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 CONOCO, INC.

CASE NO. 10,897

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

January 20th, 1994

Santa Fe, New Mexico

FEB 22 1994

This matter came on for hearing before the Oil Conservation Division on Thursday, January 20th, 1994, at Morgan Hall, State Land Office Building, 310 Old Santa Fe Trail, Santa Fe, New Mexico, before Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

January 20th, 1994
Examiner Hearing
CASE NO. 10,897

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A P P E A R A N C E S

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* * *

WHEREUPON, the following proceedings were had at 9:36 a.m.:

EXAMINER CATANACH: Call the hearing back to order at this time, and we'll call case 10,897, Application of Conoco, Inc., for approval of the expansion of a waterflood project, to qualify said project for the recovered oil tax rate pursuant to the Enhanced Oil Recovery Act, and for the expansion and contraction of certain pools, Lea County, New Mexico.

Are there appearances in this case?

MR. KELLAHIN: Mr. Examiner, I'm Tom Kellahin of the Santa Fe law firm of Kellahin and Kellahin, appearing on behalf of the Applicant, and I have four witnesses to be sworn.

EXAMINER CATANACH: Additional appearances?

Will the four witnesses please stand to be sworn in?

(Thereupon, the witnesses were sworn.)

MR. KELLAHIN: Mr. Examiner, during the break we have distributed to you and the court reporter a binder. It's the brown folder. It contains all of Conoco's exhibits on top.

I've provided you with the orders that affect this project, accompanied with the orders that we dealt with at the last time. We were involved with the Warren

unit, and they had to do with the contraction of the pools. They are packaged together. There's a series or orders under R-9467, and then the other package is R-6906.

I'd like to call as my first witness Mr. Jerry Hoover. Mr. Hoover is a petroleum engineer with Conoco in Midland.

JERRY W. HOOVER,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. My name is Jerry Hoover. I'm a petroleum engineer with Conoco. My current title is senior conservation coordinator.

Q. In that capacity, have you previously testified before the Division?

A. Yes, I have.

Q. And pursuant to your employment have you made a study of the regulatory orders and the procedures that are involved in this Application?

A. Yes, I have.

Q. And based upon that study, do you have recommendations and conclusions for the Examiner with

regards to what we've identified as the second expansion area for the Warren Blinebry-Tubb Waterflood Project?

A. I do.

MR. KELLAHIN: We tender Mr. Hoover as an expert witness.

EXAMINER CATANACH: Mr. Hoover is so qualified.

Q. (By Mr. Kellahin) Mr. Hoover, let me ask you to turn to your first display, sir, and if you'll unfold that, if you'll identify this display and then help us understand the items of importance on that exhibit.

A. This is a base map of the area we're going to be discussing, and it will be a good reference map for you throughout the hearing.

From the middle of the map, in the blue, dark blue solid outline, is the Warren unit. The wells that are shown on this map are all of the Blinebry-Tubb wells in this area.

The area outlined in red is our proposed expansion, second expansion to our waterflood project. The current waterflood project is the light blue shaded area. That same light blue shaded area is also the extent of the current Warren Blinebry-Tubb Pool, which was created especially for that waterflood project, and their boundaries coincide.

You'll notice to the west over there, with the

dotted or dashed purple line is our southeast Monument unit, and adjoining to the south is Shell's Northeast Drinkard unit.

Q. Conoco operates the Southeast Monument unit?

A. That's correct.

Q. Within the Warren unit itself -- that's the area contained within the blue outline?

A. Yes.

Q. -- is that a unit composed of a combination of fee, state and federal acreage, or is it some other combination?

A. It is all federal minerals.

Q. Has the BLM approved what you're proposing to do as an interest owner within the unit?

A. Yes, they have.

Q. Can you summarize for us before we go to the next display what has been the history of the unit insofar as giving Mr. Catanach an idea of where we are at this point?

A. Yes, if you look in the blue shaded area, Sections 33 and 34, this is where Conoco initiated its waterflood project with a small pilot project strictly in the Blinebry formation, and we received an OCD order in 1982 for that beginning project.

As that project progressed and it was obvious it was going to be a successful waterflood project, we came

back in 1991 and the OCD gave us an order to expand that order to include all of the blue shaded area.

At that time as we added Sections 26 and 27 and the upper part of 34, we also added the Tubb formation to our waterflood prospect. At the same time, you created the pool which would combine both of these formations, which are adjacent and are logically part of the same block for waterflooding.

As we progressed and the success of that initial pilot area is even more apparent now, as you'll see in some of the engineering data, we have studied the rest of the Warren unit area in respect to the Blinebry-Tubb formations and have arrived at the conclusion that we need to unify the entire Warren unit area in these two formations and to expand our project to include all of it.

Q. Have you made a study of the pool rules, the regulatory orders, and the other matters of -- issues of importance to the Division and determined in your opinion what items, orders or rules need to be modified in order to accomplish the objective you're seeking to obtain?

A. Yes, I have. First of all, we need approval of expansion of the waterflood project and the authority to inject in additional wells.

That carries with it the need to also expand this combined Blinebry-Tubb Pool to cover that same area so that

we can have the same, consistent, unified waterflood project in that area.

That precipitates the need to make some adjustments in the existing Blinebry and Tubb pools. It also -- In the Warren unit we have to deal with participating areas, so that was another issue that we had to clarify, and that's why we've met with the BLM and have worked out the changes and modifications in the participating areas that would be required.

Q. In addition to the geographic expansion of the waterflood into what we've characterized as a second expansion area, are you proposing to have initial qualification of that area as a project area so that you can pursue the possibility of obtaining the enhanced oil recovery tax credit that's available for this type of project?

A. Yes, we would. The rest of the project predated the law that allows that. We feel like this is a logical geographic expansion to that project that should be a viable option.

Q. Okay. Let's turn now to Exhibit 2 and talk to the Examiner about what pool rule contractions and expansions are needed as we deal with the Blinebry portion of the case.

A. Yes, Exhibit 2 does deal with the modifications

in the Blinebry Pool. Since we've created the new combined pool for the waterflood project when we add that expansion area to it, some changes will be needed.

You'll see again in the light blue is the current Blinebry-Tubb Pool. The orange area is our expansion area, and we're requesting that that acreage, that 1280 acres, be added to the current Blinebry-Tubb Pool. At the same time, that will need to be deleted from the Blinebry Oil and Gas Pool.

Now, the acreage shown in yellow is what remains in the Blinebry Oil and Gas Pool in this area, and you'll note that up in Section 21 we created a problem by contracting it with that orange area. We caused a lack of continuity in the Blinebry Pool acreage, the yellow acreage.

We took all of our recommendations for what we're going to do to the Hobbs District Office and visited with them about their solutions, what they felt would be the proper way to resolve these pool changes, and it was their suggestion that we add the 160 acres shown in purple to the Blinebry Pool in order to tie the yellow acreage together and make it contiguous.

