STATE OF NEW MEXICO
ENERGY, MINERAL AND NATURAL RESOURCES DEPARTMENT
OIL CONSERVATION COMMISSION

ORIGINAL

APPLICATION OF THE NEW MEXICO OIL AND GAS ASSOCIATION FOR AMENDMENT OF CERTAIN PROVISIONS OF TITLE 19, CHAPTER 15 OF THE NEW MEXICO ADMINISTRATIVE CODE CONCERNING PITS, CLOSED-LOOP SYSTEMS, BELOW GRADE TANKS AND SUMPS AND OTHER ALTERNATIVE METHODS RELATED TO THE FORE GOING MATTERS, STATE-WIDE.

CASE NO. 14784 AND 14785

VOLUME 10

August 28, 2012
9:00 a.m.
Wendell Chino Building
1220 South St. Francis Drive
Porter Hall, Room 102
Santa Fe, New Mexico

THE COMMISSION:

JAMI BAILEY, Chairperson

GREG BLOOM, Commissioner

DR. ROBERT BALCH, Commissioner

MARK SMITH, Esq.

FLORENE DAVIDSON, COMMISSION CLERK

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EXHIBITS

PAGE ACCEPTED/ADMITTED

(Note: In session at 9:00.)

CHAIRPERSON BAILEY: Good morning. This is the meeting of the Oil Conservation Division on Tuesday, August 28th here in Porter Hall in Santa Fe, New Mexico; to my right is Commissioner Greg Bloom, designee of the Commissioner of Public Lands. To my left is Commissioner Bob Balch, who is the designee of the Secretary of Energy, Minerals and Natural Resources; and I am Jami Bailey, director of the Oil Conservation Division.

Have the commissioners had a chance to read the Minutes of the previous hearing? I see Mr. Dawson in the audience who was the designee for the meeting that was held on July 18th of 2012 here in Porter Hall.

MR. DAWSON: I have.

DR. BALCH: I have.

CHAIRPERSON BAILEY: Do I hear a motion to adopt the Minutes as presented?

DR. BALCH: I will make the motion.

MR. DAWSON: I will second.

CHAIRPERSON BAILEY: All in favor? (Aye).

CHAIRPERSON BAILEY: I will sign on behalf of the Commission. I also see that we have Affidavits for Notice that were published for the

June 20th, 2012 and the August 28th meeting today. These are notice requirements of the hearings and they have obviously been published in the newspapers and dockets as necessary, so I will accept those for the record.

MR. SMITH: And those will be part of the record?

CHAIRPERSON BAILEY: Yes. Today we are calling the continued Consolidated Case 14784 and the bifurcated case, 14785 having to do with provisions of Title 19, Chapter 15 of the New Mexico Administrative Code Concerning Pits, Closed Loop Systems, Below Grade Tanks, Sumps and Other Alternative Methods Related to the Foregoing and Amending Other Rules to Conform With Changes State-wide. Shall I call for appearances again?

MR. CARR: May it please the Commission, my name is William F. Carr. I am with the Santa Fe office of Holland & Hart and we represent the New Mexico Oil and Gas Association.

MR. HISER: If it please the commission, I am Eric Hiser with the firm of Jorden Bischoff & Hiser in Scottsdale, Arizona. I also represent the New Mexico Oil and Gas Association.

MS. FOSTER: Good morning, members of the

Commission. My name is Karin Foster. I'm the executive director and attorney for the Independent Petroleum Association of New Mexico.

MR. JANTZ: Eric Jantz, Environmental Law Center for OGAP.

MS. GERHOLT: Gabriel Gerholt on behalf of the Oil Conservation Division.

MR. FORT: I'm Patrick Fort on behalf of Jalapeno Corporation.

MR. DANGLER: Madam Chair, Commissioners, Hugh Dangler on behalf of State Land Office. Thank you.

CHAIRPERSON BAILEY: Dr. Neeper?

MR. NEEPER: I am Don Neeper representing New Mexico Citizens for Clean Air and Water, pro se.

CHAIRPERSON BAILEY: As always, we will leave time for public comment for people who sign in at the back of the room. We will allow time before we break for lunch and before we break for the day so it will be somewhere around 11:00, 11:30, and then again somewhere around 4:00 to 5:00 o'clock this afternoon.

I believe that we were at the point of Mr. Jantz presenting the witness.

MR. JANTZ: Thank you, Madam Chair. I am

here with Ms. Kathy Martin and we are going to talk about some of the things that the oil industry witnesses have testified to in rebuttal. Would you please introduce yourself?

MS. FOSTER: If I may make a statement at this time. I would like to clarify again for the record on behalf of the Independent Petroleum Association that we would object to the presentation of this witness at this time. We don't believe she is a proper rebuttal witness. The Oil and Gas Accountability Project had the opportunity to present a case. They had notice just like every other party in this case as to what evidence was going to be presented, including modeling evidence. They could have put Ms. Martin on at the time they initially presented their case. We don't believe this is proper testimony.

I would point to OGAP's Notice of Intent which was filed where they say Ms. Martin has extensive knowledge in the areas of lining materials, liner construction, waste/liner compatibility as it relates to the efficacy of a closed-loop system. They also point to her experience in wastewater impoundments and environmental issues related to hydraulic fracking.

None of these issues are pertinent for rebuttal testimony. If you recall the testimony presented, we did not talk about liners. In Rule 17, the liner part of it, we left that alone, and I don't think this witness is an appropriate witness for rebuttal at this time.

MR. FORT: Madam Chair, I also join in that motion by IPANM, and to expound a little bit further in terms of looking as to whether or not testimony by a witness is proper rebuttal testimony, they have to meet basically -- it has to be new things that come out in a case-in-chief. It has to be things that could not -- that were admissible in their case-in-chief and, therefore, should have been presented in their case-in-chief. And secondly, it has to bear directly on whether or not the Commission is going to adopt these regulations.

If you look at the areas that they propose to have Ms. Martin testify in, one is the multi-well fluid management pits. Those were set forth in the filings, I believe, originally back in October and in November of 2011 as part of the issues before the Commission. They were aware that this was an issue as to whether or not we adopt these.

They also bring out they want to talk

about leak detection. That was mentioned regarding these multi-well fluid management pits as well. They want to talk about the liners as well. That was all there. It was all laid out. There's been some modifications, I understand, but the gist of it has been there since the end of 2011. They have had adequate time to prepare. They know what the issues are. Again, these are issues that this Commission has to decide, and that's what they should have presented in their direct testimony.

We do note that Ms. Martin was not listed in their prehearing statement for their case-in-chief.

Second is that they want to look at several leaks from various pits, I assume temporary reserve pits or drilling pits. It doesn't indicate. However, the issue -- they knew from the end of 2011 that we were going to ask for increased concentrations that were allowable in the constituents in the pit and that we were going to also ask for on-site closure and we were changing that. That would make them aware they should have presented that again in their direct testimony.

They talked about also the liners. The liners, again, wasn't an issue that was brought up,

most of that. I think the only thing may have been the slope regarding the design and construction for liners, but otherwise, that's Pit Rule 17 and not only is that inappropriate for rebuttal, because it's an issue that's to be decided by this Commission, it's also not relevant about reserve or temporary or permanent pit liners. That's not an issue before this Commission.

I'm trying to think. There was another area that they wanted to bring up and that would have been, I guess, regarding the modeling. Again, that was all taken care of in terms of -- and I think the proposed exhibits are instructive on that point.

The exhibits they propose to introduce are all either from the 2007 or the 2009 hearings. That information was readily available. If they knew about the increase or the higher constituent concentrations that were going to be allowable and the on-site closure, if they wanted to present that they should have presented it in their case-in-chief on direct.

They chose not to. That's their decision, but they don't get two bites at the apple. That's the problem here. Basically, the applicants get to

put on their case-in-chief. And then the defense or the opposition in this case, OGAP, gets to put on its case-in-chief. It gets to bring up things that were brought up in the applicant's case-in-chief and their case-in-chief. If, in fact, OGAP brings up something in their case-in-chief that is new, then the applicants get to do that on rebuttal.

Now, on rebuttal, it's only on those the issues that are not new. It's not that you get to relitigate things. Because now what's going to happen is that if, in fact, the applicants put on other witnesses to rebut what Ms. Martin wants to say, we are going to have a motion by OGAP that they want to put on more rebuttal.

That's not how this works. You basically get to put on your case-in-chief and you put on everything that's admissible, and secondly, that bears directly on the issues before this Commission. It's only new things that come up that in the defendant's case-in-chief in terms of -- that they brought up that the applicant gets. Then OGAP gets the last word, so to speak, on responding to those new things that the applicants are rebutted. Otherwise, we will have this continuous thing. It has to stop. You only get one direct and one

rebuttal, if it's applicable. Then after that, you're done.

So all ever this stuff could have been brought up. Even the list of the wells, the dates on the -- apparently the order from the OCD, the last one, the last order issued was in, I believe, April of 2010. Clearly all this information was readily available to OGAP and they should have put this forth in their direct case, their case-in-chief. This isn't proper rebuttal.

CHAIRPERSON BAILEY: Mr. Carr?

MR. CARR: May it please the Commission, I would just like to note that rebuttal testimony really should not be used as a vehicle to allow a party to sit back and not present a meaningful case and then after the applicant has rested call a new case on undisclosed witnesses that they could have earlier presented. Having said that, one of the reasons our cases go on forever is we procedurally don't go case, response and rebuttal.

But I think it's incumbent that anyone comes before you and proposes to present rebuttal testimony can demonstrate, in fact, that what they are doing truly qualifies as rebuttal.

CHAIRPERSON BAILEY: Mr. Hiser,

Dr. Neeper, Ms. Gerholt? Do you have comments?

MR. NEEPER: No comment.

MS. GERHOLT: No comment.

MR. DANGLER: Nothing, thank you.

CHAIRPERSON BAILEY: Mr. Smith?

MR. JANTZ: May I respond?

CHAIRPERSON BAILEY: Yes.

MR. JANTZ: I think there are two problems with the industry's argument. One, it assumes a formal rule-making, formal process, formal judicatory process. We have all been to court about this and the First District Court has ruled that this is an informal rule-making process. Therefore, these judicatory technicalities, rebuttal, surrebuttal, case-in-chief, are not applicable. Those are formal rules of procedures that apply to formal procedures. If the Commission is going to change its procedure in midstream, that's fine. We can deal with that. But the fact of the matter is this is an informal ruling.

Second of all, being an informal rule-making, there are only two things the Commission has to take into account. One, whether there's any prejudice to any party; and two, whether the information we are going to present is relevant

and useful to the Commission in its decision-making process.

In terms of fairness, none of these parties, not a single one, Mr. Fort, Ms. Foster, Mr. Carr, alleged any prejudice to their clients by the way it's been going forward. There's been a parade of speculation about what's going to happen in the never-ending process but the fact of the matter is there are no crystal balls. We are entitled, as a member of the public, to present some rebuttal to what's being testified to at this Commission.

Second of all, in terms of fairness, it's worthwhile to note that the NOIs presented by Independent Producers and NMOGA, OGAP got two weeks to see those and study those. They have had an entire month, four times as long, to review and study our NOI from Ms. Martin.

So I think it's preposterous for them to argue that they have been slighted and it's unfair, given the fact that they have had four times as long to consider what Ms. Martin is going to say compared to our two weeks to consider what their witnesses were going to say. With that said, I think that the industry's arguments are without merit.

CHAIRPERSON BAILEY: Mr. Smith? As

commission counsel, do you have a recommendation for this commission concerning a rebuttal witness?

MR. SMITH: Of course. I would like to say that I don't think that the procedural issues that have been brought up by NMOGA and IPANM and Jalapeno are mere technicalities. I think they are there to help ensure a fair process. I do thing that it is the case, however, that this is not a trial, and I think some of the points were made by the industry side were particularly good. It is not particularly admissible technique to wait for rebuttal in order to bring up things that could have been brought up in the case-in-chief.

I don't know whether this is truly rebuttal or not. You all have gotten sort of metaphysical here on me, but I have looked at some of the case law with respect to surprise witnesses which seems to me to be the real issue here, and as nearly as I can tell, even though it may not be the thing to do to hold off until the end for rebuttal witnesses for something that you could have put in a case-in-chief, trial courts, even in the formal trial setting, appear to me to allow witnesses that would be characterized as surprise witnesses as long as curative measures have been taken in order to

ameliorate the prejudice to the other side.

I think that this Notice of Intent filed by OGAP was filed two months ago, and I really haven't heard anything that would indicate that any of the industry reps are prejudiced by this. So it would seem to me that given the intent of the rule-making, which is to inform the Commission, that this witness should be allowed to testify. However, I do think that the testimony should be limited to issues that have been previously raised as opposed to raising any new issues right now. And, of course, the other parties will need to be given the opportunity to put on a witness to rebut whatever testimony they hear now.

So my recommendation would be allow the testimony, limit the testimony to issues that have thus far been presented by either side.

CHAIRPERSON BAILEY: During this hearing?

MR. SMITH: In this hearing. Allow cross-examination and allow rebuttal witnesses by NMOGA, IPANM, Jalapeno, OCD, whomever wants to put on a rebuttal witness.

CHAIRPERSON BAILEY: Commissioner Bloom, do you agree that we should overrule the objection to hearing Ms. Martin?

COMMISSIONER BLOOM: Yes, agreed.

CHAIRPERSON BAILEY: Dr. Balch?

DR. BALCH: I will go with Mr. Smith's ruling.

CHAIRPERSON BAILEY: The objection is overruled as far as objecting to Ms. Martin.

MR. SMITH: I would like to say with respect to objections on relevance, that sort of thing, those objections should be brought up during the testimony.

CHAIRPERSON BAILEY: Okay. Would you stand to be sworn.

KATHY MARTIN

after having been first duly sworn under oath, testified as follows:

DIRECT EXAMINATION

BY MR. JANTZ

Q. Thank you, Madam Chair. Please introduce yourself to the Commission.

A. My name is Kathy Martin. I live in Norman, Oklahoma.

Q. We have your CV as proposed Exhibit 3. Let's talk about it. Let's talk about your education first. Would you explain to the Commission your educational background?

A. Sure. I have a Bachelor's Degree in Petroleum Engineering from the University of Oklahoma back in 1987 and then I went straight into Master's Degree in Civil Engineering also at OU where I focused on the wastewater treatment side of civil engineering, environmental engineering.

The OU Environmental Engineering Program is heavily focused on groundwater. It's a groundwater school but I also took groundwater seepage, groundwater pollution control, modeling, but it also had some good course work in air pollution control and engineering technologies. I took course work on risk assessment using epidemiological and laboratory tests and then translating them into a risk factor. I took things like corrosion engineering and all at the graduate level from Chem E. Surface colloidal science which is looking at the electromagnetic layer between clay minerals and solutes. Different things dissolve in liquids so looking at the solid/liquid interface, and I also have about 50 hours past my Master's in graduate course work in anticipation of going for a Ph.D.

Q. Can you talk a little about your Master's Thesis?

A. Yes. While I was a graduate student I worked as an intern for the Water Resources Board where they basically paid me to read about liners and waste liner compatibility, and then I read that paid reading effort to translate into my thesis, which was the removal of polychlorinated biphenyls from topsoil using a non-ionic can surfactant. It was a laboratory experiment taking known contaminated soil and changing the concentration of surfactant and contact time in order to create a recipe for soil-washing to remove what is basically one of the most stubborn pollutants ever created by mankind.

Q. Ms. Martin, let's move on to your professional experience. Can you describe for the Commission your professional experience, what you have done once you graduated from school?

A. Correct. I was an intern with the Oklahoma Water Resources Board while I was in graduate school and then they hired me directly after I graduated. I worked for the Water Board for three years and the first task was to draft rules and regulations for surface impoundments and lined application. That's basically what they paid me to read so it translated into a year-long effort with a

rule committee of academia, industry and environmental people and I was in charge of drafting the rules and going through like a stakeholder review process. Then it was sent to the legislature for approval.

During that time I also was assigned to be the project officer of the Tar Creek Superfund site, which I was the third project officer of that site. It's the number one superfund site in the United States. Fifty square miles of acid mine drainage from one of the largest lead and zinc mines in the world.

During the time that I worked on that, I worked with the USGS and developed a groundwater recognizance study on the Roubidoux aquifer which was a confined aquifer which had been polluted by the mines, which were actually in the Boone formation at 2- or 300 below surface. The Roubidoux was about 1,000 feet below surface and it was contaminated via abandoned oil wells in Northeastern Oklahoma and we used the USGS to do groundwater sampling and create proof that that had indeed occurred and that the Roubidoux had been compromised by the superfund site.

Then the third task, once my rules became

official, then I was assigned every permit that could possibly land on my desk while I wasn't looking and I wrote permits for all of the non-discharging facilities in Oklahoma that have had non-hazardous industrial wastewater. And then from those I also was in charge of closure of surface impoundments.

Prior to my writing the rules, the State really didn't have a closure process, so once the rule was instigated a lot of companies came forward and wanted to close lagoons out with this procedure.

Q. Can you tell us what the STRONGER Board is?

A. Right. I didn't go into my -- when I worked at the DEQ.

Q. Please explain that.

A. When Oklahoma was looking for MPS delegation we had to combine the Water Board and the Health Department to create a new agency called the Department of Environmental Quality and I transferred into that agency into the Customer Assistance Program which was the first of its kind in the United States, non-regulatory part of the agency that could handle permit assistance and compliance assistance without getting anybody in

trouble.

So we created the Compliance Assistance Program using like a multi-media approach so if somebody like Conoco Refinery came in and wanted to talk about some compliance at their facility we could put together a team of people that understood RCRA, air quality, water quality, et cetera and sit down at the table with them, and we did that with small companies, big companies.

Also for new companies that wanted to come to the state, for example, I think when Mikron wanted to come and also the company that made the toolboxes for Sears, then we would sit in a meeting and I would put together all of the various people who had expertise in RCRA, air, and we would develop a timeline of when they would have to submit their permit applications in anticipation of when they wanted to start operation so we would back it up, and that became a standard for the state and for other states as well.

From that, because I was involved in multi-media assistance, at some point I also got training in air quality. This was right after the Clean Air Act Amendments of 1990 so I went to UT Arlington and was trained in permitting and

hazardous air pollutants, et cetera, and I started -- the first HAP program was under the Small Business Assistance Program under the Clean Air Act Amendments of 1990. It was for dry cleaners, and so I did a state-wide dry cleaning assistance effort which I went all over the state talking to dry cleaners and everything. So I started that program and how that would be implemented from then on. So I have a lot of air quality experience plus some RCRA and water quality.

Q. Did this come into play in your capacity as a board member for STRONGER?

A. Actually, yes.

Q. And can you explain that a little bit more?

A. Right. I was recruited to replace Don Neeper when he stepped down as an environmental stakeholder on the STRONGER Board and I represented the Sierra Club on that board. I think I put on my resume up until 2010, is when I stepped down.

Q. What did you do as a STRONGER Board member?

A. During my tenure, the state guidelines for the review of environmental regulations for oil and gas exploration activities had already been

developed through IOGCC, Interstate Oil and Gas Compact Commission, and through STRONGER. But during my tenure we were discussing including new guidelines for stormwater drain construction on well sites and also the hydraulic fracturing guidelines. And also I reviewed -- I was involved in the state review of Oklahoma's oil and gas environmental regulations, Kentucky and Tennessee's.

Q. And does any of your experience involve analyzing transport fate?

A. In the STRONGER?

Q. Any of it?

A. Oh, in any of it? Yes. While I was working for the Water Board, as part of the closure requirement, this was all about developing good sampling analysis plans, monitoring plans, determining the extent of contamination and then how to translate that into clean air, and I did that for several years.

Q. Okay. Do you have any professional certifications?

A. I am a licensed professional engineer in civil engineering in the state of Oklahoma.

Q. And have you provided expert testimony in any other hearings?

A. Yes.
Q. Administrative hearings?
A. Yes.
Q. Have you provided any expert testimony in court?
A. Yes.
Q. And were you qualified as an expert in all of those testimonies?
A. Yes.
Q. At this point I would like you to take a look at Proposed Exhibit 3, Ms. Martin. This is a true and correct copy of your CV?
A. Yes.
MR. JANTZ: At this point I would like to move Exhibit 3 into the record, please.
CHAIRPERSON BAILEY: Objections?
MS. FOSTER: I would object.
CHAIRPERSON BAILEY: It is admitted.
(Note: Exhibit 3 admitted.)
MR. JANTZ: At this point by virtue of education and experience I would like to move Ms. Martin in as a qualified expert in petroleum engineering, civil engineering and environmental engineering.
CHAIRPERSON BAILEY: Any objections?

MR. FORT: Objection.

MS. FOSTER: Objection. I would like to voir dire the witness, if possible.

CHAIRPERSON BAILEY: Go ahead.

VOIR DIRE EXAMINATION

BY MS. FOSTER

Q. Ms. Martin, did you testify in 2009 in front of the WQCC?

A. For the Dairy Rule?

Q. Yes.

A. Yes.

Q. Did you submit a resume at that time?

A. Yes.

Q. And in your resume did you not say that your experience related to adjacent landowner for swine facilities, not landowner facilities as opposed to what your resume states at this time? In other words, is your resume different now than when it was submitted previously in 2009?

A. My expertise in representing adjacent landowners to swine facilities is in the third party engineering evaluation of a wastewater treatment system including the liner design, impoundment design, nutrient management plan, et cetera, which overlaps into what we will be talking about today.

Q. The reason I objected to your resume is because the resume that you presented to this Board is different than the one you stated previously. In the resume that you've submitted today you expanded your responsibilities to adjacent landowners for livestock facilities and not swine facilities.

A. Well, I have expertise in livestock facilities. It's dairy, poultry and swine and it's been two years since I testified.

MS. FOSTER: That was the basis of my objection to the resume. I have two copies of her resume and they are different.

CHAIRPERSON BAILEY: We will accept Ms. Martin.

MS. FOSTER: If I could voir dire the witness?

MR. SMITH: May I just ask --

CHAIRPERSON BAILEY: Go ahead.

