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:	CASE NO. 11,807
APPLICATION OF STEVENS & TULL, INC., FOR SALTWATER DISPOSAL, LEA COUNTY, NEW MEXICO	ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGS

EXAMINER HEARING

BEFORE: DAVID R. CATANACH, Hearing Examiner

September 4th, 1997

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 4th, 1997, at the New Mexico Energy, Minerals and Natural Resources Department, Porter Hall, 2040 South Pacheco, Santa Fe, New Mexico, Steven T. Brenner, Certified Court Reporter No. 7 for the State of New Mexico.

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I N D E X

September 4th, 1997
Examiner Hearing
CASE NO. 11,807

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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:

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By: W. THOMAS KELLAHIN

* * *

WHEREUPON, the following proceedings were had at 9:55 a.m.:

EXAMINER CATANACH: And at this time we'll call Case 11,807.

MR. CARROLL: Application of Stevens and Tull, Inc., for saltwater disposal, 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, and I have three witnesses to be sworn.

EXAMINER CATANACH: Call for additional appearances.

Will the three witnesses please stand to be sworn in?

(Thereupon, the witnesses were sworn.)

MR. KELLAHIN: Mr. Examiner, I have three witnesses to present to you.

The purpose of this Application is to seek a replacement disposal well. Stevens and Tull has utilized previously other disposal wells in this immediate vicinity. We'll describe those for you. And the purpose today, then, is to ask you to approve the utilization of the State "BF" Well Number 4 as a disposal well.

This case has been continued and readvertised because the selection of the first replacement well was in close proximity to an oil well operated by Mr. Shackelford for which he had an objection.

We have now found another wellbore which is removed from the area of his concern. It is at a low structural position in the reservoir, and Mr. Shackelford has concurred that this wellbore poses no risk to him.

We are discussing reinjection of produced water that is produced from what is identified as the West Teas-Yates Seven Rivers Pool. This is an area where oil is produced in association with volumes of water.

There is, offsetting us to the east, a pressure-maintenance project in this same reservoir interval, and they reinject water plus make-up water for a pressure-maintenance project.

My three witnesses are a landman, a geologist and an engineer. We will first call the landman, Mr. Jerry Weant.

JERRY L. WEANT,

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. Weant, for the record, sir, would you please

state your name and occupation?

A. Yes, my name is Jerry Weant and I am the landman for Stevens and Tull, Inc.

Q. Mr. Weant spells his last name W-e-a-n-t.

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

A. Yes, I have.

Q. Pursuant to your employment in the capacity as land manager for your company, have you made a search of all the offset operators, the owner of the surface for the disposal well location and any surface lessee for that property?

A. Yes, I have.

Q. In addition, have you been involved in behalf of your company with the documentation of not only this wellbore but the other wellbores that were utilized for saltwater disposal by your company in this area?

A. Yes.

Q. As part of your work, have you been in contact with the Oil Conservation Division, have searched their records for various past orders and approvals that are relevant to this case?

A. Yes, I have.

MR. KELLAHIN: We tender Mr. Weant as an expert petroleum landman.

EXAMINER CATANACH: He is so qualified.

MR. KELLAHIN: Mr. Examiner, the exhibit book is marked as Applicant Exhibit 1. Within the book there are tabs that are subdivided in such a way that there's a portion of the book that deals with land matters, the next part deals with the geologic issues, and then finally the engineering topics.

Q. (By Mr. Kellahin) Mr. Weant, if you'll turn with me, sir, let's look at the Application very quickly. This is the replacement Application, if you will, and is the wellbore that your company proposes to utilize for saltwater disposal?

A. That is correct.

Q. The original application had requested an exception from the standard guidelines for surface pressure limitation. If you use the standard guidelines of .2 p.s.i. per foot of depth, at this location the wellbore would be limited to 700 pounds, and you have requested initially authority to inject up to 1000 pounds?

A. That is correct.

Q. What is your position as of today?

A. We believe that we would not need any more than the 700 pounds per square inch.

Q. All right. The Division customarily approves in this type of arrangement the opportunity for you as an

Applicant to submit step-rate tests subsequent to the entry of an order to have the pressure limitation adjusted with the Division's approval. Are you aware of that?

A. Yes, sir.

Q. Would that process be acceptable to you?

A. Yes, sir, it would.

Q. The interval for use for injection is to be the Yates-Seven Rivers formation of the pool?

A. That is correct.

Q. And do you have a particular footage to identify for the Examiner as to the total gross interval that you're seeking approval for injection?

A. Yes, sir, that is on the third page of the Application, there's a schematic of the wellbore, and at the bottom it lists the injection interval from 3160 feet down to a depth of 3418 feet.

Q. All right, let's make sure everybody's got that page. When we look at the wellbore diagram following the Form C-108 -- we're still behind the Application part --

A. Yes.

Q. -- we're looking at the bottom of the first portion of the injection well diagram, and at the very bottom it indicates the interval for which you're seeking approval?

A. That is correct.

Q. All right. Let's turn beyond that now and have you identify for us the general area in which this property is located. The first display behind the tab that says "land" is a plat that shows us what, sir?

A. That shows our acreage position in Sections 9 and Section 16, which would be our leasehold, which would be directly affected by this injection well.

Q. Okay. Let's turn past this, and there's an enlarged portion of it, so that we can more quickly identify the offsetting operators and the location of the various wells.

Is this again a plat that you prepared?

A. Yes, it is.

Q. What's the significance of the color code?

A. The color code reflects the various offset operators to our leasehold, which is shaded in yellow, that would be affected or are within -- that touch our leasehold in this area.