So we're bringing their recommendation for that addition to the Blinebry Pool.

Q. With what District employee in Hobbs did you deal

with, with regards to the nomenclature of the pool rule changes?

A. We dealt with Paul Kautz, the geologist.

Q. Let's turn now to the issue of how to make the appropriate changes to the Tubb Gas Pool, as you propose to extend what we've created and identified as the Warren Blinebry-Tubb Oil and Gas Pool.

A. All right, that's Exhibit 3. The first modifications are exactly the same as they were for the Blinebry, taking the orange expansion area and adding it to the Blinebry-Tubb Pool. That leaves only the yellow area in the Warren Tubb Gas Pool.

The two 80-acre tracts in purple would have also remained designated as Tubb Pool, but as you can see they became isolated from the current Tubb Pool. There's no development there, no plans for development. It was the District's recommendation that we simply exclude and delete those two 80-acre tracts from the existing Warren Tubb Gas Pool.

Q. Give us some information so we have a point of reference for understanding why we have the Tubb Gas Pool, if you will, identified in portions of the unit area.

A. Right, and we can look at Exhibit 3 that we're looking at here. If you'll look in Section 28, just to the lower right of the number "28" is the Warren Unit Number 8.

This was the first well drilled in this area back in the late Fifties. It was a very high gas well. There obviously was probably a small gas cap in this small high here at that time. And it was not realized at that time that the primary development of Tubb in this area would really yield oil wells. It was not until 15 years later that we began to drill the wells to the east in Sections 27 and 26 and realized that the Tubb indeed was primarily an oil reservoir.

But at the time when the pool was established for that initial well, it was called the Tubb Gas Pool, somewhat anomalously now.

Q. As a reservoir engineer and as an individual with expertise within the regulatory framework, do you see any reason to create and continue to maintain a separate gas pool from the Blinebry Oil Pool?

A. No, we do not. I think our engineering work has indicated that's not necessary now.

Q. Your recommendation, then, is to contract those other two pools and correspondingly expand and consolidate the Tubb and the Blinebry so it's identified under one set of pool rules?

A. That's correct.

Q. And that pool would be an expansion of the existing pool for which we have special rules, and that's

identified as the -- Do we call it the Warren Blinebry-Tubb Oil and Gas Pool?

A. That's correct.

Q. All right. Let's turn now to Exhibit 4. Would you identify that for me?

A. Exhibit 4 is simply a tabular form of the maps we've just looked at. It gives the exact acreage, locations and the number of acres that we're talking about in each of the modifications that were indicated on the maps.

Q. If the Examiner desires, then, to have a written description of what acreage to delete, what acreage to add to the various pools, that Exhibit 4 can be utilized for that purpose?

A. That's correct.

Q. Sir, would you identify and describe what we've marked as Exhibit Number 5?

A. Exhibit 5 is a list of injection wells and a list of producing wells. Let's look at the injection well list first, at the top.

This includes all of the new injection wells that we anticipate in the second expansion area. Since we're asking to combine this area with the current waterflood, it also will require approval for injection into three wells that were within the first expansion area. They're along

the border of these two expansion areas, and they were not included in the previous order. Those are the two wells in Section 27, 36 and 110, and the well at the bottom of the list in Section 33.

So this is a list of new injection wells required in the second expansion area, plus three from the old first expansion area.

Q. And as we subsequently deal with the C-108 and the underground injection control issues, then we can use Exhibit 5 to keep track of those new injection wells?

A. Right. I would simply note one other thing here, that the asterisks on the wells indicate additional wells to be drilled. You'll note that two-thirds of those are injections wells required for the new project.

Q. All right, sir. Let's turn now to Exhibit Number 6. Would you identify and describe that for us?

A. Exhibit 6 is a letter from the Bureau of Land Management, giving us their approval for the proposed expansion. It specifically deals with approval for changes in all the participating areas. They dealt with three items.

First, they approved the first expansion or revision to the Blinebry-Tubb waterflood participating area, which we created for that new pool.

Then, it's approval for the 25th revision to the

Blinebry participating area, contracting it.

And it is the 15th revision to the Tubb participating area dealing with this contraction.

Q. Has the BLM concluded that this is a logical and reasonable expansion of the participating area within the unit?

A. Yes, they have. We brought all of the exhibits which you will see in the hearing today to Roswell and met with the BLM and gave them all the information about our proposed project, and they are in agreement with us and approve that.

Q. Let's turn now to the subject of notification for this hearing, Mr. Hoover. If you'll turn to what's marked as Exhibit 7, would you identify that for me, please?

A. The first page of Exhibit 7 is a notification list, as required by 107 A (7), and also by the C-108. The first category, you'll note, are the Warren unit working interest owners. They were notified. We notified the minerals interest owner, which is the BLM, and the surface owners. And the last group are the operators of wells within one mile of proposed new injection wells, which is a requirement of the C-108.

All of these parties were notified by certified mail, and we have attached the copies of those return receipts.

Q. As a result of that notification, did you receive any objections --

A. No, we have not.

MR. KELLAHIN: -- from any of those parties?

Mr. Catanach, that concludes my examination of Mr. Hoover.

We move the introduction of his Exhibits 1 through 7.

EXAMINER CATANACH: Exhibits 1 through 7 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Hoover, your proposal is to expand the waterflood to only that additional portion of the Warren unit that has production on it?

A. That's essentially correct. There are a couple of wells outside the area that have been poor producers and did not warrant including.

Q. Such as in the southwest quarter of Section 29?

A. That's correct.

Q. Is there currently Tubb and Blinebry production throughout the expansion area?

A. Yes.

Q. So it's essentially fully developed in those two pools?

A. Section 28 is not fully developed. The addition of the required injection wells will pretty well fill that in. There will be required three or four more producing wells, perhaps to fill out the area.

That same thing occurred in the first expansion area. We drilled four more producing wells in that area since the order was issued in order to fill it out.

Q. The wells you have shown in the expansion area, they're not identified as being either Blinebry or Tubb producers.

A. No, that identification is not on this plat.

Q. All of those are oil wells, the wells shown in black, with black dots?

A. That's correct.

Q. And there's only one gas well, the Number 35?

A. That's correct. And that is in a very small, diminishing gas pocket.

Also not shown, and available to you here, is the fact that there are -- there's also some Drinkard production in Section 28. Some of these wells are now dualed with the Drinkard, which is outside the scope of our project, but...

Q. Which formation is dualed with the Drinkard? Could it be either one?

A. It could be either one, but I think it's

primarily the Blinebry, in several instances. I don't have that note here, but...

Q. Is -- With the expansion of the waterflood, is that Drinkard going to be isolated in those wells somehow?

A. Yes.

Q. It's not going to be dualed in any form?

A. Well, of course if we expand the Blinebry-Tubb Pool to where that's a commingled pool, it would allow the commingling of those few wells -- I mean the dualing of those few wells that do have Drinkard. Drinkard is kind of spotty across the area. It's not consistent. We have made a few wells.

