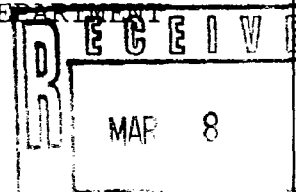


## STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

## OIL CONSERVATION COMMISSION



IN THE MATTER OF THE HEARING CALLED BY )  
 THE OIL CONSERVATION COMMISSION FOR THE )  
 PURPOSE OF CONSIDERING: )

CASE NO. 11,358

APPLICATION OF NEARBURG EXPLORATION )  
 COMPANY/NEARBURG PRODUCING COMPANY TO )  
 TERMINATE INJECTION OPERATIONS INTO TWO )  
 CERTAIN DISPOSAL WELLS BY RESCINDING )  
 DIVISION ADMINISTRATIVE ORDER SWD-336 )  
 AND DIVISION ORDER NO. R-7637, EDDY )  
 COUNTY, NEW MEXICO )

ORIGINAL

REPORTER'S TRANSCRIPT OF PROCEEDINGSCOMMISSION HEARING

BEFORE: WILLIAM J. LEMAY, CHAIRMAN  
 WILLIAM WEISS, COMMISSIONER  
 JAMI BAILEY, COMMISSIONER

March 12th, 1996

Santa Fe, New Mexico

This matter came on for hearing before the Oil  
 Conservation Commission on Tuesday, March 12th, 1996, 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.

\* \* \*

## NEW MEXICO OIL CONSERVATION COMMISSION

COMMISSION HEARINGSANTA FE, NEW MEXICOHearing Date MARCH 12, 1996 Time: 9:00 A.M.

NAME	REPRESENTING	LOCATION
Jerry Elge	Neaburg	Midland
Scott Launderson	Exxon	Midland
Bob St. Leger	Neaburg	Midland
Marino Brunner	Bryan	SF
Jan Bruce	Humble Oil Firm	SF
Randy Turner	Turner & Co. Oil Firm	Midland

## I N D E X

March 12th, 1996  
 Commission Hearing  
 CASE NO. 11,358

	PAGE
EXHIBITS	4
APPEARANCES	5
OPENING STATEMENTS:	
By Mr. Turner	7
By Mr. Bruce	8
APPLICANT'S WITNESSES:	
<u>ROBERT G. SHELTON</u> (Landman)	
Direct Examination by Mr. Turner	9
<u>TIM McDONALD</u> (Engineer)	
Direct Examination by Mr. Turner	16
Cross-Examination by Mr. Bruce	31
Examination by Commissioner Bailey	39
Examination by Commissioner Weiss	41
Examination by Chairman LeMay	42
<u>JERRY B. ELGER</u> (Geologist)	
Direct Examination by Mr. Turner	49
Cross-Examination by Mr. Bruce	70
Examination by Commissioner Bailey	79
Examination by Commissioner Weiss	82
Examination by Chairman LeMay	87
TITAN WITNESSES:	
<u>ROD S. PHARES</u> (Geologist)	
Direct Examination by Mr. Bruce	93
Cross-Examination by Mr. Turner	105
Examination by Commissioner Bailey	111
Examination by Chairman LeMay	112

\* \* \*

## TITAN WITNESSES (Continued):

JOHN L. Moseley, III (Engineer)

Direct Examination by Mr. Bruce	113
Cross-Examination by Mr. Turner	118
Examination by Commissioner Weiss	120
Examination by Chairman LeMay	122

QUESTIONS OF ALL WITNESSES	124
----------------------------	-----

## CLOSING STATEMENTS:

By Mr. Bruce	135
By Mr. Turner	138

REPORTER'S CERTIFICATE	142
------------------------	-----

\* \* \*

## E X H I B I T S

Applicant's	Identified	Admitted
Exhibit 1	11	105
Exhibit 2	11	105
Exhibit 3	12	105
Exhibit 4	12	105
Exhibit 5	12	105
Exhibit 6	18	105
Exhibit 7	18	105
Exhibit 8	18	105
Exhibit 9	19	105
Exhibit 10	19	105
Exhibit 11	19	105
Exhibit 12	50	105
Exhibit 13	52	105
Exhibit 14	54	105
Exhibit 15	59	105
Exhibit 16 (does not exist)		
Exhibit 17	33, 47, 60	105
Exhibit 18	66	105

\* \* \*

Titan Exhibits	Identified	Admitted
Exhibit 1	94	104
Exhibit 2	97	104
Exhibit 3	98	104
Exhibit 4	101	104
Exhibit 5	116	118

\* \* \*

## A P P E A R A N C E S

FOR THE COMMISSION:

MARGARET CORDOVANO  
Assistant General Counsel  
Energy, Minerals and Natural Resources Department  
2040 South Pacheco  
Santa Fe, New Mexico 87505

FOR THE APPLICANT:

TURNER & DAVIS, P.C.  
400 West Illinois, Suite 1400  
P.O. Box 2796  
Midland, Texas 79702-2796  
By: J. RANDY TURNER

FOR TITAN RESOURCES, L.P.:

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

\* \* \*

1           WHEREUPON, the following proceedings were had at  
2   9:02 a.m.:

3  
4           CHAIRMAN LEMAY: We have one case on the docket,  
5 Case Number 11,358, which is the Application of Nearburg  
6 Exploration/Producing Company to terminate injection  
7 operations into two disposal wells.

8           I shall now call for appearances in Case 11,358.

9           MR. TURNER: My name is Randy Turner. I'm with  
10 the Turner and Davis law firm out of Midland, Texas,  
11 representing Nearburg Exploration Company.

12           CHAIRMAN LEMAY: Thank you, Mr. Turner.

13           MR. BRUCE: Mr. Chairman, Jim Bruce from the  
14 Hinkle law firm in Santa Fe, representing Titan Resources,  
15 L.P., in opposition to the Application of Nearburg.

16           I have two witnesses to be sworn.

17           CHAIRMAN LEMAY: Okay. Mr. Turner, how many  
18 witnesses do you have?

19           MR. TURNER: I'll have three witnesses, Mr.  
20 Chairman.

21           CHAIRMAN LEMAY: Okay. Will those witnesses that  
22 will be giving testimony kindly stand and raise your right  
23 hand?

24           (Thereupon, the witnesses were sworn.)

25           CHAIRMAN LEMAY: We shall begin.

1 MR. TURNER: If it please the Commission, I'd  
2 like to make a brief opening statement, just to outline the  
3 case that we plan to present on behalf of the Applicant,  
4 Nearburg Exploration Company, in this case.

5 This is a de novo hearing for Case Number 11,358.  
6 Previous hearing was held to consider the Application of  
7 Nearburg Exploration Company to terminate the previous  
8 order, Number R-7637, which authorized Anadarko Petroleum  
9 Corporation to dispose of saltwater into its Osage Number 1  
10 well. This well is situated in the North Dagger Draw area  
11 in Eddy County, New Mexico, and has been used as a disposal  
12 well since approximately 1984.

13 When the Application was filed originally for the  
14 use of this well as a disposal well, that Application had  
15 been challenged by Chama Petroleum Company, which is a  
16 predecessor to Nearburg Exploration Company. Nearburg's  
17 challenge of that Application was denied.

18 Many years have gone by since the Application was  
19 originally granted for Anadarko to use this well as a  
20 disposal well. Since that time many wells have been  
21 drilled in the area leading up to the point and location of  
22 this saltwater disposal well that was operated by Anadarko  
23 Petroleum Company.

24 It is Nearburg's contention that the interval  
25 into which water is being disposed in this Anadarko



1 saltwater disposal well is the same interval that is a  
2 productive interval in the North Dagger Draw Pool, and that  
3 is what we will attempt to demonstrate to the Commission  
4 today.

5 And we ask that the Commission then give the  
6 relief sought by Nearburg to order that the injection into  
7 this well be terminated pursuant to New Mexico Statutes  
8 Annotated, Section 70-2-12 (b) 4, which requires that the  
9 Commission prevent the drowning by water of any stratum or  
10 any part thereof that is capable of producing oil or gas,  
11 and to prevent the premature and irregular encroachment of  
12 water and the premature watering out of a potentially  
13 productive reservoir. That is the relief that we'll be  
14 asking for today from the Commission.

15 And with that, I'll defer to Mr. Bruce.

16 MR. BRUCE: Mr. Chairman, just very briefly, this  
17 matter has been before the Division in 1984, 1986, 1995,  
18 and then today. Nearburg has been to the well three times.  
19 Each time the Division has held that the Titan well,  
20 formerly the Anadarko well, is injecting into an  
21 unproductive portion of the Cisco/Canyon reservoir and that  
22 there are barriers between the injection interval and the  
23 productive interval of the Cisco/Canyon reservoir, and  
24 there is no harm from continued injection.

25 The only new evidence from the last hearing in

1 September of 1995 until today is a well that Yates has  
2 drilled offsetting, immediately offsetting, both the Titan  
3 injection well and a Yates injection well, which is now  
4 shut in, and that well is an excellent well. In a few  
5 months it has produced over 50,000 barrels of oil.

6 There is just no problem here, and we will put on  
7 evidence to show that.

8 Thank you.

9 CHAIRMAN LEMAY: Thank you. Mr. Turner?

10 MR. TURNER: I'd like to call my first witness,  
11 Mr. Bob Shelton.

12 ROBERT G. SHELTON,  
13 the witness herein, after having been first duly sworn upon  
14 his oath, was examined and testified as follows:

15 DIRECT EXAMINATION

16 BY MR. TURNER:

17 Q. Mr. Shelton, will you please state your name for  
18 the record, please?

19 A. Robert G. Shelton.

20 Q. And where do you reside?

21 A. Midland, Texas.

22 Q. And where are you employed?

23 A. I'm employed with Nearburg Producing Company.

24 Q. And in what capacity are you employed with  
25 Nearburg?

1 A. I'm the land manager.

2 Q. How long have you been employed with Nearburg?

3 A. I've been working with Nearburg Producing Company  
4 since September of 1989.

5 Q. Could you briefly describe your duties as a  
6 landman with Nearburg?

7 A. I oversee all general and administrative land  
8 functions, all contract negotiation and all acquisition of  
9 any properties that we have at Nearburg, and their  
10 maintenance.

11 Q. And in connection with those duties, do you spend  
12 a fair amount of time and have familiarity with Nearburg's  
13 operations in the Dagger Draw area?

14 A. Yes, I do. I work specifically with those  
15 properties quite a bit.

16 Q. And have you previously testified and been  
17 accepted as an expert witness before the Oil Conservation  
18 Commission?

19 A. Yes, I have.

20 MR. TURNER: I tender Mr. Shelton as an expert  
21 witness.

22 CHAIRMAN LEMAY: His qualifications are  
23 acceptable.

24 Q. (By Mr. Turner) Mr. Shelton, you have with you  
25 today some exhibits; is that correct?

1           A.    Yes, I do. Exhibit Number 1 is a locator map.  
2    It shows the Titan Dagger Draw SWD well, which is formerly  
3    the Anadarko saltwater disposal well. That well is located  
4    in the southwest quarter of the northwest quarter of  
5    Section 22, Township 19 South, Range 25 east, Eddy County,  
6    New Mexico. It's offset by the Nearburg Producing Company  
7    Ross Ranch 22 Number 2 well, which is a well drilled to the  
8    Cisco/Canyon formation, and it's currently producing in the  
9    Cisco/Canyon formation.

10           You'll also notice even on the locator map other  
11   wells in the area that are also wells in the Cisco/Canyon  
12   or Dagger Draw-Upper Penn-Cisco/Canyon field.

13           The next exhibit, Exhibit Number 2, is a Dagger  
14   Draw pool boundary map, and that map indicates in red a  
15   line that is shown effective August, 1985, was the pool  
16   boundaries. At the time of this hearing, the pool  
17   boundaries are shown in yellow, and again it shows the  
18   Titan Dagger Draw SWD well, which is located on the eastern  
19   side and well within the boundaries of the current Dagger  
20   Draw-Upper Penn pools for production.

21           The lighter shading, yellow, which is in the very  
22   north part of the map, is acreage that has been added to  
23   the pool since the date of the last hearing, which was  
24   September 7th, 1995. In just those -- in the last few  
25   months you can see there's five quarter sections or five

1 160-acre tracts that have been added by the Division to  
2 this pool.

3 Next is a letter from Mark Nearburg to Anadarko,  
4 dated 1984, which indicates that we -- as Mr. Bruce  
5 indicated, we were opposed to this order and the original  
6 injection, and this is a letter indicating our notification  
7 to Anadarko, back as far as 1984, that we were opposed.

8 Exhibit Number 4 is the Anadarko order by the  
9 Commission which they are currently operating under, which  
10 gives them the authority to inject into the well.

11 And Exhibit Number 5 is a letter from Panhandle  
12 Royalty Company, who is also a working interest owner with  
13 us in the Ross Ranch 22 Number 2 well, and is also a  
14 working interest owner with other people in the -- other  
15 operators in the field, and this letter indicates their  
16 support for what we're requesting before the Division  
17 today. They're asking also that the permit be rescinded  
18 and -- just a support letter from them.

19 Q. Okay. Can we -- Mr. Shelton, if you would, let's  
20 go through these exhibits again, and I have a few specific  
21 questions to ask you regarding -- beginning with your  
22 Exhibit Number 1.

23 In orange -- You have an orange dot with an arrow  
24 that you say indicates the location of the Nearburg Ross  
25 Ranch 22 Number 2 well?

1 A. That's correct.

2 Q. When was -- Approximately when was that well  
3 drilled?

4 A. As I remember, that well was drilled in early  
5 1995, if I'm correct.

6 Q. Okay.

7 A. Tim or Jerry may be able to answer that more  
8 easily.

9 Q. Okay. So about a year ago or so?

10 A. Yeah, a little over a year ago, I believe, is  
11 when that well was drilled.

12 Q. Okay. And the red arrow indicates the location  
13 of the Dagger Draw -- the Titan Dagger Draw saltwater  
14 disposal well; is that -- That's correct?

15 A. That's correct.

16 Q. And that is referred to as the Titan Dagger Draw  
17 saltwater disposal well. That is the well that previously  
18 was operated by Anadarko, correct?

19 A. Right, that is correct.

20 Q. And that was completed as a saltwater disposal  
21 well in approximately 1985?

22 A. That is correct.

23 Q. Okay, let's go to your Exhibit Number 2. Again,  
24 you indicated that the lands included within the red  
25 outline were the lands that were within the Dagger Draw

1 pool as it existed as of August, 1985?

2 A. That's correct.

3 Q. And the lands that are colored yellow outside of  
4 that boundary are the lands that have subsequently been  
5 included within this pool?

6 A. That's correct.

7 Q. So the significance, then, of your Exhibit Number  
8 2, the dates -- The pool, as it existed in August, 1985,  
9 that would coincide, then, with the date that the --  
10 approximate date that the Anadarko well was completed as a  
11 saltwater disposal well?

12 A. That is correct.

13 Q. Okay. And then Exhibit Number 3 is the letter  
14 from Mark Nearburg of Chama Petroleum Company that  
15 expressed opposition to this well, the Anadarko well, being  
16 completed as a saltwater disposal well?

17 A. Yes, they had filed a C-108 application, and we  
18 were made aware through notification of the Commission  
19 guidelines of their application, and we wrote them advising  
20 them of our opposition at the time they made application by  
21 way of C-108.

22 Q. Are you familiar with the basis at that time,  
23 1984, of the opposition of Chama to the completion of the  
24 Anadarko well as a disposal well?

25 A. Yes, I am familiar with that through knowledge

1 that I've gained since 1989, working with Nearburg, and  
2 that opposition was that we believed at the time the  
3 Cisco/Canyon was a productive reservoir in the area and  
4 that it should not be injected into or disposed into.

5 We thought that even through the procedures and  
6 the application that they -- that Anadarko had at the time,  
7 we felt like even at the injection point that they were  
8 making at that time, it would be a productive interval, and  
9 was then, and we opposed it on that basis.

10 Q. And at that time of the original opposition to  
11 the Application of Anadarko, did Chama own leasehold  
12 interest in this area?

13 A. Yes, we did, we owned leasehold interest in this  
14 same quarter section and adjoining quarter sections also.  
15 That's the reason our notification was given to us, because  
16 we were an owner within a quarter-mile radius of the well.

17 Q. Okay. And what was the basis of the concern  
18 about the injection well from Chama's perspective at that  
19 time?

20 A. That they were putting water in their productive  
21 reservoir.

22 Q. And what led you to believe that the interval  
23 that they would be injecting into was productive?

24 A. There was other -- Well, I'll let Tim address  
25 this later. He's probably more qualified to address this.



1 As I understand, there was other tests in the area that  
2 had, to our satisfaction, proven the reservoir to be  
3 productive.

4 MR. TURNER: I have no further questions.

5 CHAIRMAN LEMAY: Mr. Bruce?

6 MR. BRUCE: No questions, Mr. Chairman.

7 CHAIRMAN LEMAY: Commissioner Bailey?

8 COMMISSIONER BAILEY: No.

9 CHAIRMAN LEMAY: Commissioner Weiss?

10 COMMISSIONER WEISS: I have no questions.

11 CHAIRMAN LEMAY: Nor do I.

12 Thank you very much.

13 MR. TURNER: Next call Mr. Tim McDonald.

14 TIM McDONALD,

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

17 DIRECT EXAMINATION

18 BY MR. TURNER:

19 Q. Mr. McDonald, will you state your name for the  
20 record, please?

21 A. My name is Tim McDonald.

22 Q. And where do you reside, Mr. McDonald?

23 A. I reside in Dallas, Texas.

24 Q. And with whom are you employed?

25 A. With Nearburg Producing Company.

1 Q. In what capacity are you employed with Nearburg?

2 A. I'm a petroleum engineer.

3 Q. How long have you been so employed?

4 A. Since July of 1985.

5 Q. With Nearburg?

6 A. That's correct.

7 Q. Okay.

8 A. With Chama Petroleum originally, and then with  
9 Nearburg.

10 Q. Chama Petroleum --

11 A. Predecessor, right.

12 Q. Okay. And how long were you employed with Chama?

13 A. I think the name was changed after I was there  
14 for about a year.

15 Q. What are your duties as an engineer with  
16 Nearburg?

17 A. Oversee the operations and the engineering  
18 functions for Nearburg in all their New Mexico operations.

19 Q. Okay. In connection with those duties, then, in  
20 New Mexico, are you familiar with Nearburg's experience in  
21 operations in the Dagger Draw area?

22 A. Yes, I've been involved with those since we -- I  
23 think we took our first lease in the late 1980s -- not  
24 our -- the new -- the development drilling in Dagger Draw.

25 Q. Have you previously testified before the Oil

1 Conservation Commission?

2 A. Yes, I have.

3 Q. And have your qualifications as an expert witness  
4 previously been accepted by the Commission?

5 A. Yes, they have.

6 MR. TURNER: I tender Mr. McDonald as an expert  
7 in petroleum engineering.

8 CHAIRMAN LEMAY: His qualifications are  
9 acceptable.

10 Q. (By Mr. Turner) Mr. McDonald, you brought with  
11 you a series of exhibits today; is that correct?

12 A. That's correct.

13 Q. Would you go through briefly and describe each of  
14 your exhibits, I guess beginning with Exhibit Number 6?

15 A. Exhibit 6 is a historical -- just a historical  
16 plot of the water and the pressure that was reported to the  
17 OCD that was injected into the Titan saltwater disposal  
18 well.

19 Q. Okay.

20 A. The second exhibit is a decline curve of our Ross  
21 Ranch 22 Number 2 well, Section 22, that offsets the  
22 disposal well.

23 Q. Okay.

24 A. Exhibit 8 is a record of the completion that was  
25 reported by Anadarko to the OCD on their disposal well when

1 they were completing it, as well as three wells that  
2 Nearburg completed in a similar manner.

3 Q. Okay.

4 A. Number 9 is some photographs of Anadarko's  
5 response after we held a meeting with Anadarko and the OCD  
6 in Artesia to try to work together to resolve this  
7 situation to see if there was a problem.