Q. When we look at the center of the half-mile radius circle, there's the Number 4. Does that approximate the location of the proposed disposal well?

A. That is correct. That wellbore is located 330 feet from the north line and 330 feet of the east line of Section 16, of Township 20 South, Range 33 East.

Q. I'm going to ask you to skip over to another

plat, which I think is easier for the Examiner to read.

A. Okay.

Q. If you'll turn to the engineering tab at the very back part of the book, look past the engineering tab, and turn four pages back, following the red insert, there will be a locator map that also demonstrates the half-mile-radius circle. Do you have that, sir?

A. Yes, sir.

Q. Again, you're showing the Well Number 4 as the proposed disposal well. Show the Examiner on this display what was the original disposal well that you had utilized in the past.

A. In the past, we had used the well which is the "BF" State Number 2 well, which is located directly below the number 16, the section. It has the number 2 listed on it. It's outside the circle. It's located in the -- it would be Unit K of Section 16.

Q. And below it, it shows the number 3225?

A. Correct.

Q. All right. Why have you ceased utilizing that wellbore?

A. That well was approved for injection into the basic same formation.

We had been disposing of water in that for approximately six months when the casing collapsed, and at

the request of the NMOCD we plugged and abandoned that wellbore.

Q. All right. You had previously applied for a wellbore as a replacement well for disposal purposes other than the currently proposed Number 4 well; is that not true?

A. That is correct.

Q. Now, where was that well located?

A. Okay, that well would be located -- That's the "BF" State Number 1 well. It's located in Unit G. It's designated with a 1, and below it are the -- 3278.

Q. On this plat it --

A. -- it's highlighted in yellow also.

Q. And there's two wells in close proximity to each other?

A. Correct, the other well, being showed as a dryhole marker, is the Anasazi State 16 Number 1 well.

Q. All right. It was that wellbore that Mr. Shackelford expressed some concerns to you; is that not so?

A. That is correct.

Q. And his production is located where in relationship to that well?

A. Due west.

Q. As a result of discussions and meetings with Mr. Shackelford, have you determined, then, that -- with your

technical people, that the Number 4 well is the most probable successor as a disposal well?

A. Yes.

Q. Okay. All right, let's go back to the land testimony now. We were looking at the colored plat that was the locator map.

As a result of the new notifications for the Number 4 well as your replacement well, did you cause all these companies within the half-mile radius to be sent notice of this hearing as well as a copy of the Application?

A. Yes.

Q. To the best of your knowledge, have you received any objections or complaints from any of the parties to whom you've sent notice?

A. We've received no objections.

Q. Following that plat there is another plat. Identify and describe that plat for us. It's a foldout, Mr. Weant.

A. Okay. This is just a larger, blown-up section of the map, which uses the same color code as the previous map, and it identifies Stevens and Tull's leasehold in the immediate vicinity, as well as the offset operators.

MR. KELLAHIN: Following that display, Mr. Examiner, is my certificate of notification of hearing in

which we have notified the offset operators.

In addition, we have notified the Commissioner of Public Lands plus the lessee of the surface of where the disposal well is located.

Q. (By Mr. Kellahin) Following the certificate and the notices, there is an administrative order in the book, Mr. Weant?

A. That is correct.

Q. It's Administrative Order SWD-631. What is this?

A. That was the administrative approval for the "BF" State Well Number 2. That was the well we had discussed earlier that has been plugged and abandoned.

Q. All right, this is the well that had the casing collapse?

A. That is correct.

Q. All right. Following that administrative order, what is next in the exhibit book?

A. That is an administrative approval for the disposal of water in the Anasazi 16 State Well Number 1, which is located due north of the "BF" State Number 1 well on our map, which was indicated by a dryhole marker. We are currently disposing of a small volume of water in the Bone Spring formation in that well.

Q. Why is this wellbore not suitable for disposal of water produced out of the Yates-Seven Rivers?

A. The well itself just will not -- is not capable of taking any sufficient amount of water to alleviate the disposal problems we have for our production out of the West Teas Unit -- or West Teas acreage.

Q. All right, sir. Following that administrative order, what have you included in the exhibit book?

A. These are copies of two orders that we have been furnished in the past, discussing surface groundwater in the immediate vicinity. These are orders that allowed open pits at a prior date that were used by other operators. But the basic purpose of them was just to show the lack of fresh water in this vicinity.

Q. Are you aware of whether fresh water is produced and utilized in this area for residential or stock purposes?

A. To the best of our knowledge, there is none.

MR. KELLAHIN: Mr. Examiner, that concludes my examination of Mr. Weant.

We'll reserve introduction of the entire exhibit book until we've had all the witnesses authenticate their documents.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Weant, you currently operate all of the acreage shown in yellow on that plat?

A. Yes, sir. There is 280 acres in Section 16 and 280 acres in Section 9.

Q. And how many producing wells do you have on this acreage?

A. In Section 9 we have seven, in Section 16 we have three.

Q. Are these all Yates-Seven Rivers producing wells?

A. Yes, sir.

Q. And that's the water that's going to be utilized for disposal, that produced water from these wells?

A. That is correct.

Q. Did you actually met with Mr. Shackelford about this new proposal?

A. Yes, sir.

Q. And he has no objections, as far as you know?

A. That is correct.

Q. Okay.

A. He feels that based upon the geology, which will be further discussed by Mr. Ulmo, our geologist, that this will have no effect on his wellbore whatsoever.

