STATE OF NEW MEXICO
ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION DIVISION

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

APPLICATION OF THE NEW MEXICO OIL CONSERVATION DIVISION THROUGH THE SUPERVISOR OF DISTRICT II FOR AN EMERGENCY ORDER SUSPENDING CERTAIN APPROVED APPLICATIONS FOR PERMITS TO DRILL, AND FOR ADOPTION OF A SPECIAL RULE FOR DRILLING IN CERTAIN AREAS FOR THE PROTECTION OF FRESH WATER, CHAVES AND EDDY COUNTIES, NEW MEXICO.

CASE NO. 15487

REPORTER'S TRANSCRIPT OF PROCEEDINGS

COMMISSIONER HEARING

December 5, 2016
Volume 1 of 3
Santa Fe, New Mexico

BEFORE: DAVID R. CATANACH, CHAIRPERSON
PATRICK PADILLA, COMMISSIONER
DR. ROBERT S. BALCH, COMMISSIONER
CHERYL BADA, ESQ.

This matter came on for hearing before the New Mexico Oil Conservation Commission on Monday, December 5, 2016, at the New Mexico Energy, Minerals and Natural Resources Department, Wendell Chino Building, 1220 South St. Francis Drive, Porter Hall, Room 102, Santa Fe, New Mexico.

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INDEX

(1:02 p.m.)

CHAIRMAN CATANACH: So at this time I will call Case Number 15487, which is the application of New Mexico Oil Conservation Division through the supervisor of the District II for an emergency order suspending certain approved applications for permits to drill and for adoption of a special rule for drilling in certain areas for the protection of freshwater, Chaves and Eddy Counties, New Mexico.

At this time I will call for appearances in this case.

MR. BROOKS: Mr. Chair, Honorable Commissioners, David Brooks of the Energy, Minerals and Natural Resources Department, assistant general counsel, appearing for the Oil Conservation Division and for the district supervisor of District II who is sitting here operating the teleconference.

CHAIRMAN CATANACH: Thank you, Mr. Brooks.

MR. OLSEN: A. J. Olsen, general counsel for the Pecos Valley Artesian Servicing District, referred to as PVACD, and with me is co-counsel, Olivia Mitchell.

MR. FELDEWERT: Mr. Chairman, Members of the Commission, Michael Feldewert, with the Santa Fe office of Holland & Hart, appearing on behalf of COG

Operating, LLC, OXY USA, Inc., and Fasken Oil & Ranch.

MR. LARSON: Mr. Chairman, Commissioners, Gary Larson, of the Santa Fe office of Hinkle Shanor firm, appearing for EOG Y Resources and Lime Rock Resources 2-A.

MR. BRUCE: Mr. Chairman, Jim Bruce of Santa Fe representing Mack Energy Corporation and Devon Energy Production Company, L.P.

MS. FOSTER: Mr. Chairman, Members of the Commission, Karin Foster, Southwest Government Affairs, representing the Independent Petroleum Association of New Mexico.

CHAIRMAN CATANACH: Okay. Additional appearances?

Okay. Before we get started, I do have an announcement with regards to today's schedule. I have, unfortunately, a meeting at the Governor's office at 4:30. So we will be shutting down the hearing about ten after 4:00 today. So we'll try to make up ground tomorrow if we need to. And also maybe with regards to tomorrow, we could probably start at 8:00, if that's agreeable to everybody, and then if we need to go late tomorrow evening, we can do that.

Is there any need to do opening statements at this time? Does anybody care to do that?

MR. FELDEWERT: I'd like to. I don't know about Mr. Brooks.

MR. BROOKS: I'll waive opening statement. I think the Commissioners are already familiar with the background of this case.

CHAIRMAN CATANACH: Okay.

MR. OLSEN: I would like to, also.

CHAIRMAN CATANACH: You waive it?

MR. OLSEN: No. I'd like to make a brief statement.

CHAIRMAN CATANACH: Okay. Go ahead.

OPENING STATEMENT

MR. OLSEN: Thank you.

Mr. Director, Members of the Commission, I appear on behalf of the PVACD, and I would like to take just a moment to introduce the PVACD and what it is. It is a quasi-governmental agency authorized in 1932 and was charged with protecting and conserving the waters -- groundwater of the Roswell Artesian Basin and, more specifically, the boundaries of the PVACD. We are not member-based conservancy district or district, if you may, much like Elephant Butte Irrigation District or Carlsbad. We are a -- we serve a constituency. We are funded by ad valorem taxes authorized by statute for a tax base.

We represent a constituency of over 100,000 individuals, properties owners ranging from 20 miles north -- approximately 20 miles north of Roswell down to Brantley Lake. From the east side or from the river, for the most part, is our eastern boundary, to the west. Our constituents are folks from agricultural to refining at Navajo to the cities of Roswell, Artesia, Dexter, Hagerman, Lake Arthur, plus industry from agricultural to manufacturing, as I say, to refining.

Our concern and our charge has been since 1932 as to conserve and protect the waters of the Basin. And we've done an excellent job of that over these many years, and we come before you today on one more issue, and that is to make sure that the -- not only the quantity of the water that we've struggled to protect these many years but also the quality of the water.

And thus the District is here today in support of the position of the Division in the promulgation of the new proposed rule because years of experience have taught us that there are -- indeed that the hydrology -- the geohydrology of the RAD is a unique part of the state of New Mexico, unlike anyplace else, two distinct aquifers, a shallow aquifer or the alluvium, if you may, and then the Artesia, which is a karst system. And the Roswell Artesian Basin is the

most -- if not the most, one of the most studied groundwater aquifers in the U.S. It has sustained the life blood of the valley since the 1800s.

And why we're here today is to ensure that those two aquifers are protected, taken care of from the original -- or from the rules or the regulations promulgated by -- in 2008 defining that the -- that the aquifers be separated and protected. We're here today to make that just more definitive for the -- to make sure that the shallow and the artesian are protected and taken care of.

Thank you.

CHAIRMAN CATANACH: Thank you, Mr. Olsen.

Mr. Feldewert?

OPENING STATEMENT

MR. FELDEWERT: Mr. Chairman, Members of the Commission, I'm going to refer to a few exhibits as we go through. So I don't know what order your exhibits are in. I'm assuming that you-all have copies of the exhibits that we submitted, as well as others, because I think at the outset of this hearing, it's important to know how this whole application started.

And if you look at the pleadings, you'll initially see that there was a request for an emergency order to allow time to review certain APDs and determine

if the productive string was deep enough to cover the aquifers. And so I saw -- Mr. Goetze had it out earlier. Your OCD Figure 3, I think, is the best place to go for purposes of what we're looking at here. Figure 3 is the one that shows the artesian aquifer area, the shallow aquifer area. So it would be OCD's Exhibit 1, and within that is their Figure 3. So it could look something like this one (indicating). So in my book, it's OCD Number 1, and within that, there is a number.

Now, the reason I refer to this is because the origin of this whole application is -- if you look at this Figure 3, there is an area in yellow to the bottom. It's labeled as "Area of Recent Oil and Gas Development with Suspended APDs." They were suspended because those initial APDs that have been filed are not in compliance with existing Division orders which require at least one protected string through the lowest aquifer.

We've given you a copy of Respondent's Exhibit Number 1. So that would be our Exhibit Number 1. If you would like to, you can keep your finger here and turn to our Exhibit Number 1, which is a copy of the Division's existing rules. And I go to them because those APDs did not comply with the Division's existing

rules. That's what led to this whole application. When we look at those existing rules, there is -- I have them highlighted for you in our book under Exhibit 1, Respondent's Exhibit Number 1, 19.15.16.10, down there at the bottom, "Casing and Tubing Requirements."

When you look through that, it requires at least one protective string through the aquifers. It provides that two protective strings can be required as necessary, "as necessary." So there is flexibility there for the district office and the Division. They don't require two strings in all -- two protective strings in all circumstances. And what you'll find is that when you know you're at an area with drilling hazards or you have problems drilling or you're going through a salt section, under this rule, they require you to put two protective strings for obvious reasons. But under this rule, as it applies now, okay, you have to have at least one protective string through the aquifers.

The second part of this rule, Subpart B, existing rules, requires that the cement on that protective string be circulated to the surface. So I have to have cement to the top of the hole under the existing rules.

Then -- you can read them at your leisure,

but Subpart C, Subpart D, Subpart G, very specific, they talk about the type of cement you've got to use, how it's supposed to be set, what you're supposed to do.

So we have these existing rules that have been protective over time -- protective over time. And if we now go back to Figure Number 3 that we kept our finger on, the problem was, what led to this whole thing, is that somehow APDs were approved, mistakenly, without a protective string that's required by the rules now through the deepest aquifer. That is being cured by the emergency order that's been signed. That's being addressed by the emergency order in the existing Division rules.

So as you go through this hearing, there are three questions I think you need to ask yourself. The first question: What evidence is being presented that demonstrates a need now for special rules knowing what we've already got? We have rules that have been in place for decades. We have drilling that has occurred in this area for -- this designated area for decades. And if you want a flavor of it, you can look at Lime Rock's Exhibit Number 1. It's the same as the Division's map. If you look at that and all the black dots in Lime Rock's Exhibit Number 1 for all the wells that have been drilled in this area, hundreds, if not

thousands. And most of those wells have been drilled with a protective string through the aquifers cemented to surface just like the current rules require.

So if I go back to Exhibit Number -- this Figure Number 3 that the Division has put forth, yes, they have an area down there where they didn't comply with the existing rules. But history tells us that the existing rules have protected the aquifer and that all we need to do here to deal with that issue in yellow is apply the existing rules to the existing APDs. That can be cured. We don't need special rules to do that.

The second question -- so the first question is: Why do we need rules? What's going on?

The second question: If the evidence demonstrates we need special rules, what geographic area needs to be covered? You just heard from Pecos Valley District's attorney, Mr. Olsen. He says we've got a unique hydrology out there. I look at the Division's map here, Figure Number 3. The unique area, if that's what you want to call it, is where the shallow aquifer is hatched here. That's where we have the two overlying aquifers, one over the other. The rest of this area, I submit to you, is not much different than the rest of the state where we have aquifers and we've had rules in place for years to protect those aquifers.

So if we need special rules, if for some reason they bring forth evidence showing special rules, then what area do we really have to cover? What is so unique about this area? That's the next question you've got to address.

Third and final question: If you need special rules, what should they be? And this is where our filed modifications come into play.

And if I may approach? If I may approach, Mr. Chair?

CHAIRMAN CATANACH: Certainly.

MR. FELDEWERT: Here's what I've done for you. I've taken the filed modifications, increased the font so you can read it much easier. Okay?

COMMISSIONER BALCH: I believe you're calling us old.

(Laughter.)

MR. FELDEWERT: Well, no. I need one as well. I'm going to have one for myself. I've got one for Mr. Brooks, one for Mr. Olsen. It's just easier to read from.

So what are we doing with our filed modifications? Now, we've given you a red-line version off of their proposed rules. That's Attachment A. We've given you a clean version, which is Attachment B,

same as we filed with our pleadings quite some time ago. These are jointly filed by operators with experience -- actual drilling experience in this area. So you're talking about COG Operating. You're talking about OXY USA. You're talking about Fasken Oil & Ranch, Devon Energy, Mack Energy Corporation, EOG Y Resources, formerly Yates Petroleum, Lime Rock Resources, IPA New Mexico, NMOGA. All filed these modifications jointly.

And what have we done? We've taken -- first off, if you go -- I'd work off the red line. It's easier. Assuming you think you need special rules, assuming there is evidence to support that, then here's what we have suggested with our modifications.

C(2) -- Proposed Rule C(2). What we've done there is modify it to require at least one protective string through the deepest aquifer or the first oil show cemented to surface, following the existing rules, what they call a two-string design. You've got your protective string, and then you've got your production string. That is a standard design that's been used for decades in this area without any incident of contamination, fluid migration or any other groundwater issues. It's been used for decades. And we have witnesses that are going to testify to that fact,

not only that it's been used but that this is protective of groundwater in this area, and it should obvious from decades of drilling that we've had without incident. But that's what we've done with C(2).