8 Q. Okay.

9 A. Number 10 is production history from four wells  
10 that have now been completed in the C interval in this part  
11 of the reservoir.

12 And the last Exhibit, 11, is a petrophysical  
13 analysis incorporating the FMI log run in our Ross Ranch  
14 Number 8 well in Section 22.

15 Q. Okay. Now, let's go back through these exhibits  
16 a little more slowly and in a little more detail.

17 Your Exhibit Number 6, again this exhibit  
18 represents what?

19 A. It's a historical plot of the volumes and  
20 pressures that were reported to the OCD. We were informed  
21 at the last hearing that actually more water had been put  
22 in the well and not been reported through a clerical error  
23 by Anadarko, so what their engineer testified to was  
24 actually greater than 3.7 million barrels injected into  
25 that well as of the first of this year.

1           Q.    Okay.  Let's skip for just a minute over to your  
2   Exhibit Number 8.  Would you explain the contents of this  
3   exhibit?

4           A.   Exhibit 8 -- On the first wells that we completed  
5   in Dagger Draw, we would perforate the wells and swab them  
6   before we would acidize the wells, to get an idea if we  
7   wanted to go ahead with our acid job.  We weren't real  
8   familiar with the production at the time.

9                    So since then, now we just go in and we perforate  
10  them, we acidize them immediately and run submersible pumps  
11  so we don't have this same kind of information.

12                   But on these three wells we had information that  
13  we thought we could compare, that we can compare, to  
14  Anadarko's procedure.  And when they completed their well  
15  for disposal, after they perforated it, they had -- they  
16  were -- I'll just read it here.

17                   They swabbed fluid level down to 5500, perforated  
18  7806 to 7814 with a casing gun.  The fluid level was at  
19  5400 feet when coming out of the hole.

20                   Went in with a second gun and found fluid level  
21  at 4000 feet and had 100 pounds on the casing.  Perforated  
22  7830 to 7840, fluid level at 2300 feet when coming out of  
23  the hole was 200 pounds on the casing.

24                   Had a third run and guns did not fire.  The fluid  
25  level was at 1900 feet with 300 pounds on the casing.  And

1 finished perforating from 7840 to 7850, and 7860 to 7866,  
2 7920 to 7930, and 7980 to 7998. The fluid level was at 450  
3 feet with 800 pounds on the casing when they finished  
4 perforating.

5 They flowed gas off the casing at approximately  
6 30 MCFD for 2 hours, with a little oil coming back with the  
7 gas. They shut the well in with 740 pounds on the casing.

8 The next morning they had 840 pounds on the  
9 casing. They opened the well and flowed 60 barrels of oil  
10 and 260 barrels of water in 24 hours, which is a 19-percent  
11 oil cut. The well was then acidized and put in service as  
12 an injection well.

13 If you look at our wells as a comparison, on the  
14 first one we perforated, ran our tubing and packer, swabbed  
15 for four hours, initial fluid level 400 feet, recovered 50  
16 barrels of water with a 20 percent oil cut and a good gas  
17 show.

18 To date that well has cum'd over 272,000 barrels  
19 of oil and 639 million standard cubic feet.

20 The next well we perforated, swabbed nine hours,  
21 initial fluid level 300 feet, recovered 95 barrels of  
22 water, the last three hours at a 20-percent oil cut with a  
23 good gas show.

24 That well has cum'd almost 497,000 barrels of oil  
25 and 835 million standard cubic feet.

1           The last well we perforated, initial fluid level  
2   300 feet, recovered 45 barrels of water with a slight show  
3   of gas, with no oil show. After it was acidized and placed  
4   on production, that well has cum'd to date 253,000 barrels  
5   of oil and 271 million standard cubic feet.

6           Q.   Mr. McDonald, in looking at the comparison of the  
7   three Nearburg wells that are listed in the lower half of  
8   this Exhibit 8 to the information on the Anadarko Dagger  
9   Draw well, I note that the -- It appears that there are a  
10   lot of similarities in the way that these wells were  
11   drilled and completed. Would that be your assessment?

12          A.   Yeah, they were perforated and tested prior to  
13   acidizing.

14          Q.   Right. And the Anadarko well -- which I  
15   understand was drilled in approximately 1985; is that  
16   correct?

17          A.   That's correct.

18          Q.   The information that's showing on Exhibit 8  
19   pertaining to the Anadarko well shows that that well  
20   was actually opened and flowed 60 barrels of oil with a  
21   19-percent oil cut; is that --

22          A.   That was the drilling report that was furnished  
23   to the Commission by Anadarko.

24          Q.   And what correlation, then, can you draw between  
25   the Anadarko well that produced oil in the initial 24-hour

1 test, to the Nearburg wells that are described below?

2 A. I would say using the technology that was  
3 available when the Nearburg wells were completed with the  
4 submersible pumps, that had that technology been available  
5 back when the Anadarko well was being used in this area,  
6 when the Anadarko well was completed, that it should have  
7 been tested and very likely would have been productive,  
8 most likely would have been productive.

9 Q. Okay, and let's next go to your Exhibit Number 7,  
10 and would you please explain the significance of this  
11 chart?

12 A. It's just a decline curve of our Ross Ranch 22  
13 Number 2 that Mr. Shelton spoke about. It came on in  
14 December of 1994 and to date has cum'd 13,000 barrels of  
15 oil and 239 million cubic feet of gas, and I don't have the  
16 water on here but a considerable amount of water.

17 It basically is just -- It shows it to be a poor  
18 well as compared to other wells in the area.

19 Q. And where is this well in relation to the  
20 Anadarko disposal well?

21 A. It's a direct offset to the disposal well.

22 Q. What is the producing interval for your Ross  
23 Ranch 22-2 well?

24 A. The Cisco/Canyon. It's the A and the B sections  
25 of the Cisco/Canyon.



1 Q. Okay. There's a high water production from the  
2 Ross Ranch 22 Number 2 well?

3 A. Yes.

4 Q. Okay, Mr. McDonald, let's go to your Exhibit  
5 Number 9.

6 A. Nine is -- we had met -- We called a meeting with  
7 the OCD in Artesia to sit down and try to gather some data.  
8 We wanted to get the Anadarko well shut in, but we had  
9 agreed to -- Anadarko had offered to work with us as far as  
10 trying to set up some interference tests and determine if  
11 there was a problem with their disposal well. So we left  
12 the meeting planning to set up something with Anadarko to  
13 that effect.

14 And the next -- a couple days later, we went out  
15 there, and they had basically covered all their gauges and  
16 locked everything up where there was no way to determine  
17 the pressures or volumes of fluid that were going in the  
18 well, or -- When we put our Ross Ranch 22 Number 2 well on,  
19 we couldn't observe the pressures on their well and try to  
20 determine if there was a problem.

21 Q. Did you have further discussions with Anadarko  
22 about getting them to shut their well in?

23 A. At that point, I think we had just determined  
24 that they were obviously not going to work with us, based  
25 on this, and that's when we filed for our hearing back in

1 November or December -- or September, I guess it was.

2 Q. Let's go to your Exhibit Number 10. Could you  
3 just go through -- There's several pages attached to  
4 Exhibit Number 10.

5 A. All right.

6 Q. Just go through and talk about the significance  
7 that you place on each of these separate pages.

8 A. Basically, these wells will tie in with Mr.  
9 Elger's testimony, his geologic testimony, his cross-  
10 section.

11 But what they are is, they're a production  
12 history of wells that have been completed around or after  
13 the hearing that we had in September that are producing out  
14 of the C zone only, in the Dagger Draw, in this portion of  
15 the Dagger Draw field.

16 There are four wells:

17 The Yates Aparejo well, which is an excellent  
18 well as you can see from there. It started off at 27,000  
19 barrels of oil a month, still producing 12,000 barrels a  
20 month.

21 The Polo well of Yates, which produced -- in  
22 December produced almost 11,000 barrels of oil.

23 The Boyd X Com Number 1, which is a recompletion  
24 that Yates did. It's still producing in excess of 8000  
25 barrels a month.

1           And the last one is the Nearburg Osage Boyd 15  
2       Number 3 that we drilled this fall and have completed as an  
3       excellent oil producer also, only out of the C zone.

4           And like I said, this will tie in with some of  
5       Mr. Elger's cross-sections, and it's basically to show that  
6       there's substantial production from the C zone that's  
7       occurred even since our last hearing in this portion of the  
8       field.

9           Q.     Mr. McDonald, you're referring to the C zone.  
10       Would you explain to us what you mean when you refer to the  
11       C zone?

12          A.     I should probably let Mr. Elger address that. We  
13       -- Nearburg categorizes the porosity sections as an A, a B  
14       and a C interval, as markers, geologic markers. And  
15       there's a D, even, that's lower than that.

16          Q.     But it's your testimony that the wells that are  
17       described on each of the pages of Exhibit Number 10 are  
18       wells that are producing from the C zone?

19          A.     That's correct.

20          Q.     And that's a zone that is a part of the  
21       Cisco/Canyon formation; is that correct?

22          A.     That's right.

23          Q.     Okay. And so each of those wells is producing  
24       from what you refer to as the C zone?

25          A.     That's correct.

1 Q. And what portion of that formation is the  
2 Anadarko well being injected into?

3 A. The Anadarko is injecting into the C. Possibly  
4 also the D, I don't recall, but I know they're injecting  
5 into the C.

6 Q. Okay. And these wells that are described in  
7 Exhibit 10 are wells that -- Are these recently completed  
8 wells?

9 A. Yes, they're all -- this Aparejo was completed in  
10 5 of 1995, the Polo was completed in August of 1995, the  
11 Boyd X 1 was recompleted in July of 1995, and the Osage  
12 Boyd of Nearburg's was completed in December of 1995.

13 And at the time that our hearing in September --  
14 most of the -- I don't know of any of this production  
15 information that was yet available through the ONGARD  
16 system.

17 Q. Okay, you have with you also an Exhibit Number  
18 11. Would you please describe that exhibit for us?

19 A. It's a log that -- It's an FMI, a formation  
20 microimage, of Schlumberger, a tool that they have that  
21 Nearburg and others have been using out in the Dagger Draw  
22 to try to better identify the reservoir due to the complex  
23 nature of the vugular dolomite, fracturing, different  
24 factors that occur out there.

25 And what this one is, it's a portion of it that

1 incorporates the ELAN, which is just the calculated log  
2 from the standard open-hole logs, with the FMI in what they  
3 call a spot analysis.

4 And the things that are of interest on here that  
5 we should take note of are, in the second column from the  
6 left there's a purple curve. It's a vug density. And  
7 that's actually -- This tool is a resistivity-imaging tool,  
8 and it actually more or less takes a picture of the  
9 wellbore, and it can identify vugs and fractures and image  
10 them for us.

11 And what it show there -- It just picks out spots  
12 per foot. These are all indexes, and it will show -- like  
13 if you notice up in what we would call the A section, at  
14 about 7660 to 7770, it shows a substantial amount of vugs.  
15 The green curve in that same tract is the vug size in  
16 square inches, ranging from zero to ten.

17 And the other curve of interest is the spot  
18 connectivity curve, which is the fourth curve over from the  
19 left. It's the red curve, and it's an index. And  
20 basically what it is, a higher reading identifies more vugs  
21 that are connected with one another. It doesn't look at  
22 intergranular or matrix porosity at all, just the vugs that  
23 it sees on the FMI images. And it shows what -- a low  
24 number or not many are connected, and a high number, more  
25 are. It's a relative index, but it's something that's just

1 beginning to be used out in this field in our completion  
2 practices in identifying zones that may be or may not be  
3 communicating.

4           You can see this log, which is our Ross Ranch  
5 Number 8 well in Section 22, below the A zone, prior to  
6 going into the B zone at 7750 or so, you basically lose all  
7 your vugs, you don't see any vugs. It's a tight section,  
8 and your connectivity goes away. So based on this log, you  
9 have a -- you know, a pretty good seal there between the A  
10 and the B.

11           As you go from the B and the C, it becomes much  
12 less dramatic. The B, we call the top of the B at 7750 and  
13 the top of the C is around 7850, and you can see there that  
14 between the B and the C there's a limestone section that's  
15 probably about ten feet thick, but you still see  
16 connectivity and you still see vugs in that area, although  
17 they're not as great as in the higher porosity sections of  
18 the B and the lower C. There is still, based on this log,  
19 there are vugs that are connected which, in my opinion,  
20 could cause communication between the C and the B.

21           Q. Now, you just mentioned the -- I believe your  
22 Ross Ranch Number 8 well?

23           A. Right.

24           Q. And where is that well located in relation to  
25 the Anadarko disposal well?

1           A.    It's in Section 22, it's south of the disposal  
2 well.  There's a map that we presented earlier.  We can  
3 show it.

4           Q.    But it's a direct offset --

5           A.    Right.

6           Q.    -- to the disposal well in question?

7           A.    (Nods)

8           Q.    And what interval is that well producing from?

9           A.    The Ross Ranch 8 is producing from the B and the  
10 C -- the A and the B.

11          Q.    The A and the B, okay.

12          Q.    In looking at the log that you were just  
13 describing there, as a qualified expert engineer, do you  
14 have some concerns after reviewing such a log regarding the  
15 flow of injected water and the communication of that water  
16 in this area?

17          A.    Based on this log, as long as we're seeing, you  
18 know, vugs that are connected, we can certainly have flow.  
19 The reservoir is a vugular dolomite, and it really is a  
20 dual-porosity type system.  You have fractures that are  
21 vugular enhanced fractures where you have very high  
22 productivity, as well as come on at very high rates, as you  
23 can see from some of the decline curves.

24                And as the fractures and vugs are drained, then  
25 the matrix porosity more or less contributes at that point

1 as the pressure is pulled down.

2 And that's one of the things that's really  
3 changed out here from the time that Anadarko originally  
4 completed their disposal well. With the use of submersible  
5 pumps, we're able to move a lot more fluid and pull the  
6 pressures down and deplete the vugs and fractures and  
7 actually get the matrix contribution that we could never  
8 get before with just standard beam pumps.

9 This is very new tech- -- It's been used in other  
10 parts of the world, but out here it's new technology, and  
11 it's developed -- it's evolving. We've been running this  
12 log on every well we've drilled basically since the Ross  
13 Ranch 22-2, and it just -- I think it's obvious that some  
14 of these seals that we thought, based on standard logs  
15 where the resolution wasn't that great, the sampling rates  
16 weren't that frequent, may not be the barriers that we once  
17 thought they were.

18 MR. TURNER: I have no further questions.

19 CHAIRMAN LEMAY: Thank you, Mr. Turner.

20 Mr. Bruce?

21 MR. BRUCE: Just a second, Mr. Chairman.

22 CROSS-EXAMINATION

23 BY MR. BRUCE:

24 Q. Looking at your Exhibit 8, Mr. McDonald, now  
25 these wells are in Section 31, some three and a half miles



1 away from the injection well?

2 A. Yes, they're quite a ways away. The reason that  
3 I used them, I used them as examples because they were  
4 completed in a similar manner to the Anadarko well. They  
5 were perforated and then tested prior to acidizing or being  
6 pumped.

7 Q. So -- When were those wells completed? Excuse  
8 me.

9 A. I believe they were in the early 1990s, late  
10 1980s.

11 Q. Early 1990s, okay. So you had pretty much the --  
12 They were drilled in the 1990s, so you had the advantage of  
13 the modern technology that was available on completing  
14 wells at this time?

15 A. That's correct.

16 Q. Is Section 31, all of Section 31, operated by  
17 Nearburg?

18 A. I believe it is.

19 Q. Does Nearburg have any dryholes nearby to these,  
20 or poor wells nearby to these three Dagger Draw 31 wells?

21 A. Yes, we do.

22 Q. Within a half mile or so?

23 A. Yes, we do.

24 Q. Either dry or just uncommercial?

25 A. Right.

1 Q. Several?

2 A. We have -- There were two, I believe. There's  
3 one that's temporarily abandoned that had some dolomite  
4 porosity that may be re-entered in a completion attempted  
5 here this year; and there's one that was tight, there  
6 wasn't any dolomite, it was all limestone.

7 Q. And Nearburg has had other uneconomic wells in  
8 the Dagger Draw also, hasn't it, besides these two you  
9 mentioned and the Ross Ranch 22 Number 2?

10 A. We had two in the Dagger Draw South field. They  
11 were uneconomic.

12 Q. Looking at your Exhibit 10, we don't have a land  
13 plat in front of us with all of these wells yet. I wonder  
14 if you could, for ease of reference, maybe get -- I know  
15 Mr. Elger will be talking about this, but maybe Exhibit 17,  
16 which has a little land plat on it, maybe we could locate  
17 some of these wells you're talking about. Can we do that,  
18 please?

19 A. Do that now or --

20 Q. Over on -- Yeah, Exhibit 17, over on the right-  
21 hand side of it there's a little land plat, and I'd just  
22 like to locate some of those wells. And in comparison with  
23 Exhibit 10, now, Exhibit 10, I think you said that's the  
24 Yates Aparejo well?

25 A. Right.

1 Q. Where is that well located?

2 A. Why don't you come help me with this, Jerry? I'm  
3 not familiar with this map here.

4 MR. ELGER: Number 5.

5 THE WITNESS: It's Number 5.

6 Q. (By Mr. Bruce) Number 5. So it's in the  
7 northwest quarter of the northeast quarter of Section 16?

8 A. That's correct.

9 Q. And then I think the second page is the Yates  
10 Polo well; is that what you called it?

11 A. It's Number B. This is in the south- -- yeah,  
12 Section 10, southwest.

13 Q. Number --

14 A. -- B, southwest-southwest of 10.

15 Q. Oh, okay. I was looking at the wrong section,  
16 sorry. So that southwest -- That's the Yates Polo well,  
17 southwest quarter, southwest quarter of Section 10.

18 Next is the Yates Boyd, I think you said, X Com?

19 A. Right, it's Number D, the northeast quarter of  
20 16.

21 Q. And finally Nearburg's Osage Boyd 15 --

22 A. Number C-15. It's a directional well. The  
23 orange is the bottomhole location.

24 Q. Okay, let's talk about a couple other wells on  
25 here. Looking down in Section 21, there's a well lettered

1 G. What well is that?

2 A. It's the Ross EG 14 that Yates operates.

3 Q. And do you have any data on that well?

4 A. We have a working interest in it, so we have -- I  
5 don't have it with me. It was drill stem tested. Oil in  
6 the C zone. It was not completed in the C, it was  
7 completed in the B and the A, I believe.

8 Q. Upper zones?

9 A. The B, yeah.

10 Q. It's completed in the B zone?

11 A. Right.

12 Q. And that well directly offsets the saltwater  
13 disposal well; that's the Yates well which was also the  
14 subject of the last hearing, isn't it?

15 A. That's correct.

16 Q. And that Yates saltwater disposal well, Number 10  
17 on this map, injected into the B zone?

18 A. The A, the B and the C.

19 Q. Okay, so it injected into the A, the B and the C  
20 zone, and Yates drilled that direct offset, letter G. Do  
21 you have any data on cumulative production from that well?

22 A. It's a good well, it's made 50,000 barrels or so,  
23 I believe.

24 Q. In looking to the south of the -- looking in  
25 Section 22, now, you have the Titan saltwater disposal

1 well, and then to the south a well lettered H, and that's  
2 the Boyd --

3 A. That's the Ross Ranch 8.

4 Q. Ross Ranch 8, Excuse me. And what kind of  
5 production are you getting from that well?

6 A. It's a good well also, out of the B zone.

7 Q. What are its daily rates?

8 A. Its rates are 700 to 800 barrels a day.

9 Q. And what's its cumulative production?

10 A. I don't know -- I'm not sure. It's just a lot,  
11 it's more than the EG 14.

12 Q. The well just to the north of that hasn't been  
13 commenced yet?

14 A. That's right.

15 Q. What about just to the south of the Ross Ranch 8?  
16 There's a Number 1 and a Number 19. What is the status of  
17 those wells? Those are Nearburg wells, aren't they?