Q. Let me verify, the proposed injection interval is 3160 to 3418; is that correct?

A. Yes, sir.

EXAMINER CATANACH: Okay, that interval is not correctly stated in the advertisement for this case, Mr.

Kellahin.

MR. KELLAHIN: I think you're correct, Mr. Examiner.

Although it was correctly notified to all the offsets and the surface owner, it is shown differently on the advertisement.

EXAMINER CATANACH: Yeah. I think probably you might have to readvertise to correct that.

MR. KELLAHIN: All right, sir.

Q. (By Examiner Catanach) Have you received anything from the State Land Office concerning using this well for disposal?

A. As --

Q. You've notified them.

A. Yes.

Q. Have they sent you anything, any kind of response to your request, or did you just notify them?

A. They've been notified. We've not received any kind of objection or anything from them.

EXAMINER CATANACH: Okay. I have nothing further.

Mr. Kellahin?

MR. KELLAHIN: No, Mr. Examiner.

THE WITNESS: Thank you.

EXAMINER CATANACH: Thank you.

GEORGE J. ULMO,

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

A. My name is George Ulmo. I'm a consulting geologist, and I'm on a full-time retainer with Stevens and Tull.

Q. Pronounce your last name again.

A. It's Ulmo. It's U-l-m-o.

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

A. No, I have not.

Q. And you reside in Midland, Texas, do you not?

A. Yes, I do.

Q. Summarize for us your education and your employment experience.

A. I received a bachelor of science degree in geology at University of New Orleans, 1976; a master's degree in geology at the University of Missouri in Columbia in 1979; and I've been working in Midland as a petroleum geologist ever since then.

I worked for three years for Exxon, and I worked

about six years for Depco, Inc. That's D-e-p-c-o. And in 1988 I went independent, and I've been independent and working as a consultant for various companies for the last nine years.

Q. As part of your responsibilities to Stevens and Tull, have you made a geologic investigation concerning this proposed disposal well?

A. Yes, I have. I started working for Stevens and Tull in May of this year, and in approximately mid-June they asked me to investigate this field for them.

And so I gathered all the wells in the area, within a three-mile radius of our field, and all the scout tickets, well logs and information, and --

Q. In addition, have you met with Mr. Paul Kautz of the Division's District Office that is responsible for supervising this area?

A. Yes, I have. Last week I called him and verified that the Yates top that I was using was the same as his top. And I asked him about the Capitan Reef and where he felt the top of the reef was on logs.

And so using his information, I -- my cross-sections I prepared would pretty much substantiate what he has told.

Q. All right. As a result of your study, have you satisfied yourself that you have sufficient information

about which to make geologic conclusions concerning the suitability of this wellbore for disposal purposes into the Yates-Seven Rivers formation?

A. Yes, I have.

Q. As a result of that study, do you now have conclusions about the suitability of this wellbore?

A. Yes, I do.

Q. Is it suitable for disposal purposes?

A. Yes, I believe it is.

Q. As a result of utilization of this wellbore for disposal purposes, do you see any opportunity for the contamination of any freshwater sources?

A. No, I do not.

Q. If this wellbore is approved for use, do you see that it would adversely affect any future recovery of hydrocarbons?

A. No, I do not.

Q. Let's talk generally about what you have concluded. Is this wellbore physically penetrating into the Capitan Reef?

A. No, it does not. TD in the well is approximately 30 feet above where we believe the Capitan Reef would be.

Q. Your proposed disposal interval is in which physical relationship to the Capitan Reef?

A. The lowermost perforation would be about 60 feet

above the top of the Capitan Reef.

Q. In terms of the relationship of the disposal interval to the intervals being produced of oil, where are you?

A. Most of the perforations -- Well, all the perforations are in known oil-productive zones. There are some zones below where we're perforating that also produce oil, but we are not going to attempt to inject into those.

Q. Where are you structurally, in relation to the established within the reservoir that is contributing hydrocarbons?

A. We're very far downdip. In this first file folder there's a structure map. I think -- Refer to that quickly.

Q. Let's do that. Let's explain to the Examiner how you've organized your presentation there. Behind the tab that says "geology" there's a short summary in which you have summarized the geology for the Examiner.

A. Yeah, that's --

Q. Then beyond that is a topographic locator map.

A. That's correct. And on that map the Laguna Gatuna lake is just about a mile or two west of our field. Our subject well is located in Section 16, in the Unit A location. And our field is -- picks up most of Section 9 and 16 on that top map.

Q. Okay, let's take a moment and unfold the cross-section.

A. In the first folder there are three items. The first is the structure map. Then there's two cross-sections, A-A' and B-B'.

The map, the structure map on top of the Yates formation --

Q. Hang on, before you talk about these. Let's unfold all three. I think it'll work better.

A. Okay.

Q. All right. Your structure map is contoured on the top of what datum point?

A. Top of the Yates formation, and the contour interval is 20 feet. Scale of the map is one inch equals 2000 feet.

Q. Find for us the subject well on the structure map.

A. Okay, the subject well is in Section 16, Township 20 South, 33 East. Visible on the map are several yellow areas, colored in yellow. Those represent Yates-Seven Rivers fields in the area.

To the west there's a small field called Salt Lake field. Then the West Teas field is in the center of the map. Just east of there about a mile is a yellow area which has a green outline, which traces the unit outline of

that Yates-Seven Rivers Unit operated by Titan.

Q. What's happening in this unit? What are they producing?

A. They are producing oil and gas from the Yates-Seven Rivers formation, and they are injecting water into the Yates formation for pressure maintenance.

