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 BURLINGTON RESOURCES OIL AND GAS COMPANY FOR STATUTORY UNITIZATION, LEA COUNTY, NEW MEXICO — CASE NOS. 12,046

APPLICATION OF BURLINGTON RESOURCES OIL AND GAS COMPANY FOR APPROVAL OF A WATERFLOOD PROJECT AND TO QUALIFY THAT PROJECT FOR THE RECOVERED OIL TAX RATE PURSUANT TO THE ENHANCED OIL RECOVERY ACT, LEA COUNTY, NEW MEXICO — and 12,047 (Consolidated)

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

OIL CONSERVATION DIV.
98 OCT -5 AM 9:58

BEFORE: DAVID R. CATANACH, Hearing Examiner

September 17th, 1998

Santa Fe, New Mexico

This matter came on for hearing before the New Mexico Oil Conservation Division, DAVID R. CATANACH, Hearing Examiner, on Thursday, September 17th, 1998, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

September 17th, 1998
Examiner Hearing
CASE NO. 12,046

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E X H I B I T S

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A P P E A R A N C E S

FOR THE DIVISION:

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FOR THE APPLICANT:

KELLAHIN & KELLAHIN
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By: W. THOMAS KELLAHIN

ALSO PRESENT:

MARK W. ASHLEY
NMOCD Petroleum Geologist
2040 South Pacheco
Santa Fe, New Mexico 87505

* * *

WHEREUPON, the following proceedings were had at 10:30 a.m.:

EXAMINER CATANACH: Okay, at this time we'll call Case 12,046.

MR. CARROLL: Application of Burlington Resources Oil and Gas Company for statutory unitization, Lea County, New Mexico.

EXAMINER CATANACH: Call for 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.

We would ask that you consolidate Case 12,046 with Case 12,047.

EXAMINER CATANACH: At this time we'll call Case 12,047.

MR. CARROLL: Application of Burlington Resources Oil and Gas Company for approval of a waterflood project and to qualify that project for the recovered oil tax rate Pursuant to the Enhanced Oil Recovery Act, Lea County, New Mexico.

EXAMINER CATANACH: I'll call for additional appearances in either of these cases.

Okay, will the witnesses please stand and be sworn in?

MR. KELLAHIN: Yes, sir, I have three witnesses.

(Thereupon, the witnesses were sworn.)

MR. KELLAHIN: Mr. Examiner, at the time the statutory unitization case was filed, there was still an outstanding working interest owner that had a substantial interest in Santa Fe Energy. This week they have executed a ratification, and we now have a hundred percent joinder by the working interest owners.

This is a small waterflood project. It is a portion of the Delaware. It consists of portions of two federal leases.

We need to make you a presentation on statutory unitization because there are two overriding royalty owners who Mr. Gallegos has contacted and repeatedly requested to sign ratifications and has not yet received those. And so we need to satisfy the requirements for committing involuntarily those overrides.

The principal case, however, is a waterflood project, and we have the geologist and the engineer to present to you the components of the waterflood project and to qualify our injection wells as having appropriate mechanical integrity for the flood.

With your permission, then, we'll start our presentation with Mr. Rick Gallegos.

RICK GALLEGOS,

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. Gallegos, for the record, sir, would you please state your name and occupation?

A. Rick Gallegos, and I'm a senior landman with Burlington Resources.

Q. On prior occasions, Mr. Gallegos, have you testified before the Division?

A. Yes, I have.

Q. Has it been your responsibility as a landman for Burlington to become knowledgeable about the interest ownership within this project area?

A. Yes.

Q. As a result of that knowledge and information, have you contacted all the various interest owners concerning participation in this unit?

A. Yes, I have.

Q. In addition, has it been your responsibility to seek preliminary approval from the Bureau of Land Management for your project area?

A. Yes, I have.

Q. Are you knowledgeable about the various contracts, including the unit agreement and the unit operating agreement?

A. Yes.

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

MR. KELLAHIN: He is so qualified.

Q. (By Mr. Kellahin) Mr. Gallegos, let's start with some preliminary background information for the Division, and let's start back with the original concept and the initial working interest owner meeting that occurred in January of this year. And to help set the stage for that discussion, let me direct your attention to Exhibit Number 1. What does this represent?

A. Exhibit Number 1 was the initial outline that we had proposed for the waterflood project area.

After discussions with all the working interest partners, we had an initial meeting in January, and then we had a follow-up meeting in March. and at the March meeting a consensus was reached to divide the project into two different units, dividing it right there at the township line, basically splitting the field in half. And part of the reasoning for that was that the eastern portion of the field had -- it had an increase in production due to some water disposal wells in the area, and our reservoir engineer, Doug Seams, will elaborate on that when he comes up.

MR. KELLAHIN: Mr. Examiner, Exhibit 1 is the original concept.

Exhibit 2 represents the configuration of the project as we're asking your approval for.

And then Exhibit 3 is Mr. Gallegos' summary of activities, so that you won't have to take notes on the chronology; he's provided you a summary.

Q. (By Mr. Kellahin) All right, when we take the original project area, were all the working interest owners -- were all the working interest owners within the entire concept area in attendance at the initial meeting?

A. Not all of them were, but all of them were aware of it, and all of them had received notice.

Q. Okay. By the second working interest owner meeting in March of 1998, had all the working interest owners within the concept area been apprised of the potential project?

A. Yes.

Q. And so as a result of that meeting, then, there was an agreement to divide the project, and Burlington elected to go forward with the project that's on the eastern portion?

A. That is correct.

Q. Let's turn to Exhibit Number 2. With the deletion of the two 40-acre tracts that are shown on the Examiner's copy as crossed out in red, with the deletion of those two 40-acre tracts, does that configuration represent the tract configuration you're seeking approval for?

A. Yes, it does.

Q. Okay.

A. And the two 40-acre tracts were deleted as a result of our meeting with the Bureau of Land Management. Subsequent to that meeting, they had -- the BLM had recommended that we delete the two tracts, and we agreed with them, and since deleted them.

Q. The next sequence in the chronology, Mr. Gallegos, is a letter you circulated on March 17th, 1998?

A. Yes, and in that letter we advised all of the working interest owners in the original concept area that we would be dividing it into two units.

Q. Okay. Let's set aside your chronology for a moment. We will come back to other events on the chronology.

If you'll turn now to Exhibit 4, what does Exhibit 4 illustrate?

A. It illustrates all the tracts that are in the waterflood project area that we are seeking approval of, and it's got it broken down by ownership, by the various tracts.

Q. Okay, so when we look at the subsequent contract documents and we see this number- and letter-coding --

A. -- it will also be referenced in Exhibit B to the unit agreement and unit operating agreement.

Q. Okay. We can come back to that one in a moment. Let's turn to the preliminary approval letter from the BLM. That's Exhibit 5. Identify for the record what we're seeing.

A. What you're looking at there is a unit by the -- or, I'm sorry, a letter by the Bureau of Land Management that gives us preliminary designation of the unit, their approval, and in that approval was the deletion of the two tracts.

Q. If you'll turn to Exhibit 6, would you identify what this exhibit is?

A. Yes, that is the unit agreement for the Corbin-Delaware Unit for our waterflood project.

Q. Is this a standard-form unit agreement the form of which has been approved by the Bureau of Land Management?

A. Yes, it is.

Q. If you'll turn to the back of that exhibit, let's start looking at the exhibit attachments, starting with Exhibit A to the unit agreement. What are we seeing here?

A. What you're seeing there is the outline of the area to be included in the waterflood project, and a -- once again, a breakdown by the tracts, and then a breakdown, too, by the two federal leases that are involved in that unit.

Q. It's a unit area that consists of all federal acreage, and that's divided into two separate federal leases?

A. That is correct.

Q. When we turn to Exhibit B, have you satisfied yourself that you have accurately tabulated the ownership and identity of those owners by tract on this exhibit?

A. Yes, I have. The Exhibit B was taken from a title opinion I had done by the law firm of Turner and Davis.

Q. While we keep Exhibit B before us, let's turn to the certificate of notification for hearing. It's Exhibit 7. Do you find that, Mr. Gallegos?

A. Yes.

Q. If you'll turn to the third page of that certification, there's a tabulation of interest owners. Do you see that? The third page?

A. Yes, I sure do.

Q. All right. Let's go down the page and have you identify for us as of today what the current status is of the voluntary commitment by this list of interest owners to the unit.

A. Santa Fe Energy has committed to the unit, they've furnished me with a ratification and joinder.

Q. At that point, do you now have a hundred percent of the working interest owners --

A. Yes, I do --

Q. -- committed?

A. -- I have a hundred percent of the working interest ownership ratified, it has ratified the unit.

Q. What is represented by the balance of the names and addresses?

A. The balance of the names and addresses are all overriding royalty interest owners. And there's two of those that we have not received commitment from, Altura Energy, Limited, and Leigh Wilber. The remainder of the overriding owners, we have received their ratification and joinders.