MR. SMITH: -- Ms. Foster a question? Can you point out on the resume where the differences are, please?

MS. FOSTER: I have a copy of the resume submitted in the 2009 hearing in front of the WQCC. It was admitted as Exhibit C-1 in that proceeding. I can provide that to the Court if you would like me

to do that.

MR. SMITH: Well, you just talked about an expansion that you focused on. I thought maybe you could draw the Commission's attention to where the expanded language is.

MS. FOSTER: The expanded language is in her resume she states under her experience, the second paragraph, that her experience is related to adjacent landowners for livestock facilities, and in the resume that she submitted in 2009 it states it's adjacent landowners to swine facilities.

Q. (By Ms. Foster) Ms. Martin, I see from your CV you are licensed in the state of Oklahoma under License No. 18254; is that correct?

A. Yes.

Q. When did you obtain that license?

A. Over 15 years ago.

Q. And your primary discipline is civil engineering; is that correct?

A. Correct.

Q. And you are currently self-employed by Martin Environmental Services, correct?

A. Correct.

Q. You are holding yourself out as a professional engineer in this testimony, correct?

A. Yes.
Q. In your testimony, you are testifying on technical issues?
A. Correct.
Q. Are you employed by the New Mexico Environmental Law Center?
A. Who my client is in this proceeding?
Q. Are you employed by them?
A. No.
Q. So you are a consultant for them in this proceeding?
A. Yes.
Q. Are you being compensated for your expert testimony here today?
A. Yes.
Q. You are being compensated for your expert testimony as a professional engineer; is that correct?
A. Yes.
Q. Are you employed by any other firm holding itself as a corporation, partnership or association that provides engineering services in New Mexico?
A. No.
Q. Now, would it be fair to say from your resume that you are primarily concentrated on

environmental issues relating to large scale animal feeding operations? Is that mostly what your experience is about?

A. Right, as it relates to their lagoon and liner system and nutrient management plan.

Q. In fact, since 2010 to present you have experience in mobile meat harvesting, correct?

A. That's true.

Q. And then you were working with adjacent landowners for swine facilities in 1997 to present; is that correct?

A. And dairies and poultry facilities, yes. In 21 states for over 15 years.

Q. And your three months with the Seward County Commissioners you worked on environmental regulations for CAFOs, which is confined animal feeding operations, correct?

A. Correct. That was a bidded project so I didn't work for them, I was a contractor.

Q. And looking at your technical experience, I believe you stated in the WQCC hearing, at that time you said 12 years of experience in CAFO proceedings; is that correct?

A. I believe that would be correct.

Q. And mostly with the CAFO proceedings you

worked on lagoon liners; is that correct?

A. And nutrient management plans and other aspects of the regulations which could be quite varied from state to state. But yes, primarily the waste management system.

Q. And you also studied pathogen transport in the CAFOs, right?

A. Yes.

Q. And pathogens are biological materials?

A. Correct.

Q. Did you study any migration of chlorides?

A. Yes, and nitrates and other salts.

Q. Did you actually do any modeling with regard to that transport material?

A. More simple, yes, using equations. Absolutely.

Q. On the back of a napkin or with a computer program?

A. Not on the back of a napkin but serious calculations using Darcy's Law, et cetera, and other types of equations.

Q. Hand calculations that you did, not using a computer program, correct?

A. Yes.

Q. And you are intending to testify in this

administrative proceeding as a professional engineer?

A. Yes.

Q. And did you attempt to become familiar with the professional engineering regulations applicable in the state of New Mexico?

A. I did several years ago but not recently.

Q. Not for this hearing?

A. It was several years ago.

Q. And did you attempt to obtain licensure as a professional engineer in the state of New Mexico?

A. No.

Q. Are you familiar with the New Mexico Engineering and Surveying Practice Act?

A. Like I said, I read it several years ago but not -- I wouldn't be able to recite it today.

Q. Are you familiar with a roster here in the state of New Mexico concerning professional engineers?

A. A roster being a list?

Q. A list of certified and licensed professional engineers?

A. All states have that. All states have a list of who is licensed in the state.

Q. Are you on that list?

A. No.

Q. So you do not have licensure on the state of New Mexico?

A. Nor did I say I did.

Q. Are you familiar with Section 6123-2 of the Engineering and Surveying Practice Act?

MR. JANTZ: Objection. Ms. Martin is not a lawyer, first; and second of all, how is this relevant? Ms. Martin is being qualified as an expert in petroleum, civil and environmental engineering, not per se a professional engineer. That's her certification and part of the calculus that goes into her expert qualifications but she is not specifically being qualified as a professional engineer. None of the witnesses have been.

MS. FOSTER: That is not true. Mr. Mullins was qualified as a professional engineer and in the Notice of Intent OGAP has presented this witness as a professional engineer. She is listed as a PE and she's testifying on technical issues as a professional engineer. She stated that she is familiar with the regulations under the Engineering and Surveying Act of New Mexico which specifically states that any person that is offering to practice engineering in the state of New Mexico is required

to submit evidence that he or she is qualified to practice. It also states -- and the next question I was going to ask her was if she was familiar with the definition of engineering in the state of New Mexico under that same act which she is supposed to be familiar with as a professional engineer, and it specifically states for the practice of engineering in the state of New Mexico, that includes expert technical testimony, which is what she is here for today.

THE WITNESS: May I respond?

MR. SMITH: Let her go forward, I think with the voir dire. Overrule, I think, Mr. Jantz' objection.

CHAIRPERSON BAILEY: I will overrule the objection and allow you to go ahead with the voir dire.

Q (By Ms. Foster) Ms. Martin, for this hearing did you prepare any reports on your findings and review of other documentation?

A. No formal report. I may have provided some summaries of information related to what we are here about.

Q. And you created Exhibit 3; is that correct? That is your table that you created?

A. I asked somebody at the law center to recreate what I had done, yes. It looks to be about what I had done.

Q. You didn't sign off on the document in your professional expertise as a professional engineer, did you?

A. My understanding of professional engineering licensing in the 21 states that I have worked in is that I am not required to be licensed in that state if all I am doing is testifying in an administrative proceedings. I may not solicit work. I may not do any engineering work outside of administrative proceedings, but during the proceedings itself, the work related to being an expert has always been allowed and I have never had to have a license in the state that I testified in. And I have been doing this for 15 years.

Q. Are you stating that your testimony is relating to environmental issues?

A. For what?

Q. Your testimony relates to environmental issues; is that not correct?

A. Environmental, civil and to a certain extent, petroleum, yes.

Q. And your degree or your certification in

the state of Oklahoma is related to civil engineering; is that correct?

A. Correct.

Q. And this issue that you are testifying to today regards safeguarding life, health and property, is that not correct, in the state of New Mexico?

A. My testimony today will be correcting some errors that were stated under cross-examination. Whether or not they are heated, possibly there could be some saving of health and environment, but that's not the number one goal. The goal is to highlight errors that were discovered during cross-examination that was not -- I could not have imagined somebody would have said that they did.

Q. So what you are saying is that your testimony does not relate to life, health and property?

A. Well, with respect to the rules, it relates to that, yes.

MS. FOSTER: I have copies here for the Board. I have the definition here from the Engineering and Surveying Practice Act of the state of New Mexico which this witness, as a professional engineer, stated she is familiar with and she is a

professional engineer in another state, and I would ask the Board to take administrative notice of this statute for the State of New Mexico which states that for the practice of engineering in the state of New Mexico it does relate to expert technical testimony, either public or private, relating to environmental issues insofar as they involve safeguarding life, health and property in the state of New Mexico, which I believe, again, this witness is here for.

It also states that a professional engineer in the state of New Mexico is a person who is licensed by the Board to practice the profession of engineering in the state of New Mexico.

Q (By Ms. Foster) Now, are you familiar that under the Engineering and Surveying Practices Act in New Mexico that engaging in the business of a professional engineer without a New Mexico license will subject you to civil penalties and revocation of your license in another jurisdiction?

A. As I said, in 21 states where I have testified only in administrative procedure, I have never been subjected to penalties or violations.

Q. So you are not testifying under any exception --

A. So I would assume the same thing would occur here.

Q. You are not testifying under any exceptions to the professional licensing requirements in New Mexico under Section 61-23-22, are you?

A. I guess if you would let me look at it I can answer the question.

Q. I can help you out. Are you an architect?

A. No.

Q. Are you testifying on behalf of your employer?

A. Well, as a contractor, yes.

Q. So you are stating that you do not have a New Mexico license but you have an Oklahoma license?

A. Correct.

Q. Looking at your Oklahoma license, have you ever been disciplined by the Board?

A. No.

Q. And when does your Oklahoma license expire?

A. Friday.

Q. That would be August 31, 2012, so if we were having this hearing next week you would not be qualified as a professional engineer in any

jurisdiction; is that correct?

A. That would be assuming I didn't renew my license.

Q. As of last night had you renewed your license?

A. No.

MS. FOSTER: I believe I have an exhibit here which I would like to present to the board I printed off the website last night, August 27, 2012 at 7:23 p.m. stating that her license is set to expire on Friday, August 31, 2012.

Q. Have you renewed it?

A. I have until Friday to renew it. No, I did not renew it last night.

MS. FOSTER: At this point I would object to the testimony of the witness. I don't believe that she is qualified to testify in the state of New Mexico. She is testifying that she was presented by OGAP as a professional engineer in this instance. In the Notice of Intent, again, she was presented as a professional engineer. She is stating that she is going to be talking about modeling, et cetera, et cetera.

I don't believe she is qualified in the state of New Mexico. She could have asked for a

license in the state of New Mexico. I believe there is reciprocity between the state of New Mexico and Oklahoma but she has not bothered to do that in this instance and, therefore, she is in violation of the laws of the State of New Mexico and I believe that the Board has to follow the regulations and laws of the state of New Mexico and prevent the witness from testifying. She is not a qualified witness in the state of New Mexico.

CHAIRPERSON BAILEY: Mr. Smith?

MR. SMITH: I thought we had other objections.

MS. FOSTER: Mr. Smith, can I give you the documents that I referred to in my questioning? In other words, a copy of her license in the state of New Mexico? Would you like to have a copy of that for the record?

CHAIRPERSON BAILEY: I think that's up to the Commission as to whether they want to accept it as an exhibit and whether there are any objections to it.

COMMISSIONER BLOOM: I would be fine accepting it.

DR. BALCH: Yes.

CHAIRPERSON BAILEY: Let's see what Mr.

Smith says.

MR. SMITH: I would accept them unless there is a good objection to it.

MR. JANTZ: Again, I object on relevancy. We are not offering her as a professional engineer. The Notice of Intent noted she was a professional engineer but that's not the -- we are not offering her as a professional engineer. We are asking her to be qualified as an expert in petroleum, civil and environmental engineering. So irrespective of her certification as a professional engineer -- let's assume that she didn't have that. Her expertise by virtue of education and experience would still be the same. This does not hinge on her certification as a professional engineer.

Second of all, in terms of the violations of statutes of New Mexico, it's not entirely clear that she is in violation of the statutes in New Mexico, and in any event, it's not the purpose of the Commission to look after witnesses. Ms. Martin assumes the risk of potential sanctions if she wants to testify.

MR. SMITH: Mr. Jantz, I think the issue there was really whether you had a good objection to this exhibit.

MR. JANTZ: The point is that entire line of questioning, as well as the exhibit offered in support of it, is irrelevant.

CHAIRPERSON BAILEY: Mr. Fort?

MR. SMITH: Madam Chair, I think you should accept the exhibit if for no other reason it makes at least some sense to the voir dire. You did allow the voir dire.

CHAIRPERSON BAILEY: Then we do accept the exhibit.

(Note: IPANM Exhibit A accepted.)

CHAIRPERSON BAILEY: Mr. Fort?

MR. FORT: Yes, Madam Chair. In terms of her expertise in petroleum engineering, I object. Her testimony and what I can also gather was she said that she was on the STRONGER Board and that what she had done at the time was look at stormwater retention, as I understood, for drilling rigs and I guess drilling processes.

She talked about hydraulic fracturing. That's not an issue here. She did review Oklahoma state statutes regarding oil and gas and that she has not done any modeling other than using her equations to calculate things.

I would object that she's not qualified

based on what she has presented here today, to testify on the issues of multi-well fluid management pits and their involvement in the petroleum industry, various constituents and on-site closure. She may know about liners. That's fine, but that's primarily with confined animal feed operations and even, you know, in looking at what Tom Mullins said, once you have -- I think his testimony was primarily, and this would relate to -- because with animal waste there's a lot of liquid.

Mr. Mullins said that the liner primarily is for the liquid. He says once you have it in a solid phase in terms of the constituents in the pit and it's dry, the liner may be a barrier but it's not going to prevent those constituents from moving through it.

So what we're talking about is a different type of process where you have a lot of liquids involved. Here we have liquid involved with the drilling mud but we are going to dry it out. We have to remove all the liquids and then we have closure.

So it's a very different process that's involved and, therefore, she has very little background in the petroleum industry. I would ask

that she not be allowed to be an expert in petroleum engineering.

MR. JANTZ: May Ms. Martin have an opportunity to respond to Mr. Fort's questioning and direct him to where she has experience in modeling and petroleum engineering?

MR. SMITH: I would suggest this, Madam Chair. I think you have two issues before you: One, her qualifications, and the second is this issue with respect to licensure and her ability to testify in the state. I would suggest to you that that, the licensure business, is a question for the witness to determine, and I would not be distracted by that issue. I suggest that you not be.

With respect to the qualifications, I would ask if the commissioners have any voir dire that they would like to ask the witness, see if there is anything that you have heard the witness testify to in terms of her qualifications that cause you to want to hear her testimony and make your decision based on that.

MS. FOSTER: Mr. Smith, if I may, they are saying they are not going to qualify her as a professional engineer; however, they are offering her as an expert in petroleum, civil and

environmental engineering. I have a few more questions as to really truly where her experience in petroleum engineering is other than her graduate school work in 1989.

MR. SMITH: You have further voir dire?

MS. FOSTER: I do. I would like to -- I believe I pointed to a few things on her resume concerning her CAFO experience, livestock feeding operations. I don't see anything on here on petroleum engineering and petroleum experience on her resume whatsoever, and the argument that I would make is she is not qualified in the area of petroleum engineering. She might have gotten her degree in 1986 from the University of Oklahoma -- sorry, 1987 from the University of Oklahoma in petroleum engineering, but since then it was very clear from her resume, as well as her prior testimony in front of the WQCC, that all she has worked on is livestock operations, she has not worked in petroleum engineering.

So I think we are splitting hairs here, and I understand that about the licensure issue. But if she is not being offered as a professional engineer and she does not need to be licensed in New Mexico, then we really do need to look at whether

her experience is truly in petroleum engineering.

Then the third issue we need to look at, if she is going to be testifying, that her testimony is truly rebuttal testimony in terms of the issues that we are talking about. So, therefore, her experience on hydraulic fracking is irrelevant. Her experience on liners is irrelevant, whether it be for feed stock operations or not or even industrial wastewater projects. That is irrelevant to this hearing at this time. So I think there's three issues.

MR. SMITH: I have to say I think your argument would have been better placed after the Commission had their opportunity to voir dire. You kind of short-stopped them, and I would ask you all if you have questions to ask them. If not, if you don't have any questions, then does this witness appear to you to have the expertise to give the testimony she is intending to give? That's a technical issue and it's up to you all.

CHAIRPERSON BAILEY: Dr. Balch, do you have any questions?

DR. BALCH: Well, I guess I can ask a couple questions. Your bachelor's degree is in petroleum engineering?

THE WITNESS: Correct.

DR. BALCH: That was at Oklahoma University?

THE WITNESS: Yes.

DR. BALCH: What was the focus of their program at that time? Were they a drilling school, a reservoir school, a simulation school?

THE WITNESS: I took classes in everything. I don't think there was a particular focus.

DR. BALCH: Usually professors have a focus --

THE WITNESS: When I was at the school they were just building the Natural Gas Institute, to give you a perspective of where we were. Now I think there is a bigger focus on natural gas. But at the time it was equal to reservoir, drilling and water flooding or secondary recovery.

DR. BALCH: So in your career as a civil engineer and then also primarily as a consultant in environmental engineering, have you had opportunity to work with any pit design for the petroleum side?

THE WITNESS: What I was going to say is the reason I went into petroleum engineering is my family had an oil company in Mississippi. We had a

small exploration company for a decade so I was involved with that after school, but there wasn't really good work in 1987. That's when oil went from $70 a barrel to $10, and rather than digging myself in a hole I went to civil engineering. But my family still had an oil company during that time and they actually prospered quite well. That would be the experience. I don't put it on my resume. It's just that that what my family did. It's a family business.

DR. BALCH: What was the nature of your work with the family business?

THE WITNESS: I helped my dad a little bit looking at well logs and just more conversation of how the family business would be and whether or not I would work for him after I got out of school, et cetera.

DR. BALCH: So after --

THE WITNESS: Not every day, but on a regular basis.

DR. BALCH: After school, have you consulted for oil companies or in regards to oil operations?

THE WITNESS: After I got out of my bachelor's degree, I basically was just involved

like in the Society of Petroleum Engineers in Oklahoma City. I was on the executive committee for several years, so just attended their meetings and professional presentations and conferences.

DR. BALCH: Executive committee for your local Chapter or for the national --

THE WITNESS: For the Oklahoma City Chapter, which at that time had 2500 members. I think we were the second largest Chapter in the world next to London. I was in charge of the newsletter and was also secretary for a year but I was on the executive board for three or four years and I was involved in the first environmental conference that SPE ever put on which is now an annual event, but I did the first one and it came out of Oklahoma City.

DR. BALCH: So I don't know much about professional licensing because I am in science. I don't have to have a license to be a scientist.

THE WITNESS: Well, you are employed by the government so you don't have to.

DR. BALCH: Right. So you have a primary area of practice of civil engineering.

THE WITNESS: Correct.

DR. BALCH: Which is pretty broad, covers

a lot of different things. And you have a secondary practice of agricultural, petroleum and environmental. The secondary area, is that something you get certified for? Is that just something you list on --

THE WITNESS: Are you looking at her exhibit? I haven't seen it. If you could let me look at that. I think this is a search result, right?

MS. FOSTER: It is.

THE WITNESS: Just to see if I was registered in these other disciplines. The only discipline I have been registered for is civil, although I testify in a lot of agricultural proceedings. The design of lagoons and liners is a civil engineering practice.

DR. BALCH: So the secondary practice, is that something you list on your application or something you get certified for?

THE WITNESS: I think that was a search result to see if I was registered in those other topics. It's nothing that I have presented myself on my resume as, except those are areas that I have worked in.

MS. FOSTER: For clarification, that's not

a search result. I just basically put her name in under the Oklahoma Petroleum and Engineering Surveying Board and that is the document that came up.

THE WITNESS: Let me look at it again from that perspective.

MS. FOSTER: It states what her background is, if there's disciplinary action.

THE WITNESS: Oh, this is from the new -- sorry about that. I remember that we just had an E-mail maybe in the last year where you filled out a questionnaire to better understand areas you work in, and I think that's where the secondary practice came from. They asked you to check all that apply, so that's where the agricultural, petroleum and environmental comes in. Sorry about that. I thought you were searching for actual PE, the seal number. That was a result --

MR. SMITH: Hang on to that in case there are questions.

THE WITNESS: That is the result of a questionnaire that was sent by the PE board in Oklahoma, a long series of things like: Are you actively using your license? What are the typical ways you use your license?

DR. BALCH: Where the jobs are coming from?

THE WITNESS: Yes. I guess they have incorporated the questionnaire into the result.

DR. BALCH: You haven't actually had consulting work for the oil industry?

THE WITNESS: In petroleum, no.

DR. BALCH: I think you have extensive experience in agricultural and environmental. Do you feel qualified to present evidence on petroleum engineering? Do you feel qualified as an expert in petroleum engineering?

THE WITNESS: To the extent of what we are going to talk about today, absolutely.

CHAIRPERSON BAILEY: Mr. Bloom? Do you have questions?

COMMISSIONER BLOOM: Just a couple. Ms. Martin, to get back to the professional engineering, are you presenting yourself as a qualified engineer in New Mexico that's going to give expert testimony or are you an expert witness that has a PE in Oklahoma?

THE WITNESS: The way you have to word it, if you do not have the PE license in the state that you are testifying is, as I did, I introduced myself

with a professional engineering certificate in Oklahoma and in no way implied that I am certified in the state of New Mexico or any other state, and that's usually a requirement for expert testimony and that's exactly what I did. Like I said, I do that in 21 states and never had trouble until today.

COMMISSIONER BLOOM: Can you talk about your modeling experience.

THE WITNESS: It would be including from college, of course, in the university setting. I had an entire semester on groundwater modeling in graduate school. I did dam reservoir design in graduate school looking at infiltration impacts on the dam, earthen dams, and then just what I had to do in predicting groundwater pollution from leakage from lagoons. I do that all the time and it's a pretty simple equation using Darcy's Law, et cetera. And that would be it.

COMMISSIONER BLOOM: How often does your agricultural work deal with such modeling?

THE WITNESS: All the time.

COMMISSIONER BLOOM: It's part of your regular practice?

THE WITNESS: Yes. I do it.

COMMISSIONER BLOOM: You look at liner

performance as well?

THE WITNESS: Yes.

COMMISSIONER BLOOM: Can there be differences in liner performance in agricultural setting to a petroleum setting?

THE WITNESS: Well, basically, like I said, my research into my thesis was looking at all kinds of liner systems from earthen, clay, plastic, concrete, steel, composite, sprayed asphalt, et cetera, and looking at waste liner compatibility. So all types of waste, salt waste, hydrocarbons, and that was a broad nine-month reading opportunity, 30 hours a week in preparation of writing state rules that would have to encompass all types of industry in Oklahoma, not one type of basis.

That's the basis of my understanding of liners was that extensive research effort. From there, my experience of implementing that knowledge into actual regulatory language and then taking that regulatory language and creating permits on it and then going in and actually closing out lagoons. So that's the steps. And that was back in the '90s, from '89 to '96.