Q. How are the injection wells identified on this display.

A. Okay, on this map any water disposal or injection wells are colored blue. All the Yates-producing wells are colored in yellow and have a circle drawn around the normal well symbol.

Q. All right, let's go back to your portion of the reservoir. What is the trapping mechanism for the hydrocarbons?

A. It's a structural trap, and the Yates appears to be draped over the underlying Capitan Reef topography.

Q. Show us the structural relationship now for the disposal well in relation to the known oil production.

A. Okay, the disposal well -- I have written on there the word "subject well" with the arrow pointing to that well in the Unit A location, Section 16, and it is at an elevation -- the Yates there is at an elevation of a plus 410 feet. And that's one of the lowest wells that we operate in the field. And it is approximately 180 feet low

to the Shackelford well in that same section.

Q. Let's use this as a locator now. Set it aside, and let's turn to your A-A' cross-section that cuts east to west across your portion of the reservoir. Let us start by finding the proposed disposal well and then developing your conclusions in relation in that well.

A. Okay.

Q. If you're looking at structural cross-section A-A', where do we find the disposal well on the cross-section?

A. Okay, our disposal well is well number 12 on that cross-section. The -- Have numbers written above the log headers on those for easy identification, and I've written the word "subject well" above that wellbore.

Q. There's a color code on the cross-section that cuts through the subject well. There is a yellow line above and below. What does that represent?

A. Okay, the top yellow line is the top of the Yates formation, and the lower yellow line is the top of the Capitan Reef, and the interval between the two is approximately 300 feet in thickness. It varies slightly over the field.

Q. Your structure map, then, is prepared using the data that's demonstrated on the Yates datum point?

A. Yes, and this is a structural cross-section, and

my datum for a structural cross-section is plus 500 feet.

Q. Let's move to the east, now, and have you show us where you and other operators have been able to produce oil out of the Yates.

A. On this cross-section?

Q. Yeah, going to the west.

A. Going to the west, okay. All the producing intervals I colored in red, the perforations were colored in red. And I made some correlations through the Yates, just some correlation points that I carry through, and this divides the Yates into basically four intervals.

Based on what Paul Kautz told me last week on the phone, he feels there is no Seven Rivers formation present out here. And the lowermost interval of the Yates is what most operators do call the Seven Rivers formation.

So those black correlation lines that run through the cross-section in the Yates, the lowermost black line would be what most operators call the Seven Rivers out here. Typically, the lower part of the Yates, the unit right above that, produced the most oil.

Basically, all the sands in this entire Yates produce, and some of the dolomites produce too. And we're going throughout the field, just -- It varies from well to well where you find porosity. It seems like most of the lower Yates -- the third and fourth zones in the Yates have

the greater permeability and the most oil recoveries.

Q. There are two wells I want to draw your attention to on the cross-section. There is the Shackelford well that he was concerned about, and the offsetting well that you had proposed as a disposal well, that you've since abandoned. Where are those two wellbores?

A. Okay, Shackelford well is well number 8 on this cross-section, and the State "BF" Number 1 was the -- the one that we had proposed as an injection well, is well number 9.

Q. Okay, let's look at the well number 8, the Shackelford well. Give us a short history on how Mr. Shackelford has produced oil.

A. Okay, that wellbore originally produced from about four different intervals in the Yates, and it made over 200,000 barrels of oil, I believe.

And the well was ready to be abandoned, and Shackelford came in and squeezed all the old perfs with cement and he reperforated a six-foot interval, and he's currently producing from that six-foot interval.

Q. That interval is the third one down from the top of the series of four perforated intervals in that well?

A. Yes, that's correct.

Q. And so he was able, despite producing substantial oil from different portions, to come back lower than some

of that oil production and currently produce more oil?

A. Yes, that's true.

Q. Now, where are these in relationship to the Number 9 well, which was the well you originally proposed as a disposal well?

A. The "BF" 1 well?

Q. Yes, sir.

A. You have the right number?

They are just a few feet high, approximately 20 feet high to our well, and...

Q. He was concerned you were too close?

A. Right, we were one location away from him, approximately 1320 feet from his wellbore, and he was afraid that the water we -- would invade in his reservoir.

Q. Now, the source of the water to be injected back into the reservoir, in fact, is produced Yates-Seven Rivers water?

A. That's true.

Q. And it comes from wells that you're operating?

A. Yes.

Q. The relationship now between the Shackelford well and your currently -- the subject well, well log 12, is such that you are able to conclude there should be no adverse effect on Mr. Shackelford or even you?

A. That's true. We're more than a half a mile away,

and we're 180 feet low to his well.

Q. Let's look at the cross-section that takes us vertically north to south through this area and picks up your original disposal well.

A. Okay, that's cross-section B-B' on the structure map. And I'd like to point out, on the structure map I also wrote in red a small number that corresponds to the number on the cross-section, to help you locate the wells more easily.

Q. When we look at the B-B' cross-section, how do we find the wellbore that was your original disposal well?

A. That is well number 2 on that cross-section.

Q. Okay. And how was it being utilized?

A. Currently or --

Q. When it was used as a disposal well, how was it utilized?

A. Okay, all the old perforations -- It had been perforated in the entire upper, middle and lower Yates intervals, and those perforations were turned into water injection -- water disposal perforations.

Q. All right, and this is the wellbore that had collapsed casing?

A. Yes.

Q. Okay. That wellbore situation was examined by you and the Oil Conservation Division, and the collective

choice was a plugged and abandoned well?