18 A. Those were -- They were Morrow gas wells that  
19 we -- at least the Number 1 is the South Boyd; is that  
20 correct?

21 Q. Yeah. They're currently completed in the  
22 Cisco/Canyon?

23 A. I believe that's so. They're shut in, they're  
24 not producing.

25 Q. They're not producing? Why not?

1           A.    They were -- at the time that we -- they have --  
2   One problem that we had with those wells, they both had  
3   4-1/2-inch casing, and we weren't able to run large sub  
4   pumps and we could never -- we ran a sub pump, and we were  
5   only able to move -- less fluid than what we would have  
6   liked, and we were never able to pull down the pressure  
7   there.

8                    So one thought that we have is that as we  
9   generally pull the pressure down in this portion of the  
10   reservoir, we plan to go back into those wells with a sub  
11   pump and test them at a later date.

12           Q.    What is the -- We asked this at the last hearing.  
13   Referring to your Exhibit 8 again, these Dagger Draw 31  
14   wells, what is the cumulative water production from these  
15   wells?

16           A.    I don't have that data. I should have put it on  
17   here. It's probably two to two and a half times the oil.

18                    The Number 4 is much less. The Number 4 was  
19   actually probably less than the oil, but the 2 and the 1  
20   were about a two or higher water-oil ratio, as I recall.

21           Q.    What's the -- One final question. Looking at the  
22   land plat again, Section 22, to the east of your Ross Ranch  
23   22-2 well, and to the east of the Titan saltwater disposal  
24   well, what is the status of that well?

25           A.    It's the same as the South Boyd Number 1. We had

1 tested it, it made an oil cut, and we hope to come back and  
2 run a sub pump in at some point again.

3 There's been very little -- Other operators have  
4 had the same experience out here with going into these old  
5 gas wells that have the small casing and the questionable  
6 cement jobs over the Cisco/Canyons. There's been wells  
7 drilled offsetting some of these old gas wells that have  
8 made very nice Cisco/Canyon wells, where the testing of the  
9 gas wells was not economic.

10 Q. What is the water-oil ratio of the well we just  
11 mentioned? I didn't get the name of it, but the one to the  
12 east of the saltwater --

13 A. B and B 1. It was high. I don't recall what it  
14 was.

15 Q. So at this point, Nearburg -- And I believe  
16 Nearburg operates Sections 22 and 27; is that correct?

17 A. That's correct.

18 Q. They have not drilled anything to the east,  
19 essentially, of the Titan saltwater disposal well?

20 A. We have a well over in 24 of the next township  
21 and range. It's actually in that section of the Fairchild  
22 well. It's over here somewhere.

23 Q. A couple of miles away?

24 A. Yeah.

25 Q. And what is it?

1           A.    It's pretty -- It makes 80 barrels of oil a day  
2 and about 2000 barrels of water, about 800 gas, 500 gas.

3           MR. BRUCE: Thank you, Mr. Chairman.

4           CHAIRMAN LEMAY: Thank you, Mr. Bruce.

5           Commissioner Bailey?

6                               EXAMINATION

7   BY COMMISSIONER BAILEY:

8           Q.    Where does Nearburg dispose of its water?  
9 Where's your saltwater disposal?

10          A.    We have two Devonian saltwater disposal wells,  
11 which is a deeper formation than the Cisco/Canyon. We've  
12 re-entered two old gas wells in deep zones of the Devonian.  
13 So it's not anywhere -- It's way below the Cisco/Canyon.

14          Q.    Where are they located?

15          A.    They are -- Do we have a map that shows them?  
16 Here, let me...

17                Yeah, our Aikman disposal well is in the south of  
18 the southwest -- the southeast of the southwest of Section  
19 27. And our Holston saltwater disposal well is in Section  
20 4 to the south, south township and range, and it's in the  
21 northwest of the northeast.

22          Q.    And that's also in the Devonian?

23          A.    Also in the Devonian, that's correct.

24          Q.    Have you done any analyses on the water that's  
25 produced from your well to be able to fingerprint if it's



1 cutting water or introduced water or --

2 A. It's Cisco/Canyon water.

3 Q. It is just --

4 A. I don't know what the origin is, you know, if it  
5 was put there by injection or was there originally.

6 It's really impossible to tell, but it is  
7 Cisco/Canyon water.

8 Q. Is the source of the water that's injected into  
9 the Titan well also Dagger Draw-Cisco/Canyon?

10 A. Yes, it is.

11 Q. Given the vulgar description, the permeability  
12 of the area, 11 years' worth of injection, what kind of  
13 radius of influence do you see for this -- or have you  
14 calculated for this injection well?

15 A. It's very difficult, because you're not dealing  
16 with a homogeneous sandstone-type reservoir. You have  
17 these vugs and -- You know, we've played with some numbers,  
18 but I don't -- we never were comfortable enough with them  
19 that we would present them here.

20 You know, it's certainly -- It's just not that  
21 simple. It's just hard to -- I think it would be  
22 unrealistic to draw circle drainage maps in this type of  
23 reservoir.

24 COMMISSIONER BAILEY: That's all.

25 CHAIRMAN LEMAY: Commissioner Weiss?

## EXAMINATION

1  
2 BY COMMISSIONER WEISS:

3 Q. This 4 million barrels that was injected into the  
4 saltwater disposal well --

5 A. Uh-huh.

6 Q. -- there's nowhere wet; is that right? That's  
7 what I hear you saying.

8 A. That's correct, and we -- you know, now that  
9 we're seeing -- We know that it was injected in the C, we  
10 feel like it possibly could have gone in the B, and now  
11 that we're getting producing wells out of the C zone we're  
12 concerned that it could water those wells out.

13 Q. Yeah, we don't know whether it's north, south,  
14 east, west?

15 A. We don't know.

16 Q. You don't know where the pressure sinks are, you  
17 don't know what the pore volume is?

18 A. Well, we know that the field is off to the --  
19 field proper is off to the west. So the pressure sink is  
20 obviously going to be that direction.

21 And we've seen pretty good drawdown. The  
22 original reservoir pressure out here, I believe, was 3700  
23 pounds or so, and as these wells have been drilled out  
24 here, they've been in the 2400-pound-or-less range. So  
25 it's -- there is communication across the entire field,

1 pressurewise.

2 COMMISSIONER WEISS: I have no more questions.

3 Thank you.

4 EXAMINATION

5 BY CHAIRMAN LEMAY:

6 Q. Mr. McDonald, let's -- I'd like to set the stage  
7 a little better in the field so that we can get a little  
8 better understanding. You don't -- I realize you've got a  
9 geologist coming up, but can you tell me the -- which way  
10 it dips? Does it -- regional dip to the southeast in here,  
11 pretty much, structurally?

12 A. It's -- They're different, there's different  
13 highs all through here. I guess as a rule, I believe it  
14 is, but you have different areas of buildup of carbonate.

15 Q. But regional -- taking out the buildups and all,  
16 regional dip would be on the southeast? The contours would  
17 run northeast-southwest?

18 A. Yeah, that's...

19 Q. Are there any definable oil-water contacts in the  
20 A, B and C zones?

21 A. They've changed over the years. You know,  
22 originally we thought 4200, then 4250. Now we're  
23 completing down below 4350 subsea.

24 So as we've drilled -- It's different in  
25 different areas of the field, it appears.

1           Q.   Is there any relationship between water as a  
2 percentage of oil production and structural position?

3           A.   Yates did a -- in the past -- in the hearing that  
4 we had before this, they did a very detailed statistical  
5 study, and they basically showed that there really wasn't.  
6 If you look at --

7           Q.   So you have oil and water --

8           A.   -- all the wells in Dagger Draw that you -- Yeah,  
9 you can't draw any real conclusions from the statistical  
10 data.

11          Q.   As you go downdip, then, there's no increase in  
12 water production from the various A, B and C zones? What  
13 defines the limits of the development in the field?

14          A.   I don't think we've found it yet. We're still  
15 pressing east.

16          Q.   So even though this saltwater disposal well looks  
17 like it's kind of in the downdip southeast portion of the  
18 field, you feel that you still have commercial development  
19 southeast of that saltwater disposal well?

20          A.   We think it's possible. We wouldn't have  
21 thought, ten years ago, we'd be, you know, anywhere near  
22 here, and here we are. So we just don't know.

23          Q.   You mentioned the marginal wells Nearburg has, or  
24 nonproductive or dryholes. Why were those marginal or  
25 nonproductive or dry?

1           A.    Over --

2           Q.    High water or no porosity?

3           A.    No, over in Section 31 one had no porosity, one  
4 only had about 15 feet of porosity.

5                   The wells -- The gas wells that we've recompleted  
6 did make an oil cut, but the water cut using the sub pumps  
7 in the smaller casing in the older wells, they were not  
8 economic due to the high water cuts. But we were never  
9 able to pull the pressure down.

10          Q.    Are you familiar with the Bough C development at  
11 all in northern Lea County?

12          A.    A little bit, a little bit.

13          Q.    Is this similar? Do you -- You put a submersible  
14 in, you get increased oil production as you pump the water  
15 off generally?

16          A.    Yeah, you do. What we see, I think, is that you  
17 drain the vugs and the fractures. And as you pull the  
18 pressure down, then you get your matrix, which probably has  
19 a higher oil in place, and you start getting the  
20 contribution from the matrix porosity.

21                   And that's the only way that you can get the  
22 matrix to contribute, is by pulling down the pressure in  
23 the vug fracture system.

24          Q.    Any trends with water increasing with -- each  
25 month, or decreasing or volumes or stays about the same?

1           A.    It -- The decline on the water is very similar to  
2   the oil.  Generally out here, they'll have a rapid -- the  
3   oil and the water would have a -- they may have a flat  
4   period initially, then they would have a very rapid decline  
5   as the vugs and fractures are drained for a six- to nine-  
6   month period, and then they go on a 40- to 45-percent  
7   decline, and the water generally tracks the oil fairly  
8   well.

9           Q.    So you don't --

10          A.    We're pulling down the pressure, we're not seeing  
11   any contribution from -- you know, any meaningful  
12   contribution from our aquifer supporting the pressure.

13          Q.    The -- I forgot what that fracture log was, that  
14   super-duper log you had here.

15          A.    The high-dollar log.

16          Q.    I didn't get -- You gave me some tops, maybe.  
17   The A zone looks like it comes in with the dolomite there  
18   at -- what?  7660 or something?

19          A.    Yes, sir, about there.

20          Q.    And the B zone, top of the B was pretty much --

21          A.    7750.

22          Q.    -- 7750?

23          A.    Right.

24          Q.    Where does the C top come in?  7800?

25          A.    7850.

1 Q. 7850?

2 A. Right.

3 Q. What about that tight streak in there about 7800?  
4 Is that -- That's not a division?

5 A. Oh, that's just part of the B, consider that part  
6 of the B.

7 Q. I realize you're not a geologist. Maybe the  
8 geologist will testify.

9 It looks like your division of A, B and C and  
10 maybe of D is based on dolomite with lime tight streaks  
11 between, is it? If your lithology log on the right is --

12 A. Yeah, more or less.

13 Q. The limestone is tight, you're looking for  
14 dolomite, right?

15 A. Right. And you see variations in thickness of  
16 limestone and in percentage of limestone. You know, maybe  
17 all limestone, you may still have some dolomite, some shale  
18 even.

19 Q. But the vugs -- Your good reservoir system is in  
20 the dolomite?

21 A. That's correct.

22 Q. And you don't see any relationship or water  
23 percentagewise to A, B and C zones; they're just kind of  
24 like if you've got some porosity, you'll get some  
25 percentage of oil and water, you'll produce that fairly

1 constantly through the life of the well, and just the total  
2 fluids have dropped?

3 A. That's correct, there's good wells in all three.  
4 You know, in the field proper there's good wells in all  
5 three horizons.

6 Q. Again, your exhibit here, Exhibit 10, those are  
7 all C-zone producers. The purpose of that exhibit was to  
8 show that you have C-zone producers?

9 A. We now have C-zone producers where we didn't  
10 before.

11 Q. Where you have injection?

12 A. That's right.

13 Q. But your closest C-zone producer is three miles,  
14 three and a half miles away, commercial production or --

15 A. I believe they're -- I think they're like a mile,  
16 about a mile --

17 Q. About a mile, yeah, okay. About a mile away is  
18 your closest C-zone production?

19 A. Right. We have a test, a DST that Mr. Elger will  
20 show in one of his cross-sections, in the Yates Ross Ranch  
21 14 that did show, you know, an oil test in the C, a drill  
22 stem test. But it's not completed out of there at this  
23 point.

24 Q. You show a Well Number 12 on your -- Again, I'm  
25 going back for reference to Exhibit 17. I'm trying to



1 establish where your production limits are, but -- Is that  
2 a pretty good well, that Number 12 in Section 22, without  
3 shutting the saltwater disposal --

4 A. No, that's the poor well, that's the well that we  
5 feel like we -- may be being harmed by the saltwater  
6 injection well.

7 Q. The poor well?

8 A. Right.

9 COMMISSIONER WEISS: That's this --

10 THE WITNESS: That's the Ross Ranch 22-2, the  
11 curve.

12 Q. (By Chairman LeMay) Okay, got it. Okay. So  
13 that's the key well for your testimony, that's the one you  
14 figure being hurt?

15 A. That's correct.

16 Q. In all three zones, A, B and C?

17 A. We are -- yeah, certainly in the -- We didn't  
18 produce out of the C. The C looked -- We didn't have any  
19 mud log shows when we drilled the C, so we never completed  
20 a completion in the C. But in the A and the B we were  
21 producing a lot of water.

22 Q. It's your testimony you feel that the water from  
23 the C can migrate up into the A and B and hurt --

24 A. Based on what we see on these spot ELANs, we're  
25 starting to believe that's possible.

1 CHAIRMAN LEMAY: Anything else?

2 COMMISSIONER WEISS: No, I don't have anything.

3 COMMISSIONER BAILEY: (Shakes head)

4 CHAIRMAN LEMAY: That's all we have, you may be  
5 excused. Thank you very much.

6 MR. TURNER: My next witness is Mr. Jerry Elger.

7 JERRY B. ELGER,

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

10 DIRECT EXAMINATION

11 BY MR. TURNER:

12 Q. Mr. Elger, would you please state your name for  
13 the record?

14 A. My name is Jerry Elger.

15 Q. Where do you reside, Mr. Elger?

16 A. I reside in Midland, Texas.

17 Q. And by whom are you employed?

18 A. I'm employed by Nearburg Producing Company.

19 Q. And for how long have you been employed by  
20 Nearburg?

21 A. Approximately seven and a half to eight years.

22 Q. You're employed as a geologist?

23 A. As a petroleum geologist, correct.

24 Q. How many years have you practiced as a petroleum  
25 geologist?

1           A.    Since 1974 I've been employed in Midland, Texas,  
2   as a petroleum geologist.

3           Q.    Have you previously testified before the Oil  
4   Conservation Commission?

5           A.    Yes, I have.

6           Q.    And have your credentials as an expert in  
7   petroleum geology previously been accepted by the  
8   Commission?

9           A.    Yes, they were.

10           MR. TURNER:  I tender Mr. Elger as an expert in  
11   petroleum geology.

12           CHAIRMAN LEMAY:  His qualifications are  
13   acceptable.

14           MR. TURNER:  Thank you.

15           Q.    (By Mr. Turner)  Mr. Elger, you have with you  
16   some exhibits today, beginning, I believe, with Exhibit  
17   Number 12; is that correct?

18           A.    Yes.

19           Q.    Let's just go through these one at a time.  Let's  
20   open up Exhibit Number 12.  Could you tell us -- explain to  
21   us the purpose of your Exhibit 12?

22           A.    Exhibit 12 is a look at a portion of the Dagger  
23   Draw-Upper Penn North Pool as it existed back when Anadarko  
24   originally applied for their saltwater disposal permit to  
25   drill their well in Section 22.  It shows the density of

1 wellbores that existed at that time.

2           The color coding, the yellow-shaded wells are  
3 Pennsylvanian producing gas wells from either the Atoka or  
4 Morrow formation. The orange-shaded wells are producers  
5 from the Cisco/Canyon dolomite section, which is the  
6 subject of this hearing.

7           The map on the left, again, indicates August of  
8 1984, at the time of Anadarko's application to drill our  
9 SWD.

10           And the map on the right shows the density of  
11 wellbores in this -- across this portion of the same  
12 township as it exists today. Again, the orange are the  
13 existing Canyon producers, the green wells are permitted  
14 locations as of this date. And those may be either  
15 permitted or active locations. In some cases they may be  
16 drilling locations.

17           As you can see in the comparison of the two maps,  
18 the field has moved across a good portion of Section 20,  
19 29, 21, Section 16, and there is now even production out of  
20 the Canyon to the east of the Anadarko well.

21           As Bob -- or Tim McDonald mentioned earlier, in  
22 section 24 there's a producer. There's a new producer in  
23 the southwest quarter of Section 15 which is -- it's north  
24 but it's also east of the Anadarko SWD well.

25           And there's a whole series of good wells which

1 have been drilled in recent months to the south of the  
2 Anadarko SWD well in Section 22 and 27.

3 Q. Okay, let's next look at your Exhibit Number 13.

4 A. Exhibit Number 13 is an enlargement of the  
5 subject area, incorporating primarily Section 16, 15, 21  
6 and 22.

7 The color coding, again, is the same as it was in  
8 the previous map. The orange-shaded wells are Canyon  
9 producers. The orange-and-yellow-shaded are former  
10 Pennsylvanian gas wells that were plugged and production  
11 tested or had production histories from the Canyon  
12 reservoir. And the blue wells are either current or former  
13 SWD wells. And again, the unshaded circles represent  
14 proposed or permitted locations for the Canyon.

15 The map is a structure map on the top of the  
16 Canyon dolomite reservoir, and you can see the relationship  
17 of the Anadarko SWD well, again located in the northwest  
18 quarter of Section 22, in which the top of the dolomite in  
19 that well is at minus 4168 subsea, and the relationship of  
20 that well relative to other active producers in this  
21 portion of the field.

22 The numbers that you see by each well represent  
23 the cumulative oil production, and the top number is the  
24 cumulative oil production, the bottom number is the  
25 cumulative gas production as of the end of September, or to

1 September 1st of 1995.

2 Q. Okay.

3 A. Also shown is the disposal volume for each of the  
4 wells, reference wells in Section 21 and Section 22. And  
5 again, the well in Section 22 remains an active SWD well,  
6 having disposed of in excess of 3.7 million barrels.

7 Q. There are two saltwater disposal wells depicted  
8 on your Exhibit 13?

9 A. There's actually three.

10 Q. Actually three. Okay, the third being up in the  
11 top right-hand corner, I see.

12 A. That's correct.

13 Q. The saltwater disposal well depicted in Section  
14 21, what is the name of that well?

15 A. That is the Yates Osage, I believe, is the name  
16 of that well.

17 Q. Okay. And to your knowledge, is that well being  
18 used as a disposal well at this point?

19 A. It is not, to my knowledge, being used as a  
20 disposal; it's a former disposal well.

21 Q. When did it cease to be used as a disposal well?  
22 Do you know?

23 A. At the previous hearing in September, I believe  
24 Brent May with Yates Petroleum testified that when Yates  
25 recognized the potential for hydrocarbon production across

1 this portion of the field, including this portion of  
2 Section 21, Yates, on a voluntary basis, drastically  
3 reduced their injection volumes into that well at that time  
4 and elected to let the development activity occur out there  
5 and see what -- see exactly what the relationship of the  
6 producing portions of this field would be, relative to that  
7 particular wellbore.

8 Q. To your knowledge, then, Yates operates a good  
9 many of these wells in this area; is that correct?

10 A. That is correct.

11 Q. Let's go to your Exhibit Number 14. Mr. Elger,  
12 would you explain for us the contents of your Exhibit 14?

13 A. Exhibit Number 14 is a -- I call it a log  
14 montage. It consists of a number of Canyon dolomite  
15 producers, both north and south of the subject disposal  
16 well.

