

1 NEW MEXICO OIL CONSERVATION DIVISION

2 STATE LAND OFFICE BUILDING

3 STATE OF NEW MEXICO

4 CASE NO. 10439

5
6 IN THE MATTER OF:7
8 The Application of Anadarko Petroleum
9 Corporation for Salt Water Disposal,
Lea County, New Mexico10
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14
15 BEFORE:

16 DAVID R. CATANACH

17 Hearing Examiner

18 State Land Office Building

19 February 6, 1992

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23 REPORTED BY:24 CARLA DIANE RODRIGUEZ
25 Certified Shorthand Reporter
for the State of New Mexico

COPY

A P P E A R A N C E S

FOR THE NEW MEXICO OIL CONSERVATION DIVISION:

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Santa Fe, New Mexico 87504

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BY: W. THOMAS KELLAHIN, ESQ.

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1 EXAMINER CATANACH: Call the hearing
2 back to order, and at this time we'll call Case
3 10439.

4 MR. STOVALL: Application of Anadarko
5 Petroleum Corporation for salt water disposal,
6 Lea County, New Mexico.

7 EXAMINER CATANACH: Are there
8 appearances in this case?

9 MR. KELLAHIN: Mr. Examiner, I'm Tom
10 Kellahin of the Santa Fe law firm of Kellahin,
11 Kellahin & Aubrey, appearing on behalf of the
12 applicant, and I have one witness to be sworn.

13 EXAMINER CATANACH: Are there any other
14 appearances? Okay. Will you swear the witness
15 in, Mr. Stovall?

16 MR. STOVALL: I'd love to.

17 MR. KELLAHIN: Mr. Examiner, my witness
18 is George Buehler, B-U-E-H-L-E-R. He's a
19 petroleum engineer with Anadarko.

20 GEORGE R. S. BUEHLER

21 Having been first duly sworn upon his oath, was
22 examined and testified as follows:

23 EXAMINATION

24 BY MR. KELLAHIN:

25 Q. Mr. Buehler, for the record, would you

1 please state your name and occupation.

2 A. It's George Russell Skipton Buehler.
3 I'm a petroleum engineer with Anadarko Petroleum
4 Corporation in Midland.

5 Q. Let me ask you to speak up as you make
6 your presentation, George. On prior occasions,
7 Mr. Buehler, have you testified before the
8 Division as a petroleum engineer?

9 A. No, sir. This is my first time. I
10 worked on the potash study committee a few years
11 ago.

12 Q. Summarize for us your educational
13 background.

14 A. I graduated in 1976 from Marietta
15 College with a degree of Bachelor of Science in
16 petroleum engineering. I went to work for
17 Columbia Gas in Charleston, West Virginia. I
18 worked in West Virginia, Ohio, Kentucky,
19 Virginia, Maryland, Western New York State,
20 Ohio.

21 In 79, I went to work for Anadarko in
22 Liberal, Kansas, and worked Southwest Kansas for
23 two years; transferred to Midland in 81, and
24 since then I've been working Southeast New Mexico
25 and West Texas, as far over as Jack and Weiss

1 County.

2 Q. Do your areas of responsibilities
3 include the subject matter of this application?

4 A. Yes, sir.

5 Q. Were you the responsible engineer that
6 prepared the data and submitted to the Division
7 the Commission Form C-108 for a requested
8 approval for this salt water disposal well?

9 A. Yes, sir.

10 Q. In addition, have you made a study of
11 the available technical literature with regards
12 to the geohydrology of the Capitan Reef in this
13 particular area of New Mexico?

14 A. Yes, sir.

15 Q. And based upon that entire study, have
16 you been able to reach certain engineering
17 conclusions concerning this disposal well?

18 A. Yes, sir, I have.

19 MR. KELLAHIN: We tender Mr. Buehler as
20 an expert petroleum engineer.

21 EXAMINER CATANACH: He is so
22 qualified.

23 Q. Mr. Buehler, to orient the Examiner to
24 the specifics of your application, let me
25 suggest, sir, that you turn to Exhibit No. 1 and

1 that we look at page 5 to that exhibit.