Q. Summarize the status of your discussions with Altura.

A. I have -- I also followed up with phone discussions with Altura on several occasions, and it's a matter for them -- It's such a small deal to them that they have not taken the time to look at it or to route it through their management to get approval.

Q. What is their percentage interest in terms of an overriding royalty in the unit?

A. Approximately .17 percent, so...

Q. And the other party is whom?

A. Leigh Wilber, and I have also spoke with Mrs. Wilber. I think this is a case where they're just not familiar with what they're signing. They're not the original -- This override was handed down to them, so they're not real comfortable in signing the document. They really know nothing about it. I tried to explain it to them. And they had indicated that they would probably try to go to an attorney and have him look at it and get it signed for us eventually.

Q. What percentage interest is associated with their interest?

A. Once again, Leigh Wilber has approximately .17 percent.

Q. Okay. And at this point, then, you have what total percentage of royalty and overrides committed to your project --

A. Approximately --

Q. -- on a voluntary basis?

A. -- 96.73 percent of the royalty and overrides have committed to the unit.

Q. Okay. When we move back to the unit agreement and look at Exhibit B, then Altura will be indicated on this display, and your documents will also show the override to Leigh Wilber?

A. That is correct. Leigh Wilber will have an override under Tracts 1A, -B and -C, and Altura will have an overriding royalty interest under Tracts 1A, 1B, 2A and 2B.

Q. And finally, appended to the operating agreement is an Exhibit C. What does this show?

A. The Exhibit C shows a breakdown of the interest by tracts.

Q. Turn your attention now to the unit operating agreement, Exhibit 8. Do you have an opinion as to whether this is a standard form operating agreement that has been edited to be suitable for unit operations?

A. Yes, it is a standard form unit operating agreement, we have modified slightly.

Q. And all the working interest owners have signed and committed their interest under the operating agreement?

A. Yes, they have.

Q. Turn with me to Exhibit 9, Mr. Gallegos. Would you identify and describe this display?

A. Exhibit 9 was the original letter, both an original letter and a follow-up to the overriding royalty interest owners, seeking their commitment to the unit agreement and unit operating agreement.

Q. Under this proposal you identified for them the proposed unitized interval?

A. Yes, I did.

Q. And you estimated for them what your technical people had advised you was the potential additional oil that might be recovered if this project is approved and is successful?

A. That is correct.

Q. When we go back to your chronology, then, we follow the course of events where you have submitted to the working interest owners the agreement. Was there a submittal to the working interest owners of the various engineering reports that --

A. Yes, there --

Q. -- formed the basis for the unit?

A. Yes, there was. That was submitted on June 8th. The agreements were submitted on May 22nd, and then we followed up with an engineering report on June 8th.

Q. When we follow through the correspondence, then, after the July 13th letter, what happened after that?

A. After the July 13th letter, we were able to get 82.5 percent of the working interest owners committed, and roughly about 85 percent of the working interest owners, and then subsequently we got 100 percent of the working interest and 97.63 percent of the overrides and royalty owners.

Q. As a petroleum landman, do you now believe you have effective and efficient control over unit operations, to make this project effectively controlled by the unit operator?

A. Yes.

Q. Let me ask you to turn to Exhibit 10. Exhibit 10 refers to the notice to the offset operators within a half-mile radius of the injection wells. This notice list was compiled based upon a C-108 submittal from your company?

A. Correct.

Q. All right. To the best of your knowledge, have you received any objections from any of the offset operators who --

A. I have not received --

Q. -- are entitled to notice?

A. -- any.

Q. Okay. At this point in the approval process, Mr. Gallegos, the remaining activity to be completed is an order from the Division allowing the inclusion of these two overriding royalty interest owners, plus the Division's approval of the waterflood project?

A. That is correct.

Q. Once you have those approvals, then you can go back to the BLM and get final unit approval?

A. That's correct.

Q. Do you have a time frame for what you believe to be your company's actual initiation of the waterflood project?

A. It will probably be, I would estimate, January of next year, of 1999.

Q. Thus far, have you received any objection from any of the parties that you have contacted concerning their participation in the project area?

A. No, I have not.

MR. KELLAHIN: That concludes my examination of Mr. Gallegos, Mr. Catanach.

We move the introduction of Exhibits 1 through 10.

EXAMINER CATANACH: Exhibits 1 through 10 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Gallegos, do you eventually anticipate obtaining the approval of the Wilber interest? Is it Wilber?

A. Yeah, it was Leigh Wilber and Altura Energy, were the two outstanding interests. And yes, I do. I spoke with Mrs. Wilber's husband earlier this week on Monday, and he said it was just a matter of unfamiliarity with it, and they were going to try to talk to some of their relatives and possibly take it to an attorney and that they would like to go ahead and get it ratified and to us.

I also anticipate getting Altura Energy's also. Theirs was more of a time constraint. It was so small to them, in the scheme of what they do, that they just haven't had to take any time to deal with it, more than anything.

EXAMINER CATANACH: Mr. Kellahin, I don't recall an instance where we have just statutorily unitized royalty interest owners. Do you have any recollection --

MR. KELLAHIN: I don't recall an instance either. It's appropriate, though, as you would do in a compulsory pooling case, to have a mechanism to commit their interest so that they can share with their appropriate percentage. In the absence of that, then we are in the legal dilemma of having to figure out how to pay them their share on a leasehold basis, and it just doesn't work.

EXAMINER CATANACH: I don't have a problem issuing an order. I guess my question is, have you looked at the Statutory Unitization Act and satisfied yourself that we have in your unit agreement or in your unit operating agreement everything that's necessary to issue a statutory unit order?

MR. KELLAHIN: Yes, sir.

EXAMINER CATANACH: There is?

MR. KELLAHIN: Yes, sir.

EXAMINER CATANACH: Including allocation -- how allocation of production is to be handled?

MR. KELLAHIN: We have an engineering witness that's going to talk to you about tract participation, the equities established, and that his ultimate conclusion is that we are fair, reasonably and equitably allocating unit production on an appropriate basis. So we're going to hit all the pegs for you with some other witnesses.

EXAMINER CATANACH: Okay, as long as we have that in the record.

MR. KELLAHIN: Yes, sir.

Q. (By Examiner Catanach) Mr. Gallegos, you have actually -- Have all the working interest owners actually signed this agreement?

A. Yes, they signed a ratification and joinder, which effectively commits their interest to both the unit and the unit operating agreement.

Q. And is it just Burlington and Santa Fe, are the only two working interests?

A. No, there's Burlington Resources; Santa Fe; RKC, Inc.; and Central Resources. So there's four working interest owners.

Q. Okay. Can you tell me why the two 40-acre tracts were excluded by -- or sought to be excluded by BLM?

A. Yeah, I can get into it. Our geologist will expand on it. But basically, it was because the sand was -- basically covered less than 50 percent of the tracts, so they had recommended that we exclude them from the unit. And our geologist will elaborate on that.

Q. Okay. It also appears to me that the acreage in Section 7 has yet to be drilled; is that correct?

A. Let me check. There are -- I believe there is a well on 7. And this is -- Our reservoir engineer was going to address this portion of it.

Q. Okay. Who made the decision to exclude the west half of this pool?

A. It was made -- Basically, it was a consensus of the parties at the second working interest owner meetings, and the two big parties in the entire field are Santa Fe Resources and Burlington Resources.

And Santa Fe Resources was in support of it also. They, I think, will pursue, or they have indicated that they will pursue unitizing this western portion of the field, and they will operate that. They are the big owner there, and we're the big owner in the east half.

Q. But Burlington does have an interest in what would be the western --

A. Yes, we do.

Q. You have no indication of when they might pursue that?

A. They were -- At the time, they were going to pursue it continually with ours, but they have kind of fallen behind, and my guess, it will probably be next spring, and that would be -- That's just an estimate. They have indicated that they are going to pursue it, though.

EXAMINER CATANACH: That's all the questions I have of this witness, Mr. Kellahin.

<u>KEITH WINFREE</u>,

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

DIRECT EXAMINATION

BY MR. KELLAHIN:

Q. All right, you're the real Mr. Winfree, huh?

A. That's correct.

Q. Please state your name and occupation.

A. My name is Keith Winfree. I'm a senior staff geologist with Burlington Resources.

Q. Mr. Winfree, on prior occasions have you testified before the Division?

A. Yes.

Q. As part of your duties as a petroleum geologist, have you made an investigation of the geology surrounding this project?

