

1 STATE OF NEW MEXICO
2 ENERGY AND MINERALS DEPARTMENT
3 OIL CONSERVATION DIVISION
4 STATE LAND OFFICE BUILDING
5 SANTA FE, NEW MEXICO

6
7 23 October 1985

8 EXAMINER HEARING

9 IN THE MATTER OF:

10 Disposition of cases without testi-
11 mony from the docket for 23 October
12 1985.

CASES 5777
8730, 8731
8732, 8711
8719, 8735
8736, 8737
8733, 8712
8721, 8689
~~8739~~, 8732

13 BEFORE: Michael E. Stogner, Examiner

Transcript in
CASE 5730

14
15 TRANSCRIPT OF HEARING

16
17 A P P E A R A N C E S

18
19 For the Oil Conservation
20 Division:

Jeff Taylor
Legal Counsel to the Division
Oil Conservation Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

21
22 For the Applicant:
23
24
25

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

STATE OF NEW MEXICO
ENERGY AND MINERALS DEPARTMENT
OIL CONSERVATION DIVISION
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO

6 November 1985

EXAMINER HEARING

IN THE MATTER OF:

Disposition of cases without testi-
mony from the docket for 6 November,
1985.

CASES 8741,
8673, 8635,
8744, 8746,
8736, 8737,
8689, 8739.

*8735
Transcript in
Case 8741*

BEFORE: David Catanach, Examiner

TRANSCRIPT OF HEARING

A P P E A R A N C E S

For the Oil Conservation
Division:

Jeff Taylor
Legal Counsel to the Division
Oil Conservation Division
State Land Office Bldg.
Santa Fe, New Mexico 87501

For the Applicant:

1

2

I N D E X

3

4

STATEMENT BY MR. CARR

5

5

STATEMENT BY MR. KELLAHIN

6

6

7

LOUIS MAZZULLO

8

Direct Examination by Mr. Carr

8

9

10

BILL SULLIVAN

11

Direct Examination by Mr. Kellahin

40

12

Cross Examination by Mr. Carr

87

13

14

STATEMENT BY MR. KELLAHIN

107

15

STATEMENT BY MR. CARR

109

16

17

E X H I B I T S

18

19

Nearburg Exhibit One, Plat

10

20

Nearburg Exhibit Two, Cross Section C-C'

11

21

Nearburg Exhibit Three, Page

14

22

Nearburg Exhibit Four, Daily Drilling Report

18

23

Nearburg Exhibit Five, Forms

18

24

Nearburg Exhibit Six, Cross Section

21

25

Nearburg Exhibit Seven, Cross Section DD-DD'

23

1

2

E X H I B I T S CONT'D

3

4

Nearburg Exhibit Eight, Photo 30

5

Nearburg Exhibit Nine, Diagram 32

6

7

8

9

Anadarko Exhibit One, Summary 44

10

Anadarko Exhibit Two, Economics 45

11

Anadarko Exhibit Three, Economics 47

12

Anadarko Exhibit Four, Cross Section A-A' 48

13

Anadarko Exhibit Five, Wellbore Diagram 52

14

Anadarko Exhibit Six, Drilling Reports 52

15

Anadarko Exhibit Seven, Scout Tickets 62

16

Anadarko Exhibit Eight, Scout Tickets 62

17

Anadarko Exhibit Nine, Scout Tickets 62

18

Anadarko Exhibit Ten, Scout Tickets 62

19

Anadarko Exhibit Eleven, Plat 71

20

Anadarko Exhibit Twelve, Summary 78

21

Anadarko Exhibit Thirteen, Structure Map 39

22

Anadarko Exhibit Fourteen, Report 81

23

24

25

1

2

3

MR. STAMETS: We'll call next
Case Number 8739.

4

5

6

MR. TAYLOR: The application of
Chama Petroleum Company to rescind Division Order No. R-
7637, Eddy County, New Mexico.

7

8

MR. STAMETS: We will ask for
appearances at this time.

9

10

11

MR. CARR: May it please the
Commission, my name is William F. Carr, with the law firm of
Campbell & Black, P. A., of Santa Fe.

12

13

14

15

16

17

We represent in this matter
Nearburg Producing Corporation, which has just been the suc-
cessor -- the successor company to Chama Petroleum Company.
I'm going to try to say "Nearburg" throughout the hearing; I
may not be successful. Obviously, they are synonymous.

18

19

20

21

22

23

24

25

We do have one witness.
MR. KELLAHIN: Mr. Chairman,
I'm Tom Kellahin of Santa Fe, New Mexico, appearing on be-
half of Anadarko Production Company, the applicant in the
original salt water disposal case, to which Chama -- and I
will have to be excused also because I've learned this case
using "Chama" and not "Nearburg" as the opposing party.
We appear on behalf of the
operator of the disposal well, Anadarko Production Company,

1 and I also have one witness to be sworn.

2 MR. STAMETS: Mr. Carr, was
3 that Nearburg Production Company?

4 MR. CARR: It is Nearburg Pro-
5 ducing Company.

6 MR. STAMETS: I'd like to have
7 the two witnesses stand to be sworn at this time.

8

9 (Witnesses sworn.)

10

11 MR. STAMETS: You may proceed,
12 Mr. Carr.

13 MR. CARR: May it please the
14 Commission, I have a very brief opening statement.

15 Nearburg Producing Company is
16 before you today in Case 8739 asking you to rescind Order R-
17 7637, which authorized the disposal of salt water into the C
18 and D Zones of the Cisco formation in their Dagger Draw salt
19 waste disposal well located in Eddy County. This order was
20 dated August 23rd, 1984.

21 This area has been the subject
22 of several hearings previously before the Commission. They
23 were disputes over the use of the Antweil B&B Well located
24 to the east of the subject disposal well. As you may re-
25 call, in those cases Anadarko was seeking a salt water dis-

1 disposal well and Chama was given authority to re-enter and at-
2 tempt to complete in the Morrow and that well is now pro-
3 ducing from the Morrow.

4 Today we're going to present
5 evidence to you that we believe will show that Anadarko in
6 completing a salt water disposal well produced oil. It ap-
7 pears to be able to -- it appears that they could have esta-
8 blished commercial production in the lower zones in the Cis-
9 co. These were not extensively tested and they then pro-
10 ceeded to use these zones for disposal.

11 This production, we believe,
12 was not reported to the State and we have evidence, we sub-
13 mit, to show that it was production from a zone that we pre-
14 dicted in a prior hearing would be capable of producing oil
15 and that the continued injection into this zone is impairing
16 the correlative rights of Chama, an offsetting interest
17 owner, and may result in waste of hydrocarbons, and then we
18 will ask you to order Anadarko to cease injection and do it
19 in an expeditious fashion. We hope you will enter an order
20 rescinding the prior approval of salt water disposal.

21 Our first witness, our only
22 witness is Louis Mazzullo.

23 MR. KELLAHIN: Mr. Chairman, I
24 also have an opening statement at this time.

25 As perhaps this Chairman does

1 not know, this area, as Mr. Carr, has indicated to you, has
2 been the subject of a number of hearings before the Commis-
3 sion. The reason for the hearings is that there is produc-
4 tion in the Cisco Canyon in this area by existing wells
5 which are operated by Anadarko. The production is in the
6 Cisco Canyon, and as you may know and as the evidence will
7 show, that production is separated between four zones. They
8 are identified by the geologists and engineers as the A,
9 which is the upper zone, the B, the C, and the D.

10 As a result of production from
11 the upper portions, we believe the evidence will demonstrate
12 that this -- in this area the only commercial production
13 that's been established is in the upper section, the A zone.
14 We believe the testimony today, as it did in the prior hear-
15 ings, will reconfirm the appropriateness of the disposal or-
16 der that was entered by the Commission in August of '84,
17 which in fact found an absence of commercial oil production
18 in the lower zones.

19 We believe the evidence will
20 demonstrate to you that Anadarko as a prudent operator drill-
21 led the disposal well based upon the evidence from the Au-
22 gust hearing and that the drilling confirms the absence of
23 commercial oil production.

24 The evidence will demonstrate
25 to you that for reasons of the way the well was completed

1 there was a small volume of oil produced into the pit over a
2 short period. That volume, the evidence will indicate to
3 you, was 33 barrels of oil. That's all that was ever pro-
4 duced or able to be produced out of this well.

5 The evidence will demonstrate
6 to you that there's no commercial production in this well or
7 in the offsetting wells that will be affected or could be
8 affected from the continuing disposal by Anadarko into this
9 well.

10 We believe at the conclusion of
11 that evidence we will have demonstrated for you that Chama,
12 now Nearburg, application is without merit and ought to be
13 denied.

14 MR. STAMETS: You may proceed,
15 Mr. Carr.

16 MR. CARR: We call Mr. Mazzul-
17 lo.

18
19 LOUIS MAZZULLO,
20 being called as a witness and being duly sworn upon his
21 oath, testified as follows, to-wit:

22

23 DIRECT EXAMINATION

24 BY MR. CARR:

25 Q Will you state your full name and place

1 of residence?

2 A Louis J. Mazzullo, and I reside in Mid-
3 land, Texs.

4 Q By whom are you employed and in what ca-
5 pacity?

6 A I am Geological Manager of Nearburg Pro-
7 ducing Company, which is the successor of Chama Petroleum
8 Company.

9 Q Have you previously testified before this
10 Commission and had your credentials as a geologist accepted
11 and made a matter of record?

12 A I have.

13 Q Are you familiar with the application
14 filed in this case on behalf of Chama Petroleum Company?

15 A I am.

16 Q And are you familiar with the area that
17 is the subject of today's application and the Anadarko dis-
18 posal well?

19 A Yes, I am.

20 MR. CARR: Are Mr. Mazzullo's
21 qualifications acceptable?

22 MR. STAMETS: Wtihout objection
23 he is considered qualified.

24 Q Mr. Mazzullo, what does Nearburg seek
25 with this application?

1 A Nearburg Producing Company seeks an order
2 rescinding Division Order No. R-7637, which authorizes dis-
3 posal of produced water into Anadarko's captioned C and D
4 zones of the Cisco Canyon formation through their Dagger
5 Draw salt water disposal well. The well, operated by Ana-
6 darko, is located 1495 feet from the north line and 225 feet
7 from the west line of Section 22, Township 19 South, Range
8 25 East, in Eddy County, New Mexico.

9 Q Mr. Mazzullo, would you now refer to what
10 has been marked for identification as Nearburg Exhibit Num-
11 ber One, and by way of introduction identify this and review
12 the information contained on Exhibit One.

13 A Exhibit Number One shows in areas shaded
14 in yellow, fluorescent yellow, Nearburg Producing Company's
15 acreage interest in Township 19 South, 25 East, in Eddy
16 County, New Mexico.

17 It also shows several wells which are
18 highlighted by different colored dots.

19 The blue dot in the northwest quarter of
20 Section 22 is the location of Anadarko's Dagger Draw No. 1
21 salt water disposal well.

22 The red dot adjacent to it to the east is
23 the location of Chama, or Nearburg Producing No. 1 B&B, Mor-
24 row producer.

25 The green dot to the west of the disposal

1 well shows the location of Anadarko's No. 1 Osage Canyon
2 producer, and the red dot in Section 27, for future
3 reference in forthcoming exhibits, is the location of
4 Chama, or Nearburg's No. 1 South Boyd Well.

5 I might just digress a second and since
6 the change of our company has been a fairly recent
7 happening, I will be probably transposing "Chama" and
8 "Nearburg". They mean the same thing.

9 Q Mr. Mazzullo, what does the orange line
10 on this exhibit indicate?

11 A The orange line on this exhibit indicates
12 the boundaries of the North Dagger Draw Canyon Field, which
13 is -- which has been extended to pick up Anadarko's No. 1
14 Osage Well in the north half of Section 21.

15 Q All right, would you now refer to what
16 has been marked as Chama, or Nearburg, Exhibit Number Two,
17 and identify this, please?

18 MR. STAMETS: Mr. Mazzullo.

19 A Yes.

20 MR. STAMETS: This random
21 colored outline, that's the Dagger Draw --

22 A Dagger Draw North boundaries.

23 MR. STAMETS: Upper Penn?

24 A Upper Penn.

25 MR. STAMETS: Okay. Thank you.

1 A Has everybody got a copy?

2 Q Would you identify this exhibit now, Mr.
3 Mazzullo?

4 A Exhibit Number Two is a structural cross
5 section which extends west from Chama, or Nearburg's, No. 1
6 B&B Well into the site of the proposed salt water injection
7 well, and westward into Anadarko's No. 1 Osage Well in Sec-
8 tion 21.

9 This exhibit is the exact duplicate of an
10 exhibit previously submitted in Case Number 8234 before this
11 Commission. It had been exhibited at that time as Exhibit
12 Number Four.

13 Q That was in Case 8234.

14 A In Case 8234.

15 Q Now, would you go to this exhibit and just
16 note what this exhibit was designed to show?

17 A First of all, this exhibit was hanged on
18 a structural datum. It shows the Upper Pennsylvanian sec-
19 tion, the Cisco and Canyon section. Throughout the course
20 of this -- this testimony I will be referring to it various-
21 ly as Cisco Canyon or Canyon. Most of this production, I
22 believe, in the area is Canyon. If I say Cisco Canyon, I
23 mean the same thing.

24 What this exhibit was originally designed
25 to show was several things. First of all, it identified

1 three of four porous zones, which is shown on the exhibit
2 shaded in blue, which we believe at the time, that is at the
3 time of the prior hearing, to be potentially oil productive
4 in what was to be Anadarko's salt water disposal well loca-
5 tion. We believe this based upon detailed geologic and log
6 evaluation of the area.

7 Secondly, it was designed to show of the
8 three zones shown in blue, the upper zone corresponded to
9 what Anadarko referred to as they A horizon and the other
10 two zones respectively to the B and D horizons.

11 At the time of the prior hearing based
12 upon, partly upon this cross section, that I thought produc-
13 tion was possible in the lower part of the Canyon zone into
14 which Anadarko proposed to inject produced water.

15 Q Mr. Mazzullo, at what depth did you indi-
16 cate production could be obtained?

17 A I expected that production may have been
18 obtained within a correlative interval defined between the
19 depths of 7690 feet and 8000 feet in our B&B Well, the Near-
20 burg's B&B Well.

21 At the time I expressed concern that
22 granting Anadarko's application would impair our correlative
23 rights to the Canyon and result in reserves left in the
24 ground which would otherwise have been produced; in other
25 words, it would result in waste.

1 Q Now, Mr. Mazzullo, at the time of the
2 hearing on the original Anadarko application did Chama re-
3 quest that a drill stem test be run on each of the zones in
4 this well in the Cisco Canyon formation prior to the well
5 being used for salt water disposal purposes?

6 A Well, inasmuch as there was no other rel-
7 atively inexpensive way that we could propose to test the
8 formation for its possible oil potential, I recommended at
9 the time that if the application was approved in Anadarko's
10 favor that drill stem tests be run across all perforated
11 zones in the Canyon prior to disposal.

12 That recommendation was ignored when ap-
13 plication was approved by Division Order R-7637.

14 MR. CARR: May it please the
15 Commission, at this time we would request that the record in
16 Case 8234 be incorporated herein by reference.

17 MR. KELLAHIN: No objection.

18 MR. STAMETS: We will incor-
19 porate the record in the original Case 8234.

20 Q Now, Mr. Mazzullo, I would ask you to now
21 direct your attention to what has been marked as Nearburg
22 Producing Company Exhibit Number Three. I'd ask you to
23 identify that, please.

24 A Exhibit Number Three is a page from Pet-
25 roleum Information's Scouting Reports, Well Completions in

1 Southeastern New Mexico. The date on this report is June
2 5th, 1985. The information contained in such a report is
3 usually obtained directly by company -- from company repre-
4 sentatives by Petroleum Information.

5 Q When was this scout report discovered?

6 A Chama at the time subscribed to the ser-
7 vice and the report was made available soon after its re-
8 lease on June the 5th, 1985.