2 A. Okay.

3 Q. Describe for us the source of the plat
4 you've submitted as page 5 to Exhibit No. 1.

5 A. Okay. Upon receiving the information
6 that we were going to go to hearing, I went ahead
7 and was aware of some wells that the City of
8 Carlsbad had. I was hoping that they would be
9 able to help me more than anyone else since they
10 were using the Capitan as a source of drinking
11 water.

12 I proceeded and called the City, and
13 after getting transferred from here to there, I
14 finally was able to get ahold of a Mr. Jim
15 Harrison with the water department in the City of
16 Carlsbad. We had a conversation. I felt like I
17 needed to go over and talk to the man, so I made
18 a trip over to Carlsbad, met with Mr. Harrison,
19 he showed me some maps, shared some information
20 with me, and he told me I should go see a Max
21 Cordova, who is the environmental engineer for
22 the City of Carlsbad.

23 Mr. Cordova put me on to a publication
24 of the State of New Mexico, and I'm referring to
25 Technical Report #38, the author being W. L.

1 Hiss, H-I-S-S. You should have a copy of this, I
2 guess, in your library within this building.
3 This particular copy I was able to get out of the
4 Midland library. This is the dominant source of
5 my information.

6 Q. Contained within that engineering
7 report on the Capitan Reef hydrology, is there a
8 map which you have duplicated and then placed as
9 page 5 to Exhibit No. 1?

10 A. Yes, sir. I could not fit the entire
11 map but I fit what would be the most important
12 section of the Capitan Reef in Exhibit No. 1.

13 Q. Let's use this, then, as our display to
14 orient the Examiner as to some of the specifics
15 of your request, Mr. Buehler. First of all, find
16 the arrow for us that identifies the proposed
17 salt water disposal well.

18 A. The blue arrow in the middle there is--

19 Q. All right. For those people that don't
20 have a colored copy, it will be the arrow in the
21 middle of the three arrows? The center arrow?

22 A. Yes, sir.

23 Q. All right, sir. Identify that well.
24 What is it called?

25 A. Right now it's called, I believe, the

1 Saunders. Anadarko has asked in the application
2 that the well be renamed the Exxon Salt Water
3 Disposal #3, and that would be how it would
4 appear on all the documents that we've sent in.

5 Q. What is Anadarko's reason for seeking
6 this well as a disposal well?

7 A. Anadarko has approximately, I
8 believe--is it 240 acres, Mike?--of acreage to
9 develop for Delaware. The Delaware there has a
10 high water cut.

11 We have drilled the first well and have
12 experienced something less than what would be
13 commercial production with the water produced.

14 At the time of my application, we were
15 paying approximately \$2 per barrel for disposal.
16 We would, therefore, like to put in a water
17 disposal well to improve our economics so we
18 could go ahead and further develop the acreage
19 that's available.

20 Q. The source of the produced water for
21 which you'll use this disposal well is the
22 Delaware formation?

23 A. Yes, sir.

24 Q. That's the current plan?

25 A. Yes, sir.

1 Q. In examining possible disposal wells,
2 why have you selected this particular well?

3 A. For one, it's still on the lease which
4 we have the acreage. It's federal. The wellbore
5 appears to be a wellbore that we can reenter and
6 deepen for disposal with what we consider to be
7 reasonable costs.

8 Q. Your proposed disposal formation is to
9 be the Capitan Reef formation?

10 A. Yes, sir.

11 Q. Discuss for us and identify the arrow
12 that's colored in red, which is the far eastern
13 arrow. What's the purpose of that?

14 A. Okay. The arch that you can see on
15 there is what the state engineers have shown as
16 the reef itself. The red arrow is a well that
17 Anadarko operates. It's what Anadarko calls the
18 Teas Yates Unit Water Supply Well #1. It
19 produces water from the Capitan Reef, and is a
20 source of injection water or makeup water for our
21 Teas Yates Unit, which is a flood in the Teas
22 Yates formation.

23 Q. Do you have a water analysis of the
24 water that's produced from that Teas Unit well
25 identified by the red arrow?