Q. Within the existing unit, do you currently have any dual Drinkard completion? Is this something you --

A. Within the current waterflood project?

Q. Right.

A. I'm not aware of one.

Q. So this may be something new, dualing these wells with the Drinkard?

A. Yes.

Q. Are these the appropriate kind of questions for you, or is there another engineering witness?

A. You're probably leading into the engineering area.

EXAMINER CATANACH: Okay.

MR. KELLAHIN: So that you know, Mr. Examiner, we have the operations engineer, who knows all the details of the C-108.

EXAMINER CATANACH: All right.

MR. KELLAHIN: And then we have the reservoir engineer that --

EXAMINER CATANACH: Two more engineers?

MR. KELLAHIN: We've got a whole bunch of them here. So we should have enough experts here to field most of the questions, and among them I think we have the answer.

EXAMINER CATANACH: All right.

Q. (By Examiner Catanach) Now, Mr. Hoover, this is all federal royalty, right?

A. That's correct.

Q. And there's only three working interest owners within the unit?

A. That's right.

Q. No overriding royalty interest owners?

A. There are some minute overriding royalties. That's the reason for the participating areas. And that's all handled through the participating areas.

Q. Is the production from the expansion area, is that going to be commingled with the other unit production, with the first area production?

A. I'm not sure what the facility setup would be. The production engineer can probably help you with that.

Q. What I'm leading into is, who's going to receive the tax benefit of the EOR?

A. I knew where you were headed, and I'm sure we'll do whatever is required at that point.

Q. That gas well, that's a Tubb gas well?

A. It is a Tubb gas well.

Q. Do you propose to keep producing that well as a gas well?

A. When you see the scheduling of the project as it's laid out, we feel like that this will not be a problem. We're not looking at injection into this area for several years yet, and what free gas is still accumulating in this area has really dwindled. It's almost gone. There's not much left.

Q. The injection well situation, you mentioned three wells that -- I believe the Number 36 --

A. 36.

Q. -- 99, and 110?

A. And 110, I believe that's correct.

Q. Now, I'm kind of confused on that --

A. 36, 99 and 110.

Q. Okay. Have those wells already been approved as injection wells?

A. They have not. See, they're on the border between these two expansion areas. They were not a part of our plan for the first expansion area.

Therefore, they were not approved in the previous order as injection wells. So we need to draw those into this Order.

Q. So you've got 17 new injection wells that you're trying to permit with this Application?

A. That's correct.

Q. Okay.

A. Those three will help us tie the patterns into the second expansion area.

Q. Have the -- Is there an agreement in place between the working interest owners, how to allocate production within the unit?

A. That's controlled pretty much by the participating areas, and there are formulas involved in each one of those as to how it will be distributed.

EXAMINER CATANACH: Well, I think that's it for the time being --

THE WITNESS: Okay.

EXAMINER CATANACH: -- Mr. Hoover.

MR. KELLAHIN: Mr. Examiner, at this time I'd like to call Mr. Dave Nelson. Mr. Nelson is a geologist.

MR. STOVALL: It's not the one who works for the

Division, huh?

MR. KELLAHIN: No.

DAVID E. NELSON,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Nelson, would you please state your name and occupation?

A. My name is David Nelson, and I'm a geologist with Conoco.

Q. On prior occasions, Mr. Nelson, have you testified before the Division as a geologist?

A. I have not.

Q. Summarize for us your education.

A. I have a bachelor's degree and master's degree in geology. Bachelor's --

Q. In what areas did you obtain those?

A. I obtained my bachelor's in 1978 and my master's in 1985.

Q. From what universities?

A. My bachelor's degree was received from Eastern Washington University, and my Master's was received from Oregon State University.

Q. Summarize for us your employment experience as a

petroleum geologist.

A. I've been employed by Conoco for 11 years, beginning in 1982. I have worked for Conoco in Ventura and in Houston and in Midland.

Q. As part of your geologic duties for your company, have you made a geologic study of what we've identified as the Warren unit?

A. Yes, I have.

Q. As part of that study, did you include the geologic information available to you on the Tubb formation as well as the Blinebry formation?

A. Yes, I have.

Q. Were you able to conclude your study and reach certain geologic conclusions with regards to this second expansion area?

A. Yes.

MR. KELLAHIN: We tender Mr. Nelson as an expert petroleum geologist.

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Kellahin) As part of your study, Mr. Nelson, were you able to reach any geologic conclusions about the boundary or the configuration of the second expansion area?

A. Yes, I have. The geologic structure of the area is an anticline, which is closed in all four directions.

The anticline is roughly centered on Section 28 and Section 27, which laps over both the first expansion area and the second expansion area. There are closed lows to the north, to the southwest and to the southeast, which define this pool.

Q. When you look at a geologic boundary, if you will, whether it's simply the limits of the reservoir or some structural component to the reservoir, do you find that the second expansion area, this project area under consideration today, has some logical explanation geologically?

A. Yes. Well, it's continuous with the first expansion area. It is a well defined petroleum reservoir, both in the Blinebry and in the Tubb formations.

Q. Have you prepared a structure map on the Blinebry?

A. Yes, I have.

Q. It's marked as Exhibit 8, I believe, is it not?

A. Exhibit --

Q. -- 8, Exhibit 8?

A. Yeah.

Q. Does this represent your work, Mr. Nelson?

A. Yes, it does.

Q. On this display, the project area, this second expansion area, is the area that's stippled in the lighter

blue?

A. That's correct. The light blue -- Well, I should say, the color coding is consistent with the maps that Jerry Hoover presented.

The light blue stippled area is the proposed expansion area number two, the darker blue or green stippled area is the expansion area number one and the earlier project area to the south.

Q. Do you have a --

A. The boundary of the Warren Unit is a blue outline around the sections.

Q. Do you have a geologic opinion as to whether this geographic expansion, this second expansion area, is reasonable?

A. Yes, it's -- it is reasonable. It is tied -- clearly tied with the first expansion area. It is continuous, and the portions of Section 28 are within the anticlinal closure.

Q. As we move to the northwest side of the second expansion area, then we're moving to the political boundary between the Southeast Monument unit and the Warren unit, are we not?

A. That's correct.

Q. Looking along the north boundary of the expansion area, there's an 80-acre tract within the unit that's been

deleted from the expansion area?

A. Yes.

Q. Is there a geologic reason to exclude that?

A. Yeah, that's in a downdip position and not expected to produce economic quantities of hydrocarbons.

Q. And then as we move to the southwest side of the expansion area within the unit in Section 29, there's part of the unit area that's excluded from the second expansion?