A. Yes.
Q. This project was originally studied by Platt Sparks and Associates, was it not?
A. That is correct.
Q. As part of their original project study, did they include a detailed study of the geology?
A. Yes.
Q. And it was your task to review the geologic information they had used, to review their conclusions, and to see whether or not you were in agreement with them; is that not true?
A. That's correct.
Q. Based upon that effort, do you now have conclusions and opinions concerning the project area?
A. That's correct.
MR. KELLAHIN: We tender Mr. Winfree as an expert petroleum geologist.
EXAMINER CATANACH: He is so qualified.
Q. (By Mr. Kellahin) Let's talk about some of those opinions. Have you satisfied yourself that it is geologically logical to configure the tracts within this unit as proposed?
A. Yes.
Q. There is a logic to the boundary of the unit and an organization of the tracts in such a way that you can

effectively and efficiently expose a certain portion of the Delaware to a waterflood?

A. Yes.

Q. Within the geology of the unit, have you satisfied yourself that the various maps that were used are accurate and reasonable --

A. Yes.

Q. -- and that based upon that mapping that Platt and Sparks has constructed a hydrocarbon pore volume map that appropriately allocates reservoir volume to each of the tracts?

A. Yes.

Q. In addition, are you satisfied that the other geologic parameters that are involved in this Application are fair and reasonable?

A. Yes.

Q. Let's turn first of all to the interval that's contained within the unitized section. If you'll take this type log for me, Exhibit 11, identify and describe for us what portion of the Delaware is subject to the unit.

A. As you can see on this type log, we've indicated the unitized interval. This is a density neutron porosity log. It is the Meridian Oil, Incorporated, West Corbin Federal Number 22. It's within the unit, the proposed unit.

The top of the unitized interval in this well is at 5002 feet, which corresponds to the top of the lower YZ sandstone, which you can see on the log is a porosity zone, and we've colored the porosity greater than 8 percent in yellow.

The unitized interval also includes the upper member of the "A" sand, which is the second yellow zone beginning at 5026. It includes the lower member of the "A" sand, which begins at 5050 feet. And then it also includes the "B" sand, which begins at 5084 feet. The base of the unitized interval is the base of the "B" sand at 5100 feet.

Q. As part of the presentation, we'll show the Division a structure map in a moment, and then you're going to have four -- You're going to show them a structure map, and then you're also going to show them four individualized isopachs that subdivide the Delaware into the various members that were studied?

A. That's correct, isopachs of hydrocarbon pore volume.

Q. All right. What we will look at is a hydrocarbon pore volume map, which is the final conclusion map for each of those members?

A. That's correct.

Q. Before we get to that, let's illustrate for the Division Exhibit 12 so they can see the well density where those wells are located within each 40-acre tract. Would you do that by describing Exhibit 12 for us?

A. Certainly. The Exhibit 12 is a simple map which shows the individual 40-acre spacing units within the proposed unit, and they're colored in yellow. The wells that have produced from these sands already are indicated with the letters "prod".

And then the -- to the left of each circle indicating the location of the well, there are a series of abbreviations which relate to the sands.

If we just take one, for example, the well -- the furthest northwest producing well produces from the UYZ, which is the upper YZ. That's outside the unitized interval. It also produces from the lower YZ, which is within the unitized interval. And it produces from the AUM, which stands for the upper member of the A. The ALM, which you can see in some of the other wells, is the lower member of the "A", and then the "B" is indicated just by the letter "B".

So what the map shows is that all of these zones are productive somewhere within the unit, and they're not present in every well. Every well has not produced from all four units.

Q. Have you satisfied yourself that with this configuration and with the current well density that we have fully exploited the opportunity for primary recovery and that it now is timely to initiate a waterflood for secondary recovery?

A. Yes.

Q. Do you see any reasonable potential benefit to delaying the waterflood until all 40-acre spots have been drilled with Delaware wells?

A. No.

Q. Is there a structural and geologic basis for the proposed location and number of injection wells in relation to the producers?

A. Yes.

Q. Let's look at that first relationship. If you'll turn to Exhibit 13 -- Mr. Examiner, those are pretty small copies, and we've got some enlarged copies to aid your ability to see the details.

All right, the first display, Mr. Winfree, is Exhibit Number 13, and it is a structure map. If you'll go to the display board. Now, this is just one of a great many number of structure maps you could have selected out of the Platt-Sparks study; is that not true?

A. That's correct.

Q. Would this be characteristic, though, of the structure so it would serve purposes to illustrate the structural concept and relationship of the wells?

A. Yes, they're all very similar.

Q. All right, give us a short summary with focus on why the three wells that had been selected for conversion to injection -- in fact, one of them is currently a disposal well, is it not?

A. That's correct.

Q. All right. Display for us the reasoning for using these three wells for injection.

A. Okay. First let me just introduce the map so that we'll all be able to see what I'm talking about. There's one section, one square mile, give you an idea of the scale.

The structure contours in this particular structure map are on the top of the Delaware "A" upper member. I chose that because that's where the bulk of the reserves are, so this is the most important of all the structure maps to look at.

We have a contour interval of 20 feet, and the highest contour up here is minus 1040. The lowest contour on the map is minus 1320, so we have that sort of a range.

The obvious geologic conclusion is that we have a dipping surface that generally dips off to the south, into the Basin. It has these small structural noses on it, but overall we have an updip area in the northern end of the unit, a downdip area in the southern end of the unit.

The injection wells are all positioned in the downdip end of the unit, and the reason for that, which I'll show you with the hydrocarbon pore volume maps, is, the sands extend below the oil-water contact in this direction, and up here the sands reach a stratigraphic pinchout. So having downdip injectors is the most efficient way to get at all of these zones.

The oil-water contact for this particular reservoir, the upper member of the A, is approximately minus 1180.

Q. Let's go to the first hydrocarbon pore volume map, and let's start with the highest interval within the unitized section. This is the lower YZ sand?

A. That's correct.

Q. Describe for us how this is mapped and what conclusion you've reached.

A. Okay, the process that was used to generate all of these hydrocarbon pore features for these maps was to start with the structure, the oil-water contact, to map the gross sand interval with porosity greater than 8 percent, then to map the water saturation, map the thickness of the zone above the oil-water contact, and then to sum all of those through a volumetric calculation into hydrocarbon pore-feet.

This map here appears -- or -- Let me back up.

Again, we have the same scale here, and I have a contour interval of .1 pore-feet. The zero line on this map is constrained on the downdip end by an oil-water contact, and on all other sides by a pinchout, which is mapped by mapping gross sand. So it's a very -- It's a small accumulation, restricted just in this part of the unit.

Q. This conclusionary map for the hydrocarbon pore volume was used as part of the calculations, then, to come up with the parameters to be negotiated for participation?

A. That's correct.

Q. All right. Let's go down to the next level, and which one's that going to be?

A. The upper member of the "A".

Q. Again, identify and describe this display.

A. We have the same scale, and in this one we have a .5 pore-foot contour, slightly different.

The zero line up here is determined by the updip pinchout of the sand, and this is structural contour following along here for the downdip oil-water contact. So we have quite a thickness of hydrocarbon pore footage through this part of the unit, and then it extends up to about right there, and then we have the downdip area where it's wet, but that's where the injectors will be.

Q. Let's use this as a means to walk around the boundary. Let's look at the zero line in the southern portion of Section 7, which is at the top end of the unit.

A. Okay.

Q. We have included three 40-acre tracts in the south half of the south half of 7. They're in the unit, right?

A. Yes.

Q. Do each of these three tracts satisfy the BLM's criteria for having at least a calculated 50 percent of those tracts above the zero line?

A. That's correct.

Q. All right. So in order to have the ability to allocate reservoir share, it's necessary to include those tracts and give them their percentage value of pore volume in the unit?

A. That's correct.

Q. I also see that there's wells been drilled in those tracts, some of those tracts.

A. That's correct.

Q. Are you satisfied that there is no need to drill further Delaware wells in those tracts at this time?

A. Yes, I am.

Q. And you have sufficient control to give you some certainty about the location of the zero line?

A. Yes. These are deeper, so we do have data, even though there's no Delaware producing wells there.

Q. When we go to the southeastern corner of the unit, we've got some tracts that have a portion of the pore volume that is very minimal, and yet those tracts are included. Those tracts also include some injection wells. What's the rationale for the inclusion of the tracts in the unit?

A. Well, the actual -- There's three reasons. That's the proper location for the injectors, is one. All of the tracts have some hydrocarbon pore volume in them. And when you look at the tract map, you can see that these pieces down here are part of larger tracts that have large amounts of hydrocarbon pore volume in them.

So in other words, the tracts are larger than the 40-acre spacing units.

Q. And if the Examiner wants to see how that is configured, he can go back to Mr. Gallegos' Exhibit Number 4, and he can see how the ownership is divided within the unit based upon those tracts?

A. (Nods)

Q. All right. Let's go to the next layer down, and we're going to get the what? "A"? Lower member?

A. That's correct.

Q. All right, sir, if you'll continue and identify and describe that display.

A. Same scale. In this case, the contour interval is .1 pore-feet, although for clarity on the map some of the contours are left out, so I'll just make it real clear. This is a zero pore-feet, .2 pore-feet, .5 pore-feet, .6, .7 and .8.