C(3). We have removed the requirement. Under their proposed rules, it's a requirement that you have two protective strings. I don't know why, but that's what they've submitted. So we remove that C(3). And in conjunction with that, we have modified what was their Rule D. And what Rule D does is it follows the existing rules and allows a district supervisor to require, when he or she deems appropriate a second protective string, when it's necessary, just like the existing rules. When necessary, they have that discretion. So it's not mandatory like they're proposing. He has the decision to do that.

Next thing we've done, C(4), we've taken that out. That's a different subject. Now, here's what C(4) does. It requires you currently to stop your drilling process, wait for the cement to dry on the protection string, take a cement bond log once that cement is properly cured, submit it to the district office and then sit around and wait for them to approve it before you can continue. All the while, you're just sitting there waiting. You're waiting for the cement to

cure. You're waiting for the district office to have the time and the personnel to take a look at it and approve it before you continue.

Now, we have an exhibit that addresses the costs that are associated with that, and it is substantial, because you've got to let that cement dry, and then you've got to wait around and hopefully they've got time to approve it, whether it's on a weekend or a holiday or whatever, before you can continue under their proposal.

We've got witnesses that are further going to testify that the submission of a cement bond log makes no sense when you have cement circulated to surface. Remember, we are all saying you have to have a protective string through the aquifer cemented to surface. So why do you have to submit a cement bond log? Our witnesses are going to address that.

C(5). That's a minor change. The operator shall cement -- the production casing has to be to a depth of 500 feet across. And the one thing we change is the previous case-in-chief, because we're going to show you don't need an intermediate string. In all circumstances, you don't need a second protective string to fairly --

C(6) or -- there was a C(6). This deals

with the production string. And what we've done here is say that you don't need to submit a cement bond log if your production casing string is cemented to surface. Again, no reason to do it if it's circulated to surface. Alternatively, if it's not cemented to surface, 500-foot overlap is appropriate to show the -- for the purpose of that cement or, what we think is a more effective tool, a temperature survey. That's all the changes to C(6).

The next topic is -- well, let me step back. You'll also see the red line with their proposed Rule E. Simply because -- there is no need to have that any longer because we've already said you have to have at least one productive string through the lowest aquifer cemented to surface. So there is no need for E.

So that means the last point is what was their Rule F, the annular space. That's the second page of our --

Everybody agrees the annular space should be 2 inches. Okay? The witnesses will confirm here that you want to measure, though, that 2 inches from the casing -- outer diameter of the casing from the hole, not from the couplings to the hole. Because when you do it in the couplings to the hole, then you're dealing with the circumstance where the current -- doesn't fit, current tools don't work as well, and, more importantly,

you don't get the turbulence that you need for effective drilling and the cleaning of the pipe so that you can properly adhere the cement.

So it looks like a minor change, but it's a necessary change. We're taking the couplings to the casing.

Now, that's what we've done with the modifications if you think that there is evidence presented showing a need for special rules. But that's the first question: What is being presented -- or what's going to be presented to show that demonstrates the need for special rules? I haven't seen anything in their exhibits, especially given what your current rules already require. The issue that -- the problem down here (indicating), the area in yellow, can be addressed with the existing rules. We don't need special rules. So why are we here?

Second question: What area should be covered if you think there are special rules that are needed?

And third: If you need special rules, what does the evidence show you those rules should be?

Now, in closing, I don't know what the Division -- exactly what the Division is presenting on those points. I certainly don't know what Pecos Valley

is presenting on those issues. But I think you need to keep another point in mind, and that is special rules cannot be based on politics. Special rules cannot be based on unsubstantiated fears or concerns. They must be based on evidence presented in a hearing like this one that is fully vetted publicly. And I think you're going to find at the end of this hearing that there is no evidence supporting or showing the need for special rules and that the only problem that exists out here in this area in yellow can be addressed by the emergency order with the existing Division rules.

Thank you.

CHAIRMAN CATANACH: Thank you, Mr. Feldewert.

Mr. Larson, do you have anything?

OPENING STATEMENT

MR. LARSON: Mr. Chairman, Commissioners, both of my clients, EOG Y Resources, which has historically been known as Yates Petroleum, which has operated in this area going on 100 years, and Lime Rock Resources II-A understand and appreciate the Division's and the Conservancy District's concern about protecting usable groundwater. But EOG and Lime Rock are constrained to question the need for a one-size-fits-all special rule with casing requirements they both deem to

be unnecessary. And those casing requirements are unnecessary for several reasons.

First, as Mr. Feldewert has noted, neither the Division nor the Conservancy District as to this point has presented any information that tends to establish the groundwater in either the shallow alluvial aquifer or the deeper artesian aquifer has been impacted by oil and gas operations. More than 9,000 oil and gas wells have been drilled in the designated area, and as far as I'm aware, none of them has contaminated groundwater in either of the aquifers.

Secondly, as Mr. Feldewert has pointed out, the Division already has the regulatory authority and discretion, under 19.15.16.10A, to impose casing requirements such as an intermediate casing string on a case-by-case basis.

And third, a uniform requirement of the intermediate casing string will result in hundreds of thousands of dollars of the increased drilling costs for each well drilled, as well as significantly increase safety risks.

And while increased costs aren't easily juxtaposed to the need to protect groundwater to be used for drinking and other domestic uses, EOG and Lime Rock understand they are averse to incurring those costs due

to a rule that would be duplicative, would be ill-suited to an area with highly diverse geology and, most importantly, are unnecessary. And for these reasons, EOG and Lime Rock request the Commission to deny the Division's application.

CHAIRMAN CATANACH: Thank you, Mr. Larson.

Mr. Bruce?

MR. BRUCE: I would just agree with what Mr. Feldewert and Mr. Larson said.

CHAIRMAN CATANACH: Thank you, Mr. Bruce.

Ms. Foster, anything?

MS. FOSTER: Thank you, Mr. Chairman. I also would agree with the statements already made. I don't feel the need to make an opening statement at this time.

CHAIRMAN CATANACH: Okay. Thank you.

Why don't we get all the witnesses to stand and be sworn at this time, or potential witnesses?

(Mr. Goetze, Mr. Kautz, Mr. Atkins, Mr. Peery, Mr. Bird, Mr. Krogman, Mr. Mullen, Mr. Maxey sworn.)

CHAIRMAN CATANACH: Before we get started, by way of background, we do have some existing orders that are out there. We issued E -- Order Number E-42 on April 8th of 2016. That order basically suspended the

APDs in the area in question. It gave the authority to the district supervisor to make exceptions to the well construction requirements that had already been reviewed. So that stayed in effect.

We then issued R-14164. That was issued May 13th, 2016. And that order basically held up the emergency order until a full hearing is held, Order Number R-14164-A. We held a hearing on that -- I'm sorry. We didn't hold a hearing. We -- by that hearing, we scheduled a hearing for this case to be on June 23rd for a scheduling conference, Order Number R-14164-B, we deferred -- this case was originally going to be heard before the Division. We then, by this order, referred it to the Commission, and we were supposed to hear it on August 8th, 2016. And finally, Order Number R-14164-C continued the case until today's date. So that's a summary of what is out there currently.

So at this time, I'll turn it over to Mr. Brooks.

MR. BROOKS: Thank you, Mr. Chairman. We would begin our case now and call Phillip Goetze.

PHILLIP R. GOETZ,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. BROOKS:

Q. Would you state your name for the record, Mr. Goetze?

A. My name is Phillip R. Goetze.

Q. Again, for the record, when the Chair asked that all of the witnesses be sworn, did you -- did you so swear?

A. I so swore.

Q. Very good. Thank you.

And by whom are you employed, Mr. Goetze?

A. I'm employed by the Oil Conservation Division in the --

Q. In which office?

A. In the Santa Fe Office, in the Engineering Bureau.

Q. And in what capacity?

A. As a petroleum geologist and geologist.

Q. Now, Mr. Goetze, would you go through your qualifications, education and experience briefly?

A. I graduated from New Mexico's School of Mines, New Mexico Institute of Mining and Technology, class of 1977, with a bachelor of science and geology.

Since then, I've been employed in various capacities as a hydrogeologist; a project geologist; a

project manager, which include time with the United States Geologic Survey, Bureau of Land Management, various consulting firms, including Charles B. Reynolds & Associates; doing geophysics, ASCG Incorporated, New Mexico; Tetra Tech; and of recent, Glorieta Geoscience, particularly in this area of southeast New Mexico; and at present, since February of 2013, with the Division.

I'm a registered professional geologist in the states of Arizona, Alaska, Texas, and a certified environmental manager in the state of Arizona. That's about it.

Q. And do you have experience in hydrogeology, as well as geology?

A. I do have that experience related to my past employment.

Q. Okay. Now, is there an exhibit that represents -- that summarizes your education qualification?

A. Yes. There is Exhibit Number 3.

Q. OCD Exhibit Number 3. Very good. Thank you.

Now, Mr. Goetze, you have prepared some pretty pictures for us. I'm told that's what geologists do best. So I would begin by calling your attention to OCD Exhibit Number 1 and ask you to tell us what that

is.

A. Exhibit Number 1 presents the location of the discussion of this Commission hearing. We're looking at both a figure presented by the USGS and by the New Mexico Bureau -- Mineral Resources -- Geology and Mineral Resources showing the location of both the Roswell Basin Aquifer System, which is the artesian, and the shallow alluvial aquifer. The exhibit -- the second figure provides, also, a general relationship showing it within the Artesian Basin relative to Roswell, the Carlsbad and the Pecos River.

Q. Is the purpose of this exhibit, primarily at least, to simply put the area we're talking about in context in terms of the state of New Mexico and the cities and counties that are affected here?

A. That is correct.

Q. Okay. From what source does this Exhibit 1 come?

A. As stated, one is from a Hydrologic Atlas prepared by the USGS. The other is from the Bureau's "Water Resources of the Lower Pecos Region, New Mexico; Decision-Makers Field Conference 2003."

Q. So both of these are from published sources?

A. That is correct.

Q. Okay. Now, I call your attention to Figure

Number 2 and ask you to identify it.

A. Figure Number 2 is a figure pulled from a reference which will be very common, a report that was done in 1983 by G. E. Welder of the geologic framework of the Roswell Groundwater Basin, Chaves and Eddy Counties, New Mexico. It is referred to as Technical Report 42, authored by the State Engineer. It was also done in cooperation with the United States Geological Survey.

Q. Go ahead.

A. The figure outlines important features with regards to the surface drainage, the legal boundary of the Roswell Underground-water [sic] Basin as determined by the State Engineer, and approximate limits for both the artesian aquifer and shallow aquifer as presented by Welder. And then on top of that is an overlay of the area, what is being called the designated area, which was outlined for consideration in this case.

Q. Now, it was -- this yellow area that's outlined in red -- that's highlighted in yellow and outlined in red, was that prepared by the Oil Conservation Division?

A. Correct.

Q. Okay. So that did not appear on the published version of this exhibit?

A. Yes, it did.

Q. It did not --
A. Oh, yeah.
Q. It did not appear?
Okay. Just to make the record clear -- I mixed up the question. So tell me, did this or did this not yellow area outlined in red appear on the published exhibit?
A. On the first version?
Q. In the published version.
A. No, it did not.
Q. Good.
Okay. Now, on this Exhibit Number 3, what form of designation shows the location of the shallow aquifer?
A. It is the -- essentially, we're taking Figure Number 2 and enlarging it, and we have a cross-hatcher over the shallow aquifer, with the artesian aquifer showing a -- just a cross fill-in.
Q. So where there are Xs and where the crosshatch makes Xs, is that where the shallow aquifer and the artesian aquifer are both present?
A. Correct.
Q. And where are the crosshatches? Just from the lower left to the upper right, is that where the artesian aquifer is present, but the shallow aquifer is

not?