17 A portion of this log has been shaded orange, and  
18 that portion which has been shaded orange is the gamma-ray  
19 marker that I utilized to pick the top of the C zone, so  
20 that only -- If you refer to the gamma ray on each one of  
21 these particular log sections, the orange shading  
22 represents the Canyon C zone.

23 On the right-hand side in the porosity columns,  
24 I've shaded red in all of the producing wells that portion  
25 of the C zone that -- the separation and the density

1 neutron curves, which is indicative of dolomite porosity.  
2 And again, I've shaded that in the porosity columns on each  
3 one of these log presentations.

4 In the Anadarko SWD well, which is the third well  
5 from the right, I've shaded the dolomite porosity section  
6 blue, indicating that water has been injected into that  
7 segment of the dolomite.

8 In the depth margin of each one of these well  
9 logs is the red-shaded area, which indicates where  
10 hydrocarbons are being produced from the Canyon formation.

11 And again, back to the SWD well, I've shaded the  
12 perforations where water is being disposed in that well a  
13 blue color, and they've also been labeled "Disposal  
14 Perforations".

15 The purpose of this log montage -- and again, it  
16 incorporates wells to the north, it incorporates a well  
17 that's almost an immediate west offset to the SWD well, and  
18 wells to the south -- is to show that the upper set of  
19 perforations in which water is being disposed in the  
20 Anadarko Titan SWD well represents porosity within the C  
21 zone, Canyon C zone.

22 Each one of these logs has been displayed on this  
23 log montage from a structural perspective, so that the well  
24 that's the second from the left, which is the Nearburg  
25 Osage well, Osage Number 3 well, represents the lowest



1 producing perforation that I'm aware of in the Dagger Draw  
2 North-Upper Penn Pool, and the subsea depth of that bottom  
3 perforation is minus 4357. Each one of these logs has been  
4 hung from that datum of minus 4357.

5 As you can see, a portion of the log sections  
6 have been shaded yellow, and that portion represents the  
7 portion of the C zone of each one of these producing wells  
8 above what I consider to be right now the lowest known  
9 producing perforation. It doesn't necessarily represent  
10 the oil-water contact, but it represents at least where  
11 productive dolomite has been proven to exist. Again, in  
12 that well from the -- second from the left, the Nearburg  
13 Osage Number 3. And you'll notice that that well is  
14 producing only from the C zone.

15 Now, you'll notice also, and of extreme  
16 importance is the fact that the Anadarko SWD well, a  
17 portion of that C zone has been shaded yellow. What that  
18 represents is the fact that there's 30 to 40 feet of  
19 dolomite within the C zone of the Anadarko SWD well, which  
20 is above known oil.

21 And that is borne out by the fact, referring back  
22 to Mr. McDonald's Exhibit Number 8, the fact that  
23 hydrocarbons were indicated from these perforations prior  
24 to disposal into the Canyon dolomite.

25 To me, the only conclusion that can be drawn is

1 that -- based on production testing from these wells to the  
2 north and based on the recovery of hydrocarbons from the  
3 production testing that Anadarko did to that well prior to  
4 disposal, there's a portion of the dolomite section that's  
5 being disposed of in that well, above the known oil.

6 Mr. McDonald also testified earlier on the log  
7 section -- I believe it was his Exhibit Number 11 -- that  
8 the Dagger Draw Number 8 well appears to have connectivity  
9 that extends across the boundary from the C zone to the B  
10 zone.

11 The porosity portion of that log section is  
12 presented. That log section is the section from the right.  
13 You'll see that the lowestmost perforation in that wellbore  
14 at this time is at a subsea elevation which is comparable  
15 to or below the uppermost set of perforations in the well  
16 just immediately to the north that Anadarko continues to  
17 dispose of water in.

18 If, as Mr. McDonald testified to, there is no  
19 boundary between the B and C, then it's very possible that  
20 the question that Mr. Weiss asked earlier, where is the  
21 water going, it could be going not only laterally in the C,  
22 it could be moving -- migrating updip in the C zone, it  
23 could be moving across those boundaries and into the B  
24 zone. We really don't know where the water is going.

25 And in fact, when I get to one of my later

1 exhibits which incorporates the Nearburg Ross Ranch 22  
2 Number 2 well, which is the offset to the SWD well, there  
3 is the likelihood and the possibility that the answer to  
4 Mr. Weiss's question of where the water's going is that  
5 Nearburg is producing it in their offset well.

6 Q. Mr. Elger, would you just take a minute and  
7 explain the -- your findings in Exhibit 14 as they pertain  
8 to the well you've designated as E? I believe it's the --

9 A. Well Number E is the Yates Petroleum Ross Ranch  
10 EG Number 14. And again it's displayed as the others are,  
11 it's represented on a structural basis.

12 The drill stem test across only the C zone has  
13 been displayed on that log section, and the results of that  
14 drill stem test have been displayed at the base of the log.

15 As you'll see, that particular interval had gas  
16 to surface in five minutes, recovered 102 feet of 43-degree  
17 gravity oil, along with 278 feet of rat hole mud. The  
18 bottomhole pressures were in the 1300- to 1400-pound range.

19 But the significance of that drill stem test --  
20 And again, if you look at those two logs, the Anadarko well  
21 is almost structurally flat to that Ross Ranch EG 14 well,  
22 and the drill stem test in the 14 well is indicating oil,  
23 and Anadarko is putting water in the same interval.

24 Q. Okay.

25 A. In fact, there really isn't a lot of structural

1 variation all across this whole area, the way this log  
2 section has been laid out, and the fact that...

3 And again, I would refer back to the fact that  
4 the wells in the far left, especially the four wells on the  
5 left-hand side of this log montage, Mr. McDonald had  
6 described the production from those wells, most of which  
7 are producing primarily from the C zone, the Nearburg Osage  
8 Number 3 producing only from the C zone, and we see  
9 production rates as described in Mr. McDonald's Exhibit  
10 Number 10, which are very good producers.

11 I think what this indicates to me is that the C  
12 zone is a very prolific reservoir in this portion of the  
13 field. And again, I think the fact that hydrocarbons  
14 recovered at least out of the C zone in the Anadarko SWD  
15 indicates to me the fact that they're putting water in what  
16 could potentially be a very prolific reservoir, and that's  
17 the purpose of Nearburg being here today.

18 Q. Let's look at your Exhibit Number 15. Would you  
19 please explain to us the concepts in this exhibit?

20 A. Exhibit Number 15 is another Canyon structural  
21 cross-section. It incorporates -- This exhibit was  
22 utilized at the hearing in last -- I believe it was last  
23 September.

24 And basically what it shows is the two SWD wells,  
25 the well that -- the Yates Osage well in Section 21, and

1 the Anadarko Titan SWD well in Section 22. It also shows  
2 the Nearburg Ross 22 well, it shows the Yates Cutter well  
3 in Section 21, and the Yates Aparejo State Com Number 3.

4 The portions of those log sections which have  
5 been perforated have been shaded red, and the corresponding  
6 dolomite porosity has been shaded orange in the producers.

7 The subsea bottom of each of the producers has  
8 been noted, and that subsea datum has been indicated on  
9 each one of these logs. the Yates Cutter well, for  
10 example, minus 4324, represents the lowest subsea portion  
11 in that well, in the Canyon dolomite.

12 Corresponding intervals in the two disposal  
13 wells. The uppermost subsea datum of the very uppermost  
14 perforation has been noted, and that -- the Anadarko Titan  
15 SWD, for instance, the uppermost perforation is at a subsea  
16 depth of minus 4325.

17 And this log section basically shows a number of  
18 wells that are producing at or below the subsea interval at  
19 which water is being disposed in the Anadarko well.

20 Q. Okay, let's move to your Exhibit Number 16.  
21 Sorry, there is no Exhibit Number 16, there's just a gap.  
22 The next exhibit is Number 17.

23 A. Exhibit Number 17 more or less is a little more  
24 detailed look at the whole gamut of wells which have been  
25 drilled in this local area. It sort of goes along with the

1 previous Exhibit Number 15.

2           The wells on the left-hand side of -- and that  
3 have been numbered in sequence from 1 through 18, were  
4 wells that existed at the time of the September hearing.  
5 And again, the -- what's been bracketed in the top as the  
6 uppermost perforation in each one of those wellbores, and  
7 the number at the bottom indicates the lowest subsea  
8 interval that's perforating each one of those wellbores.

9           The two SWD wells which have been highlighted in  
10 blue, again, the subsea top and bottom of the disposal  
11 intervals in those two wells has been noted.

12           There's two different -- There's actually three  
13 different colors. There's an unshaded portion on some of  
14 these wells, and that area represents Canyon dolomite which  
15 is above anything that was the subsea interval of the  
16 highest known disposal in either the Yates or the Anadarko  
17 SWDs.

18           And then there's a green area. That area  
19 represents the portion of the dolomite which corresponded  
20 to some interval in the Yates well in Section 21, in which  
21 water was being disposed.

22           And then the orange zone at the bottom, the  
23 double-shaded area, and has been displayed again as --  
24 colored as orange on each one of these log sections,  
25 represents that area where water was being disposed below

1    -- or water -- hydrocarbons were being produced above the  
2    lowest disposal perforation, the highest disposal  
3    perforation in the Anadarko SWD.

4            So there would be a dual disposal interval  
5    corresponding both to the basal the part of the Yates well,  
6    upper part of the Anadarko Titan well.

7            Since the hearing in September, there's been a  
8    number of wells added to this display, and those have been  
9    lettered instead of numbered, and they are letters A  
10   through I. And you'll notice that there's been five  
11   additional wells which have been perforated and are  
12   producing hydrocarbons from subsea depths below the top  
13   subsea depth where water is being disposed of in the  
14   Anadarko Titan well.

15           Q.    And the location of those wells that you just  
16   described, Mr. Elger --

17           A.    Those wells have been the ones that have been  
18   color-coded, color-displayed on the locator map, on the  
19   right-hand side of the display.

20           Q.    Being the wells designated as A through I?

21           A.    Right, and what we see is wells north of, and we  
22   see at, again, the well in Section 15, in the southeast  
23   quarter of Section 15 is the Yates BN Number 2. That  
24   particular well is producing, I believe, from the B and the  
25   C.

1           Yates has not released that particular log, but  
2 they have released the completion on that well, and the  
3 perforated -- The perforated portions of the producing  
4 interval has been released. But I feel that that well is  
5 producing also from the B and the C.

6           The wells in Section 22 and 27 are wells that are  
7 operated by Nearburg. Those wells are both producing from  
8 a subsea depth below the uppermost perf in the Anadarko SWD  
9 well.

10           So we're seeing an area where we're almost  
11 surrounding this thing with producers, and yet they  
12 continue to inject water into equivalent subsea intervals.

13           Q. And as a petroleum geologist, what does that do  
14 to your input with regard to your company's plans for  
15 future development in this field?

16           A. Well, it makes us very tentative. We're trying  
17 to develop this area very cautiously, approaching the SWD  
18 well. Of course, we drilled our well, our Ross Ranch 22  
19 Number 2 well, as an offset to the Anadarko SWD.

20           That well has performed very poorly, and based on  
21 how it encounters various dolomite zones from a structural  
22 perspective, it should have been a very prolific producer,  
23 and it wasn't.

24           So, you know, the suggestion is that that  
25 particular area, it has -- something has happened to that



1 area to make it nonproductive. And there's a very strong  
2 likelihood, in my opinion, that it's a result of being  
3 flushed by disposal water.

4 Q. Mr. Elger, I notice in looking at your Exhibit  
5 Number 17, the two disposal wells that are designated as  
6 Numbers 10 and 11, Number 10 is designated as the Yates  
7 disposal well, which I think as a matter of record now, has  
8 been shut in by the Oil Conservation Division as a result  
9 of the previous hearing in this matter.

10 And the Number 11 is the Anadarko well, which is  
11 the subject of this hearing, and I notice there is some  
12 overlap in the injection interval between those wells.

13 As a geologist looking to develop this area, the  
14 fact that you've got the Yates well shut in now but you  
15 still have the Anadarko well disposing and to some extent  
16 overlapping in that same interval, do you feel like you  
17 need additional relief and protection because of that  
18 disposal interval?

19 A. Yes, I do. And I think that overlap occurs in  
20 the C zone. And as my previous exhibit, Exhibit Number 14,  
21 demonstrates, the C zone, in my opinion, is a very prolific  
22 reservoir in and around this particular area, and I believe  
23 it is in portions of 21 and Section 22 and in Section 15.

24 And as -- Like I said, as many of those  
25 development wells are drilled out here, I think we're going

1 to see the limits of where the C-zone production exists  
2 approach and be in and around -- scattered in and around  
3 both of these disposal wells. I think the drill stem  
4 testing in the Ross EG 14 well is an indication of that.

5 Q. In referring to the -- back to the order that was  
6 entered in the case that was previously heard on this  
7 matter, the Hearing Examiner found that the likelihood of  
8 obtaining production, commercial production of oil below  
9 the depth of the Yates disposal well is -- he found it to  
10 be remote in this general area.

11 Now, based upon the new information that has  
12 become available since that hearing date, the wells that  
13 are designated as A through I, would you agree with the  
14 finding by the Hearing Examiner, based upon this new data?

15 A. No, I would not. I mean, I believe -- You know,  
16 I believe that, again, back to Exhibit 14, that the C zone,  
17 which is a stratigraphic display of the producing zones  
18 from the stratigraphically equivalent section where water  
19 is being disposed in the Titan Anadarko well is very  
20 dramatic.

21 I mean, you just can't -- The zone is oil-  
22 productive, it's prolific, there's overlap of existing  
23 production and disposal perforations and -- You know, it's  
24 not just relative to the structural tops and bottoms, but  
25 it's also relative to the stratigraphy and the fact that

1 that well has overlap with known producing intervals in the  
2 C zone, is --

3 Q. As those known producing intervals have recently  
4 been proven to exist?

5 A. That's correct, that's correct. Many of these  
6 wells have been drilled, or the information on these wells  
7 has been released since the September hearing, and that's  
8 why we've incorporated it in this new exhibit.

9 Q. Let's move on to your Exhibit Number 18, Mr.  
10 Elger. Would you please explain this exhibit to us?

11 A. Exhibit Number 18 is an exhibit that we built to  
12 more or less address a potential -- a question that, again,  
13 Mr. Weiss asked, as to where the water from these disposal  
14 wells has gone. And this particular exhibit is an attempt  
15 to address that question of where the water has gone.

16 You'll notice that it's a stratigraphic cross-  
17 section hung on the top of the Canyon -- or the top of the  
18 A zone, the top of the Canyon Bank.

19 The three wells on the left-hand side, the Yates  
20 Binger "AKU", the Hooper "AMP" Number 1, and the Yates "EG"  
21 14, all had something in common. They're all located in  
22 fairly close proximity, within a mile -- or, in the case of  
23 the Binger, a little over a mile -- from the former Yates  
24 disposal well in Section 21.

25 Each of those wells -- By the way, the Yates

1 disposal well, the interval of water injection has been  
2 displayed for that well on the right-hand side of this log  
3 cross-section. The corresponding interval for water  
4 disposal in the Titan Anadarko well has been totally shaded  
5 where the injection interval in the Yates well has been  
6 just outlined in blue.

7           You'll notice that in each one of these wells  
8 something very peculiar happens. The first dolomite  
9 section that was encountered in each one of these wells was  
10 drill stem tested, and the recovery in each one of these  
11 wells was formation water, without any hydrocarbon  
12 recovery.

13           And you'll also note that in each instance, right  
14 below that water recovery, a series of drill stem tests  
15 were conducted as drilling occurred, and there will be a  
16 series of anywhere from two to three drill stem tests in  
17 which hydrocarbons were recovered.

18           And then finally, you see in the lower parts of  
19 the wells, drill stem tests were back to almost a water  
20 situation.

21           The question is -- in my mind is, how did the  
22 water get up above the oil in each one of these instances?

23           And you'll notice also that when Yates elected to  
24 complete these wells, they did not perforate those water-  
25 bearing drill stem tests in the upper part of the Canyon.

1           One conclusion that could be drawn was that  
2   that's where some of the water went from the Yates disposal  
3   well in Section 21.

4           You'll also notice that a number of these wells  
5   are structurally high to the Yates -- the former Yates  
6   disposal well in Section 21, indicating the fact that this  
7   water has the potential, I think, to move updip into areas  
8   where pressure drawdown has occurred.

9           You can draw the same correlation with the  
10   disposal of water in the Anadarko SWD well, in my opinion.  
11   The Ross Ranch 22 Number 2, which was drilled as an almost  
12   twin to that disposal well, drill stem tested only water  
13   out of the bottom drill stem test that you see displayed  
14   and colored blue. The Ross EG 14, the Hooper "AMP" 1, the  
15   Binger "AKU" well, all those wells have drill stem tested  
16   oil updip from that particular interval.

17           And the fact -- You know, the fact is that the  
18   pressure, as Mr. McDonald alluded to, exists off to the  
19   west. That's where most of the drawdown, most of the  
20   withdrawals from this reservoir are occurring, where the  
21   major pressure sink occurs, and that's in an updip position  
22   from the disposal well.

23           The conclusion that can be drawn there is that  
24   the potential for disposed-of water in the Anadarko well to  
25   migrate updip within the C zone is very likely, it could

1 very well be occurring.

2 And again, that parallel is made with the  
3 disposal from the Yates well into these zones. The fact  
4 that water exists at the top of the Canyon, you know, updip  
5 from that well, very well could be disposal water.

6 Q. Any other conclusions that you can draw from --  
7 regarding the migration of the water from your Exhibit 18?

8 A. That's all I can draw at this time. I mean, it's  
9 -- it appears -- you know, one of the conclusions is -- A  
10 potential question that arises is, has damage occurred out  
11 here within the Canyon from the disposal of water, in not  
12 only the Yates well but the Titan Anadarko well?

13 And I think this exhibit is an attempt to address  
14 that question, and the fact that we've got water recoveries  
15 above oil is very mysterious. How does that occur, and  
16 where is the water going?

17 And I think this has probably answered one of the  
18 questions. The water is moving through the dolomite  
19 section to the west, or to the east there's probably some  
20 fracture orientation related to where water is moving  
21 through the reservoir. And this particular exhibit is an  
22 attempt to explain where -- maybe where some of that water  
23 is going.

24 And the fact that damage could be occurring and  
25 by continuing to allow water to be disposed of into these

1 specific zones in the Anadarko well, it could be moving  
2 updip and damaging updip, moving hydrocarbons out of and  
3 across leases in an updip position.

4 Q. In your opinion also, could the water be  
5 migrating vertically, as well as horizontally?

6 A. Yes, it could. And again, I would allude back to  
7 Mr. McDonald's Exhibit Number 11 as the evidence of that,  
8 and the fact that -- and again, this exhibit is suggestive  
9 of that, the fact that the Yates SWD well was disposing up  
10 in the A zone, and then correspondingly the upper A-zone  
11 sections of these drill stem tests are recovering water.

12 Q. But in either case, if vertical migration,  
13 horizontal migration is occurring, is it your opinion that  
14 a real threat exists to production from the Dagger Draw  
15 field?

16 A. Yes, it is.

17 Q. By virtue of the injection into the saltwater  
18 disposal well?

19 A. Yes, that's correct.

20 MR. TURNER: I have no further questions at this  
21 time.

22 CHAIRMAN LEMAY: Mr. Bruce?

23 CROSS-EXAMINATION

24 BY MR. BRUCE:

25 Q. Referring to your Exhibit 13, Jerry, just a

1 couple of questions.

2 Up in Section 14, in the northeast corner of your  
3 map, there's a saltwater disposal well. Whose is that?

4 A. That's a saltwater disposal operated by Yates  
5 Petroleum Corporation.

6 Q. What does that inject into?

7 A. It injects into -- I believe it injects into the  
8 A zone.

9 Q. It does inject into the Cisco/Canyon?

10 A. Yes, uh-huh, that's correct.

11 Q. And only the A zone?

12 A. I don't have that log with me, and I'm -- I  
13 believe there's some lower sections, but I don't recall  
14 whether they're the C or D.