And this looks very similar to the upper member of the "A", very similar geologic situation, as you'd expect since they're so close together on the log. Updip sand pinchout, downdip oil-water contact.

Q. All right, and let's go to the last display. This is going to be the "B" member of the interval, and it's Exhibit Number 16 [*sic*]. Would you identify and describe that display.

A. This map is the same scale. The contour interval is .5 feet. The "B" sand is more discontinuous than the "A", and so we have downdip oil-water contact -- excuse me, downdip zero lines on the hydrocarbon pore volume, which relate to the oil-water contact. We have updip sand pinchout lines, relating to the updip zero hydrocarbon pore volume.

Q. From a geologic point of view, let's talk about the mechanics of how you're going to flood the intervals. Are all the producing wellbores in the unit going to be open to each of these four members? If they have it present?

A. Yeah, if they have hydrocarbon pore volume present, they will be completed in that interval.

Q. All right. For flood purposes on the injectors, in what members will you have perforations open in the injectors to help assist the oil production out of the producers?

A. If you look at all three of the injectors together, then all of the zones will be open and will be supporting injection.

Q. The initial intent of the project is to utilize existing wellbores as producers and/or injectors?

A. That's correct.

Q. And you'll continue to use an approved disposal well as an injector?

A. Yes.

Q. Show us which one is the disposal well.

A. I may not know --

Q. I think it's the one in the northwest of the southeast of Section 18.

A. The West Corbin Number 1?

Q. I think so. All right. Now, this data, if I understand correctly, was taken and compiled and used for determining the equity formula for each of the tracts?

A. That's correct.

Q. Okay. What is your geologic opinion about the feasibility of this project within this area?

A. I think it's extremely feasible. I think we've got production data that would suggest that's...

Q. Geologically, within the various members, then, there appears to be enough reservoir continuity within that mapped area to give you the ability to put water in one well and produce oil, with that assistance, out of another well?

A. That's correct.

MR. KELLAHIN: That concludes my questions for Mr. Winfree.

We move the introduction of his Exhibits 11 through 17.

EXAMINER CATANACH: Exhibits 11 through 17 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Winfree, did you come up with the hydrocarbon pore volume maps?

A. No, I did not. It was done by Platt and Sparks. The geologist's name is on here, Mike Clemenson. But I've reviewed all this data.

Q. This was done on information that your company supplied to Platt and Sparks?

A. That's correct.

Q. And have you -- Do you agree with the conclusions that were reached by that company?

A. Yes.

Q. The actual allocation of hydrocarbon pore volume feet, is that totaled up in a later exhibit?

A. No, we don't have a single composite hydrocarbon pore volume map.

Q. Okay.

A. But that was included -- You know, the total of all four zones was a parameter for equity determination. The reservoir engineer will go into some detail on that.

Q. Okay. That was just one of the factors --

A. Yes --

Q. -- or was that -- Okay. He'll go into that --

A. He'll go into --

Q. -- more detail?

A. -- detail on that, yes, sir.

Q. The northern boundaries of the proposed unit were determined by a sand pinchout; is that correct?

A. That's correct.

Q. And how was that determined

A. From subsurface mapping. The actual map prepared by Platt and Sparks was a -- It was titled a gross sand map, and it was an isopach of gross interval of sand greater than 8-percent porosity, with the understanding with less than 8-percent porosity has no permeability.

Q. Did that map include all of the four producing horizons, the gross sand map?
A. There was one done for each, that's correct.
Q. Now, were the well logs -- You said there were some wells drilled in Section 7?
A. That's correct.
Q. Now, were those well logs utilized to determine --
A. Yes.
Q. -- whether or not there was sand present?
A. Yeah, in fact, on that map right there you can see that the well in the east part of the unit in Section 7 has zero hydrocarbon pore volume, and that's because that well had zero sand in it.
Q. I'm sorry, which quarter section?
MR. KELLAHIN: Identify for the record what you're looking at. Exhibit 15, isn't it?
EXAMINER CATANACH: I think there's a problem with the exhibit numbers, Mr. Kellahin. I think the larger exhibits were not -- didn't correspond --
MR. KELLAHIN: They're not identified in -- I'm sorry, we're confusing you and me, then. They're not numbered the same way.
THE WITNESS: It is 15, Exhibit 15. I'm referring to this well right here. The logs on that well

indicate there was no sand, so it then followed there was no hydrocarbon pore volume. That is in the southwest of the southeast of Section 7.

Q. (By Examiner Catanach) And your closest control point from there to the south would be the well in the northwest of the northeast of 18; is that right?

A. That's correct.

Q. So you've got a large area in there that you have no control points. How would you determine where that zero line would be in relation to in between those two wells?

A. Well, you would make an extrapolation from this point right here, .96, and the zero -- You could make an extrapolation that the zero would be right there. Or you could make an extrapolation that it could be further to the south. You've got to do something that's reasonable there.

Your typical way of doing this is to try to contour something that looks geologically reasonable without having extremely pinched contours except in an area where you have well control that says that's the correct thing. So this well here helps you establish that line. You know this well has got to be beyond it.

So it is an interpretation, of course, but I think this is a very reasonable interpretation.

Q. Okay. There's a tract, the northeast quarter of the southeast of 18, that appears to have very little hydrocarbon pore-volume feet.

A. That's correct, on that interval -- if I may refer to another exhibit, which is correctly labeled as 17, there is some hydrocarbon pore volume in here.

Q. Okay, and that's in the "B" sand?

A. The "B" sand, that's correct. I think that's the only one that has an appreciable amount. That's correct.

However -- well -- Did I answer your question?

Q. Yes.

A. All right.

Q. So there are no plans at this point to drill any additional wells in Section 7; is that correct?

A. That's correct.

Q. But it's your opinion that some reserves will be contributed from that acreage to unit production?

A. That's correct.

Q. On Exhibit Number 12, we're looking at your nomenclature. What does BHP stand for?

A. I didn't prepare this exhibit, but my opinion is that that is a bottomhole pressure, that the data was taken from the deeper wells. BHP -- Yes, those are locations of the deeper reservoir wells. And so some type -- I believe some type of data was gathered there, but I don't have direct experience with the preparation of this map.

Q. Okay. Are there any plans to drill any

additional wells in any of the 40-acre tracts on the unit?
A. Not at this time.
Q. I guess I'm a little confused with regards to the acreage BLM would allow into the unit and would not allow. What was the criteria that they used?
A. Again, I'll have to speculate. I wasn't directly involved in that, and we could defer the question to the reservoir engineer. I think he was more involved in that discussion, although I can speculate if that's what you'd like.
Q. We can hold off and wait and ask the reservoir engineer that question. I'm just curious as to why some of the tracts were allowed in and why some of them were not allowed in by BLM, or recommended to BLM.
What interval of the Delaware is this that we're talking about? This is the Brushy Canyon or Cherry Canyon?
A. I haven't studied this in detail, but I do have an opinion that it's the Cherry Canyon.
Q. As far as you know, is this portion of the Delaware the only portion that's productive in this area?
A. Well, there is the production of the upper YZ, which is outside the unit -- unitized interval, above the unitized interval. So I believe the answer to your question would be no, there are other zones that produce in the Delaware within this area.

Q. So your unit, though, would just encompass these four producing members?

A. That's correct.

Q. Is there a chance that somebody would drill a well on this acreage for anything outside the unitized interval, in the Delaware?

A. I think there could always be a chance. I don't think it's very probable. I think it would be an uneconomic proposition, is my opinion.

Q. Now, the Corbin-Delaware -- Is it the Corbin-Delaware Pool we're talking about?

A. I believe the --

Q. West Corbin-Delaware Pool, it appears, is what it is. Now, that pool takes into account the whole Delaware formation; is that right?

A. I don't know the answer to that question.

Q. Now, do you guys actually have data that supports what you've determined to be the oil-water contact in each of these zones?

A. Yes.

Q. And that's from well control?

A. Production data, yes.

Q. And the remaining working interest owners have all agreed to the way that you propose to allocate this production?

A. That's correct.

EXAMINER CATANACH: I have nothing further of this witness -- Yeah, I'm sorry, hold on a second.

EXAMINATION

BY EXAMINER ASHLEY:

Q. Mr. Winfree, in the type log you have another zone that shows the perforated -- just -- I don't know, 49- -- What is that? 4946, 4944, 4948?

A. That's correct.

Q. What zone is that?

A. That's the upper YZ.

Q. That's the upper YZ?

A. Yes.

Q. That's not going to be included as part of this?

A. No.

Q. Okay, so those wells that are still producing from the YZ will continue?

A. I believe that is the case, but that would be a good question for the reservoir engineer. I think he's going to address that subject.

EXAMINER ASHLEY: Okay. I have no further questions.

FURTHER EXAMINATION

BY EXAMINER CATANACH:

Q. So that -- any production that's coming from that interval would not be attributed to unit production; is that correct?