A. Correct.

Q. And is there a small amount of area over to the right-hand side where the shallow aquifer is present and the artesian aquifer is not?

A. That is correct, also.

Q. Okay. Now, in response -- responding to what Mr. Feldewert said in his opening statement, do you agree that there is no reason to require two water protection strings in the areas where there is only one aquifer?

A. Where there is only one aquifer, that would be agreeable.

Q. Now, are the shallow aquifer and the artesian aquifer separated by impermeable layers at this -- at this geologic location?

A. Which geologic location?

Q. Where they're shown as both present on this map.

A. At this point -- and it would include looking at other figures and cross section, which are provided -- there is a separation. We are looking at the shallow aquifer, a confining bed and a deeper artesian aquifer.

Q. Okay. Let's go on, then, to the other figures.

Figure Number 4, tell us what that is.

A. Figure Number 4 was a general stratigraphic section showing the general layout of the aquifer, the confining bed and the shallow aquifer.

Q. Okay. Now, would you -- I'm just going to let you explain that because that's all geologist stuff. So would you proceed and tell in your own words what this is and what you conclude from it?

A. Basically what we're showing here is that you have the San Andres Limestone which provides the artesian aquifer as it is exposed at the Sacramentos and to the west, and this becomes a source area for recharge. As we progress towards the east, the artesian aquifer is overlain by both the confining beds and, as you get into the Pecos River Valley, a high degree of alluvium that eventually forms the shallow alluvial aquifer.

With this, the figure also shows that the confining layers are representative of the Tansill, the Yates Seven Rivers, Queen and Grayburg Formation.

Q. Okay. And the confining -- the word "confining beds" is shown immediately below the designation shallow alluvial aquifer on the left-hand figure?

A. That is correct. But it still may have other exposures of the Artesian Group to the east of the Pecos

River.

Q. As you get closer to the Pecos River, are there -- does the separation between the aquifers widen?

A. They are more defined to the -- in the area of the Pecos River, and along the south portion of the Basin, they are well-defined.

Q. Now, you have an arrow running on here from the San Andres Limestone to the San Andres Formation, and you have the San Andres Formation and the artesian aquifer separated on this exhibit, correct?

A. Correct.

Q. Is the artesian aquifer considered to be a part of the San Andres actually?

A. Yes. It is held within.

Q. Now, is it -- how is it distinguished from the lower part of the San Andres, which is not productive freshwater?

A. That is through the drilling, the designations of various oil and gas operation historicals. The San Andres has shown both to be an aquifer, as well as an oil producer, especially in the deeper zone. It is known as the Slaughter zone, which has been bought in from Texas and usage.

Q. Okay. Now, that so-called Slaughter zone is shown more specifically on Figure Number 6 -- no -- 7,

right?

A. Correct.

Q. Okay. And that's down -- significantly below the San Andres freshwater?

A. It is deeper than the aquifer.

Q. Okay. Now, going back to Figure Number 4, this is a question -- well, let me just ask it. Is this figure here, is this to scale in terms of the distance between the surface and the San Andres Limestone on the one hand and the distance -- well primarily -- let me rephrase.

Is this to scale as -- in terms of the distance from the surface to the artesian aquifer, on the one hand, and the distance from the artesian aquifer down to the Yeso on the other, or is there some distortion?

A. There is some distortion. This is purely a schematic showing the --

Q. Okay. Is it actually -- how deep is the Yeso Formation in this area?

A. We may be looking at -- depending upon where you are, it can be anywhere from 1,000 to over 2,000 feet deep, but, again, relative to where you are in the Basin. To the west is going to be shallow.

Q. Okay. Yeah.

A. And then towards the east, we have a downdip.
Q. And that is, of course, all the formations in that area run, according to this, right?
A. Correct.
Q. Generally, they run from the -- from the Sacramento Mountains towards the river, they get deeper?
A. That's correct.
Q. Now, you said 1- to 2,000 feet. You're talking about the aquifer?
A. No. The aquifer -- in general discussion, the aquifer will be anywhere from -- we look at 800 to over 1,400 feet, in some cases a little shallower as it comes up to the mountains. So it's going to be a specific location.
Q. Okay. Very good.
Now, I went past Exhibit -- Figure Number 3 because I wanted to get to the cross section that showed the location of the aquifer. What does Figure Number 3 indicate?
A. Figure Number 3 is a composite of oil and gas pools or activity as projected on both the designated area, as well as the artesian and shallow aquifer as determined by the State Engineer.
Q. Okay. Now, could you -- there is a bunch of annotated stuff added onto this exhibit. Could you tell

us where that is from?

A. This figure itself is based off of Welder's report. The trend plays are based upon Ron Broadhead and his 2004 paper on "Major Oil Reservoirs in the New Mexico part of the Permian Basin...Open-File Report 479." And the pools are based upon the information offered by district.

Q. Okay. Where is the primary focus of oil and gas drilling at this time?

A. The primary interest is along the southern portion or southeast portion where both the shallow aquifer and the artesian aquifer are present. And this is what is commonly referred to as the San Andres-Grayburg Mixed Artesian Vacuum Trend, at least by the Bureau, and this has been of interest. We also have some deeper Wolfcamp that has been looked into, but that is farther to the east.

Q. In what formation are most of these oil wells drilled to?

A. They are going down to the Bone Spring and Wolfcamp. They're Permian.

Q. Yeah. And when I said where most of the oil and gas drilling is going, I didn't mean to suggest --

Okay. Now let's go on to Figure Number 5, and tell us what Figure Number 5 is.

A. Figure Number 5 is a cross section, again, from Welder's report. This is along the northern part of the Basin. If we refer back to Figure 2, you'll see that it is in the northern part. It represents a portion where there is significant recharge, and your separation of the shallow and the deeper artesian aquifer is probably the minimal.

Q. And if you go to the right -- well, on Figure Number 5, the dark blue or the darker blue, is that the valley-fill or shallow aquifer?

A. That is correct.

Q. And the lighter blue, is that the artesian aquifer?

A. That is correct.

Q. Okay. And then go on to Figure Number 6 -- well, first of all, Figure Number 5, what is the source of that?

A. Again, this is from Welder, 1982.

Q. Okay. Figure Number 6, tell us what that shows.

A. This is more in the region where the APDs have been suspended. Here we're showing the definite separation of the shallow aquifer from the artesian aquifer. It is almost on the same scale as B to B prime. Again, you're going to see that we have a

definite confined layer -- a confined aquifer with a confining layer above, with the shallow alluvial aquifer above it.

Q. Okay. And what is the source of this exhibit?

A. This is from Welder, 1982, also.

Q. Okay. Then that takes us to Exhibit Number 6 -- Figure Number 6 -- no. That's what I was talking about, right, Figure Number -- were we on the same page?

A. We were on Figure 6.

Q. We were on Figure 6. That's what I thought.

Okay. Let's go on and look at Figure Number 7.

A. Figure Number 7 was a presentation done on behalf of the UIC Program. Again, most of this is fairly old data, but it does demonstrate that we do have occurrences of oil and gas shallow within the San Andres, as well as the artesian aquifer above, which is -- provides the concern of today.

Q. Okay. And what is the source of Figure Number 7?

A. That was a report sent to the EPA in 1979 when we got the demonstration for the prototype for the UIC for our primacy.

Q. That prepared by the OCD, not by you or me?

A. That's correct.

Q. That's in 1978.

Okay. Now, Mr. Goetze, all these figures are from published sources. Are these -- in your opinion, are these the type of sources that is reasonable for a person in your profession to rely upon in making -- in forming opinions?

A. Yes, sir.

Q. Okay. And now I'm going to go to the rule that we have proposed -- the adoption of which we have proposed, and I'm going to ask you to tell us what the reasons are for its specific provisions.

First of all, we look at -- if you get the rule before you --

CHAIRMAN CATANACH: Where are we at, Mr. Brooks?

MR. BROOKS: Well, actually I'm referring to the fifth amended application for rulemaking and Exhibit A thereto.

Q. (BY MR. BROOKS) Now, where there is a bold C, a little below the middle of the first page, it says, "The well will penetrate --

CHAIRMAN CATANACH: Hang on a second. We're not on the same page.

COMMISSIONER BALCH: We're lost.

CHAIRMAN CATANACH: After your figures --

where is the exhibit after your figures?

COMMISSIONER PADILLA: Which OCD exhibit number is it?

MR. BROOKS: We do not have that on an OCD exhibit. I don't believe we have it. It's been filed with the Commission and is before you as an attachment to the application.

CHAIRMAN CATANACH: Is there someplace we have that and can reference it?

MR. BROOKS: I assumed you had the application before you, but if it's not in your notebook, we can go on to something else and I can furnish it to you at a later time.

THE WITNESS: May I intervene? I don't believe it's in your exhibit packages.

CHAIRMAN CATANACH: It is not?

THE WITNESS: Not as an OCD exhibit.

MR. BROOKS: That's what I was saying. I believe it's an attachment to the application.

Okay. We will proceed to something else, and we will go back to that when we can furnish this as a tendered exhibit.

Q. (BY MR. BROOKS) Very well. Mr. Goetze, do you believe that there is a reason for requiring wells drilled in or close to the artesian aquifer -- the

location of the artesian aquifer to be -- no. Okay. Let me go back to what I was saying because I forgot to ask you this.

Would you give us your own description of how this artesian aquifer forms and how it flows and why it's different from other types of aquifers?

A. Well, I'm sure you're going to hear a lot about it today.

Q. I'm sure.

A. In general, we're looking at a three system -- three elements to this. Of course, you have the shallow alluvial fill, a confining layer and then the deeper artesian aquifer. Recharge from it, as we've stated before, comes from the Sacramentos, as well as modified structures known as buckles, the Y-O Buckle, Six-Mile. These are features in the northeast -- or northwest side of the Basin area.

The alluvial is variable. It has been used for many years and provides limited use at this point. The confining layer is such an aquitard that it retains most of the water in the artesian. It is confining to the southeast more dynamically. It is bounded to the east and west by what has been described as no-flow boundaries. This has been from the observations of many folks that have studied the area. It does not tend to

go very far past the Pecos River to the east.

And then the artesian aquifer itself in the San Andres is very variable in the sense it is mostly carbonates, but there is karst play, as well as developed permeability, which provides a good source of drinking water, which is what it's used for, as well as industrial and agricultural purposes.

Q. Now, is the principal source of refill -- recharge for the artesian aquifer from precipitation occurring up in the Sacramento Mountains or the eastern slope thereof?

A. That is correct.

Q. And what is the principal source of recharge for the valley-fill or shallow aquifer?

A. It would be the surface runoff, including the Pecos Valley -- Pecos River. Excuse me.

Q. So it would be recharged in part by flow from the Pecos River?

A. That's correct.

Q. And would it also be in part by precipitation occurring in the Pecos Valley or close to the Pecos Valley?

A. That's correct.

Q. So then are the sources for these two aquifers basically different?

A. They are different in most cases.
Q. Now, is there some evidence that the shallow aquifer is -- has more -- a high salinity than the --
A. There are published records, as well as documentation that the shallow alluvial does have a lower water quality associated with it.
Q. And for this reason, is there some concern about intermingling the waters from the two aquifers?
A. This has been presented as a possible conduit, yes.
Q. Yeah.
The rule that we're proposing would require a separate surface casing to seal off each of the two aquifers from each other, as well as from fluids in the well coming from lower depths. Is that a reasonable solution to keeping the waters from the two aquifers separated?
A. It is reasonable.
Q. And in your opinion, to the extent that there is a concern about contamination of the shallow aquifer -- existing contamination of the shallow aquifer causing contamination of the deeper aquifer, is that the best geologic response that you know of in terms of protecting those aquifers from oil and gas -- from the influence by oil and gas production activity -- drilling

and production activity?