1 A. Yes, sir. In my C-108 I included just
2 one, but I have three that I had ran just to make
3 sure of the accuracy.

4 Q. What conclusion do you reach as an
5 engineer, based upon a review of the water
6 analysis from that Teas Yates Unit well?

7 A. The totals dissolved solids on the
8 three results that we got back on these waters
9 were all--they ranged from about 105,000 parts
10 per million to 125,000 parts per million
11 dissolved solids.

12 Chlorides were 60,000, 65,500 and
13 72,439. So, as you can see, the water is
14 nonpotable. It contains large amounts of
15 dissolved solids. The water also contains a
16 large amount of dissolved hydrogen sulfide gas.
17 There's also a large amount of, of course,
18 sulphur involved.

19 Q. When we look at the well to the west,
20 that's identified by the orange arrow, what's the
21 purpose of that well?

22 A. That is another well that we have a
23 water analysis on. Referring back to the
24 publication of Technical Report #38, the analysis
25 for that particular well was taken from Technical

1 Report #38.

2 That analysis is included on page 7 of
3 Exhibit 1, and I'm referring to the middle of the
4 page, the Middleton Federal, with total dissolved
5 solids--now, this was back in 72--of 28,740. You
6 can see the well immediately to the west of it
7 had dissolved solids in the 180,000 and 190,000
8 range.

9 Q. In reviewing the analysis, what
10 conclusion do you reach about the quality of the
11 water analyzed from that well?

12 A. The waters are nonpotable waters.
13 According to the State of New Mexico Rule 701,
14 Section D, paragraph 2, it states that "Disposal
15 will not be permitted into a zone containing
16 waters having total dissolved solid
17 concentrations of 10,000 milligrams per litre or
18 less, except for notice and hearing."

19 So, these waters or these analyses show
20 that this water falls in the range of nonpotable
21 water, that it qualifies as a disposal zone by
22 the letter of the law.

23 Q. Let's identify a few more items of
24 information from page 5. First of all, can you
25 generally locate for us the horizontal distance

1 from the proposed disposal well to the nearest
2 fresh-water well being utilized by the City of
3 Carlsbad for water produced out of the Capitan
4 Reef?

5 A. Okay. It's approximately 35 to 40
6 miles southwest, south of the City of Carlsbad,
7 where Carlsbad has their water well field, if you
8 will. It's a group of water wells drilled into
9 the Capitan Reef. This is the main source of
10 drinking water for the City of Carlsbad.

11 Q. On this display there is a line of
12 cross-section in an arc, starting on the western
13 portion of the display, arcing to the north, and
14 terminating with A' in the southeast corner of
15 the display. Do you see that arc?

16 A. Yes, sir.

17 Q. That's a line of cross-section, is it
18 not?

19 A. Yes, sir.

20 Q. Do you have a copy of the structure map
21 that conforms to that line of cross-section?

22 A. Yes, sir. That would be page 6 of
23 Exhibit 1.

24 Q. All right. Let's turn to that. In
25 looking at page 6, what's the purpose of the blue

1 arrow?

2 A. The blue arrow is to give you an
3 approximate idea of where the Exxon SWD #3 would
4 be located on this cross-section.

5 Q. In reviewing the technical report and
6 integrating it with your knowledge about the
7 production in this area, give us a summary if you
8 will, Mr. Buehler, of the various components of
9 the Capitan Reef in terms of where you find the
10 potable water in the reef and where you find
11 water that is not of that quality.

12 A. Okay. Like I said, when I started
13 looking for information, I believe I started at
14 the right place. Mr. Harrison, with the water
15 department, and the environmental engineer, Mr.
16 Cordova, explained to me that the water produced
17 by the City of Carlsbad for drinking water comes
18 from the Capitan Reef. The wells are
19 approximately 1000-foot deep, have pumps placed
20 at about 400 foot, with a working fluid level of
21 approximately 200 foot.

22 The Pecos River, which would be to the
23 east of Carlsbad, both Mr. Cordova, Mr. Harrison
24 and the Technical Report #38, concur that all of
25 the Capitan Reef west of the Pecos River, which

1 would be towards the City of Carlsbad, contains
2 potable water. These have total dissolved solids
3 of approximately 300.