A. That is correct.

Q. How would you separate that out?

A. I'm not really qualified to answer that, but that question will be addressed.

EXAMINER CATANACH: Okay. This witness may be excused.

DOUG SEAMS,

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. Seams, sir, would you please state your name and occupation?

A. My name is Doug Seams. I am a petroleum engineer working as a reservoir engineer for Burlington Resources in Midland, Texas.

Q. As part of your duties as a reservoir engineer, have you made a study of the Platt-Sparks engineering report on this project?

A. Yes, I have.

Q. In addition, have you participated with the other working interest owners to identify and negotiate and finally agree upon reservoir parameters and participation formulas for the unit?

A. Yes, I have.

Q. Are you familiar with the production history for the wells in the unit area?

A. I am.

Q. And based upon your study, have you now reached certain conclusions and opinions concerning the opportunity to effectively and efficiently recover additional hydrocarbons out of the Delaware Pool?

A. I have.

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

EXAMINER CATANACH: He is so qualified.

Q. (By Mr. Kellahin) Mr. Seams, let's start with a little background information.

Before the Examiners are a series of displays that you have submitted, the first one of which is Exhibit 18. It is stapled together so that after the summary page there is individual production histories for each of the wells in the unit area; is that not true?

A. There is production history for each of the wells in the unit area, save and except two, which are specific exhibits unto themselves, which we'll review later on.

Q. Let's start with a short summary of what has been the production history.

A. Well, the West Corbin-Delaware field was initially discovered back in 1976, in September of 1976, by Aztec Oil and Gas, by drilling and completing the West Corbin Federal Number 2 in the Delaware.

Full field delineation -- not development but delineation, happened through the development of deeper horizons in the Bone Spring and the Wolfcamp.

And then full field development occurred with about 20 producers, right at 20 producers, and one disposal well. And when I say full field, that is the entire field that we're talking about, and not just the unitized interval.

Q. You're talking about the Delaware wells to the west of the current project area?

A. Yes, I am.

Q. Are you satisfied that we have exhausted the opportunity for primary production in terms of drilling new wells?

A. Yeah, I'm fully satisfied.

Q. We're ready to initiate a waterflood project?

A. Yes.

Q. Let's look at the production history, then. If you'll start with Exhibit 18, show us what's occurred.

A. Well, looking at Exhibit 18, this is a total production curve for just the wells that are involved in the unit. And the wells involved in the unit are currently seven producing wells and one disposal well. That disposal well, once again, is the West Corbin Federal Number 4.

What I have here is a daily production graph, starting from 1976, with the initial production of that old Aztec well, which is now the Burlington Resource well, and then all the way up through present.

As you can see up at the top line in the green, is a barrels-of-oil-per-day curve. Next beneath it is the gas production. Underneath it with the yellow curve is a GOR curve, a gas-oil-ratio curve. Underneath that in blue is a water-production curve. And then on the bottom in a red or magenta-type color are the disposal volumes, labeled as injection volumes, from the West Corbin Federal Unit Number 4.

Now, as you take a look at these curves, the current production for the wells in our unit area, our proposed unit area, is 98 barrels of oil per day, 62 MCF per day, and 793 barrels of water daily. Our current daily disposal volumes into the West Corbin Unit Number 4 is right at about 1600 barrels of water per day.

Our total cumulative production volumes, through about May of this year, are 795,000 barrels of oil, 759 million cubic feet of gas and 3.1 million barrels of water. Now, that 3.1 million barrels of water, total cumulative injection into the West Corbin Unit Number 4, our disposal well, stands at 2.7 million barrels of water injected into that well.

Q. When we look at Exhibit 18, there appears to be a flat production history for the oil produced from a period from 1978 through 1989, and then there is an elevation in the production plot for the oil. What has occurred during that period of time to cause that to happen?

A. Well, looking at the character of that daily oil production curve, the West Corbin Unit Number 2 was on production for probably the first ten or twelve years of that. That is a single well's production. And we'll review that well's production curve in detail, but you can see that there's ample waterflood response on that well, stabilizing and then increasing the production.

The later production jump, or I should say production increase, between 1990 and 193 is the full field development, with the field being delineated through deeper wells, twin wells were drilled, which you can probably see on some of the maps, and went in and developed on a full field effective that Delaware reservoir.

Q. Would you turn to Exhibit 19 and identify and describe this display?

A. Exhibit 19 is a quick reference. It shows where the existing wells are in the unit, open meaning our 40-

acre tracts that won't physically have a producer or injector within the proposed unit.

And then it has the wells labeled as they are today, pre-unitization. They will be involved in the unit. For example, if you follow right through the middle of the unit on the far west side, you've got the West Corbin 20, the West Corbin 17, 15, et cetera. Those are all wells that will be involved with the unit.

Q. All right, identify and describe Exhibit 20.

A. Exhibit 20 is very similar to Exhibit 19. It just gives you an idea of the quality of the type of wells that we're dealing with.

I have there color-coded the average daily oil, gas and water production. And you can see the oil shown there as the first number; it shows up as blue. The gas number is in the middle, and then the water production is there in kind of a darker purple.

You can see that our production wells range from the West Corbin 20 of 23 barrels of oil per day, all the way down to the West Corbin Number 22, which is right at about four barrels of oil per day.

Q. Let's turn to Exhibit 21 and look at the specific performance of the West Corbin Federal 2 well.

A. Now, before we leave Exhibit Number 20, if you can keep that handy, if you look at the far southern end of the field you'll see the location of the West Corbin Number 4. That is our disposal well. That well disposes into one of the primary flood zones of this field. It has disposed 2.7 million barrels.

Now, with that you would anticipate some flood response to some of the nearby wells. And if you'll look just to the northeast where the West Corbin Number 2 is, this well has experienced by far the most significant flood response, and probably should: It's been there by far the longest, along with that disposal well.

Now, moving on to Exhibit Number 21, as we just referenced here, this is a production curve of the West Corbin Federal Number 2, and the West Corbin Federal Number 2 only. Now, I have on there indicated by a dashed line what my estimated primary decline of that well would have been without the injection support of the disposal well. You can see that there's been a significant amount of flood response even through today for that well.

Q. If additional injector wells are added, and you continue to utilize the disposal well as an injector, have you made a forecast or an estimate of the opportunity for additional oil recovery?

A. I have. What we're doing here is, we're adding two additional injectors to the one existing well that technically is an injector. And Exhibit Number 22 shows what we would get without that additional waterflood modification and what type of reserve recovery we would get with it.

The upper dashed line represents the model for what we would get with the additional waterflood reserves, and that represents total remaining recovery of reserves of 261,000 barrels. Now, without this waterflood modification, our estimated total remaining reserves are right at 100,000 barrels.

So that gives the total project an incremental amount of 161,000 barrels by adding those two additional injectors and modifying that pattern.

Q. Let's turn to Exhibit 23 and have you identify and describe this display.

A. Exhibit Number 23 is the last of the well-production curves that we haven't yet looked at. There was initially many stapled in the first exhibit we looked at. We looked at the West Corbin Number 2.

And this is just an exhibit that shows, where I have a dashed line, that shows what I thought the existing or the primary decline would have been without the support of that disposal well. And then I have an estimate of what the total flood cumulative production was to an existing date, and this going to become very important when we take a look at the tract participation parameters and how we estimated what the total remaining oil to recover through waterflood operations will be.

Q. Identify and describe for the Examiners what's contained within the package of pages identified as Exhibit 24.

A. Exhibit Number 24 is an excerpt from the engineering study that I compiled from the Platt and Sparks study. Platt and Sparks completed a waterflood feasibility study for us, and then with that data I completed the engineering study in order to proceed forward with it.

The parts critical to the waterflooded included are, here, the reservoir description; the reserve analysis on the second page. And I want to point out one of the critical pieces to the reserve analysis on the second page.

If you look at the first subtopic, "Remaining Hydrocarbon Target", the remaining hydrocarbon target is one of three factors that we have used in the tract-participation parameters, and it is by far the largest. And as we've discussed some of the other data, you'll see that it probably has by far the most impact on working interest and is also most meaningful in how to determine those working interests.

The remaining hydrocarbon target is defined as using a one-to-one secondary-to-primary ratio, then defining what the primary recovery would be for each well, and then determining what total EUR would be with waterflood operations. The amount that that is, less the cumulative production it has made so far, is the remaining target for us to go after by this waterflood modification.

If you flip all the way back to the fourth page, there's a full litany of reservoir data, all the way from average reservoir depths to pressures, gas-oil ratios, et cetera.

One of the curious things, or I think interesting things about this reservoir, is that the recovery factor to date is already close to 20 percent. So just through disposal operations in a downdip disposal well, we've already had excellent recoveries through the partial waterflood process.

And then on the very last page we have what would be the pre-unitization well names, or old name, there listed on the left, and then we have the new name, which we tried to keep as consistent with the old names just to avoid confusion.

The well names will effectively change from the West Corbin Unit Number, et cetera, to the Corbin-Delaware Unit Number, et cetera.