15 Q. And then looking on the west side of your map,  
16 like down in the southwest corner, there's one well right  
17 at the very far southwest corner. It's produced a couple  
18 hundred thousand barrels of oil, right?

19 A. Yes.

20 Q. And then just one location away appears to be a  
21 very poor well; is that correct?

22 A. Yes.

23 Q. How old are those wells? Do you know?

24 A. They're fairly recent wells. I'm going to say on  
25 the order of two and a half years, three years.



1 Q. Both of them?

2 A. Yeah, I think they're -- they're fairly --

3 Q. Okay.

4 A. I don't believe -- I'm not sure, I think one --  
5 The northernmost well may be a little bit newer, little bit  
6 newer well. If I could look at a land map I can sort of  
7 tell, because those wells were sequenced by -- numerically.

8 One is the Ross EG -- The northernmost one is the  
9 Ross EG 13, and the southernmost one is the Yates Patriot  
10 Number 3, I believe. And the 13 EG well was drilled maybe  
11 a year and a half -- a year, a year and a half, I would  
12 guess, after. But that's just an estimate. I don't --

13 Q. Okay, so --

14 A. There's been so much drilling out here, I can't  
15 remember.

16 Q. Okay. But the EG 13, which shows 3000 barrels  
17 cum production is what? A year and a half to two years  
18 old?

19 A. Yeah, probably.

20 Q. What about to the north there? You've got a well  
21 in the northeast quarter, northeast quarter, and just to  
22 the north of that you've got a well in the southeast  
23 quarter, southeast quarter of Section 17. Do you have any  
24 idea on the age of those two wells?

25 A. The well in 20 is probably -- the northeast-

1 northeast 20 is probably two and a half years. The north  
2 offset to that is actually older.

3 Q. So it appears even in the heart of the pool to be  
4 common to have a very good well offset by a very poor well?

5 A. That -- Yes, that is -- that can occur.

6 Q. Let's look at your Exhibit 15, which is a cross-  
7 section.

8 Looking at your -- at Nearburg's Ross Ranch 22  
9 Number 2, all of the perforations are above the injection  
10 interval of the Titan well?

11 A. That is correct.

12 Q. And you never tested the C zone in this well?

13 A. We did not test the C zone in that well because  
14 we did not encounter any hydrocarbon shows in the mud log.

15 Q. Okay. Now, in your preparations, did you ever  
16 try to isolate them to determine where the water was coming  
17 from?

18 A. The perforations?

19 Q. Yes.

20 A. Isolate what now?

21 Q. Did you ever try to locate in your well exactly  
22 where the water was coming from?

23 A. Yes, we did. We set a bridge plug at 7670, I  
24 believe.

25 Q. Is that the plug shown on this map here?

1           A.    Yes, that's correct.  Tried to just produce the  
2   upper -- that very upper set of perforations to determine  
3   whether --

4           Q.    Okay, is that bridge plug still there?

5           A.    I don't believe it is, no.  I believe all the  
6   existing perforations were squeezed and --

7           Q.    Okay.  After you set that bridge plug, what were  
8   the producing rates from those upper perforations, those  
9   uppermost perforations?

10          A.    I believe there was a little change, but not a  
11   significant change.

12          Q.    What is the well currently producing?

13          A.    Ten to twenty barrels of oil, 2000 barrels of  
14   water.

15          Q.    Per day?

16          A.    Uh-huh.

17          Q.    So that bridge plug is no longer there, and  
18   there's really no difference in the producing  
19   characteristics of the well?

20          A.    That's correct.

21          Q.    Did you say something that it was squeezed?

22          A.    Yes, and reperforated in the porosity interval.  
23   I believe it's at 7700.  I don't have the exact  
24   perforations, but -- 7700 to 7710, somewhere around in  
25   there.  It was reshot in the old perforations.

1 Q. Okay. So this reflects the original and the new  
2 perforations?

3 A. That's correct.

4 Q. Why was the decision made, if you were so afraid  
5 of the Titan well, to drill this location, as opposed to  
6 another location in Section 22 that you operate?

7 A. At the time we proposed this well, the Anadarko  
8 SWD well was located structurally in a very advantageous,  
9 very favorable structural position.

10 And based on the fact that there was a very --  
11 lack of limestone stringers within the open hole log  
12 portion of that section, that's almost a continuous  
13 dolomite -- I don't really see anything on the PE curves  
14 that indicates lime streaks or anything -- we felt like  
15 that would take the risk out of drilling some other  
16 location that would be available to us and not having --  
17 and losing that structural position.

18 Q. So you were trying to avoid limestone stringers?

19 A. Avoid limestone stringers, that's correct, and  
20 maximize our structural advantage. Or take the risk out of  
21 our structure, take the risk out of the structure.

22 Q. On Exhibit 15, the well to the far south, the  
23 Yates Cutter well, that's a pretty decent well, isn't it?

24 A. Very good well, that's correct.

25 Q. Can you see any effect from injection operations

1 on that well?

2 A. We're not the operator of the well; Yates  
3 Petroleum is. But we do have an interest in that well. To  
4 my knowledge, it performs as a typical Canyon.

5 Q. And what about the new Yates well, the -- Was it  
6 the Ross Number 14, which immediately offsets -- I think  
7 it's in the northwest quarter, northeast quarter of Section  
8 21, which offsets the old Yates well. What about its  
9 production performance?

10 A. As far as I know, it's a -- it also performs as a  
11 typical Canyon producer out here.

12 Q. Okay, and that's the new Yates well, the newest  
13 Yates well?

14 A. The Ross 14.

15 Q. And Nearburg does have interest in that well?

16 A. Yes.

17 Q. If the oil was swept from your location, where  
18 did it go? Downdip? Updip?

19 A. I can't answer that. It went somewhere else.  
20 Probably somebody else's lease. I'm not a reservoir  
21 engineer, so I really would have to allude to a more  
22 detailed study of the reservoir dynamics out here.

23 Q. Just a couple more questions.

24 On your Exhibit 18, when you show three Yates  
25 wells with water above the producing interval, just water

1 and no oil above the producing interval --

2 A. Uh-huh.

3 Q. -- could another conclusion from these wells be  
4 that there's a separation between various Cisco/Canyon  
5 zones?

6 A. If there is, it's not very apparent on any of the  
7 log sections.

8 Q. But it could be?

9 A. It is possible, but I don't think it's a likely  
10 -- I mean, the more likely scenario, since you see -- These  
11 wells were selected because most of the other wells in  
12 Section 21 or other portions of this field tested the upper  
13 part of the A for recovery of hydrocarbons. These three  
14 wells in particular did not recover hydrocarbons. If there  
15 was barriers involved in the separation of water and oil  
16 here, why would they not be at work in those other  
17 wellbores?

18 Q. Now, the Dagger Draw area, Mr. Elger -- I mean,  
19 you start in the North Dagger Draw, you go down to the  
20 South Dagger Draw, then the Indian Basin-Upper Penn, then  
21 there's the Indian Basin -- South Indian Basin-Upper Penn  
22 Associated Pool; is that correct?

23 A. Yes, uh-huh.

24 Q. All Cisco/Canyon producers?

25 A. That's correct.

1           Q.   Doesn't Nearburg inject water into the  
2   Cisco/Canyon A, B and C zones, not in the Indian Basin  
3   South Associated?

4           A.   These correlation markers -- which again on this  
5   display, I've labeled them A, B, C and D, these  
6   subdivisions of the Canyon -- are not correlative. You  
7   can't take these same units, and they're not universally  
8   correlative to all parts of Dagger Draw. And I've never  
9   carried these particular units or submembers of the Canyon  
10   that far south.

11          Q.   But in the Indian Basin South, are you injecting  
12   into a productive interval, injecting water?

13          A.   We are disposing of water in the Canyon Dolomite,  
14   and in a downdip position which has been drill-stem tested  
15   water-bearing in a particular well, yes.

16               And the perforations are well below -- in that  
17   particular well, are below any known subsea intervals of  
18   any productive intervals.

19          Q.   So that injection zone was tested water, right?

20          A.   Yes, that's correct.

21          Q.   Okay. What about offset wells? Are they  
22   hydrocarbon bearing?

23          A.   The well is located so far downdip that there are  
24   no immediate wells drilled to our disposal well.

25          Q.   Now, once again, on your Exhibit 18, you talk

1 about the vertical migration of water. Can that happen? I  
2 mean, isn't the water heavier than the oil?

3 A. Yes, water is heavier than oil. What's your  
4 question?

5 Q. Doesn't that preclude pure water on top of oil,  
6 unless there's a separation of zones?

7 A. Well, that's one explanation. Another  
8 explanation is that this -- the porosity which was tested  
9 in each one of these particular drill stem tests is  
10 conducive to the migration of -- You know, there may be  
11 updip wells from these, which have been producing, and this  
12 is kind of a pipeline, sort of a porosity system, in each  
13 one of these particular wet drill stem tests, and as water  
14 was being disposed of in the Yates well, it was following  
15 that path of least resistance, which corresponded to the  
16 intervals tested in each one of these wellbores.

17 MR. BRUCE: That's all, Mr. Chairman.

18 CHAIRMAN LEMAY: Commissioner Bailey?

19 EXAMINATION

20 BY COMMISSIONER BAILEY:

21 Q. I'm very interested in the impact of shutting in  
22 of the Yates saltwater disposal well, established  
23 production surrounding that.

24 A. Pardon me? What was your question?

25 Q. What impact did the shutting in of the Yates



1 saltwater disposal well have on production of the  
2 surrounding wells?

3 A. When Yates -- I don't recall, but I do believe  
4 it's in the testimony of the September hearing, when  
5 Yates -- the timing of when Yates elected to actually  
6 minimize their disposal into that wellbore. And I believe  
7 -- I'm going to guess it's like two or three years ago.

8 Most of the drilling that has occurred in and  
9 around that Section 21 where Yates was disposing of water  
10 has been drilled since, long -- you know, after they ceased  
11 disposing in that wellbore.

12 Q. So several years ago --

13 A. Uh-huh, that's correct.

14 Q. -- that well was shut in?

15 A. That's correct. They continued to maintain that  
16 disposal in an active status by disposing of just minimal  
17 amounts of water, like 100 barrels a month or so as the  
18 disposal volumes.

19 Yeah, here -- this is a -- I don't know if we  
20 want to introduce this as part of the testimony or not, but  
21 the disposal volumes in that Yates well, it really became  
22 inactive in -- the last month of disposal would have been  
23 October of 1993.

24 They put 850 barrels of water into it in March,  
25 1995, and 800 barrels into it in April of 1995.

1           Q.    So there have been slugs of disposal since the  
2           official close-down in 1993?

3           A.    Since they voluntarily ceased their disposal into  
4           that well in October of 1993, they have wanted to maintain  
5           that as an active disposal well by periodically putting 800  
6           barrels a month in here and 800 barrels a month in there.

7           Q.    Okay, but in between those slugs of disposal --

8           A.    Nothing.

9           Q.    -- you don't see any changes in the --

10          A.    No.

11          Q.    -- production?

12          A.    No, and most of the production out here, the  
13          production history is too new to tell whether -- what  
14          affects -- other than to make some correlations as I've  
15          tried to do on my Exhibit 18, where new wells that have  
16          been drilled since the disposal of 6.5 million barrels of  
17          water into that well, address the question, where has that  
18          water gone?

19                One explanation is that we're seeing it  
20          periodically in wells that have drilled in the area,  
21          resulting in drill stem tests that are water-bearing rather  
22          than hydrocarbon-bearing, above what is typically an oil  
23          reservoir, there at the top of it, what is typically in the  
24          oil reservoir.

25          Q.    Is there any correlation between slugs of

1 disposal into the Yates wells and your Exhibit Number 6,  
2 which was maybe not your exhibit, that indicates that there  
3 was an increase in barrels disposed in late 1995?

4 MR. McDONALD: Can I answer that?

5 COMMISSIONER BAILEY: Please.

6 MR. McDONALD: That was their accounting mistake.  
7 They were only reporting their produced water, not the  
8 commercial water they were disposing of.

9 COMMISSIONER BAILEY: Okay.

10 MR. McDONALD: And they figured out that they had  
11 to report it all at that point. That's why -- And that's  
12 the discrepancy of the parts per whatever million versus  
13 the 2.7 --

14 Q. (By Commissioner Bailey) So there's no  
15 correlation between the two?

16 A. (By Mr. Elger) No.

17 COMMISSIONER BAILEY: -- events?

18 That's all I have right now.

19 CHAIRMAN LEMAY: Commissioner Weiss?

20 COMMISSIONER WEISS: I've got a couple.

21 EXAMINATION

22 BY COMMISSIONER WEISS:

23 Q. I'm a little confused on why the well was  
24 drilled, the 22-12.

25 A. 22 Number 2?

1 Q. Yeah, but identified as 12 on most of these.

2 A. Again, if you'll --

3 Q. Let me finish.

4 A. Okay.

5 Q. Especially since, as I recall, Mr. McDonald said  
6 the structure didn't play much of a part out here in the  
7 production, and then go up and offset an injection well.  
8 So please tell me that again.

9 A. Well, I think Mr. McDonald -- I'm not sure if he  
10 meant that or not, that structure doesn't mean a -- make a  
11 difference out here in terms of production.

12 It's when you -- It depends on what structure  
13 you're talking about. There's various types of structures  
14 you can be talking about. You can be talking about the top  
15 of the Canyon, or you can be talking about the top of the  
16 reservoir rock, top of dolomite, which -- that's very  
17 important.

18 And the Anadarko SWD well, at the time that we  
19 proposed to drill our well, the Anadarko SWD well had  
20 encountered the top of dolomite at minus 4168, which is  
21 well above what we considered to be the oil-water contact  
22 at that time. I believe when we proposed that well, we  
23 were thinking that the oil-water contact for this portion  
24 of the North Dagger Draw-Upper Penn Pool was probably in  
25 the area of minus 4300 feet subsea.

1 Well, that should make available to that  
2 location, if we drilled in close proximity to it, how much  
3 reservoir? We should have over a hundred feet of pay in  
4 that well. More like 150 feet of pay should be available.

5 And that's -- There's no risk involved in  
6 drilling a close proximity to that well, because other  
7 portions of Section -- There was no well control in the  
8 south half of 21, there was no well control in the  
9 southwest of 22, there was no well control in the south  
10 half of 16.

11 The only well control that existed out here was  
12 the well tops for the Anadarko SWD well and for the Yates  
13 SWD well, and then for the Morrow -- former Morrow  
14 producers in the east half of 22 and the east half of 27,  
15 which we knew had hydrocarbon shows, but were fairly  
16 structurally low on the top of the dolomite reservoir.

17 To reduce our risk in going out here and drilling  
18 a high-risk well that would have dolomite but be  
19 structurally low on the top of the dolomite, we elected to  
20 drill in close proximity to a known entity, a known  
21 quantity, and that was go take our 150 feet of pay  
22 available to us by drilling close to that well.

23 Q. So it was primarily geologic, the fact that --

24 A. That's correct.

25 Q. -- two or three million barrels of water injected

1 off -- that didn't enter into the decision? I didn't hear  
2 it.

3 A. No, that's correct.

4 Q. And then one other question. Do you know if 22-2  
5 has been pumped down or what the status is there? Is it --  
6 Have you done any good there, as far as reducing the  
7 pressure so you might get some contribution from the  
8 matrix?

9 A. In the well in the east half of 22?

10 Q. The one that offsets the injection well.

11 MR. McDONALD: We are attempting to. Slowly the  
12 pressure is coming down. It hasn't come down nearly as  
13 quickly as we've seen in our wells down in 27.

14 COMMISSIONER WEISS: Okay, thank you. Those are  
15 the -- I have one other question, but I'm not sure if it's  
16 for these witnesses or if it's for the lawyers or if it's  
17 for the Commission, and that's the fact, is there a statute  
18 of limitations on this issue?

19 CHAIRMAN LEMAY: Margaret, is there -- do you  
20 know anything about the statute of limitations?

21 MS. CORDOVANO: I haven't -- I'm not sure, but if  
22 you wish, I could --

23 COMMISSIONER WEISS: Yeah, I think we ought to  
24 know that.

25 MR. TURNER: Just to respond to that from a

1 lawyer's standpoint is that, as we indicated previously, is  
2 that, you know, we have been contesting this saltwater  
3 disposal well since its initial application, and we have  
4 been here a couple other times.

5 And what has happened out here is, as we've said  
6 earlier, is that, you know, if you look at the exhibits, is  
7 that this field has progressed over the years, a lot's  
8 changed, and the development has gotten to -- up to the  
9 point and surrounding this saltwater disposal well now.

10 We think that with that development new facts  
11 have been learned and new justification for our position  
12 has been brought to light.

13 COMMISSIONER WEISS: This sounds to me like a  
14 correlative-rights issue, and -- for what it's worth.

15 MR. BRUCE: Well, in our opinion -- You have to  
16 present new evidence, and we don't think any new evidence  
17 has been presented. There's new wells, yes, but there's no  
18 evidence that there's been any change since the original  
19 Division order.

20 COMMISSIONER WEISS: So as far as the timing, it  
21 makes no difference to either of you?

22 MR. TURNER: Well, we just -- We think that the  
23 new evidence is that new wells that have shown to be  
24 productive from the very interval that the injection is  
25 occurring shows that now there is a very strong potential

1 for damage to future production.

2 COMMISSIONER WEISS: Okay, thank you. I have no  
3 more questions.

4 CHAIRMAN LEMAY: Just a couple.

5 EXAMINATION

6 BY CHAIRMAN LEMAY:

7 Q. Mr. Elger, did you say that the separation in  
8 the density neutron is indicative of porosity?

9 A. Well, in the cases of the CNL FDC logs that  
10 Schlumberger runs, or Atlas or Halliburton, the rest of  
11 them, when you get a negative crossover effect, that  
12 crossover effect is indicative of dolomite, it's indicating  
13 dolomite. And in fact that's borne out by the PE curves on  
14 these wells.

15 Go to Exhibit Number 18, for example, and you see  
16 where your dashed line is to the left of your right line,  
17 which is your -- Your neutron curve is the dashed, your  
18 density curve is the solid curve. And when they separate  
19 to this extent or this degree, that much, the crossplot  
20 porosity of those two curves falls in the regime of being a  
21 dolomite.

22 Q. I guess my understanding, we used to look at  
23 separation where you have the neutron depressed for gas  
24 effect, having had separation indicative of gas. That  
25 wasn't the separation you were referring to?



1 A. No.

2 Q. Not a gas-effect separation?

3 A. No. In fact, they cross the other way on gas  
4 effect.

5 Q. Right. So are you saying that structural  
6 position does have an effect on porosity, and you are  
7 talking about an oil-water contact here in this field?

8 A. There is an oil-water contact -- I'm sure there  
9 is an oil-water contact somewhere out here. But I don't  
10 know what it is yet. All I can do is address the facts we  
11 have, and, you know, those -- the fact that minus 40- --  
12 we've got wells that a number of -- two years ago nobody  
13 would have thought of perforating dolomite down to minus  
14 4357.

15 Now, we're seeing that we're getting tremendous  
16 wells by perforating dolomite down to minus 4357. Does  
17 that represent the oil-water contact, minus 4357? I can't  
18 answer that question. I really don't know.

19 I think at some future date there may be wells  
20 perforated that push that limit even lower, to 4360 or 4375  
21 or 4380. And will that represent an oil-water contact? I  
22 don't know. I really can't answer that.

23 In previous testimony that Brent May with Yates  
24 Petroleum has presented here, it's kind of a transition  
25 zone. It's kind of a zone -- an interval below which you

1 just become subeconomic. You'll still produce oil, but  
2 you'll become subeconomic.

3 Q. So there is a correlation with the percentage of  
4 water recovery and oil recovery with structural elevation  
5 perforations?

6 A. But as the whole area continues to pressure down,  
7 it becomes less pronounced because it's not an active water  
8 drive reservoir. You're seeing depletion of total  
9 hydrocarbons, total oil, gas and water, within this whole  
10 system.