4 The reef itself outcrops west of
5 Carlsbad in the mountains there, and then it goes
6 back underground and on to the west. Because it
7 outcrops, it's of no interest to us west of there
8 for this particular hearing.

9 The source of water for the Capitan
10 Reef, west of the Pecos River, does not come from
11 the Pecos River. This has been determined by the
12 simple fact that the water quality within the
13 Pecos River itself is far worse than the water
14 that is contained in the Capitan Reef west of the
15 Pecos River, which is the water that the City of
16 Carlsbad withdraws. The primary source for the
17 water that's within the reef west of the Pecos
18 River is due to the local weather, the rain/snow
19 runoff.

20 Q. The point of recharge for the reef,
21 then, is in the Guadalupe Mountain range, is it
22 not?

23 A. Yes, sir, and right there within the
24 City of Carlsbad itself. Mr. Harrison was
25 telling me that they have experienced minor

1 increases in the bacteria within the water in the
2 water well field south of Carlsbad. They believe
3 this is due to blasting that has been done to
4 prepare ditches for pipelines.

5 Q. If you'll turn back to page 4 of
6 Exhibit No. 1, what have you shown here?

7 A. Again, this is a map, if you will, from
8 Technical Report #38. It shows the north/south
9 state line and the east/west state line. It is a
10 geologist's conception of the different basins
11 within the southeast portion of New Mexico.

12 The report says that the Capitan Reef
13 was formed along the edge of the Delaware basin
14 back in ancient times, the landward side being
15 the north side of the reef, and the seaside being
16 the south side.

17 The reef, as you can see, makes an arch
18 through Eddy and Lea County and on into Texas.

19 Q. With that geologic depiction of the
20 Delaware basin and the Capitan Reef, let's now go
21 back again to the structure map and have you
22 describe the structural relationship of the
23 disposal well location in the reef as it
24 corresponds to the fresh water that is contained
25 within that reef.

1 A. Okay. As you can see, approximately
2 halfway down the page you'll see a line,
3 horizontal line, marked "sea level." And then,
4 from that, you'll notice the geologist has shown
5 the dip of the Capitan Reef and the formations
6 above it. These basically dip west and south.

7 Both Mr. Cordova, Mr. Harrison, and I
8 did speak with one fellow at the State Engineer's
9 Office in Roswell, agreed that the water flows
10 from the Pecos River east and south in the reef,
11 which, just based on common physics, says that
12 things are going to go downhill and so the water
13 does. It goes deeper into the Capitan as the
14 Capitan submerges itself.

15 Q. In your opinion, is there any potential
16 risk or impairment to fresh-water sources in the
17 Capitan Reef if Anadarko's proposed disposal well
18 is approved?

19 A. No, sir, just due to the gravity and
20 the slope of the formation. The waters that
21 partially charge the reef are those from the
22 Pecos River. And, if you will, page 12 of
23 Exhibit 1 is a hydrograph, which this study for
24 Technical Report #38, I believe, ran from--

25 Q. Let me borrow the original from the

1 book, if you will, Mr. Buehler, so I may share
2 that with the Examiner and he can see a complete
3 copy of what has been duplicated on page 12.

4 A. Okay. It ran from 1962 to 1972.
5 Basically, what they did to produce these
6 hydrographs, they put a bobber in the well, tied
7 a string to the surface, and had a daily readout
8 so that they could watch the fluid level in the
9 observation wells over this 10-year period.

10 Q. Over this 10-year period, what has
11 happened to the fluid level in these observation
12 wells?

13 A. Okay. I don't know why all these wells
14 are listed, but there's not a hydrograph for each
15 well. The closest well would be the Middleton
16 Federal "B" #1, which is approximately in the
17 middle of that large sheet you have there. It's
18 the top hydrograph on page 12 of Exhibit 1.

19 As you can see, over the period from 67
20 to 72--you can see the years printed at the
21 top--the level fell from approximately 510 feet
22 down to approximately 600 feet over that
23 five-year period.