A. Yes.

Q. Do you see that?

A. Yes.

Q. Is there a geologic reason for doing that?

A. This is in the southwest quarter of 29 --

Q. Yes, sir.

A. -- and the south half of the southeast quarter of 29?

Q. Yes, sir.

A. We have drilled wells there and observed that the cumulative production is poor and does not warrant a waterflood expansion or further development there.

Q. Have you made a similar investigation of the structural relationship when we look at the Tubb?

A. Yes, I have.

Q. Let's turn to Exhibit 9 and have you identify and describe that display.

A. Exhibit 9 is a structure map on the Tubb marker, which forms the top of the Tubb formation in the area. It is very similar geologically to the Blinebry. These are parallel formation tops.

It is an anticlinal closure, which is bounded by closed lows on the north, and again on the southwest and on the southeast.

Q. Do your geologic conclusions that you've expressed about the Blinebry also apply to the Tubb?

A. Yes, they do.

Q. Have you also prepared a cross-section through the expansion area?

A. Yes, I have cross-section A to A', which trends east-west across the center of the map area.

Q. Both Exhibits 8 and 9 show that line of cross-section?

A. Yes, they do.

Q. All right. Tell me about the orientation of that line. Why did you select that particular orientation?

A. I chose that cross-section to show the third dimension of the structure. It goes across the crest of the anticline, and it shows you the dip reversal on either side of the anticline, on both limbs.

Furthermore, I wanted to show the zonation of the Blinebry into five distinct porosity zones and the single

zone which we identify in the Tubb formation.

Q. Will that line of cross-section give us a typical or a characteristic geologic picture of the expansion area?

A. Yes, it will.

Q. Let's look at it. It's marked as Exhibit 10. Describe for us your conclusions.

A. This cross-section, east is on the right and west is on the left. The five green bands show the five Blinebry porosity zones, and the blue pattern fill there is the extent of the Tubb formation. I have not colored the Drinkard formation.

The --

Q. What conclusions do you reach about the feasibility geologically of exposing the second expansion area to a waterflood project?

A. Okay, the three wells on the east side of the cross-section are within the first expansion area, and we are currently flooding and producing hydrocarbons from all five zones of the Blinebry and the Tubb in that area. That is the Warren Blinebry-Tubb Oil and Gas Pool.

I'd like to use the cross-section to demonstrate the geological continuity of all five Blinebry zones as you cross the pool boundary, and also the continuity of the Tubb formation as you cross the boundary. These are similar geologically on either side of that pool boundary.

To the west of it we are producing those two formations as two separate pools, the Blinebry Oil and Gas Pool and the Tubb Gas Pool.

Q. Have you examined the geology of what is identified within the unit as the pilot project area?

A. Yes, I have.

Q. And have you also identified and studied the geology of the first expansion area?

A. Yes.

Q. Do you see any material differences between those two areas and the second expansion area that would give you geologic concern that the second expansion area is not suitable for waterflooding?

A. I do not have any concern that the second expansion area is not suitable for waterflood from a geologic perspective.

If I were to show cross-sections in any other orientation through the first expansion area or the pilot area, you would see the same geologic picture of five continuous Blinebry zones and the Tubb formation.

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

We move the introduction of his Exhibits 8, 9 and 10.

EXAMINER CATANACH: Exhibits 8, 9 and 10 will be

admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Nelson, all of the five Blinebry zones are present in the expansion area?

A. Yes, they are.

Q. And you anticipate flooding all five of those zones in the expansion area?

A. Yes, we can flood all five of those zones in the expansion area.

The geologic cross-section shows a structural datum at minus 2275, and earlier studies indicated there's a gas zone there, and we think that gas zone is largely depleted to date. So we feel we can flood into that zone if the engineering evidence indicates that we could do that.

But that does not extend into any of the other five Blinebry zones. It's isolated only to Blinebry one. So we could conceivably flood only those other four zones in that area.

Q. Are there not any wells currently within the expansion area that are completed in that upper Blinebry?

A. Yes, there are wells completed in that zone. On the cross-section, Warren Unit 8 has perforations in that zone, and Warren Unit 86 on the far west side has

perforations in that zone. And we're also producing from the zone within the Blinebry-Tubb Oil and Gas Pool on the east side.

Q. You testified that you thought that gas zone may be largely depleted; is that correct?

A. That's correct. The engineering evidence demonstrates that.

Q. Okay. What about the Well Number 35 that's producing gas out of that Tubb Zone? Is that -- that's a -- No, that's not the highest structurally Tubb well either.

A. No, it is not. It is offstructure.

Q. Is the Well Number 8 producing gas from the --

A. It does not have the same GOR as 35. It's much less in the Tubb.

I've shown you the cumulative production in the Tubb at the base of the trace of that well. That has a 60,000 GOR.

Q. Number 8?

A. Number 8 in the Tubb.

Q. Do you have any reservations about flooding that interval in the Tubb?

A. No, I do not.

Q. Do you think there's still gas present in that interval?

A. The engineering evidence indicates that if there's gas present -- that was present, it is largely depleted in the Tubb now. So I don't feel that there would be a geological problem with flooding the Tubb.

Q. There was oil present in that interval as well, though, wasn't there?

A. Yes, it produces oil. All the Tubb wells do produce oil. They are not dry gas wells.

Q. The areas that are not to be included in the expansion, it's your opinion that both those areas are nonproductive or are nonfloodable in both zones, both the Tubb and the Blinebry?

A. That's correct.

EXAMINER CATANACH: I believe that's all I have of the witness.

MR. KELLAHIN: Mr. Examiner, at this time I'd call Mr. Damian Barrett. Mr. Barrett is a reservoir engineer.

DAMIAN G. BARRETT,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A. Damian Barrett. I'm a reservoir engineer with Conoco.

Q. Mr. Barrett, on prior occasions have you testified as a reservoir engineer before the Division?

A. No, I haven't.

Q. Summarize for us your education.

A. I received a bachelor's of science degree in mechanical engineering from Loturno College in 1982. I received a master's of science in petroleum engineering in 1990 from Tulane University.

Q. Summarize for us your employment experience.

A. I have been with Conoco 11 years. Six and a half of that has been offshore, and the remaining of the 11 has been in Midland.

Q. What has been your personal involvement with this project within the Warren unit?

A. I have been a reservoir engineer involved with the waterflood expansion in the Warren unit.

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

EXAMINER CATANACH: Mr. Barrett is so qualified.

Q. (By Mr. Kellahin) Let me have you turn, sir, to the display that's marked Exhibit 11. Do you have that before you?

A. Uh-huh.

Q. Before we talk about your opinions and engineering conclusions, I think this is the first time the Examiner has seen the pattern for the project. Walk us through the plan.

A. Okay. In the green stippled area, Sections 33 and 34 in the south, that is the pilot waterflood area that injection began in 1983.

In the orange stippled area, that is the first expansion area which injection began in 1992.