9 Q Would you now go to that report, that
10 scout report, and review the information contained therein
11 for the Commission?

12 A The information contained in this report
13 refers to Anadarko Production Company's No. 1 "WD" Osage.
14 This well was subsequently renamed. A copy of the file --
15 of the application to rename this well was in the OCD files.
16 It was subsequently renamed the No. 1 Dagger Draw Salt Water
17 Disposal Well.

18 The information contained on this ticket
19 firstly indicates that the well was spudded in October of
20 1984 and that no drills -- no cores or drill stem tests
21 were conducted.

22 It also outlines, highlighted in yellow,
23 you can see where it outlined the perforation program which
24 was followed in the salt water disposal well and particular-
25 ly the reference to a flow of 60 barrels of oil and 260 bar-

1 rels of sulphur water, I assume, in 24 hours from these same
2 perfs.

3 After reference to the flow of oil is a
4 reference to the acid treatment conducted on the perfora-
5 tions.

6 Q Now, Mr. Mazzullo, this scout ticket in-
7 dicates the perforated intervals, does it not?

8 A Yes, it does.

9 Q On your understanding of this area, are
10 those perforations in the C and D zones of the Cisco Canyon?

11 A Yes, they are.

12 Q Would you now refer to what has been mar-
13 ked as Chama -- I'm sorry, Nearburg Producing Company Exhi-
14 bit Four and identify that, please?

15 A Exhibit Number Four is two pages out of
16 Anadarko's daily drilling reports, their in-house daily
17 drilling reports, two pages which cover the time period dur-
18 ing which their salt water disposal well was perforated and
19 completed.

20 Q Now, Mr. Mazzullo, how did Nearburg ob-
21 tain a copy of this report?

22 A This report was obtained directly through
23 Anadarko Producing -- Production Company, through a data ex-
24 change by both parties prior to this hearing. We exchanged
25 data with them; they exchanged data with us.

1 Q Will you now go to this exhibit, review
2 it, please, and pay particular note to portions of the exhibit
3 which relate to the production of oil and injection of
4 water in this well?

5 A On the first page of this exhibit high-
6 lighted in green is the perforation history in the salt
7 water disposal well. It shows that several zones were per-
8 forated during several attempts, and that the gross perfora-
9 tion interval in this daily report corresponds to the per-
10 forated intervals which were reported on the previous exhibit,
11 the PI scout ticket.

12 Highlighted in yellow just below is their
13 reference to a flow of 60 barrels of oil and 260 barrels of
14 water in 24 hours on November 11th, 1984.

15 Beyond, further on down the page is the
16 -- is the history of what they did subsequent to that flow
17 in the way of acidizing the well.

18 On the second page of this exhibit please
19 note the items that are highlighted in yellow.

20 Particularly note on this exhibit that
21 they had straddled all the perms after acidizing and ran and
22 swabbed on the perforations until they recovered a certain
23 amount of load back, but underlined in red is a reference to
24 "BLWTR 770". By the conventions that we use for abbreviat-
25 ing things in the industry, that reference means "barrels of

1 load water to recover". 770 barrels of load water presum-
2 ably were left in the formation. In other words, Anadarko
3 evidently never recovered enough load water to get back to
4 diverging formation fluid across those perfs after the zones
5 tested oil.

6 Q Mr. Mazzullo, would you now go to what
7 has been marked as Nearburg Exhibit Number Five and identify
8 this, please?

9 A Exhibit Number Five is a three-part exhi-
10 bit consisting of various forms submitted by Anadarko to the
11 Oil Conservation Division pertaining to the No. 1 Dagger
12 Draw Salt Water Disposal Well.

13 Page, the back page, I'm going to start
14 from the back and work my way up, the back page is a copy of
15 their Form C-101, which is the Application for Permit to
16 Drill the well.

17 Particularly note in yellow highlight the
18 reference that this orthodox -- unorthodox location for Ana-
19 darko's Osage SWD No. 1 Well has been approved by NMOCD Case
20 8234, Order R-7637, dated August 23rd, 1984.

21 Q All right, now go to the next page coming
22 forward, the C-103.

23 A The C-103, which is a Sundry Report on
24 the well, shows the perforation program.

25 The first Item 3, which is highlighted in

1 green, shows the perforations which match the perforations
2 reported in both prior Exhibits Three and Four, the scout
3 ticket and the Anadarko Daily Reports.

4 We go to Item 4, which outlines the acid
5 program which was followed across these perms. In between
6 Items 3 and 4 is no reference to the flow of oil which was
7 obtained and which was included in both the Daily Reports at
8 this point and the PI scout tickets.

9 And then finally, Item 7, is a reference
10 that the water injection commenced in this well March of
11 1985.

12 Please note that the date this well was
13 completed was in October, 1984. The date of this Form C-103
14 is March 14th, 1985.

15 Q Mr. Mazzullo, when you compare this Oil
16 Commission form with the daily reports, was anything omitted
17 in the reports filed with the Division other than the pro-
18 duction of oil?

19 A No, it more or less outlines everything
20 that was submitted on -- that was written in the daily re-
21 ports with the exception of the reference to a flow of oil.

22 Q Would you now go to the copy of C- -- of
23 Oil Conservation Division Form C-105 and review that,
24 please?

25 A That's a copy of -- Exhibit Number Five,

1 a copy of C-105, which is a Well Completion Report on the
2 Dagger Draw No. 1 Salt Water Disposal Well; again shows in
3 the perforations record column, Item Number 31, the perfora-
4 tions which were shot in this well. These perforations
5 again match the perforations listed in the daily reports, in
6 the PI scout tickets, and in the prior, in the previous 103
7 exhibit.

8 Q And these perforations are in the C and D
9 zones as we understand it from Anadarko's --

10 A As I understand it, they are in the C and
11 D zones.

12 Q Would you go on, please?

13 A Below that in Item 33 on down, where
14 there is allowed space for production is no reference to
15 produced oil that was made in their daily reports and on the
16 PI scout tickets.

17 Q Mr. Mazzullo, what does this tell you
18 about the Cisco formation in the area on which the disposal
19 well is located?

20 A This -- these exhibits indicate to me
21 that oil was produced in Canyon zones prior to treatment of
22 these zones and that Anadarko Production -- Producing Com-
23 pany failed to adequately test the oil potential of these
24 zones. They failed to report the production of oil to the
25 Commission, to the Division, and the reports were not filed

1 with the State in a timely manner.

2 Q Mr. Mazzullo, have you checked the Oil
3 Conservation Divison records concerning -- and looked at the
4 Forms C-115 to see if in fact this production was ever
5 reported?

6 A Yes, sir, we did.

7 Q And what did you find?

8 A We found no reference to a report of oil
9 in this well.

10 Q Would you now refer ot what has been mar-
11 ked Chama -- or Nearburg Exhibit Number Six, identify this
12 for the Commission and review it, please?

13 A Exhibit Number Six is essentially the
14 same cross section that was presented in Exhibit Number Two
15 with the inclusion now of a log section from the Anadarko
16 Salt Water Disposal Well in place of the well stick symbol I
17 used in the previous document.

18 The same oil potential zones which were
19 highlighted in blue on Exhibit Two are highlighted in blue
20 on this exhibit.

21 The red zones in the Anadarko Osage or
22 Dagger Draw Salt Water Disposal Well indicate perforated in-
23 tervals that Anadarko shot and is now injecting produced
24 water into in this well.

25 At the bottom of the log section of the

1 Osage -- of the Anadarko Salt Water Disposal Well is a
2 reference to the flow of oil across these zones, and again,
3 the flow of oil across these zones was across every one of
4 those perforated intervals. In other words, we don't know
5 exactly where the flow was coming from because it was tes-
6 ted, it flowed across everyone of those after all those
7 perms were opened and was not selectively tested.

8 Q Mr. Mazzullo, in other words, there is no
9 way to determine whether or not the oil came out of the
10 uppermost perforated interval or the lowermost interval?

11 A I have no way of knowing.

12 Q But it did have to come from one of those
13 sources.

14 A It had to come from somewhere in that
15 gross total perforated interval.

16 Q What is the relationship of this disposal
17 well to the Dagger Draw Pool?

18 A If we were to look back on Exhibit Number
19 One, which was the location plat of the area, we would see
20 that if, in fact, this Anadarko Dagger Draw Salt Water Dis-
21 posal Well were a producing well, a Canyon producing well,
22 it would indeed probably be included -- it would be included
23 in the Dagger Draw North Pool.

24 Q Now, Mr. Mazzullo, if we go to your index
25 map in the lower left corner of this exhibit, you have with

1 a red arrow indicated the disposal well.

2 A That's right.

3 Q And the north half of Section 21 is in
4 the North Dagger Draw Pool, is that correct?

5 A That's correct.

6 Q Would you now refer to Nearburg Exhibit
7 Number Seven and identify this, please?

8 A Let me allow the Commissioners to gaze at
9 it for a moment.

10 Nearburg Exhibit Number Seven is a struc-
11 tural cross section which includes log composites from sev-
12 eral wells, log composites meaning a porosity log and a re-
13 sistivity log are hung side by side on each well.

14 Q Would you identify the wells on this
15 cross section as you go through it?

16 A Okay, referring to the index map on the
17 lower lefthand side of the exhibit, this cross section runs
18 kind of crookedly, but it runs from the Penasco Field, which
19 includes the Anadarko No. 1 Bradshaw in Section 4, south-
20 westward to the Conoco No. 1 Barbara Federal in the north-
21 east quarter of Section 18, eastward to the Conoco No. 7
22 Barbara Federal in the southeast quarter of Section 17;
23 thence southeastward to the Anadarko No. 1 Osage Canyon pro-
24 ducer in the northeast quarter of Section 21; across to the
25 Anadarko Salt Water Disposal Well in the northwest quarter

1 of Section 22; over to the Nearburg Producing No. 1 B&B Mor-
2 row Well in the northeast quarter of 22; and then southward
3 to the Nearburg Producing Company No. 1 South Boyd in Sec-
4 tion 27.

5 Q Now this is a structural cross section?

6 A Yes, it is.

7 Q And was it prepared by you?

8 A Yes.

9 Q In constructing this cross section was
10 this based on your own log analysis of the wells?

11 A This cross section was constructed based
12 upon commercially available log suites, drill stem test in-
13 formation from scouting reports and Oil Commission files,
14 and my correlations according to Anadarko's zonations (sic)
15 as they've previously testified to.

16 I might clarify that last statement. On
17 the cross section I've referenced what I believe to be the
18 base of what Anadarko would refer to as the D zone, the top
19 of what Anadarko would refer to as the D zone, and the top
20 of the Cisco Canyon carbonate, as three marker horizons, and
21 this was hung on a subsea.

22 Q Now, Mr. Mazzulo, what does this cross
23 section show?

24 A The intent of this cross section was
25 mainly twofold.

1 I have indicated by the yellow shading on
2 the resistivity logs on each of the important wells the
3 separation between shallow and deep resistivity values. I
4 have done this to show how the character of the resistivity
5 logs varies through producing wells and how they are not a
6 reliable indicator of the relative volumes of oil and water
7 produced in the producing wells.

8 Secondly, in referring to the drill stem
9 tests and production information below each log I've
10 intended this document to show that drill stem tests are
11 likewise inconclusive, although they give some hint to the
12 presence of hydrocarbons and indicate zones which may merit
13 further extensive production tests.

14 To clarify this, let me offer an example.
15 We refer to the Conoco No. 1 one Barbara Federal, the
16 second well from the left. You will note that it has been
17 perforated in a zone which I've highlighted in blue in the
18 middle of the log. Across this zone which was ultimately
19 perforated Hanks, the original operator, conducted a drill
20 stem test, Number 3, which recovered gas to surface at a
21 million-five and 6300 feet of heavily oil and gas cut water.

22 Contrast this to some of the other shows
23 -- well, let me backtrack just a second to tell you that
24 this well, if you look down on the index map, I have the
25 cumulative production. This well, which had a good gas, not

1 a very spectacular show of oil, has produced as of the 1st
2 of January of last year, over 272,000 barrels of oil.

3 If we look at some of the other wells in
4 the area we will note that the drill stem test results on
5 producing wells vary from impressive to less impressive to
6 nonspectacular, and we also see that in wells such as the
7 Nearburg Producing No. 1 B&B that a drill stem test taken
8 across over 300-foot interval recovered 100 feet of oil and
9 5900 feet of water.

10 Q Now, if we look at the Bradshaw Well, and
11 you have information there from the daily reports, what do
12 the daily reports on this well show?

13 A The Bradshaw, let's refer to the drill
14 stem test information at the base of the Bradshaw log and
15 let me clarify what it's saying.

16 I show two recoveries. I show a recovery
17 in parentheses and I show a recovery outside parentheses.

18 The recovery outside parentheses was
19 worded on a scout ticket, a commercially available scout
20 ticket, as 1333 feet of "dist" water and gas cut drill
21 fluid. I assume that meant distillate cut -- distillate gas
22 cut drilling fluid; however, when I looked at the daily re-
23 ports which were submitted by Anadarko to us on the data ex-
24 change, they report a show of 400 feet of oil, which, by the
25 way, is anywhere between 3 and 5, 3 or 6 barrels of oil, 275

1 feet of water, and 658 feet of drill mud; certainly not a
2 spectacular show but it was enough of a show to encourage
3 Anadarko to set production in motion on this well and ulti-
4 mately, even in the absence of an adequate water disposal
5 system, produce over 22,000 barrels of oil to date, so far.

6 Q How does what they did, Anadarko did with
7 the Bradshaw well compare to the effort that they've made on
8 the well which is now their disposal well?

9 A As we see at the base of the disposal
10 well, again the yellow zones, the zones that are highlighted
11 in yellow on the log, correspond to the zones that they've
12 perforated, some of which are above the D horizon in what
13 they would refer to as the C zone, and some of which are
14 below the top of the D horizon in the D zone.

15 The reference at the base again, the base
16 of the log, again refers to a flow of 60 barrels of oil and
17 260 barrels of salt water -- of sulphur water a day before
18 the well was actually acidized and before injection began.

19 Q Now if we look at the initial potential
20 shown the bottom of the log on the Bradshaw well, what was
21 the initial daily potential on that well?

22 A The initial potential reported by Anadar-
23 ko was 30 barrels of oil and 260 barrels of water per day.

24 Q Now, Mr. Mazzullo, even if we accept the
25 figure presented by Mr. Kellahin that they only produced 33

1 barrels of water on the first day out of the disposal well,
2 that is a (not understood) or better initial potential than
3 what they experienced on the Bradshaw.

4 A It would appear to me that it is.

5 Q Now, I want you again to look at the Dag-
6 ger Draw Salt Water Disposal Well and noting the zones that
7 they have opened up in this well for disposal purposes, how
8 do these zones compare with those tested in other wells down
9 dip?

10 A Down dip, for example, in the Nearburg
11 Producing No. 1 B&B, the original operator, Antweil, drill
12 stem tested over a rather large, long interval, over 300-
13 foot interval, and yet were able to recover 100 feet of oil
14 and a substantial amount of water.

15 They went back and straddle pack tested
16 up the upper zone, what Anadarko would refer to, perhaps, as
17 their A zonesd, and they got nothing but water, which leads
18 me to believe that production from the B&B, the oil produc-
19 tion on the drill stem test in the B&B Well, must have come
20 from anywhere from the B zone on down. We have no way of
21 knowing exactly which zone it came from, but it had to be
22 from the B zone on down, and as I have shown in previous
23 document, exhibit, I believe there's a good chance it could
24 have come from the B zone as well as the D zone.

25 If we move further down quote/unquote

1 dip, to the Nearburg Producing No. 1 South Boyd Well, we see
2 that Nearburg, or Chama at the time, had gone in and selec-
3 tively perfered three different intervals in this well.

4 The first interval, which is clearly in
5 the D zone, number one, was perforated and it swabbed 300
6 barrels of water before it was squeezed.