A. Yeah, that occurred before my employment with Stevens and Tull, but that's my understanding.

Q. All right. Other representatives of your company --

A. Yes.

Q. -- were engaged in that?

All right. When we look at the reservoir from north-south, what are we seeing here on the cross-section?

A. Fairly consistent reservoir. It only thickens slightly towards the north. And on this cross-section Well Number 7, which is located in Section 9 in -- Let's see, that would be unit position O -- that was an old water-disposal and water-injection well that is currently plugged and abandoned.

And that well had been disposing water into the middle and lower portions of the -- the second -- the third -- I'm sorry, the second and third portions of the Yates.

Q. Based upon your geologic study, do you see any hydrologic connection between the disposal interval and any other interval that might potentially contain fresh water?

A. Not to my knowledge, no.

Q. No open faulting or other kind of connections?

A. No, no, this -- No, sir.

Q. All right. I know you have included in the

exhibit book two other cross-sections. Let's look just at one more. It's the other A-A' -- It's A'-A''.

A. Yeah, the continuation of this cross-section I just term A'-A''. It's been included for your reference. It's a couple of cross-sections through the Teas-Yates Unit.

Q. Well, let's show the comparison between the portion of the reservoir you're producing from ad what's occurring east of you in the old Anadarko waterflood pressure maintenance project.

A. Okay. Well Number 13 on A'-A'' is the same as Well Number 13 on A-A', so there's a slight overlap of the two cross-sections. And in that field, which is wells 14 through 23 on this cross-section -- that's the Teas field, which is currently the Teas-Yates-Seven Rivers Unit -- most of those wells produce from the first, second and third intervals of the Yates. A lot of them are open hole completions. Some of them have been deepened subsequent to their initial drilling.

And the -- a couple of water injection wells appear on the cross-section as Wells Number 17 and 22. And it seems that Titan is injecting water into the uppermost portion of the Yates, doing pressure maintenance on the uppermost sands.

The lower sands in both fields seem to produce

more volumes of oil and water than the upper sands do, and don't require -- don't seem to require the pressure maintenance as the upper sands.

Q. Summarize for us, then, your conclusions.

A. Okay. I conclude that these two fields are quite similar to each other, and what -- the lower part of the Yates, the third and fourth zones, seem to have a greater permeability than the upper sands do, and we feel that they will take the water without much effort on our part as far as pressure, and that the water that we're injecting back into the formation is the same water we've produced, so it should be compatible. And we're going to be putting it into very low well -- low on the structure. It shouldn't have any problem with any encroachment on any producing wells.

MR. KELLAHIN: Thank you. Mr. Examiner, that concludes my direct examination of Mr. Ulmo.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Ulmo, was the -- The Number 4, was that previously a producing well at this point?

A. Yes, it's producing at a very low rate. I think it was potentialed for six barrels of oil and I'm not sure how much water. Six barrels of oil and 60 barrels of water in December of 1995. And currently it's producing only a

couple of barrels, two or three barrels of oil a day.

Q. Now, is that producing from the same perforations that you plan to utilize for injection?

A. Part of the perforations that we utilize are those perforations. About the upper half of the interval that we're going to use are existing perforations, yes.

Q. And you're going to perforate the lower section in that well?

A. Right.

Q. That has not produced in that well?

A. No, and I don't think we -- I think we may have perforated an interval in there. I don't have a record of that, but I think they did try to perforate it and it was wet.

Q. Is that lower section being produced in some of the offset wells?

A. The nearest on this A-A' cross-section is Well Number 9, which is our "BF" 1 well. That's the nearest one that I know of.

I think north of that point we have in Section 9 our Federal "9" Number 8 well, I believe, is producing from below that point in the lowermost portion of the Yates-Seven Rivers. That well is about -- Let's see. That well is about 80 feet high structurally to the well that we're going to use.

Q. Are these individual sands that are being produced in the Yates, are they separated and not in communication with one another?

A. It seems that there are some permeability barriers within the reservoir. About in the middle of the Yates, the first and second black lines that I've drawn through there are the top and bottom of two dolomite beds that run through the field, through the whole area, and it's my belief that those do represent a vertical permeability within the reservoir.

Also, the sands themselves are not continuous over a large area. They pinch out going updip and laterally. And so no particular sand covers a very large area. Although they may correlate with one another on the logs, they don't really connect, you know, over a very large area. It's possible that a well half a mile away might even -- might not even be in communication.

Q. Okay. I believe you testified that your lowest perforation in your injection well is 60 feet above the top of the Capitan Reef?

A. Yes, that's true, where I believe Capitan Reef would be if we drilled deeper. And that's based on correlation with all the offset logs, and our well appears to have reached total depth approximately 30 feet above the Capitan Reef, and our bottommost perforation is about 30

feet above the TD of that well.

Q. Have you seen evidence in your well, or in other wells in this field, of a barrier between the Yates and Seven Rivers and the top of the reef?

A. There's about a ten-foot shale that's present right above the -- 10- or 15-foot-thick shale that's present above the Capitan Reef correlation point. That may represent a permeability barrier. I don't have any information that I can base anything else on.

And we don't have any knowledge of the quality of the water in the Capitan, whether it's fresh or salty or brackish.

Q. Well, do you have any evidence that shows that the Capitan Reef is not in communication with the Yates or Seven Rivers formation?

A. No, other than the presence of that shale, I have no other evidence. And, you know, Paul Kautz didn't have any strong feeling about that either when I talked to him.