The light blue stippled area is our proposed second expansion area.

The dark blue lines that are in both the pilot expansion area and the first expansion area are the current injection well patterns.

The green lines connecting four wells in Sections 20, 21 and 29 is a proposed injection pattern that we have down for 1995.

The pink lines throughout the rest of the expansion area and going into the other two areas are injection patterns that are planned for 1999.

Q. Let's go back and give the Examiner some of the history of the development of the unit so that he can understand your strategy for obtaining the secondary oil from the second expansion area.

A. Okay.

Q. Let's look at the pilot project area. What happened there, and what results were obtained?

A. Okay, the -- Like I said earlier, the pilot area water was -- started injection there in 1983. And it took between -- a little over two years before we saw first waterflood response. We saw peak response in approximately four years. We have seen very little decline for the last seven years from this area, so we've seen incredible waterflood response from this area.

Q. The success of the pilot, then, led to an examination and the formation of this first expansion area?

A. That's right.

Q. Describe for us what occurred in the development of the first expansion area.

A. Okay. With the pilot, it was just in the Blinebry formation. The first expansion area, it was -- we proposed it to be in the Blinebry and the Tubb formation, and so that's why it took a little more study to evaluate that. And with that evaluation we saw that from a reservoir standpoint, porosity, permeability, net pay, they were all very similar.

We also did some work in there, some work prior to the expansion, that showed remedial type work was going to have the same kind of response that it did in the pilot flood.

Q. All right. Let's spend a moment about the issues with regards to the Tubb and the Blinebry in the first expansion area. Did you find that you could successfully waterflood both the Tubb and the Blinebry as one common project?

A. Yes, we haven't had any problems with that.

Q. We've got a Tubb gas pool, if you will?

A. Right.

Q. Is that a true dry-gas gas pool?

A. No, as Jerry mentioned earlier, the Number 8 well in Section 28 was the first well in the Tubb formation, back in the late Fifties, and with that it was named the Tubb Gas Pool because of that one particular well. It did make a lot of gas at that point in time.

As we continued to develop the Tubb formation in the first expansion area, we saw that most of the production was oil production. As we have gone back in looking at this second expansion area, our study for looking at this second expansion area, we have determined that we basically have a 14,900 GOR for this area in the Tubb, for the whole area in the Tubb, versus the Blinebry GOR is 10,000.

So as far as gas, they're very similar and should not be a problem in waterflooding.

Q. All right. If the Examiner approves the second

expansion area as a project area and permits the flooding of the Blinebry zones and the Tubb zone, do you see any diminished hydrocarbon or gas recoveries out of the second expansion area as a result of waterflooding?

A. No, don't.

Q. In fact, just the reverse?

A. That's right.

Q. We're asking for a rather comprehensive order from the Examiner. We want some pool contractions, expansions. The notion is to give you a comprehensive opportunity, then, to flood this entire interval as you move through the second expansion area; is that not true?

A. That's true.

Q. One of the issues is your anticipated sequence of events, not necessarily the precise day or date that you're going to undertake an activity, but what is the timing or the strategy for the secondary recovery out of the second expansion area?

A. Okay, the timing is in there. We will -- We have to drill some further wells for injection purposes and for completing our fivespot pattern, and in that we have down there that we'll do some of our drilling in 1994 and 1995. With that, we will do some converting of wells in 1995. And then we have down there, 1999 for conversion of the rest of the wells to injection.

Part of the plan with this is, we calculated through there and said that we should receive higher rates with our initial wells up front, but we will recover as much as 70 percent of the primary production within that four-year time frame before we start converting those other wells, so that we can start our waterflood at that time.

It's not necessarily that we will just start converting them in 1999, specifically. There may be need to start converting before that, depending on what the response is of the wells.

Q. The development strategy for the second expansion area is based upon a 40-acre fivespot injection pattern?

A. Correct.

Q. What caused you to choose that particular pattern for the second expansion area?

A. Well, again, the pilot area is based on the same development scenario, and again with the good response we've seen there, at this point in time we don't see any need to further decrease that acreage.

Q. What did you learn in operating this first expansion area in terms of timing the sequence of water injection, that you want to apply and take benefit for in the second expansion area?

A. In the first expansion area, we did not initiate that flood until after we received -- till the wells were

almost into the stripper well status -- or they were into a stripper well status. Some of them were becoming real close to an economic limit for us to operate.

And so with that, we came very close to shutting in some of those wells and not even continuing secondary development. But that's why we went ahead and did that first expansion, was because the pilot flood had done so well.

And with that, we learned from that, that that's why we want to go ahead and get approval for this a little bit earlier, so that we don't get to a point where it's uneconomic for us to go ahead and do the waterflood work.

Q. Okay. When we look up in the northwest quarter of the second expansion area, part of that pattern is shaded with different colors than the rest of the pattern within the expansion area. Why have you chosen to distinguish that from the rest of the expansion area project?

A. You're talking about the green injection pattern?

Q. Yes, sir, around the 62 well, is it?

A. Correct.

Q. Okay.

A. The reason why we have chosen that one to be started up front is, those wells have all been on line for several years now. They have produced, like we discussed

before, most of their -- a good percentage of their primary production. So we feel that that area is mature enough to go ahead and start injection very quickly.

Q. Can you give us a sense of the current average rate of production from these different areas?

A. Uh-huh.

Q. Have you calculated what that is?

A. Yes, I have. In the pilot area right now, we are at an average of 16.7 barrels a day per well. In the first expansion area we're at an average of about 8.8 barrels of oil per day per well for the expansion area, and we have not seen flood response in that area yet.

In the second expansion area, we're approximately at 8 barrels a day per well for that area.

Q. In terms of timing these approvals, is it premature at that point to obtain approvals for this project?

A. No, I don't feel so.

Q. Let's turn to some of the engineering work you've done. Could you look at Exhibit Number 12 for us? Is this your work?

A. Yes, it is.

Q. What are you showing here?

A. I'm showing a green line that is the production history for the pilot expansion area, and a red line drawn

through that production early on, showing the primary development and decline rate of this area.

I'm also showing that water injection began in January of 1983. The oil production strayed from that line due to stimulation work. And then I'm also showing that we had flood response in October of 1986.

Q. Okay, the conclusion?

A. The conclusion, the flood has worked very successfully here.

Q. Have you made a similar examination of the first expansion area?

A. Yes, I have.

Q. Let's turn to Exhibit 13. Let's have you turn to Exhibit 13 --

A. Okay.

Q. -- and let's look at the information on the first expansion area.

A. Okay. Again, the green line is the oil production, the red line is the decline rate through this, a primary decline rate that is very similar to the pilot waterflood area.

We're showing on here downhole comminglings and stimulations that were performed between 1984 and 1987, which again have some similar response that they did in the pilot waterflood area.