11 And in fact, in the main part of the Dagger Draw  
12 field, back in -- oh, in 19 South, 24 East, the eastern  
13 portion of that township, the wells which were at one time  
14 former producers, utilizing submersible pump technology,  
15 because the total volumes of everything has gone down to a  
16 point where they hardly make any fluid at all -- If oil  
17 goes away, the oil goes away, the water goes away, the gas  
18 draws down.

19 And those wells are capable of being converted,  
20 eventually converted to beam pumps as a production  
21 mechanism. And eventually that whole scenario will occur  
22 across this area.

23 Q. Well, I'm going back maybe further. My  
24 recollection of initial production out of these wells was  
25 gas lift by Roger Hanks a long time ago. They had gas,

1 water and oil accumulations mixed, and that presented some  
2 problems, production problems.

3 Now, they're going to submersibles. You think  
4 eventually they'll go to beams?

5 A. That's correct. As the field matures and it  
6 becomes more densely drilled and the overall reservoir  
7 pressure is reduced, there's less fluid available. You  
8 have to have a lot of fluid in order to economically run a  
9 submersible pump, and eventually that total fluid just  
10 depletes as the overall bottomhole pressures -- because of  
11 competition of offset wells.

12 Q. Just a comment. I notice your formation water  
13 scenario, possibly resulting from the injection of water.  
14 Didn't you say at one time that you thought because of  
15 lower bottomhole pressures -- Just looking at those  
16 bottomhole pressures, they don't look lower to me. They  
17 look like they're, if anything --

18 A. Which ones are you --

19 Q. Well, just on any of -- your exhibit -- your  
20 shut-in on your Exhibit 18.

21 A. Uh-huh.

22 Q. The shut-in pressures look to me very similar to  
23 oil zones, if not -- I don't see any pressure differential  
24 there.

25 A. From test to test to test --

1 Q. Yes.

2 A. -- that would suggest a barrier, that's correct.

3 Q. No -- Well, I don't know if it's a barrier or  
4 not, it's just the idea that I thought your scenario had  
5 lower pressures up in the upper part of that reservoir  
6 there, where that's where the water invaded from the  
7 injection well. I don't see --

8 A. What happens is --

9 Q. Maybe you got pressured up with water.

10 A. As you move to the west into the township that I  
11 described, Township 20 South, 24 East, in the eastern part  
12 of that township, and even now the far western portion of  
13 19-25, what you see is this whole thing is continuing to  
14 climb towards the Indian Basin field, and that eventually  
15 the whole dolomite package from very top to bottom is  
16 productive.

17 So there's been pressure withdrawals in the  
18 entire Canyon dolomite segment as you move to the west and  
19 southwest and climb that very slow incline towards the  
20 Indian Basin gas field.

21 Q. Final question: Do you think this is the rim of  
22 the Indian Basin?

23 A. Is what?

24 Q. The oil rim of the Indian Basin?

25 A. Yes.

1 CHAIRMAN LEMAY: That's all the questions I have.

2 MR. BRUCE: I have nothing further of this  
3 witness.

4 MR. TURNER: I have no further questions.

5 CHAIRMAN LEMAY: Okay, does this conclude your  
6 witnesses, Mr. Turner?

7 MR. TURNER: Yes, it does.

8 CHAIRMAN LEMAY: Rather than take a break, why  
9 don't we just take a lunch break and come back at one  
10 o'clock? Would that be okay? You have two witnesses?

11 MR. BRUCE: I have two witnesses, yeah. They  
12 won't be too long.

13 CHAIRMAN LEMAY: Okay, we could take a break,  
14 come back and start a witness, but I hate to do that. I  
15 don't know how long they're going to take.

16 So let's just come back at one o'clock, take a  
17 long break.

18 (Thereupon, a recess was taken at 11:48 a.m.)

19 (The following proceedings had at 1:06 p.m.)

20 CHAIRMAN LEMAY: Okay, we shall continue.

21 Mr. Turner?

22 MR. TURNER: I have concluded with the direct  
23 testimony of my witnesses, Mr. Chairman.

24 CHAIRMAN LEMAY: Thank you.

25 I guess, Mr. Bruce, it's your turn?

1 MR. BRUCE: Okay, I'll first call Mr. Phares to  
2 the stand.

3 ROD S. PHARES,  
4 the witness herein, after having been first duly sworn upon  
5 his oath, was examined and testified as follows:

6 DIRECT EXAMINATION

7 BY MR. BRUCE:

8 Q. Will you please state your full name for the  
9 record?

10 A. Rod S. Phares.

11 Q. How do you spell your last name, Mr. Phares?

12 A. P-h-a-r-e-s.

13 Q. Who are you employed by?

14 A. I'm a consulting geologist with Hickman and  
15 Associates in Midland, Texas.

16 Q. Okay, and have you been employed by Titan  
17 Resources, L.P., for this case?

18 A. Yes, I have.

19 Q. Have you previously testified before the  
20 Commission?

21 A. No, I have not.

22 Q. Would you please summarize your educational and  
23 employment background?

24 A. I have a bachelor's in geology and a master's in  
25 geology. I went to work for Mobil Oil in 1969 in Libya,

1 spent 13 years overseas in Norway and Egypt, returned to  
2 the United States, spent two years in Houston with Mobil in  
3 exploration, moved out to Midland until 1992 when I went to  
4 consulting with Hickman.

5 Q. Okay. And for Mobil your responsibilities in the  
6 Midland office, what did they include?

7 A. We were exploration, west Texas, Permian Basin,  
8 including southeast New Mexico, Central Basin Platform,  
9 Midland Basin.

10 Q. Okay. And have you reviewed the geology in the  
11 area of interest in this Application?

12 A. Yes, I have.

13 MR. BRUCE: Mr. Chairman, I would tender Mr.  
14 Phares as an expert petroleum geologist.

15 CHAIRMAN LEMAY: His qualifications are  
16 acceptable.

17 Q. (By Mr. Bruce) Mr. Phares, we want to go over  
18 the key points that you believe require Nearburg's  
19 Application to be denied. Let's start with your Exhibit 1.  
20 First of all, just identify what Exhibit 1 is.

21 A. Exhibit 1 is an east-west cross-section  
22 previously used in the former application, the denial.

23 Q. This was Yates Exhibit 4 in the original hearing  
24 in this matter; is that correct?

25 A. And there were two important --

1 Q. Just a minute. This was Yates Exhibit 4 in the  
2 September, 1995, hearing; is that correct?

3 A. Yes, sir.

4 Q. And have you reviewed the data on these wells?

5 A. Yes, I have.

6 Q. Okay. Now, there's been some talk about whether  
7 or not any of the producing Cisco/Canyon zones are  
8 separated. Could you, using this map, discuss your opinion  
9 on that matter?

10 A. Yes, highlighted in green I just took the wells  
11 in the immediate area of the saltwater disposal wells, of  
12 which the Anadarko well perforated below -- the interval  
13 from about 7750 to 7820, and highlighted that interval as  
14 an interval of in excess of 50 feet with the crossplotted  
15 porosity on the density neutron log of less than four  
16 percent in most cases, and most of the time it was around  
17 zero percent.

18 Previous testimony, and my recollection of  
19 reading the last example, was, at four percent was -- less  
20 than four percent was not reservoir porosity. So I deemed  
21 this to be a barrier of significance, and it was  
22 correlatable across wells in both directions, and it looked  
23 to me as if we have a significant barrier in the dolomite  
24 section between the perforated interval for injection in  
25 the saltwater disposal well and the offsetting well, the



1 Ross 22.

2 Q. Next, Mr. Phares, there's also been some previous  
3 testimony about fracturing. You were here and listened to  
4 the testimony --

5 A. Yes, I was.

6 Q. -- weren't you, this morning?

7 For this, I might refer you to what Nearburg  
8 presented as Exhibit 14. Maybe if we could use this board  
9 here, and that way everybody could --

10 (Off the record)

11 Q. (By Mr. Bruce) Why don't you hold that so  
12 everybody can see it?

13 And Mr. Phares, if you need to get up and point  
14 at the pictures here, this is Exhibit 14 that Nearburg  
15 presented, and they talked about fracturing.

16 Could you point at this and give your opinion as  
17 to any fracturing in these wells in this area?

18 A. Well, in the absence of the core data which we  
19 don't seem to have, or a borehole televIEWer, which would  
20 be another source of information concerning fracturing in  
21 the well, I would then go to an acoustic log.

22 Cycle-skipping on an acoustic log is typically  
23 associated with fracturing in a reservoir. And here is the  
24 acoustic log, location D in Section 16. This is the only  
25 one on the section and the only -- one of the only ones

1 I've seen that's in the testimony.

2 And in this well there was no spiking of the  
3 acoustic log, suggesting that there was fracturing in the  
4 reservoir. So for lack of any other information, this to  
5 me indicates that there's little or no fracturing as  
6 evidenced by the data that we have.

7 Q. Thank you, Mr. Phares. Now, Nearburg also  
8 discussed new evidence that supports their case. To you,  
9 which well is the best evidence in this case? Which new  
10 well?

11 A. The Yates producer is obviously the only new data  
12 that's been introduced.

13 Q. Okay, and that's the Yates Ross EG Number 14,  
14 located in the northwest quarter, northwest quarter of  
15 Section 21, is it not?

16 A. Yes, sir, it's the direct offset to the -- Yates'  
17 saltwater disposal well.

18 Q. And what is Exhibit 2?

19 A. Exhibit 2 is the completion of that well.

20 Q. The initial completion report on that well?

21 A. Yes.

22 Q. And there's been some evidence that that well has  
23 cum'd -- what? 50,000 barrels?

24 A. 50,000 barrels is what was testified.

25 Q. Now, what about this well? It's producing an

1 interval. How does it compare to the offsetting injection  
2 interval of the Yates injection well?

3 A. I think it's been testified that the two zones  
4 are similar, that they're stratigraphically equal, that's  
5 being injected into was -- when Yates was injecting, it was  
6 being injected into the A and the B zones.

7 Q. And Yates injected what? About 6.5 million  
8 barrels of water into its saltwater disposal well?

9 A. That's what the record shows, yes.

10 Q. And it apparently has no effect on this Ross 14  
11 well, 1200 feet away; is that correct?

12 A. That certainly would seem to be the case.

13 Q. What is Exhibit 3? Just briefly identify what  
14 that is for the Examiner.

15 A. Exhibit 3 is a log from the Yates well, the well  
16 due north of the Yates saltwater disposal well. It's a  
17 density neutron of the perforated zone and the DST'd zones  
18 in that well.

19 Q. Okay. Now, what's significant about this log?

20 A. Well, two things are significant. One, it's a  
21 quality well offsetting a disposal well, which was of  
22 concern in the previous case.

23 And secondly, I think striking to me is the fact  
24 that it has a limestone cap in this well, which I think is  
25 indicative of additional trapping potential for the wells

1 on the southeast side of the Dagger Draw field.

2 Q. Okay. Does this log -- You know, on page 2  
3 you've got something colored in, you've got the colorations  
4 on this page 2 of this exhibit. What do they show?

5 A. All right, the blue highlighted area on the far  
6 right track is the density neutron, where the density  
7 neutron, this log was run on a limestone matrix. So with a  
8 density neutron track on top of each other, you're looking  
9 at a limestone. Where they separate with the neutron to  
10 the left, you're looking at a dolomite.

11 So what we have here is a 20-foot limestone seal  
12 at the top of the Cisco/Canyon.

13 Q. And on your Exhibit 1, you also highlighted in  
14 blue the limestone, did you not?

15 A. On Exhibit 1, on the western side, you can see  
16 the dolomite interfingering into limestone stringers as you  
17 go updip to the west, and I think indicative of showing  
18 trapping potential significantly caused by these  
19 impermeable limestone stringers.

20 Q. Now, I'll hold up what was Exhibit -- Nearburg  
21 Exhibit 15. On this map, the good wells they put on here  
22 also have the limestone fingering, don't they?

23 A. The one on the west is a good well, and as you  
24 can see it's got a very distinctive limestone cap at the  
25 top.

1           Q.    And the Anadarko Titan saltwater disposal well  
2   and the Nearburg 22-2 well, they don't have limestone caps?

3           A.    In both those wells what we're looking at is  
4   almost a total dolomite section, and the absence of the  
5   limestone stringers potentially breaking this carbonate  
6   bank up into those reservoirs is not apparent in those  
7   wells.

8           Q.    So if you take your Exhibit 1, together with this  
9   Exhibit 3, together, it appears that -- what? For one  
10   thing you need dolomite with -- what? Greater than --

11          A.    You've got multiple hundred feet of dolomite with  
12   good porosity stringers in excess of four percent. It runs  
13   up to 10 or 12 percent. So within the dolomite we have  
14   tight and porous stringers, the tight stringers being less  
15   than four percent, and they're considered nonreservoir.

16                And in addition to that, within the same  
17   reservoir we have tight limestone stringers, and it would  
18   appear to me as if the limestone stringers are a more  
19   important seal than even the dolomite stringers.

20          Q.    So in addition to what you're saying that the  
21   evidence shows that the injected water didn't have any  
22   harm, are you telling me that the Nearburg well they're  
23   complaining about just doesn't have it to be a good well?

24          A.    Doesn't seem to have as good a criteria as the  
25   wells to the west with the limestone stringers that provide

1 additional seals throughout the bank.

2 Q. Okay. Now, back to your Exhibit 3, the  
3 coloration here, what does the orange indicate?

4 A. That's that zone on top of the producing zone  
5 which tested no oil and recovered formation water on a  
6 drill stem test in the Yates well. It's the same zone that  
7 was highlighted on a previous cross-section as being a  
8 water zone above the producing interval.

9 Q. In your opinion, is having that water zone above  
10 the producing interval also evidence of some type of  
11 barriers that may exist within this pool?

12 A. It would argue to me that there are multiple  
13 barriers in this reservoir, that we are not talking about a  
14 common reservoir if we've got water zones on top of oil  
15 legs, yes.

16 Q. Complex reservoir?

17 A. Yes, sir.

18 Q. Finally, Mr. Phares, what is your Exhibit 4?  
19 What does that represent?

20 A. In Exhibit 4, those are the completed wells in  
21 the nine sections, including the saltwater disposal well in  
22 Section 22. Highlighted in pink are all the wells that  
23 attempted to complete in the Cisco/Canyon interval.  
24 Highlighted in blue is the saltwater disposal well,  
25 Anadarko's well, in Section 22.

1           What was significant to me on this exhibit was  
2   that the easternmost wells on this exhibit are the -- for  
3   the most part, the poorest wells in the nine-section area.  
4   East of the saltwater disposal well we have a noncommercial  
5   well. East of that well we have another noncommercial  
6   well. Section 27, the easternmost well, Number 18 in  
7   location 27 F, is a noncommercial well.

8           East of those wells we have wells that have  
9   certainly seen this Canyon/Cisco section because they've  
10   been completed in the Morrow, but nobody has, as of yet,  
11   made a Cisco/Canyon completion east of the saltwater  
12   disposal well in 22, 23, Section 27 or 26.

13           It argues that we are beginning to define the  
14   southeastern side of the Dagger Draw field, as evidenced by  
15   the -- it's not on this section; it was on the previous  
16   plat -- the two dryholes in Section 31, the other two  
17   dryholes in Section 32, which in the previous testimony  
18   last time the case was heard, it was testified that the two  
19   dryholes in Section 31 could possibly mark the southeastern  
20   limit of the reservoir in that section.

21           So I think we know we're pushing the limits over  
22   here. The limit is not, certainly, clearly defined at this  
23   point. But the well in 27, the two wells in 22, begin to  
24   clarify, I think, where that limit should be placed.

25           Q. One final thing, Mr. Phares, and you might need

1 to get up to point out a few things here. This is Nearburg  
2 Exhibit 11, I believe, which is the new log they presented.  
3 What can you tell us about this log?

4 A. Well, again going back to the model that  
5 limestone stringers play an important role in the trapping  
6 mechanism in this reservoir, this is located in 22 M, the  
7 southwestern corner of Section 22.

8 The interpretation on this log is that these  
9 zones highlighted here are limestone stringers  
10 interfingering again in the dolomite. Any time these  
11 things roll over, as we've got some fluctuations in this  
12 field, moving updip, we have potential trapping.

13 And all the cross-sections that we've seen  
14 before, where we have multiple perforations, very often  
15 they're located below these limestone stringers. So I  
16 think the limestone plays a role in the trapping potential  
17 of this flank position that we're currently discussing for  
18 the field.

19 Q. Do you have anything further you'd like to point  
20 out at this time, Mr. Phares?

21 A. No, sir.

22 Q. Now, you prepared Exhibit 4, didn't you, Mr.  
23 Phares?

24 A. Yes, I did.

25 Q. And on Exhibit 1, you reviewed the data and you



1 agree with it on those wells?

2 A. Yes, I did.

3 Q. And Exhibits 2 and 3 are merely -- one is a  
4 report filed with the Division, and another is just a well  
5 log that you compiled from Yates' records; is that correct?

6 A. Yates provided the Exhibit 3 to us, and you're  
7 right, the regular is just a published report.

8 Q. Okay. In your opinion, is the denial of  
9 Nearburg's Application in the interests of conservation and  
10 the prevention of waste?

11 A. That is correct. The only new data that I've  
12 been able to review since the last hearing is the drilling  
13 of the offset well, which is an outstanding oil well.

14 MR. BRUCE: Mr. Chairman, at this time I'd move  
15 the admission of Titan's Exhibits 1 through 4.

16 CHAIRMAN LEMAY: Without objection, Exhibits 1  
17 through 4 will be admitted into the record.

18 MR. BRUCE: And I'll pass the witness.

19 CHAIRMAN LEMAY: At this time, Mr. Turner, do  
20 you want to admit your exhibits? I'm not sure that they  
21 were --

22 MR. TURNER: Yes, I would move the admission of  
23 Nearburg's Exhibits -- I believe they're 1 through 18, with  
24 the exception that 16 was -- there is no 16.

25 CHAIRMAN LEMAY: Okay, thank you. Without

1 objection, those exhibits will be admitted into the record.

2 Mr. Turner?

3 CROSS-EXAMINATION

4 BY MR. TURNER:

5 Q. Mr. Phares, you -- in your work experience with  
6 Mobil, did you ever spend any time working in the Dagger  
7 Draw area?

8 A. No, I did not.

9 Q. Prior to your employment by Titan for this  
10 matter, had you spent any time in evaluating the Dagger  
11 Draw area and its production?

12 A. No, sir, I did not.

13 Q. Okay. During your time that you've been employed  
14 with Scott Hickman Group, have you spent any time  
15 evaluating the Dagger Draw production?

16 A. No, I have not.

17 Q. Okay. Are you familiar with the fracture  
18 orientation in the Dagger Draw area?

19 A. No, I'm not familiar with any fracturing in the  
20 Dagger Draw area.

21 Q. Okay. Your testimony regarding the fracturing in  
22 the area in regards to the Ross 14 Number 1 well that you  
23 cited as the only new evidence presented, if the fracture  
24 orientation was from east to west, would it be true that  
25 that then may not have any effect on the quality of a well

1 that was to the -- a north offset to the disposal well?

2 A. If the fracture orientation in the well north of  
3 the saltwater disposal well and the Yates -- the new Yates  
4 well, if it were -- ?

5 Q. -- an east-west orientation, might it not have  
6 any bearing at all on the quality of the well to the north  
7 of the disposal well?

8 A. In all zones?

9 Q. Yes.

10 A. If there were fracturing and if it were east-west  
11 and you disposed in -- I would expect the water to go east-  
12 west in the disposal well.

13 Q. Okay. So it might not have any bearing at all,  
14 then, on a well that was a north offset to the --

15 A. It might not have.

16 Q. I believe in your testimony regarding the  
17 Nearburg Ross 22 Number 2 well that is the well nearest to  
18 the disposal well, you indicated that the possibility of  
19 vertical migration could exist in this area?

20 A. No, I think I indicated there's a lack of  
21 possibility of vertical migration. I think there's a  
22 significant barrier between -- in that highlighted interval  
23 in excess of 50 or 60 feet of tight dolomite with 1- or 2-  
24 percent porosity.