And then from '96 on I capitalized on that understanding by helping draft rules and regulations

for CAFOs, for the surface impoundments in Oklahoma, Kansas, Nebraska, Colorado, of course here in New Mexico, Illinois, Indiana, and trying to share my understanding of how you match the regulatory language to the permit to what's actually happening in real life where you are seeing groundwater contamination and how to back that up and improve the regulations therefor. So that's the type of experience I am coming to you today with. Does that make sense?

MR. BLOOM: Yes.

DR. BALCH: The regulations that you helped to write in Oklahoma, those were put in place in the late '90s, I guess?

THE WITNESS: Correct. They are still --

DR. BALCH: Have they been modified or adjusted for new technology in any way since that time?

THE WITNESS: They were recently modified. I looked at them and they are basically about the same. It's a risk-based matching of looking at what types of pollution streams are created, like in the industry setting there might be non-contact cooling water, there might be some wash-down water that has grease, there might be some other stormwater runoff,

and I created a risk base. So is it a risk to groundwater, surface water or both, and depending on that, is the concentration like BOD, hydraulic loading and nutrient loading, would it require a more and more elaborate liner system? That is still in place.

DR. BALCH: Now, I think I might be wrong, but I think in New Mexico they have to deal with agricultural waste separately from oil and gas wastewater and other waste streams. Is it the same thing in Oklahoma or is there one rule that covers it all?

THE WITNESS: No, all are different territories, different agencies, et cetera.

DR. BALCH: So the area you worked on was more in the agricultural side?

THE WITNESS: I did both. When I worked for the Water Resources Board that was state-wide for all industry except agricultural. Then after I left the employment of the State, we had a governor task force and everything to draft regulations for liquid swine manure facilities. It was quite the big deal. So we worked weekly working on language with the agency, and that was specifically for liquid swine mineral wastewater under the Department

of Agricultural.

DR. BALCH: Nothing further.

CHAIRPERSON BAILEY: Do you have expertise in the types of computer modeling that have been presented, the Multimed and the other? Or are those different programs than you had to deal with?

THE WITNESS: I'm pretty sure we did the HELP model when I was in graduate school in civil engineering. I have not used it, like when I was working at the Water Resources Board, but I did review all of the manuals, the engineering manual, the regular manual and all of the printouts and I understand it pretty good, and I understand all the underlying equations pretty well, so I feel confident to give you my opinion if we do that today.

CHAIRPERSON BAILEY: Then I think it's time for a ruling and I believe that we shall accept you as a witness for OGAP and give your testimony the value that it deserves. You may proceed.

DIRECT EXAMINATION CONTINUED

BY MR. JANTZ

Q. All right, Ms. Martin. Let's start off by clarifying one big issue for the record. You were here for all the testimony for all of the witnesses;

is that right?

A. All except for the one day I listened on the phone. But yes, I was here every day.

Q. You were on the phone?

A. That was the last day of testimony of Mr. Mullins and I was on a conference call line, yes.

Q. So you did listen in?

A. Yes.

Q. And you read the transcript of his testimony?

A. Yeah. The call wasn't very good so I had to read the transcript as well, yes.

Q. Do you recall when Mr. Mullins said at the beginning of his testimony that he had reviewed OCD records for pit contamination?

A. Yes.

Q. Do you remember him saying specifically that he did not see a single instance of temporary lined temporary pit that had caused groundwater contamination?

A. Yes.

Q. Do you agree with that statement?

A. No.

Q. Okay. Did you review those OCD records as

well?

A. Yes, I did. A portion of them, yes.

Q. Could you explain to the Commission --

MR. FORT: Objection. This is an area that she has not been qualified to testify in. She has not been qualified to testify about wells, that she has done studies on groundwater contamination or soil contamination from drilling pits or production pits or anything in the oil and gas industry, so I would ask this line of questioning not be allowed.

MR. JANTZ: Again, the Commission accepted Ms. Martin as a qualified petroleum, civil and environmental engineer and that includes the qualifications of being able to look at records, identify contaminants and refute the statements that Mr. Mullins said. I don't think she needs to be an expert to look through the records and report what she thinks.

CHAIRPERSON BAILEY: Objection overruled.

MR. FORT: I just have a problem with the last statement. He said "I don't think she has to be an expert to look through the records and testify." That is incorrect. She is either an expert or she is not. If he is contending that she is not an expert, then it needs to be disallowed.

MR. SMITH: The Chair overruled the objection and you made your argument. I think you need to let it stand or we are never going to get out of here.

MR. FORT: That's the problem, that we are never going to get out of here. That's the problem, Mr. Smith.

MR. SMITH: Madam Chair, you overruled the objection and that's the end of it.

CHAIRPERSON BAILEY: It is, and I think we need a ten-minute break.

(Note: The hearing stood in recess at 10:11 to 10:22.)

CHAIRPERSON BAILEY: I would like to clear up one thing that Mr. Jantz misspoke before we had a break. He said he could qualify the witness as an expert in petroleum, civil and environmental engineering. That's not what we said. We said that she would be qualified as your witness for OGAP and we would give her testimony the value that it earns.

MR. JANTZ: Thank you for the clarification.

CHAIRPERSON BAILEY: Now, if you would continue.

MS. FOSTER: If I might clarify a question

then, does that mean that she is not qualified to talk about petroleum issues or we are going to delve into how much she actually knows about petroleum issues and then we can question on that?

CHAIRPERSON BAILEY: We will give the testimony the value the Commission deems appropriate as a rebuttal witness for the issues that have been brought up in this hearing.

MS. FOSTER: If I may, Madam Commissioner, I don't mean to be difficult, but I would intend then if I don't believe that her testimony -- if her testimony veers into the area of engineering principles that she is not qualified as an expert on, then I'm going to have an objection.

CHAIRPERSON BAILEY: We will hear your objection at the time.

MS. FOSTER: Thank you. Again, I don't mean to be difficult.

MR. SMITH: One thing you might do is if it begins to be intrusive in your ability to understand the questions and answers, you can give Ms. Foster a standing objection on that so she doesn't have to raise it at each question.

CHAIRPERSON BAILEY: That would be appropriate at the time.

MR. JANTZ: Just as a matter of clarification, Madam Chair, or an offer, Ms. Foster is going to have the opportunity obviously to cross-examine Ms. Martin, and on cross-examination she can delve into whatever she wants to with respect to Ms. Martin's expertise or knowledge of a particular subject on which she testifies.

CHAIRPERSON BAILEY: Thank you for that clarification. Let's get on with it.

Q (By Mr. Jantz) Ms. Martin, we were talking about your disagreement with Mr. Mullins' statement that there had been no instances of lined temporary pits causing groundwater contamination, and you were about to explain the process by which you examined the OCD records that Mr. Mullins reviewed and what you found. Would you please continue.

A. Sure. There's a large list of groundwater pollution cases under the OCD, 500, 600 cases. Of those I just picked the ones that were identified as picked and those were 222 cases, and then I took those files and I sorted them by closure date, which is one of the parameters that's in the Excel spreadsheet, and then what I did is looked at the most recent date. I think there were six of them that had no date at all, but from the ones that had

dates, from 2010 back to the year September 2000, I went to the internet and I looked at the files that are available online for each of these cases and quickly made note of any type of indication of the year the pit was constructed, what type of pit it was and what type of contamination. It was a quick -- took me probably 20 hours to do that.

Then from that list -- that was back into 2000. From that list I went and did a more detailed review just from May 2002 to the present, which would be after Rule 50, which was the rule that required some sort of liner that was appropriate to the site and could have been plastic or clay. And from that, then I went and looked at those.

There were 65 sites, and of those 65 sites what I did is I went back again to those documents online to make sure I could clearly determine whether or not it was pollution from a drilling activity-related pit versus a production activity-related pit, and of those, from 2002 to 2010 that's 35 cases. Of those 35 cases, 16 of them were obviously called drilling pits, blow pits, working pits versus a dehydrator pit or tank battery pit.

So of those 16 cases, then I read just

about everything I could on those and then I picked seven of those to highlight more in-depth where I spent probably another eight hours looking at those seven cases and looking at everything to find out more about whether -- reading the bore logs, looking at soil sample results, monitoring well results and the chronology of the site trying to understand whether it had been a really old site that was closed recently, whether it was a new pit under the Rule 50, et cetera.

Q. Okay. And did you compile a spreadsheet for the results of your search?

A. Yes, I did.

Q. And do you have that compilation?

A. Yes. I believe it's on the screen there and it's an Excel spreadsheet exhibit.

Q. And you created this?

A. Yes.

Q. It accurately reflects -- it's an accurate summary of the records you reviewed?

A. Yes.

MR. JANTZ: At this point I would like to move this into the record as OGAP Exhibit 4.

MS. FOSTER: I would object.

MR. FORT: I would object for the same

reasons I stated earlier. She is not an expert in this area.

MS. FOSTER: I would object on the grounds that Exhibit 5 that was given to us has absolutely no header. I don't know where this information came from, I don't know the efficacy of the information. She claims that she pulled this off the OCD website. I don't know that to be the case.

I would also point to the fact that this screen that we are looking at in front of us has additional and different information from the exhibit we were given as Exhibit 5. I have serious reservations about the representations that are made by this exhibit, and if I may, I would like to question her about some of the information on here because I don't think, again, if she is not an engineer and she does not have background in petroleum, then I don't think she is qualified to review OCD files and I don't think that she is qualified to testify about it in the state of New Mexico because again, the practice of engineering and testifying and expert testimony in New Mexico requires licensure.

MR. JANTZ: Madam Chair, in terms of Ms. Martin's qualifications, the Commission has

already accepted her as our witness. Again, the Commission may give her and the evidence we present the weight due. If Ms. Foster at some point wants to cross-examine Ms. Martin about the information on this and her process, Ms. Martin testified under oath that she got this information from the OCD database, the same database Mr. Mullins did. If Ms. Foster wants to cross-examine her on that, she is entitled to, but in terms of the actual substance of what's in the spreadsheet, Ms. Foster hasn't raised a claim about that.

CHAIRPERSON BAILEY: I will accept the exhibit and await cross-examination concerning the exhibit.

(Note: Exhibit 5 accepted.)

Q (By Mr. Jantz) All right, Ms. Martin. In terms of your search of the OCD database, what exactly did you find? Could you reiterate what you found in terms of the pits that contaminated groundwater?

A. Like I said, 16 of the 35 that were from Rule 50 onward were lined with plastic, either 12 mil or 20 mil and they did have groundwater contamination of chlorides, some insignificant quantities up to 40,000 parts per million.

MS. FOSTER: I object. Again, this witness testified that this is testimony from or cases from Rule 50 onward. We are here today to amend Rule 17, which was passed in 2009, so if she would like to talk about any cases on this list that are after 2009, that might actually be relevant to the issue that we have. However, the OCD has heard testimony in 2007 at length, and again in 2009 at length, concerning cases of alleged groundwater contamination and what the enforcement actions were, and I believe at that time they stated that they did have some cases under review but due to their workload there were cases left on the floor of -- I believe it was Mr. Van Genuchten office or Mr. Price's office that he didn't have time to get to.

So again, this witness is testifying about witnesses that are post Rule 50. We are not here for Rule 50 and this witness is concerning rebuttal testimony and this witness really should be talking about cases after the passage of Rule 17, which is in 2009.

CHAIRPERSON BAILEY: I will sustain that and ask the witness to confine her testimony to those pits that may have shown contamination after

Rule 17 was put in place.

MR. JANTZ: If I may respond, Madam Chair, before you make a decision on the objection, or maybe reconsider your decision on the objection, Mr. Mullins testified that he reviewed a database, OCD database and found that there have been no instances -- he did qualify it after no instance after the passage of Rule 17 of groundwater contamination based on from temporary lined pits. Ms. Martin is rebutting that assertion.

It seems to me that the instances of these pit contaminations may be relevant to the current rule. We are not passing Rule 17. Rule 17 is in place. We are working on the proposed modifications, proposed reconsideration of Rule 17 by the oil and gas industry. Again, I think this information we will find is going to be relevant to some of the issues that this Commission has to grapple with in deciding whether to accept, amend or deny the industry's conditions.

CHAIRPERSON BAILEY: You heard my ruling.

MR. JANTZ: Thank you, Madam Chair.

Q. All right, Ms. Martin, let's move on. Let's talk about multi-well pits. Now, you heard the testimony of Mr. Lane and Mr. Arthur on

multi-well pits; is that right?

A. Yes.

Q. And you heard them testify about the size of the multi-well pits?

A. Yes.

Q. And their volume?

A. Yes.

Q. Now, the rule doesn't say anything about their size or volume, does it? In your review of it?

A. If it's considered a temporary pit there will be a size restriction of the ten-acre feet.

Q. But multi-well pits aren't temporary pits, are they?

A. It was being presented as if they were but they are not.

Q. Did the size and volume or lack of size and volume limitations on multi-well pits concern you?

A. Yes.

Q. In terms of engineering and environmental impacts?

A. Yes.

Q. And how so?

MR. FORT: Just to let you know, I will

have a continuing objection to her testimony regarding oil and petroleum industry. I understand what the Chair has said but I feel I have to make the objection.

CHAIRPERSON BAILEY: We understand your continuing objection.

Q. Please continue, Ms. Martin. Why does the size and volume concern you?

A. Under cross-examination it became clear that the size got larger and larger and the volume that was to be held in the multi-well waste management pit, which could also be called a frac pit, was getting larger and larger. The surface area and the depth would have to be increased way beyond what would be considered the size of a drilling pit. We are talking several-acre size, ten to 15 feet deep maybe. And it would be in place for years if not decades.

That's the way it kind of unfolded under cross-examination, which completely changed how one might look at the way the rule was recommended for them, that these would be long-term liquid impoundments relying upon just a plastic liner to prevent pollution of groundwater when they would be full of pollutants such as stimulation liquids which

in fracking would be quite salty fluids and potentially frac flowback, which would include whatever, biocides, corrosion inhibitors, proppants or whatever that comes in the frac flowback plus production fluids, which of course would be brine. So most likely a saltier wastewater than is kept in the drilling pit.

And then, of course, it would be there for a long time. So the waste liner compatibility issue, instead of trying to have a liner that has wastewater compatibility for a year or a month, now we are talking about a significant amount of time, and I don't believe that that problem was adequately expressed in the restrictive language of the multi-well pits.

Q. Does exposure time make a difference?

A. The longer you expose the liner at the surface to wind action, wave action, potentials for rips and tears at the berm surface, then you start to have leaks through the liner that can be significant to the point where the majority of the cases that I looked at where there was groundwater contamination from lined pits, it was because of --

MS. FOSTER: Objection. Objection. Unless she wants to talk about the cases that she

looked at post 2009, then I believe that she is not qualified again to talk about anything that happened and was debated and discussed and litigated at the prior hearings.

Q. (By Mr. Jantz) Ms. Martin, for the Commission's rule, please restrict your testimony to either hypothetical situations or post 2009 factual situations. Hypothetically, if you have a long-term pit and exposure and liner incompatibility, what problems would you see?

A. You could have --

MS. FOSTER: Objection. If you could please clarify, again, based on her experience is this an agricultural pit of which she has experience and testified to in her resume or is this a petroleum pit, something containing petroleum byproduct.

CHAIRPERSON BAILEY: I understand your continuing objections. I look forward to your cross-examination to supply your answers.

MS. FOSTER: Thank you.

Q. Go ahead.

A. So the hypothetical based on my experience and knowledge, the liner exposed at the berm has the first problem with respect to wind action, wave

action and equipment cutting the liner, animals affecting the liner. That's where you can see rips and tears right away. Of course, with depth of the liner and depending on how the separate was built underneath the bottom of it, that's where you have the highest pressure on the liner.

Q. What's the pressure from?

A. From the height of the liquid pushing down on the plastic and then the plastic being pushed down on the subgrade, and without more prescriptive requirements for what that subgrade is, you may have a puncture at the bottom because of this pressure at the head of the water in the lagoon.

Q. Wouldn't the leak detection system mandated by the rules solve that? I mean, mr. Arthur testified that major or minor leaks would be detected 100 percent of the time.

A. I think he was incorrect in stating that.

Q. Why do you say that?

A. He was saying no matter the size of the leak that 100 percent of the time it could be detected. We are talking about very large lagoons now. We are not talking about a small drilling pit. We are talking about these large multi-wells which might be several acres in size. For example, if the

leak was in the center of the lagoon, then that leak would have to travel the entire distance to the edge, wherever the observation port is. And the language that was proposed by industry regarding leak detection actually doesn't provide any prescription on whether or not that's an actual engineering design or if it's a management -- if it's a visual. So there's no guarantee by the way the language is written whether or not a leak could actually be transported from the place where it occurred to an observation port or if there would even be an observation port required by law.

Q. What's an observation port, Ms. Martin?

A. Ideally, like in the permanent Pit Rules you have a double-lined system. You have two plastic liners with a highly permeable zone in between. If the primary liner develops a leak or hole of some sort, any liquids would enter the highly permeable zone and then would be transported by hopefully the sloped surface of the bottom of the secondary liner in order to encourage flow to the outside of the lagoon where you could install some sort of a bore hole with an observation port to look for either gas vapor, moisture or actual liquid accumulation.

So back to if you are looking at that particular type of scenario, then let's say you had a gallon leak. No one talked about how a one-gallon leak could be translated all the way through a media that was not prescribed in the rule to an observation point where you would be able to detect it and there was no prescription on how often this detection might occur other than like weekly. Whether there would be machinery or any type of alarm system.

Q. Do the rules as you read them require a leak collection system?

A. No, and that's another part of the misnomer, that even a large leak, 100 percent of it could be detected. First of all, you have to capture it so there has to be an underlying impermeable membrane like you have described in your permanent Pit Rule that would prevent the leak from continuing into the subsurface. It would be captured and collected and held, and then for like in landfills, they pump that leachate out and dispose of it elsewhere, but that is not in the language.

Q. It sounds like there may be site-specific considerations involved with engineering one of

these multi-well pits?

A. Yes. Obviously, depth to groundwater, whether or not you had enough subsurface soils to build these multi-well pits which are large and probably deep in order to hold so much volume, how much of it would actually have to be above-grade and below-grade and then that flows into other engineering problems with the stability of the berm.

So yes, each site would be required. You can't assume that in every site you would be able to excavate deep enough to hold that quantity of liquid.

Q. Would this idea of having a standardized plan for multi-well pits, is that satisfactory in terms of covering bases for environmental protection for the multi-well pits?

A. No.

Q. So in your estimation, is the information that Industry provided sufficient to promulgate a regulation that's protective of the environment and public health for multi-well pits?

A. No.

Q. During this discussion of multi-well pits you mentioned that the liner would go over a berm and that goes into some of the discussion that

Mr. Mullins and Mr. Arthur talked about with respect to angle of repose and how angle of repose could be used to -- what the relationship between angle of repose and liner for temporary pits would be. Could you just explain briefly for the Commission your understanding of angle of repose?

A. Right. It's an engineering term, and you can determine it for any type of materials: Sand, soil, glass beads, whatever. You pour the material onto a surface until it creates a cone of material, and then the angle between the edge of the cone and the flat surface, that angle is called the angle of repose where no more sluffing or movement has occurred. It's just if nobody breathes, that's where it will stay. It's not protective of wind erosion or rain erosion or heavy vehicular traffic but it's the angle of repose of the soil material.

Q. Why is the angle of repose that Mr. Mullins and Mr. Arthur talked about, why is that important in the context of lining of temporary pits?

A. Well, in his testimony he gave an example of using a --

Q. Mr. Mullins' testimony?

A. Yes.

Q. Okay.

A. Of using a bulldozer to cut into the ground to create a temporary pit and two sides would basically be vertical and the other two sides would be sloped and he referred to that as the angle of repose. But there is no angle of repose for soil materials that's 90 degrees or a vertical angle. The only thing that would be for would be bedrock. So I think he didn't understand what the proposed language was requiring. It was requiring angle of repose in place of two-to-one vertical side slope, which is standard engineering; three-to-one, even more so standard.

A two-to-one side slope is equal to about 26 degrees. A three-to-one side slope is about 18 degrees and angle of repose for earthen material can be anywhere from 30 to 45 degrees. So the proposed language basically allows you to double the angle allowed now for the berm construction. But he was discussing something that would be a vertical, and that is not angle of repose. So you would not be allowed to build that kind of lagoon under the proposed language, nor under the existing language.

MS. FOSTER: Clarification, ma'am. This witness, Madam Commissioner, Ms. Martin just again

used the word "lagoon." I think she is using the word "lagoon" when she is talking about multi-well fluid management pits, larger pits, but right now I believe this line of questioning has to do with temporary pits.

So I would just ask her not to use agricultural terms, lagoon, when we are talking about the oil and gas industry and temporary pits versus fluid management pits for clarification.

CHAIRPERSON BAILEY: I think the Commission is able to distinguish between lagoons and pits.

Q (By Mr. Jantz) So Ms. Martin, in terms of the slope of the pit, whether it's 90 degrees or angle of repose, what difference does that make in terms of installing a liner?

A. Well, it depends on if you are going to have a temporary pit or a multi-waste management pit and the duration that the pit will be expected to endure. So if you have -- of course, the angle of repose is for either, but it becomes more critical if you are trying to have a stable berm for one to ten years versus possibly only a few months.

Q. Does the slope have any effect on liner failure?

A. The slope, of course, for the plastic liner is another slope all together, and it actually will control the final slope of the berm.

Q. Can you explain that more? What do you mean by slope of the plastic liner?

A. There's something called the interface friction angle, and that would be the angle that you would have to have the berm so that when you lay the plastic liner on top of that particular soil material that the liner would not slide down the berm; that the friction would basically hold it in place, and then you could just anchor the top to prevent wind from blowing it across.

The interface friction angle, if it's smaller than the angle of repose, meaning you have to have an even less steep or more gentle slope in order to prevent the liner from sliding off, that's the angle that you have to build the impoundment in order for the liner not to be under undue stress at the top. If the angle is greater, the interface friction angle is greater than the angle of repose, then you could do the angle of repose and it would be fine.