24 Q. What does that tell you?

25 A. That tells me that the Capitan Reef is

1 being depleted. The reason for the depletion is
2 the withdrawal of Capitan Reef water
3 predominantly by oil companies, to be used in
4 waterfloods. Anadarko itself uses it in its Teas
5 Yates Unit, as we said, in that one water
6 analysis. Also, through other parts of Lea
7 County, Eddy County, water is withdrawn, as well
8 as down in Week and Ward counties of Texaco.
9 These waters have been withdrawn well prior to
10 1965.

11 Q. In making your literature search and
12 investigation of this issue, do you find any
13 instances of down structure, meaning down
14 structure from your disposal well, down structure
15 Capitan Reef use of that water for potable
16 purposes?

17 A. No, sir, I was not able to find any.
18 It was explained to me by the geologists and
19 whatnot that the reef just keeps going deeper and
20 deeper into the Delaware basin, and eventually it
21 becomes uneconomical to lift potable water from
22 that deep and the water would not be potable at
23 those depths, from the literature that I've
24 covered.

25 Q. Did you explain to the City of Carlsbad

1 technical people, as well as the State Engineer,
2 the purpose of your inquiry insofar as you were
3 seeking to use a portion of the Capitan Reef as a
4 disposal interval?

5 A. Yes, sir.

6 Q. Did they express to you any concerns,
7 reservations or objections about your use of the
8 Capitan Reef at this location as a disposal well
9 location?

10 A. No, sir. None whatsoever. They
11 believe, especially Mr. Cordova and Mr. Harrison,
12 that there is a barrier that is underneath, if
13 you will, or that the Pecos River itself,
14 parallels the barrier very closely that separates
15 the western side of the reef from the eastern
16 side of the reef, just strictly because of the
17 water qualities.

18 The water quality on the west, 300
19 total dissolved solids, the water quality of the
20 Pecos River is very poor. It's very saline. It
21 has to go to the east into the Capitan Reef, the
22 portion which we desire to have disposal into.

23 Q. Let's go back now, sir, and have you
24 summarize for us the different parts of Exhibit
25 No. 1. First, what have you summarized for us on

1 pages 1 and 2?

2 A. Basically I just tried to do some
3 logical thinking here. I've talked about why, in
4 Roman numeral one, why we need the well. We have
5 gone ahead, in Roman numeral number two, we've
6 gone through the permitting process. We've sent
7 our application and received back our permit from
8 the BLM to reenter and deepen what we'll call the
9 Exxon SWD #3.

10 Q. This disposal well is located on a
11 federal lease?

12 A. Yes, sir. We have also made
13 application, and that's why we're here today,
14 with the OCD, with OCD Form C-108, and we're now
15 at hearing over the application.

16 Q. In preparing and submitting that
17 application, did you include notification to
18 anyone within a half-mile radius of your disposal
19 well that had operations that might be affected
20 by your disposal well?

21 A. Yes, sir, we followed the application
22 as required. We went ahead and sent out
23 notification to everyone. We also put a notice
24 in the newspaper. We received back all but one
25 of the notices we sent out. When we did not

1 receive it back--in fact, we received back the
2 notice itself as nondeliverable--we went ahead,
3 and that would be on--

4 Q. Let's reference that for the Examiner.
5 You're looking at Exhibit 2 now?

6 A. Exhibit 2, and that would be on page
7 22. I personally went ahead and called the
8 Chamber of Commerce and City Hall, and they had
9 no record of Partco, Inc. So we did make a
10 good-faith effort to contact everyone. That was
11 the only one in which we were unsuccessful.

12 Q. For purposes of notifying the surface
13 owner, you notified the Bureau of Land
14 Management?

15 A. Yes, sir.

16 Q. As a result of any of these
17 notifications, did you receive any objections?

18 A. None whatsoever.

19 Q. In part III, then, you've summarized
20 the source of the technical information that
21 you've assimilated for the purposes of reaching
22 the conclusions that you've expressed today?

23 A. Yes, sir.

24 Q. You've summarized for us in Exhibit 1,
25 page 1, the Capitan Reef information that we just

1 discussed?