25 Q. But if there's no limestone present, then, how

1 again would you explain the poor quality of the Nearburg  
2 22-2 well?

3 A. If there's no limestone present?

4 Q. Yes.

5 A. I think that is the explanation, or one of the  
6 explanations, as to why it's a poor well. I think it lacks  
7 some of the trapping potential of wells that have limestone  
8 stringers in them.

9 The offset well also lacks a limestone cap of any  
10 significance or any interfingering of limestone. The well  
11 that Ross drilled is a twin to it. Both wells looked  
12 exactly the same to me.

13 And the other cross-sections that were presented,  
14 all I said was, I noted over and over again that if you  
15 have multiple reservoirs below the top of the dolomite,  
16 they seem to be sitting below a limestone stringer. So it  
17 seems to me as if there's two potential barriers in this  
18 well, one, zero- to two-percent dolomite, and zero-percent  
19 porosity in the limestone stringers.

20 Q. Being a consultant that's been hired by Titan in  
21 this case, you really have -- I guess it's a fair statement  
22 to say that you really have no financial interest in  
23 whether or not there might be damage that could result from  
24 injection of water into these wells, since you have no  
25 interest in any of the wells in this area?

1           A.    That's correct.

2           Q.    In the testimony that Nearburg put on previously,  
3 we indicated that -- let's see which exhibit it is -- there  
4 were several wells that had been completed since the  
5 previous hearing in this case, several of which were  
6 productive in the C zone, which is the same zone that water  
7 is being injected into in the disposal well.

8                    Could you explain to me why it is that you think  
9 that the only well of significance that you chose to talk  
10 about today was this Ross 14 well, and why are the others  
11 not significant?

12           A.    Primarily because we're interested in where water  
13 is going in that well and what the configuration of the  
14 bank is in the area of the disposal well.

15                   As we know, the bank is very complex and changes  
16 to the west and to the north. So to describe a  
17 configuration of limestones and dolomites a mile away,  
18 which do not reflect the configuration in and around the  
19 saltwater disposal well, unless we're talking about  
20 injecting the cross-sections here, I just don't really  
21 think it's germane.

22                   I will point out that one of the wells that was  
23 highlighted, which is a recent completion, I guess, or in  
24 the 1990s, is the well in 22 M, and if there is production  
25 down in the C zone, from the examples that I have seen thus

1 far, it requires a limestone stringer down in and around  
2 the C, which we do not have in the area that we're talking  
3 about.

4           So I'm not saying we can't produce down there,  
5 but it seems to me at this point, from the evidence that  
6 I've seen on the cross-sections, when we have lower  
7 reservoirs in this bank, most of the time they seem to be  
8 associated with dense limestone stringers.

9           Without those -- Now, there may be some other  
10 wells. I'm just talking about the cross-sections that I've  
11 been able to review.

12           Q. Have you mapped some of these other wells for  
13 determination of whether or not these limestone stringers  
14 are present?

15           A. No, I've only looked at the exhibits that were  
16 presented in the last hearing, and the new ones that -- and  
17 I've only seen your new ones since today. So I've only  
18 seen the cross-sections that were presented in the last  
19 hearing, the density neutron well from the Yates, that was  
20 new information, from the Yates well north of the saltwater  
21 disposal well, and your 22 M, which again highlights  
22 limestone stringers. So that's the data set that I've been  
23 able to review.

24           Q. As a professional engineer, knowing what you know  
25 about the existence of the quantity of water that's been

1 injected into this disposal well, into this C zone, and  
2 knowing also that there -- now that there are wells in the  
3 area that are capable of producing in the C zone, as well  
4 as the B zone and possibly above, are you saying that you  
5 as an engineer would not have any concern about drilling  
6 wells in this area, given the history of the water  
7 injection into this disposal well?

8 A. I'm the geologist. I don't know if you want to  
9 still ask that to me or if you want to ask Lewis. I'm not  
10 an engineer. I have mapped  $\phi h$  in a number of reservoirs,  
11 to calculate volumes for remaining oil and for what it's  
12 going to take to fill up a reservoir. I have not attempted  
13 to do so in and around these wells.

14 So the volume that might be occupied by the  
15 injection in either the Yates well or the Anadarko well, I  
16 wouldn't guess at, at this point.

17 Q. If there are no limestone stringers found to be  
18 present in the Anadarko disposal well, where did the  
19 initial oil production from the production testing that was  
20 conducted on that well come from?

21 A. My model would be that the -- The tight dolomites  
22 are capable of creating a seal to stack up some  
23 hydrocarbons. However, I think that the limestone  
24 stringers are a better seal and that the chances of  
25 stacking up hydrocarbons underneath the limestone stringers

1 gives you a greater opportunity to stack up a better oil  
2 column. So I think it's similar to a poor seal in that you  
3 develop a certain capillary pressure below and you can  
4 stack up X amount of hydrocarbon column below a poor seal,  
5 but you can stack up a lot more below the limestone.

6 So my guess would be that below the dolomites, if  
7 they are not absolute zero, the you're going to get a  
8 higher water cut in those reservoirs, as opposed to the  
9 ones that are underneath the limestones, which are better  
10 seals. That would be my model. If I was going to go map  
11 the field, I would attack that and see if that held up.

12 Q. If it is a poor seal, then if water is disposed  
13 into the C zone, could then it escape up into the B zone?

14 A. In geologic time, yes, but I don't think in our  
15 time.

16 MR. TURNER: No further questions.

17 CHAIRMAN LEMAY: Thank you.

18 Commissioner Bailey?

19 EXAMINATION

20 BY COMMISSIONER BAILEY:

21 Q. Is frac'ing a normal part of the completion  
22 procedures for these wells?

23 A. Is frac'ing?

24 Q. Uh-huh.

25 A. I don't believe so.



1 Q. I'm trying to summarize what you've said. There  
2 is no seal, injection has been maintained within the  
3 formation, but yet we don't know the orientation of  
4 fractures, we don't know where the water's gone that has  
5 been injected into this well?

6 A. No, I would say that there is a seal. I'm saying  
7 that there's two seals in the Canyon bank. There's the  
8 limestones, which present the best seal, and there is zero-  
9 to four-percent dolomites. If you have a significant  
10 interval of those, I think they also represent a seal. So  
11 my expectation would be that if you injected below 60 feet  
12 of zero- to four-percent dolomite, your injection has  
13 stayed below the -- has stayed in the C interval.

14 I am not aware of any evidence of fracturing that  
15 was presented here today or in the previous hearing, so as  
16 far as east-west or fracturing, the only evidence that I've  
17 seen suggests that that is not the case.

18 CHAIRMAN LEMAY: Commissioner Weiss?

19 COMMISSIONER WEISS: I have no questions.

20 EXAMINATION

21 BY CHAIRMAN LEMAY:

22 Q. That well in M of 22, is that a very good well?

23 A. I think they testified that it is a -- you know,  
24 that it is a good well.

25 Q. It's not?

1 MR. BRUCE: I think the testimony was that it  
2 produces 700 to 800 barrels a day, Mr. Chairman.

3 Q. (By Chairman LeMay) Good well. M of 22, good  
4 well.

5 A. M of 22, southwest corner, southwest-southwest.

6 Q. Does that have your limestone seals?

7 A. Yes, it does. That's the one that we hung up on  
8 there that has multiple --

9 Q. That and the Yates well?

10 A. Yes. The Yates well only has one at the top.  
11 This one has four or five.

12 Q. Where do you think the water has gone?

13 A. I think the water in the Anadarko well has gone  
14 into C. I see no reason for it to go anyplace else. And  
15 in that area is still in C.

16 CHAIRMAN LEMAY: Any other questions? If not,  
17 the witness may be excused.

18 Thank you, Mr. Phares.

19 MR. BRUCE: Call Mr. Moseley to the stand.

20 JOHN L. MOSELEY, III,

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

23 DIRECT EXAMINATION

24 BY MR. BRUCE:

25 Q. Would you please state your name and your city of

1 residence?

2 A. John L. Moseley, III, Midland, Texas.

3 Q. And who do you work for?

4 A. I'm employed as a consulting petroleum engineer  
5 by T. Scott Hickman and Associates in Midland.

6 Q. And what is your relationship to Titan in this  
7 case?

8 A. We were retained by Titan several days ago to  
9 represent them in this case.

10 Q. Have you previously testified before the  
11 Commission as a petroleum engineer?

12 A. Yes, I have.

13 Q. And were your credentials as an expert accepted  
14 as a matter of record?

15 A. Yes, they were.

16 Q. And have you examined the engineering matters  
17 pertaining to the saltwater disposal well in the  
18 immediately surrounding area?

19 A. Yes, sir, I have.

20 MR. BRUCE: Mr. Chairman, I tender Mr. Moseley as  
21 an expert petroleum engineer.

22 CHAIRMAN LEMAY: His qualifications are  
23 acceptable.

24 Q. (By Mr. Bruce) Just a couple things, Mr.  
25 Moseley. You were here listening to Nearburg testify, were

1 you not?

2 A. Yes, sir.

3 Q. And there was some questions about pressure  
4 gradient. Could you discuss that with respect to injection  
5 into the Titan saltwater disposal well?

6 A. The way I visualize this, at least in the area  
7 surrounding the saltwater disposal well in question, which  
8 would be Section 22 primarily, I visualize the -- a water  
9 leg or a water aquifer downdip in Section 22 that's tending  
10 to feed or to resupport or repressure the withdrawals that  
11 are occurring updip within the Canyon/Cisco interval.  
12 Consequently, the pressure gradient that's occurring here  
13 is east to west, because most of the withdrawals are  
14 certainly coming from the western portion of the field  
15 here.

16 This has been described in the literature as  
17 being a partial water drive combination solution gas drive,  
18 which I tend to agree with. If you look at some of the  
19 drill stem test pressures that have been taken in 1995 in  
20 some of these wells, you'll see shut-in pressures in the  
21 neighborhood of 2400 to 2500 pounds, as compared to maybe  
22 3000, 3100 pounds, original pressure. So although it's not  
23 a complete water drive, certainly it is a significant water  
24 drive, in my view, based on that information.

25 Q. Okay. So any injection, if it's moving anywhere,

1 should tend to move to the west; is that --

2 A. That's correct.

3 Q. Now, do you view the new Yates well, the Ross EG  
4 Number 14, as significant?

5 A. I would say it's significant in the sense that  
6 it's certainly a good well, and it's offsetting a saltwater  
7 disposal well that is, in fact, injecting into generally  
8 the same upper portion of the pay. So if anything, that  
9 might have been a help to that well in terms of its oil  
10 production.

11 Q. What is Exhibit 5, Titan Exhibit 5?

12 A. Exhibit 5 is just a depiction of the production  
13 from the Ross EG Federal 14, which is the new Yates well  
14 that went on, I believe, in November. It's produced over  
15 50,000 barrels of oil and is still making about 350 barrels  
16 a day, at the current time.

17 Q. And this well is about 1200 feet away from the  
18 Yates saltwater disposal well?

19 A. That's correct, 1200 feet north of the original  
20 Yates saltwater disposal well.

21 Q. And that Yates well injected -- what? Six and a  
22 half million --

23 A. Six and a half million barrels, roughly, yes.

24 Q. Okay. Do you see anything anomalous in this  
25 production curve?

1 A. No, sir, I don't.

2 Q. And did you review the testimony transcript from  
3 the prior September, 1995, hearing in this matter?

4 A. Yes, I did.

5 Q. And was this well the one that Nearburg was so  
6 concerned about drilling?

7 A. That was my understanding, yes, based on the  
8 transcript.

9 Q. Do you have any other issues that you would like  
10 to point out at this time?

11 A. Well, one thing I didn't mention in terms of the  
12 pressure gradient. It's hard for me to visualize the oil  
13 being swept from a well west -- or east, rather, and  
14 downdip from that saltwater disposal well, in view of the  
15 fact that the pressure gradient is, in fact, east to west.

16 Certainly the injection -- In order to sweep that  
17 location, you would certainly need significant withdrawals  
18 south and east of that location in order to bank that oil  
19 or to produce that oil -- displace that oil in any other  
20 direction.

21 Q. And again, that would assume there's some  
22 communication between the water injection --

23 A. Absolutely.

24 Q. -- zone --

25 A. Absolutely.

1 Q. -- and the producing zone?

2 A. That's right.

3 Q. Was Exhibit 5 prepared by you, Mr. Moseley?

4 A. Yes, it was.

5 Q. And in your opinion, is the denial of Nearburg's  
6 Application in the interests of conservation and the  
7 prevention of waste?

8 A. Yes, sir, I would say so.

9 MR. BRUCE: Mr. Chairman, I would move the  
10 admission of Titan's Exhibit 5.

11 CHAIRMAN LEMAY: Without objection, Exhibit 5  
12 will be admitted into the record.

13 Mr. Turner?

14 MR. TURNER: Thank you.

15 CROSS-EXAMINATION

16 BY MR. TURNER:

17 Q. Mr. Moseley, are you familiar with which  
18 direction in this field would be updip from this disposal  
19 well?

20 A. Well, basically it's got to be west, probably  
21 north. I think there's a general southeast dip here.

22 Q. Okay. And it was Mr. Phares' testimony that  
23 the -- he believed that the water that was injected into  
24 the C zone would stay in the C zone, and if that's the  
25 case, and most of the production to date has been to the

1 west, wouldn't that indicate that the productive -- the  
2 wells that were productive in the C zone would eventually  
3 be impacted by the migration of water updip?

4 A. Well, probably no more than the natural aquifer  
5 repressuring that's occurring. You've got a certain amount  
6 of repressuring going on from the aquifer itself, is the  
7 way I view it, which is located southeast.

8 Q. What evidence of the existence of an aquifer do  
9 you have to support that?

10 A. Well, it's been published that the Dagger Draw  
11 field is considered a partial water drive, and downdip is  
12 where your water is going to be coming from, if it is in  
13 fact a water-drive reservoir.

14 Q. Have you spent any of your professional time,  
15 other than at these proceedings today, studying the Dagger  
16 Draw field?

17 A. I have not studied the Dagger Draw field in  
18 total. I have studied -- evaluated a number of wells and  
19 leases within the field itself.

20 Q. But for what purposes?

21 A. Mainly for acquisition purposes.

22 Q. But you don't really have any personal experience  
23 with the operations, from an operations standpoint,  
24 regarding the nature of these wells?

25 A. Not directly, no.



1 Q. How recently have you done other work in the  
2 Dagger Draw area, other than the work in preparation for  
3 today's hearing?

4 A. We looked at some stuff back to the west probably  
5 two or three years ago.

6 Q. I'm sorry, the answer was -- ?

7 A. Probably two or three years ago, we looked at  
8 some properties back to the west.

9 Q. Okay, and the literature that you referred to  
10 regarding the existence of an aquifer in this area, what  
11 time period was that from?

12 A. Well, that's from the -- in fact, right out of  
13 the 1976 New Mexico Geological Symposium book.

14 Q. 1976?

15 A. Yes.

16 Q. Do you know how many wells existed in the Dagger  
17 Draw field at that time?

18 A. I couldn't tell you exactly, no.

19 MR. TURNER: I have no further questions.

20 CHAIRMAN LEMAY: Commissioner Bailey?

21 COMMISSIONER BAILEY: No questions.

22 CHAIRMAN LEMAY: Commissioner Weiss?

23 EXAMINATION

24 BY COMMISSIONER WEISS:

25 Q. Yes, sir, Mr. Moseley, during your review of the

1 DST pressure information --

2 A. Yes.

3 Q. -- did you get enough information where you could  
4 draw some isobars, sketch them on Exhibit 4? Could you  
5 make a stab at it?

6 A. We certainly could. We did not do that, but it  
7 certainly could be done, yes.

8 Q. Could you -- Would you do it? Do you know it off  
9 the top of your head?

10 A. Oh, no, not off the top of my head, no, I'm  
11 sorry.

12 Q. Okay, that takes a lot of work.

13 A. No. Right. I would have to go back to the data  
14 itself. Just from just observing the data as I worked  
15 through it, I noticed that the pressures were in that 2400-  
16 to 2500-pound range.

17 Q. To the west and 3300 or something to the east?

18 A. Well, not -- No, not so much that, but in terms  
19 of the original reservoir pressure here --

20 Q. Yes.

21 A. -- in other words, at discovery, you're talking  
22 about a range of 3000 to 3300 maybe.

23 Q. Okay. So --

24 A. So what I'm -- The point I was trying to make  
25 was, there has been some pressure drawdown, certainly.

1 Q. Yeah, but whether it's on the east or west, you  
2 don't know?

3 A. No, I have not looked at the pressures back to  
4 the west, so I don't know what the status of those are.

5 Q. Did you look at them -- Is there a pressure  
6 difference in the information that you studied, not just  
7 from discovery to current, but the more recent wells? Is  
8 the drift to the west?

9 A. I couldn't say that, really, without further  
10 study.

11 COMMISSIONER WEISS: Okay. Thank you, that was  
12 the only question I had.

13 EXAMINATION

14 BY CHAIRMAN LEMAY:

15 Q. Okay, Titan's got consultants. Maybe you can't  
16 answer this, but did Titan acquire Anadarko's interest --

17 A. Yes.

18 Q. -- in production?

19 And they got these -- Is there any production  
20 that Titan owns in the field?

21 A. Yes, in fact, they have a well to the north and  
22 I'm not sure of the name of it. It's a couple of miles to  
23 the north. And water that they are producing from that  
24 well is going to the saltwater disposal well, in addition  
25 to Texaco's water, which they're disposing of.

1           So it's a commercial -- a profit center to them,  
2   in terms of the disposal well itself.

3           Q.   And Titan acquired its interests from Anadarko --

4           A.   That's correct.

5           Q.   -- a year ago, or were you involved in that,  
6   or --

7           A.   In January, as I recall.

8           Q.   January of --

9           A.   -- of this year, yes.

10          CHAIRMAN LEMAY:  Oh, okay.

11          MR. BRUCE:  It might have been December of 1995.

12          THE WITNESS:  Or December.  I'm not sure of the  
13   exact date of the acquisition.

14          Q.   (By Chairman LeMay)  Okay.  And prior to that,  
15   Titan didn't have any production in the field?

16          A.   Not that I'm aware of.

17          MR. BRUCE:  It might -- I hate to testify, Mr.  
18   Chairman, but I -- They are a new company.  I was informed  
19   they were formed, I believe, last summer, or maybe --  
20   sometime last year.  They're based in Midland, and they are  
21   -- This was their first acquisition in New Mexico.

22          CHAIRMAN LEMAY:  Thank you, that helps, who we're  
23   trying to figure out -- There's a Titan involved in  
24   Columbia, and I didn't know if it was an international  
25   company or how they acquired their interest or what --

1 MR. BRUCE: This is a domestic --

2 CHAIRMAN LEMAY: -- what that picture is.

3 MR. BRUCE: -- I believe it's an onshore.

4 CHAIRMAN LEMAY: Okay.

5 THE WITNESS: Yeah, as far as I know, it is,  
6 Titan Resources.

7 CHAIRMAN LEMAY: Okay, thank you. That helps.

8 I have no questions. Thank you.

9 MR. BRUCE: I have nothing further to present.

10 CHAIRMAN LEMAY: Maybe we'd like to -- we've done  
11 this occasionally -- the Commissioners would like, after  
12 hearing both sides, maybe to ask some questions of some of  
13 the witnesses that have testified before or the ones that  
14 are here now. Is that acceptable to both of you?

15 Commissioner Bailey, do you have any questions  
16 that you would like to throw out there, that maybe you  
17 haven't had an expert witness to address that's bothering  
18 you or --

19 COMMISSIONER BAILEY: I'd like to explore the  
20 quality of the waters and if there's any way that we can  
21 distinguish the commercial waters that are being disposed  
22 into that well and the formation water.

23 MR. BRUCE: Yeah, I don't have anybody here who  
24 can testify on that. I can certainly ask Titan what wells  
25 and what zones the injection water is coming from, if that

1 would help.

