?

A. I know that we're required to isolate that zone from other zones and that we're required to isolate freshwater zones, protect freshwater zones.

Q. How long have you been working in this area, Mr. Smallwood?

A. About a month.

Q. Where are the G-18 and G-17 wells?

A. They're located nearly seven miles or so west of here.

MR. PADILLA: Mr. Examiner, I don't think I have any further questions.

EXAMINATION

BY MR. CATANACH:

Q. Okay. Mr. Smallwood, as I understand it,

you're requesting that the -- that Siete work on C-48, C-49 and B-49?

A. Yes, sir.

Q. And you said you calculated that water would reach the C-48 in two years; is that right?

A. I estimated it would be about two years.

Q. That's based on what volume?

A. 500 barrels a day. I actually did it for B-49, so it would probably be a little less than that for C-48.

Q. Mr. Smallwood, if Siete did agree to work on one or more of these wells, Arco's position would be to let them do it or have them pay for it?

A. Have them pay for it.

Q. But they would be willing to let them work on them, or have you work on them?

A. Have us work on it with their representatives on the site and pay for the jobs.

EXAMINER CATANACH: Okay, I have no further questions of the witness. You may be excused

Anything further?

MR. PADILLA: Nothing further.

EXAMINER CATANACH: Closing statements, or no?

MR. CARR: I have a short one.

EXAMINER CATANACH: Okay, Mr. Carr?

MR. CARR: Mr. Catanach, the Oil and Gas Act provides in its section which enumerates the powers of this Division that you are required or that you are empowered to require that wells be operated and produced in such a manner as to prevent injury to neighboring leases and properties, and we believe the case that is before you today is just such a case.

We believe we have a situation where we're asking you to prevent injury to our property. When someone comes in and proposes to institute a waterflood project the burden is on them to show that this will not occur.

We are concerned about the effects of water on the casing in certain wells which we operate that offset the injection well.

There is little problem now. As Mr. Lee testified, the reservoir drive mechanism is solution gas drive. Once they would institute waterflooding, you would have water moving in the formation. Not only would you produce higher volumes, but there would be higher volumes under pressures moving toward other wellbores in the area.

We talked primarily about the Grayburg and how water would migrate away from the injection well in

that formation. But they're asking for authority to do many other things, and any one of the zones into which they propose to inject could become a problem. Yates, Queen, Seven Rivers, the Penrose, the Grayburg or the San Andres.

Corrosion in this area from shallow waterfloods is causing problems. Our Exhibit 3 is evidence of that, and we have concern about this and are trying to address the concern now.

But the burden is on the guy who wants to inject the water. The problem is, if something isn't done now, we won't know about this until like we did with the G-17 and -18 wells, all of a sudden we started having problems with our casing.

And so we think the time to act and the time to respond is now.

The testimony presented by Siete shows that in ten months they anticipated a response to their offsetting wells, wells 1600 feet away. We're concerned about what this water might do in wells a little over 2100 feet away in two years' period of time. This is a short period of time, and we submit to you the problem is real. The migration we believe can in fact cause property damage.

Siete comes in with other examples, and they

say, well, there are waterfloods with Abo wells offsetting them in fairly close proximity. But there's nothing here that would show that tomorrow any one of these wells won't develop a casing leak, because it's one of those things that you simply don't know if it's going to occur until it happens, and we're now starting to have evidence that in fact this is happening.

With the Siete Application there's just a lot we don't know. Mr. Lee comes in here and says in his opinion the injected water won't reach the Arco wells. How could anybody know? We don't know what volumes are going in, we don't know what zones are going to be utilized, we don't know what pressures it's going to be done, we don't have any analysis of the water, we don't know what the chloride content is. We don't know. And I submit to you no one knows how quickly it would get to the Arco well, but the evidence suggests it will get there and it can do it in a relatively short period of time.

We're asking that Siete not be given a blank check in this case. First of all, we're asking you to deny the Application. If you don't, if they would be willing to pay for cement -- put cement behind the casing in the wells that we believe would be affected, that would be an agreeable remedy.

But we certainly don't think the blank check should be written in such a way that without further notice and opportunity to be heard by Arco -- or to be heard from Arco, you should go forward and expand the zones, increase the volumes, increase the pressures, and go forward with Siete, without at least giving us an opportunity to continue our objection.

That's all I have.

EXAMINER CATANACH: Thank you, Mr. Carr.

Mr. Padilla?

MR. PADILLA: Mr. Examiner, I think this case is fairly straightforward, and I don't want to spend too much time talking about it anymore. I just -- There are some problems seven miles away. Apparently -- That problem apparently has been corrected, and it can be corrected.

The wells that Arco has concerns about are saltwater disposal wells which have special requirements of the Oil Conservation Division as far as pressure and integrity, determining what the integrity of those wells are. I assume that there's going to be a requirement to have some sort of inert fluid that will tell us whether or not a problem is occurring or is in the process of occurring, and at that time that can be corrected.

The problem here is one of economics for Siete. Siete has testified that the economics are marginal. The initial primary production has not been that good necessarily. But by the same token, the waterflood project is marginal, trying to produce oil that would not otherwise be recovered.

To say that there will be a problem and to analogize that a problem seven miles away will occur or a similar problem will occur is sheer speculation when you have nothing else, especially in the face of the argument made by Siete that right in this immediate area there's wells that have been injection wells that have covered 220 feet away from the same wells that Arco is operating -- or not the same wells, but wells that are similar wells.

I think those wells are included in their Exhibit Number 1. So I don't think that we have major concerns here.

As far as I can see that there is a concern that Arco may have, but I don't think that it requires the necessity of going and cementing the wells that -- to vary the economics of the project.

There is adequate precedent here for injection of waters. Nothing has happened. Marbob, R&B are operating injection -- waterfloods in the area.

There's been no problem. They're just -- They're something that I think Arco has -- anticipates may be a problem. It's just speculation at this point.

I don't think I need to say anything further. There's no apparent issue with regard to anything in the Application, so the only concern that we see here is simply Arco's concerns, which may have been experienced seven miles away, but we don't know what the exact cause was.

Thank you.

EXAMINER CATANACH: Thank you, Mr. Padilla. The only thing I have to say is, Mr. Lee, you get that stuff in that I asked for as soon as you can --

MR. LEE: You bet.

EXAMINER CATANACH: -- and I guess at this time we'll take Case 9897 under advisement.

(Thereupon, these proceedings were concluded a 2:50 p.m.)

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 9897, heard by me on April 4 1990.

David R. Catanach, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

I, Steven T. Brenner, Certified Shorthand Reporter and Notary Public, HEREBY CERTIFY that the foregoing transcript of proceedings before the Oil Conservation Division was reported by me; that I 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 April 19, 1990.

STEVEN T. BRENNER
CSR No. 106

My commission expires: October 14, 1990