7 The second zone, which I have shown --
8 which is probably equivalent to the C zone, Anadarko's C
9 zone, was perforated, acidized, and flowed 26 barrels of oil
10 and 279 barrels of water per day, clearly comparable to, for
11 example, what Anadarko had recovered in their Bradshaw well.

12 Furthermore, Nearburg went up the hole,
13 perforated zone 3, which is probably equivalent to the B and
14 the A zones in part, perforated and swabbed a total of 102
15 barrels of oil in 16 hours. I previously testified to that
16 at a prior hearing.

17 I feel that the shows that we have gotten
18 in the South Boyd Well, the shows which are indicated in the
19 Antweil or Nearburg No. 1 B&B, are every bit as comparable
20 to shows that were obtained prior to production in other
21 producing wells in the area, including Anadarko's Bradshaw
22 Well.

23 Q Mr. Mazzullo, would you now refer to what
24 has been marked as Nearburg Exhibit Number Eight and identi-
25 fy this, please?

1 A Nearburg Exhibit Number Eight, for pur-
2 poses of documenting what we have obtained in the South Boyd
3 Well, is a picture of a flare which was set off upon produc-
4 tion testing in the No. 1 South Boyd.

5 This flare was the result of the recovery
6 of oil obtained on swab test number two, which is captioned
7 in the prior Exhibit Number Seven. That production test, as
8 I have previously said, and as you can read on Exhibit Num-
9 ber Seven, flowed 26 barrels of oil and 279 barrels of water
10 per day.

11 For purposes of scale, the little white
12 specks that you can see clouding the picture are snowflakes,
13 the test was conducted in December, in -- in the month of
14 December.

15 To the extreme lower left part of the
16 picture you can see the 2-1/8th inch flow line out of which
17 the oil, water, and presumably gas, is flowing.

18 This clearly documents the production of
19 oil that we've obtained on the South Boyd, in case there was
20 any doubt.

21 Q Now, Mr. Mazzullo, you've been talking
22 today about drill stem tests. What does a drill stem test
23 tell you about a well?

24 A Again, I've maintained this in the prior
25 hearing, as well, a drill stem test may give an indication

1 of possible presence of hydrocarbons, but in itself, a drill
2 stem test is not an adequate way to judge the potential of a
3 reservoir, particularly these Canyon reservoirs. It does
4 not show whether or not a well will be an economic well in
5 any zone.

6 Q Now what conclusions have you been able
7 to reach about the Canyon, or Cisco Canyon reservoir in this
8 area based on your -- on your study as depicted on Exhibit
9 Number Seven?

10 A Exhibit Number Seven just gives a portion
11 of the amount of work which has gone into studying this area
12 on behalf of Nearburg Producing Company. The Cisco Canyon
13 system in this general region is an extremely complicated
14 carbonate reservoir. I've been studying carbonate reser-
15 voirs for a number of years right now. I've had the oppor-
16 tunity study it with carbonate experts in the field. The
17 types of stratigraphic traps which you get in this area, and
18 they are stratigraphic traps, as I will show in a moment,
19 are composed of overlapping and laterally offsetting porous
20 carbonates, which is separated vertically by impermeable
21 carbonates and shales.

22 It's very difficult, if not impossible,
23 to adequately assess the potential oil in such reservoirs by
24 simple, conventional analyses.

25 For example, one cannot assume in a car-

1 bonate sequence such as this, that being down regional dip
2 is necessarily detrimental to the possibility of oil produc-
3 tion in any particular zone, when stratigraphic conditions
4 remain favorable to reservoir development.

5 Finally, referring again to the Anadarko
6 No. 1 Bradshaw on Figure -- on Exhibit Seven on the lefthand
7 side, the cross section, Exhibit Seven, indicates Anadarko's
8 willingness to proceed with attempting a completion on a
9 well which had a drill stem test of 400 feet of oil, or 3 to
10 6 barrels of oil, in contrast to their unwillingness to at-
11 tempt completion on the salt water disposal well, which had
12 a show of 60 -- a flow of 60 barrels of oil and 260 barrels
13 of salt water.

14 In the Bradshaw Well Anadarko was willing
15 to perforate the drill stem test interval which recovered a
16 less than spectacular show of oil and potentialized that well
17 at 30 barrels of oil a day and 260 barrels of water, and in
18 spite of the difficulty of a water disposal system at the
19 time they drilled the well, they have gone ahead and pro-
20 duced at least 22,000 barrels of oil out of that well.

21 Q Mr. Mazzullo, are you ready now to go to
22 Exhibit Number Nine?

23 A I think so.

24 Q Would you refer to that, please, and
25 identify it for the Commission?

1 A As I've never one to make simple
2 diagrams, this is another two-part diagram, Exhibit Number
3 Nine.

4 On the lefthand side of the exhibit is a
5 structure map which is drawn at the top of the Cisco Canyon
6 carbonate, which has been defined in cross sections which
7 were previously discussed, including Number Seven.

8 Highlighted in blue on this cross sec-
9 tion, the blue triangles represent wells which have or had
10 paid from the Canyon dolomite section, or if you will, the
11 Upper Penn.

12 Highlighted in red dots are wells which
13 have drill stem test or production test shows of hydrocar-
14 bons in the Canyon section.

15 The downward facing red triangle, which
16 is -- as the red arrow pointing to it, is the Andarko dispo-
17 sal well, the subject of today's hearing.

18 Just for areal reference I have high-
19 lighted the Anadarko No. 1 Matlock and Bradshaw Wells in
20 Section 4, the Osage Well in Section 21, and Chama's wells
21 in Sections 22, 23, and 27 -- I'm sorry, Nearburg's wells in
22 those sections.

23 On the righthand side of this document is
24 a map showing the same area without the structure contours
25 and showing cumulative production in barrels of oil for each

1 of the producing wells that data were available for in this
2 area, and also again showing the shows of hydrocarbon in
3 wells that are not producing presently from the Canyon by
4 the red dots.

5 In parentheses under the cumulative pro-
6 duction figures under the salt water disposal well is indi-
7 cated a number of feet below the top of the Canyon dolomite,
8 the Cisco Canyon dolomite, to the deep producing or injec-
9 tion perforation in each one of these wells.

10 Q Now, Mr. Mazzullo, you prepared this ex-
11 hibit.

12 A I did.

13 Q And what does it show you about the gen-
14 eral structure of the Cisco Canyon formation in this area?

15 A Okay, referring now to the lefthand side
16 of the document, a structure top of the Cisco Canyon car-
17 bonate, we see a regional east-to-southeast dip on the top
18 of that carbonate, which is punctuated in places by closed
19 contours, or highs, which actually reflect depositional
20 build-ups in the Canyon carbonate sequence.

21 The reason I say this is because these
22 same highs do not necessarily coincide with deeper structure
23 in horizons such as the Atoka or the Morrow, Lower Penn or
24 older structures.,

25 Secondly, this lefthand map shows that

1 for the most part, or almost all the wells in the Dagger
2 Draw North Field, which are the wells in Sections 16, 17,
3 18, and to the south, to the west and south, all of these
4 wells are clearly on the dip slope at the top -- defined at
5 the top of the Cisco Canyon carbonate, and are clearly not
6 necessarily associated with quote structure unquote. I say
7 quote/unquote structure with reference to the fact that I
8 believe that this map is not showing true tectonic structure
9 but is rather showing depositional structure, depositional
10 build-ups in various places in the Canyon section.

11 If we look now and compare the righthand
12 -- the lefthand structure map with the producing cumulative
13 map on the right, you will note that the wells, most of
14 which have been in existence for quite awhile, vary in pro-
15 duction, total production, from up-dip wells which have less
16 total production than wells that are down dip.

17 For example, in Section 13 of Township 19
18 South, 24 East, the well in the southeast quarter, now plug-
19 ged, had produced only 2594 barrels of oil.

20 If we go eastward into Section 18, in the
21 southwest quarter, the well there produced 126,142 barrels
22 of oil as of January, 1985.

23 If we go to the southeast quarter of the
24 same section, that well produced over 266,000 barrels of
25 oil.

1 Now, if you just simply compare that map
2 to the map on the left, you'll note that the 266,000-barrel
3 well is clearly down dip from the 2594-barrel well, and as
4 you go further down dip, in fact, production drops off
5 again.

6 Also shown on that righthand map is that
7 the depth to the deepest producing perms in the Canyon sec-
8 tion varies. It varies from much less than 100 feet to the
9 lowest perf, perhaps what Anadarko would refer to as the A
10 or B zone, to as much as 342 feet, which is what Anadarko
11 would refer to as the D zone, and in fact, their salt water
12 disposal well has been perforated as deeply as 349 feet be-
13 low the top of the Cisco Canyon dolomite in the D zone.

14 So what I'm trying to conclude from these
15 two documents is, first of all, that there doesn't seem to
16 be a necessary structural reason for cumulative, total cumu-
17 lative production in the Canyon; and secondly, that the
18 Canyon actually produces not only from the A zone or the B
19 zone but from up and down the section by a few hundred feet
20 below the top of the Cisco Canyon dolomite.

21 Q Mr. Mazzullo, would you state the conclu-
22 sions that you've been able to reach from your study of this
23 area and the Anadarko disposal well?

24 A We believe that Anadarko is injecting
25 water into a zone that we previously testified to as being

1 capable of oil production and that oil producability in this
2 area, because of the complex geology and the complex deposi-
3 tional and diogenetic history of the rocks, can only be de-
4 termined by extensive production testing of each prospective
5 zone.

6 The nature of the reservoir in this area
7 is such that structure is not a controlling factor and that
8 stratigraphic factors indicate the possibility of other as
9 yet untapped Canyon reservoirs in and east of and southeast
10 of the Dagger Draw Salt Water Disposal Well.

11 Let me clarify something real quickly.
12 Structure is not controlling; structure is secondary.

13 I so stated these same -- the same state-
14 ments in the previous testimony and my testimony seems to be
15 confirmed by the recovery of oil in the Dagger Draw Salt
16 Water Disposal Well.

17 Waste of oil will result and correlative
18 rights will be impaired if continued injection is permitted
19 in Anadarko's disposal well. By Anadarko's own testimony,
20 and I will refer to Case Number 8234, page 40, lines 3 to 4,
21 they said in reference to a question by Mr. Carr as to what
22 they would do in the event oil was found in their salt water
23 disposal well, quote, if had commercial oil in it we would
24 attempt to get the oil. Unquote.

25 They clearly did not adequately test to

1 determine the significance of the oil recovery they got in
2 their salt water disposal well. They did not report the oil
3 recovery to the Commission, and they proceeded to inject
4 produced water into an interval which we maintained and now
5 confirm to having potential for oil production.

6 Q Mr. Mazzullo, do you have a recommenda-
7 tion to make to the Commission?

8 A I recommend that the Division immediately
9 order Anadarko to cease disposal of produced waters in their
10 Dagger Draw Salt Water Disposal Well and that the Division
11 at the earliest possible date in order to avoid any further
12 waste or damage enter an order rescinding the Division Order
13 No. R-7637.

14 Q Were Exhibits One through Nine prepared
15 by you or compiled under your direction and supervision?

16 A They were.

17 MR. CARR: At this time we
18 would offer Nearburg Producing Company Exhibits One through
19 Nine.

20 MR. STAMETS: Without objection
21 these exhibits will be admitted.

22 MR. CARR: That concludes my
23 direct examination of Mr. Mazzullo.

24 MR. STAMETS: Any questions of
25 this witness?

1 MR. KELLAHIN: No questions,
2 Mr. Chairman.
3 MR. STAMETS: Any other -- any
4 other no questions?
5 The witness may be excused.
6 MR. CARR: That concludes our
7 case in this matter.
8 MR. STAMETS: Mr. Kellahin?
9
10 (At this time the noon recess was taken.)
11
12 MR. STAMETS: The hearing will
13 please come to order.
14 Mr. Kellahin, you may proceed.
15 MR. KELLAHIN: Thank you, Mr.
16 Chairman.
17 We'll call at this time Mr.
18 Bill Sullivan.
19 Mr. Chairman, as background to
20 give you a graphic picture against which to hear and
21 understand Mr. Sullivan's testimony, I have given you out of
22 order Exhibit Number Thirteen, which is a structure map on
23 the Canyon C.
24 In addition, Mr. Chairman, I
25 have circulated a copy of the salt water disposal Order R-

1 7637, which is the subject of the controversy here.

2

3

BILL SULLIVAN,

4

5

6

7

DIRECT EXAMINATION

8

9

10

11

12

13

14

15

16

17

18

19

20

21

22

23

24

25

7637, which is the subject of the controversy here.

being called as a witness and being duly sworn upon his
oath, testified as follows, to-wit:

DIRECT EXAMINATION

BY MR. KELLAHIN:

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

A My name is Bill Sullivan. I'm the Divi-
sion Reservoir Engineer for Anadarko Petroleum Corporation.

Q Mr. Sullivan, would you describe for the
Commission when and where you obtained your degree?

A I graduated in 1978 from Texas A & M Uni-
versity with a Bachelor's degree in mechanical engineering.

Q Would you describe for the Commission
what your responsibilities are for your company?

A For Anadarko Petroleum I supervise a
staff of reservoir engineers that are responsible for oper-
ating and analytical decisions in the West Texas and south-
east New Mexico area.

Q On behalf of your company did you prepare
certain testimony and deliver that testimony along with
exhibits at the hearing before the Commission in Case 8234

1 on August 1st, 1984, that resulted in the entry of the dis-
2 posal order that approves disposal by use of the Dagger Draw
3 disposal well?

4 A Yes, I did.

5 Q Have you subsequently conducted addi-
6 tional reservoir engineering and geologic studies for the
7 subject matter in this application by Chama?

8 A Yes, I have.

9 MR. KELLAHIN: Mr. Chairman, we
10 tender Mr. Sullivan as an expert reservoir engineer.

11 MR. STAMETS: He is considered
12 qualified.

13 Q Mr. Sullivan, I'd like to take a few
14 moments with you, sir, and using Exhibit Number Thirteen as
15 an outline, I'd like you to describe for us the background
16 of information that was used by Anadarko in making its deci-
17 sion for seeking a salt water disposal well for the water
18 produced out of the Cisco Canyon, and by reference, sir,
19 would you take Exhibit Thirteen and identify for us general-
20 ly the types of wells that are depicted so that we might
21 orient the Commission as to what the status is of produc-
22 tion?

23 A Yeah. Exhibit Thirteen is a plat and it
24 is also a structure map in the area of the top of the Cisco
25 Canyon C zone, as we designated it.

1 The yellow colored acreage is acreage in
2 which Anadarko Petroleum Corporation owns an interest, with
3 the solid yellow acreage being tracts we own 100 percent of
4 the leasehold rights, and the cross hatched acreage is some-
5 thing less than 100 percent ownership.

6 The well in the northeast quarter section
7 of Section 21 in the middle of the map is Anadarko's Osage
8 No. 1 Well. The well was completed as a producer from the A
9 zone of the Cisco Canyon in early 1983 and produces approxi-
10 mately 50 barrels of oil a day and 1000 to 1100 barrels of
11 water per day.

12 The completion of that well immediately
13 gave us need for substantial water disposal capacity. Ini-
14 tially we hauled water by truck through commercial trucking
15 services from that well and the cost was very prohibitive to
16 dispose that water.

17 In searching for a salt water disposal
18 alternative to hauling it by truck, as has been mentioned,
19 we initially made an application to re-enter the B&B No. 1
20 Well, which at that time was an abandoned wellbore. The
21 well is located in the northeast quarter section of Section
22 22, a mile east of our Osage producer.

23 Essentially, concurrently Chama
24 Petroleum made an application to re-enter the same wellbore
25 for commercial gas production in the Morrow. They were

1 granted an order giving them that right. They've done so
2 and the well is currently a Morrow, marginal Morrow pro-
3 ducer.

4 At that point we were -- it was
5 necessary to consider other alternatives for salt water dis-
6 posal in the area and we recommended or applied to the Com-
7 mission for a permit then after that review to drill our
8 Dagger Draw SWD 1 Well. The well is located in the north-
9 west quarter section of Section 22 and it's denoted with a
10 large red arrow on your map.