We're showing water injection began in 8 of 1992, and the stray from that line, again, is downhole comminglings and simulations that were performed in simultaneous operations with starting the waterflood.

Q. Do you have a projection as to when you might achieve a positive production response directly related to the water injection for the expansion area number one?

A. Yes, the response is predicted to be sometime early in 1995.

Q. Let's turn now to the project area in this case, which is the second expansion area, Exhibit Number 14.

A. Uh-huh.

Q. Identify and describe that display.

A. Okay. Again, the green line is the oil production for the expansion number two area. The red line again is the primary decline rate, which is very similar to both the pilot and the expansion number one area.

We have done some drilling of new wells and stimulations. That is the deviation from the primary decline line. With that, there were four new wells drilled in there. We see usually high initial rates with fairly rapid decline on those wells, which allows us to recover some of our primary production quickly.

Q. Let's turn now to your calculations on estimated recoveries. If you'll turn to Exhibit 15, as a result of

your calculations, were you able to reach any conclusion about the estimated additional recoveries that you may achieve with the waterflooding of the second expansion area?

A. That's right. Currently, our current recovery of original oil in place for the second expansion area is 8.4 percent of the original oil in place.

With the waterflood expansion project in this area number two, we are expecting 26.8 percent of original oil in place recovery. Without this work, we would be leaving 10 percent of that original oil in place in the ground, at least. That's a minimum, and it could be higher than that.

Q. Your display also shows that similar information for the expansion area one, as well as the pilot project area?

A. That's right.

Q. Have you estimated for us the total volume of incremental oil to be recovered as a result of the secondary waterflooding of the second expansion area?

A. Yes, I have.

Q. And what is your estimate of the total volume of that oil?

A. The total volume of just the waterflood recovery is 1.7 million barrels.

Q. Have you prepared a plot to graphically demonstrate that to the Examiner?

A. Yes, I have.

Q. Let's turn to 16 and have you identify that.

A. Okay, this is the expansion number two area, oil production. In the green pattern you'll see the current estimated ultimate recovery or primary at 1.8 million barrels. The drilling of new wells, ten new wells, in red, is an incremental 1 million barrels. And then the blue waterflood incremental oil recovery is 1.7 million barrels.

Q. All right, sir. Let's turn to Exhibit 17. Would you identify and describe that display?

A. Okay, this is a summary of the economics for the number two expansion area. It is broken out by the different phases, how we propose them on that original map, Exhibit Number 11, and has the different phases in there.

I would draw your attention to the total project column at the very end. With that we have a total investment of $5.6 million to do all of the work that's required for this second expansion area. And this gives us a discounted net present value of $13.4 million.

Q. All right, sir, and let's turn now to the final exhibit. Would you identify and describe Exhibit 18?

A. Okay, this is the work plan with the reserves that will be recovered by stages for the expansion number

two area.

We have current EUR, estimated ultimate recovery, at the top. Then we have the different stages of drilling three wells first, then seven wells with their total reserves, then a total of 18 conversions to injection and their total reserves, and then total reserves for the total project.

Q. In the absence of approval by the Examiner of the Application, what's going to happen in the second expansion area?

A. There would not be any of the secondary recovery which, as we've identified, is 1.7 million barrels.

MR. KELLAHIN: That concludes my examination of this witness. We move the introduction of Exhibits 11 through -- Did we have 18?

THE WITNESS: Uh-huh.

MR. KELLAHIN: -- 11 through 18.

EXAMINER CATANACH: Exhibits 11 through 18 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Barrett, as I understand your testimony, there will be an area within the second expansion area that will be flooded fairly soon?

A. Uh-huh.

Q. The northwest portion of that expansion area?

A. That's right.

Q. That's because those wells are done with primary production; is that your testimony?

A. That's right. They're not totally done, but they're far enough along that we can start our injection in that area.

Q. When do you anticipate that starting?

A. We have that scheduled for the first quarter of 1995.

Q. The remaining area within the expansion area will be put on line for waterflooding gradually, or do you anticipate all at once, or what kind of scenario is that?

A. Well, I think what we have is a -- possibly a gradually scenario, because of the different ways these wells respond. There will be times that -- In certain areas where your porosity isn't quite as developed as in others, you may recovery your primary production a little faster or a little slower than expected, and so we might put other patterns on a little sooner than 1999.

Again, the 1999 was just an estimated time frame for a total project scenario.

Q. You should be completed in 1999?

A. That's what we expect.

Q. Now, will all of these tracts when they're fully

developed -- Will they all be fully developed in both pools?

A. Yes, they will. Well -- Yes, from what we know, they will.

Q. The way you handle injection and production at this point in the first expansion area and in the pilot area is just injection wells injecting into both intervals, Tubb and Blinebry?

A. Just in the first expansion area.

Q. Oh, okay.

A. We don't have Tubb injection in the pilot area.

Q. I see. And the producing wells all produce dually from --

A. No, they're singly-completed. It's a downhole-commingle situation.

Q. Okay, I see what you're saying. They're all open in one zone, and they're all just producing --

A. Correct, Blinebry and Tubb are produced together.

Q. Is it uneconomic to conduct these floods separately in the Blinebry and in the Tubb?

A. It really -- With the way the reservoir is set up, it really doesn't make sense to waterflood them separately at this point.

And again, we feel like we're not taking on too much that we can't do a good job with it as it's set up.

Q. You said that the average production in the second expansion area was eight barrels a day per well?

A. Correct.

Q. I assume that there are some wells in the area that produce a whole lot more than eight?

A. Yeah, that's right.

Q. Okay.

A. That's an average per well.

Q. And you will be drilling some new wells to the Tubb and Blinebry, new producing wells?

A. That's correct.

Q. And you said they usually come on at a pretty high producing rate?

A. Yes, they decline fairly quickly.

Q. Okay. I just want to verify some of your figures.

Estimated secondary recovery within the second expansion area, 1.7 million barrels?

A. Correct.

Q. And the investment, $5.6 million, that's total investment?

A. Correct.

EXAMINER CATANACH: Okay. I don't have anything else.

Mr. Kellahin?

MR. KELLAHIN: Call at this time, Mr. Examiner, Joe Miller. Mr. Miller is an operational engineer, and we're going to go through the red binder. It's the C-108 book.

JOE MILLER,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. Mr. Miller, would you please state your name and occupation?

A. My name is Joe Miller, and I'm operations engineer for Conoco.

Q. On prior occasions, sir, have you testified as an operations engineer before the Division?

A. No, I have not.

Q. Summarize for us your education.

A. I received a bachelor's degree in petroleum engineering from Marietta College in 1989.

Q. Subsequent to that, have you been employed as an operations or production engineer?

A. Before --

Q. Before Conoco?

A. Before I went with Conoco? No, I have not.

Q. All right, sir. Summarize your employment

experience in that capacity with Conoco.