And they actually have a way to determine that. It's a safety factor are you take the tangent

of the friction angle over the tangent of the angle of repose, and if it's greater than one you are okay and if it's less than one you are not.

Q. So a friction angle might be a better way to ascertain whether there will be stress on a liner than angle of repose?

A. Or this ratio of the two angles to determine whether it's greater than one or less than one.

Q. The safety factor?

A. You can call it a safety factor, yes.

Q. Sounds like that's almost site-specific in the soil?

A. In general, the interface, which is the interface between the soil material and that liner, that friction angle is determined by that particular type of soil, so it would be different for sand than it would be for silt then it would be for gravel or plastic beads or whatever. So either you would have to find some generic information out in the research or determine your own in the lab to find that angle, and it would depend on the plastic, whether the plastic was rough or smooth, its weight, et cetera.

Q. Let's move on to Mr. Mullins' model. You said during your qualification part of your

testimony that you reviewed Mr. Mullins' testimony; that you had been here for portions of his testimony, reviewed his model and results. Based on your review and what you heard of Mr. Mullins' testimony, do you agree with the assumptions that Mr. Mullins made, the inputs to this model?

MS. FOSTER: I have a standing objection to this, Madam Commissioner. Again, either the witness is testifying as a petroleum engineer under the regulations of the state of New Mexico or she is not. She is specifically responding to a professional engineer who is licensed in the state of New Mexico, and I believe that we are veering off into testimony and expertise that she might have garnered through her education and experience as an engineer. So as to this line of questioning, I would have a standing objection.

MR. SMITH: I think the notion of the standing objection is you don't have to raise it each time.

MS. FOSTER: We are moving on to different topics, with all due respect, and I want to make sure specifically as to this issue, this is relevant expert testimony. You are not going to find somebody off the street who will be able to come in

and review the modeling that's been done by either the OCD or Mr. Mullins without having an engineering degree.

So, you know, I specifically stated when I said I didn't want to be difficult here, but I wanted to make sure that my objections are listed in a timely basis. Since we veered off from the multi-well fluid management pits into modeling, I wanted to make sure that my objection stands.

MR. SMITH: Does the Commission understand this all now so you can move on without further interruption?

CHAIRPERSON BAILEY: I believe that we do.

COMMISSIONER BLOOM: Yes.

DR. BALCH: Yes.

MR. SMITH: Good.

CHAIRPERSON BAILEY: Mr. Fort?

MR. FORT: And I do have my standing objection. To add to that, she does not have any expertise in computer modeling.

CHAIRPERSON BAILEY: You may proceed.

Q (By Mr. Jantz) Again, Ms. Martin, do you have concerns with some of the assumptions that Mr. Mullins made in his modeling?

A. Right. Based on my experience doing many

of these calculations and iterations by hand, which, by the way, takes hours and hours where you have to do a very complex equation, take the answer from that and do iterations, I am very familiar with how that works, and a computer program basically just makes that happen in a few minutes. So with my experience of doing it by hand old school, I am very interested in assumptions versus results because the assumptions in any engineering problem dictates how you treat the result.

So his assumptions on the line of permeability, for example, if you look at IPANM's Exhibit 11, which is the HELP engineering manual, and you go to Page 75 and 76 --

MS. FOSTER: What exhibit?

THE WITNESS: Your Exhibit 11. This would be the HELP engineering manual. The geomembrane liner information starts on Page 74 and there's also on Page 25 -- let's look on Page 25 first. Then also if we look at Mr. Mullins' Exhibit 7, which is the HELP model runs, and we can just look at -- if you are on Exhibit 7, there's a handwritten number on the bottom, the handwritten No. 2, and look at the area that says Layer 4, which is the inputs for the flexible membrane liner.

On Exhibit 7, Mr. Mullins utilized an effective saturated hydraulic conductivity for the flexile membrane liner of .39999 times ten to the minus 12 centimeters per second rounded up as four times ten to minus 13 centimeters per second.

If you look at Page 25 of Exhibit 11, the default parameters for the HELP model -- that means if you don't input your own permeability for the liner material it already has some internal to the computer program, and if you will look at Table 6, which is the default geosynthetic material characteristics on Page 25 of Exhibit 11, there is an entry for low density polyethylene membrane. If you will look and see, the saturated hydraulic conductivity is four times ten to the minus 13. That's the default value that the program will use unless you change it, okay? So we are clear on that.

Then if you look at the proposed rule, especially for construction of temporary pits, there is the requirement for plastic liner.

MS. FOSTER: Could I ask you what page?

THE WITNESS: I will get to that. NMOGA's Exhibit 1, Attachment A, Page 14.

MS. FOSTER: Thank you.

A. This would be 19.15.17.11, which is the design and construction specifications, Paragraph F, which is Temporary Pits, and Subparagraph 3, which discusses "The operator shall design and construct a temporary pit." This is the existing language. Nowhere in this paragraph is there a restriction on the permeability of the liner. If you look on Page 19 of the same NMOGA Exhibit 1 Attachment A, Paragraph J of the same big citation for multi-well fluid management pits, and if you look at that Subparagraph 3 which talks about the liner material, again, there is no requirement or restriction on the saturated hydraulic conductivity of the liner.

If you look to Page 18 on NMOGA's Exhibit 1, Attachment A, it's the proposed language in the same construction, 19.15.17.11. Now we're looking at Paragraph H. This is for liners -- Paragraph H, Paragraph 4A. There is a saturated hydraulic conductivity restriction for liners on below-grade tanks, and that value is one times ten to the minus nine centimeters per second.

Also if you look at Page 16 of NMOGA's Exhibit 1 Attachment A, obviously the proposed language, again, under Paragraph G for permanent pits, Subparagraph 3, which is the primary and

secondary liner requirements, there is a hydraulic conductivity restriction of no greater than one times ten to the minus nine, and those are the only plastic liner restrictions in the regulatory language.

The difference between one times ten to the minus nine and four times ten to the minus 14 is that the regulatory language for permanent pits allows the permeability of the liner to be 2500 times more permeable than the liner that was modeled in the HELP model.

Q. Why does that matter, Ms. Martin?

A. Permeability is the ability to translate fluid across the liner membrane, so the regulatory language -- now, again, there is no restriction on temporary pits. But if we were looking at permanent pits, the permanent pits would be able to leak or seep 2500 times more waste pollution than what was modeled with any of the HELP models. Because all of the HELP models that were presented by Mr. Mullins used the same default permeability.

Q. Okay. So does Mr. Mullins' assumption about permeability reflect the regulatory reality?

A. No.

Q. What other concerns did you have with the

assumptions that Mr. Mullins made in his inputs?

A. Basically it's a combination of the infiltration rates, the evapotranspiration depths and his testimony on it was that it wouldn't really matter if you had a liner or not. This would be just looking at the taco or burrito closure method of what is hopefully dry solids at that time. What he had done is he assumed a deep enough evapotranspiration depth that any rainfall would be evaporated and not enter into the buried materials and that by virtue of that plus this liner that is 2500 times more restrictive than regulatory, that literally no wastewater would come out of the buried materials; that that indeed set up for there to be this extraordinarily fantastical conclusion that it would take 100,000 years for something to reach the groundwater when, in fact, the assumptions have basically set you up to fail in being able to predict what actually happens in real life; that those conditions are not what happens in New Mexico and also what is not required in the regulations.

Q. Would it have made sense for Mr. Mullins to compare his conclusions in his modeling outputs with what's really gone on in the state of it New Mexico?

A. Yes, I think that would have been a valid and important comparison to look at known problems with lined facilities and known groundwater contamination and try to figure out why that happened and why the model does not see that that can occur or to prove that in a real case scenario we have buried material. This industry has given us the information and the model accurately reflects that. That was not provided. What we were just led to believe is that under these very strict assumptions where basically no liquid gets to the buried material, obviously no liquid could leak out of it. So it could be eternity. But is that realistic and is that what actually happens? And it was not presented with real life cases.

Q. For the purposes of rule-making, in your experience are those assumptions conservative?

A. No, these would be so ideal they would be fanatical, because they do not represent even -- well, like I said, if no rainwater ever got to your groundwater, then your groundwater is the most precious thing you ever have because there's no recharge, right? So the attitude in this proceeding should be a much higher reverence. I think we agree that groundwater is being recharged so it's not

being accurately reflected in the HELP model.

Q. I would like for you -- to wrap up, Ms. Martin, both Mr. Mullins and Dr. Thomas testified about their lack of concern for some of the hydrocarbons being transported through subsurface.

A. Could I make one more comment about the HELP model before we go to that?

Q. Please do.

A. If you look on Page -- again, Exhibit 11, Page 75, 76. I think I said those words and then I lost my train of thought so I want to make sure we do that. Page 75 and 76, and I don't have those pages in front of me. But if you look, this is where the model describes the equations that are being used to calculate flow through the liner and they used a combination of fixed and Darcy's --

MR. SMITH: Do you want to use these?

THE WITNESS: Yes, thank you.

MR. JANTZ: Thank you, Mr. Smith.

MR. SMITH: Just for the record, what I handed the witness were Pages 75 and 76 out of IPANM Exhibit 11.

A. Just to be clear, Page 74 is where the HELP engineering manual begins the discussion of

geomembrane liner leakage. Page 75 is where it begins to talk about the equations that were used in the model to calculate flow through the plastic liner, and 76 is a continuation of that discussion. And then at the bottom of Page 76 it talks about how the model calculates leakage through holes, and then the final Page, 77, is what the default value is for that, permeability.

Q. Okay. So --

A. But anyway, on Page 75, 76, this is the equation that they used, which is basically flow is equal to the permeability times the head plus the thickness over the thickness of the liner, which is traditional Darcy flow. So when we talk about K being the permeability, if the regulation allows one times ten to the minus nine, then this is where you would multiply by 2500 times the answer that was arrived at by Mr. Mullins' testimony.

And I think he said in cross that the permeability would have no effect on the result of the HELP model. I'm pretty sure that's how I recall him saying that. And that is patently wrong, of course.

There's only three things to look at: The permeability of the material, the head of any liquid

over the material and the thickness of the material. So if you change one by 2500 times, you are going to have a change in the value of the answer. If you increase the head, like if he assumed it was only a half a foot and you increase it to one foot you will double the amount of leakage that the equation will generate. If you increase the thickness of the liner, like instead of having a 20 mil or 40 mil require a 60 mil, then that would reduce the flow, because of the ratio between the total head over the thickness of the liner. You are dividing by the thickness.

So flow is proportional to permeability. It's inversely proportional to thickness. It goes down when the thickness goes up. His statements that it would make no difference if there was a liner or not must be restricted to the understanding that he allowed no liquid into the closed area in the first place, none. So, therefore, in fact it's true. It doesn't matter if you have a liner. If you have no liquid, there's no liquid to escape, which is not a realistic model, okay? That's what I wanted to make sure I clarified.

Q. Thank you for that clarification, Ms. Martin. I want to talk to go back to the issue

of transport of hydrocarbons.

A. Yes.

Q. Mr. Mullins and Dr. Thomas testified that those, the concentrations in the waste tables weren't a concern to them because these hydrocarbons, BTEX, Benzene in particular, don't go anywhere in the environment. Do you agree with that?

A. We're talking about the waste tables in Table 1 and Table 2?

Q. Yes.

A. Which is on Page 41 of NMOGA's Exhibit 1, Attachment A. And my concern with his statement starts with his lack of concern over the fact that industry has proposed multiplying the Benzene trigger. Because Table 1 is a trigger. When you are getting ready to do closure you do your five point samples, each corner of the pit plus the center, compost it up, take one sample, find out what the chloride concentration is or find out what the BTEX is, right?

Q. Yes.

A. This is an average value to see if there's enough concentration to trigger further sampling. What the industry did is they translated existing

language that's in a paragraph -- and it is difficult to read --

CHAIRPERSON BAILEY: Can you tell us exactly what she is speaking to?

MR. JANTZ: Page 41, Tables 1 and 2.

A. NMOGA's Exhibit 1, the proposed rule language, Page 41, Table 1.

Q. 19.15.17.13 Table 1, NMOGA's NOI, Attachment 1. This is the NOI from April.

CHAIRPERSON BAILEY: Okay.

Q. Please go on, Ms. Martin.

A. For clarification, the existing language is on Page 28 of the same document and for temporary pits, looking at Paragraph B1, B-I, and it's about in the center of Page 28, and that's where it talks about the trigger for Benzene, BTEX, chlorides, TPH.

MS. FOSTER: For clarification is this the section that has been crossed out in NMOGA Attachment A?

THE WITNESS: Correct.

MS. FOSTER: Why are we talking about it?

THE WITNESS: I'm going to talk about the numbers that I pulled from existing language comparing to the numbers that are in Table 1.

MR. JANTZ: Because it's the language

being modified. That's why we are talking about it.

THE WITNESS: I thought everybody was clear on what the language was being modified.

MS. FOSTER: Again, you are here for rebuttal testimony.

A. Well, he said he had no concerns about it but I want to make sure that everybody understands that, for example, for the Paragraph I, temporary pits where groundwater is between 50 and 100 feet, there are triggers. The trigger for Benzene is .2 milligrams per liter in the existing rule and Industry has proposed 50 -- I'm sorry, 10 milligrams per kilogram. It was .2 milligrams per kilogram and they are proposing 10, which is 50 times. So the trigger for any further sampling, now they will allow 50 times more Benzene.

But the value for BTEX, if you look on Page 28, the trigger for BTEX is 50 milligrams per kilogram and in their Table 2 on Page 41 it remains 50 milligrams per kilogram. So what they are saying is they are going to allow the Benzene to be a greater percentage of the total BTEX, being 10 milligrams per liter instead of .2, so basically becoming 20 percent of the BTEX.

However, if we know how BTEX works in the

subsurface, BTEX is the most soluble of the Benzene, Toluene, Ethylbenzene and Xylene so it's the most likely to be gone, to be disbursed. If the liner leaked the Benzene will be gone.

Q. When you say will be gone, what do you mean?

A. It won't be left in the solids in an equal proportion as the other elements of BTEX.

Q. Where does it go?

A. Because of its water solubility, if there's liquids it will go where the water went. In fact, Benzene is three times more water soluble than Toluene, and it's ten times more water soluble than the Ethylbenzenes and the Xylenes. So it was very curious that we are changing the entire characteristics of BTEX, keeping it at 50 but allowing it to have almost 20 percent Benzene before there's a trigger for any more sampling, but yet not being concerned about that, even though we know that it's the one that would be there in the lesser concentration.

And that is the chemical that we all agree upon is a known carcinogen. It's the one nobody will argue is not a pollutant of concern. So I completely disagree with Dr. Thomas that there

should be no concern about these new tables. These new tables show a complete disregard for how Benzene exists in their environment and allows for a considerable amount more of it before any other sampling would occur. And also in conjunction with that, his saying well, that's fine if you have that much left --

MR. CARR: May it please the Commission. I have been trying not to object but it seems to me one thing Ms. Martin hasn't been qualified as is a toxicologist. Now we are having testimony within that area of expertise and I object to the testimony.

MR. JANTZ: Ms. Martin isn't talking about toxicology. She is talking about how Benzene moves through the subsurface. Ms. Martin will not offer any opinion whether when Benzene hits a receptor, somebody drinks the water, that's going to do them damage. She is making a statement about the contaminant.

MR. CARR: She has been talking about it being a known carcinogen, about it being the chemical of concern, and she is moving to the area of toxicology.

CHAIRPERSON BAILEY: I would like for the

witness to restrict herself to transport and not toxicology.

MR. JANTZ: Understood.

Q. So Ms. Martin, notwithstanding the toxicity or lack of toxicity of Benzene, what are your thoughts on -- would you please continue your thoughts about Dr. Thomas' testimony about this stuff being locked up.

A. Well, as a project officer of Tar Creek Superfund site I'm quite aware of what the EPA and the national water quality standards and the State's water quality standards of New Mexico consider Benzene to be, and it's a hazardous pollutant and it's hazardous because it is a known carcinogen.

CHAIRPERSON BAILEY: Ask your witness to --

THE WITNESS: That is policy.

CHAIRPERSON BAILEY: I wish that you would please pay attention to what the Commission has requested, that you do not bring into toxicology, that you confine your answers to transport of contaminants.

Q (By Mr. Jantz) So again, this idea that the stuff is locked up in the subsurface, do you agree with that?

A. Not for Benzene.

Q. If you will give me just a moment, I need to see if there's anything we missed. In terms of transport of these hydrocarbons, Mr. Mullins provided -- I believe it was Mr. Mullins -- provided a study from the American Petroleum Institute as a basis for this idea that these contaminants don't move in the subsurface. Could you speak to that?

MS. FOSTER: Is that an IPANM exhibit?

MR. JANTZ: I believe it is. Let me see.

MS. FOSTER: It might be 13.

MR. JANTZ: Yes, it's IPANM Exhibit 13.

Q (By Mr. Jantz) Do you need that, Ms. Martin?

A. Just a second. Excuse me. I pulled it out so it would be easy to find. Give me just a second. I'm sorry. Here it is. Okay. Yes, this would be Exhibit 13, API report titled "Soil and Groundwater Research Bulletin, Non-aqueous Phase Liquid (NAPL) Mobility Limits in Soil."

Q. Independent producer's Exhibit 13?

A. Correct.

Q. Do you have concerns about using this study as a basis for predicting contaminant transport for the hydrocarbons in the waste Table

22?

A. Yes.

Q. What are they?

A. This report relies upon studies that looked at DNAPLs or dense non-aqueous phase liquids which would be more viscous -- pesticides, herbicides, waxy, syrupy layers. The type of hydrocarbons that you are going to expect in your drilling pits are going to be LNAPLs or light, more mobile, more soluble, more volatile. So it would be highly inappropriate to talk about how dense hydrocarbons are not mobile in soil and then translate that information to things that we know are highly mobile in soil through underground storage tank remediation or anything else. So it's inappropriate.

Q. I think that sums up our direct testimony and I will tender the witness.

CHAIRPERSON BAILEY: It is 11:20. Would you check to see if we have had any people who would like to make comments? There are no members of the public to make comments. Then at this point we have time to begin cross-examination if you would like to begin.

THE WITNESS: May I go to the ladies room.

CHAIRPERSON BAILEY: Sure. Let's take a ten-minute break.

(Note: The hearing stood in recess at 11:22 to 11:32.)

CHAIRPERSON BAILEY: We will go back on the record. We were about to finish cross-examination of Ms. Martin.

CROSS-EXAMINATION

BY MR. HISER

Q. Ms. Martin, you testified about the design standards for temporary pits and multi-well fluid management pits; is that correct?

A. With respect to the regulatory language?

Q. Yes.

A. Yes.

Q. In that, you drew a concern about the absence of the saturated hydraulic conductivity level?

A. Correct.

Q. Do the design standards in Requirement F for temporary pits, which is found in 11.F-3, which is on Page 14 of NMOGA Exhibit No. 1, does that specify the use of a 20 mil string reinforced LLDPE liner?

A. Yes.

Q. And if we flip back a couple pages to the equivalent provision under Section J, which is the multi-well fluid management pit under Paragraph 3, does that also specify the 20 mil LLDPE liner?

A. On Page 19?

Q. Yes, thank you, Page 19 of NMOGA's Exhibit No. 1?

A. Yes.

Q. Do you have any reason to disagree with the default saturated hydraulic conductivity for the LLDPE liner that's provided in the HELP manual which you cited to?

A. As far as what?

Q. As far as what the saturated hydraulic conductivity of the low density polyethylene liner would be?

A. To include in the rules as regulatory language?

Q. I'm asking if you have any reason to disagree --

A. With the default value? Actually, I had some documents that provided a little bit different information, more current information where it gave the water permeability from like a manufacturer's specs. One times nine to the minus nine or less,

which is still several orders of magnitude greater as a starting point than the default that was used in the model.

Q. Can you identify that manufacturer please?

A. Let's see. I didn't think I would have to say that. It's Geoplas LD is the name of the product and the product code would be their LD -- they only had a value for 40 mil so the product code would be LD1000, which is for one millimeter, which is about 39.4 mil, and it's the LLDPE geomembrane tech specs for Geoplas.

MS. FOSTER: For the 40 mil liner?

THE WITNESS: Yeah. So it would be for --

MS. FOSTER: I object to her answer to the question, again, because the question specifically asked for the 20 mil liner and that's what's recommended in the rule. So her answer is completely irrelevant.

CHAIRPERSON BAILEY: You may continue, Mr. Hiser.

Q (By Mr. Hiser) Do you agree that these liners have a certain inherent hydraulic conductivity just by the specification of the use of the liner material and proper installation?

A. It has a permeability related to molecular

diffusion through the plastic itself and then it has a leakage rate due to pin holes and manufacturer defects. It's a dual.

Q. Yes, but the saturated hydraulic conductivity that's used or used in the rule generally goes to the manufacturing side?

A. Yes.

Q. No further questions.

CHAIRPERSON BAILEY: Now you may express your opinions.

CROSS-EXAMINATION

BY MS. FOSTER

Q. I just have a few questions for Ms. Martin. Ms. Martin, other than in graduate school, have you done any actual HELP modeling yourself?

MR. JANTZ: Objection. Ms. Martin answered this on the qualifications voir dire.

CHAIRPERSON BAILEY: She did respond to that question.

Q (By Ms. Foster) Ms. Martin, did you use the HELP modeling that was done by the OCD in the 2007 hearing and the 2009 hearing and by Mr. Mullins? Did you try to duplicate any of the inputs that those several individuals did on the HELP modeling?

A. Duplicate meaning?

Q. Put in the inputs?

A. I did no modeling, no physical modeling. I just looked at the assumptions and the manuals and how the calculations were performed within the modeling.

Q. And so you had concern with the HELP modeling output which generates the input for the Multimed?

A. Correct.

Q. Did you do any Multimed modeling or try to duplicate to verify the veracity of the modeling that was done?

A. No.

Q. And you stated that you had difficulty with the infiltration rates as one of the inputs on the modeling? That you stated, I believe, it was unrealistic for the levels that were put in?