11 As Mr. Kellahin indicated, we
12 had a hearing in August, 1984. Chama at that time objected
13 to our application to drill that well and dispose water into
14 the C and D zones of the Cisco Canyon. We were granted a
15 permit after that hearing by the Commission to basically im-
16 plement our initial recommendation and application.

17 We drilled the well and com-
18 pleted it as a salt water disposal well in the C and D zones
19 of the Cisco Canyon after that time and I believe it was
20 completed in late 1984.

21 Then October of this year Chama
22 filed their application to rescind our permit.

23 Q When we look at the 40-acre tract that
24 the disposal well is located on, you've indicated to us that
25 as acreage that Anadarko has a 100 percent interest in. Is

1 that -- does that include 100 percent interest in all oil
2 and gas rights for that 40-acre tract?

3 A Yes, it does, at all depths.

4 Q I'd like you to direct your attention
5 now, Mr. Sullivan, to Exhibit Number One and if you'll give
6 me a moment, we'll have copies of that handed out.

7 Did you prepare Exhibit Number One, Mr.
8 Sullivan?

9 A Yes, I did.

10 Q Would you identify for us the informa-
11 tion depicted on the exhibit?

12 A Exhibit Number One is a summary of the
13 operating economics as they relate to our Osage No. 1 Well
14 and it's posing a scenario where it is necessary to truck
15 water away from the well and have it disposed in commercial
16 disposal facilities.

17 Under heading number One, Operating Ex-
18 penses, I've summarized your categories of operating expen-
19 ses that would be incurred in operating that well. Clearly
20 the water disposal charges dominate the over all expenses
21 and are roughly \$1.25 per barrel to truck and dispose 1000
22 barrels a day of produced water through a commercial system,
23 which we actually did for several months. The water had to
24 be trucked as far away as Loco Hills.

25 The second section on this page cal-

1 culates how much oil production would be necessary to break
2 even while you're hauling that water and incurring these ex-
3 penses and given the monthly expense of \$41,500, the calcu-
4 lation indicates that it would take 68 barrels per day of
5 oil production from the Osage Well just to break even, just
6 to pay those direct expenses and, as I've indicated, the
7 well was making 50 barrels a day and therein is our motiva-
8 tion to find a less expensive salt water disposal alterna-
9 tive.

10 Q This was the economic background, then,
11 against which Anadarko was seeking a disposal facility?

12 A Yes, it was.

13 Q And that the Osage No. 1 Well with a
14 proven capacity and ability to produce 50 barrels of oil a
15 day was still going to be uneconomic unless you had a dispo-
16 sal facility other than trucking the produced water away.

17 A That's correct.

18 Q Would you turn now to Exhibit Number Two,
19 which we will hand out.

20 At this time, Mr. Sullivan, would you de-
21 scribe for us the economic expenditure that Anadarko has un-
22 dertaken before and after completion of the disposal well so
23 that we understand what your company's economics are at risk
24 in the this project?

25 A Yes. Exhibit Number Two is a summary of

1 the amount of money that has been invested and committed by
2 Anadarko in this project, starting from the time we re-en-
3 tered and completed the Osage No. 1 as an oil well in the
4 Cisco Canyon. The two columns there, the two money columns,
5 the first column is net to Anadarko, which reflects our net
6 investment in the area, and the second column is gross to
7 all the working interest owners in our projects, and there
8 are certain of these wells, and it's clear here which they
9 are, that Anadarko doesn't own 100 percent interest.

10 For example, we don't own 100 percent of
11 the Osage No. 1, we have partners. To drill and complete
12 the Osage we spent \$358,000, and then at that point, as I
13 indicated, we needed some less expensive water disposal
14 capacity. Given our order to drill the Dagger Draw Salt
15 Water Disposal No. 1, we spent approximately \$336,000 to the
16 point of perforating the Cisco Canyon in that well.

17 Beyond perforating the zones we spent an-
18 other \$99,000 and overall it cost us \$435,000 to drill and
19 complete the Dagger Draw SWD No. 1 and have it ready for
20 disposal services.

21 At the point that we set, or at the point
22 we perforated the Cisco Canyon in our water disposal well,
23 if I could jump to the bottom of the page, the next to the
24 last entry, Anadarko has spent \$694,000. That's drilling or
25 re-entering the Osage No. 1 and the drilling expense and the

1 initial completion efforts on the Dagger Draw SWD No. 1.

2 Since that time, since we established
3 that we did have a successful water disposal well in the
4 Lower Cisco Canyon, we have continued with our project in
5 the area and spent additional significant money to build
6 surface disposal facilities to re-enter an additional well
7 in Section 4, the Matlock No. 1 Well. That re-entry was
8 supported by the existence of less expensive salt water dis-
9 posal facilities. We laid numerous lines to gather and
10 transport salt water and gas. We've committed nearly Half a
11 Million Dollars to a gas sweetening plant and compression
12 facilities to sell the gas coming out of three wells in the
13 area, and in summary we've spent nearly a Million Dollars
14 since the time we perforated the Dagger Draw Disposal No. 1.

15 And overall we've spent significantly
16 more money since that time than we had up to that point in
17 time exploiting this project.

18 Q Would you turn now, sir, to Exhibit Num-
19 ber Three and describe for us in terms of recoverable
20 reserves what the impact would be to Anadarko should the
21 Commission determine that the order entered approving this
22 disposal well ought to be terminated? Could you describe
23 for us using Exhibit Number Three what the recoverable re-
24 serves at risk are with regards to this project?

25 A The bottom line is we believe we would

1 lose approximately 59,000 barrels and 236-million cubic feet
2 of commercial gas reserves, and these are gross numbers, if
3 we lost this water disposal well and were required to resume
4 operations of trucking the water at \$1.25 a barrel.

5 That's a summary number. The impact is
6 seen from the three wells we operate in the area. In addi-
7 tion to the Osage No. 1 I've already mentioned, we operate
8 the two wells in the southeast quarter of Section 4, the
9 Bradshaw No. 1 and the Matlock No. 1. Each of those three
10 wells will suffer reduced ultimate recovery because of the
11 impact on operating expenses of having to truck water.

12 The two wells in Section 4, for those two
13 wells the impact is less significant because they don't pro-
14 duce as much total water and the direct impact on monthly
15 expenses is not quite as significant, but overall from the
16 three wells we believe we'd lose 59,000 barrels and nearly a
17 quarter of a BCF of gas.

18 Q Against that general background, Mr. Sul-
19 livan, I'd like to direct your -- the next portion of your
20 testimony to the considerations made by your company in de-
21 termining the location for a disposal well, and at this time
22 to aid us in understanding your position, I'll ask that Ex-
23 hibit Number Four, the cross section, be distributed.

24 A Exhibit Number Four is a structural cross
25 section through the Cisco Canyon section in this area.

1 There's an index map in the lower left corner and for orien-
2 tation the symbol in the northwest quarter of Section 22 is
3 our water disposal well.

4 The cross section has two -- two logs
5 shown on it back to the east. One is our Osage and they're
6 labeled at the top, and there's another log shown that's a
7 producing well from the North Dagger Draw Pool area proper.

8 Then going back to the east our Osage
9 Well, there's a log shown on Chama's, or Nearburg's South
10 Boyd No. 1 Well and Nearburg's B&B No. 1 Well, and then on
11 across to the next township, and a Ralph Nix well that is a
12 water disposal well in the lower part of the Cisco Canyon,
13 also.

14 Of course at the time we recommended the
15 drilling of this well we didn't have this log on our
16 Osage. We had two on either side of it and we had the
17 record of their testing; two on either side, not figurative-
18 ly, on this cross section. We had the B&B and the Osage
19 wells that we had control on and we felt it was particularly
20 important if we were going to drill nearly a Half a Million
21 Dollar disposal well to drill it in an area that we were
22 confident from existing control we would be able to dispose
23 water into porous zones in the Cisco Canyon, and further,
24 that we had control to our satisfaction that those zones of
25 the Cisco Canyon were not commercially productive of oil or

1 gas.

2 The control existed through the form of a
3 history of testing the Osage Well, which was drill stem tes-
4 ted twice and the results are summarized on the cross sec-
5 tion, and then also in the B&B No. 1 Well, which Chama had
6 entered to test the Morrow. That well was also drill stem
7 tested twice in the Cisco Canyon and neither of those drill
8 stem tests gave us an indication that either well was poten-
9 tially commercially productive in the C and D zones of the
10 Cisco Canyon.

11 Q Let's talk in general about commercial
12 oil production in the Cisco Canyon prior to the Osage Well.
13 Let's assume the Osage Well is not on the cross section and
14 let's talk, first of all, about the relationship between oil
15 and water production generally.

16 My first question is obtaining commercial
17 oil production in the Cisco Canyon in any of the four zones.
18 Do you see that oil production produced as oil only or is it
19 produced in association with water?

20 A It is essentially always produced in as-
21 sociation with significant volumes of water.

22 Q Within this particular area where do we
23 find the commercial oil production in terms of identifying
24 that production in relation to the A, B, C, or D zones of
25 the Cisco Canyon?

1 A If I understand your question, in the im-
2 mediate area the only commercially productive zone indicated
3 is the A zone in our Osage No. 1 Well.

4 Q As we move to the north and west and get
5 into the North Dagger Draw, where is the producing oil in-
6 terval that's commercial in those wells in the Cisco Canyon?

7 A In the older Dagger Draw Field proper the
8 C zone is the predominant producing interval of the Cisco
9 Canyon and I understand there is also some D zone production
10 in that field.

11 Q What was the specific reason in terms of
12 information available to you in August of '84 that caused
13 you to recommend the drilling of the Dagger Draw Disposal
14 Well at the location we find it today?

15 A The geological control was a very strong
16 factor in that we could again drill this well at a location
17 approximately equidistant between two wells that we had a
18 log that showed adequate porosity, and we had drill stem
19 tests that condemned the C and D zones as to their potential
20 for commercial oil production from the Cisco Canyon.

21 Relative with that information compared
22 to drilling back to the west, for example, there was no con-
23 trol for several miles as to the porosity and permeability
24 in the Cisco Canyon and we believed it more prudent to drill
25 the well at the location we recommended than to drill it on

1 the west side of our Osage, principally because of the
2 availability of geologic control on both sides of our recom-
3 mended location.

4 Q All right, let's turn now to the fact
5 that the Oil Commission has entered the order approving the
6 disposal well for the Dagger Draw Well and you have drilled
7 the well. Let's talk about the wellbore diagram. If you'll
8 distribute Exhibit Number Five, let's direct our attention
9 to the well itself.

10 In addition, Mr. Sullivan, I've asked
11 that Exhibit Number Six, which is the drilling and comple-
12 tion reports, that they also be handed out so that we have
13 those available.

14 A Okay. Initially let me address Exhibit
15 Number Five, which is a schematic diagram representing the
16 initial and current status of our Dagger Draw Disposal Well.
17 The primary casing string is set at a depth of 8,128 feet.
18 It's 5-1/2 inch casing. The cement behind that casing was
19 circulated up to a depth of 600 feet; was measured by a tem-
20 perature survey in the well, and that 600-foot level was
21 substantially above the casing shoe of our intermediate cas-
22 ing, which you will note is set at approximately 1312 feet.
23 That, we believe, is a very adequate cementing program.

24 The overall perforations, from 7806 to
25 7998, indicated there towards the bottom of the schematic

1 and also shows that we have a packer set at 7772 feet, ap-
2 proximately 30 feet above the upper perf and that we have
3 the annulus loaded with fluid and we do have the proper
4 monitoring devices on the annulus at the surface.

5 The tubing in the well is plastic-lined
6 tubing. It's a 3-1/2 inch tubing string.

7 Q Have your reviewed the Division Order R-
8 7637 to determine whether or not you can reach an opinion
9 that the well was drilled pursuant and in accordance with
10 the requirements of that order?

11 A Yes, I have, and the wellbore complies in
12 all respects with the requirements of the order and with the
13 general requirements of wells -- of the statewide rules.

14 Q Was it perforated in conformance with
15 that order?

16 A Yes, it was.

17 Q And were the perforations in the wellbore
18 confirmed by the Division Office of the Oil Conservation
19 Division in the District?

20 A Yes, they were. Prior to perforating the
21 well recommended zones were reviewed with the District staff
22 in Artesia and I understand a representative of the office
23 witnessed the perforating procedure and concurred it was in
24 compliance with the order.

25 Q The allegation in the application by Cha-

1 ma against Anadarko is that there was a commercial oil zone
2 in the disposal well; that Anadarko flooded a commercial oil
3 zone and failed to adequately rest and determine the
4 commerciality of any oil shows that may have occurred in the
5 disposal well.

6 Pursuant to that contention in the
7 application have you made a complete review and study of all
8 the data, drilling reports, completion information, notes,
9 anything you can find in the files of the Oil Commission
10 and Anadarko on this subject matter?

11 A Yes, I have.

12 Q As a reservoir engineer, do you typically
13 make evaluations of this type in order to determine
14 appropriate testing, completion techniques, and to review
15 the acts of others and to make sure that they were in
16 accordance with such prudent practice?

17 A Yeah, it's one of the common
18 responsibilities of my job, and of our jobs. It's the age-
19 old question of what is a commercial show versus a
20 noncommercial show, and it requires analysis, technical
21 documentation; it's something we do frequently.

22 Q Do you have an opinion, sir, as to
23 whether Anadarko was prudent in the drilling of this well
24 in terms of a commercial oil show?

25 A Yes, I believe we were.

1 Q Do you find any evidence, sir, that the
2 information available to you showed that there was a commer-
3 cial oil zone present in this well?

4 A No, I don't find any evidence.

5 Q Would you discuss for us the way the well
6 was drilled and completed and identify for us those factors
7 or reasons that cause you to believe there was no commercial
8 oil zone present in the disposal well?

9 A Okay. To do that I'd like to direct the
10 attention to Exhibit Number Six. Exhibit Number Six has
11 several pages. The first two pages are a synopsis of the
12 day-by-day procedure during the perforating of the well and
13 initial results, and attached to that is a copy of our -- of
14 our actual daily drilling report as recorded in the field,
15 that I probably won't get into all the details for just a
16 minute on.

17 On November 13th of 1984 we had, of
18 course, already drilled the well to TD and logged it and set
19 pipe and were prepared to begin perforating it. We chose to
20 perforate it substantially under balanced to avoid damage to
21 the zones, to insure that we would be able to adequately
22 dispose water into them, and in fact we swabbed the fluid
23 level in the casing down to approximately 7300 feet, which
24 is only about 500 feet above our planned top perforation.

25 Q Excuse me, Mr. Sullivan, let me ask you

1 to explain for the record what it is and what significance
2 it has to you as a reservoir engineer that the well was per-
3 forated under balanced?

4 A With having swabbed the fluid level down
5 to that depth with approximately 500 feet of fluid above our
6 top perforation, and the fluid being water, it tells us that
7 there was less than 250 pounds of pressure that would be ex-
8 posed on the formation upon perforation.

9 We know the formation has approximately
10 3,031 pounds bottom hole pressure, and so we fully knew that
11 immediately upon perforating the wellbore fluid would begin
12 flowing directly into the wellbore and filling it up with
13 water.

14 It allows cleaner perforations when fluid
15 flows that way than when you perforate it over balanced and
16 you force fluid to flow the other direction, with whatever
17 else it may carry with it.

18 Q All right, what happens next?

19 A We began perforating. The perforating
20 procedure required several runs with a perforating gun, and
21 it was a casing gun.

22 The first run we perforated the very top
23 zone from 7806 to 14. On the way out of the hole with the
24 wireline casing gun we determined that we came out of the
25 fluid in the hole at 5400 feet and you can see -- I failed

1 to mention one thing, that immediately prior to the perfor-
2 ating we spotted acid across the zone, which raised the
3 overall fluid level to 6400 feet.