A. It is the most conservative application.

Q. Thank you.

Now, let's talk about cement bonding because there was a question raised about it. Are you -- are you prepared to testify to that because we didn't talk about it previously?

A. No. You did not tell me this (laughter.)

Q. Are you -- are you --

A. I was going to let my petroleum geologist take care of that.

Q. Yes, sir.

Is that -- is cement bonding -- what is a reasonable test for determining if you -- well, first of all, tell us what a cement bond is.

A. A cement bond log is a type of log where you can measure conclusively the qualities of the cement and placement, as well as success. It has a variety of forms. The newer ones are quite sophisticated.

Q. Does this sort of have to do with how much of the space that the cement is pumped into that actually fills up?

A. Not only that, but the quality of the attachment -- between the formation, as well as the casing.

Q. And if there is not a cement -- if there is not adequate cement bonding, what may happen?

A. You may end up with a micro-annulus or channeling. So it presents the opportunity of not having a complete separation in the seal.

Q. Okay. So in your judgment, then, is it a reasonable solution to concern about fluid movement to require that a cement bond log be submitted and approved to demonstrate that you've got a good cement job?

A. It offers the best answer for the current technology.

Q. Thank you.

Now, do you have any opinions on this annular space issue that's been discussed?

A. Not at this point, no.

Q. Thank you.

MR. BROOKS: Mr. Chairman, I will tender in evidence at this point exhibits -- the Figures 1, 2 and 3, 4, 5, 6 and 7, which are a portion of OCD Exhibit A -- I'm sorry -- OCD Exhibit -- it's not A.

What is this exhibit number that includes these figures --

THE WITNESS: I believe --

MR. BROOKS: -- Mr. Goetze?

THE WITNESS: It is Exhibit 1, Figures 1,

2, 3, 4, 5, 6 and 7.

MR. BROOKS: That's right. We're using the exhibits.

Okay. I will tender at this time Exhibit 1 in its entirety, which consists of a cover page and Figures 1 through 7, inclusive.

CHAIRMAN CATANACH: Is there any objection?

MR. FELDEWERT: No objection.

MR. OLSEN: No objection.

MR. LARSON: (Indicating.)

CHAIRMAN CATANACH: Exhibit 1, which includes Figures 1 through 7, is admitted.

(NMOCD Exhibit Number 1 is offered and admitted into evidence.)

MR. BROOKS: I will pass the witness.

CHAIRMAN CATANACH: Go ahead, Mr. Olsen.

MR. OLSEN: May it please the Director.

CROSS-EXAMINATION

BY MR. OLSEN:

Q. I'd like to go back, sir, if I may, and talk about the area in concern and as it applies to -- as it is governed today by certain regulations. And I'll make reference to existing regulations in place. Are you familiar with the regulations in place today by the Division on the drilling of wells and the separation of

strata?

A. I am aware of it, yes.

Q. And I want to address Section 19.15.16.9 of the sealing off of strata, which is from the regulations in place.

CHAIRMAN CATANACH: Mr. Olsen, where are you reading that from?

MR. OLSEN: It's not an exhibit to -- it's the existing regulations in place for the Division. These are as of 12/1 of '08.

CHAIRMAN CATANACH: Is that not included -- that's not included in your exhibit, Mr. Feldewert, is it?

MR. OLSEN: Yes. They are part of Mr. Feldewert's exhibits.

CHAIRMAN CATANACH: Okay. I'm looking for something we can reference while you're looking at that.

MR. FELDEWERT: It should be our Exhibit Number 1, so it would be Respondent's Exhibit 1.

CHAIRMAN CATANACH: Is that the one you were reading from earlier?

MR. FELDEWERT: Yes, sir. Well, wait.

MR. OLSEN: I think that's your Number 1, isn't it, Michael?

MR. FELDEWERT: Yes, sir.

Q. (BY MR. OLSEN) If I may, with permission, read 19.15.16.9, Section A, "During the drilling of an oil well, injection well or other service well, the operator shall seal and separate the oil, gas and water strata above the producing or injection horizon to prevent the contents from passing into other strata." Are you familiar with that section?

A. Yes, I am.

Q. Section B of that -- Subsection B of that same section, "The operator shall ensure that fresh waters and waters of present or probable value for domestic or stock purposes are confined to their respective strata and are adequately protected by division-approved methods. The operator shall take special precautions by methods satisfactory to the division in drilling and abandoning wells to guard against loss of artesian water from the strata in which it occurs, and the contamination of artesian water by objectionable water, oil or gas." Are you familiar with that section, sir?

A. Correct. I am.

Q. And last but not least, Subsection C, "The operator shall ensure that water is shut off and is excluded from the various oil- and gas-bearing strata that are penetrated. The operator shall ordinarily make water shut-offs by cementing casing." Are you familiar

with that section?

A. Yes, sir.

Q. Now, with that said, I'd like to visit with you, if I may, about the geology, hydrogeology of the Roswell Artesian Basin. And I'd like to go to your exhibit -- I'd like to address Figure 3 -- Figures 2 and 3. Let me start with Figure 2. I think you testified that Figure 2 was taken from the Welder report, 1982?

A. That's correct.

Q. Is the Welder report recognized as -- as a document that is relied upon by hydrologists, geologists in the review of the Roswell Artesian Basin?

A. It is a very important document.

Q. And is it the type of document that you, as a geologist, would rely upon in attempting to identify water-producing areas?

A. Yes.

Q. Or I should say water-producing strata.

A. It is used in contingency with looking at APDs.

Q. Now -- excuse me -- again, reviewing Figure 2 of the OCD exhibits -- and I'd like you to look at what is B, B prime, which is the northern part of the Roswell Artesian Basin. That is your Figure 2.

Now, is there a combination of both artesian and shallow in the area north of the line B, B

prime?

A. There is -- at that point communication has been identified. It is a recharge area.

Q. And explain communication for us, if you would, please.

A. That potential for both going deep and shallow surface runoff, as well as going into the source rock is available.

Q. Okay. Now, in the area north of B, B prime, what would you estimate to be the depths of the surface to bottom of the shallow?

A. That would be in cross section. Again, depending upon location -- it would only be conjecture -- a few 100 feet, maybe.

Q. Is the shallow and the artesian aquifers in the area north of the line B, B prime separated by a confining layer --

A. That, I cannot --

Q. -- or impermeable layer, I should say?

A. It starts to develop, but I am not familiar with on the ground in that area.

Q. Are you familiar with the term the "red bed"?

A. Yes. I'm familiar with the red bed.

Q. Is the red bed as a separator, as an -- as an impermeable layer found in the area defined of B, B

prime north? Do you know?

A. No, I would not know.

Q. Okay. What is the depth of the artesian aquifer, an area north of the line B, B prime?

A. That, I would not know.

Q. Okay. Let's go to the area that would be identified -- again, I'm referring to Figure 2, the area between B, B prime and D, D prime.

A. Uh-huh. Okay.

Q. That area appears to contain both artesian -- an artesian aquifer and then also a shallow aquifer, correct?

A. Correct.

Q. Do you know whether the depths of the artesian in the -- I'm sorry -- of the groundwater in the between -- identified as B, B prime and D, D prime? And by the way, that's D, as in David.

A. The depth to the artesian?

Q. No. Depth to the bottom of the shallow. Let's start there.

A. That would be anywhere from -- they put in wells from 70 to 120 feet in that area.

Q. And then is the shallow -- is there an impermeable layer between the shallow and the artesian in that area?

A. Yes, there is.
Q. What is that impermeable layer often kind of referred to?
A. Depending on whose geology you do, but some people say the Artesian Group. I tend to go with "the formations." And we do have references to another nomenclature brought in from Texas.
Q. Now, the depth of the artesian is -- ranges from the top of the artesian to the bottom. And the area between B and B prime and D and D prime, do you know what that is?
A. Yes. It can vary. I was looking at -- at this location, I do not because of -- I would not have that information.
Q. I'd like to go now to the area of the lower part of Figure 2, the area which would be D, D prime to the bottom of the figure. And does that area also contain shallow and artesian?
A. In that area where it's crosshatched?
Q. Yes.
A. (Indicating.)
Q. Again, do you know if the artesian -- I'm sorry -- if the shallow is -- if there is an impermeable layer between the artesian -- the shallow and the artesian?

A. Yes, there is.
Q. Okay. Do you know -- this is just a question. Do you know if the New Mexico State Engineer has regulations in place regarding the drilling of water wells to ensure that the artesian is separated from the shallow?
A. I am aware of them, yes.
Q. And do you know why -- just as -- I note that you had worked for Jay Lazarus, and Jay does a lot work down in that country. And I was just wondering if you were familiar with why the engineer had those in place.
A. It would be to confine the artesian and keep the separation.
Q. And why is that?
A. Based upon experience, I would believe it would be to keep the two water sources distinct and separate, not only for quality issues but for the quantity issues, also.
Q. Are you familiar or do you know what the shallow waters -- what their use are for within the RAB?
A. The shallow, from the work I did in the area, was primarily domestic.
Q. Do you know if the shallow is -- and when we say domestic, household use?
A. Correct.

Q. Do you know if the shallow within the RAB is also used for irrigation purposes?
A. It is in some places.
Q. Do you know if it's also used for municipal and industrial purposes?
A. I would not be aware of that.
Q. Now, the artesian -- I think you indicated that the artesian was also being used for consumptive purposes?
A. Correct.
Q. Now, does that include municipal and industrial?
A. Yes.
Q. Irrigation?
A. Yes.
Q. Domestic?
A. Yes.
Q. I'd like to visit about -- for just a moment, if I may, about a contamination issue. If the shallow -- if the impermeable bed, the red bed, if you may, were to be perforated into the artesian, what's the effect of that?
A. If they were going to have communication, it would exist at that time.
Q. So we would have a commingling and a

contamination issue, correct?

A. Not necessarily. You would have the opportunity for it.

Q. Are you familiar with the terminology "transmissivity of an aquifer"?

A. Yes.

Q. Would you explain for us what that term means?

A. A relationship of porosity over a surface area and its ability to move and communicate. So we would have an understanding of the ability for both migration as well as production.

Q. Are you familiar with the velocity of the artesian aquifer within the RAB, how fast the water moves?

A. I'm not aware at this point.

MR. OLSEN: May I have just one moment?

CHAIRMAN CATANACH: (Indicating.)

(Pause in proceedings.)

MR. OLSEN: Thank you, sir. I appreciate it.

We'll pass the witness.

CHAIRMAN CATANACH: Thank you, Mr. Olsen.

Mr. Feldewert, do you have questions?

CROSS-EXAMINATION

BY MR. FELDEWERT:

Q. Mr. Goetze, the question to you about the state water regulations, now, I've read through those regulations, and I thought you -- did you mean to testify that the state water regulations require two protective casings through the aquifers when they're draining from the artesian aquifer? Did you mean to say that?

A. Which? The New Mexico Administrative Code on rulemaking?

Q. Yeah.

A. The opportunity is there for its use.

Q. Okay. But they don't require two protective casings? They don't require them to be separately cased?

A. Not necessarily.

Q. There is no requirement in the state water regulations that's being proposed here by the Oil Conservation Division?

A. Not that I'm aware of.

Q. All right. Now, you said that your concern here relates to the shallow aquifer of less quality somehow migrating to the deeper aquifer of higher quality?

A. This was something that was raised in discussion, yes.
Q. Raised in discussion by whom?
A. By going back to the start of this process.
Q. All right. So if I'm understanding, that can only occur when you have both aquifers overlying one over the other, correct?
A. Correct.
Q. We don't have that concern outside of the shallow aquifer area identified on your Figure 2?
A. That's correct.
Q. All right. Now, you testified -- I think you said that -- and you were very careful about your testimony, that you thought the two protective strings advocated by the Division was the most conservative approach to that concern; is that correct?
A. That is correct.
Q. Do you have any evidence of any fluid migration caused by oil and gas drilling between the shallow aquifer and the deeper artesian aquifer?
A. I have no reports or evidence of such.
Q. Zero, zip, nada?
A. Correct.
Q. And do you know how many wells, Mr. Goetze, have been drilled out in the area of the shallow aquifer

where it overlies the deeper aquifer?