A. Correct.

Q. And have you done any research on the infiltration rates in New Mexico?

A. From a closed, dry drilling pit burrito, no.

Q. Have you done it for any oil and gas pits or locations in New Mexico?

A. In New Mexico, yes. I did do some background reading on the variety of subsurface materials in the Southeast and the Northwest, USGS reports, some other -- there was some other HELP modeling reports for a landfill down in, I think, Roswell. I read that and looked at how they interpreted their results. I looked at a lot of the -- when I was looking at the groundwater pollution cases I looked at a lot of the borings to look at what the subsurface materials were and noted that the subsurface materials in the oil field are not accurately reflected in the HELP model either; that they are not a uniform soil and they are not all loam. They are clay and sand and caliche, and so that part of the model was not accurate either. But I did do quite a bit of reading before I started to attempt to critique. Yes, absolutely.

Q. And what will you consider a reasonable infiltration rate in New Mexico --

A. Depends on --

Q. -- based on your research?

A. -- what soil materials. I read everything from over the Ogallala, looking at up to 90 feet per year down to .003 feet per year and it's really site-specific.

Q. In looking at IPANM Exhibit No. 13 that you pointed to, if you could turn to that exhibit, please. I believe that you stated in your testimony that this exhibit only concerned NNAPL, which were more waxy substances; is that correct?

A. DNAPL, dense non-aqueous phase liquids. When you go to the bibliography, some of the statements that were made, they reference some bibliography and the bibliographies were restricted to DNAPLs.

Q. Would you look at Table 1 on Page 3 of the document. Does that not refer to Benzene and have some residual NAPL void fraction numbers as well as liquid chemical density numbers on Benzene, et cetera, et cetera?

A. Yes.

Q. Isn't Benzene one of the LNAPLs?

A. Yes.

Q. I'm sorry. I'm a little dyslexic when it comes to all those numbers. The light one, correct?

A. Yes.

Q. So this document does refer to Benzene?

A. It has it in it, but the overall conclusions include the dense.

Q. Include the dense?

A. Yes.

MS. FOSTER: At this time, based on what has been testified to by Ms. Martin, I have no further questions.

CHAIRPERSON BAILEY: Ms. Gerholt?

MS. GERHOLT: No questions.

CHAIRPERSON BAILEY: Mr. Dangler?

MR. DANGLER: No questions.

CHAIRPERSON BAILEY: Dr. Neeper?

MR. NEEPER: I have just one question.

CROSS-EXAMINATION

BY MR. NEEPER

Q. In your testimony I heard some concern about leaks in multi-well pits. Was your concern more with the transmission of the liner or was it with the fact that there would be no secondary liner required?

A. Both.

Q. Thank you.

CHAIRPERSON BAILEY: Mr. Fort?

MR. FORT: No questions.

CHAIRPERSON BAILEY: Commissioner Bloom?

COMMISSIONER BLOOM: Just a few questions. Good morning, Ms. Martin.

THE WITNESS: Good morning.

COMMISSIONER BLOOM: I want to make sure I understood your line of thinking about the modeling that was done, and what you were saying is that the HELP model default is four orders of magnitude. The liner is less -- four orders of magnitude less permeable than what Rule 17 requires where it mentions liner permeability?

A. It's four orders of magnitude less permeable than for permanent pits but there is no restriction for temporary pits, so it could be any permeability ideally because there's nothing to enforce.

COMMISSIONER BLOOM: And what do you see as being the possible effect of that as it goes forward?

THE WITNESS: When you do a compliance inspection, then all you have to look at is is there a 20 mil liner. You don't have any ability to look at whether or not it has prevented seepage because that comes from knowing that there's at least a ceiling of seepage based on the permeability, so they wouldn't be in violation of seeping until it contaminated your groundwater enough to trigger groundwater pollution. But the language -- there's one sentence that was the original trigger for

causing the agency to cause groundwater monitoring to occur, and that sentence has been removed in the proposed language. That is 19.15.17.13 D1C.

COMMISSIONER BLOOM: Do you have a page number?

THE WITNESS: I have a printout from LexisNexis but the citation, a one sentence -- I guess we could find it in the proposed. Sorry about that. So it would be NMOGA Exhibit 1 Attachment A. Let's look at Page 29, Subparagraph C. That's the crossed-out language. "If the operator or the division determines that a release has occurred then the operator shall comply with 19.15.29," which is the spill rule, "and 19.15.30," which is for abatement.

That was a step. Like you took the five-point sampling, did your composite. If it busted Table 1, then maybe the agency would require additional sampling and it stops in the proposed rule. Whereas in the existing rule there was additional sampling plus this category, which spilled them into the abatement program. So that link has been removed.

So the problem, to summarize, is if you don't have a restrictive liner permeability, then

you don't have a restriction on seepage or volume at all. So basically they can have a temporary pit with a 20 mil liner. It can have holes in it that you can't see and it can be leaking like a sieve. When they go to closure, if their five-point sampling shows that the chlorides or the Benzenes don't bust Table 1 they don't have to do anymore sampling so you have no way of knowing if the groundwater had been contaminated.

You have in the inspection -- to enforce the ability to restrict the amount of wastewater that can go to the groundwater, you do that by having a permeability and then you can do compliance by having them do a water balance on the pit to show that seepage had not occurred or something like that, and that's not expressed in the proposed language.

COMMISSIONER BLOOM: Then you mentioned a factor of 2500. Is that the increased amount of seepage you would get because of the difference in permeability between what --

THE WITNESS: Yeah, it was like a four.

COMMISSIONER BLOOM: -- would seep and the permeability mentioned in the current rule?

THE WITNESS: Yeah. It's basically four

to one which is a quarter, so that made it 2500 instead of 1,000, I think is how it worked.

COMMISSIONER BLOOM: I think a couple of times in the testimony that we have heard, I believe, from NMOGA and again from Mr. Mullins, we heard there has been no leaking or contamination from lined pits, correct?

THE WITNESS: Correct.

COMMISSIONER BLOOM: And what you looked at, you found -- was it 36 cases you testified to?

THE WITNESS: There were 222 that had a designation of pit out of a much larger dataset of other types, like natural gas processing plants or whatever else the OCD regulates. I just looked at the 222 that had a designation of pit, and then I had to physically go on the internet and look at the files to see if it was a drilling pit, a dehydrator pit, a tank battery pit, etc.

Of those, I focused from September 2000 on. Basically, I went from 2010 back until I got tired. And then of that, I decided to look at a subset of just what happened after Rule 50 when you started to require some sort of liner, be it clay or plastic, because that would be the only time I would expect to find a plastic liner for sure.

So of those, I found 16 cases that were definitely drilling pits and definitely had plastic liners.

COMMISSIONER BLOOM: Between 2000 and 2010?

THE WITNESS: From 2000 to 2010 of the things that ended up in an abatement plan basically.

MS. FOSTER: Madam Chair, as to this line of questioning, this directly relates to Exhibit No. 5, which was ruled that we were not going to discuss any cases that were --

CHAIRPERSON BAILEY: This is a commissioner asking.

MS. FOSTER: I understand that. I'm asking for leave to clarify some of the answers that she just gave because I believe there's some additional information that would be useful for the Commission to understand pertaining to those alleged cases of groundwater contamination that she found.

I did not go into that during my cross-examination because that particular exhibit was taken out and it was not discussed additionally by this witness. So technically, it would not have been proper cross-examination for me at that time. However, now that Commissioner Bloom has brought out

the question and she has answered the way that she has, I would like to have leave to answer some of the questions.

COMMISSIONER BLOOM: I'm not sure we took that exhibit out. I believe the questioning stopped after we were told that there would be no more commentary on anything that didn't have to do from implementation of the current pit rule forward.

MS. FOSTER: That exhibit was not offered and put into evidence.

MR. JANTZ: Madam Chair, members of the Commission, my recollection is we did offer it as evidence and it was admitted.

MS. FOSTER: No.

MR. JANTZ: Madam Chair simply prohibited further questioning about the substance of the exhibit.

MR. HISER: For the benefit of the Commission, what Madam Chair said was that it was accepted.

CHAIRPERSON BAILEY: Would you like additional information that could be gleaned from cross-examination?

COMMISSIONER BLOOM: Sure. Absolutely.

DR. BALCH: I also have a question about

the exhibit, so I concur with Commissioner Bloom.

CHAIRPERSON BAILEY: Why don't we break for lunch at this point so we can all reorganize. After we come back, we will allow information concerning that exhibit and cross-examination on the exhibit that's been accepted.

MR. SMITH: Madam Chair, so I have some kind of idea of what's going on here, are we interrupting the Commission's questioning now to allow questioning on this exhibit and then we are coming back to the Commission's questioning?

CHAIRPERSON BAILEY: Apparently so.

(Note: The hearing stood in recess at 11:51 to 1:14.)

CHAIRPERSON BAILEY: We will go back on the record. We need to clarify what exhibits for OGAP have been introduced and which have been accepted, so if we can clarify. The spreadsheet of exhibits, there's no label on it but I have it written in as Exhibit 3.

MR. JANTZ: Madam Chair, members of the Commission, Exhibit 3 is Ms. Martin's CV. That would be OGAP's Exhibit 4.

MS. FOSTER: Five. Exhibit 4, I believe is your OCD Exhibit 13C from the 2007 hearing.

MR. JANTZ: Exhibit 5.

CHAIRPERSON BAILEY: So the Commission has accepted Exhibit 5 now as an exhibit in the case. There were other documents that were supplied as part of the Notice of Intent?

MS. FOSTER: Madam Chairwoman, as to Exhibit 5, there was no question as to whether there were objections. I don't think there was a foundation laid to Exhibit 5. The discussion previously, I believe, was that it was accepted for discussion purposes but it was not moved into evidence, so I would object to the admission of Exhibit 5 as part of this case.

CHAIRPERSON BAILEY: Okay. Your objection is based on what?

MS. FOSTER: My objection is based on the fact that Ms. Martin cites to 228 cases in this spreadsheet and she has not testified to any of the background information as to those pits. She makes the claim that these are all cases of contamination. However, there's no information in the record as to what type of pits they are. I believe some of them are tank batteries, some of them are legacy pits. She also makes no representation in the record as to the depth of groundwater.

I believe the date on file on the exhibit is pre 2009, July 2009. The date that is listed there is the date of the abatement plan, so therefore, again, it would come in under the old Pit Rule and would not really be relevant to the case at hand.

I would also point to the fact that she claims this exhibit is in rebuttal to Mr. Mullins' testimony where he testified that he reviewed 421 cases of alleged groundwater contamination. That was the list that was prepared by Mr. Fesmire that was in the media and all that, and he testified that there were some cases that were under investigation at the time but to his knowledge there was no proven cases of groundwater contamination.

So, you know, Exhibit No. 5 completely misrepresents the facts and I would not want to lead this Commission to look at that spreadsheet of 228 cases without having additional information, so I would object.

CHAIRPERSON BAILEY: Do any of the other attorneys have comments?

MR. FORT: I would join in with those objections.

CHAIRPERSON BAILEY: Mr. Carr?

MR. CARR: May it please the Commission, in addition to this, in terms of foundation, all we know is this is just something that has been taken from another proceeding. We don't know what the spills may have been. We haven't had a chance to look at them to see if they were remediated. The real question with these is whether or not what is being delivered to you -- what these are are situations that violate Rule 17 as we propose to amend it. And until they can show that, I don't see any relevance.

MR. JANTZ: Madam Chair, first of all, with respect to Ms. Foster's objection. We heard that this morning. It's my understanding that the Commission did accept it. I don't know if we have a transcript or we can read the transcript back and see what the Commission said with respect to admitting this into evidence. My understanding was that the Commission did.

In any event, simply for the sake of argument that the Commission did not, Ms. Martin laid the foundation. She explained what process she went through, what documents she inspected to create this spreadsheet, and Ms. Foster agreed to cross-examine her on any of the information that may

be contained therein.

With respect to Mr. Carr's objection, this is relevant to this proceeding because it has to do, as Ms. Martin will explain, with the effect of liners and how liners are protective or not in temporary pits and groundwater contamination. So the relevance lies in Ms. Martin's testimony about the particular situation, the pit liner strength, the way it was installed, the berm, angles, things like that to help the Commission make the determinations about this rule. It's essentially by analogy. We are asking the Commission to make a decision by analogy based on what we know is the reality of pits and pit liners that have been installed in the past.

CHAIRPERSON BAILEY: Mr. Carr?

MR. CARR: May it please the Commission, there has to be some connection between a well identified on a list of several hundred and whether or not the berm was improper, whether or not the liner was torn, what rule was in place at the time this was done, whether it was a lined pit or not, whether that was authorized at that time, whether it's like the first one in overflow from a tank battery that was really designed to control brine.

Just to say, you know, problems happen, well, until they are connected to the issue before you, we will say sure, problems have happened. Were they remediated? Did they violate the rule and does this rule address that problem and are these in violation of a rule and are we looking at enforcement issues rather than regulatory issues? Until you do those, just locking a table into the record and saying, "Look, Mr. Fesmire, we looked at it and there were problems," we need to find out why the problems existed and tie it to the proceeding. That has not been done.

CHAIRPERSON BAILEY: Mr. Smith? Why don't you weigh in also.

MR. SMITH: I think it meets the relatively low threshold test of being admissible. You can make of it what you will, but I think of the arguments we have heard, Mr. Jantz' argument edges the rest of them out, even Ms. Foster's.

CHAIRPERSON BAILEY: This table is accepted for exhibit purposes as OGAP Exhibit No. 5.

(Note: OGAP exhibit 5 admitted.)

MR. JANTZ: Thank you Madam Chair. Now, just to be clear on where we were, is Ms. Martin going to be able to testify about what she

discovered in her review of the record in response to Commissioner Bloom's question? That was my understanding is how we were going to proceed. Or not?

CHAIRPERSON BAILEY: Mr. Bloom, can you recall what your question exactly was?

COMMISSIONER BLOOM: I believe I asked -- we heard testimony previously that if there was any contamination -- we heard testimony previously from Mr. Mullins and a NMOGA witness that there has been no contamination from lined pits. They have gone back and looked at the Fesmire study, and I believe that's where Ms. Foster interjected with an objection. And then there was some ensuing conversation about Ms. Foster asking other questions.

DR. BALCH: We are ready for the question where she was going to cross-examine on the piece of evidence.

CHAIRPERSON BAILEY: That's the logical conclusion, yes.

MR. JANTZ: That was my understanding of where we were on this. Thank you for the clarification, Madam Chair, members of the Commission.

DIRECT EXAMINATION CONTINUED

Q (By Mr. Jantz) So Ms. Martin, you understand that we are going to talk about just what you found in your exploration of this OCD database and the files that you looked at, right?

A. Yes.

Q. Can you describe the seven cases -- was it seven cases you looked at in greater detail?

A. Yes, seven out of the 16 drilling pit contamination cases, I picked seven of those out and prepared more complex analysis.

Q. Okay. Could we talk about the first one?

A. Sure. I looked at starting with the most current date, and just for the record, the one that was dated 2010, that was a closure for a 1949 pit. But I looked at AP 81, which was a Chevron U.S.A. Mark No. 13 drill pit, and so if every one sees that, it's probably on the first page. Don't put that up there because that's different.

DR. BALCH: Do you have the order number on the -- can you refer to which cases these are with an order number that we can cross-reference on the table we have in front of us?

THE WITNESS: Let me see the table you have.

DR. BALCH: Are these distributed or are they the first seven?

THE WITNESS: Let me see what you are looking at. So mine is in the reverse order. Yeah, the youngest case is the No. 1, the 2010, and I'm going to be looking -- you look down the order number, AP 81 is the fifth one on the first page.

DR. BALCH: Maybe if you are talking about a particular case you could just give us the order number and then we know which one you are talking about?

THE WITNESS: Yes, sir. Absolutely. AP 81 Chevron Mark drill pit. The things that I looked at were how long the pit was open before the solids were removed, whether it was lined with plastic obviously was the first thing, and then what was the soil contamination and if there was groundwater contamination and what those values were, so I picked those highlights out.

This one was drilled in January of 2006. They started stiffening the drilling mud with clean dirt in March of 2006 so just a couple months later, but they didn't excavate the pit until January of 2007 so it was about a year to actually remove the source. Then there were soil borings made.

In July of 2007, more samples in August, and finally in January of 2008 a remediation proposal was submitted and the plan was approved the following month to backfill the pit with a 40 mil liner at the bottom.

Just for information, depth to groundwater was determined using a generalized format, which is what's proposed in the regulations, not having site-specific groundwater information but to look at maybe existing water wells around the area, and they provided a table that had a list of water wells and then they said it was 63 feet below ground surface.

But the Mark No. 13 is in Section 3, and in that table that they provided there was no groundwater depth for Section 2, 3 or 4. So actually they picked a value that was several miles away and applied that depth to groundwater to this case.

The last items would be the consultant report to the agency said that the --

MS. FOSTER: Objection. I don't believe she prepared the consultant report. She can call that witness to come in and testify. This is going to make for a very long day.

MR. SMITH: What is your objection,

hearsay?

MS. FOSTER: Yes.

Q (By Mr. Jantz) Was this from a public file, Ms. Martin?

A. Yes.

Q. So it's public record?

A. Yes.

MR. JANTZ: It fits the hearsay exception.

CHAIRPERSON BAILEY: Sustained.

A. The reason for requiring the abatement was there was an overflow area that had caused contamination and there was also the pit liner had failed in the southeast corner of the pit causing an overflow. Like I said, death to groundwater was estimated at 63 feet below ground surface, but actually, once they finally did soil borings they found very moist soil at 20 feet below ground surface. They never said actually where the groundwater was.

This particular site had soil chlorides at five feet below ground surface ranging from 200 to 10,000 milligrams per kilogram and at ten feet below ground surface ranging from 5,000 to 20,000 milligrams per kilogram, and in the borings at five feet there was a caliche, which was described as

fractured rock, but below that was sand. So this would be illustrative of something that was different from the HELP model definitely for subsurface materials.

The second one I looked at would be 1878. If you go down, that's the third one down after AP 81. This is Pride Energy Company. As you can see there's five sites. I picked one of them. This will be for Reserve Pit No. 15 in South Four Lakes Unit, and again, the things that I looked at, number one was the drill date was November 2004. The well was completed actually March 2005.

In September of 2005 they submitted the C-104 form to allow transport of products. In August of 2007 the pit closure form was submitted, that C-144, so that was basically -- they completed the well in 2005 so they didn't submit the form until August of 2007. Then they had to revise it in December of 2007 and then they started doing initial groundwater sampling in 2008, which would be just about three years after the well was completed. The reason for potential pollution was "brine from the pit migrated through the vadose zone to groundwater via saturated flow during operation of drilling pit or during the drying process."

And the groundwater abatement was to pump and use. Basically, they were pumping out the salty water and disposing of it elsewhere.

In this case they had estimated -- let's start with the monitoring data. The background groundwater quality was 167 milligrams per liter chloride and 1210 milligrams per liter TDS. For the soil samples that were taken at eight feet we had 1600 to 4800 milligrams per kilogram chlorides. At 14 feet, 1500 to 4200 -- obviously, the 4200 is the hot spot. At 20 feet, 450 to 2600 milligrams per kilogram and at 30 feet, 300 to 800 milligrams per kilogram. So they excavated the pit down to 30 feet.

The groundwater information, they had the initial groundwater concentration was 3930 milligrams per liter chloride and so they did some subsequent sampling. Oh, and also 9820 TDS, and then compare that to the background chloride that I just said, which was 167.

This was the report that estimated the linear groundwater velocity nine to 90 feet per year and that the chloride mass had traveled 150 feet downgradient from the pit. The velocity calculated for this particular facility then said the travel

time was from November 2004 to May 2008 or basically 40 feet per year.

The next one I looked at was AP 77, which would be the very next one on the table, another Pride Energy, Well No. 14 out of the South Four Lakes Unit. This well was spudded in September 2004 and completed in October 2004. The Closure Form C-144 was submitted in August of 2007, which is almost three years later. The C-141 form was submitted in January 2008. The abatement plan -- the agency required an abatement plan in February of 2008 and the abatement plan was submitted September 2008, which would basically be four years after the well was completed.

We will start with the beginning and I will tell you what the end result was. Again, the consultant had supposed that brine from the pit migrated to groundwater from a failed liner.

With respect to soil concentrations, this was January 2008 soil concentrations. At eight feet it ranged from 1300 to 14,000 milligrams per kilogram. At 12 feet, 1500 to 12,000 milligrams per kilogram, and at 16 feet 900 to 9200 milligrams per kilogram. The highest concentration was in the center of the pit and the southeast corner. They

used a trench burial system for closure so they took the solids and put that trench right next to the pit. That's where it was located. The estimated downgradient migration was given at 150 feet lateral.

The first monitoring well was located in the southeast corner, which is where they had the highest soil concentration. The groundwater concentration three feet below the water table was 1100 milligrams chloride with 2200 milligrams per liter TDS. At 17 to 20 feet below the water table, so deep into the water, it increased to 3100 milligrams per liter chloride and 5400 for TDS.

After purging the monitored well the chloride increased to 4700 milligrams per liter, so it went from basically an unpurged well at the top of the water table 1100 to a purge where you are really drawing the salt. 4700 for chlorides and 8100 for TDS. The depth to groundwater was estimated originally at 24 to 38 feet below ground surface but later was determined to be 23 as they did their monitoring of wells.

Then at the end it was decided that this site was originally a legacy site. March 1961 Humble Oil drilled Unit No. 1 and they completed the

well in July of 1961, and in 1967 Humble submitted a plug and abandonment form basically six years after the well was completed. When Pride Energy went back to the same site, they put their drilling pit basically in the same place as the original one so there was some confusion of where all the pollution came from for this site. But it leads you to make sure you understand, especially when you are going back in and maybe going to a different formation and you're going back and putting another pit at the same well, and pits are gravity-drained. You are going to go to the low spot and you may be building your drilling pit right upon the last place. So I found that problem in several.