A. I've been an operations engineer with Conoco for four years.

Q. As part of your duties, are you responsible for the Warren unit?

A. Yes, I am.

Q. In what particular way? What is it that you do?

A. I am responsible for maintaining production and developing the Warren unit production.

Q. Did you personally complete and prepare and tabulate the data for submitting the Division Form C-108?

A. Yes, I did.

MR. KELLAHIN: We tender Mr. Nelson as an expert witness.

EXAMINER CATANACH: Mr. Miller.

MR. KELLAHIN: It was a trick question.

EXAMINER CATANACH: You were seeing if I was paying attention.

MR. KELLAHIN: Yes, sir.

EXAMINER CATANACH: Mr. Miller is so qualified.

Q. (By Mr. Kellahin) Mr. Miller, let's look in your exhibit book and find the display that shows the location of the wells within the area of review.

A. In the C-108 package, there is a map, the C-108 map, which the Warren unit is outlined in blue.

Q. Okay. Have you determined that you have properly located all wells, whether shallow and deep, within the area of review?

A. This map includes all penetrations.

Q. Within the half-mile radius surrounding each injection well, have you made an investigation of all those wellbores, either plugged and abandoned or producing wells, that penetrated through or to the injection zone?

A. Yes, I have.

Q. Did you find any plugged and abandoned wells?

A. Yes.

Q. And does your C-108 contain schematics of the plugged and abandoned wells?

A. Yes, it does.

Q. Do you find any plugged and abandoned wells that in your opinion as an operation engineer have not been properly or adequately plugged and abandoned?

A. No, all of the plugged and abandoned wells were plugged in accordance with NMOCD and BLM rules.

Q. When you look in the area of review at the producing wells that penetrated to or through the Tubb-Blinebry zone for injection, do you have information on all those wells?

A. Yes, do.

Q. Did you determine in each instance what in your

opinion was the top of the cement for those wells?

A. Yes, I did.

Q. For all those wells, did you find information to show you a measured top of cement?

A. No, I did not. There are, I believe, two wells that I had to calculate a cement top.

Q. What is the criteria or the formula that you used to calculate the cement top on those wells that did not have a measured top of cement?

A. I used a conversion of 1.32 divided by 2 cubic feet per sack for a cement yield.

Q. And the C-108 shows a footnote somewhere as to those wells in the calculation?

A. That's right.

Q. Okay. As part of that process, have you identified any wells that have not satisfied the criteria of having cement covering the injection interval to protect the casing string in those wells?

A. Yes, I have found five wells within the area of review that do not have cement tops entirely covering the proposed injection interval.

Q. And have you made an exhibit of that information for us?

A. Yes, that is Exhibit Number 20.

Q. Again, Mr. Miller, this represents your work?

A. Yes, it does.

Q. Let's go through each of the five and have you make your recommendations to the Examiner as to what you propose ought to be done with each of those wells.

It may be helpful if you'll take the plat that we have and help us find each well. Let's start with the first one.

A. Okay, the first well identified on Exhibit 20 is Warren McKee Number 28. Warren McKee Number 28 is located in Section 20.

Q. We're in Section 20 and Unit J of 20?

A. That's correct.

Q. All right.

A. Warren McKee Number 28 is an injection well in the Warren McKee Pool. The Warren McKee Number 28, because it is an injection well, and we do monitor our injection wells, both on the injection tubing, production casing annulus, and also the production casing intermediate casing annulus, I do not believe that this would be a problem well, because we are able to monitor the annuluses.

Q. Do you see any purpose served by taking remedial action to bring the top of the cement in that well up above the injection interval?

A. I believe that as a prudent operator, we could wait until we saw a problem -- made sure a problem exists.

Q. Okay. Let's go to the next one. It's the Southeast Monument Unit McKee 62 --

A. Yes.

Q. -- in Unit letter K of Section 20?

A. That is correct.

Q. All right.

A. This is also a McKee injection well.

Q. And what are the circumstances about this well?

A. This well, also, because it is an injection well, we monitor both annuluses.

Additionally, the Number 62 and the Number 28 wells both have a twin Blinebry-Tubb producer, which in effect acts as a pressure sink -- I failed to point that out on the first well -- relieving the pressure if pressure would exist from a Blinebry-Tubb injection well.

Q. All right. Number 28 and 62 are in a circumstance where there is a pressure sink in that area?

A. The producing wells, the Semu Number 104 which twins the Semu 62 McKee injection well, and the Conoco Warren Unit 77 which twins the McKee 28 well, the 77 and the 104 wells are Blinebry-Tubb producers, which in effect would draw down any pressure from injection wells coming that way.

Q. That's going to reduce the possibility of actual pressuring up the annulus on those wells?

A. That's correct.

Q. In addition, you have a monitoring system for those injection wells?

A. Yes.

Q. And if a leak or communication is detected in those wells, what do you do then?

A. If communication would exist in the McKee injection wells, then it would be appropriate to enter the injection wells and squeeze cement above their estimated top of cement so that that entire injection interval would be covered with cement.

Q. And as the common operator in both projects, then, it would be under your control as an operation engineer that you could shut in the surrounding wells and address that issue?

A. Yes, the Blinebry-Tubb injection wells that were at fault would be immediately shut in.

Q. All right. Let's go now to the third well. It's the McKee 59 in Section Number 20, Unit letter M. What's the circumstance about this well?

A. This is also an injection well that we are monitoring. It does not have a twin Blinebry-Tubb producing well, but it is on the very edge of the area of review.

Because of its physical location and the

remoteness of this well to our proposed Blinebry-Tubb injection wells, I do not believe it is necessary to immediately fix this well until we would see a problem.

Q. Okay. The Warren McKee 7, we're moving down into Section 29 now, we're in Unit letter B.

A. Warren McKee Number 7 is a McKee producing well. As a prudent operator, I believe Conoco should fix this well immediately, and I propose that to remediate this well we would perforate above the cement top and squeeze cement above the proposed injection interval, Blinebry-Tubb injection interval.

Q. Okay, so this is one of the five that in your opinion is a problem well and that we ought to fix?

A. This is a problem well that we should fix before we inject any water in the Blinebry-Tubb in this area.

Q. Within what? A half-mile radius, is that the plan?

A. Yes.

Q. All right. Let's turn now, then, to the last well. It's the McKee 60, again in Section 29, now in Unit letter E.

A. Semu McKee 60 is also a Warren McKee injection well, and it is similar to the 62 and the 28 and the 59 in that we would be able to monitor the two annuluses. Also, the Number 60 is in a remote location and is on the edge of

the area of review.

Q. Apart from these five, you've examined all the rest, and there is absolutely no concern about the rest of them?

A. There's no concern with any of the other wells in the area of review.

Q. Okay. Let's turn now to the subject of fresh water. What did you do in order to determine the presence and location of any fresh water in the area?