We actually did not call it the West Corbin-Delaware Unit. Since Santa Fe is planning to unitize the west half, we'll leave that to them.

Q. Let's look at Exhibit 25, Mr. Seams. It shows that there is an equity determination using the following reservoir parameters and percentages, remaining recoverable oil of 60 percent, the hydrocarbon pore volume of 30 percent, and surface acreage of 10 percent.

Do you have an opinion as to whether that is a fair and reasonable allocation back to the tracts of their appropriate share of the hydrocarbons?

A. Yes, I do. As you look at our factors, we have three main factors. Sixty percent of it goes to the remaining EUR of that particular tract, 30 percent to a hydrocarbon pore volume, and then 10 percent to acreage.

We feel its remaining EUR is by far the largest magnitude of importance, because we have had partial waterflooding through the areas, and those wells that have received almost complete waterflooding have almost next to no remaining target, regardless of what pattern modifications we do. So that has a 60-percent bearing.

Now, due to the unknown nature of what we do, we still think hydrocarbon pore volume is a very important number, and that has a 30- percent bearing on it. And we have included some tracts that are very significant in the roles of injection. They have little hydrocarbon pore volume on them, but on the downdip side we needed those tracts for injection, and we have a 10-percent acreage participation factor for those issues.

Now, this spreadsheet is ordered by ownership tract on the left, and you can see each of the individual values for each of the tracts as you flow down, and of course across.

Q. When we look at Exhibit 26, what are we seeing here?

A. Exhibit 26 is a summation of Exhibit 25 using the estimates that we had for remaining EUR or, in essence, remaining secondary target, hydrocarbon pore volume numbers. And then the acreage is, we've determined through the four working interest owners, the working interest for each owner.

Kind of an interesting thing to note is, it really wasn't advantageous for us in any way that we are a constant 78.55-percent working interest across the full unit area.

Q. Are you satisfied that the formula and the basis for the formula allocate production of hydrocarbons to the separately owned tracts in the unit area on a fair, equitable and reasonable basis?

A. Yes, I feel it was very fair and equitable, especially taking into account the already existing semi-waterflooded condition of the reservoir that we're trying to unitize.

Q. Are you satisfied that the division of the pool into an eastern portion and a western portion -- that there is the ability of Burlington as the unit operator to control the flow and migration of hydrocarbons along the western boundary of the unit, so that correlative rights are protected?

A. Yes, I do. We have discussed this in detail with the probable operator of the western unit, Santa Fe. And if you look back -- If I remember, it's Exhibit 12, it showed the flood pattern of what we're attempting. We do have a producer there that lies next to the boundary, and all of our injection basically will push the product updip. We're very comfortable that we won't lose or actually gain product across that east-west line that divides those two proposed units.

Q. Let's turn to Exhibit Number 27 and have you identify and describe this display.

A. The waterflood implementation plan really consists of converting two existing producers to injection, and this is a well-cost estimate or a workover estimate that -- would it take in order to make that happen.

It's going to cost approximately $81,500 to convert the West Corbin Number 6 to an injection, and then that same cost again to convert the West Corbin Number 22 to an injector.

Q. All right, let's turn to Exhibit 28 and have you identify and describe that display.

A. Exhibit Number 28 just takes a look at the original oil-in-place estimates to see if some of our recoveries are valid and within a reasonable range. And as I said earlier, the primary EUR for this field is approaching 20 percent; it's 18.7 percent.

Throughout the cumulative production so far, throughout these semi-waterflooded conditions, it looks like we'll recover up to 28 percent. That includes the 100,000 barrels of remaining reserves.

With the additional waterflood implementation, it looks like the recovery of total oil in place is going to be approaching 38 percent, which is actually very high. It's a very efficient waterflood area.

Q. Would you turn now to Exhibit 29, and let's go through the chronology and your time line for the project.

A. This chronology is -- basically shows where we've been, where we're at and where we want to go, and hopefully it will give you an effective idea of the pace of our project.

We initially mailed out our engineering summaries, which we reviewed a portion of a second ago, on June 8th, 1998.

On June 9th, 1998, we solicited the BLM for approval.

On June 17th, we telephoned the partners for approval.

We mailed out the hearing notices on August 25th.

We are having our Commission hearing today, so right there in the middle of our chronology is where we're at today.

Then hopefully we can gain Commission approval somewhere in the middle of the month of October.

We'll permit our injection wells in November.

And we plan to do all of the capital work in 1999, just as soon as possible, more than likely in the month of January.

Now, we do have the potential for an additional infill well, which we'll evaluate in June of 1999 -- that would be over on the far western side of the field -- to perhaps trap any oil that looks like it may be migrating to the west. Right now, we don't feel like it's feasible. But we're going to monitor the wells, just to make sure that that won't happen.

Q. In your opinion, is the management and operation of this as a unit feasible?

A. Yes.

Q. In the absence of unit operations in the waterflood project, what happens to these wells?

A. Well, we recover 100,000 barrels and we're done.

Q. Let's turn to the topic of the C-108, Mr. Seams. Mr. Seams, I have given you a copy of Exhibit Number 30 and also a copy of Exhibit Number 31. What is the purpose of Exhibit Number 31?

A. Exhibit Number 31 is a correction to a portion of Exhibit Number 30. Upon further review of the cement tops, we noticed that there was some potential errors. We wanted to go to the best source of data. We did that, and that best source of data was often temperature surveys, CET logs and CBL logs. And so I've corrected each one of those cement tops where applicable.

And so as you go through the C-108, please refer to the amended cement tops for that information.

Q. Have you reviewed the C-108 and satisfied yourself that within the half-mile radius of each injection well, we have tabulated all the wellbores within those areas for review?

A. Yes, I have.

Q. Okay. Exhibit 31 represents your latest re-examination of those matters?

A. Yes, it is.

Q. When we look at the relationship of the injection interval to the cement in those wells, do you find any wellbores which we might characterize as problem wells, in which it may be necessary to take further remedial action --

A. Yes.

Q. -- in order to isolate any casing from the formation that's being exposed to the flood?

A. Yes, I have.

Q. Identify for the Examiners which, if any, wells you indicate as potential problem wells.

A. Referring back to Exhibit Number 31, you see the listing of the wells flowing across from left to right. If you look right in the middle of the listing you'll see something called a TOC, top of cement, and just to the right of that is the estimated top of the cement. And then off just to the right is by the method that we determined it.

For instance, if you come down just one line to the West Corbin Federal Number 5, you'll see TOC, top of cement, at 7075 feet, determined by temperature survey. TS is temperature survey. This is one of the wells that will be a potential problem for us.

Q. What, if anything, do you propose to do with this well? This well is operated by whom?

A. This well is operated by Burlington Resources.

Q. And it's currently perforated in the Wolfcamp?

A. It is currently producing out of the Wolfcamp, yes.

Q. How will you address this issue?

A. This well is currently marginal within the Wolfcamp. We're going to look at all the potential recompletion potential, and in that process we will either P-and-A the well or recomplete it. But as part of that process, we will squeeze this interval within the flood interval to make sure that there's no flow behind the pipe.

Q. Okay. Are there any other potential problem wells?

A. There is -- As you flow through here, there is an asterisk that marks each one of them. There's a potential problem well that's just noted just to the left of that TOC. There's two on the first page and two on the second page.

The first two on -- The two on the first page is the West Corbin 5, which we just discussed and then the Huber 17 Federal Number 1. Both of these wells are operated by Burlington Resources, and both of these wells are marginal currently.

Now, the two on the second page are actually the same well, just different operators, change in ownership. They're both the West Corbin Federal Number 1, so we have three total wells that are potential problem wells for us in this area.

The West Corbin Federal Number 1 also is a marginal well and has the same-type decisions attached to it, that we either need to look at P-and-A'ing this well, recompleting it. But both of those aspects, we'll isolate that zone with cement, the potential flood zone with cement, I should say.

Q. In examining this project, Mr. Seams, you're aware that the Division normally issues injection approval with a pressure surface limitation, are you not?

A. Yes, I am.

Q. The standard practice of the Division is in the absence of step-rate tests or other data, they will limit you to .2 p.s.i. per foot of depth to the top perforation. If they use that practice, what would be your maximum surface pressure for injection?

A. Right at 1000 pounds, 1000 p.s.i.

Q. All right. Do you anticipate that that's going to be adequate to allow you to effectively use these injection wells for flood purposes?

A. I think it's going to be a little bit less than what we're going to need. We have a flood that is very much like this about a mile and a half to the east, and injection pressures there are typically 1200 to 1300 pounds, p.s.i.

Q. If the Division approves this Application and provides an administrative procedure for you to submit step-rate tests or other data to get an administrative increase in the pressure, would that be suitable?