Q. But you conveyed to Paul that you, in fact, were going to inject into that lower Yates interval?

A. Yes.

Q. Okay, and he didn't seem to have any concern about it?

A. No. And in fact, at first we thought inject into what we call the Seven Rivers Reef, which is -- people call

that. And after talking with him we determined that's probably the Capitan, so we decided to stay as far away from that point as possible.

Now, Paul didn't have an actual top of the Capitan in this area. He didn't have any deep wells that went into it. And based on my conversation with him, I picked that top of the reef as high as I possibly could, on the first mass of limestone that appears on the logs. And that would be -- Some operators would pick it a lot lower than I have, but I picked it as high as I could in an effort to try to keep as far away from that Capitan as possible.

Q. So what is your opinion as to the likelihood of injected fluid getting into the Reef from your operation?

A. Well, the reservoir pressure in the Capitan is probably higher than what we're going to be putting in. We're going to put in as little pressure as we can to get it to take water. And based on the way these wells have produced from this lower interval in the Yates, they don't have any problem conducting large volumes of fluid. We have a couple wells that are making 800 barrels of water a day.

So we think that some of this -- the permeability is good enough that we'll be able to put the water away without any problem, really. And we're -- we believe that

the lower part of our perforations in this third Yates interval are in the very permeable sands and that it's in the water leg of the same reservoir that we are producing from, and we don't feel that there's going to be any -- really any chance that we'll be invading the Capitan, because Capitan reservoir pressure is greater than what we're going to be putting into the wellbore.

Q. Where did you determine that?

A. Just from hydrostatic -- You know, just on a normal pressure gradient. You know, we're not going to really be pressuring up on it very high.

Q. The volume of water that you're talking about is 3000 barrels a day? Is that --

A. I'm not sure, I think for this wellbore I think we're only planning on around 1000 or 1100 to 1200, something like that. If we produced 3000 barrels of water, we'd need to look into another disposal well later on down the line, more than likely, to take care of the other part of our water.

Q. With regards to affecting any offset production in that lower Yates interval, do you have any opinion as to what that might be, if any?

A. Right now, we're undecided whether the drive mechanism is water drive or a solution gas drive. This field has produced more than a million and a half barrels

of oil, and if we were going to see any response to this, you know, we'd have to put in a lot of water to even begin to see a response.

We don't think that we're going to be putting in enough volume to make up the volume of oil and the volume of water that's been produced from this field just for this one disposal well. And if we were to see any kind of a response, it may be beneficial in that we may be sweeping some oil in a localized area towards some of the other wells. But we don't really think that's going to occur.

Q. The well that you were previously using, the Number 2 well --

A. Uh-huh.

Q. -- was that injecting in the upper -- upper Yates?

A. Let's see, that's on cross-section B. It was injecting into the -- There was two sets of perforations in the upper, and there was one in the middle part, and there was some in the third interval, and also in the -- what we previously thought was the Seven Rivers intervals. They were injecting everything over there.

Q. So they were injecting into the same interval that you plan to inject in, in this well?

A. Yes, uh-huh. And even lower.

Q. Was that well structurally higher, though?

A. Yes, that's one of the higher wells in the field. And I don't know of any response that was -- Well, we only used it for six months, so I don't think there has been a noted response in any of the offset wells for water breakthrough or increased oil production or anything.

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

MR. KELLAHIN: Okay. Mr. Examiner, my last witness is Mr. Jesse Lawson. Mr. Lawson is a petroleum engineer.

JESSE K. LAWSON,

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. Lawson, for the record, sir, please state your name and occupation.

A. Jesse Lawson, petroleum engineer.

Q. Where do you reside, sir?

A. Midland, Texas.

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

A. No, I have not.

Q. Summarize for us your education and employment.

A. I'm a petroleum engineer. I have a bachelor of

science degree in petroleum engineering from New Mexico Tech in Socorro, New Mexico. I worked, upon graduation, for Unocal, Union Oil Company of California. After that I was with Williamson Petroleum Consultants in Midland, Texas, as an evaluation engineer and then went to work for Stevens and Tull, Inc.

Q. In what year did you obtain your degree?

A. 1991.

Q. As part of your duties, have you studied the information required by the Oil Conservation Division for submitting Applications on what they identify as their Form C-108?

A. Yes, sir, I have.

Q. In addition, have you studied the reservoir engineering aspects of disposing of produced water at this location in the reservoir?

A. Yes, sir.

Q. Have you examined that in relationship to any potential adverse consequences to the Capitan Reef?

A. Yes, sir, I have.

Q. And in relation to any adverse consequences on potential oil production?

A. Yes, sir.

Q. Have you been able to conclude and satisfy yourself that all the wellbores within the area of review

are configured in such a way that there is no risk of migration of produced fluids or injected fluids into other formations, or into freshwater zones?

A. Yes, sir, that's correct.

Q. Describe for us, before we look at some of your work, how you visualize the use of this wellbore and how you support your conclusions that there should be no adverse consequence either to the Reef or to oil production.

A. This particular wellbore and the perforations are, as Mr. Ulmo stated previously, structurally around 180 feet low. It's on the flank of the reservoir. Our bottommost perforation is 60 feet above Capitan Reef.

We will be -- We're still in a pressure-completion situation out there as we inject fluid into this produced water that's going back into the same formation that it came out of, so the waters will be compatible.