4 Then coming out of the hole after the
5 first run with the perforating guns we hit the fluid level
6 at 5400 feet and clearly 1000 feet of fluid had come into
7 the hole since we perforated it, and there's a notation here
8 that that measurement was recorded approximately fifteen
9 minutes after having perforated the very first zone.

10 So in a period of only fifteen minutes
11 1000 feet of fluid had come into the wellbore, so the well
12 is flowing and is very permeable.

13 Beyond that point we made additional runs
14 and on virtually every run with the casing gun there were
15 three additional runs. We noted a fluid level going in the
16 hole and a fluid level coming out of the hole, and each time
17 we could see the fluid level coming closer and closer to the
18 surface, and coming out of the hole on the final run we hit
19 the fluid level at approximately 450 feet. This was four
20 hours since the previous fluid level had been measured.

21 At that point we completed perforating
22 all the zones we intended to perforate and we left the well
23 shut in for the night.

24 Q What then happened on the 15th of Novem-
25 ber '84?

1 A The next morning we came to the location
2 and we found that the wellbore still shut-in had accumulated
3 a casing pressure of 800 -- 840 pounds, as indicated.

4 We opened the well up. After communicat-
5 ing that to our Midland Office we decided to open the well
6 up for a four hour period, which we did. We simply opened
7 the well into the frac tanks that we had used out there to
8 accumulate fluid, and observed it, and it did die during
9 that time, and by 7:00 o'clock the next morning we had
10 reported a recovery of 60 barrels of oil and 260 barrels of
11 water in the frac tanks, and that volume was measured by a
12 color cut tape in the two tanks that the fluid had flowed
13 into.

14 At that point we went back in the hole,
15 after having flowed it for 24 hours, with a retrievable
16 bridge plug and a treating packer to begin acidizing the
17 wellbore.

18 The first thing we did was set the re-
19 trievable bridge plug immediately above the perforations, and
20 we circulated the entire wellbore with clean fluid to fully
21 replace all the fluid that was in the wellbore, and this
22 would have been fluid that came out of the formation.

23 Through that process we saw no more oil.
24 At that time there was no more oil in the wellbore after we
25 had recovered what we had in the 24-hour period.

1 The bottom of that page takes us through
2 subsequent events where we in the future found that what we
3 had initially estimated to be 60 barrels of oil, based on
4 our color cut measurement in the two frac tanks, was actual-
5 ly 33 barrels of oil when we finally measured it and got it
6 all in one tank.

7 We did then proceed to acidize the zones
8 and our actual procedure is consistent with what the appli-
9 cant has shown in their offering of the state forms as pre-
10 vious evidence.

11 Using the retrievable bridge plug and
12 packer we straddled three different intervals and acidized
13 each of the three different intervals separately with a to-
14 tal of approximately 11,200 gallons of acid, I believe is
15 the figure.

16 That took place on the 17th and 18th of
17 November, the two days after we had seen the show of oil re-
18 covery on the flowing test.

19 Immediately after acidizing it, with the
20 bridge set at the very bottom of the hole, we swabbed 100
21 barrels of water back in six hours, and in that recovery
22 there was no show of oil again.

23 At that point we came out of the hole
24 with our treating tools and equipment we did run in the hole
25 with our packer and injection tubing, and prepared to place

1 the well on water disposal service.

2 We feel like that beyond the very initial
3 show of the well trying to flow because it was so substan-
4 tially under balanced, we saw no additional oil in the well-
5 bore. When we circulated the wellbore, completely displaced
6 the volume, there was no oil in it, and after we acidized
7 it, when we swabbed the fluid back, we had even no -- no
8 show of oil at all.

9 Q Do you believe it would have been
10 reasonable and prudent after knowing that information to
11 have gone ahead and conducted any type of drill stem test on
12 any of the Cisco perforations?

13 A No, I don't believe so. There was no in-
14 dication at that point that any, any zone in the wellbore was
15 trying to become a commercial oil producing zone. It simply
16 had the initial show and no additional show.

17 Q How could Anadarko have completed the
18 disposal well in such a way that you could have had a dis-
19 posal irregardless of oil being present in any of the per-
20 forations?

21 A We could have done at least two things
22 differently if we had felt, I guess, especially sensitive
23 about what was going to happen at this wellbore.

24 First, we would not have perforated it
25 under balanced, clearly. We could have loaded the hole with

1 fluid and the formation pressure is not adequate to flow
2 against a full wellbore full of water, and had we perforated
3 it in a full well of water, it would not have flowed. We'd
4 have never seen anything come out of the wellbore, but we
5 perforated it under balanced in the interest of having a
6 good perforation.

7 Second, if we had been especially sensi-
8 tive about what might come out of the wellbore, we wouldn't
9 have flowed it for the 24-hour period. We arrived the mor-
10 ning after perforating and saw what we viewed as significant
11 casing pressure, 840 pounds, and we elected to flow it for a
12 24-hour period and see what we would learn.

13 We did see the show of oil but we didn't
14 see any more than beyond that point, and concluded it was
15 noncommercial.

16 Those two things, as I say, if we had
17 been overly sensitive about seeing oil in this wellbore, we
18 would have done different and could have done different, and
19 would have never seen anything come out of the wellbore, and
20 still been fully in compliance with our order and our per-
21 mit.

22 Q Having seen the initial oil show in the
23 tank, or in the pit, that was estimated at 60 barrels of
24 oil, what significance do you place as a reservoir engineer
25 on the fact that when the tubing and packer were set in the

1 wellbore, the fluid displaced contained no oil; was 100 per-
2 cent water?

3 A It tells -- it tells us that beyond the
4 initial flow induced by the very substantial under balanced
5 condition that it was perforated in, the well, under any
6 kind of stabilized conditions, was not going to make any
7 oil; in fact, did not make any oil. There wasn't any in the
8 wellbore.

9 Q How do you account or explain the
10 presence of the oil show? Where would that have come from?

11 A I can testify a zone that in our judgment
12 it probably came from. I concur with Mr. Mazzullo, we can't
13 conclusively say where it came from. The physical
14 phenomenon that caused it, again, is the very significant
15 underbalanced condition under which we perforated the well,
16 and in engineering terms, the functions of permeability
17 change with severe changes in pressure differential, and
18 there was simply a different permeability function at this
19 severely underbalanced condition than one would see under
20 any stabilized operating conditions, and that for that very
21 initial flash, I'll call it, because we were so severely un-
22 derbalanced, there was some small volume of what under those
23 conditions was mobile oil. And then we subsequently con-
24 cluded that under normal conditions there was no mobile oil
25 and certainly no commercial oil to be recovered.

1 MR. KELLAHIN: At this time
2 I'll ask that Exhibits Seven through Ten be circulated.

3 Q Mr. Sullivan, I've placed before you Ex-
4 hibits Seven, Eight, and Nine and Ten, which have been iden-
5 tified as scout tickets. Would you describe for us, or
6 identify those exhibits and explain the background surround-
7 ing the issuance of these scout tickets?

8 A Yes. Each of the four exhibits is a com-
9 mercial scout ticket. The reason there are four is that
10 there are two services in Midland that provide commrcial
11 scout tickets, and from each service I have two tickets, so
12 we have four tickets, altogether.

13 Exhibit Number Seven was the intial scout
14 ticket on our water disposal well that came from the Subsur-
15 face Library in Midland, and beyond the factual information,
16 it shows perforations, and it shows the indication that the
17 well flowed 60 barrels of oil and 260 barrels of water in 24
18 hours.

19 They gathered this information because we
20 routinely provide them drilling reports from our wells and
21 our drilling report, as we've provided here, fully discloses
22 that the oil came out of the wellbore; it was picked up on
23 this scout ticket.

24 Exhibit Number Nine is the initial scout
25 ticket from Petroleum Information, which is the same infor-

1 mation source of one of Mr. Mazzullo's exhibits, and consis-
2 tent with what he showed, it also shows the recovery of 60
3 barrels of oil a day.

4 This flowing test of 60 barrels of oil
5 and 260 barrels of water being reported on a well that's de-
6 signated a salt water disposal well caused some confusion
7 and we have had scout tickets re-issued from both services.

8 Exhibits Numbers Eight and Ten are re-
9 vised scout tickets from the Subsurface Library and from
10 Petroleum Information, respectively, and in each of those
11 scout tickets that have been revised, the reference to the
12 recovery of oil and water in a 24-hour period has been de-
13 leted, and it indicates that these are certainly not public
14 record-type quality information.

15 We understand now from the previous tes-
16 timony, I believe the scout ticket from Petroleum Informa-
17 tion was the source of Nearburg's concern, and it probably
18 precipitated their application in this case.

19 Q Tell us how accurately the measurement is
20 made initially when it was estimated that there were 60 bar-
21 rels of oil and 260 barrels of water?

22 A In this case the well was flowed into two
23 frac tanks that were manifolded together, and in the morning
24 after the flowing test a color cut estimate was made, and
25 the procedure for that is simply taking a waxed line that

1 changes color when it gets in oil or water, and you dip it
2 in from the top of the tank to the bottom, and you pull it
3 back out and you say how many inches of this line went
4 through the oil section, and then you can take a tank table
5 and estimate that -- that those inches are how many barrels
6 in these two tanks, and 60 barrels of fluid in two frac
7 tanks is on the order of less than two inches, probably, so
8 it's very -- it's inaccurate, the resolution is very poor,
9 but it's typically how things are measured at that point in
10 -- in any procedure.

11 Q Have you subsequently caused the oil to
12 have been more accurately measured, and can you give us
13 what, in your opinion, would be a correct and accurate num-
14 ber for the oil?

15 A Yeah. The well is -- the oil is cur-
16 rently still on the location in a vertical tank with a sight
17 gauge on it, and we can check that tank and with accurate
18 tank tables on it now know that there are 33 barrels of oil
19 that truly are still on the location, and that is the oil
20 that came out of this wellbore.

21 Q Chama's indicated in their direct presen-
22 tation that there was something inappropriate about the way
23 Anadarko filled out certain Commission forms and its failure
24 to declare the presence of the oil show.

25 Do you have any comments on that issue,

1 Mr. Sullivan?

2 A They -- they offered a C-103 and a C-105
3 from our well and indicated that neither mentioned the
4 volume of oil.

5 The C-103, as they said, is simply a sun-
6 dry report of on-going operations and there is certainly no
7 requirement that oil be mentioned on there, and, in fact, we
8 could demonstrate that their C-103s on the South Boyd No. 1
9 don't indicate any recovery of oil from the Cisco Canyon.
10 We have those but I'll just -- I'll simply state that.

11 There is no requirement. We -- we did
12 not fail to comply with any requirement.

13 The C-105, we view the intention of the
14 area in there to report a production test with the intent of
15 an initial test on a productive well, and we simply didn't
16 put it in because this is not a productive well.

17 Again, we did not fail to comply with any
18 requirements and it was not an intentional cover-up of in-
19 formation. We had it fully in our drilling reports and we
20 had it in the scout tickets at that point in time.

21 Q What is your understanding of the purpose
22 of that form entry, in terms of setting an allowable for the
23 well, if this was a producing oil well?

24 A I believe the C-105 in and of itself does
25 not cause approval of an allowable, but the information on

1 it should be consistent with the form submitted for the re-
2 quest of an allowable if one was requesting an allowable at
3 that point to begin production of a well, which, of course,
4 we -- we didn't need.

5 Q The well's been drilled and completed as
6 a disposal well. Would you bring the Commission up to date
7 on the ways in which the well is being utilized for disposal
8 in terms of the pressure limitation and the volumes? Are
9 you in compliance with the order?

10 A Yes. The order permits a maximum dispo-
11 sal volume of up to 10,000 barrels per day and constrains
12 the surface pressure to, I believe, 1508 pounds, or less,
13 based on the .2 of a pound per foot factor and our 7800-foot
14 upper perf. It would probably be 1560 pounds, actually.

15 We have never experienced any positive
16 surface pressure to date in injection operations on this
17 well. The maximum rate of injection we've seen so far is
18 approximately 13-or-1400 barrels per day coming from our
19 three producing wells that are now tied to the disposal sys-
20 tem.

21 So we are comfortably within the con-
22 straints in the order. They are not constraining us in any
23 way and we certainly haven't violated them.

24 Q We've got the well being utilized as a
25 disposal well, now, and Chama files its objection.

1 In retrospect, Mr. Sullivan, have you
2 gone back again and reviewed the data and formulated an ad-
3 ditional factual basis upon which you can re-examine what
4 Anadarko had done initially to determine whether that ini-
5 tial decision was prudent and correct on completing this as
6 a disposal well and not trying to complete it as an oil
7 well?

8 A Yes, I have.

9 Q Let me ask you, first of all, can you
10 tell, from looking at the cross section, Exhibit Number
11 Four, if you can draw any comparisons between the commer-
12 ciality of oil production among the various wells in an ana-
13 lysis of the cross section?

14 A Let me start from the left, which is
15 west, and go to the right, I believe; and again, on the left
16 end is just a well for control purposes in the Dagger Draw
17 Field, and the productive zone is indicated with perfora-
18 tions. It's what we've designated as the C zone.

19 Again, it's approximately two miles, two
20 and a half miles, removed from our salt water disposal loca-
21 tion, and is substantially structurally higher in all the
22 Cisco Canyon zones than we are in the area of our project.

23 The next well, moving to the right, is
24 our Osage No. 1, where in late '82 and early '83 we com-
25 pleted the well as a producer in the A zone of the Cisco

1 Canyon from the two perforated intervals denoted on the
2 cross section.

3 That was a re-entry of a previously aban-
4 doned well and Anadarko re-entered it on the strength of a
5 drill stem test and it showed approximately 50 percent oil
6 cut of the lower porosity zone in that Cisco Canyon A sec-
7 tion.

8 The very next well is our water disposal
9 well on the top, structurally, on the top of the A, I be-
10 lieve we're roughly 40 feet low to our productive well in
11 the A section.

12 On the top of the C, which I'll refer to
13 additionally, we're more or less flat to our Osage Well.
14 Our perforations, our disposal interval through perfora-
15 tions, are indicated on the log on that well in the cross
16 section, and again, we believe that nothing in the C and D
17 zones at this location is potentially commercially produc-
18 tive.

19 I will also point out relative to the
20 Osage, step back one time, please, that there is a drill
21 stem test in the C zone from 7830 to 65, that was completed
22 when the well was initially drilled, that had no hydrocarbon
23 show whatsoever.

24 That, and further information I'll dis-
25 cuss, we believe condemns the C zone section in this area.

1 Now, coming to Chama's South Boyd No. 1
2 Well on the cross section, it's located roughly a mile south
3 of our water disposal well, and we concur through review of
4 the facts that Chama did in fact have an oil show from at
5 least, from two zones in the Cisco Canyon. I -- I will pro-
6 bably review our understanding of the facts of that well,
7 and I believe you'll find them somewhat different than what
8 the previous testimony has been.

9 They tested the lower, or the D zone, of
10 the Cisco Canyon, and, as I indicated, had no show of oil or
11 gas at all.

12 The small perforated section around 7800
13 feet did have a show of oil. On subsequent testing it
14 failed to have a show of oil.

15 The section up in the lower A and B was
16 tested by Chama, and -- and we know also had a show of oil,
17 but it was a very, very marginal show of oil over a very,
18 very sustained period of testing, and we will suggest is not
19 indicative of commercial production in any of these zones,
20 and relative to the South Boyd No. 1 in the Cisco Canyon, we
21 conclude, after reviewing the facts, that there is no com-
22 mercial production anywhere that's been tested in that well-
23 bore in the Cisco Canyon.

24 The next well on the cross section is the
25 Chama-operated B&B No. 1, which they have re-entered and es-

1 tablished produciton from the Morrow, I believe, approxi-
2 mately 30 MCF a day.

3 Prior to that re-entry, Mr. Antweil had
4 drill stem tested two sections, as previous testimony indi-
5 cated, in the Cisco Canyon, and neither of those two drill
6 stem tests indicate the commercial -- the potential for com-
7 mercial oil production.

8 The last well, I won't address. It's --
9 it's not directly relevant other than it being a Cisco Can-
10 yon water disposal well, with no really pertinent testing
11 information available on it.