A. Yes, it would.

Q. The source of the water to be used for injection wells is what?

A. It's from the local production, and that consists of the Wolfcamp, the Bone Springs and the Delaware.

Q. And this is the same water that's currently being disposed of in the disposal well?

A. Yes, it is.

Q. Do you see any compatibility problems or other issues with regards to using those sources for injection purposes?

A. No, we don't through either the field injection process or formal testing.

Q. Let's have you turn the C-108 through to one of the schematics, and let's look at an illustration of how you propose to convert the producer to an injection well.

A. I am several pages back, I'm looking at the West Corbin Federal Number 6, and I'm looking at the current completion. As you can see, this well currently has tubing, a rod pump in the hole. The triangles represent a tubing anchor catcher.

What we plan to do with the West Corbin Federal

Number 6 is, if you turn to the next page, we will go back in the hole with an injection string of tubing, more than likely some type of lining in order to lessen the effects of corrosion, have an injection packer, and we'll actually squeeze off that upper Delaware set of perforations.

As we were looking at the unitized interval, if you remember, it consisted of the lower YZ, the "A" and the "B". Well, this has an upper YZ in it, which is not part of the unitized interval, and we'll squeeze any nonunitized interval off in the two injectors.

Q. The research that went into the preparation of the C-108 demonstrates that if there is any opportunity to produce fresh water, it's at very shallow depths; is that not true?

A. Yes.

Q. Describe for us what search has been made to determine the source and the extent of utilization of any freshwater sources.

A. We have contacted the state and federal geologists on the sources of fresh water in the area and came up with no known sources.

And we actually did a visual search by foot with -- and we've documented that with some of the digital pictures you probably have in the back of your C-108.

So we've done both a visual search and also a technical search through the sources that we have.

Q. Where is fresh water coming from that is utilized to any extent within this area?

A. This field is located just off the Mescalero Scarp. It's kind of on the way from Hobbs to Loco Hills. And as you drive along the highway, as you come down off the scarp, you can see back up on the scarp some very large tanks. Those are all freshwater tanks which are attached to pipelines, which feed both livestock and other type of industrial applications down in the Basin. To my knowledge, there's no known freshwater wells down there to feed that, so it's all fed from up top in the scarp.

Q. Are all the existing wells in this area of review adequately cased in such a configuration to protect any shallow freshwater sources if it was determined there were any existing?

A. Yes, they are. The surface casing was set and cemented to surface on every instance.

Q. What kind of rates do you anticipate in terms of injection rates for the wells?

A. We anticipate between 500 and 1000 barrels of water injected per day.

Q. And you have the source of produced water to use those volumes without utilizing fresh water?

A. Yes, we do.

Q. Summarize your conclusions and opinions for me, Mr. Seams, concerning the appropriateness of this project and why you're seeking to have approval by the Division.

A. We're seeking approval for formal unitization of this unit because we have, in effect, a partial waterflood that has responded very well. We would like to go ahead and complete the waterflood and recover the potential incremental reserves of 161,000 barrels. It would make full utilization of our current wellbores, and it would also, of course, bring the added value of those reserves to all the working interest owners and, of course, net interest owners.

Q. In your opinion, will we be afforded the opportunity to recover oil that would not otherwise be recovered?

A. Yes, we will.

Q. And is the allocation of the hydrocarbons to be recovered done on a fair, reasonable and equitable basis?

A. Yes, they are.

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

We move the introduction of his exhibits, starting with Exhibit 18 and going through to Exhibit 31.

EXAMINER CATANACH: Exhibits 18 through 31 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Seams, do you by any chance know what order authorized the Number 4 well to be used as a disposal well?

A. No, I don't.

Q. Okay.

A. I can say we researched that within our regulatory department, but I wasn't party to that.

Q. Okay. But we probably want to reclassify that as an injection well?

A. Yes, we do.

Q. Are you making any change to that injection well?

A. No, actually its injection profile right now and mechanical setup is very adequate.

Q. Are there any plugged wells in the area of review?

A. In the area within the unit boundaries?

Q. Well, within the area of review of the injection wells, half-mile radius.

A. Yes, there are. If you'll take a look at Exhibit Number 31, we've got noted on there the wells that are plugged. In fact, the very first well listed on there, the Continental Federal, operator Bob Dean, Limited, is a plugged well.

Q. Where would I find the schematic diagram for that

P-and-A'd well?

A. It may not be in there. The schematic diagrams attached are for the wells that will be involved in injection. We did not attach a schematic diagram for every well listed on Exhibit Number 31.

Q. We need that, P-and-A diagrams for all the P-and-A'd wells within the area of review.

A. Okay.

Q. Do your Exhibits show which of the four intervals the injection wills will be perforated in? Does that show up somewhere?

A. Uh-huh. If you look at the wellbore diagrams in the C-108 -- it's probably not explicitly listed -- it shows the depths, the intervals, and it shows where our current completion is. And then with a crossout-type note it shows that interval that we will squeeze. And those intervals that we will squeeze are, of course, in the nonunitized interval. And in each case, they happen to be an upper YZ member.

Q. Okay, but you're not going to be injecting -- In each of the injection wells, you're not going to be injecting into all the producing intervals; is that right?

A. If I understand your question to be, will each injector have all of the producing intervals? Now, for instance, the current disposal well only has the "A" and the "B". There's no YZ zone present.

The other two, the 6 and the 22, actually have collectively all four of the zones.

Q. So they will be open in all four zones?

A. Uh-huh.

Q. Is there -- Aside from the injection wells, is there YZ production in the remainder of the unit wells, producing wells?

A. I think there's one. I don't know if I've got that map handy, let's see.

Q. Okay, and how is that going to be handled?

A. We talked to the working interest owners about that, if they desired for us to go in there and squeeze off that zone. But it was so small that they elected just to go ahead and leave that open in the producers, but we would squeeze it off in the injectors.

I think there's one -- Let's see. There's two producers where that exists.

Q. Two producing wells?

A. Uh-huh.

Q. And your plans would just be to leave that zone open?

A. Uh-huh.

Q. And just combine that with unit production?

A. The zone in those areas is actually very thin.

We could go in there and spend the effort to cement squeeze that off, but we're concerned about the fracture stimulation of that.

And we are concerned much more on the injection style, that if you lose a lot of injection, the upper YZ, then -- it really affects the performance of the unit and those unit parameters. But on the production side, we're pretty confident that we're nearing the end of depletion and that we're comfortable with not squeezing that off in the productive wells.

Q. Do you have any idea how much that zone might be contributing, as far as production goes?

A. I can tell you the zone as a whole, as a whole isopach. It only has 50,000 barrels of secondary recoverable reserves, so its primary reserves would be about 50,000 barrels. And that -- and only -- Less than 20 percent of that is in the unit area; the other 80 percent is south of the unit area. It's a very thin zone that has some very thin stringers up into our unit area. It's not feasible for us to waterflood it where we're at. It's also too small.

I can't quantify for you what its production is, but it's a very minor zone in respect to the other producing zones.

Q. I may ask this of Mr. Kellahin or the landman:

Does that have any implications of producing a zone that's not included in the unitized interval?

MR. KELLAHIN: With the agreement of the parties, I see that it does not. The owners of that out-of-unit interval have concurred that we would not have to isolate it, and to be produced with the unit production. And by agreement, then, they have waived their independent opportunity to produce it otherwise.

And as a feasible matter, it would not be produced.

THE WITNESS: Uh-huh.

MR. KELLAHIN: It would simply be gone.

THE WITNESS: It would be lost.

MR. KELLAHIN: So at least we recover. It would be lost otherwise.

Q. (By Examiner Catanach) I'm just a little bit further curious: Why wouldn't you include the upper YZ in the unitized interval, Mr. Seams?

A. Two of the biggest impediments to including the upper YZ in the flood is, number one, it's very small. If you look at the mapping of it, if you look at the hydrocarbon pore volume mapping of it, the total potential flood reserves for the upper YZ is 50,000 barrels, and only 20 percent of that is within our unit area. The rest of it lies to the south. So it makes the waterflood much more difficult to manage with all those multiple zones.

If you look at the potential within our waterflood, probably 75-plus percent of the reserves are in the "A" zone, maybe even close to 80 percent. That's really what we wanted to concentrate on, and there were some zone that came along coincident with that. The upper YZ really wasn't coincident with the "A" zone. It was really further deposited to the south, and it's also very small.

We'd like to just very much exclude it from the unit. It would actually ease unit operations considerably. And the other working interest owners, we've discussed which zones would or wouldn't be in it, we discussed it early on that we would have a much more efficient unit, probably a much more cost-effective unit, to limit it to those primary zones that we have selected as the unitized interval.

Q. While you're talking about 10,000 barrels which may potentially be recovered from that zone through secondary operations, is that about right?

A. From the -- Yeah, it would be close, uh-huh, 10,000.

Q. And all you're really talking about is maybe opening up the -- well, the injection well, the furthest injection well to the west, is already open in that zone.

I just don't understand what the additional difficulties would be to try and recover those reserves.