A. We looked at over 1,000 wells in that area. Some of them do not go that deep, but there is a significant number.

Q. Decades of drilling?

A. Correct.

Q. No incidents whatsoever?

A. No reports.

Q. You also mentioned that the artesian aquifer is recharged by the Sacramento Mountains?

A. Runoff.

Q. Runoff?

A. The recharge is at the base of the Sacramentos. Plus, the buckles do contribute.

Q. Am I correct that there are other areas in the state that have similar aquifers that are recharged by mountain runoff?

A. Yes, but not on this scale.

Q. You means in terms of volume?

A. In terms of area. It's the only artesian we have that is of this scale.

Q. But you have other areas in the state with aquifers that are recharged by runoff from mountains?

A. That's correct.

Q. All right. So the uniqueness here, I guess if

you want to call it that, is the fact that we have a shallow aquifer overlying a deeper aquifer?

A. And an artesian aquifer.

Q. All right. You mentioned that there are -- I'm looking at your Figures 4 and 5. You mentioned that in certain areas, there are confining barriers; is that right?

A. There is a confining layer vertically, and then horizontally, there are restrictions.

Q. Okay. Let's talk about confining vertically. How confining is it?

A. To the south, it seems very confining, since it is able to have its own pressure head. It's a confined aquifer -- artesian aquifer. Historically, it has had its own pressure.

Q. And then to the north?

A. It tends to drop off. And where you have both shallow and the deeper coming together, it's the same potentially at the surface.

Q. So if I take your -- your Figure 3 and I look at the shallow aquifer area, you're saying part of that area is going to have a various -- you're going to have a confining barrier, and others are going to have less confining barriers?

A. Yeah. I would say that.

Q. Which means that there could be communication, potentially, already between the two aquifers?
A. There is.
Q. There is?
A. Uh-huh. You have recharge of a -- if you go to Figure 1, you have your Border Buckle, and then six miles off, the Y-O Buckle are -- that provide recharge.
Q. So if I'm looking at Figure 6 -- 5 -- sorry -- 5, what do those squiggly lines mean between the --
A. Squiggly little lines?
Q. You see those squiggly little lines for the Pecos River in that barrier?
A. To where the shallow and the artesian come together?
Q. Yeah.
A. It would be a minimal confining layer at that point.
Q. Minimal. That's what those squiggly lines mean?
A. Well, that squiggly line is interpretation.
Q. So it could be beyond that?
A. It would have to be, based upon what was observed by Mr. Welder when he compiled his information.
Q. Let me make sure I understand it. If I see squiggly lines there below the Pecos River, before Rio

Honcho, in that gray area, that means there is potentially communication between those two aquifers there?

A. There may be at certain points a confining layer.

Q. And that's all a matter of interpretation how far that communication exists?

A. I believe that would be best handled by a true hydrologist.

Q. How did you -- you mentioned -- I'm looking at your Figure Number 3 or Figure Number 2. We can just flip back and forth. I'm sorry. I think it's Figure 2. You testified that the red outline and the yellow was something that was added by the Division to the map, if I look at Figure 2?

A. This was prevented in this exhibit following the legal description that was provided.

Q. And how was this area in red determined?

A. The area was best determined taking where we had production and simplifying the outline of legal townships and using that as a guidance as opposed to subdividing into smaller legal descriptions.

Q. Let me be more specific. I think you said that that was an outline that the Division came up with for consideration; is that correct?

A. That's correct, a designated area.
Q. Who determined this outline and this area for consideration as the designated area?
A. It was a consideration made by both Legal and Technical.
Q. Within the Division?
A. Correct.
Q. Okay. All right. And it was purely designed around the area where there was either aquifer present?
A. That's correct.
Q. Did the Division intend for that to be the defining line of where these proposed special rules would apply?
A. At this point the discussion was to have an area designated such that we covered most of the possibilities, the maximum, as well as provide an adequate boundary for notification.
Q. Okay. So it was the most expansive area that could be, in your opinion?
A. That's correct.
Q. And it's up to the Commission to determine whether it should be this entire area or some other area or whether we have special rules at all, correct?
A. Correct.
Q. And define this red line -- and I know you

don't have the rules in front of you, but I do have the modifications.

MR. FELDEWERT: If I may approach?

CHAIRMAN CATANACH: Certainly.

THE WITNESS: Thank you.

Q. (BY MR. FELDEWERT) There was one thing I saw when I was looking at your proposal that we addressed, I think, in our proposed motions, and that dealt with paragraph -- Rule C. And you'll see -- I'm talking about the opening paragraph, the paragraph -- I don't need to read it. But you'll see there is still a reference to "within one mile of the area so mapped," which I term to be the designated area. Was that left over from when these were considered to be pool rules rather than rules for this particular area?

A. I would not know.

Q. In other words, you don't anticipate that you're proposing rules not only that would encompass this large area within the red line, but within one mile outside that? Is that what's being proposed?

A. I would not know that.

Q. Okay. And would you agree with me that the only problem, looking at Figure 3, that exists today, from the Division's standpoint, is that the area -- within the area in yellow, for some reason, there were

APDs that were approved that did not have a protective string that went through the deepest aquifer?

A. It was my understanding that that was brought to attention upon review.

Q. And the Division is in the process of ensuring, using existing rules, that they have a protective string through the deeper aquifer?

A. I believe that we have issued emergency responses concerning this, but at this point, that would be best answered by District.

Q. Okay.

MR. FELDEWERT: I don't have any other questions. Thank you.

CHAIRMAN CATANACH: Thank you, Mr. Feldewert.

Let's see. Mr. Larson?

CROSS-EXAMINATION

BY MR. LARSON:

Q. Good afternoon, Mr. Goetze.

A. Mr. Larson.

Q. Has the OCD received any reports of hydrocarbon contamination of the shallow alluvial aquifer caused by oil and gas operations?

A. Not related to oil and gas operations. That's correct.

Q. And has the Division received any reports of hydrocarbon contamination of the deeper artesian aquifer caused by oil and gas operations?

A. Not related to oil and gas, only naturally occurring.

Q. And I direct your attention to Figure 4, specifically what's referred to as the confining beds, and I believe you said that was referred to a different way by different people?

A. Yes.

Q. And both Mr. Brooks and Mr. Olsen asked you questions involving the word "impermeable" to address the confining beds. Are they, in fact, impermeable?

A. There is a certain amount of leakage, but depending upon where you are in the Basin, it's -- impermeability does increase and decrease with respect to location.

Q. And is there any recharge of the alluvial aquifer from the artesian aquifer through the confining bed?

A. There is, in the Welder report, reference to a no-flow boundary, some communication or possible communication with the --

Q. So there is commingling that's naturally occurring between the two aquifers?

A. Yes, sir.
Q. In the area designated on Figure 2, and that's the area -- the crosshatched area that includes both aquifers, would a single surface string drilled to below the bottom of the deeper aquifer, cemented to surface, provide sufficient protection to prevent commingling?
A. I'll leave that to the district geologist to have a discussion.
Q. That's fine.
MR. LARSON: That's all I have, Mr. Chairman.
CHAIRMAN CATANACH: Thank you, Mr. Larson.
Mr. Bruce?
MR. BRUCE: No questions.
CHAIRMAN CATANACH: Ms. Foster?
MS. FOSTER: No questions.
MR. BROOKS: Mr. Chairman, I don't care which way we do it, but I'd like an opportunity to redirect either before or after the Commissioners asks their questions.
CHAIRMAN CATANACH: I'll say after.
MR. BROOKS: That's entirely satisfactory. In fact, that's the way I prefer it.

CROSS-EXAMINATION

BY COMMISSIONER BALCH:

Q. So you're referencing a 1982 hydrogeologic study?

A. As well as its update with the 2003 effort.

Q. 2003 effort and 2004 play maps. Are these the best and most recent data sets available?

A. This is what's publicly available.

Q. This is the best available?

A. That's the best you can come up with the price tag available.

Q. With a price tag of zero?

A. But some of it -- the discussion with Mr. Broadhead and the people at the Bureau.

Q. So that was my consideration. I'm wondering if you think that these maps are representative of the current placement of the aquifers.

A. That would be something open for discussion. I'm sure there has been more specific information available, but the compilation of those and the availability of them tends to be either -- the area unavailable or in the process of an open file or some sort of preliminary document.

Q. Is it -- is it common to run a cement bond log when you bring cement to surface?

A. Not necessarily. We have accepted the show of cemented surface as being adequate.

Q. When a cement bond log is run under these circumstances, does it ever come back negative?

A. Depending upon what the operator does, yes, we have had them come back negative.

Q. Come back negative. Is that a common occurrence or a noncommon occurrence?

A. It is more of an uncommon occurrence.

Q. So if you were to pause your drilling for the purpose of waiting for the cement to cure, run the bond log, get the bond log reviewed, how often would that result in going back and redoing your cement job?

A. I would not know, but it would probably be a lower probability.

Q. And if you do that, really what you're doing is you're going back in and you're perfing and squeezing anyway?

A. That's correct.

Q. So that delay probably is not necessary in that case, since you remediate the problem either way?

A. That would be possible, yes. Correct.

Q. That's all I have. Thank you.

A. You're welcome.

CROSS-EXAMINATION

BY COMMISSIONER PADILLA:

Q. Just a couple. Mr. Goetze, you were talking a little bit about the water quality differential between these two aquifers. Can you elaborate a little more on that, what we're talking about here?

A. Well, in certain parts of this area, there are many agricultural operations, and these have had a direct impact on the shallow aquifer, high values of nitrate, TDS, chlorides. These things are known and well documented down there and have had -- as of this date, I know of numerous abatement plans that have been submitted to NMED for either monitoring or corrective action.

Q. 100,000, 200,00 TDS?

A. No. I've seen it as much as 15,000.

Q. Okay.

A. Chloride.

Q. Okay. And that's from surface operations affecting recharge, et cetera?

A. Well, it's surface sources.

Q. Right.

You talked a little bit about the potential for commingling between the buckles and then the confining beds. How much commingling are we talking

about?

A. Well, to the north, a potential for the confining layer -- in the Basin to the north, the confining layer is less prevalent and has less dominance than when you get farther south. In the south portion of the Basin, it is much thicker and more prevalent.

Q. And through the buckles?

A. The buckles are a feature -- a flex feature with faults and fractures which tend to be a source for recharge.

Q. So that really hasn't had any noticeable effect, I guess, just in the short time that humans have been watching this kind of thing?

A. Well, it was something that was just -- it's a mapping feature that's found as a source.

Q. As to the yellow area outlined on -- I think it's Figure 3, the area of recent oil and gas development, suspended APDs, there's been some discussion that those were APDs that probably shouldn't have been approved in the first place. Is that -- I'm just curious from the OCD standpoint. Is that a clerical error, or is that a procedural change, or what happened there?

A. It tends to be more of a personnel issue. We have vacancies. We have lost our artesian geologist,

and the next witness has been covering probably the most active portion of the state of New Mexico as a solo act. So there is a certain amount of personnel issues. And, again, familiarity with the area; we did have someone there, but they were not quite aware of it, of what the relationships were.

Q. But just to be absolutely clear, those APDs did not meet current requirements?

A. The ones that were suspended did not meet what was best practice.

Q. Okay. The last question: The bond log review that Dr. Balch just touched on, what kind of internal turnaround does that require for OCD?

A. Most instantaneous. We would have to have some sort of obligation to meet the operator's schedule.

Q. Same day, next day, something like that?

A. We could be doing it within -- with email. We could do it with reception of the email. It's all a game of having someone available to do it.