Now for something completely different. AP 94, which would be -- this is the Marbob Scratch State Corn, No. 1, Lea County. Sorry, it's like two down. Does everybody see where that is? It's from the 77. Okay. This one had a 12 mil plastic liner. The well was spudded April 2005. The C-141 form was submitted in August 2007 with the words "compromised pit" on it saying "encountered wet soils and water at 40 feet below surface. Most of pit material has been removed."

So in August of 2007 a soil investigation

ensued. In September of 2007 they drilled Monitoring Well No. 1. In October they did Monitoring Wells No. 2 and 3. In August of 2008, and again, this would be basically three years after the well had been finished, the Stage One abatement plan was requested by the agency and based on the form back in October 2007 where groundwater impacts had been determined. So it took a little while for the abatement plan to be requested.

The monitoring well, the first sampling event -- oh, and first of all, there were two conflicting statements. The C-141 -- I'm sorry, the C-144 form dated December 13, 2004 said groundwater was greater than 100 feet. A C-144 form dated September 21, 2007 said groundwater was less than 50 feet.

The first monitoring well event, in monitoring Well No. 1, 396 milligrams per liter chloride. Monitoring Well No. 2, 45,590 milligrams per liter chloride. In the second sampling event, Monitoring Well 1 was 708, so twice basically the first sample. They did not sample Monitoring Well No. 2, but they sampled Monitoring Well No. 3. After purging the well for a half gallon they got 472 milligrams per liter chloride.

In October, which was the third sampling event, Monitoring Well No. 1 had 2260 milligrams per liter chloride. Monitoring Well No. 2 had 42,800 milligrams per liter chloride, and Monitoring Well 3 had 400. In the January sampling event, Monitoring Well 1 had 35,200 milligrams per liter chloride and Monitoring Well No. 2 had 44,400 milligrams per liter chloride.

And what was interesting about the case -- because obviously, very, very high concentrations in the groundwater -- is as they did the boring, as they were drilling Monitoring Well No. 1 they did take soil samples and do chloride concentrations. So at 35 feet below ground surface they had less than 16 parts per million chloride in the soil. At 40 feet, which is just five feet deeper, it rose to 3900. Then at 45 feet it was 3500 and at 50 feet it dropped to 208.

With Monitoring Well No. 2, at 35 feet below ground surface the chloride concentration in the soil was 9800. At 40 feet it was 5,000. At 45 feet it was 3200. At 50 feet it was back to 5,000 and at 55 feet it was 528. For Monitoring Well No. 3, 35 feet, the concentration was only 48. At 40 feet it was only 64. At 45 feet, only 192, and down

at 55 feet back to 64. So monitoring well 3 would be the least contaminated. Monitoring Well 2 showed the highest contamination, and Monitoring Well 1 showed that there was salt contamination at significant depth.

Then the next one would be AP 69, which is an Apache NEDU, and it is --

Q. Ms. Martin, by way of correction, I believe that's AP 68.

A. Okay. Sorry about that. Yes, you are right, 68. And I got my glasses on and everything, and that is just a couple of lines below the Marbob. It's Apache Corporation NEDU 527 Pit, Lea County. The well was drilled September 2005. The well was logged in October of 2005. In July of 2006 a leak detected during a dig and haul remediation pit closure procedure and material was removed to a depth of ten feet below ground surface and disposed of at the Sundance facility, so that was basically a year after the well was drilled.

July 19, 2006, a groundwater impact report was submitted to District Office One in Santa Fe -- and Santa Fe. On July 31st an additional 9,000 cubic yards were removed to a depth of 21 feet below ground surface which was under the pit liner. In

November 2006 Form C-141 was submitted with the words "drilling pit liner has somehow been compromised and leaked below the liner."

In November 2006 the Stage 1 investigation was required by the agency and in February 2007 the Stage One abatement plan was submitted.

There was up to 37,000 parts per million chloride in the soils at 16 feet below ground surface at the southwest quadrant of the pit and groundwater at 52 feet below ground surface was 2007 milligrams per liter.

The next one I looked at is AP 62 and that would be just a few more down. This is the Samson Livestock, Samson Resources Livestock 30-1, Lea County. The well was completed December 2003. The pit was left open to dry the entire year 2004, per writing in the report. A large rainfall event occurred during that time that may have damaged the liner. I'm paraphrasing. Up to four feet of standing water in the pit during the dry-out period.

In February 2005 Pit Registration Form 144 was submitted showing a 20 mil plastic liner, so that was submitted a year and a couple months after the well was completed. May 2005, soil samples were taken below the pit. The highest value was at the

center of the pit at 4,000 to 8,000 milligrams per kilogram chloride.

In July of 2005 a site delineation plan was done and then in September of 2005 nine borings were taken and the first monitoring well was installed in the center of the pit. October 4, 2005 the Santa Fe office was -- the operator notified the Santa Fe office of groundwater impact. The following June it was reported in October of 2005. So June 2006 a corrective action plan was submitted which would be using the evapotranspiration cover.

June 26, 2006, basically a couple weeks later, depth to groundwater was measured to determine groundwater flow direction, and in August of 2006 the agency required a Stage 1 and Stage 2 abatement plan which was submitted in September of 2006 proposing to use a capillary barrier.

The final abatement plan was submitted November 2007, which would be four years after the well was completed. Okay.

For sampling. Shallow groundwater. Let's go with depth to groundwater. Shallow groundwater was at 40 feet below ground surface with a background water quality of 30 milligrams per liter chloride and 650 milligrams per liter TDS. The

saturated hydraulic conductivity of the subsurface materials was provided as 50 to 100 feet per day, and in this case they used clustered monitoring wells, shallow and deep, so we will start with the monitoring well information.

Like I said, in September of 2005 the first groundwater monitoring sample brought back 3999 milligrams per liter chloride at the center of the pit. March 2006 they overpurged the well and got 2230 milligrams per liter chloride with 4500 in TDS. In May, just a few months later, they purged 400 gallons and got 2400 milligrams per liter chloride. In June 2006, again, just the next month, they purged 5600 gallons and still got a chloride concentration of 1930 milligrams per liter.

In June 2007 the following year, they started reporting -- there's a table where they report the shallow and the deep concentrations in their groundwater monitoring annual report. The shallow water sample was 1620 milligrams per liter chloride. The deep water sample, 6700 milligrams per liter of chloride and 13,000 milligrams per liter TDS. They also had a soil sample at 25 feet below ground surface. The average was 4300 milligrams per kilogram of chloride.

Monitoring Well 1 was in the center of the pit. Monitoring Well 2 was east of the pit and Monitoring Well 3 was south of the pit, and I think that kind of summarizes the severity of that.

The next is AP 61, Chesapeake. This will be the last one I looked at, and it is the very next one on the table. Even though it's called Chesapeake, they were not the original operator. Zurich Oil and Gas drilled on July of 2002 and they had a lined drilling pit. In November the New Mexico Oil Conservation Division noted problems with the pit but did not issue a violation letter. In May of 2004 Chesapeake bought the well and the pit was closed during that transaction and it was not clear if they closed with the materials on-site in the trench or not.

August of 2004 NM OCD requests an abatement plan to Chesapeake because chloride contamination was detected in a monitoring well in a property east of the well site which was Champion Technologies, basically across the street, who was also monitoring their groundwater for a pollution problem and chloride started to show up in their Monitoring Well No. 7. And Champion Technologies was an oil and gas service yard. Basically, the

agency looked for where the source would be and right across the street was this well site.

In November of 2006 the consultant, BBC, submitted a two-page letter as an abatement plan in response to the August 2004 requirement, so over two years before the two-page letter was submitted. The agency rejected that letter as an abatement plan and submitted several warnings letters to Chesapeake to please submit an abatement plan. Finally one was submitted December of 2006, and that would be four years after the well was drilled. And in August of 2007 Chesapeake was still asking about the status, whether or not it was approved or not, which was interesting.

Here the hydraulic gradient was estimated at .003 feet per feet or three times ten to the minus three centimeters per second, but the pollution did travel off-site. They did -- a site investigation proposed to do drill borings outside the pit footprint. The first monitoring well was put at the southeast corner, which would be the closest corner of the pit to the Monitoring Well No. 7 that detected chlorides. Then they did a monitoring well to the north of that and to the west trying to find the delineation and trying to find

the backgrounds and it was kind of left at that. They were waiting for the agency to approve their abatement plan.

Q. Thank you, Ms. Martin. I just want to ask you one more question as a point of clarification. This testimony is based on your review of public records; is that right?

A. Yes.

Q. You didn't do any independent investigation within the sites?

A. No, these were all on the agency website.

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

CHAIRPERSON BAILEY: Any cross-examination?

MR. HISER: No.

MS. FOSTER: I do.

CROSS-EXAMINATION

BY MS. FOSTER

Q. Ms. Martin, this is an eight-page exhibit and you claim there are 13 cases of groundwater contamination out of the listed 228 cases?

A. What I said was all 222 of these have been described to me as groundwater pollution cases. Of those I restricted my initial -- I started at 2010 and worked up until I got tired of downloading

files. I spent about 40 hours just looking at all the files to get to September of 2007 just to find out the spud date and what kind of pit it was and whether they had a plastic liner.

Then I went back and said okay, let's just narrow it down now to of all those in the universe just after the Rule 50, which was 2002, and those are 66 files that all have groundwater contamination. Then of those, 35 are drilling and the rest are production.

Q. Okay.

A. Of the 35 drilling, 16 of those -- let's see -- are obvious drilling workover pits. When I say obvious, that means in the records on the computer it said it, no question about it. There were lots of -- there were several closure plans but it was unclear whether it was the reserve pit or the production pit so I ignored those. I went straight for the ones --

Q. Right. I'm looking at why it is that you have 228 on here when we are really only talking about 16. Now, you were present for Mr. Arthur's testimony, correct?

A. Yes.

Q. And he had an exhibit there that he talked

about 12 cases that were under investigation on his testimony. I think it was one of his slides. Are you familiar with those?

A. Where he was saying that it was 99.98 percent something.

Q. Well, he had a list of cases that were under investigation. Are any of those duplicates on the list?

A. Can you point me to his exhibit? I would have to look at it. He is a NMOGA witness, right?

Q. Yes.

MR. HISER: This is NMOGA Exhibit 3, Page 3 of that exhibit.

A. This is Mr. Gantner's testimony?

Q. Mr. Arthur's exhibit.

MR. HISER: Maybe it's 5.

MR. JANTZ: NMOGA 5 looks like Mr. Lane.

CHAIRPERSON BAILEY: Exhibit 14.

MR. SMITH: What do you think it is?

MR. HISER: Commissioner Bailey suggested 14.

MS. FOSTER: I think it's Exhibit 15, Page 4, Table.

A. Let's see. Let's look at, I think, AP 61. Didn't I talk about that one? That was the

Herradura, so that's on there. The Marbob is on there. Samson Livestock is on there. Pride No. 14, yeah, that was one of the ones I just discussed. And the NEDU is one I discussed. As far as the other ones, of the 16 I didn't actually call out those numbers but I will check that against my list. I did the 81, I did the 94, I did 61. So I did AP 61, AP 94 and AP 81, the bottom three.

R485, when I looked at the files that's the Chesapeake Williams No. 14 Federal No. 1, it was interesting. I did not consider that to be definitive one way or the other. The note I made to myself was that the agency said the application was not normal but approved it anyway.

Q. That was a reserve pit actually.

A. I didn't include that.

Q. So looking at the ones that you have in common here, let's talk about those. Those are all pre 2009, correct? In fact, the Chesapeake Herradura was 2002 pit construction. The Marbob Scratch date Com 1 was 2005 construction and the Chevron Mark 13 drill pit was 2005 or '6 pit construction?

A. Yes.

Q. That would have been study in the last OCD

hearing, right?

A. I was not there. I have no idea.

Q. You didn't review the testimony from the last OCD hearing pertaining to these cases?

A. I looked at the HELP models but I didn't look at the testimony. My goodness gracious, I have already spent 100 hours so far.

Q. All right. So the Chevron Mark 13 actually had a 12 mil polyethylene liner; is that right? That's what you testified to.

A. Which one?

Q. The Chevron Mark 13.

A. The AP 81?

Q. Yeah.

A. Yes, 12 mil polyethylene liner. I'm sorry I didn't mention that, but yes, I was aware of that.

Q. Okay. And so the Industry's recommendation -- and you are consistent with the original 2009 Pit Rule in that we are keeping 20 mil liners on all our pits, correct?

A. You are keeping them on there? That's what you are required by the rule. Whether or not they are done or not --

Q. Our proposal --

A. That you are keeping, yes.

Q. We are not recommending removal of liners, right?

A. Correct. I understand the question now, yes.

Q. It's the end of the day. I'm tired. So all of these pits that we have are moving forward, the APDs would have liners, correct? Or the pits would have liners?

A. The APDs?

Q. The APDs would state that the pits will have liners?

A. Instead of saying under Rule 50, yes. It will say under this new rule, yes.

Q. Right. Now, you mentioned a couple of times -- you used the word pollution, contamination. Are you familiar with the WQCC, the Water Quality Control Commission of New Mexico?

A. I worked with them on the Dairy Rule for a few years. I am familiar with that.

Q. So then you would be familiar with what the standard of contamination in the State of New Mexico would be?

A. At this point in the day I can't recite it to you.

Q. Let me bring that to your attention.

A. I would imagine it would be different for different scenarios.

Q. Well, the abatement standards and requirements, first of all, do you need to abate the vadose zone in the state of New Mexico for all these wells?

A. I did not look at the abatement rule.

Q. The TDS concentration of 10,000 milligrams per liter, if the water quality is greater than 10,000 milligrams per liter that is not protected water in the state of New Mexico, is it?

A. If the background was that. To tell you the truth, I know if it's less than, it is.

Q. All right. And if it is less than the 10,000, then in order to consider something to be groundwater pollution you have to meet the toxic pollution standards under Section 20.6.2110.1; is that not correct?

MR. JANTZ: Objection. Calls for a legal conclusion.

MS. FOSTER: This witness is testifying that these are all cases of groundwater contamination and I am just asking her if she knows what the background TDS level is and whether truly it was a legal determination that this was actual

contamination. She is making these allegations on the record that there was groundwater contamination and I don't think she has testified to the actual levels that were presented to meet the legal definition of groundwater contamination.

CHAIRPERSON BAILEY: Please answer to the best of your ability as a non-lawyer.

A. Could you read me the citation again, please?

Q. Section 20.6.2.1101 N.M.

A. I don't have that in front of me. I don't have a copy of that. Talking about Rule 20?

Q. No, talking about Rule 1101 N.M.

A. I don't have it in front of me.

Q. Okay. And and in addition to the toxic pollutant requirements you also have to meet the standards of 3103; is that not correct?

A. 31203 sounds familiar, yes, from the Dairy Rule.

Q. So looking at these wells, can you tell me what the level of Benzene was in the Chevron Mark 13 Unit drill pit, AP 81? Level of contamination?

A. I didn't write it down so I'm assuming it wasn't mentioned. They had remedial goals but I didn't make note of that here. I did make note of

the other 16 that had BTEX contamination but I only did these seven for chloride contamination.

Q. But you are here testifying as an expert witness saying there's contamination and the only thing that you know is the chloride level at the time of the abatement plan, correct?

A. In the soil and in the water as it was presented in the abatement plan or the -- whatever the documentation was on the website, yes.

Q. But you are not familiar with the toxicity levels that were under, say, Toluene or Chloroform or any of the other requirements under Rule 1101 for this to be a legal determination of contamination?

A. The term contamination was actually words in the abatement plans. It was the words of the operator.

Q. It was the word of the consultant that worked --

A. For the operator, who I would assume approved the documents before they were submitted.

Q. But was this a final legal determination by the OCD, a hearing officer, or was there a fine that was instituted in any of the seven cases you looked at?

A. I don't believe that kind of information

was uploaded on the website. It was just abatement plans, monitoring reports, correspondence, E-mails, sampling results. Like I said, with the chain of custody and all that. So those were the kinds of things uploaded on the website and that's what I restricted myself to.

Q. But again, what I'm trying to get at is you don't know what the background groundwater levels were, if it was greater than 10,000 TDS; in other words if it was protected waters under the Office of the State Engineer that is under the jurisdiction of the OCD.

A. Maybe you didn't hear me when I mentioned what the background concentrations were on several of them that were provided in the materials. They were like -- the Ogallala, 167 parts per million chloride, and I know a lot about the Ogallala. It's not going to be 10,000.

Q. So that is maybe one area that is protected by the State Engineer. But in all of these you can state this is actual legal contamination because it is less than the 10,000 milligrams per liter standard for water and it meets all the toxicity requirements as well as the heavy metal requirements of 3103 in order to meet the

legal contamination? What I'm getting at is there's a difference between impacted soils and contamination of groundwater.

A. Are you instructing me?

Q. No, I'm asking you. Are you familiar with that difference?

A. I would think that you are talking about having -- the agency will allow you to pollute the aquifer up to 10,000 parts per million and whether or not that's considered contamination legally or not, you are putting pollution into the groundwater up to a level. But I took the word "contamination" from the documents themselves and I would refer to the authors of those, whether they thought that was a legal contamination or not.

Q. So you are just mimicking their words?

A. I suppose that's a disrespectful way of saying that I was accurately taking notes from their presentation.

Q. Now, looking at -- say, for example, AP 77, the Pride Energy well. This was completed in 2004 and there was an abatement plan that was ordered. Everything was done here under the current Spill Rule, Rule 29, and the abatement rule, which is Rule 30, correct?

A. Correct. That was the sentence that I had spoken that was now removed under your proposed language, which is the trigger to go into the abatement plan, yes. Exactly.

Q. So these operators operated under established rules and requirements of the OCD, right?

A. If they existed during the same time frame, yes, they did. Whether they obeyed them, I don't know.

Q. Looking at Page 2 of your Exhibit 5, if you could go to --

A. I have to see it.

Q. AP 22 half-way down the page, the first Yates Petroleum, Williams Pit?

A. Yes.

Q. What kind of pit was that?

A. The only thing I could discern is it was 1997, so I did not count that as a definitive drilling pit with a liner.

Q. All right. So that was a production pit? Would it surprise you?

A. It was not definitive or I would have written it down.

Q. How about the Dominion Oklahoma Texas

Exploration Production Well further down that page? What type of pit is that?

A. The Dominion?

Q. 270, yeah.

A. My cutoff was at September 7, 2000. The last one I looked at -- the oldest one I looked at was the Dominion 8 3RP 272 and that was a well that was drilled before 1995 so I didn't pay any attention to it.

Q. Okay, but you included another six pages on the document of things you didn't review that were older than these dates?

A. This is the universe from the big universe of groundwater pollution cases like, say, from gas processing plants or pipelines or whatever. The universe that had the designation pit, okay? So there's 22 of those. I cut that out, created a new document, sorted it by chronology and then took from the most current backwards. I actually did count how many, you know, abatement plans per year, just because it was interesting, but I really just focused on the most current until I got tired going backwards in time.

Q. So you don't know that the Dominion Oklahoma well was actually a separator and that the

depth to groundwater was only 18 feet on that one? I mean --

A. Well, of course, like I said, I didn't even open up those files. The last file I opened to see was the 272. So you are asking for one beyond where I investigated, and I thought it was very clear that I opened each and every one of those files and read to determine the date it was drilled, whether or not it had a lined pit and whether or not there was contamination of the groundwater. And I made little notations to myself like going backwards in time, 1999, unlined pit. Unlined separation pit.

Q. When you say contamination of groundwater, that is based on a line in a report by a consultant. You didn't actually verify the information to determine what the background water level was or whether there were any other toxins that were truly a legal definition of contamination. You didn't do that, did you?

A. I was trying to see if I have that abatement rule.

MS. FOSTER: Again, I'm going to object to the exhibit. We can go through. There's 228 cases here and I have notes on most of those in terms of depth to groundwater. Other than the three cases

that she brought up, none of the other ones are lined reserve pits. None of them are after 2009 that have occurred. I don't know why we have this big huge thing of 228 cases when she just testified that she had only gone through the first page and a half of all of these cases.

So, you know, if she would like -- if there could be an exhibit of just the seven that she talked about that are actually relevant to the Commission, if you want to review those more, that would be a much more relevant exhibit instead of all this additional information where she can't substantiate any of the claims because she just testified that she didn't review anything.

CHAIRPERSON BAILEY: Do you have any other questions or cross-examination?

MS. FOSTER: I do not.

CHAIRPERSON BAILEY: Do any of the other attorneys have cross-examination?

MR. FORT: I have a couple questions.

CROSS-EXAMINATION

BY MR. FORT

Q. I noticed that in Exhibit 5 several of these have drilling pit in the name of the facility or the name of the well, but is that you that did

that or was that in the name of the well itself?

A. That was in the -- the agency did that.

Q. The agency did that?

A. Yes. I myself, when I did my notations to myself, that is not on your exhibit but I have like my little notes to myself. So any time it says pit or drilling pit or workover pit, I did not think that that was a drill pit. Actually, I went and looked at the file to make sure that I understood but all of those delineations were from the agency or whoever typed it into the database.

Q. Okay. So which of these are drilling pits other than the ones that are designated drilling pits -- or workover pits, excuse me.

A. From the top of the page down, ACO 255, that's like the third one, Unit Petroleum.

Q. Okay.

A. And AP 100, those two are drill pits. AP 95 St. Mary is a drill pit. AP 81, AP 80, AP 79, AP 78, AP 77, AP 76 and AP 94, those are all in a row. Then skip two. I think the three RP 21 sounded like it was a blow pit, so in effect that could be a drilling pit but it was not lined. Same for the three RP 20s. The AP 68 was described as a working pit. AP 61, a drill pit. AP 62, drill pit. AP 56,

horseshoe pit. The 3RP 406, that was an unlined dehydrator production pit. 1RP 465 was an unlined pit. Didn't say what it was. 1RP 461 is actually now AP 62. 3RP 400 --

Q. Okay.

A. That was a dehydrator pit.

Q. 461 is actually 61 so that's a double entry?

A. Yeah, but I didn't count it. I just made a notation that it was now AP 62 and I only counted it as AP 62. The Cimarex, 1RP 431, that was called an open reserve pit. 1RP 485, that was the thing that called it a not normal, approved anyway. It wasn't definitive and I didn't count it. 3RP 394, which is XTO's, that was a blow pit unlined. 3RP 395, the Fannie Ward, production pit. The next one, 3RP 393 was a separator pit.