2 A. Yes, sir.

3 Q. We haven't specifically discussed it
4 and let's draw the Examiner's attention to page 7
5 of Exhibit #1.

6 A. Again, these were water analyses that
7 were taken in preparing Technical Report #38. I
8 did not include all the wells to the west. I
9 didn't feel they were pertinent, but I can go
10 ahead and shoot that, if you wish.

11 These are the wells that would be
12 immediately on either side of Anadarko's SWD #3.
13 As you can see, there is a variation in them, but
14 all of these do have high total dissolved
15 solids.

16 As I also mentioned, the Teas Yates
17 water supply well, the analysis is included. The
18 Middleton "B" 1 is the closest well to the west
19 with a water analysis. You can see the date of
20 these analyses were back in October of 66.

21 I have to believe that the water
22 qualities have gotten worse out there. I don't
23 know whether it's due to drilling. As you drill
24 the Capitan Reef, it's underpressured. Once you
25 get into it you have to dry drill to the San

1 Andres before you can set your intermediate
2 string or your long string. The other possible
3 source of poor quality is just the fact that the
4 reef itself is being depleted and therefore less
5 water has to dissolve more minerals.

6 Q. Let's turn now, Mr. Buehler, to Exhibit
7 2. In preparing the C-108 for presentation, did
8 you follow the outline of information requested
9 as it's set forth on the form itself?

10 A. Yes, sir.

11 Q. Let me go through and ask you questions
12 so we can summarize your conclusions concerning
13 the C-108 documentation. First of all, did you
14 prepare a map showing the half-mile radius circle
15 around the area so that you could identify the
16 area of review?

17 A. Yes, sir. That would be page 4 of
18 Exhibit 2.

19 Q. Within that area of review, did you
20 examine all the wellbore information for those
21 wells that penetrate to or through the Capitan
22 Reef?

23 A. I went ahead and looked at all the
24 wells that were there, period, and there was only
25 one well that--I believe that's correct, there's

1 just one well that penetrated the Capitan Reef.

2 Q. Do you have a schematic or wellbore
3 information tabulated for that well?

4 A. That would be Anadarko's Exxon Federal
5 #1, which would be page 6 of Exhibit 2.

6 Q. In making your investigation of that
7 information, did you find any plugged and
8 abandoned wells?

9 A. Yes, sir. There was a shallow well,
10 the Federal 18 #5 in Section 18, 19 South, 33
11 East. It had a total depth of 3,345. That would
12 be page 5 of Exhibit 2.

13 Q. In looking at all that data, do you
14 find any well that would be characterized as a
15 problem well, by which I mean that it has
16 inadequate casing or cementing, by which that
17 wellbore would be a source for allowing the
18 Capitan Reef disposal water to migrate into a
19 shallower fresh water sand?

20 A. No, sir. We would prepare the well
21 itself to restrict any flow up the back side, and
22 none of these wells--well, as you can see, the
23 Exxon #1 is cemented back to surface and the
24 other well, the Federal "AT" #5, only penetrated
25 to 3,345. Our disposal zone would be from 3,500

1 on down.

2 Q. When you look at page 2 of Exhibit 2,
3 does that represent the schematics of the
4 disposal well?

5 A. Yes, sir. The one on the left is a
6 "before" and the one on the right is an "after."

7 Q. Let's leave for a moment the Capitan
8 Reef. Within the half-mile area, do you find any
9 fresh water sands at any depth that are being
10 utilized for agricultural, stock water, or
11 potable uses?

12 A. Okay. There is one well--I went ahead
13 and spoke with the State Engineer's Office in
14 Roswell and received back what would be page 14
15 from Mr. Kenneth Fresquez, if I said that
16 properly.

17 Q. Vasquez.

18 A. Vasquez. As you can see, about
19 three-quarters down the page I have underlined
20 the closest water well there.

21 Q. Give us a reference to the well.

22 A. Okay. It's in Section 18, 19 South, 33
23 East, which would be just north--I guess it's
24 numbered.

25 Q. 7497?

1 A. 7497.

2 Q. It's near the bottom of the page and--

3 A. I have it underlined.

4 Q. --it's got a double underline under it
5 and just above it on the far left column it says
6 7497.

7 A. Okay. They're showing it at a total
8 depth of 850 feet. It is producing from what
9 they call the Triassic. And the date collected
10 was 2/15/63.