Q. Given that you just talked about personnel issues, we're talking about a lot of capital expenditures sitting on -- do you think that's feasible to turn those around?

A. Well, I would say there is a lot of donated time that goes on.

Q. Okay. Thanks.
A. You're welcome.

CROSS-EXAMINATION

BY CHAIRMAN CATANACH:

Q. Mr. Goetze, if the Commission establishes a rule for a two-string scenario through the -- through the shallow and deeper aquifer or two separate strings, wouldn't that only encompass the area of where the shallow aquifer and the artesian aquifer are present?
A. That would be my belief.
Q. So outside of that area, would we need to institute any special rule in that area other than what's on the books already?
A. It would save you encumbrance if we just did it that way.
Q. Now, let me ask you about the boundary of the shallow aquifer. How precise is that boundary as mapped? Do you know what's that based off of?
A. That would be based off of numerous field observations.
Q. Would you be comfortable -- or could you define that area in terms of section, township and range?
A. It could be investigated to be fine-tuned, especially if we were to go and find more recent information.

Q. So we could define that more clearly in terms of that measuring system.

Is the Artesia Group productive in this area?

A. It has had occurrences. The Grayburg has had occurrences. We have had -- most of that activity is to the east of the Pecos, where you have the Twin Lakes and that type of occurrence.

Q. What about the San Andres?

A. The San Andres does have production -- overproduction in this area.

Q. So would that be -- would the artesian aquifer be above the San Andres production?

A. That's correct.

Q. Okay.

A. If you go to Figure 7, the Slaughter zone, which is pretty much the Lower San Andres, the occurrences there are well documented. And, of course, showing on the east or southeastern side of this cross section, you have the Grayburg pools. But at that point, your artesian seems to be somewhat limited as far as aquifer.

Q. So in the area where the San Andres is productive, is there something separating between -- separation between the oil productive portion of the

San Andres and the artesian there?

A. There does not seem to be communication.

Q. So there is something there preventing --

A. Well, the reservoir characteristics are such that you've contained your oil.

Q. The area that you confine as the active area, you said that was mostly deeper formations?

A. That were being petitioned for drilling, yes.

Q. Wolfcamp? Bone Spring?

A. Right. Deeper.

Q. Is the San Andres being targeted in that area? And these are mostly horizontal wells, right?

A. Yes. And matter of fact, I think there were only a few vertical, but these are all horizontals.

Q. What is the difference in the water quality between the shallow and the deeper? Do you have knowledge about that?

A. From the work I did, there is a significant water quality difference.

Q. Could you elaborate on that?

A. In the wells that I sampled, I had TDS's of 200 to 500 for the aquifer -- for the artesian aquifer. Surface could range anywhere from 10,000 down to below 1,000 TDS, and chlorides.

Q. What would be the cause of that?

A. Again, it would be surface -- surface use and discharge.

Q. Are you aware of any -- of lost-circulation issues between the artesian aquifer and the shallow aquifer that would prevent -- that would interfere with cementing across those zones?

A. There is -- locally, there are features that do introduce an issue of karst, but that would be best handled by a discussion with the district geologist.

Q. Is your proposed rule dealing with the annular spacing between the casing and the -- for cemented purposes, the -- the annular space, the size of the casing or the size of the 2-inch --

A. Well, the 2-inch, I think that is something the Commission has to take a look at. The 2-inch needs to be better defined. And at this point, we have looked at the 2-inch being a maximum based upon casing to casing.

Q. So is the Division suggesting any rule change with regards to that?

A. Not that I'm aware of.

Q. Okay. So you believe the existing rules deal adequately with that issue?

A. I will again defer to the district geologist, let you have a discussion with him.

CHAIRMAN CATANACH: I have no further

questions.

Mr. Brooks?

REDIRECT EXAMINATION

BY MR. BROOKS:

Q. Okay. Redirect briefly, Mr. Goetze. I want to talk to you about the designated area, which is the area shown on Figure 2, outlined in red and emphasized in yellow. The limits of the aquifers were determined by what?

A. These are as described by the State Engineer, and most of it's used for its planning documents, as well as what I understand to be when they define the aquifer, this is what they use as a guideline.

Q. These are -- are these published maps -- is the base that was used for Exhibit 2, before the red-lined area was added, is that based -- a published map put out by -- compiled by the State Engineer?

A. That is a report offered by the State Engineer, yes.

Q. Now, do you know any specific and readily accessible, more accurate source by which that can be redefined and updated?

A. At this point I have no summary published report that's better than this.

Q. Okay. You, at my request, magnified or --

magnified this exhibit several times; did you not?

A. Correct.

Q. Was it possible, even with repeated magnification, to delineate with any confidence of accuracy which sections within given townships would be included within the aquifer -- would overlie the aquifer as mapped on this map and which would not?

A. We could not successfully do that.

Q. Obviously, it could be done in some instances. The eastern tier of sections along -- in Township 26 -- in Townships 18, 19 and 20 -- 18 -- 16 through 20 in Range 26 -- 16 through 20 South, in Range 26 East obviously were not included.

A. That's correct.

Q. But in order to come up with mapping by sections, would it not be necessary to make -- to simply make guesses as to where those lines run in response to section lines in some instances or many instances?

A. It would have been a projected view.

Q. Yeah.

Okay. Now, is it not likewise -- is it likewise true that there are situations on this map where you cannot tell where the line of the map to aquifer comes within one mile of the outer boundary of a township?

A. The accuracy is questionable in some locations, but we did the best as far as providing a buffer.

Q. So if we included one mile around the designated area, the designated townships, that would be conservative in the sense that it would be protecting the aquifer as its boundaries are illustrated even if -- with a one-mile clearance --

A. That's correct.

Q. -- wherever, because we were able to identify where it crossed according to the State Engineer's mapping, the township lines?

A. That's correct.

Q. Okay. Now, you said the delay to -- you testified in response to cross-examination that because bonding deficiency in cement that went to the surface was rare, that the delay might not be necessary, is that correct, delay involved in approving; is that correct?

A. May not be necessary.

Q. Now, in the interest of providing the highest degree of protection, would it be a rational response -- a reasonable response?

A. To provide a cement bond log?

Q. Yes.

A. I think it would be a reasonable conservative effort.

Q. Very good.

Now, you were asked about oil and gas activity involving the Artesian Formation. Is that a current concern?

A. It is not a high target in this area, I believe, at this point.

Q. Would the same thing be true of the San Andres?

A. That, I could not tell you.

Q. Okay. Mr. Kautz would probably be more familiar than you would --

A. Yes.

Q. -- since he approves APDs on a daily basis?

A. I would defer to him.

Q. Okay. Very good.

MR. BROOKS: Mr. Chairman, I omitted one formality that is customary in OCD proceedings as tendering the witness for advance approval of his qualifications. However, I would note that the only purpose of that is to establish the right of counsel to ask the witness questions about his opinions. And this witness was asked questions about his opinions both on direct and on cross, and no counsel interposed an objection to his qualifications. Therefore, at this time I would like to tender Mr. Goetze as an expert in the field of geology and hydrogeology.

CHAIRMAN CATANACH: Mr. Goetze is so qualified.

MR. BROOKS: Pass the witness.

CHAIRMAN CATANACH: Are there any additional questions of this witness?

Okay. You may be excused.

THE WITNESS: Thank you.

CHAIRMAN CATANACH: Let's take a ten-minute break.

(Recess 2:54 p.m. to 3:15 p.m.)

CHAIRMAN CATANACH: Call the hearing back to order, and at this time, I'd turn it over to Mr. Brooks.

MR. BROOKS: Very good. Mr. Chairman and Honorable Commissioners, I have initiated attempts to get the proposed rule before you for inclusion with your notebooks. I do not know if you have them now or not.

COMMISSIONER BALCH: (Indicating.)

MR. BROOKS: You do?

COMMISSIONER BALCH: It appears so.

MR. BROOKS: Okay. The proposed rule that we are asking you to adopt is Exhibit A to the Fifth Amended Application for Rulemaking. And if you have that before you, that will make the testimony go more smoothly.

CHAIRMAN CATANACH: We do. Thank you, Mr. Brooks.

MR. BROOKS: Thank you.

CHAIRMAN CATANACH: At this time you're going to call your next witness?

MR. BROOKS: Call Paul Kautz.

PAUL KAUTZ,

after having been previously sworn under oath, was questioned and testified as follows:

DIRECT EXAMINATION

BY MR. BROOKS:

Q. Mr. Kautz, can you hear me?

A. Yes, I can.

Q. Very good.

Would you state your name for the record, please?

A. Paul Kautz. Last name spelled, K-A-U-T-Z.

Q. Thank you.

Now, at the beginning of this proceeding, the court reporter asked all those who expected to testify to stand and be sworn. Were you one of those that were sworn?

A. Yes, I was.

Q. And did you state that you took the oath -- that you subscribed to the oath as stated?

A. I did.
Q. Thank you.
Mr. Kautz, by whom are you employed?
A. I'm employed by the Energy, Minerals and Natural Resources Department, Oil Conservation Division, in Hobbs, New Mexico, as the district geologist in the Hobbs District.
Q. The Hobbs District -- does the Hobbs District include the area that is the subject of this proceeding?
A. No, it does not. I am also acting district geologist with the Artesia District.
Q. Have you served in that capacity, as acting district geologist, for the Artesia District several times?
A. I've lost count how many times.
(Laughter.)
Q. Okay. At the time that you gave your testimony in the previous hearing that occurred on May 10th, 2016, you said that there was a district geologist who had been hired in the Artesia District Office. Did that person subsequently terminate their employment there?
A. Yes, she did.
Q. And is that position now again vacant?
A. Yes, it is.
Q. Okay. Well, there has been a question come up.

And I'm taking this out of order, but because it has to do with the staffing in the Artesia office, is there a person in the Artesia office who is capable of reading bond logs?

A. Yes, there is. There is the compliance officer who is a former employee of Schlumberger, Gilbert Cordero. And hopefully -- we're in the process -- we've had interviews, and hopefully we'll have a new geologist who will also have the ability to read the bond logs, also.

Q. Okay. Are there several people in the Hobbs District Office who are capable of reading cement bond logs?

A. Yes, there is. We have myself; the district supervisor, Maxey Brown; and we have one compliance officer who is a former employee of Halliburton who is capable of reading bond logs.

Q. Okay. Now, would those people be available --

You went dark for a moment.

Would those people be available from the Hobbs District Office to assist if there were unavailability of the one person who reads them in Artesia?

A. Yes. They would be available. We have email. We've had cement bond logs in the past by email.

Q. Okay. Then I will go back to what I had prepared as the order which follows this rule that we have proposed. The first provision that we have proposed in regard to this rule is entitled "Wells that penetrate the shallow aquifer." Now, that would include mostly wells that also penetrate the deep aquifer, correct?

A. Yes, that is correct.

Q. Now, there is a small area along the east side, according to Figure 2 which was admitted in evidence, along the east side of the aquifer where the shallow aquifer protrudes farther east than the deep aquifer?

A. Yes.

Q. Looking at the map, can you tell exactly how far that is?

A. I'd say maybe one to two miles at the most.

Q. So does that indicate to you that, for the most part, if the wells overlie the shallow aquifer, they'll also overlie the deep aquifer?

A. Yes.

Q. Very good. Now, the first provision under C has to do with the conductor pipe. What is conductor pipe?

A. Conductor pipe is something to prevent cavings on drilling your surface casing.

Q. And how deep does it usually -- do you usually set a conductor pipe?

A. Most of them I've seen are around 40 feet, but I have seen some as deep as 200 feet.

Q. Now, the rule says that it will be adequately cemented in place to -- the proposed rule says that the conductor pipe will be adequately cemented in place to prevent drainage of fluids from the surface or other shallow formations into the shallow aquifer. That gives a reason by itself, but is that -- is that a proposal that you consider appropriate?

A. Yes, I do. And that was one of the things that was -- when we first had meetings with the Pecos Artesian Conservancy District, that they were concerned about whether the conductor pipe was being cemented or not.