12 Q In conducting this re-examination of what
13 Andarko did in the disposal well, Mr. Sullivan, will you
14 tell us generally what other studies that you had made to
15 determine whether or not Anadarko was prudent in what they
16 did?

17 A We completed some -- some fairly rigorous
18 and comprehensive log analysis relating our Osage water dis-
19 posal well to known wells on each end of the spectrum.

20 Q All right, let's -- let's circulate Exhi-
21 bit Numbers Eleven, please, so that we can have benefit of
22 what you're telling us.

23 A All right.

24 Q Tell us, first of all, what it is that
25 you're trying to study in terms of the log analysis ap-

1 proach?

2 A What I'll be discussing in this log anal-
3 ysis is known as a bulk volume water. Bulk volume water is
4 simply the product, mathematical product, of porosity multi-
5 plied by water saturation.

6 For example, if you had a 10 percent por-
7 osity and a 10 percent water saturation, the produce of
8 those two numbers would be a .01 bulk volume water, and it
9 is literally just a true measure on a unit per unit basis of
10 the amount of water sitting in the system down there.

11 Bulk volume water typically has direct
12 implications to the relative permeability functions of a
13 given type of rock, and we have reviewed the bulk volume
14 water in many zones in many wells in this area, both known
15 producers and both known nonproducers in the Cisco Canyon
16 section.

17 Q Using the plat, which is the first page
18 of Exhibit Number Eleven, would you identify the wells that
19 you've used as part of your study?

20 A Each of the seven wells that we have com-
21 pleted this analysis on are designated with a red dot on the
22 plat, the first page of Exhibit Number Eleven, and for
23 orientation, our water disposal well in the northwest quar-
24 ter of Section 22 also has a small red arrow pointing to it,
25 and it's one of the wells, of course, that we've done an

1 analysis on.

2 The four wells generally on the western
3 side of the map are the four commercially productive wells
4 that we've done an analysis on, and the other three wells,
5 again, are our water disposal well, the Chama B&B Well, and
6 the Chama South Boyd Well, which are noncommercial oil wells
7 in the Cisco Canyon and my future discussion of the analysis
8 will bear that out.

9 Our aim was -- was in establishing a cor-
10 relation between log analyses and a prediction of the poten-
11 tial of commercial production from a zone in the Cisco Can-
12 yon.

13 To do this, and knowing that bulk volume
14 water is frequently used as an indicator of producing oil
15 cut, or producing water cut, if you will, bulk volume water
16 was calculated for each of these seven wells.

17 On the second page I have summarized for
18 the four producing wells in the area that these calculations
19 were made for what the average bulk volume water through the
20 producing section of those wells is.

21 In a function I'll describe in a minute,
22 that average bulk volume water can be used to project an in-
23 itial water cut of production from these wells, and I've
24 summarized that projected water cut in the third column on
25 this page.

1 In the last column we've tabulated the
2 actual initial producing water cut of these wells, and let
3 me summarize them down the page.

4 The first well, the analytical technique
5 projected a 43 percent water cut and the well actually
6 demonstrated a 42 percent water cut.

7 For the second well, the technique pre-
8 dicted a 62 percent water cut and the well actually demon-
9 strated a 54 percent water cut.

10 The third well showed roughly the same
11 relationship.

12 On the fourth well, the analytical tech-
13 nique predicted a 55 percent water cut and the well actually
14 performed initially with a 76 percent water cut, and I will
15 point out that these actual water cuts are based on the ini-
16 tial potential tests. They're the very first production
17 from each of these four wells.

18 In general, over the four wells we've re-
19 viewed, we believe this information bears out that our pre-
20 dictive technique, using bulk volume water, is fairly reli-
21 able.

22 And now I'd like to take just a minute
23 and in summary form describe how that predictive technique
24 works.

25 To use bulk volume water, it's necessary

1 to find end points of the function; that is, find what bulk
2 volume water represents 100 percent oil production and then
3 also find what bulk volume water represents 100 percent
4 water production.

5 And these are essentially the end points
6 of the relative permeability function that you have to find,
7 and those end points vary from one rock type to the next.

8 In all of this review, the lowest bulk
9 volume water found in any well was .008, and we assume that
10 that being the very lowest found, that it would be indica-
11 tive, most indicative, of 100 percent oil production. It was
12 a small zone in one of these productive wells.

13 A rule of thumb is that there is a
14 2/100ths difference between 100 percent oil and 100 percent
15 water, which would suggest that .028, then, bulk volume
16 water is indicative of 100 percent water production.

17 Going on that, then, as an initial calib-
18 ration, the interpolation between those two points is a lin-
19 ear function. For example, if you are halfway between .008
20 and .028 in bulk volume water, you would predict a 50 per-
21 cent oil cut.

22 That type of interpolation, based on the
23 average bulk volume water shown, is what was used to deter-
24 mine the projected water cut from this log analytical tech-
25 nique.

1 And again in summary, we think it is
2 borne out fairly well from the actual experience of the four
3 productive wells overall; granted that from one well to the
4 next there are some slight deviations.

5 Q How have you applied this particular an-
6 alysis to prepare for commercial production, for example, in
7 the disposal well, the Dagger Draw?

8 A In our Dagger Draw disposal well, in the
9 C zone the average bulk volume water is .0285, which is, es-
10 sentially, exactly what we believe is an upper limit indica-
11 tive of 100 percent water production.

12 In the D zone our bulk volume water is
13 which is fully possible. And over the disposal interval the
14 average bulk volume water is .031, and again, consisten with
15 our calibration of this technique to existing production, we
16 believe the log analysis further supports that the well
17 could not have been a producing well in the Lower Cisco Can-
18 yon.

19 Q Have you applied this analysis to Chama's
20 South Boyd Well?

21 A Yes, we have done that, also.

22 In the C zone the average bulk volume
23 water in Chama's South Boyd Well is .034. In the D zone
24 it's .037, so again, both those zones are significantly in
25 violation of what we view the maximum bulk volume water to

1 have any oil production, even one percent oil production,
2 essentially, on stabilized rates.

3 Q Have you applied this analysis to Chama's
4 B&B Well, the well originally drilled by Mr. Antweil?

5 A Yes, we have. Again, both the C and D
6 zones have average bulk volume waters of .037 and .03, res-
7 pectively, and again both those zones show an average that
8 exceeds what we believe is representative of 100 percent wa-
9 ter production.

10 Q Using this method of analysis, Mr. Sulli-
11 van, do you have an opinion as to whether or not the con-
12 tinued utilization of this well as a disposal well in the
13 Cisco Canyon would jeopardize commercial oil production in
14 this interval?

15 A I believe there is no commercial oil pro-
16 duction in this interval in our wellbore or in the South
17 Boyd Well, or in the B&B Well, which Chama operate, which we
18 gather they would have the concern of potentially impairing
19 their rights.

20 Our judgment is that beyond not being
21 commercial in our wellbore, there are no commercial reserves
22 in the C and D zones in their wellbores, either.

23 Q Have you made any other types of analysis
24 to determine in retrospect whether or not your decisions on
25 the disposal well have been true and accurate?

1 A Yes. Having -- having the log analysis
2 and feeling somewhat confident that it reasonably predicts
3 the initial production in terms of water cut from the Cisco
4 Canyon in these wells, we also felt like it was appropriate
5 to see the how the very initial production in existing wells
6 relates to the actual longer term production, and I'll call
7 your attention to Exhibit Number Twelve.

8 Exhibit Number Twelve is a summary for
9 eight producing Cisco Canyon wells in the area, and it
10 shows, in addition to the name and location, the reported
11 initial potential test for each of the eight wells in bar-
12 rels of oil per day and barrels of water per day.

13 The last column on the page shows the ac-
14 tual average rate for each of those eight wells in the first
15 six months that they actually produced.

16 This is not the rate at the end of six
17 months; again, it's the average rate for the first six-month
18 period.

19 I will go to the bottom and state that
20 the average of these eight wells was an initial potential of
21 385 barrels of oil per day and 579 barrels of water per day,
22 which is a 40 percent oil cut.

23 At the bottom of the last column we can
24 see that the average actual production rate of the eight
25 wells was 88 barrels per day, and 572 barrels of water per

1 day, over the first six months of the life of these wells,
2 and that is a 13 percent oil cut.

3 And we see that overall on these eight
4 wells the oil production rate dropped 77 percent over the
5 first six months average relative potential test, so we un-
6 derstand through this analysis that given an existing poten-
7 tial test on a well, that's not what the well's going to
8 make in the first six months average, and certainly not over
9 the life of the well, and that if I was to make a predic-
10 tion, I would, in fact, predict that the well would make ap-
11 proximately 25, 23 to 25 percent of its initial potential
12 over a sustained period.

13 You will note that without exception
14 there were significant drops in the actual production in the
15 first six months relative to the potential test on each one
16 of these wells.

17 Each well was significantly poorer than
18 its potential test indicated, even though some were very
19 commercially successful wells in terms of ultimate recovery.

20 Q Let's assume, Mr. Sullivan, that the ini-
21 tial production out of the disposal well, that was produced
22 as a result of being underbalanced, that went into the tank
23 and subsequently measured 33 barrels of oil, let's assume
24 that equates to an initial potential test, can you give us a
25 relationship between what that would be in terms of an oil

1 cut to what we would find in an initial test for a well
2 that's proven to be commercial?

3 A Given the results of this analysis sum-
4 marized on Exhibit Twelve, if the 33 barrels a day was indi-
5 cative of a potential test on the well, I would probably ap-
6 ply the roughly 25 percent factor to that and predict that
7 the well would only make in the range of 7 to 8 barrels of
8 oil per day, which 50 barrels a day in our Osage Well is not
9 commercial without water disposal capacity.

10 One comment I would make is that we don't
11 herein concede that that was representative of a potential
12 test, because the conditions under which that oil came out
13 of the wellbore were substantially different than the condi-
14 tions under which these wells would have been potentialled,
15 in that again we perforated the well so severely underbal-
16 anced, which probably would not have been the condition on
17 these wells that were flowing as much as 250 barrels of oil
18 a day.

19 Q Using this method of analysis, Mr. Sulli-
20 van, do you believe that the disposal well was, or is, cap-
21 able of commercial oil production?

22 A I believe our disposal well is not cap-
23 able of commercial oil production.

24 Q Using this method of analysis, do you
25 have an opinion as to whether or not there are commercial

1 oil reserves that are being jeopardized by the continued
2 utilization of this well for disposal?

3 A Based on the wells in the area available
4 for review, we found no indication of commercial reserves
5 that could potentially be impaired by disposal into this
6 well.

7 Q Lastly, Mr. Sullivan, I want to direct
8 your attention to the specific drilling report information
9 that we have obtained from Chama with regards to the testing
10 and completion efforts they made on the South Boyd Well, to
11 have you draw some conclusions.

12 Would you circulate this?

13 A Exhibit Fourteen was provided to us by
14 Chama, and it's their daily drilling report of the drilling
15 and testing procedure for the South Boyd No. 1 Well, and
16 page nine begins the testing procedure of the Cisco Canyon
17 zone in the well.

18 Q All right, let's turn to page nine. I
19 believe Mr. Mazzullo has indicated in his direct testimony
20 this morning that as a result of their test on the Cisco Can-
21 yon, that they realized about 102 barrels of oil out of the
22 testing process. Do you recall that?

23 A Yes.

24 Q Have you had an opportunity to review the
25 testing procedures as given to us by Chama, and do you have

1 an opinion about whether or not that well is capable of pro-
2 ducing in commercial quantities?

3 A Yes, I have reviewed in some detail this
4 drilling report and information available to us, and I con-
5 clude after reviewing it that the well is not capable of
6 commercial production truly anywhere that they tested it in
7 the Cisco Canyon, and especially so in the C and D zones of
8 the Cisco Canyon.

9 Q All right, let's -- let's direct your at-
10 tention, I think, to about December 12th in the testing on
11 the well, and have you narrate for us how the tests were
12 conducted, what the test results were, and what, in your
13 opinion, are your conclusions?

14 A Yes. Just shortly prior to December 12th
15 the upper part of the Cisco Canyon C zone had been perfor-
16 ated from 7795 to 7813, and it's as indicated on our cross
17 sections and the previous exhibits, also.

18 On December 12th, the first recovery was
19 experienced from that zone after it had been acidized and on
20 December 12th the report states that the well flowed and
21 swabbed 26 barrels of oil and 279 barrels of water in a 24
22 hour period, and from memory, I believe that's consistent
23 with previous testimony here today.

24 The very next day, that very same zone,
25 as we know it, was also flowed and swabbed and the next day

1 it tested 21 barrels of oil and 126 barrels of water from,
2 again, this very same zone.

3 Immediately after that two-day test
4 period --

5 Q Well, let me stop you for a moment.

6 A Okay.

7 Q You've got a two-day test now. You've got
8 a total of 47 barrels of oil and 407 of water. What does
9 that give you for an oil cut?

10 A It's almost exactly a 10 percent oil cut.

11 Q What does that tell you as a reservoir en-
12 gineer?

13 A It suggests to me that, for one, it's
14 noncommercial, essentially, as it stands; and two, that we
15 -- we expect this 47 barrels a day, even -- even with our
16 knowledge at this point, would not be a sustained producing
17 rate and is a noncommercial rate.

18 Q All right, then what happened?

19 A We conclude that Chama felt like they had
20 fully tested that zone and they set a bridge plug immediate-
21 ly above it at 7791, and on December 15th proceeded to per-
22 forate the lower part of the A and the B zone in the Cisco
23 Canyon in their well, with the overall interval being from
24 7714 feet to 7715 feet, and I believe that interval is indi-
25 cated as perforated on each of the exhibits you've received

1 today.

2 They tested that period for a substantial
3 time after having acidized it adequately, and in summarizing
4 the subsequent days, over a ten-day period accumulated ap-
5 proximately 28 barrels of oil and nearly 1300 barrels of
6 water, which is an overall 2 percent oil cut, and one can
7 see, reviewing the daily reports, that the actual volumes
8 generally are reported in terms of barrels of total fluid,
9 and 2 percent oil cut, or 1-1/2 percent oil cut, or maybe 3
10 percent oil cut, and again, this is from the A and B zone in
11 the Cisco Canyon.

12 Q Is a 2 percent oil cut in the A and B
13 zones commercial in here?

14 A No, it's not commercial on sustained pro-
15 duction, and certainly not as a very initial test of a zone.

16 Q All right, then what happened?

17 A Subsequent to that test, and presumably
18 concluding that the A and B was probably not commercial, the
19 operator went back and again tried to confirm, I guess,
20 their test of the C zone, 7795 to 7813, that they had pre-
21 viously recovered the 47 barrels of oil out of.

22 They set a bridge plug below it and a
23 packer above it, and went through several procedures to make
24 sure that both the bridge plug and the packer were adequate-
25 ly set and sealed, and over an eight-day period of retesting

1 those very same perforations from 7795 to 7813, they re-
2 covered no measureable oil, and in fact only mentioned a
3 trace of oil recovery on one day, two days, I'm sorry, which
4 were the 31st of December and the 2nd of January. Beyond
5 that they recovered, typically, 240-250 barrels of water
6 with no oil show; again over that eight-day period recovered
7 very, very significant amounts of water with measurable oil
8 reported, and this is the second test of the very same zone
9 that they'd previously recovered 47 barrels of water out of.

10 That overall procedure took place between
11 the 27th of December and the 4th of January, and we believe
12 further confirms our indications that even though one can
13 see a marginal show of oil immediately after perforating and
14 swabbing back one of these zones, that's in way indicative
15 that sustained commercial production can be established.

16 Q Does that complete the relevant portions
17 of the testing procedures that you want to direct our atten-
18 tion to?

19 A Yes, substantially. After January 4th
20 the operator spent a few more days retesting the very lower
21 portion of their perforations in the B zone and again accum-
22 ulated no significant amounts of oil.