11 Q. Does your proposed utilization of the
12 Capitan Reef for disposal purposes, at this
13 location, expose that fresh water well to any
14 impairment?

15 A. Not in my opinion. We would have a
16 surface string and a long string, and they would
17 both be tied back to surface and cemented back to
18 surface. We would also have a packer and
19 injection tubing inside that casing.

20 Q. Do you find, within the area of review,
21 any other uses of fresh water or water that would
22 qualify as fresh water?

23 A. No, sir. And I'm going by the State of
24 New Mexico Engineer's Office as my source.

25 Q. What is your proposed surface

1 limitation pressure for utilization in this
2 disposal well?

3 A. 700 pounds.

4 Q. How do you arrive at that number?

5 A. Two-tenths of a pounds times the depth
6 to 3,500 feet.

7 Q. Give us the approximate range, as you
8 best now know it, of the volume of water to be
9 disposed of, in barrels a day, into the disposal
10 well.

11 A. Right now, from our Exxon #1, we feel
12 that we could have as high as 500 barrels per
13 day. With further development, we're looking at
14 something beyond that.

15 Q. Do you see any problems with this well
16 taking those volumes of water for disposal
17 purposes?

18 A. No, sir. As I stated earlier, when you
19 drill the reef section, you just lose complete
20 returns.

21 Q. Is your well proposed to be completed
22 in such a way that it meets the requirements of
23 the Bureau of Land Management and the Oil
24 Conservation Division?

25 A. Yes, sir. As I stated earlier, we have

1 received back an approval from the BLM to reenter
2 the well.

3 Q. Have you provided, in your
4 documentation, the analysis of the waters to be
5 mixed, in other words, the Delaware water and the
6 Capitan Reef water, so that there's a chemical
7 analysis of that combination?

8 A. Yes, sir. The compatibility would be
9 page 10 of Exhibit 2.

10 Q. Does the mixing of those waters cause
11 you any operational difficulties that are beyond
12 your ability to control?

13 A. No, sir. It does show a tendency for
14 scaling, but I don't know of any disposal well
15 that we have that doesn't require an acid job
16 periodically to maintain the disposal into it.

17 Q. That's part of the routine maintenance
18 anticipated for this disposal well?

19 A. Yes, sir.

20 Q. Was the information you presented
21 either prepared by you directly or represent part
22 of your literature search and investigation of
23 documentations that apply to this particular
24 case?

25 A. Yes, sir.

1 Q. In your opinion, Mr. Buehler, will
2 approval of Anadarko's application be in the best
3 interests of conservation, the prevention of
4 waste, and the protection of correlative rights?

5 A. Yes, sir.

6 MR. KELLAHIN: We move the introduction
7 of Exhibits 1 and 2.

8 EXAMINER CATANACH: Exhibits 1 and 2
9 will be admitted as evidence.

10 MR. KELLAHIN: That concludes my
11 examination of Mr. Buehler.

12 EXAMINATION

13 BY EXAMINER CATANACH:

14 Q. Mr. Buehler, is there any evidence
15 you've seen that indicates there is a barrier
16 within the reef separating the good from the bad
17 water?

18 A. Within the reef itself?

19 Q. Yes.

20 A. No, sir. All of the wells I looked at
21 and evidently in Technical Report #38, shows
22 that--you're talking about vertical separation
23 now?

24 Q. Right.

25 A. There's no reference made to any

1 vertical separation. That's not to say that, you
2 know, when you drill the reef you can hit several
3 different loss circulation zones.

4 Q. You've testified that everything pretty
5 much west of the Pecos River is considered pretty
6 good water in the reef?

7 A. Yes, sir.

8 Q. And everything east of there is
9 considered pretty bad?

10 A. Yes, sir.

11 Q. Does the quality deteriorate the
12 further east you move?

13 A. As you can see from--on pages 18 and 19
14 of Technical Report #38 are the total analysis of
15 the wells that were involved, not all the wells
16 but the wells, evidently, they felt worth
17 testing. They jump around. But I will also say
18 that they are all over 10,000 on their total
19 dissolved solids.