Q. And can you explain your reasons for thinking that that is an appropriate regulation?

A. We've had situations in our district where when there were slow-drilling wells, there was potential for water collars to -- if they knew that there was an open hole, that they can usually get rid of water that way. And so we had to institute a procedure where slow drills required the conductor pipe to -- requirements that included locking -- locking caps. But on a drilling

rig, that won't be necessary since there is someone there 24 hours a day.

Q. Okay. If you have a conductor pipe, is that protecting the integrity of the hole when you start the drilling process?

A. Yes, it does.

Q. And if you leave that conductor pipe in place, what advantage does -- or cemented in place, what advantage does that have?

A. It has no advantage at all.

Q. No advantage for the drilling purposes?

A. No.

Q. So why should we require it?

A. Well, just to make sure that it's cemented in place, prevent any fluids from -- from the surface entering the ground.

Q. The fluids from the surface would not enter the ground through the hole when it's being drilled, would it?

A. Rain, et cetera.

Q. They would enter the hole through the area outside the drill pipe?

A. That's correct.

Q. And that's the reason for having the --

A. Conductor pipe.

Q. -- having the conductor pipe there?

The second requirement is that the surface casing string be set at least 50 feet below the base of the shallow aquifer, and that is a specific requirement for this area that -- where both aquifers exist, correct, that we're proposing?

A. Yes.

Q. Now, if the shallow aquifer were the only aquifer, would that be the same as the statewide requirement?

A. It would.

Q. 50 feet below the -- below the aquifer depth, is that the usual statewide requirement?

A. It also has to be made in a competent bed.

Q. Okay. And that is also provided in the proposed rule, right, and such that the surface casing is landed in the first competent formation?

A. That is correct.

Q. So if you didn't have a deeper formation, this rule would be equivalent to the statewide rule?

A. Yes.

Q. Okay. But the purpose of making a specific provision -- for setting a casing below the base of the surface casing, is the purpose of that to separately protect the upper shallow aquifer and the deeper

artesian aquifer?

A. Yes, it is.

Q. Now, then you go on in paragraph three of C. The proposed rule requires an intermediate casing string in the San Andres. Now, what would be the purpose of the intermediate casing string in the San Andres?

A. It would be set below the artesian aquifer and above any occurrences of fault in the San Andres.

Q. Okay. The wording is "approximately 1,200 feet below the surface and not more than 50 feet above the first show of hydrocarbons encountered in the San Andres Formation." Is the 1,200 feet a prescriptive provision, or is it merely an estimate of where that appropriate level would be?

A. It's just an estimate. In one of the areas where operators are drilling, the first occurrence of oil is occurring just slightly below that depth.

Q. Okay. How would you determine where 50 feet below the -- 50 feet above the first show of hydrocarbons would be? Where would you determine that -- how would you determine that depth?

A. From mud logs -- a sufficient quantity of mud logs available to review.

Q. And that would be the mud log -- would that be the mud log from the drilling of the well itself?

A. It could be from the drilling of the well itself or an adjacent well.

Q. Okay. And once you've determined that feet -- once you've determined that location, that is 50 feet above the first show of hydrocarbons, you want to have that surface casing -- intermediate casing string set above that depth, correct?

A. That's correct.

Q. And what's the reason for that?

A. Prevent the hydrocarbons from entering the aquifer.

Q. So the hydrocarbons would be retarded by the cement holding the casing in place of the intermediate casing string?

A. (No response.)

(The court reporter inquired if there was an answer from the witness.)

Q. (BY MR. BROOKS) I will repeat the question then or rephrase the question.

In the absence of the intermediate string, would there be a hazard of hydrocarbons moving up outside the casing into the aquifer?

A. There would be a potential for that.

Q. Okay. And if the intermediate casing string is set immediately above the -- or close to the top of the

hydrocarbon level, that would prevent that, correct?

A. Yes, it would.

Q. Okay. Mr. Kautz [sic] suggested that this two-casing string was a relatively conservative preventive measure for limiting the possibility that fluids could move between the two aquifers or into either of the aquifers from a greater depth. Do you agree with that judgment?

A. Yes, I do.

Q. Do you want to add anything in terms of reasoning for it?

A. I think it's pretty straightforward. You'd be -- your first protection string would protect the upper aquifer, and then the second one would protect the lower aquifer. And that's basically it.

Q. Okay. Now, the next requirement of the rule is that before they proceed with drilling, after setting a casing string, they obtain a bond log and submit it to the OCD for approval. In your opinion, is that an appropriate requirement?

A. Yes, it is. And in my district, we include that as a condition of approval, that they run either a cement bond log or a temperature survey if they do not circulate cement on any of the strings of casing.

Q. Okay. Now, about the cement bond log and the

temperature survey -- and we haven't focused on this in our previous discussions, but do you prefer one or the other?

A. In our early discussions with the Pecos Valley Artesian Conservancy District, there were concerns about the quality of bonding, and that was one of our suggestions, to require the quality of the cement jobs.

Q. Well, yes. To require a cement bond log, right?

A. Yes.

Q. Now, do you consider a temperature survey to be an adequate substitute for a cement bond log?

A. No. The temperature survey just indicates where your top of cement is at, where the cement bond log would indicate the quality of the bonding that's occurred.

Q. Now, what is the concern about continued drilling prior to review of the cement bond log?

A. Well, if you start drilling before it's -- it's reviewed, you're just -- you have to come up with some plan of action to what's not an adequate bond, your cement casing.

Q. Is that more difficult to do if we started drilling further down?

A. It's not difficult to do as long as you run the

cement bond log. But usually, you know, you're going to be there two days before you drill out anyway. You've got eight hours waiting on your cement, and then all the other things you have to do, with testing your blow-out. It's usually two days before you drill out.

Q. And is your office or the Artesia office, the assistance of your office, capable of responding with cement bond log approvals within that time frame?

A. I don't know about the Artesia office, but the Hobbs office, I've taken calls on the weekend many a time.

Q. Now, back to the same thing that I did not do with Mr. Goetze, but I will do this with you now. Do you have OCD Exhibit 3 before you?

A. Just a second.

Yes, I do.

Q. OCD Exhibit 3 is your resume and Mr. Goetze', and it's all included in one exhibit. But are the first two pages, the first page and the back side of the first page, is that your professional resume?

A. I don't have -- have that part with me.

Q. What do you have with you? It's OCD Exhibit 3.

A. Oh, I thought you were referring to Figure 3.

Q. No. I'm not referring to Figure 3.

You do not have it?

A. No, I don't.

Q. Okay. Well, would you summarize your background and qualifications and experience, absence of not having that exhibit before you?

A. I received my BS degree in geology from University of New Mexico in 1974. Upon graduation, the Navy -- well, the Navy paid my way through school, and upon graduation, I received a commission in the United States Navy. In 1978, I resigned my commission and went back to grad school at UNM.

In '80, '81, I was a grad student there. I presented a paper at a conference on the geology and bottom holes of northern New Mexico. I've published two articles on the geology of the Espinaso Formation, Oligocene Age, in north-central New Mexico. And I went to work for the Oil Conservation Division in 1981 as district geologist. And I've had worked here since that time with two gaps in employment, one in 2006 where I retired. About four months later, I came back to work part time because they couldn't find anybody to replace me. And then they asked me to come back full time, and I came back in 2008 full time as district geologist.

MR. OLSEN: Excuse me, Counsel.

Mr. Director, counselors, I would stipulate to the qualifications of the witness and his resume as

being an expert in his field.

MR. BROOKS: Well, I didn't tender him both as an expert, and I think he's testified sufficiently. But anyone who is concerned about it may expand on it with the witness. I intend to tender him as a witness, both as an expert in geology and as an expert in regulation of oil and gas drilling.

CHAIRMAN CATANACH: Are there any objections?

MR. FELDEWERT: No.

MR. LARSON: No objection.

CHAIRMAN CATANACH: Mr. Kautz is so qualified.

MR. BROOKS: Thank you.

Q. (BY MR. BROOKS) I want you to address this question of the 2-inch annulus. You have testified that the 2-inch annulus is a necessary requirement. Well, you so testified in your testimony in May. Do you still believe that that is something we should require?

A. Yes, I do. With a 2-inch annulus, you have sufficient turbulence to sweep the mud out ahead of your -- of your cement and also to ensure that the -- that the cement properly bonds to the rock and the casing.

Q. So would it be a minimum requirement or a

maximum requirement or both?

A. I think it should be at least a 2-inch requirement, no less than 2 inches.

Q. Okay. Thank you.

A. When you start going beyond 2 inches, you start running into problems.

Q. Yes, sir.

Okay. Would you explain what is meant by a 2-inch annulus, because these measurements are a little bit -- they're subject to some ambiguities here. Could you tell us what you mean by that?

A. What I mean by it is 2 inches greater than the maximum diameter of your casing at your coupling point.

Q. Which would be the outer diameter of the coupling?

A. Yes, sir.

Q. So 2 inches would be what? The difference between what and what?

A. Well, usually on eight-and-five-eighths casings and higher -- larger, something about 1 inch greater than that, so it would be about 3 inches greater than the casing.

Q. Now, the difference that you're looking at for 2 inches, is that the difference between the outside diameter of the coupling and the inside diameter of the

hole -- I mean --

A. The distance between --

Q. -- the outside of diameter of the hole, whatever the hole diameter is?

A. Whatever the hole size is minus your coupling diameters.

Q. Should not be -- should be at least 2 inches, right?

A. Yes.

Q. Now, Mr. Feldewert, in his opening statement, indicated that his witnesses would testify that the 2-inch diameter should be greater than -- 2 inches greater than the outside diameter of the casing rather than the outside diameter of the coupling. Do you disagree with that?

A. I have no opinion on that at this point.

Q. Okay. Thank you.

Now, what is the basic reason why you think there should be two protective strings of casing?

A. To protect the water quality in both aquifers, prevent any cross-flow between them while drilling.

Q. Now, Mr. Goetze testified that he was not personally aware of any instances of contamination. Are you aware of any?

A. No, sir.

Q. Is it sometimes difficult to determine where contamination comes from?

A. Yes. And in particular with this aquifer, like the San Andres here, where you have both the occurrence of hydrocarbons and freshwater, you really don't know where -- you can't tell whether it's hydrocarbon influx or some other source.

Q. Does the OCD investigate to determine if there's ever been contamination, or does it simply respond to complaints?

A. We looked at 900 wells. We never finished the survey, lack of manpower, but we reviewed over 600 wells and haven't found any sources of -- any possibilities of freshwater contamination.

Q. But -- well, let me put it this way: Nevertheless, it's your -- is it your considered opinion that maintaining the separation between these aquifers is a prudent prophylactic measure?

A. Yes, sir.

Q. Okay.

MR. BROOKS: Mr. Chairman, I would like to -- well, I don't believe -- there are no further exhibits. I would like to tender Exhibit 3, since there were no objections to Mr. -- I did not tender Exhibit 3 when Mr. Goetze finished testifying because it's both

Mr. Goetze' resume and Kautz' resume. Kautz has testified to the highlights of his resume, although he did not identify the exhibit. So at this point, I would like to tender OCD Exhibit 3, which is the resumes of the two witnesses, if there is no objection.

CHAIRMAN CATANACH: Any objections?

MR. FELDEWERT: No.

CHAIRMAN CATANACH: Exhibit 3 will be admitted.

(OCD Exhibit Number 3 is offered and admitted into evidence.)

MR. BROOKS: Very good. I will pass the witness.

CHAIRMAN CATANACH: Mr. Olsen?

MR. OLSEN: Mr. Director and Commissioners.

CROSS-EXAMINATION

BY MR. OLSEN:

Q. Good afternoon, sir.

A. Good afternoon.

Q. Mr. Kautz, is it safe to say that the rule as -- the proposed rule as it is before the Commission today is not the result of a claim of contamination or damage to the aquifers, but the purpose is to preserve the aquifers from contamination?