23 The overall volume that we see documented
24 in this drilling report is 102 barrels of oil recovered from
25 the Cisco Canyon, but as we understand and read this report,

1 it did not come out in two days of eight hour testing. Dur-
2 ing two consecutive days the well did produce 47 barrels of
3 oil, but the balance of that 102 barrels came out of an ad-
4 ditional, roughly, 21 days of substantial expense and tes-
5 ting of several zones in the Cisco Canyon, and that at no
6 point, there are no two eight-hour periods that add up to
7 102 barrels of oil in this well.

8 Q So, then, you've now reviewed for us the
9 events around the drilling of the disposal well. You have
10 now concludes your log analysis, the bulk volume analysis,
11 the production analysis. You've reviewed the drilling re-
12 ports for both wells.

13 What is your final conclusion, as a
14 reservoir engineer, based upon your studies, in terms of
15 whether or not this disposal well ought to be continued to
16 be utilized as a disposal well?

17 A My opinion is that the well is appropri-
18 ately, and was appropriately completed as a water disposal
19 well; that there is no known commercial potential in the C
20 and D zones in the area; and, in fact, in Chama's wells we
21 believe there's no potential at all in the Cisco Canyon, and
22 that we are not impairing anybody's correlative rights by
23 disposing water in the C and D zones in our well, pursuant
24 to the order and permit that we were granted a year and a
25 half ago.

1 MR. KELLAHIN: That concludes
2 my examination of Mr. Sullivan.

3 We'll move the introduction of
4 Exhibits One through Fourteen.

5 MR. STAMETS: Without objection
6 these exhibits will be admitted.

7 Are there questions of this
8 witness?

9 MR. CARR: Yes, that's right,
10 there are a few.

11 MR. STAMETS: You may proceed
12 when ready, Mr. Carr.

13

14

CROSS EXAMINATION

15 BY MR. CARR:

16 Q All right, Mr. Sullivan, let's just --
17 your -- the first exhibit that you testified to, Exhibit
18 Number Thirteen, and I believe that exhibit showed Anadar-
19 ko's ownership in the general area --

20 A Generally, yes, it does.

21 Q I believe you testified that Anadarko has
22 all the rights in the 40 acres on which the well is located.

23 A I believe I did.

24 Q How close to the northern boundary of
25 that 40-acre tract is this disposal well?

1 A 175 feet.

2 Q And it is true that outside that 40 acres
3 upon which the well is located there are other interest own-
4 ers, including Chama.

5 A That's true. I understand Chama owns
6 slightly less than half of the 40-acre tract north of that.

7 Q And the standard spacing requirements in
8 this area for wells in the Cisco Canyon is 160 acres.

9 A Yes, for productive wells.

10 Q If we look now at Exhibit Number Two, I
11 believe Exhibit Number Two, if I can find it, is a listing
12 of various costs, various costs incurred by Anadarko as a
13 result of their efforts in the area that are linked to the
14 salt water disposal well.

15 A I believe you're right.

16 Q Now, you re-entered your Matlock No. 1
17 Well and you've added these costs. Is that not true?

18 A Yes, we did re-enter the Matlock Well.

19 Q And this is not really a direct result of
20 the salt water disposal well. You could have re-entered
21 this Matlock No. 1 Well had you had any satisfactory or com-
22 parable means of disposing of the water.

23 A For a quarter a barrel.

24 Q And if you had drilled a well at some
25 other location out there that wasn't positioned in close

1 proximity to Chama interests and hadn't had this objection,
2 then you still could have been and would have been able to
3 re-enter the Matlock No. 1.

4 A Yes, with respect to the location ques-
5 tion. Once we had established the capability to dispose of
6 water, the feasibility would have been established.

7 Q And you had costs relating to facilities
8 for gas sweetening and compression.

9 Now, these costs were necessary, no mat-
10 ter what, to make the water -- make the gas marketable, is
11 that not correct.

12 A Yes, but the whole project would have not
13 been marketable at all had we not established satisfactory
14 water disposal facilities.

15 Q Now, in what time period were these costs
16 incurred?

17 A The -- I'll start at the top of the page.
18 The Osage No. 1 was re-entered and completed and the comple-
19 tion was in very early 1983.

20 Our re-entry of the Dagger Draw No. 1, I
21 believe, was commenced in approximately November of 1984,
22 after our prolonged efforts to find a satisfactory alterna-
23 tive, which began in, I believe, July of 1983.

24 Almost immediately we re-entered the Mat-
25 lock No. 1 in early 1985, and almost immediately began ar-

1 rangements to build our gas sweetening facilities and com-
2 pression facilities.

3 Q That would have been early in 1985?

4 A Yes.

5 Q What about laying the salt water disposal
6 and gas lines, when was that accomplished?

7 A Immediately after completion of our water
8 disposal well.

9 Q So that would have been, when do you
10 think, early '85, late '84?

11 A Probably about the second quarter of
12 1985.

13 Q What -- what about the surface disposal
14 system? When was that expense incurred?

15 A In the first and second quarter of 1985,
16 after we had established we could dispose water into the
17 Cisco Canyon.

18 Q Now, you did not report to PI, or anyone,
19 the fact that there'd been any oil produced from this well
20 until June of '85, isn't that correct?

21 A We provided PI with our drilling report
22 when the well was completed. Apparently they did not issue
23 their scout ticket until June of 1985.

24 One of the exhibits we've offered today
25 is from the Subsurface Library, and I believe theirs was is-

1 sued March 3rd, if I recall, 1985.

2 Q And this oil was produced in November of
3 1984.

4 A I'd have to review my drilling procedure
5 real quickly.

6 It was produced when we perforated the
7 Cisco Canyon.

8 Yes, that's true.

9 Q If that information had become public
10 earlier, it's possible that some of the objections raised
11 might have been raised before you incurred this expense,
12 isn't that true?

13 A I don't know.

14 Q Now, you stated in the North Dagger Draw
15 Pool that the primary -- predominant producing zone was the
16 C zone.

17 Are you familiar with the recompletions
18 made by Conoco in this area after they took over the old
19 Roger Hanks Wells?

20 A Not in any --

21 Q And you don't know whether or not they
22 were able to make recompletions in the A and B zones at that
23 time.

24 A I don't believe I can answer that, if
25 it's a question.

1 Q Do you know whether or not they were able
2 to make recompletions? That's the question.

3 A No.

4 Q Now, you talked about the control that
5 you had, that you placed this salt water disposal well at a
6 location virtually halfway between two wells in which you
7 had control and evidence of porosity zones for taking water?

8 A Right.

9 Q You also have control off to the west, do
10 you not? There's a well, it looks like, in the northeast of
11 the southwest of Section 20.

12 A Okay.

13 Q Do you have a log available on that well?

14 A I don't have it here handy. I'm sure we
15 do.

16 Q You also would have had control and in-
17 formation from a well located in the northwest of the south-
18 east of 17, would you not?

19 A Yeah.

20 Q There's also a well in the southeast of
21 the northwest of 16.

22 A Right.

23 Q So there were others. There is control
24 to the west that you could have evaluated, west of the
25 Osage, in determining whether or not a salt water disposal

1 well could be located there.

2 A There are wells that would provide con-
3 trol.

4 Q Let's jump to your Exhibit Number Six.
5 If I understood your testimony concerning Exhibit Number --
6 well, referring to Exhibit Number Six, you stated that in
7 your opinion that back in November of '84, that the oil came
8 into the hole because it was underbalanced, and that's --
9 you were able to produce the well to the -- either 33 bar-
10 rels or 60 barrels, but in any event, you produced that be-
11 cause the well was underbalanced, is that correct?

12 A When we perforated it.

13 Q When you perforated the well.

14 A Right.

15 Q Then, if I understand this report, be-
16 cause of fluids in the well it was no longer underbalanced
17 and you were unable to recover oil.

18 A Overnight of the first day the well was
19 shut-in, of course, and it would have reached equilibrium,
20 and, of course, at that point no longer been underbalanced.

21 Q Did you pump the well?

22 A No.

23 Q At that time? If you had pumped it,
24 would that not return it to an underbalanced status so that
25 you could have determined flow rates?

1 A It would have returned it to somewhat of
2 an underbalanced condition. It's unlikely we could have re-
3 turned it to the same degree because we probably can't lift
4 that volume of fluid out of it. It's very highly permeable.

5 Q When we look at your Bradshaw and your
6 Matlock, they're not flowing, are they?

7 A No.

8 Q And you're pumping those, are you not?

9 A Yes.

10 Q And when you pump those, you place the
11 wells in an underbalanced situation.

12 A Yes.

13 Q And then they produce.

14 A They don't make nearly the total volume of
15 fluid because the rock properties are different and we are
16 able to adequately draw them down, if you will, with a pum-
17 ping unit, because they only make approximately 250 barrels
18 of total fluid a day.

19 Q Well, how many barrels of total fluid did
20 -- did you make on the one day out of the subject disposal
21 well, 260, did you not?

22 A 320 total fluid.

23 Q 320.

24 A Right.

25 Q But you don't have any information other

1 than that one day.

2 A Right.

3 Q You pumped the Bradshaw but you didn't
4 pump the proposed disposal well.

5 A That's true.

6 Q Now, if I look at this report, this is
7 titled Supplemental Completion Report. Now, when was this
8 prepared?

9 A It was prepared for our submission to you
10 following your request, essentially, for our drilling re-
11 port, and it's explanatory of, and consistent with, the very
12 same facts on the following pages, which is our drilling re-
13 port provided to you.

14 Q And if we look at it, if we look at, say,
15 November 15, 1984, on the supplemental report there's no re-
16 ference to the fact that Anadarko put approximately 33 bar-
17 rels of water in the hole. There's no -- I'm certainly not
18 intending to distort this any by doing that, and I just won-
19 der how complete you tried to make this?

20 Is this a summary of what's on the -- a
21 daily report?

22 A I think that's probably your proper char-
23 acterization.

24 Q Now, this was, as I understand it, re-
25 cently prepared, and you state here that the oil is still on

1 the location. Where on the location is it?

2 A It's in a tank. It's in a battery with
3 five tanks, sitting within 100 feet of the salt water dispo-
4 sal well.

5 Q And so you simply are keeping it in a
6 tank.

7 A Yes.

8 Q What plans do you have for that? Is that
9 how you handle oil when you produce it, just let it sit in a
10 tank?

11 A We generally don't run a tank with 33
12 barrels in it. Through continued injection operations we
13 will, on a continuing basis, accumulate small bits at a time
14 oil carryover out of our producing water and when there is
15 enough oil to warrent running a tank, we would plan to run
16 the tank.

17 Q And so that will sit there until you fill
18 the tank, and then you'll sell it. Is that what you're tel-
19 ling us?

20 A I don't know if we'll fill the tank but
21 we'll get substantially more than 33 barrels there, probab-
22 ly, befcrc we'll sell it.

23 Q Now, how much has been injected in that
24 well at this time?

25 A I believe approximately 60,000 barrels of

1 water.

2 Q And how much more oil have you picked up
3 while injecting 60,000 barrels of water?

4 A I can't tell you. It would be in a sep-
5 arate tank. It wouldn't be in the same tank.

6 Q Okay, so you're holding this one 33 bar-
7 rels in one tank.

8 A Right.

9 Q And you have never reported that as being
10 produced to the Division.

11 A No, I don't -- I don't believe we've vio-
12 lated any requirements by not.

13 Q You didn't file a C-115 showing it was
14 produced?

15 A I don't believe that's -- no, we didn't.

16 Q I think you testified to this; I don't
17 understand it. Maybe you didn't, but I think you stated
18 there were permeability changes when the wellbore was full
19 of fluid. Is that what you said?

20 A I doubt it.

21 Q That's not what you intended to say.

22 A No, it wouldn't have been.

23 Q Okay. Now, we have a re-issued scout
24 ticket on this well dated 10-19-85. Why? Why would you re-
25 issue a scout ticket?

1 A It was obvious from, among other things,
2 the application of Chama, that there was substantial confu-
3 sion and concern over this report of oil being flowed on a
4 test on a water disposal well, and we felt it appropriate
5 and reasonable to change the scout ticket.

6 If we picked up a scout ticket on some-
7 body else's water disposal well that said it flowed 60 bar-
8 rels of oil a day, we'd scratch our heads and we'd call
9 them.

10 And we felt like that somebody wouldn't
11 want to look at water disposal well scout ticket that would
12 show that.

13 Q Unless you're Chama.

14 A Yeah, they'd already seen it.

15 Q The well did, however, produce 33 barrels
16 on a flow test.

17 A It produced 33 barrels, yes.

18 Q And you deleted that from the amended
19 scout ticket.

20 A Yes.

21 Q If we go to your Exhibit Number Eleven,
22 you've spotted a number of wells. Mr. Sullivan, how did you
23 get your RW factors? Did you have a set rate you worked
24 with then, or did you use a fixed RW?

25 A The RW we would have used would be based

1 on a produced fluid analysis from our well.

2 Q And did you use one sample?

3 A I believe so.

4 Q And apply that across the area?

5 A I believe so.

6 Q Have you looked at enough samples to de-
7 termine whether or not there is a salinity variation in the
8 water produced in this area?

9 A We -- we know there are moderate varia-
10 tions, but from all information available, what we used is
11 not technically inconsistent with the other information
12 available, and it's the only place we have a rigorous analy-
13 sis.

14 The only other thing we could do would be
15 speculate about how different somebody else's well was.

16 Q If you had, though, a different salin-
17 ity, that would affect the test.

18 A It would impact the calculated water sat-
19 uration.

20 Q Now, on your Exhibit Number Twelve, we
21 had -- you presented a comparison of the actual early pro-
22 duction to the initial production tests in the Cisco Canyon
23 wells.

24 A Right.

25 Q If I understand your testimony, on this

1 exhibit you looked at eight wells and you concluded that
2 when you compare the early production to these initial pro-
3 duction tests, the early production is about 25 percent of
4 potential.

5 A The average of the first six months
6 period was approximately 25 percent of what the potential
7 test indicated.

8 Q Did you do a similar calculation on your
9 Bradshaw or Matlock Wells?

10 A No, I don't. I have --

11 Q Do you have pictures available to you
12 that you could show what the initial potential test was,
13 say, on the Bradshaw and compare the first six months pro-
14 duction to it?

15 A I don't think I do.

16 Q It would be substantially more than 25
17 percent, would it not?

18 A Yes. From recollection the potential
19 test, and you've indicated it on one of your exhibits, is
20 approximately 30 or 31 barrels per day, and those wells
21 fairly consistently make that much oil.

22 Q Now, in preparing for today's hearing,
23 did you review any of the original hearings or transcripts
24 of the original hearings on the establishment of the pool
25 rules for the North Dagger Draw Pool?

1 A No.

2 Q Are you aware from any source that Roger
3 Hanks had problems keeping these wells, some of the wells
4 set forth on Exhibit Number Twelve, on production?

5 A I am aware from -- from previous review
6 of his actual production experience; it's obvious when you
7 plot his production. It's very erratic.

8 Q And month to month there were big swings
9 in it.

10 A Yes.

11 Q And he had trouble keeping them on.

12 A Right.

13 Q And that would have actually affected
14 your statistics on the early production from these wells.

15 A In the very same manner it would affect
16 the commerciality of those wells. Whether or not it comes
17 out in one day or thirty days, if you get X barrels in a
18 month, that's all the money you get.

19 Q That's right, but the fact of the matter
20 is, there were apparently problems keeping these wells on
21 every day. There was a fluctuation month by month, day by
22 day.

23 A Yes.

24 Q Are you aware that after these wells had
25 produced for a year that they were reported an increase in

1 the oil production, although the water production stayed
2 virtually constant?

3 A I don't believe, when I review production
4 curves of the Roger Hanks wells, it's of consequence. I --
5 I haven't done this same analysis eighteen months after pro-
6 duction.

7 MR. CARR: Mr. Stamets, we
8 would request that the Commission take administrative notice
9 of the transcript in Case 5117. That's the case in which
10 the North Dagger Draw Pool rules were established, and would
11 ask that you particularly take note of the testimony of
12 Roger Hanks, in which he testified that after a year the oil
13 production in these wells increased.

