NEW MEXICO CIL CONSERVATION DIVISION

STATE LAND OFFICE BUILDING

STATE OF NEW MEXICO

CASE NO. 10439

IN THE MATTER OF:

The Application of Anadarko Petroleum Corporation for Salt Water Disposal, Lea County, New Mexico

BEFORE:

DAVID R. CATANACH

Hearing Examiner

State Land Office Building

February 6, 1992

REPORTED BY:

CARLA DIANE RODRIGUEZ
Certified Shorthand Reporter
for the State of New Mexico

ORIGINAL

A P P E A R A N C E S

FOR THE NEW MEXICO OIL CONSERVATION DIVISION:

ROBERT G. STOVALL, ESQ.
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BY: **W. THOMAS KELLAHIN, ESQ.**

I N D E X

E X H I B I T S

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

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

EXAMINER CATANACH: Are there appearances in this case?

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

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

MR. STOVALL: I'd love to.

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

GEORGE R. S. BUEHLER

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

EXAMINATION

BY MR. KELLAHIN:

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

please state your name and occupation.

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

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

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

Q. Summarize for us your educational background.

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

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

County.

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

A. Yes, sir.

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

A. Yes, sir.

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

A. Yes, sir.

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

A. Yes, sir, I have.

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

EXAMINER CATANACH: He is so qualified.

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

that we look at page 5 to that exhibit.

A. Okay.

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

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

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

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

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

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

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

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

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

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

A. Yes, sir.

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

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

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

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

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

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

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

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

A. Yes, sir.

Q. That's the current plan?

A. Yes, sir.

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

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

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

A. Yes, sir.

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

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

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

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

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

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

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

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

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

Report #38.

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

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

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

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

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

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

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

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

A. Yes, sir.

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

A. Yes, sir.

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

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

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

arrow?

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Q. Let me borrow the original from the

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

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

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

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

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

Q. What does that tell you?

A. That tells me that the Capitan Reef is

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

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

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

Q. Did you explain to the City of Carlsbad

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

A. Yes, sir.

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

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

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

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

pages 1 and 2?

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

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

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

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

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

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

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

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

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

A. Yes, sir.

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

A. None whatsoever.

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

A. Yes, sir.

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

discussed?

A. Yes, sir.

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

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

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

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

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

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

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

A. Yes, sir.

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

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

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

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

just one well that penetrated the Capitan Reef.

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

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

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

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

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

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

on down.

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

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

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

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

Q. Vasquez.

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

Q. Give us a reference to the well.

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

Q. 7497?

A. 7497.

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

A. I have it underlined.

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

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

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

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

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

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

Q. What is your proposed surface

limitation pressure for utilization in this disposal well?

A. 700 pounds.

Q. How do you arrive at that number?

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

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

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

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

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

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

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

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

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

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

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

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

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

A. Yes, sir.

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

A. Yes, sir.

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

A. Yes, sir.

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

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

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

EXAMINATION

BY EXAMINER CATANACH:

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

A. Within the reef itself?

Q. Yes.

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

Q. Right.

A. There's no reference made to any

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

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

A. Yes, sir.

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

A. Yes, sir.

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

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

Q. Okay. That was my next question.

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

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

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

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

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

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

sir.

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

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

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

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

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

and those would be predominantly east of the Pecos.

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

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

MR. KELLAHIN: No, sir.

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

MR. KELLAHIN: No, sir.

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

(And the proceedings concluded.)

CERTIFICATE OF REPORTER

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

CARLA DIANE RODRIGUEZ, RPR
CSR No. 4

I do hereby certify that the foregoing is a complete record of the proceedings in the Examiner hearing of Case No. 10439, heard by me on February 6 1992.

David R. Catanach, Examiner
Oil Conservation Division