2 COMMISSIONER BAILEY: Okay, because there will be  
3 a fingerprint from the other waters that are produced,  
4 possibly from the Texaco wells.

5 MR. McDONALD: The Texaco wells are producing  
6 from the Cisco/Canyon, as well as the Titan well. So it's  
7 all similar.

8 COMMISSIONER BAILEY: So all of the --

9 MR. McDONALD: Right.

10 COMMISSIONER BAILEY: -- water is from the  
11 Cisco/Canyon --

12 MR. McDONALD: Right.

13 COMMISSIONER BAILEY: -- you can't have any kind  
14 of --

15 MR. McDONALD: Right. No, unfortunately.

16 COMMISSIONER BAILEY: -- analysis? Thank you.

17 MR. McDONALD: And all the wells, by the way, are  
18 acid-frac'd when they're completed. That was a question  
19 that you asked.

20 COMMISSIONER BAILEY: So is it possible that some  
21 of these fracturing techniques, particularly in the prior  
22 wells, have opened up fractures between the zones?

23 MR. McDONALD: I think some of the vugs also,  
24 yes.

25 COMMISSIONER BAILEY: And that would provide

1 conduits --

2 MR. McDONALD: We do it to mainly tie the vug  
3 system together.

4 I'm sorry?

5 COMMISSIONER BAILEY: And that would provide  
6 conduits between the different zones?

7 MR. McDONALD: I would think it would.

8 CHAIRMAN LEMAY: Do you think it's water drive,  
9 the field?

10 MR. McDONALD: No, I think it's very weak water  
11 drive. I think there's a component, there is an aquifer  
12 off to the east. But I think the withdrawals are so much  
13 greater than what the aquifer is supplying that we're not  
14 seeing any effect whatsoever from the water drive when  
15 we're pulling these.

16 And you have to look also, these wells are  
17 drilled on 160s, and if you just look at the DSTs, the  
18 second or third well on a 160 might be 1300 pounds, versus  
19 the first one at 2400 pounds. So there's that much  
20 communication between the wells.

21 So it's hard just to -- I mean, there's wells out  
22 to the east that have DSTs that are 1300 or 1400 pounds  
23 bottomhole pressure too. It just depends on when they were  
24 drilled in that 160-acre unit.

25 I think that's one of the differences in Indian

1 Basin. Over in Indian Basin, you do have an effective  
2 water drive over there.

3 CHAIRMAN LEMAY: Commissioner Weiss?

4 COMMISSIONER WEISS: Yeah, it's not clear to me  
5 -- I understand that both sides have presented evidence of  
6 geology and that Nearburg would like to have Titan stop  
7 injecting water in that well, but I don't know why you want  
8 them to stop.

9 MR. ELGER: Can I answer that? Again, the  
10 exhibit that I've prepared, which is a structural exhibit,  
11 it's my Exhibit, cross-section, Number 14, and I go back to  
12 that cross-section where I've shaded only the C zone, I  
13 only address the C zone in this cross-section.

14 And this cross-section shows, has demonstrated,  
15 most of the wells that I've incorporated on this cross-  
16 section are new wells, fairly recently drilled wells. And  
17 they're good commercial wells. They make -- Like I said,  
18 the Nearburg Osage well, which is -- the Osage Number 3,  
19 which is the second from the left, has produced rates in  
20 excess of a thousand barrels of oil per day, only from the  
21 C zone.

22 When you take where that C zone exists in a  
23 structural perspective, relative to this saltwater disposal  
24 well, where Anadarko or Titan is putting water in the C  
25 zone, they're putting water into the C zone structurally



1 where its oil is being withdrawn out of these other wells.

2 COMMISSIONER WEISS: But we don't know where the  
3 water went, I thought.

4 MR. McDONALD: That's the problem.

5 COMMISSIONER WEISS: I mean, this is crazy. I  
6 mean, we've got a lot missing. We don't know where the  
7 water is.

8 MR. McDONALD: Exactly. And I think a lot of it  
9 ties with -- We've run a lot of imaging tools in this  
10 field, and we do see fractures, we see vugular enhanced  
11 fractures. And I think that ultimately, as we run more of  
12 these, we're going to be able to identify fracture  
13 orientation.

14 And until we do that, we don't know where the  
15 water is going. So it may be damaging the wells or  
16 affecting wells to the north-south. We don't know that  
17 until we determine that, and how can we sit here and inject  
18 water --

19 COMMISSIONER WEISS: Yeah.

20 MR. McDONALD: -- into a productive --

21 COMMISSIONER WEISS: So you don't know whether it  
22 affected the 22-2, do you?

23 MR. ELGER: That's correct.

24 MR. McDONALD: Nobody knows at this point.

25 MR. ELGER: And because the water -- We can't

1 fingerprint the water, because what's being disposed of in  
2 that well is Canyon-produced water. There's no  
3 identification of that water. We might be -- It might be  
4 going in the Anadarko well and coming out the Nearburg  
5 well.

6 CHAIRMAN LEMAY: Is it possible that you've got a  
7 positive influence on oil production? This could flow the  
8 bank of oil like a water drive --

9 MR. McDONALD: There may be some leases --

10 CHAIRMAN LEMAY: -- lose somebody all their  
11 wellbore?

12 MR. McDONALD: For some leases there may be, and  
13 there may be, obviously, adversely affected ones as well.  
14 So it's hard to -- It just doesn't seem to make sense to  
15 inject water into a -- you know, it's obviously a  
16 productive formation, not knowing where it's going, who  
17 you're hurting and who you're not hurting.

18 And we're out here drilling lots of wells to  
19 develop this, you know, spending lots of money to try to  
20 make wells out here, and it just seems a shame to have one  
21 commercial injection well injecting in the middle of our  
22 development.

23 MR. ELGER: You know, the testimony that Anadarko  
24 presented when they initially production tested the  
25 disposal well prior to the injection of water -- and their

1 recovered hydrocarbons, their well flowed 60 barrels of oil  
2 and 260 barrels of water in a 24-hour period. To me, that  
3 indicates there's oil in the reservoir rock opposite the  
4 perforations in that well.

5 MR. MOSELEY: Yeah, but that's not --

6 MR. ELGER: Now, we drill a well right next to  
7 that well and come in basically structurally flat and don't  
8 get a hydrocarbon show, in that same equivalent section.  
9 What that tells me is that the oil has moved past our well  
10 due to the disposal in these perf- --

11 MR. MOSELEY: Where did that all go if it's moved  
12 past your well?

13 MR. ELGER: Well, it moved off of Nearburg's  
14 lease.

15 MR. MOSELEY: Well, which direction?

16 MR. McDONALD: That's what we're trying to  
17 determine, but that's --

18 MR. ELGER: You know, we can't determine where  
19 the water -- where the oil has migrated to, but it's no  
20 longer under Nearburg's lease.

21 MR. PHARES: I don't think the completion  
22 practices in this field argue against a fractured reservoir  
23 system. I just don't think that you would --

24 MR. ELGER: Fracturing doesn't have anything to  
25 do with this. I'm talking about --

1 MR. PHARES: I thought that's how this water is  
2 getting around, if you're -- if you've got fracturing, you  
3 want to move water from a from C up to A and then two miles  
4 over.

5 CHAIRMAN LEMAY: We've gotten a little too casual  
6 here.

7 (Laughter)

8 CHAIRMAN LEMAY: I appreciate this kind of  
9 discussion; it's very enlightening. But for the record,  
10 it's difficult to get it. And also we need to kind of  
11 control the topic.

12 So I would prefer that the Commissioners would  
13 ask the questions individually and not you all ask them of  
14 each other.

15 Bill?

16 COMMISSIONER WEISS: No, that's my quandary, is,  
17 I see no direct evidence that the water is swept through.  
18 There's indirect, perhaps. But then again, is it a bum  
19 well because of these lack of stringers?

20 MR. McDONALD: It's not only that well -- well,  
21 it's -- You're still putting water in the ground.

22 MR. SHELTON: You know, we've got other leases  
23 surrounding this acreage that we will also be drilling to,  
24 and what we're trying to do is protect ourselves from oil  
25 being swept not only off this acreage that we have where

1 the Ross Ranch 22 well is, but also moving through like on  
2 the southwest quarter of Section 15, which is within a half  
3 mile of the disposal well, we have wells planned in that  
4 immediate area too.

5 So what we're trying to do is protect our  
6 correlative rights so we have an opportunity to drill and  
7 develop more wells without seeing the influence of oil  
8 movement through the C zone possibly up through the B zone.  
9 We're trying to protect our acreage here and our offsetting  
10 acreage for future development of the field.

11 MR. BRUCE: Mr. Chairman, could I just ask Mr.  
12 Shelton, how long has Nearburg had these leases?

13 MR. SHELTON: Pardon?

14 MR. BRUCE: How long has Nearburg owned these  
15 leases in Sections 15, 22, 27?

16 MR. SHELTON: Since, you know, the mid-1980s,  
17 we've had these leases. And, you know, one of the reasons  
18 we drill -- We have lease expirations out here. We drill  
19 these wells because of lease expirations also.

20 CHAIRMAN LEMAY: let me just ask a question or  
21 two here. You've got the majority of interest in the  
22 field, I assume. Conoco's got some interest. I think they  
23 acquired that by Hanks, or at least they have some  
24 interest. Nearburg has interest, Titan has a well or two,  
25 I guess, but not a large interest. Yates has a huge

1 interest. Does Yates have anything to say in this case? I  
2 don't see them here. I don't see anything in the record.

3 MR. TURNER: My response from that is not from an  
4 evidentiary standpoint, other than the fact that the prior  
5 Hearing Examiner made -- came to the decision that the  
6 Yates well should be shut in. And even prior to that,  
7 Yates voluntarily shut in that well. We think -- because  
8 they do have an interest out there, and they felt, I think,  
9 some potential risk for continued injection into their own  
10 well, so they ceased.

11 CHAIRMAN LEMAY: But they're not here to state  
12 any kind of opinion concerning this case?

13 MR. BRUCE: Mr. Chairman, at the last hearing  
14 they opposed Nearburg's Application, and as Mr. Turner  
15 said, they voluntarily shut in their well.

16 They've since drilled this other well that's  
17 good, and I think they wrote a letter to the Commission  
18 saying that they weren't following up at this time because  
19 they don't need that saltwater disposal capability.  
20 There's a letter, I believe, in the Commission's file.

21 CHAIRMAN LEMAY: Does Titan need the saltwater  
22 disposal capability in this well?

23 MR. BRUCE: I believe they do, for their well.  
24 You know, Yates -- I think it's pretty common. You know,  
25 Nearburg has some saltwater disposal systems out there,

1     Yates has a massive system.

2             But yeah, I mean, with the quantities of water  
3     this formation -- this zone produces, it's necessary.

4             MR. TURNER: And my response to that is that  
5     there are other options out there, options of disposal  
6     wells in this area that are taking water into the Devonian  
7     formation at the same price that it would cost to dispose  
8     of water into this well, a safer approach to disposal  
9     that's not jeopardizing a productive interval.

10            MR. SHELTON: We would be happy to take their  
11     limited amount of water. From what I understand, they're  
12     only themselves producing about 200 barrels a day that  
13     currently goes into this system, and we have a connection  
14     within a few hundred feet. We'd be more than happy to  
15     supply a connection to dispose of their water at the same  
16     price they're charging Texaco to do so, and try to  
17     alleviate this problem without any harm to them whatsoever.

18            MR. BRUCE: Except the cost.

19            CHAIRMAN LEMAY: Except the cost. Interference  
20     with Texaco's water -- they have a profit-making option.

21            MR. MOSELEY: Exactly.

22            CHAIRMAN LEMAY: Any other questions from the --

23            COMMISSIONER WEISS: I have no other questions.

24            CHAIRMAN LEMAY: Commissioner Bailey?

25            Did you all want to summarize, or just let it go

1 at that?

2 MR. TURNER: I'd like a brief summary.

3 MR. BRUCE: Okay.

4 CHAIRMAN LEMAY: Okay.

5 MR. BRUCE: Mr. Chairman, I go first.

6 MR. TURNER: Right.

7 MR. BRUCE: One preliminary thing. I would -- I  
8 meant to do this at the beginning of the hearing -- move to  
9 incorporate the record of the September, 1995, Examiner  
10 Hearing --

11 CHAIRMAN LEMAY: Okay, I was going to ask you  
12 whether you want that record incorporated. Is that  
13 acceptable, record of the September hearing? Okay.

14 MR. BRUCE: -- because obviously Anadarko and  
15 Yates did testify at that hearing.

16 CHAIRMAN LEMAY: Okay.

17 MR. BRUCE: As I indicated at the beginning of  
18 the hearing today, the OCD has held three times that water  
19 injected into this interval, that the Titan well is  
20 injecting into, is separated from the producing interval.  
21 Nearburg has not presented any new evidence that this has  
22 changed.

23 For their evidence, they use wells three and a  
24 half miles away or wells a mile and a quarter away, but  
25 they have consistently ignored the Yates Ross EG 14 well,



1 which is just a quarter mile away. In that well, the  
2 injection interval from Yates' saltwater disposal well and  
3 the producing interval from the Number 14 well are exactly  
4 the same. Yates injected over a period of time 6.5 million  
5 barrels of water into its injection well, drills a well  
6 1200 feet away. It's a great well; in the space of three  
7 months it's produced 50,000 barrels.

8           During the rebuttal arguments here, Mr. McDonald  
9 says that there's a great amount of communication between  
10 wells. Well, if that's the case, why is the Yates new well  
11 such a good producer?

12           We think that what you're looking at is, just as  
13 Mr. Phares said, there's a separation of zones in this  
14 pool. There's many separations of zones.

15           Every geologist, every engineer who has ever  
16 gotten up to testify in this series of hearings or in the  
17 pool rules hearings for the North Dagger Draw and the South  
18 Dagger Draw, all they've ever said is that this is an  
19 extremely complicated reservoir. And I don't mean to  
20 insult the geologists here, but they've kind of said, We're  
21 not sure what's happening.

22           But the fact is, Nearburg cannot point to any  
23 communication between these Cisco/Canyon zones.

24           At page 92 of the September, 1995, transcript Mr.  
25 Elger could not positively state that there was any

1 communication between these Cisco/Canyon zones.

2 As a matter of fact, if you go read that  
3 transcript, if you came back in a few weeks and read this  
4 transcript, you'll see that their presentation is purely  
5 speculation. Their testimony, the witnesses of Nearburg,  
6 their testimony is peppered by "possibly" or "could be" or  
7 "might be", when asked what's happening.

8 They have not presented any evidence, certainly  
9 no new evidence, of any communication of zones at this  
10 hearing. No harm has occurred to Nearburg or to the  
11 offsetting Yates interests. In fact, since this is as at  
12 least a partial water drive, people are being benefitted by  
13 the water injection.

14 In September, 1995, at the last hearing, Yates,  
15 which opposed Nearburg's Application, said that once in a  
16 while in this pool, you get a poor well. That's what  
17 happened here with Nearburg's Ross Ranch 22 Number 2. They  
18 apparently want to blame someone. Unfortunately, the only  
19 thing to blame is the geology, not Anadarko, not Yates, not  
20 Titan. Simply, they drilled in an area where they got a  
21 poor well.

22 On their production plat, you can see that  
23 evidence peppered throughout the pool. Like I pointed out,  
24 or had Mr. Elger point out, you've got a well that produces  
25 200,000 barrels of oil. You go 1320 feet away, you've got

1 a well that produces 3000 barrels of oil. That's just the  
2 way this reservoir is.

3 We don't think there's been any substantial --  
4 any evidence presented of communication between the zones.  
5 Titan saltwater disposal well is not harming anyone, and we  
6 think the Application should be denied.

7 CHAIRMAN LEMAY: Thank you, Mr. Bruce.

8 Mr. Turner?

9 MR. TURNER: In reviewing the order that was  
10 entered in the original hearing, the Hearing Examiner based  
11 his opinion on the fact that -- his decision in that case  
12 was to shut in the Yates well but not to shut in the  
13 Anadarko well. And in reading the opinion I can see the  
14 logic that Mr. Stogner used in coming to that conclusion.

15 Basically, his findings were that the Yates well  
16 was injecting into an interval where there was existing  
17 production, namely in the B interval, and I believe that  
18 the Hearing Examiner felt like continued injection and even  
19 prior injection into that formation had caused and was  
20 likely to cause some potential damage to production in the  
21 area.

22 On the other hand, the Hearing Examiner stated  
23 that there does not appear to be any likelihood of  
24 obtaining commercial production in the gaps into which the  
25 Anadarko well was disposing.

1           Since the date of that hearing, there have been  
2 several wells drilled. Several of these wells have -- we  
3 have demonstrated, are producing from this C interval.  
4 Therefore, we believe that we have the same justification  
5 and basis for having the Anadarko well now shut in as  
6 existed when the decision was made to shut in the Yates  
7 well.

8           Furthermore, I think that proof of this concern  
9 and the legitimization of this concern, I think, can be  
10 seen from the actions that were taken by Yates in making  
11 the decision themselves, as a prudent operator, to cease  
12 injection into their own disposal well, one that they had  
13 money invested into, and one that they saw as having some  
14 economic benefit to them.

15           However, I think prudent business people such as  
16 Yates make decisions based upon what is the overall good of  
17 the entire field, such as we have here. I believe that  
18 their actions demonstrate that there is a legitimate  
19 concern that continued injection into a known productive  
20 interval is likely to cause damage to future production.

21           Nearburg is not here today, and was not here  
22 previously, to complain only about one well, the offset  
23 well to the Anadarko well. That's not why we're here. We  
24 drilled that well, did not get a good well. We're not here  
25 to blame anybody for that. We admit, as demonstrated by

1 the exhibits, not all wells in this area are good wells.  
2 We've drilled some bad wells, we haven't tried to blame  
3 anybody for those bad wells.

4           However, we're here because we believe that the C  
5 interval is a productive interval and it's the same  
6 interval that water is being injected into, and we want to  
7 have some protection from damage that could occur or has  
8 already occurred by that injection.

9           I refer the Commission to the statutory  
10 directive. New Mexico Statutes Annotated 70-2-12 (b) 4,  
11 that directs the Division to protect operators from  
12 encroachment from water injection, even if there is only  
13 evidence that such injection would tend to reduce the total  
14 ultimate recovery of oil from this pool. We have not  
15 demonstrated clearly where the water is going.

16           On the other hand, the Titan group here today  
17 cannot tell you where the water is going, and they cannot  
18 tell you with certainty that the water is not going to  
19 adversely affect production from this pool.

20           The Dagger Draw field, as you are well aware of,  
21 I'm sure, is one of the leading oilfields in New Mexico.  
22 It is a field that has produced enormous amounts of oil.  
23 We believe that there are still large quantities of oil to  
24 be produced.

25           We believe that what makes sense here is a

1 balancing. We have a saltwater disposal well that  
2 continues to inject water into a known productive interval,  
3 and we believe that in assessing the correlative rights of  
4 the various parties, that the Commission should consider  
5 the potential damage that could result from this field, as  
6 opposed to taking the prudent measure of shutting in this  
7 well, especially in light of the fact that there are  
8 alternatives available to the Titan group now, to take  
9 their water elsewhere, at a cost that is in line with what  
10 other operators in the field are paying.

11 We believe that if you consider the equities on  
12 balance, that the prudent decision will be to shut this  
13 well in and to avoid any further damage to this area and to  
14 encourage future development in this area.

15 CHAIRMAN LEMAY: Thank you, Mr. Turner.

16 Anything additional in this case?

17 MR. BRUCE: No sir.

18 CHAIRMAN LEMAY: If not, the Commission will take  
19 it under advisement.

20 And thank you very much, gentlemen, for your  
21 presentations.

22 (Thereupon, these proceedings were concluded at  
23 2:12 p.m.)

24 \* \* \*


## 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 Commission 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 March 26th, 1996.

  
\_\_\_\_\_  
STEVEN T. BRENNER  
CCR No. 7

My commission expires: October 14, 1998