A. We contacted the State Engineer's Office in Roswell and received a listing of all freshwater wells in a one-mile radius, from Mr. Johnny Hernandez. He provided us with four freshwater wells in the area of review. Of those four wells, we were able to locate one well.

Q. Surface inspection found one of those wells?

A. Yes.

Q. Identify for the Examiner which well you found on the surface.

A. As listed, it is number 3, the EC Hill well. This well was located, and a water sample was gathered.

Q. Other than the information from the State Engineer's Office, did your physical inspection of the area identify any other wells that were not reported to the State Engineer?

A. No, we found no other wells.

Q. What, in your opinion is the deepest producing depth of the fresh water in this area?

A. The deepest depth of fresh water is 150 feet from the surface.

Q. Are the wells drilled, cased and cemented in such a way to isolate and protect freshwater sources?

A. Yes, they are. All of the wells contain an intermediate string, which is cemented to surface, which protects the fresh water.

Q. Do you see any open faulting or other hydrologic connections that would communicate the injection interval with freshwater sands?

A. No, I do not.

Q. What is the source of the water that's been used in the unit for waterflood purposes?

A. The water that we use for the current waterflood is reclaimed water from the City of Hobbs effluent plant.

Q. And what is your plan for the second expansion area in terms of water for injection purposes?

A. We will continue to use that same source.

Q. Your injection wells are all drilled and equipped in accordance with Division Rules --

A. That's correct.

Q. -- for injection wells?

A. That's correct.

Q. You have internally lined, plastic-coated tubing for your injection wells?

A. Or fiberglass-lined tubing, yes.

Q. And you monitor pressure between the tubing and the casing annulus?

A. We monitor the pressure between the tubing and the casing and also the production casing and the intermediate strings.

Q. This is a closed system, I assume?

A. The system -- Can you rephrase that?

Q. Yes, sir. What type of water injection system are you using? Is it a closed system?

A. Closed, as in --

Q. Closed, as closed to the atmosphere.

A. The system is not completely closed so that oxygen cannot enter.

Q. Okay. Your injection wells, the water is piped into the injection wells?

A. That's right.

Q. All right. And then once it reaches an injection well, how is it fed into that injection well? Is it under pressure or otherwise?

A. Yes, large pumps inject water into the injection wells.

Q. All right. There is an existing procedure within

the rules for pressure limitations. What is the current injection pressures at the surface?

A. For the pilot area of the waterflood we have subsequent approvals through step-rate testing, to a maximum, I believe, of 2000 p.s.i. The first expansion area is limited to an injection pressure around .2 p.s.i. per foot, or 1000 p.s.i.

Q. For the second expansion area, if the Division adopts its usual procedure of providing a surface pressure limitation of .2 p.s.i. per foot of depth to the top perforation, plus an administrative remedy where you can by step rate obtain increases in that pressure, is that a procedure that is acceptable and works for you?

A. That is acceptable.

Q. Have you encountered any surface flows of water, any water flows at the surface, from any of the injection wells?

A. No, I have not.

Q. No problems in the field with operating the current project?

A. No, sir.

MR. KELLAHIN: That concludes my examination of Mr. Miller. We move the introduction of his Exhibits 20 and 21.

EXAMINER CATANACH: Exhibits 20 and 21 will be

admitted as evidence.

MR. KELLAHIN: I'm sorry, I misspoke. It's Exhibits 19 and 20, is it?

EXAMINER CATANACH: Exhibits 19 and 20 will be admitted as evidence.

MR. KELLAHIN: Yes, sir.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Miller, the five wells you identified as being a problem, you proposed monitoring four of these wells. If you in fact did have water entering these wellbores through the injection interval, is it always the case that you would necessarily see that at the surface? You would necessarily be able to detect that by monitoring?

A. I feel we would be able to detect it between the intermediate and production casing string. As you can see, the four wells have an intermediate string cemented to between 3000 and 4000 feet. Between that 3000 to 4000 feet and the top of the Blinebry, there are no productive horizons in that area of review, so that if water entered at a depth of the Blinebry-Tubb, we would see pressure on our annulus.

Q. You did examine all of the P-and-A'd wells. Do you have -- Did you provide schematics of the P-and-A'd wells?

A. Yes, there are schematics.

Q. Okay.

A. Just prior to the log sections there are schematics of three wellbores that are P-and-A'd in the area of review.

Q. Okay. Mr. Miller, are you the engineer I should be talking to about the Drinkard dual completions that may be within the area?

A. Yes.

Q. Okay. How many of those wells do you think you're going to have?

A. Possibly four wells. They would be located in Section 28. The four wells that possibly could be Drinkard dualed with the Blinebry-Tubb are Numbers 94, 95, 96 and the 111.

Q. And it would be a dual completion, not a downhole-commingled completion?

A. Yes, the wellbore would be dualed, the Drinkard, dualed by isolation packers with the Blinebry-Tubb interval.

Q. So all that production would remain separate?

A. Yes, it would.

Q. Okay.

A. And produced at separate batteries.

Q. Okay. I had an earlier question about the

introduction from the expansion area, from the second expansion area. How would you propose to handle that with respect to -- Would you commingle it with the other production from the unit, or how would you handle that?

A. Currently, the production in the expansion area is separate, metered separate from the first expansion and pilot area. That is due to being two and three different pools. We have to keep that separate. We could continue to keep that separate.

Would you like more detail on that?

Q. Well, I mean, the fact that you could keep it separate, that may be enough to satisfy us, and that may be in fact what we eventually require that you do, because we have to keep a close eye on that production in the expansion area because you're going to get some credit for that, some tax credit, so that may be what we decide you need to do. So I guess all I'm asking is if that's possible to keep that production separate.

A. Currently it is separate.

Q. Okay. Is that -- The fresh water, is that Ogallala water in that area?

A. The -- Yes, originally it would be. It would be -- We receive the water from the City of Hobbs effluent treatment plant. I believe their drinking water is Ogallala water. So in the beginning, yes, it would be

Ogallala water.

Q. Okay. What I'm actually referring to is the freshwater wells in that area that are producing from the Ogallala.

A. Yes, they are Ogallala wells.

Q. Did you submit an analysis of the source water in this package?

A. There's not an analysis of the source water in this package. It was part of the first expansion project.

Q. We do have one of those on file then?

A. Yes.

EXAMINER CATANACH: Okay. I believe that's all I have, Mr. Kellahin.

MR. KELLAHIN: That completes our presentation, Mr. Examiner.

EXAMINER CATANACH: Okay. Can I get you to write a rough order for me?

MR. KELLAHIN: Yes, sir, be happy to.

EXAMINER CATANACH: Is there anything further in this case?

There being nothing further, Case 10,897 will be taken under advisement.

(Thereupon, these proceedings were concluded at 11:10 a.m.)

* * *

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 8th, 1994.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1994

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10897 heard by me on 1-20- 1994.

, Examiner
Oil Conservation Division