A. Well, the difficulties are that these are the very updip limits of it. Very likely, you'd be injecting water at the updip limits of something, and you would either adversely affect anything that people wanted to do downdip, if ever, or you would push a lot of oil from the upper YZ down to a downdip area where, of course, the unitized interests would be different.

It's -- These sands are actually kind of stacked like shingles. And the upper YZ is down further, while our main pay interval is up into the north. So when you try to combine those in a flood and the upper YZ is so small compared to our main target, it would just make for a very difficult-type flood arrangement.

And plus, just the target is so small, just some of the problems that you could have just through injection operations if that became a thief zone. It makes a lot of sense to go ahead and eliminate that and try to concentrate on a more discrete package of sands.

And we can look at the sample log, which is Exhibit Number 11, and we see the upper YZ noted on it just right above 4950. It's consistently like that throughout the zone; it's just a very thin zone, while the zones within our unitized interval, the lower YZ through the "A" and through the "B", tend to thicken areas where we have sweet spots. The YZ doesn't. It remains a very thin sand lens.

Q. Your Exhibit Number 18, the decline curve, that is for all -- Is it seven wells?

A. Seven producers and one disposal well.

Q. So ultimately there is only going to be five producing wells and three injection wells within the unit?

A. You're right, five producers, three injectors.

Q. And the injectors are currently producing at pretty low rates?

A. Well, of course one is our current disposal well.

Q. Yeah.

A. And then the other two are actually kind of in the mid-range of rates. Let's see if I can flip to that one. That would be Exhibit Number 20.

West Corbin Number 22 is one of our lowest producers. It's 4 oil, 8 gas and 160 water. And that makes sense; it's down near the lower dip of the oil-water contact.

And then West Corbin 6 would be our other injector. It's at the far eastern side of the unit. It's at 5 oil, 5 gas and 50 water.

Q. Okay. I believe you said total production was 98 barrels a day?

A. It totals just under a hundred barrels a day, and I quoted 98 barrels a day, 62 MCF and 793 water.

Q. Okay. So we can use Exhibit Number 18 as essentially the production curve that we can use to -- what? When you show a response, that will be the curve we can use?

A. Actually, the response curve would be more indicative of the with and without waterflood modification curve. That would be Exhibit Number 22.

Q. Twenty-two.

A. I'm share mine, if you like. Exhibit Number 22 is the same collection of wells, it just has a shorter time frame. It goes from 1990 to 1998.

Q. Uh-huh.

A. And on that it has what we would see is where our decline curve is going to go without any waterflood modification. That obviously would be the lower dashed line. And then the upper dashed line is, I think we'd be able to maintain decline with this additional waterflood modification.

We do at this point have a couple of wells that are watering out. The West Corbin Number 2 is a good example.

Q. Are you saying that your response is going to be immediate, Mr. Seams?

A. It's going to be an immediate effect on decline. The reservoir pressure out here is actually quite high due to all the injection, and the conductivity of the sand between injection and producing wells is very good. On a flood very much like this at lower pressures we have response within eight months, and that was at depleted pressures of 300 to 400 pounds.

My guess is -- we haven't done any exact testing -- but reservoir pressure out here is probably well above 1000.

Q. That response may be difficult to ascertain. You really don't expect to see an incline?

A. Will we see the classic waterflood hump? I don't think so, and the reason why is, we've already done a very -- a pretty good job waterflooding this reservoir.

The only wells that haven't been thoroughly waterflooded, if I can -- if you can kind of hold this production curve in your hand and look back at the map -- would be the wells in the upper dip portion, on the far west side. They were the furthest away from the disposal well, and they're also in the thickest pay.

Anything around the disposal well has been pretty well waterflooded, which you can kind of also see on that tract participation parameter spreadsheet. We have remaining EUR for some of those wells, and some of the remaining EUR is very low, for the wells near that disposal well. That would be Exhibit Number -- I think it was 25. Yeah, 25 and 26.

If you look at Exhibit Number 25, you can see that the remaining EUR for tracts number 1A, 1B, is zero, and the remaining EUR for tract 2C, which, if I remember right, is where the West Corbin Number 2 is, is only 6000 barrels. It's been thoroughly waterflooded.

The greatest amount of recoverable reserves is in tract 2A, which is that midsection of the reservoir furthest away from the disposal well. It still has the highest oil saturation and, of course, the highest ϕh. So it has the highest remaining secondary target.

Q. Well, would it make sense not to qualify this entire unit for the EOR tax credit if you've already waterflooded a portion of it? Should we not qualify the whole unit for that?

A. Well, it would make sense for me to qualify the whole unit just from the basis of, how do you differentiate?

The whole unit, we're going to make an earnest effort to complete and fully waterflood this unit until we reach full depletion of the reservoir. We're imparting a strategy of reservoir depletion that affects the whole reservoir. You know, our intent and our efforts are all pointed towards full depletion of the reservoir.

Q. How did you guys determine the percentages or the way to weight the allocation factors?

A. Well, we first looked at what is going to have the greatest impact on the value for the flood. And the greatest impact on the value of the flood is that that has a secondary remaining target. That's, in effect, what we're going after. So we gave it the greatest weight, and that is 60 percent.

And of course, we determined it through a primary-to-secondary analogy, which has proven up both on an offset field and within this field with the West Corbin Number 2, where its estimated primary very much equalled its secondary response to the offset development well.

Next, just due to the uncertainties of where, exactly, the hydrocarbon pore volume and the hydrocarbons are coming from, we gave the hydrocarbon pore volume a 30-percent weighting factor.

And then we had acreage in there for 10 percent, to account for any acreage that had a very low primary and secondary recovery, little hydrocarbon pore volume, but we needed that acreage -- or that acreage was vital to have as an injector. So we included the 10-percent factor there.

This isn't, probably, a typical unitization procedure, because we've already gone halfway through the process of waterflooding, and that target is what is remaining, and that's what we tried to quantify.

Q. Okay. On your Exhibit 24, the reservoir data, did you just take into account all four of the intervals and just average the amount for those? Is that what you did?

A. One second. Yes, very much. There's some very average numbers in here, and the average depth would be the average top of that unitized interval. Average height, porosity -- Obviously, those things vary tremendously, as what you saw on the maps.

But I mean, there are some things that are very -- that are probably accurate for all of them, such as bottomhole temperature, reservoir volume factor, some of those issues.

There are some individual zone numbers, such as the oil-water contacts listed there on the bottom.

The reason also why we have no total maps, but these are also broken down by zone is, we have to manage each one of these by zone. Each one has its own flow characteristics. So we did look at it in detail.

Q. You guys aren't going to try and regulate flow into the injection wells in each of these zones, are you?

A. I missed your question.

Q. Regulate the flow by any means into each of these zones?

A. We may have to. We'll actually measure how much each zone is taking fluid initially, and then -- probably every six months or every twelve months on a regular basis. And if we develop some type of thief zone, then we'll have to try to mitigate that problem.

We have that to a small degree on a flood that's very similar that's a mile and a half to the east. We're currently going through what we would call flood modification or flood-pattern modifications, where we do that both vertically and areally, try to make sure the water goes to where the remaining oil target is.

Q. What do you see as the life of the -- the remaining life of the flood, Mr. Seams?

A. Probably no more than about 12 years, and that would be to almost complete abandonment. If I look at my curve here -- Yeah, remaining life without flood modifications, right at about seven and a half years. Remaining life with flood modification is right at about 19 years, and that would be to, you know, very much stripper well status.

Q. And your additional costs are going to be approximately $81,500 per injection well?

A. That's correct.

Q. For the two wells?

A. Uh-huh.
Q. No additional cost for the Number 4?
A. The Number 4 is adequately --
Q. The disposal well.
Is it summarized somewhere where you have the total tract participation per tract?
A. Yeah, if you take a look at Exhibit Number 26 --
Q. Okay.
A. -- if you look at 26, over on the far left-hand side is the ownership by tract. Just basically notes the tract.
And if you look at the individual owners, if you look at the unit working interest --
Q. Uh-huh.
A. -- that's the ownership that they have, or each working interest owner has in each of those tracts.
Now, that's a percent thereof, of the total unit. For instance, where Burlington Resources' interest is a constant 78.55 percent, well then, those add up to 78.55 percent.
EXAMINER CATANACH: I think that's all we have, Mr. Kellahin.
Is there anything else you --
MR. KELLAHIN: Except to leave the record open for a brief period so Mr. Seams can submit to you the

schematics on the P-and-A'd wells in the area of review.

EXAMINER CATANACH: Okay, we will do so.

And there being nothing further in these two cases, Case 12,046 and 12,0147 will be taken under advisement.

(Thereupon, these proceedings were concluded at 12:25 p.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. ______, heard by me on ______________ 19____.

______________________, Examiner
Oil Conservation Division

CERTIFICATE OF REPORTER

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

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

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

WITNESS MY HAND AND SEAL September 21st, 1998.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998