We'll still be in a pressure-depletion mode. There will not be any make-up water going into it, so there is no way that we could be polluting -- or not so much polluting but invading any type of fresh water of the Capitan Reef. We're too far away from it, and we do not have the pressure -- there would not be the pressure there necessary to be able to push water into the Capitan Reef if there was -- you know, if --

Q. Let's go to the form itself, which is behind the Application tab, and there's a wellbore schematic.

A. Yes, sir.

Q. Show us very quickly how you propose to utilize the wellbore for injection.

A. We will set an injection packer with 2 7/8 injection tubing. The packer will be set at 3100 feet, and we'll start injecting down it. We'll be monitoring any type of pressure in the annuluses through a pressure gauge on the Bradenhead flange and on the intermediate string flange, and also taking pressure readings, surface injection pressure readings, right off the tubing. We'll be injecting into perforations of from 3160 to 3418.

Q. All right. Let's turn now to the engineering tab. The first display behind that tab is a written summary of your proposed recompletion procedures?

A. Yes, sir.

Q. Following that summary is a red divider sheet, and then we have a list of wellbores. What does this mean?

A. This is a list of wellbores that are within one half-mile radius of the subject well. There are -- Actually, several of the wells are immediately outside that one-half-mile circle, but we included them into it since they were in close proximity to that circle, so we wanted to include those also.

Q. All right. Then behind that summary sheet is the locator plat?

A. Yes, sir.

Q. What's the significance of the yellow dots?

A. The yellow dots on this locator map indicate all wells that are within one-half mile or -- within one-half mile of our subject well, and also includes four wells that are immediately outside that radius that we included in our tabulations and in our analysis.

Q. Is there a summary sheet showing us how you've analyzed these wellbores?

A. Yes, sir, there's a tabulated summary sheet that's directly behind the locator map.

Q. What is the source of the data that you used to make this study?

A. Wellbore records, file records, state completion and federal completion records.

Q. For example, when we look at the spreadsheet, if you look at the far right and read the second column back from the right that says "reasons" --

A. Yes, sir.

Q. -- there's some codes here. Describe what you're abbreviating.

A. The code "DR" stands for drilling report. The information that I used to determine the top of cement for

the production string came right off a drilling report.

Also, further down, there is a calculation that says "calculation" with a "*". That is a calculation that I made when there was no other data that would actually identify the top of the cement. I made these calculations using 1.32 cubic foot yield per sack of cement and a 50-percent safety factor.

Further down, there are some other codes that says "OMB-#1004-0137". That is an Office of Management and Budget federal form that contained top-of-cement data that I used.

In the very bottom down there, there's a third number of "BB-#42-R355.5". That is a -- I believe a revised Bureau of Budget form. It's another federal form. I think it's pretty much identical to the OMB; they just over the years changed those forms. It also identifies the top of cement for the production casing.

Q. Let's turn behind the summary sheet. There's a divider tab, red divider tab. Within this next section, between the red and the green inserts --

A. Yes, sir.

Q. -- you have a series of calculations and hand-drawn schematics. What do these represent?

A. These represent the top-of-cement calculations that I made using the previously mentioned conditions to

determine where the top of cement was that had not been reported.

Q. So if the Examiner wants to check your summary sheet, here's your work product and he can go through each of the schematics if he chooses to do so and see how you derived your calculation?

A. Yes, sir.

Q. And in all these situations you have presumed the 50-percent safety factor --

A. Yes, sir.

Q. -- recognizing that in many of these wellbores, that is more than aggressive, if you will, in terms of the safety factor?

A. Yes, sir.

Q. There will be some of these calculations where it's obvious that the cement was circulated either to the surface or between casing points, but with the utilization of the 50-percent factor, it might appear that the cement column did not rise as high as that you know it did?

A. That's correct.

Q. All right. Behind those worksheets there is a green divider tab, and we start into another set of schematics. What are we looking at here?

A. Those are -- You'll find a set of six schematics. Those are all of the P-and-A'd or D-and-A'd wellbores that

are within that half-mile radius of our subject well, and also one or two of them fall immediately outside that half-mile radius but I included them in this for safety purposes.

Q. Have you satisfied yourself that in your opinion, the all of the P-and-A'd wellbores have been adequately plugged and abandoned?

A. Yes sir. There are two, though, that are in the very back that I had looked at very closely. They're the last two in it, the Tenneco Federal Number 1 and the Snyder State Number 1.

Q. All right, let's look at those, the Tenneco Federal 1 first.

A. Yes, sir. The Tenneco Federal 1 of Fina Oil and Chemical Company is located in the center of the southeast quarter of the northwest quarter of Section 15, Township 20 South, Range 33 East in Lea County.

This is the only wellbore in the six wells where they actually recovered casing out of the wellbore, so I paid particular attention to it and how it had been plugged and abandoned.

Q. And you're satisfied that it is properly plugged and abandoned?

A. Yes, sir, they have a cement plug from the TD at 3418 to a height of 1200 feet. They have heavy mud fill

from 1200 feet to 20 feet with a surface cement plug of 20 feet on top of it.

The next one is the Snyder State --

Q. This is just before we get into the last green tab section?

A. Right. Yes, sir --

Q. All right.

A. -- it's the very last one, Olsen Energy, Inc.

MR. KELLAHIN: It's the other way, Mr. Examiner. You need to turn back the other way.

THE WITNESS: Your -- Sir, the green tab on your --

MR. KELLAHIN: Your other left.

EXAMINER CATANACH: The page after the green tab?

MR. KELLAHIN: No, before the green tab.

EXAMINER CATANACH: Got it.

MR. KELLAHIN: There we go.