Q. What was 392?

A. 395. I'm getting to 392.

Q. Sorry.

A. 392 was a production tank pit. The 3RP 415 which is XTO, that was a dehydrator pit. 3RP 491, they called it a disposal pit, so again, not clear so I didn't count it. 3RP 389, that was a dehydrator, ten feet to groundwater in sand, by the

way. The 3RP 389 and 3RP 387 are the same. For some reason they have two different numbers but you can see the well number is the same. Actually, in the total number I did count that, but as the number of drill pits or something it didn't affect my counting.

Q. Okay.

A. And for 3RP 347 to 3RP 337, the Williams Four Corners, they had the same documentation. I didn't consider them a drilling pit. I just let it go. I was kind of looking for interesting things after a while, something different. The 1RP, when we get to the Meteor Developments, the Bobby Lewis Ranch, by the way, those are as a duplicate entry again. That's A 1973 battery pit.

3RP 385, the Johnson was a production tank pit, less than 15 feet to groundwater, BTEX in the groundwater. 3RP 384, a separator pit, less than seven feet to groundwater. The 3RP 382, a McCoy, that's a blow pit, less than six feet to groundwater. 3RP 379 BP, that's a separator pit, less than four feet to groundwater, 1,000 parts per million BTEX in the groundwater. AP 25, which is the beginning of the Yates, the Scripp pit, that was a battery pit. The Inex pit and the Lattion pit and

the Williams pit, those were all tank batteries and they were like 1997 or before the year 2000. Those were obviously tank battery pits.

Now to 3RP 381, the BP Exploration well. That was a blow pit and a separator pit but it was drilled before 1992. 3RP 380, I don't have any information on that actually. 3RP 378 -- you can tell I was getting tired -- separator pit. And from then on the Manana Gas -- by the way, this was like a good, long line of production pits. The Manana Gas -- where is that one? I just saw it.

MS. FOSTER: Half-way down the page.

A. Thank you. I thought I was losing my mind. That was less than 16 feet to groundwater, 30,000 BTEX but it was not obvious what the pit was. Okay. When I say not obvious, a lot of these abatement plans, they don't say. They just say it's a pit. Now, some of them, there was a whole series of closed like amnesty for closing unlined pits, so I guess they didn't really have to say but I just tried to pick the ones where they absolutely said there was a plastic pit and there was a liner. There was quite a few that were not good.

The 3RP 132, which is XTO, blow pit, eight feet to groundwater. 3RP 120 also XTO, pre 1992

construction. That was a blow pit. 3RP 374, El Paso Field Services, constructed the drill before 1995. It was a line drip pit.

Q. A what? I'm sorry.

A. A line drip pit. 3RP 269 Koch, drilled before 1995, a separator pit. 3RP 264 Yates, unlined separator pit drilled before 1998. When I say that, I think whatever date -- sometimes they would say the drill date and I would say the drill date but sometimes it was just an activity like sampling and they didn't say when the well was drilled but it was obviously before the sampling test. Could have been God knows how old.

The last two I did, 3RP 308 Williams Four Corners, it was drilled before 1999. It was an unlined pit, part of the unlined pit closure program. 3RP 272 Dominion, it was drilled before 1995, and I said forget about it, let's do something else.

Q. Now, the unlined pit for Williams Four Corners 3RP 308, you said it was an unlined pit. Did you treat that as a drill pit?

A. If it did not definitively say drill pit I did not count it as a drill pit.

Q. So the 16 that you mentioned, those are

definitively drill pits?

A. Right.

Q. Based on the record?

A. From what I could read on the stuff uploaded to the internet. I didn't go to the agency and look into the files or whatever. Whatever was on the internet.

Q. So all you know was about the 16?

A. Right, which is the smaller. I didn't go back through the other -- what was it? We just did what, 65? And there's 222 total. I have no idea what those are and it was not important to me. I kept it whole so you know where it came from. Does that make sense?

Q. Yes.

A. Okay.

Q. Now, I noticed that some of these newer pits, AP 100 and ACO 255, Unit Petroleum Company, 3Q drilling pit, are those one and the same actually? The well name appears to be the same.

A. There were several things that were duplicates, yes. Sometimes it's obvious when you look at the table and sometimes it was when you pulled up the -- you know, there's a -- you fill out the little questionnaire on the website. Put the AP

number or the 3RP number and you hit continue. It will have a document and you open the document up and it will say, "Go see AP 62," or something, or you look at it and it's exactly the same information as something you just read. There were some duplicates. And I think we put them on the record, the ones that were obvious.

Q. So did you treat AP 100 and ACO 255, the two we were talking about, did you treat them as one or treat them as two in the twelve?

A. I don't have -- tell me where the AP 100 is.

Q. It's the second one --

A. I didn't count that one.

Q. -- of the 12. Did you count 255?

A. Yes.

Q. Okay.

A. You want me to tell you the ones I counted?

Q. Yes.

A. Okay. I've got little checkmarks. As we were going through I noticed I didn't have checkmarks on all of the ones, so this is still not going to be accurate, but for sure that I have checkmarks, I did the ACO 255, AP 81, 80, 79, 78,

77, 76, AP 94. Skip a couple. The 3RP 420, AP 68, AP 61, AP 56. Then skip about four, 1RP 431, then 3RP 394, which is just a couple down. And that's 16. And I think in there there was one -- oh, the Samson Resources should have been, but I think that was where there was a duplicate.

Q. Right.

A. So I don't think I counted it twice.

Q. Okay. So those are the 16 and you looked at the seven which are part of that 16; is that correct?

A. I looked at all 16 pretty carefully but then for the purposes of this rebuttal I went back and spent another eight hours on just seven of them trying to pull out consistent information. That's what I did.

Q. Okay. I'm very curious. I'm assuming that the very first one is not applicable because it's a tank battery.

A. Yes.

Q. The next one, the very first one you included in the 16 is ACO 255, and why did you not include that in your further research? Because that's the latest one.

A. I restricted to ones where it definitively

said in the closure documents that it was lined with plastic, preferably 20 mil. One of them was 12. That was the criteria, and it was a drilling pit. Like I said, not all of these abatement plans were very clear of what they were doing.

Q. In ACO 255, what was the drilling date?

A. I didn't put it. I didn't --

Q. Okay.

A. I just put drilling pit but I didn't put it on my notes here. Sorry. But it obviously wasn't -- it was the third one I looked at. I hadn't developed the system for documentation yet. Later I got much more rigorous in documenting.

Q. Okay. Let's go through these 16 because I want you to answer one question for me, if you can.

A. Sure.

Q. Whether or not the release occurred during the operational phase or the post-closure.

A. Right, and, you know, the ones that I tried to quote from the closure documents, where it was supposed that it happened during either the drilling phase or in the drying out period.

Q. So both of those would be post-closure?

A. Not necessarily. That's why I gave you the well completion date and then when they started

to remove solids if it was known. Sometimes that was two years.

Q. But if it's during the drying phase you are letting the liquid dry out, are you not? You're going to leave the solids there and then you may start doing something with the solids once they're dried out.

That's my point. If it's operational during the drilling phase, that's one thing. We may have a breach of a liner. But if you are letting it dry out, you still have liquids in there at some point, and it becomes dry and then at some point you're going to come back in and do the closure, but my question really relates to whether or not this is pre-closure or post-closure. Maybe that's a better way of saying it.

A. To me what it illustrates is even though the majority of the attention of the HELP model, the Multimed during this hearing has been focusing on a dry burrito or tostada closure, that in effect, those closures are occurring either right next to drilling pits or on top of the drilling pits that could have leaked voraciously during the one or two months that they were in operation, and that there could be significant salt concentration in the

subsurface and pollution of the groundwater. And that we have been mesmerized by the 100,000 years to contamination and forgetting that the groundwater could be totally contaminated just during the use of the drilling pit.

Also I wanted to emphasize that a lot of times there were several years between when the pit was supposed closed according to the rule, such as six months, before there was even a form submitted. And then years after that actually the source material was removed and years after that the contamination was like a pump and treat type of thing.

And that's the value of this review, is that to put our minds back on the fact that these temporary pits can cause significant pollution; that closure occurring on top of that pollution without doing any subsurface sampling -- for example, like maybe the multi-well pit, if the leak detection system didn't detect the leak there would be no soil samples at all even if the pit had been in use for ten years.

Q. Do you know when they have the multi-well fluid management pit when they detect a leak they have to fix it?

A. If they detect it. I talked about the fact that you don't have prescriptive language to ensure the collection and transportation of that leak to an observation port. It only says that a leak detection system could be used, which could be a visual walk-around. See what I'm saying? As compared to the permanent pit where there is a very specific system prescribed.

Q. Okay. So you would say that a leak detection system, since we have to know, may or may not include an observation port?

A. Well, it could include engineering controls or management controls or both, and I would hope it included both, such as a mass balance on the lagoon, especially the big ones. Leak detection, someone having to go out and look at an observation port, maybe doing some dye or tracer study making sure that a leak could actually be translated all the way across the width or the length of the bigger pits, and that the underlying liner, which is not required by the multi-well management pit, that you may have a leak but only 10 percent of the leak get to the observation port. Did you collect 100 percent of the leak and capture it, and there's no requirement for that.

Q. If you have a secondary liner?

A. There's no requirement for secondary liner on the multi-well.

Q. Are you sure? Look under leak detection.

A. Okay. Let's go there. Because we talked about that, whether or not it was obvious. Multi-well. This would be under Construction, 19.15.17.11 Paragraph J, Subparagraph 9. It says, "The operator shall design the leak detection system to adequately detect any leak from the primary liner." And my notation to myself, it does not require two plastic liners. Because when you look in the permanent pit language, it very clearly requires two plastic liners with a high permeable zone in between, and you did not replicate that requirement under multi-well pits. I'm sorry, it's NMOGA Exhibit 1, Attachment A, Page 19 towards the bottom.

Q. I'm not picking it up. It does talk about having a leak detection system from a primary liner so the implication is you have a secondary liner.

A. But the system could be mass balanced. So let's say you have your inputs and outputs of the lagoon. You consider the rainfall and evaporation, the difference between inputs and outputs could be

considered to be seepage or leakage from the pit and that could be a detection system. It doesn't specify that it has to be the kind of leak detection system that is absolutely prescribed for permanent pits.

Q. Okay. So you would be happy with just a secondary liner? Because what you are telling us --

A. I would be encouraged.

Q. What you want is a better definition. That's all you said.

A. Well, I would be encouraged. If there was a better prescriptive language, absolutely.

Q. Now, from those 16 you can't tell me -- on the ones you can tell me, they are not post-closure, the leaks. They are operational. I understand what you are saying about leaks. Now, how many wells were spudded during this period of time that you looked at? Do you know?

A. I didn't look but I think Mary Ellen testified about that.

Q. Are we talking 10,000, 20,000?

A. I didn't look. I'm not going to hazard a guess.

Q. But based on the information you have, you only have pre-closure leaks that you're aware of?

A. Well --

Q. And specify which one is not a pre-closure leak.

A. Are you talking about closure, removing the source?

Q. I'm talking about closing the -- okay. In terms of if you have a pre-closure -- talking about closing the pit itself or removing it in the case where you have an abatement, yes.

A. Because I would think the chronology is your drilling maybe takes a month. The pit isn't actively used, and after that there's a closure date? Is that what you mean?

MR. JANTZ: I object to this line of questioning. Maybe if Mr. Fort defined his terms, what he means by closure, Ms. Martin would be better able to answer the question.

CHAIRPERSON BAILEY: Can you do that?

MR. FORT: Yes, I can.

Q. Closure is when you are no longer using the reserve pit for operations; that you have dried it out and you have started to either remove it and take it to an off-site landfill that's approved by OCD or that you are going to close it on-site and cover it with the four foot of topsoil.

A. Okay. I get that. That's your definition of closure. Please ask me the question again.

Q. The question is, of these 16, all the of these are what I would call a pre-closure leak.

A. No.

Q. Which one is not?

A. Of the ones that I talked about the seven, I think all of them were pre-closure plus some of the solids were still there. They hadn't made -- well, in the chronology provided in the file on the internet, okay? That's the limitation of my knowledge --

Q. That's our limitation as well.

A. Right. But they usually say when they dried out the solids, when they removed it if it's known. And I thought I testified to that. But some of the ones I just testified about, the seven that I talked about, like, for example, the one year of drying out period, it rained really bad and there was four feet of water in the pit, so I would say in that case there was probably more seepage.

If the original seepage was because of a liner failure, it's possible the four feet captured that liner failure, but I didn't really segregate whether it was just during the one month that was in

operation or through the entire. At some point during the lifetime of that pit, the pollution was established in the subsurface and in the groundwater. Those were all I --

Q. So you really didn't care about operational or drying out or post-closure?

A. When it was available I noticed the dates and I found those instructional. Because the rule requires that you have to close it pretty quickly, but the ones where there was pollution, they didn't close them really quickly.

Q. That's part of the problem about prior to 2004.

A. Prior to what?

Q. These pits being closed under the old rule, okay?

A. Well, I don't know. No question? Just a statement?

Q. Just a statement.

A. Okay, I'll be quiet.

Q. I have no further questions.

CHAIRPERSON BAILEY: Mr. Dangler? Ms. Gerholt? Dr. Neeper?

MS. GERHOLT: No questions.

MR. NEEPER: No questions.

MR. DANGLER: No questions.

CHAIRPERSON BAILEY: Do you have rebuttal to those specific cross-examinations?

MR. JANTZ: No redirect.

CHAIRPERSON BAILEY: Okay. We are back to the question --

THE WITNESS: Madam Chair?

MR. JANTZ: I think the witness needs a break.

CHAIRPERSON BAILEY: Let's take ten and be back at ten till 3:00.

(Note: The hearing stood in recess at 2:40 to 2:50.)

CHAIRPERSON BAILEY: Would you please put the spreadsheet on the screen? Thank you. Back to your question, Mr. Bloom.

COMMISSIONER BLOOM: Actually, I think this question --

THE WITNESS: May I make a comment? In my enthusiasm I forgot to mention that I have a printout on all 66 of the cases. So if you wanted to ask a question about one of them, I do have that information here and I know Mr. Fort had asked something, and I forgot. They were out of sight, out of mind, but I have printouts from all of the 66

cases. If you have a question I will try to answer.

COMMISSIONER BLOOM: Thank you, Ms. Martin. Just to your left of the testimony here, you went through them a little fast. I was wondering AP 78, Pride Energy, what county was that located in?

THE WITNESS: I think those were all in Lea County.

COMMISSIONER BLOOM: I believe most of these were in the Southeast. Did you find any in the Northwest?

THE WITNESS: Of the seven I presented, unfortunately, they were all in the Southeast. I did not go and do some for the Northwest. I'm working at .75 cents an hour right now, so I just stopped. Other people may be familiar with the names and know that better than I.

COMMISSIONER BLOOM: You provided us with a number of summaries. Could those be made available to us to review?

THE WITNESS: Sure.

COMMISSIONER BLOOM: That would be helpful. So back to my original question. Were there any post Rule 17 leaks, pit liner leaks that you are aware of?

THE WITNESS: As you can see on the table, the last entry was in 2010, right? The Apache tank battery. That was actually a 1949 pit that was being closed. Doesn't have anything to do with anything. So I think the only 2009 were the effective date -- July. So to answer your question, after the effective date of the Pit Rule, there was nothing on this list. Whether this list is all encompassing, I have no idea. That finite list.

MR. CARR: When you say this list, are you referring to your exhibit?

COMMISSIONER BLOOM: Exhibit 5?

THE WITNESS: Exhibit 5, which was a subset of a larger exhibit that you guys referred to.

MR. CARR: I didn't know what list you were talking about.

THE WITNESS: I agree.

COMMISSIONER BLOOM: So then I think I will leave that there with respect to pits. And would you describe again what happens with liners in a situation where you have more weight on top of them? We talked about the multi-well fluid management pits. We heard that the typical multi-well fluid management pit could have about 40

acre feet of water in them. What happens to liner performance in that sort of situation?

THE WITNESS: Well, ten acre feet is about 3 million gallons, so four times that, 12 million gallons. It depends how they do that. If they get that capacity in depth, like have it maybe 18 feet deep. If they are trying to conserve water they are probably going to reduce the surface area exposure and go for depth, depending on how they do that.

COMMISSIONER BLOOM: Loss through evaporation?

THE WITNESS: Right. Loss through evaporation if they are holding it to be used, which was the way it was described as one of the uses. But the height, the maximum height of the liquid is the driving force, so if you had a wider surface area and shallower, you would have less driving force to the liner but you would have more liner material that was exposed.

A lot of seepage rates are given in gallons per acre per day. The permeability times the hydraulic gradient gives you the seepage rate and that's in gallons per acre per day so you multiply it by acres, which is the surface area, and it's already incorporated in the depth. So the

bigger, you have, obviously, more possibilities for downward migration. The bigger surface area, sorry.

COMMISSIONER BLOOM: No further questions. Thank you.

CHAIRPERSON BAILEY: Commissioner Balch?

DR. BALCH: I'm going to start off on Commissioner Bloom's question about -- I think you said that deeper pits, as you call them, can increase punctures in the liner?

THE WITNESS: Well, it increases the weight on the liner so if there's a sharp thing underneath it I suppose you are right, yeah. I could put -- if there was already a weakness in the liner -- there's a lot of liner failure studies on plastic liners where during construction a heavy object had fallen like a big, heavy wrench and then the impoundment had been used.

Dr. Daniel Smith did some studies where he actually went and drained 13 lagoons to look at what happened to the liners, and some of them, actually the impression of the wrench had been pushed like an impression. Didn't poke all the way out but it was pressed into the liner. So some of those kinds of things can happen, too. But yes. Increased depth is increased pounds per square inch.

DR. BALCH: So this is mostly in the context of the multi-well fluid management pit which presumably has more than just the primary liner system to protect it. So if there was a leak like that, it would be detected if there was an appropriate detection system in place: Secondary liner, catch basins.

THE WITNESS: Yeah, we talked about it. It's not obvious in the rule, right. So if there was a secondary liner and it was capable of capturing that through the duration of the use. And then, like I said before, there's did you capture 10 percent of the leak or 100 percent of the leak? So it's the idea of leak capture, not just leak detection.

DR. BALCH: So from your experience with agricultural, is it possible to design a pretty much foolproof liner detection systems?

THE WITNESS: My experience in 15 years with the agricultural industry is they are even more resistant to putting in plastic liners than the oil and gas industry. They share between a compacted clay and plastic, but they are behind.

DR. BALCH: Usually a single liner system, something like that?

THE WITNESS: Yes, if you are lucky. Depends on the size and depends on the state.

DR. BALCH: Your experience is primarily in Oklahoma but you testified that you also worked in 21 other states or 22 other states?

THE WITNESS: Right.

DR. BALCH: Give me an impression on how long the agricultural liquid pit would typically be in operation for.

THE WITNESS: Like for a large scale dairy, 20 years or more.

DR. BALCH: So they don't move around every couple years, they just have one pit --

THE WITNESS: Correct.

DR. BALCH: -- for the entire operation. I guess I am still asking you about agricultural pits because I'm curious. You gave a part of an answer in how they were designed. You said clay or plastic liner, usually single without leak detection or with leak detection?

THE WITNESS: Correct.

DR. BALCH: What would be a typical design in New Mexico, for example? I know your experience is primarily in Oklahoma.

THE WITNESS: Right. Actually, my

experience started in Oklahoma for CAFOs, but I have actually spent since 2004 working on CAFOs in Indiana and I spent -- I looked at 50 facilities in Colorado, looked at the four facilities of the largest facility in the United States, 70 mile long facility. I looked at 16 -- anyway, more information than you need to know.

Depending on the state, some states require monitoring wells to be installed when you construct the lagoon. So there's monitoring from the get-go. Others have a trigger that if there's a leak or spill that monitoring wells could be required, and this is written into their NPDS permit or their water quality permit.

In New Mexico for agricultural it's a groundwater permit for dairies, for example. I think we wanted monitoring wells to be included but it's an option for the permit writer. Does that answer your question? So that's the leak detection is monitoring wells rather than a double-lined system with a highly permeable sandwich.

DR. BALCH: That answered the question.

THE WITNESS: I did?

DR. BALCH: I think you did. I think you were already asked if you tried to incorporate some

of your questions about Mr. Mullins' Multimed modeling and you have some criticisms of some of the values and you went into it. I think you were asked if you tried to do the simulations yourself using the HELP of Multimed models and you said you hadn't used the software, but did you do any calculations or just use professional knowledge to come up with the conclusion that results would be different?

THE WITNESS: What I did try to do is read the manuals very clearly to understand what equations were used and where the parameters came from. Were they default parameters or input parameters, so that I understood. And then all I did was address whether or not some of those default parameters made sense when you looked at the regulatory language or made sense like if you make an assumption that you have four feet available for evaporating moisture, but that's not the case everywhere in New Mexico. Then that's not really fairly representing what happens in the field.

I looked for those kinds of things and then I doublechecked on the equations to make sure that they had some sort of relevance, how they were used in the actual computation of the model.

DR. BALCH: I guess I thought I heard you

conclude that you thought that Mr. Mullins' model was overly conservative.

THE WITNESS: No. Overly conservative?

DR. BALCH: Well, misrepresented the amount of possible infiltration or chlorides transport, under-represented.

THE WITNESS: Yes.

DR. BALCH: Did you make any calculations to back up that assertion? Back of the envelope or modeling?

THE WITNESS: I looked at the permeability equation that I mentioned on Page 74, 75 and how that would be affected by the change of permeability. You have to understand, if you say no liquid gets into the closure area at all, obviously no liquid can leave it because there's no input. And that's what one of the assumptions was, no rainfall ever would reach below four feet.