14 MR. KELLAHIN: Let me ask a
15 point of clarification before you rule, Mr. Chairman.

16 Are any of those wells depicted
17 on Exhibit Number Twelve, Mr. Sullivan?

18 A Without knowing which specific wells Mr.
19 Hanks would have been referring to at the time, I can't an-
20 swer. Certain of these wells were, at one time or another,
21 operated by Roger Hanks.

22 MR. KELLAHIN: I don't have any
23 objection, Mr. Chairman. I'm not sure it's really relevant,
24 but I'll pose no objection.

25 MR. CARR: Mr. Chairman, at

1 least three, maybe -- at least four of the wells on this ex-
2 hibit.

3 MR. STAMETS: Mr. Carr, at this
4 point I'm not convinced that the evidence on Exhibit Twelve
5 is pivotal in this case. Because of the nature of the re-
6 quest of Nearburg, I'm -- I'm reluctant to commit to taking
7 administrative note of anything which would require us to --
8 to not take action at the end of this hearing.

9 MR. CARR: Mr. Stamets --

10 MR. STAMETS: I would prefer,
11 Mr. Carr, if you would hold your request until the -- until
12 the end of the testimony in this case and then we would be
13 better able to assess whether we should or not.

14 MR. CARR: Either that, or I
15 would simply ask that if, as you're evaluating this, if this
16 becomes pivotal testimony, you will also consider that.

17 MR. STAMETS: Fine, Mr. Carr,
18 thank you.

19 Q Mr. Sullivan, you've presented some cal-
20 culations concerning bulk volume water analysis, and you --

21 A Yes.

22 Q -- used this to conclude that the Chama
23 wells were not capable of commercial production.

24 A I can draw that conclusion on that basis
25 in addition to other facts that support that conclusion.

1 Q You've also used that to conclude that
2 the disposal well is not capable of commercial production.

3 A Yes.

4 Q And here again, did you take into account
5 any variations in the salinity of the water?

6 A No. As I indicated, all of these calcu-
7 lations are based on the same water resistivity.

8 Q You heard Mr. Mazzullo testify this mor-
9 ning that this was a complex carbonate reservoir. Do you
10 believe that in fact the bulk volume water analysis is the
11 way you should go about determining if a well is capable of
12 commercial production or not?

13 A I believe it's appropriate when you can
14 calibrate, when the analyst can calibrate it to known exper-
15 ience. I believe people get in trouble with it just using
16 it off the top of their desk.

17 When one can calibrate it to the known
18 performance of existing wells, particularly to known wells
19 that don't produce, I believe it's appropriate and I believe
20 in this case it's appropriate.

21 Q And you believe it's appropriate to use
22 this approach where you're dealing often with isolated
23 zones.

24 A Yes.

25 Q And it is your testimony that none of

1 these wells would be capable of commercial production.

2 A None of which wells?

3 Q The South Boyd, the B&B, and the disposal
4 well. I'm talking now about (not clearly understood).

5 A That is my judgment, yes.

6 Q And wasn't it also your judgment in the
7 hearings on the B&B, that the B&B (not clearly understood)
8 to commercial production in the Morrow?

9 A I was very concerned that it could be and
10 I argued that it was noncommercial to re-enter the well, and
11 I'd suspect the facts would bear that out, that it has not
12 and will not pay out the cost of re-entering that well.

13 Q Now when you went into this well and
14 drilled the disposal well and one day you could see the well
15 produce somewhere between 33 or 60, and I'll use 33 for the
16 question purposes, barrels of oil in a 24-hour period of
17 time, you then proceeded to acidize the well. That's what
18 you really did next, isn't that correct?

19 A Well, things happened in between, but we
20 did acidize the well after that.

21 Q And after you acidized it, no tests were
22 ever (not clearly understood) on individual zones.

23 A It was swabbed for, I believe, a 6-hour
24 period.

25 Q But all the zones were swabbed at once.

1 A Yes.

2 Q They were not individual zones.

3 A No, none of them.

4 Q And there's been no testing done on the
5 individual zones in the disposal well.

6 A That's correct.

7 Q And when you were swabbing, you swabbed
8 out initially 100 barrels after having put approximately,
9 something in excess of 800 barrels into the well.

10 A I believe that's right.

11 MR. CARR: No further ques-
12 tions.

13 MR. STAMETS: Are there other
14 questions of this witness?

15 MR. KELLAHIN: Does the Commis-
16 sion have questions of Mr. Sullivan?

17 MR. STAMETS: No.

18 MR. KELLAHIN: May we have a
19 five minute break, Mr. Chairman, at this point? Mr. Sulli-
20 van has testified for an hour and a half now.

21 MR. STAMETS: Okay, we will take
22 five.

23

24 (Thereupon a recess was taken.)

25

1 MR. STAMETS: Mr. Kellahin, do
2 you have anything further?

3 MR. KELLAHIN: No, sir. We
4 rest our direct case.

5 MR. STAMETS: Mr. Carr, do you
6 have anything further?

7 MR. CARR: Nothing but a clos-
8 ing statement, Mr. Stamets.

9 MR. STAMETS: Mr. Kellahin, do
10 you have a closing statement?

11 MR. KELLAHIN: If you desire.

12 MR. STAMETS: We'll let you go
13 first. I don't want one but if you insist.

14 MR. KELLAHIN: I'll keep it
15 very brief, Mr. Stamets.

16 Mr. Chairman, Mr. Commissioner,
17 we have taken Chama's request to have this well shut-in for
18 disposal purposes very seriously.

19 We welcome the opportunity to
20 demonstrate to you what we believe is an overwhelming, com-
21 pelling case that Anadarko has been prudent at the time they
22 completed this for disposal, and the reflective re-examina-
23 tion of this matter by Mr. Sullivan, in other words, after
24 the fact, shows that, in hindsight, they did exactly what as
25 appropriate in this case.

1 I believe that it does not mat-
2 ter, that we could argue that this is simply a re-litigation
3 of the disposal hearing back in August of '84.
4 It doesn't matter to us that Chama wants to come and talk
5 about geology again, and it doesn't matter to us that Chama
6 does not have any producing oil from the Cisco Canyon.

7 It doesn't matter that despite expensive,
8 expensive testing on the South Boyd Well, that, in our opin-
9 ion, there's no commercial production.

10 It doesn't matter that the
11 scout ticket was incorrect.

12 It doesn't matter to us that
13 there are no recoverable reserves that are jeopardized in
14 the section.

15 What does matter to us, how-
16 ever, is the fact that Chama has directly impugned the inte-
17 grity of this operator, and for that we have taken this very
18 seriously.

19 The testimony, we believe, is
20 overwhelming and compelling that the economic need to have
21 this salt water disposal well to utilize for the disposal of
22 water for proven reserves that can be recovered is still ne-
23 cessary.

24 It's important to us to have
25 picked a location that was the best in terms of well con-

1 trol. We believe that the subsequent drilling has recon-
2 firmed Mr. Sullivan's testimony of August '84.

3 There is no evidence, nor does
4 anyone here believe that there would be a total absence of
5 any oil in any of these zones. That's not historically what
6 occurs.

7 What happens is that when wells
8 are completed there may be a small show of gas -- of oil in
9 one of these zones.

10 Mr. Sullivan has demonstrated
11 for us very eloquently the fact that no further testing is
12 required for this well. In fact, it was completed underbal-
13 anced; that when the tubing and packer were set and the to-
14 tal fluids were displaced, no oil was there.

15 We believe that we acted pru-
16 dently in this manner and ought to be allowed to continue to
17 use this well for disposal purposes.

18 Thank you.

19 MR. STAMETS: Mr. Carr.

20 MR. CARR: Mr. Stamets, Near-
21 burg Producing Company is before you today seeking an order
22 to rescind Order R-7636, an action which would stop the in-
23 jection of salt water in the C and D zones of the Cisco Can-
24 yon formation in Anadarko's Dagger Draw salt water disposal
25 well.

1 The evidence, we submit, is
2 that following the August 23, 1984, order, Anadarko drilled
3 a disposal well. The order did not require for them to test
4 the zones and they did not do it, and when they got into the
5 Lower Cisco on the 15th of November last year, they reported
6 production of 60 barrels of oil and 260 barrels of produced
7 water. Today they've reduced that amount of 33 barrels of
8 oil, but either figure, we submit, is a significant volume
9 of oil to be produced from a well in a 24-hour period.

10 Mr. Kellahin has told us of a
11 lot of things that didn't matter today to Anadarko. We sub-
12 mit that a look at the record says it also didn't matter
13 that they produced this volume of oil from a well and that
14 they didn't follow up on it. They did not test. They went
15 ahead and acidized the well. They put load water in the
16 wellbore. They removed from the wellbore only about one-
17 eighth of the load water they put in and concluded from that
18 that they didn't have a commercial well.

19 We submit that they didn't re-
20 port the well, the production; that now, instead of coming
21 forward and reporting it, they have simply gone back and
22 amended the scout tickets where they accurately produced
23 what they believe to be the case at the time the production
24 was obtained, and we submit now they have a commercial dis-
25 posal well in a zone that is capable of commercial produc-

1 tion and certainly is entitled to further testing.

2 Order R-7637, in Finding 4,
3 concluded that there's no commercial oil and gas -- that no
4 commercial oil and gas production has been found in the C
5 and D zones in the immediate area of the said proposed dis-
6 posal well.

7 I think when you think of the
8 volumes that were produced and you remember that from the
9 evidence presented here today, the volume produced in 24
10 hours was substantially better than initial production re-
11 ceived from a number of wells in this area that are now pro-
12 ducing in commercial quantities, wells, some of which are
13 operated by Anadarko, that Finding Number 4 is simply no
14 longer valid.

15 You also found that salt water
16 disposal will not cause the premature drowning by water of
17 any zone capable of producing in commercial quantities.

18 I can't tell you which zone
19 this oil came out of. I can tell you this, that one of
20 those zones produced in 24 hours a minimum of 33 barrels of
21 oil. The way the well was tested and completed and placed
22 on -- completed for disposal, has precluded any individual
23 testing, and I can tell you there is a zone there that had
24 that capability and that is a zone, even with water having
25 been disposed in it, that today is capable of commercial

1 production, and I submit your Finding Number 5 in that order
2 is erroneous.

3 And we submit that the well has
4 been located where it is and is being used for disposal pur-
5 poses, and although they own all of the 40 acres on which it
6 is located, 175 feet away they're injecting into a zone that
7 could produce 30 barrels, 33 barrels of oil in 24 hours and
8 is a zone that is owned by people other than just Anadarko.

9 Now, we've presented evidence
10 on the nature of this reservoir and it became clear that
11 this is not a simple kind of characterization where we can
12 say down dip, water, no oil. It's just not what we have
13 here.

14 We have a situation where we
15 have a complicated structure and the structure, a compli-
16 cated reservoir, and structure simply will not tell you
17 where you have got commercial production.

18 If we go and look at the Dagger
19 Draw, and the Dagger Draw now adjoins this property, if the
20 disposal well had in fact been returned to a producing sta-
21 tus, it would be included within the Dagger Draw Pool, we
22 concede that wells down dip from production from watered out
23 zones, in fact, are capable of commercial production.

24 Mr. Sullivan has come in here
25 today and he's summarized the information supplied by Chama

1 on its own wells. As he looks at the -- and this is Anadar-
2 ko Exhibit Four, and as he looks at this evidence, he ig-
3 nores the fact that there were radioactive surveys that
4 showed significant communication in the previously tested B
5 zone in the South Boyd Well, and this is the reason those
6 tests were abandoned and this is the reason we have the
7 water/oil ratios in that well that we do. This is Exhibit
8 Number Fourteen.

9 He presented bulk volume water
10 calculations. He ignored, in doing this, the significant
11 effect which results from varying formation water salinity,
12 and these varying salinities are set forth on Nearburg Exhi-
13 bit Number Seven, and are shown to exist in the individual
14 wellbores.

15 And that's the kind of situation
16 we're encountering in this particular reservoir.

17 If we take a look at the drill
18 stem tests and the information that we have, the production
19 information that we have on the Osage Well, the salt water
20 disposal well, and we move on over to the B&B Well, all of
21 the information which we have initially on each of these
22 wells in the Cisco Canyon, would be equally supportive of
23 being able to make a commercially productive well in these
24 zones. All of them show a potential for production, and we
25 submit that the continued disposal of water in the Anadarko

1 well is threatening the correlative rights of Chama Petroleum
2 Company.

3 At the last hearing Scotty Al-
4 corn, the geological engineer for Anadarko, was asked by me
5 about whether or not they had -- what they would do if they
6 got a well that was capable of producing oil, and he stated:
7 If it had commercial oil in it, we would attempt to get the
8 oil. We would certainly not want to pass up an oil zone.
9 We're not in the water business; we're in the oil business.

10 He then went on to say, when
11 asked about their water disposal problems, he said, "We had
12 to have a disposal well in the area to do any -- to do drill-
13 ling any more, anyway. We're just barely holding our own."

14 I submit to you that what Ana-
15 darko was in when they drilled this well not the oil busi-
16 ness. It was the water business, and that what they were
17 doing was attempting to water out the zones that belonged to
18 others in an effort to enable them to economically dispose
19 of water so that they could go forward with production on
20 their own properties.

21 It is your duty to prevent the
22 crowning of oil in any strata, or any part thereof, capable
23 of producing oil or gas with produced water.

24 We submit that you have no
25 choice in this case but to order the injection of water in

1 the salt water disposal well operated by Anadarko immediate-
2 ly cease.

3 If you don't do this, we submit
4 you're meeting the express duty to prevent premature
5 drowning of formations, and you're also impairing correla-
6 tive rights and causing waste.

7 Anadarko has testified that
8 they have incurred substantial expenses in this area, and
9 we're aware of those costs, and if it gets to the point
10 where injection is ordered to cease in this area, Nearburg
11 Producing Company is certainly interested in talking with
12 Anadarko about paying its pro rata share of the cost of the
13 central cased hole in this well, of taking over operations,
14 and making a reasonable attempt to return this well to pro-
15 duction.

16 If, however, this cannot be
17 done, and if the well has to cease because of the damage we
18 submit it is doing to this reservoir, then, of course, they
19 can do what they always could have done, and that is drill a
20 disposal well on their own property, not 175 feet off the
21 property that is owned by others.

22 Nearburg Producing Company
23 therefore requests that you rescind Order 7637, and that you
24 immediately direct the disposal of produced water in the
25 Anadarko Dagger Draw Salt Water Disposal Well cease.

1 MR. STAMETS: Thank you, Mr.
2 Carr.

3 Does anyone else have anything
4 they wish to add in this case?

5 Let's see if Mr. Kelley and I
6 can reach a decision at this point.

7 Mr. Kelley, my feeling is at
8 this point we've heard competent, technical testimony on
9 both sides of this issue, and having done this for a number
10 of years, I realize that competent, honest engineers and
11 geologists can disagree.

12 My feeling is that overall the
13 evidence at this time is not sufficient to demonstrate that
14 there is commercial production in Anadarko's injection well,
15 nor in those zones in sufficient proximity to said well, to
16 require that it be shut in or the order be rescinded.

17 DR. KELLEY: I think that's my
18 feeling, too. I don't believe there's enough -- any evi-
19 dence presented that there was commercial production in that
20 zone.

21 MR. STAMETS: On that basis,
22 then, the Commission will deny the application of Nearburg
23 in this case and ask Mr. Kellahin to write an order which
24 would convey the decision of the Commission.

25 Thank all of the participants
in this case today.

1

C E R T I F I C A T E

2

3

4

I, SALLY W. BOYD, C.S.R., DO HEREBY

5

CERTIFY that the foregoing Transcript of Hearing before the

6

Oil Conservation Division (Commission) was reported by me;

7

that the said transcript is a full, true, and correct record

8

of the hearing, prepared by me to the best of my ability.

9

10

11

12

13

Sally W. Boyd CSR

14

15

16

17

18

19

20

21

22

23

24

25