Q. (By Mr. Kellahin) You're looking at the Snyder State 1?

A. Yes, sir.

Q. All right, describe why you examined this and what conclusion you made.

A. The Snyder State Number 1 was a D-and-A'd. They drilled the well. There is only one section of casing in this well. They drilled down to a depth of 3429 and it was

a dry hole, so they did not run any type of intermediate or production-string casing in this well. They just plugged back to a height of 801 feet.

And then there is a gap in there. There is nothing in the report that tells me what type of fluid or what is between 801 feet and the surface. They put a 10-sack cement plug on top of the -- at the surface down.

There is -- That's all the information that has been reported that I could determine, as far as the plugging on it.

Q. Okay. Then the supporting information behind the last green divider represents what?

A. That represents the data in which I was able to make both the top-of-cement calculations and the P-and-A plugging schematics. They include a Form C-105, and the two Office -- or the Office of Management and Budget and the Bureau of Budget documentation.

Q. Summarize for us your conclusions.

A. I'm of the opinion that injecting into the State "BF" Number 4 will not endanger any freshwater zones, particularly the Capitan Reef. Our bottom perf is 60 feet above the top of the Capitan Reef.

We will be reinjecting produced water coming right out of the Yates-Seven Rivers in the West Teas field, back into that same formation, so there will not be any

water-compatibility problems.

We will be reinjecting only the produced water; there will not be any make-up water. So we'll be still in a pressure-depletion mode. There will not be any type of -- - If we have any type of water influx, we will be getting water coming in to us because of the reduced pressure.

Our injection-withdrawal ratios, I do not have any firm numbers on it, but we will not be injecting -- would probably less than one, just from the simple fact that we will not be having any type of make-up water going back into this area.

MR. KELLAHIN: Mr. Examiner, that concludes our presentation.

We move the introduction of Stevens and Tull's Exhibit Number 1.

EXAMINER CATANACH: Exhibit Number 1 will be admitted as evidence.

EXAMINATION

BY EXAMINER CATANACH:

Q. Mr. Lawson, you don't plan to utilized lined tubing in this well; is that correct?

A. That's correct, sir.

Q. What's the reason for that?

A. We have plans to chemically treat the water on the surface. We had noticed in the State "BF" Number 2

before the casing collapsed on it that it had a tendency to develop some iron sulfite, and we'd have to go in there periodically and acidize it. And after we'd acidized that State "BF" 2 it would go on a vacuum, and then -- till it started this process of, you know, scaling up again.

And I'm of the opinion that it would be more economical to treat the problem of the iron sulfite through settling tanks, that type of thing, to prevent or economically keep our cost of operations to a minimum out there.

Q. Do you guys have a water analysis of that produced?

A. No, sir, at this time we do not.

Q. Do you know what kind of chlorides it contains?

A. No, sir, I do not.

Q. The lined tubing is pretty much a standard deal --

A. Yes, sir.

Q. -- so that may be a requirement in the final order.

A. Okay.

Q. On the -- I was looking at some of your offset wells. The Anasazi 16.

A. Yes, sir.

Q. It appears that the injection interval in that --

Well, there's -- That injection interval in that well is not covered by cement. Is that what you've seen with regards to that well?

A. Are you looking at the top-of-cement calculation?

Q. Yes, I am.

A. The injection interval on that, from my calculation using a 50-percent safety factor, doesn't appear to be. But with a 50-percent -- If you drop that 50-percent safety factor down to, say, 25 percent, then it does more than cover that injection interval.

When you're using that 50-percent safety factor, you look at the amount of cement that was used, 1150 sacks of cement in a 12-1/4-inch hole with an 8 5/8 casing, you're going to have a very large annulus, and you're actually cutting in half that volume that you're using for that.

So that's a very aggressive safety factor. And I understand that -- The reason I used that was that I wanted to see what a worst-case scenario -- where that would be at.

Q. So if you use something greater than that, do you think that whole interval up to the next casing string is covered?

A. Oh, yes, sir, I do. The yields -- the top of cement and yields of 1.32, I do not go in there and do a

really in-depth yield analysis based on all the particular additives and such that was present in that cement. A lot of times those are not really reported very accurately.

But the 50-percent safety factor would represent a worst-case scenario.

Q. You don't have any actual data to support or to indicate that that cement top is above where you have it, though?

A. No, sir, I don't. There was no documentation in the drilling report, C-108, C-105 or any other form that would actually tell us exactly where that top of cement was, and examination of the well file did not indicate any type of temperature survey or CBL or anything of this nature.

EXAMINER CATANACH: Will that water analysis be provided, Mr. Kellahin?

MR. KELLAHIN: Yes, sir, if you desire one, we'll get one.

EXAMINER CATANACH: It's required.

MR. KELLAHIN: Yeah.

EXAMINER CATANACH: I believe that's all I have of this witness. You may be excused.

Is there anything further that you --

MR. KELLAHIN: No, sir.

EXAMINER CATANACH: I guess what we need to do is

readvertise this to reflect the correct interval that you're going to be injecting into.

Now, you've stated that your notification was correct?

MR. KELLAHIN: Yes, sir.

EXAMINER CATANACH: Okay. So all we have to do is renotify and republish it -- I mean readvertise and republish it, and that will be done for the -- well, four weeks from now.

MR. KELLAHIN: Yes, sir.

EXAMINER CATANACH: So we'll continue it until that hearing and take it under advisement at that time.

MR. KELLAHIN: Thank you.

(Thereupon, these proceedings were concluded at 11:00 a.m.)

* * *

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 11807, heard by me on September 4 1997.

David R. Catanach, 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 6th, 1997.

STEVEN T. BRENNER
CCR No. 7

My commission expires: October 14, 1998