A. That is correct.

Q. Is it also fair to say that this proposed rule is not reactive, but it's proactive then?

A. Yes, sir. I would say it's proactive.

Q. Let me ask you, in your review of the RAB, have you found numerous instances where two strings of casing were set where there was shallow and artesian aquifers identified?

A. Yes, sir.

Q. And is it safe to say that that practice of setting two strings goes back to the '70s?

A. I couldn't answer that question.

Q. When you were looking for contaminants in the aquifers, what type of contaminants were you looking for?

A. Basically hydrocarbon.

Q. Did you identify any water wells that did have hydrocarbons in them or just you were unable to identify where there were contaminants as a result of the failure to case a well?

A. There were two reported water wells with possible hydrocarbons contamination in them, but it would be impossible to tell whether it's natural occurring or from a contaminated source.

Q. Was there a -- what type of methodology did you adopt in doing your sampling for your review?

A. I can't answer that because I wasn't part of the -- part of that.

Q. Mr. Kautz, you testified under oath on May 10th of 2016. Do you recall that testimony?

A. Yes, sir.

Q. Have you had a chance to review the testimony that you offered in May of 2016?

A. No, I haven't.

Q. Has your opinion which you tendered to the Hearing Examiner in May of 2016 changed from your testimony or any opinions that you have today?

MR. FELDEWERT: Object to the form of the question. Very vague question. He gave a number of opinions during that testimony.

CHAIRMAN CATANACH: Can you clarify, Mr. Olsen?

MR. OLSEN: Without going into it, throughout his testimony -- and I appreciate counsel's objection. I guess my response, Mr. Director, would be just to the witness' recollection as to the opinions that he tendered, if he has any recollection if any changes.

CHAIRMAN CATANACH: I'll go ahead and allow it.

THE WITNESS: I believe I did make one -- I

have made one change, and that's from a one-string to a two-string water protection system.

Q. (BY MR. OLSEN) And would you explain that further for us, please?

A. I believe it's important to keep -- make sure those two aquifers are isolated from each other in order to protect it.

MR. OLSEN: May I have just one moment, sir?

CHAIRMAN CATANACH: Okay.

Q. (BY MR. OLSEN) Mr. Kautz, thank you so much for your time. I appreciate it.

MR. OLSEN: We pass the witness, sir.

CHAIRMAN CATANACH: Mr. Feldewert?

MR. FELDEWERT: What time did you want to quit today?

CHAIRMAN CATANACH: Ten after 4:00.

MR. FELDEWERT: Because I'm going beyond that.

CHAIRMAN CATANACH: Well, we can start.

MR. FELDEWERT: Okay.

CROSS-EXAMINATION

BY MR. FELDEWERT:

Q. Mr. Kautz, do you have your proposed rule in front of you?

A. Yes, I do.
Q. I want you to focus on proposed Rule C.
A. Okay.
Q. Now, you have in here that you would -- under this proposed rule, you have a second protective string at a depth of approximately 1,200 feet below the surface and not more than 50 feet above the first show of hydrocarbons encountered. Do you see that?
A. Yes, sir.
Q. Okay. What happens if there are hydrocarbons encountered above 1,200 feet?
A. Then they would be required to set that intermediate casing at least 50-foot above any hydrocarbons.
Q. So is the overarching idea here that the string would be set not more than 50 feet above the first show of hydrocarbons?
A. That's correct.
Q. No matter where that show is?
A. No matter where that show is.
Q. And why is that?
A. To isolate the two aquifers and protect them.
Q. Okay. Rules D and E, in the last clause, each require the cement on the production casing string to be cemented to the surface. Were you aware of that?

A. No.
Q. Wouldn't you agree that what you have in C(5), that it is sufficient to have the cement on the production casing string set at a depth not less than 500 feet above the next previous casing shoe, whatever that is? Wouldn't that be sufficient?
A. That would be sufficient.
Q. Okay. And isn't that fairly customary, sir?
A. For our -- our rule says 200, but I'm going with what the BLM requires.
Q. Okay. So you would accept even 200 feet above?
A. I prefer not to accept 200 feet because the way cement likes to fall back.
Q. Okay. But you don't see any reason to circulate the cement on your production casing string all the way to the surface where we already have -- when we already have a protective string, correct?
A. There's no need for it, but most operators will go -- they'll go to surface. They'll go ahead and circulate it anyway.
Q. Okay. Now, I want to focus on Rule C(4). And if I'm understanding your Rule C(4), as written, you're suggesting that they should require a cement bond log for each protective string and that there should be no further drilling until that district office approves

that cement bond log. Is that your suggestion?
A. Yes, sir.
Q. So that, in essence, would require stoppage in the drilling after each setting of the casing -- productive casing, correct?
A. Yes, sir.
Q. And you would require that even if it was cemented to the surface?
A. On the production string, if it was cemented to the surface, I would not require it.
Q. Okay. And same thing on the protective string. There is no need to have the cement bond log if it's circulated to surface; isn't that correct?
A. Only if you want to assure the quality of the cement bond.
Q. Can't you test the cement at the surface if it's circulated to surface?
A. There is potential for channels and micro-annuluses.
Q. Okay. But all that -- if that were to occur, that's not going to be cured by a cement bond log, is it?
A. No.
Q. Okay. And isn't it true, Mr. Kautz, that you have to let that cement cure for a period of time before

you can have an accurate reading on the cement bond log?
A. I'm not sure of the time required to cure.
Q. So you don't know?
A. I don't know.
Q. So you don't know whether you would give false readings if you didn't let that cement cure before you took the cement bond log?
A. I don't know.
Q. Okay. Three or four years ago, Mr. Kautz, you were with the Division's district office, correct?
A. Yes, sir.
Q. Okay. Did you have more personnel or less personnel than what you have now?
A. I would say about the same as a few years ago.
Q. If we were -- three or four years ago, when the Permian Basin was very active, how long would it have taken your office to provide the approval that you -- that you suggest is necessary under the proposed rules?
A. As soon as I got the email, I would review the log, and I would have a response.
Q. Okay. And you don't have anything else to do?
A. I have APDs from both districts to look at, but, you know, you have to have second priorities.
Q. Right. Right. So you've got to set priorities, and the priorities are set based upon the

number of personnel you have and the amount of time you have, correct?

A. They're set on what I have to do.

Q. Okay. And can you sit here today and say that if you were as busy as you were three or four years ago, that you could turn these cement bond logs around quickly in every single circumstance?

A. Three or four years ago, I was working over 100 hours a week.

Q. And you still want to do that?

A. That's what I was working at the time.

Q. So my question is, Mr. Kautz, knowing the realities of the district office and knowing the workload of the district office and knowing the personnel that you have in the district office and knowing your budget constraints, can you sit here and guarantee that your office would able to turn around and approve cement bond logs instantaneously?

A. For the Roswell Artesian Aquifer, yes, I can.

Q. Okay. Are you aware, Mr. Kautz, of any cement bond log requirements for water wells?

A. No, sir.

Q. They don't require them, do they?

A. There is no requirement that I know of, but I believe they should be run, also.

Q. They don't even require them if they've got a water well that goes through the shallow aquifer into the deep aquifer -- into the artesian aquifer, correct?

A. Could you repeat that question?

Q. The water wells rules -- the State Engineer's rules for water wells don't even require a cement bond log if you're going through the artesian aquifer -- going through the shallow aquifer down to the better-quality artesian aquifer?

A. That's correct.

Q. All right. So you're aware now of the issue with respect to the annular space?

A. Yes, sir.

Q. All right. You would agree -- I think you testified you'd agree that 2 inches is the right spacing based on the tools that are involved today and the casing that is utilized today and the equipment that's out there, correct?

A. Yes.

Q. Okay. And you are not a drilling engineer? Is that true, sir?

A. No, I am not.

Q. And I think you said that you had no opinion as to whether that 2 inches should be measured from the couplings or should be measured from the outer diameter

of the casing?

A. I was -- I wasn't -- I believed you were asking about the coupling, but I wasn't sure what you were asking me.

Q. Okay. But you would defer to those with drilling expertise as to what -- where that 2-inch should be measured in order to utilize the existing equipment, the existing tools and obtain the necessary turbulence to ensure cement bonding. Would you not, Mr. Kautz?

A. Yes. I would defer to the experts.

Q. Okay. And at least you can testify that increasing the annular space does not mean better cement bonding?

A. That's correct.

Q. And you would agree that you need good turbulence in your annular space in order to properly clean the casing and to provide the best environment for effective cement bonding. You agree with that, correct?

A. Yes, I do.

Q. And you've similarly testified, then, that the -- well, let me strike that.

Now, you have suggested that we suddenly need two protective strings through these freshwater zones?

A. Yes.
Q. Isn't it true that if you put two protective strings through these freshwater zones, that that well is no longer capable of someday being used as a water well?
A. Could you repeat that question?
Q. If you have two cemented protective strings through these aquifers, isn't it true, Mr. Kautz, that that would prevent anyone from subsequently using that wellbore as a water well?
A. No, sir.
Q. You think it's --
A. We have routinely plugged and abandoned wells. When we plug and abandon them, we'll perforate through two strings of casing in order to get to the cement outside.
Q. Are you saying that you have utilized -- that you have utilized wells with two protective casings as water wells?
A. No, sir. I said we were able to perforate through two strings in order to get -- properly plug the well.
Q. Okay. I'm talking about use as a water well.
A. No.
Q. No?

A. You should be able to -- you should be able to perforate with two strings.

Q. But you've never done it. You don't know anybody that has?

A. No.

Q. Okay. Now, let's get back to the origin of this whole case here, and I'm looking at your Figure Number 3, Mr. Kautz. I'm looking at that yellow area down there where there was an area of oil and gas activity where the APDs were suspended. Okay?

A. My map -- my Figure 3 does not have that area in yellow.

Q. So I'm talking about OCD Exhibit Number 1, Figure 3.

A. That's correct.

Q. Okay. So you don't have --

A. Mine's in black and white.

Q. Oh, that's not helpful.

I'm going to represent to you that we're looking at a yellow outline down towards the bottom. Okay? But you're familiar, Mr. Kautz, with the area where the APDs were mistakenly approved, correct?

A. Yes.

Q. Okay. And that there is an emergency order in place to address that issue?

A. That's correct.
Q. And I believe you testified at the last hearing that the only problem that you found with respect to those APDs was that they were not deep enough to cover both aquifers?
A. Yes, sir.
Q. In other words, the only problem you found was that the protective string that they had in design wasn't deep enough to cover both aquifers?
A. That's correct.
CHAIRMAN CATANACH: Mr. Feldewert, I think we have to shut it down. I know you're kind of in the middle.
MR. FELDEWERT: Okay.
CHAIRMAN CATANACH: So do we want to start at 8:00? Is there any objection to that?
MR. OLSEN: That would be great for us. One of our witnesses has to leave. We have to get his testimony on tomorrow because he has to leave for out of state on Wednesday; Mr. Peery.
CHAIRMAN CATANACH: Okay. So we'll reconvene at 8:00 tomorrow morning.
MR. FELDEWERT: Thank you.
(Recess 4:09 p.m.)

STATE OF NEW MEXICO
COUNTY OF BERNALILLO

CERTIFICATE OF COURT REPORTER

I, MARY C. HANKINS, Certified Court Reporter, New Mexico Certified Court Reporter No. 20, and Registered Professional Reporter, do hereby certify that I reported the foregoing proceedings in stenographic shorthand and that the foregoing pages are a true and correct transcript of those proceedings that were reduced to printed form by me to the best of my ability.

I FURTHER CERTIFY that the Reporter's Record of the proceedings truly and accurately reflects the exhibits, if any, offered by the respective parties.

I FURTHER CERTIFY that I am neither employed by nor related to any of the parties or attorneys in this case and that I have no interest in the final disposition of this case.

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