20 Q. Okay. That was my next question.

21 Q. You have not seen any instance of a
22 well east of the Pecos that has less than 10,000?

23 A. Sir, I'm just strictly going by the
24 study that was done by the State Engineer's
25 Office. Based on the wells that we--based on the

1 well that I analyzed or had analyzed, our Teas
2 Yates water supply well, the water going that
3 direction is bad. I think it has to be getting
4 worse just because of the drilling that's going
5 on in the area. But it could also, like I say,
6 be caused by just increased total dissolved
7 solids within the water that's remaining if it
8 continues to leach out minerals.

9 Q. There's an area within the reef that
10 has specific guidelines for drilling and casing.
11 This area that you're in does not fall within
12 that area?

13 A. Yes, sir. I'm familiar with the
14 secretary's area down there in the potash. This
15 is north of the potash. Typically, in the potash
16 area, we would have to set a surface string. We
17 would then a string a hundred foot below the
18 bottom of the salt, and we could continue on
19 drilling.

20 If it would be a deep well, of course a
21 well would have to set a second string of
22 intermediate just strictly for pressure control.
23 If it were a Delaware ware or possibly a Bone
24 Springs well, just a production string would be
25 the third string. But we are north of that area,

1 sir.

2 Q. Do you have any idea how much water you
3 will ultimately dispose of in this well?

4 A. If we were to totally develop the
5 acreage that we have available--and let me refer
6 to this--approximately 5,000 barrels of day would
7 be the maximum, I would assume. That's if we
8 developed all the acreage. We're trying not to
9 be commercial.

10 Q. You've indicated that flow within the
11 reef in your area, you believe, is to the south
12 and to the east?

13 A. Right. It flows from the Pecos River
14 up around and down and on into Texas. And I
15 believe that's substantiated by the fact that the
16 hydrographs show that there is a continuing drop
17 in the water levels. The large hydrograph that
18 you have right there in front of you, at the top
19 would be the more westerly wells.

20 You can see that there is less of a
21 drop. The ones at the very top, I believe, not
22 having that in front of me, are the ones from
23 west of the Pecos which the City of Carlsbad
24 withdraws from, and then on down you can see
25 where the wells are losing static fluid level,

1 and those would be predominantly east of the
2 Pecos.

3 My first information on water flow
4 within the reef came from the two gentlemen I
5 spoke with in Carlsbad, and the State Engineer,
6 so it's not my theory. It's something that they
7 have told me.

8 EXAMINER CATANACH: Okay. I have
9 nothing further of the witness. Anything further
10 of this witness?

11 MR. KELLAHIN: No, sir.

12 EXAMINER CATANACH: The witness may be
13 excused. Anything further in the case?

14 MR. KELLAHIN: No, sir.

15 EXAMINER CATANACH: There being nothing
16 further, Case 10439 will be taken under
17 advisement.

18 (And the proceedings concluded.)
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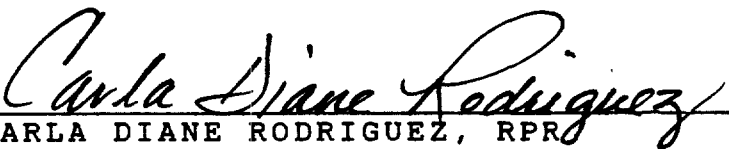
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STATE OF NEW MEXICO)
) ss.
COUNTY OF SANTA FE)

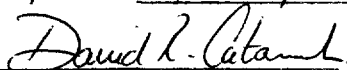
I, Carla Diane Rodriguez, Certified
Shorthand Reporter and Notary Public, HEREBY
CERTIFY that the foregoing transcript of
proceedings before the Oil Conservation Division
was reported by me; that I caused my notes to be
transcribed under my personal supervision; and
that the foregoing is a true and accurate record
of the proceedings.

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

WITNESS MY HAND AND SEAL February 17,
1992.


CARLA DIANE RODRIGUEZ, RPR

I do hereby certify that the foregoing is
a complete record of the proceedings in
the Examiner hearing of Case No. 10435,
heard by me on February 6 1992.


David L. Catana, Examiner
Oil Conservation Division