So, you know, you could have any kind of permeability and you would get no flow because there was no input, and I thought that was not reflective of what goes on in the field as far as the types of subsurface materials, et cetera.

DR. BALCH: Well, I guess asking a little bit more about that assumption of infiltration from

rainfall events, for example, in New Mexico. What is the primary source of water table recharge? I mean, if I think about the Ogallala, I think about water coming off the Rockies and kind of going underneath rather than coming in from above as rainfall.

THE WITNESS: Actually, like in Oklahoma, the Ogallala is recharged at Beaver River where the aquifer is exposed at the surface.

DR. BALCH: But it's still runoff from -- I don't know where that source water --

THE WITNESS: The little bit of water that Colorado and Texas allows to enter the state of Oklahoma. So mostly it's rainfall, which is why we have a significant drop and why everyone has gone dry farming. Because we had a 50 to 100-foot drop in the Ogallala in the panhandle and that's just not sustainable.

DR. BALCH: I think that's all my questions for you. Thank you.

CHAIRPERSON BAILEY: I have some. Throughout your testimony you did not distinguish plastic liners and we all know with your expertise that there's a world of difference between plastic liners that are six or eight mil thickness and 20

mil string reinforced L -- whatever it is -- DPE or equivalent. The list of wells on your spreadsheet, I paid close attention when you were talking about wells that had been -- or pits that had been constructed under Rule 50 as opposed to pits that had been constructed under Rule 17. Are you aware of the differences in the plastic requirements for liners between drilling pits constructed under 17 and those constructed under Rule 50?

THE WITNESS: Yes, I'm aware of the difference. In Rule 50, the language is to pick a liner that was adequate for the situation, so it could be clay or plastic. With respect to whether or not I delineated in my testimony whether it was LLDPE or HDPE or PVC and what thickness, I could only tell you what was presented in the information on the internet, so that would maybe direct the industry next time they do a closure plan that they be more specific. But when it was definitively said like 12 mil or 20 mil, then I brought that out.

CHAIRPERSON BAILEY: Right.

THE WITNESS: A lot of times it just said plastic, okay?

CHAIRPERSON BAILEY: Which could have been six, eight or ten mil plastic?

THE WITNESS: No telling.

CHAIRPERSON BAILEY: As was testified to in the original pit rules.

THE WITNESS: There's no telling, yes.

CHAIRPERSON BAILEY: So the question is which of these wells that are on your list have drilling pits that were constructed under Rule 17, not under Rule 50?

THE WITNESS: Right. And I think I answered that already. None of them.

CHAIRPERSON BAILEY: Which is what Mr. Mullins had to say.

THE WITNESS: By the nature -- that wasn't what I was looking for. That is what everybody else was looking for. What I was looking for was groundwater contamination with liners, period. There were 20 mil liners used in the past, even though they weren't required by law, and there was pollution, so I needed to bring that up because it seemed like we were always looking at the dry burrito and not talking about the groundwater contamination source which was the drilling pit itself during operation.

CHAIRPERSON BAILEY: And the specific requirements for the pit liners are not proposed to

be changed, are they, under these applications?

THE WITNESS: For the temporary pits, right?

CHAIRPERSON BAILEY: Yes. To retain the 20 mil string reinforced LLDPE or equivalent.

THE WITNESS: Right.

CHAIRPERSON BAILEY: I just want to have that very clear.

THE WITNESS: Yes.

CHAIRPERSON BAILEY: I have heard of companies who are developing above-ground tanks that are large enough to be used as multi-well fluid management pits. So there would be no digging out of earthen materials. They would be constructed on top of the surface. Have you seen any of those brochures?

THE WITNESS: I know in the agricultural industry there are above-grade silos that can handle up to maybe one to two million gallons of storage. Of course, those are glass-lined, fancy-schmancy. So I would not be surprised that there are companies out there proposing that.

CHAIRPERSON BAILEY: Do you have any comments concerning those above-ground tanks?

THE WITNESS: The construction materials,

maybe cathodic protection for corrosion and maybe some kind of secondary containment and that would be the way to go with that. At least you can see it.

CHAIRPERSON BAILEY: Given evaporation and high duration of clays and drilling muds, you several times have discussed calculations of water balance to determine leaks from temporary pits. Is that a practical way of determining smaller volumes of fluid loss?

THE WITNESS: Well, for example, in Colorado for agricultural impoundments, that's required. They have to do a mass balance in order to prove there was no seepage from the plastic liner. And you're right, for small volumes you would have to have a very good metering system, very good documentation, have on-site evaporation records, not just use the local airport or the local lake pan evaporation data, map, have your own rainfall data to narrow it down. But you would probably restrict it to some fraction of the pit.

And then what I found, because I looked at 50 of these in Colorado, and what I found is the really critical area is to have a depth to volume chart created by the engineer after construction where you know for each incremental foot in the

lagoon what is that volume of storage. So if you had a depth marker and you showed a two-inch drop in fluid level when everything should be the same -- say it happened in one day, so evaporation/precipitation is not necessary to count -- you could actually see it in the demarcation with your binoculars that there was a two-inch thing that you could actually calculate that that might be a seepage loss.

But if it was a quarter inch or if there was wave action, yes, in a larger lagoon your accuracy would be out the window. But it is a good starting point.

CHAIRPERSON BAILEY: That's all I have. Do you have any redirect?

MR. JANTZ: No redirect, Madam Chair.

CHAIRPERSON BAILEY: All right. Your witness may be excused. The next rebuttal witness would be -- Dr. Neeper, you had your turn? Dr. Jantz? We come to Dr. Buchanan.

MR. CARR: We prefer to have Dr. Buchanan as the last witness.

CHAIRPERSON BAILEY: Who is the next one?

MS. FOSTER: Mr. Mullins.

CHAIRPERSON BAILEY: He would be rebuttal?

MS. FOSTER: Well, yes.

CHAIRPERSON BAILEY: If you would like to put Mr. Mullins on, why don't we allow them time to --

MS. FOSTER: Actually, can we do this while we are waiting?

CHAIRPERSON BAILEY: Please go ahead.

MS. FOSTER: Madam Chair, this morning in the opening comments that we made to open this case, there was a statement that was made that the IPANM Case No. 14785 initially had an application concerning Otero Mesa in Rule 39. That was the initial application made by IPANM. I think back in October. That was part of our petition. By order of this Commission dated January 19th of 2012, Otero Mesa is severed from the case. Yet this morning there was a statement made that that issue was still pertinent.

At this time I would make an application to the Court to dismiss IPANM's petition regarding Rule 39. We do not intend at this point to continue litigation on Rule 39, and I have spoken to Ms. Calman, who has been there through this entire hearing expecting to discuss Rule 39, so I wanted to put the Court on notice that we are dismissing that

part of our petition at this time. So, therefore, there is no more severed case and, therefore, we are wholly under Case No. 14785 for this matter in this proceeding at this time. I have a copy of the order if you would like to see that as well.

CHAIRPERSON BAILEY: I recall. Any discussion?

MR. SMITH: You might ask Ms. Foster to draw up an order or give it to Florene to finalize dismissing that portion of the petition.

CHAIRPERSON BAILEY: Would you do so?

MS. FOSTER: Yes, I will.

CHAIRPERSON BAILEY: Thank you. Mr. Mullins, you are still under oath. You will remain under oath for your entire life.

TOM MULLINS

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

DIRECT EXAMINATION

BY MS. FOSTER

Q. Mr. Mullins, were you present for Ms. Martin's testimony today?

A. Yes, I was.

Q. She testified at length to what was eventually admitted as OGAP Exhibit No. 5. Are you

familiar with that exhibit?

A. Yes, I am.

Q. And that exhibit pertains to 228 cases of pits that are on the OCD website. Are you familiar with that list of pits in New Mexico?

A. Yes, I'm familiar with the list. I have 228 just because that's the line numbers. I believe there's been 224 or 222 listed because some of them are duplicates.

Q. Now, in your original testimony you testified to a number 421 cases of contamination. I believe that was one of the reasons for Ms. Martin's rebuttal testimony. And I believe you stated there was no cases of groundwater contamination from a drilling and reserve pit. Would you like to clarify that as it pertains to Exhibit No. 5, OGAP Exhibit No. 5?

A. Yes. Thank you. Originally I looked at a number of -- industry committee members. We looked at roughly 760 cases of alleged groundwater contamination. Of those, 421 cases were listed as having contaminated groundwater. And those related to entirely, every single one of those, to an earthen dehydrator, separator, drip pit, blow pit in those instances. None of those 421 dealt with a

workover or a drilling reserve pit and were lined in any way.

Q. Now, for clarification, if you could please describe to the Commission what do you mean by a blow pit?

A. We have had a few regulations regarding pits of all types over the years. A blow pit, a separator pit or a dehydrator pit was an earthen production usage pit. It received water as well as hydrocarbons on a very frequent basis for a long period of time, sometimes 40 years or 50 years or more, which is a different usage of the pit than what we're talking about principally here at this hearing today.

It's under a different sort of hydraulic head situation. It's being continually refreshed, and the incidents of those contamination cases, there were approximately 65,000 earthen production pits up in Northwest New Mexico, and when you look at the listing of those closures that occurred under the various regulations, we cycle those down to the 421 cases where soil had been contaminated. And from that list you have a smaller number where groundwater had been contaminated.

In all of the instances that I'm aware of

groundwater was typically less than ten feet or less than twelve feet in-depth. There are a few instances where it was 40 feet but those were all long-term production pit usage. So that differs from Exhibit 5, although the cases that are referenced in Exhibit 5 OGAP include a large number of the cases that were reviewed previously in 2007 and 2009.

Q. So of the cases that -- actually, before I ask you that question, on these type of pits, why don't you discuss the level of hydraulic head on some of these pits because that seems to be of great concern in terms of the migration issue.

A. First of all, we are dealing with a constant liquid phase. You have your water faucet dripping continually and it's dripping outside the house under the soil, it will continue to -- that column can stay hydrated and be under constant hydraulic head. The testimony in modeling that I presented was a diffuse natural recharge area which is effectively dry vadose zone material, not down along the river bank. And I believe that the testimony that I have given previously was correct with regard to infiltration rates that are typical for the state of New Mexico.

We are dealing with two different animals when we are talking about liquids being stored long-term versus short-term versus the modeling that I performed, which was modeling the solid drill cuttings and the movement of liquids potentially through the drill cuttings down to the vadose zone.

Q. Would it be fair to say in a very simplistic fashion that your modeling really did relate to drilling pits and not the multi-well fluid management pits being proposed by NMOGA and the IPANM petitions?

A. That's correct.

Q. Now, are you familiar with the seven cases that Ms. Martin raised and described to this Commission?

A. Yes, I am. I have reviewed Exhibit No. 5 and all 228 line items, and I concur with Ms. Martin's representation that there were 16 that are drilling reserve pit related cases, so I am familiar with those. I reviewed those records.

Q. And you are a professional engineer licensed in New Mexico, correct?

A. That's correct.

Q. And are you testifying as a professional engineer?

A. Yes, I am.

Q. As a professional engineer having reviewed those seven cases, what is your professional opinion as to the contamination claims that were made by Ms. Martin on those 16 cases?

A. Well, I believe Ms. Martin testified that the records indicate the word "contamination" by consultants in several of the reports. I reviewed each of these incidents, and again, they were all prior to the current Rule 17. Several of these reports reference an existing pit that is on the well site location, whether it was 1960s vintage, 1950s vintage. And in those particular instances, whether they were reserve pits initially, they were then utilized for produced water. So in those instances -- I think there's three or four cases -- in those instances I don't believe you can definitively indicate that the temporary lined reserve pit might be the potential cause of the groundwater impact.

It's interesting that it appears from my review of the records that there was a pursuit of the standard being -- the new standard of 250 milligrams per liter or effectively a pursuit of anything that would be greater than drinking water.

And then --

Q. For clarification, that's 250 milligrams per liter of which substance?

A. Of chlorides.

Q. Are chlorides a toxin?

A. I don't believe chlorides are a contaminant or a toxin that I'm aware of. I have reviewed the records and I don't see any information on the 16 cases that I reviewed that deal with any Benzene or hydrocarbon-related migration. They are all chloride related. There's no information in the analysis that was done with regard to the metals that potentially might be in there. So I think it would be inappropriate to conclude for the Commission that groundwater had been contaminated based upon just a cursory review and what was presented by Ms. Martin on drilling reserve pits.

Q. Now, Ms. Martin also testified to your modeling. Do you recall that line of questioning?

A. I do.

Q. And she specifically was concerned, as it related to the HELP model on your inputs, the infiltration rate discussion. Have you done any background research or any review of any peer-reviewed literature concerning acceptable

infiltration rates in New Mexico?

A. Yes, I have, and I believe I testified to that previously in the record, that Dr. Daniel B. Stephens had done an extensive study on the infiltration rates in New Mexico. And I recall Dr. Balch asking me the question what figure that was. Off the top of my head, that number does not come to me, but it was consistent with my prior testimony of what were reasonable infiltration rates.

Ms. Martin also indicated that I did not allow any water within the system. That would be incorrect. If you look at the HELP model input pages, you will find that I utilized an initial soil moisture in every instance within the model and accounted for the precipitation appropriately.

In addition to the infiltration rate, Ms. Martin indicated that she had a problem with the evapotranspiration depth. I believe the HELP model actually contains a map within the engineering manual that indicates that at 48 inches to 60 inches there is an appropriate depth for the evaporative zone depths being utilized, and in my opinion I think the modeling that I did is appropriate.

Q. Now, as to the API exhibit that Ms. Martin referred where she said that that only addressed the

heavier constituents, did you use that document in your modeling in your education in order to do the modeling in this case?

A. That would be Exhibit 13, the non-aqueous phase mobility when it's in soil. I utilized that in conjunction with all of our testimony in relation to Table 1 and Table 2, what would be acceptable threshold standards. Ms. Martin indicated in her testimony that this research document did not include reference to light aromatic hydrocarbons. And Page 3 of the exhibit covers Benzene, mineral oil, and then Page 5 of the exhibit also sets thresholds for gasoline, middle distillates, and I believe the exhibit adequately covers both light as well as dense, is her term, hydrocarbons. It can be utilized as a reference document for soil screening levels before you are concerned about the contamination becoming mobile.

Q. Now, as a professional engineer, have you testified in other jurisdictions?

A. I have testified in New Mexico where I am licensed.

Q. And why is it that you answer it like that? Would you not testify in Texas with a license?

A. I would send my $150 to the State of Texas and obtain my license in the state of Texas before I testified in a technical expert manner.

Q. When you say technical expert manner, is that in response or rebuttal testimony to another professional engineer's opinions?

A. That is correct. My understanding is that as a professional engineer you have to understand the regulations and rules not only in your state of jurisdiction but in every state where you plan to offer expert testimony.

Q. When you say expert testimony, is that on anything relating to your engineering experience as a petroleum engineer?

A. If I'm going to practice engineering as a professional in that state, I should have that designation, and especially before a regulatory body or a court.

Q. There was discussion by Ms. Martin that you had made the statement that the liner thickness is completely irrelevant to the modeling. I believe that she referred you to IPANM Exhibit No. 7, the HELP model. Could you discuss why it is that the thickness of liners is input that was relevant to your modeling?

A. I believe Ms. Martin inaccurately was representing what I said. My answer was given in response to Dr. Balch's question about whether the modeling output results from HELP regarding what the infiltration rate would be, would be appreciably different if the liner was present or the liner was not present, and I recall my prior testimony indicating that it didn't make much difference whether the liner was there or not. And that would be correct. The liner thickness is in this particular instance only .02 inches. Obviously the hydraulic conductivity, or if you change the liner style, it will affect the infiltration rate. But in this particular instance, given the entire four-layer model, it didn't make much difference.

Q. One final question concerning New Mexico recharge. I think this is a question that Dr. Balch put to Ms. Martin concerning the source of water table recharge in New Mexico. There is recharge in New Mexico, is there not? Particularly in the Southeast and the Northwest?

A. Yes, I believe there is. There is recharge along the rivers, recharge in the mountains. But my modeling in particular dealt with the unsaturated soil areas where we would be burying

drill cuttings.

Q. Thank you. No further questions.

MR. CARR: No questions.

CHAIRPERSON BAILEY: Cross-examination?

MS. GERHOLT: No questions.

CHAIRPERSON BAILEY: Mr. Fort?

MR. FORT: I would like to ask one question.

CROSS-EXAMINATION

BY MR. FORT

Q. Mr. Mullins, in your review of those seven cases, were you able to determine when the leak occurred, the operational phase or pre-closure or post-closure?

A. I could not from those records.

MR. FORT: Thank you.

CHAIRPERSON BAILEY: Mr. Jantz, do you have any?

MR. JANTZ: I do not.

CHAIRPERSON BAILEY: Mr. Dangler, Dr. Neeper?

MR. DANGLER: I have a few questions.

CROSS-EXAMINATION

BY MR. DANGLER

Q. I'm just trying to understand the

statement about it doesn't make much of a difference about the liner, which I think you retestified to now. And I'm sorry, but I'm really not at the level of the science so I need to ask a couple smaller predicate questions. It would seem to me just intuitively that the liner would create a barrier and could force some things upward in an evapotranspiration model; is that correct? Or not? Is that completely crazy?

A. I don't think that's correct what you said.

Q. So essentially the liner depth, there's no effect on the evapotranspiration at all, the existence of the liner at all?

A. In the model that I prepared for the Commission, the liner material was below the evaporative zone depth, so in all the cases that I presented a liner would not have had an impact on the near surface, potentially moving water to the side, let's say, over the top of the material.

Q. Okay. And what about the Darcy's flow model where one of the parameters appears to be the permeability of the liner? Why would the existence of a liner or not, not affect that?

A. The modeling that I performed, and when

you look at the distance that was traveled, I stated that the thickness of the liner material was .02 inches, as I recall, from the exhibit. So it's not very thick. In addition, we also had the other depths of material which also have hydraulic conductivities or permeabilities for flow, and my statement was that it was not going to be appreciably different given the order of magnitude that we are talking about and the scale of years whether the liner was present in the pit for the analysis of the drill cuttings.

Q. Okay. Let me ask you another question about the drill cuttings. Does your modeling assume that the drill cuttings have basically no moisture in them; that they are completely dried out?

A. As I recall, there's an initial moisture content of the waste material of the drill cuttings material, so that would be the moisture content.

Q. And do you recall how you came to that moisture content?

A. I don't specifically. Not at this moment.

Q. So if, per chance, drill cuttings had not dried out entirely and, in fact, were wet when they were buried, how would that affect your modeling, do you know?

A. It would change the initial conditions. I think given the scale of time, because the source of precipitation basically, the water that's coming into the system is controlled in the top 48 inches of the HELP model, that long, that it wouldn't change the long-term modeling very much.

Q. And then my other question for you is I believe other people have asked this and it may have been covered and answered, but in case I missed something. How do you test your modeling against real world conditions like, you know, how do you verify that the modeling has any meaning at all? No offense.

A. And I think that the evidence that the Industry has put on specifically in discussing the salt bulge, when you look at the natural soil profile that are everywhere in the State of New Mexico you will identify the salt bulge characteristics as being at various levels that I'm sure Dr. Buchanan can reference.

But our instances indicate 60, 70 inches in the case that comes to mind from the Burlington Resources pit up in the Northwest, as well as a review of the literature appears to indicate that very long infiltration times through the soils in

the areas that we're talking about here.

Q. So in terms of soil structure, we see some evidence of instability? Is that fair to say?

A. It breaches the natural -- breaches the profile, yes.

Q. And that seems to support the modeling that you did?

A. That is correct.

Q. And have you at all looked at any other sources of leaks and things that have gone through the soils that we have read about that are kind of common knowledge to people?

A. That's a very large statement. I have been working in this business for 20 some years. I'm not sure if it's within the scope of my testimony or not of rebuttal, but --

MS. FOSTER: I would object.

MR. DANGLER: Madam Chair, in response to the objection, I'm just speaking of common occurrences that are common knowledge to people. And the question would be, assuming I could ask it in parts, have you heard about the jet fuel leak in Albuquerque, and assuming you have, is there any attempt to rule out those migration patterns or compare those with what his testimony has been to

the Commission of what happens under his model. That's really the question. If he doesn't want to speak to it, that's fine.

CHAIRPERSON BAILEY: It would be helpful to have those specific questions.

Q. We will take the jet fuel from Albuquerque. That's one spill and leak that everybody is aware of. Obviously it's not from a pit but creates migration patterns and some surprising migration patterns. For instance, it doesn't go down towards the river but the other direction because it's being pulled by suction from water pumps. Have you considered anything like that in terms of testing your models with what we see in the real world?

A. I'm not familiar with that particular spill or release, but in general, long-term hydraulic head type fluid migration is a different animal than what we are talking about here with my modeling, so I don't know if it would be appropriate for me to comment on that.

Q. And have you taken statistics from the leaks that we have been discussing that have happened that are appropriate to compare?

MS. FOSTER: Objection. Could we get some

clarification?

MR. DANGLER: I think the clarification would be that we have been discussing a number of leaks that have occurred that people have testified to. There's been some talk about it today in rebuttal.

CHAIRPERSON BAILEY: The specific spills and releases in Exhibit 5?

MR. DANGLER: Yes, the 16. That would be my question, whether it is taking into account those.

A. Could you rephrase or ask that question again? Because I have looked at --

Q. Sure. Those are real world statistics from real world movement of chlorides.

A. Well, I don't think that's a correct statement on the question. Some of the cases relate to chlorides, some of them relate to, as in the long-term production pits, it was not chlorides that were being chased, it was a different contaminant.

Q. So various contaminants and they moved out of pits, and that movement is interesting. Have you attempted to use any of those figures to cross-check your modeling?

A. I don't think it would be saying

cross-check my modeling. I don't understand that with regard to your question. And in a general statement, I'm not trying to be flip, but you're lumping a large number of leaks or alleged cases of contamination and asking me to make a statement.

Q. That's because I don't do the work. That's why.

A. Generally, and I want to be very careful about what I'm saying.

Q. I'm just wondering if you have done any work with those kinds of movements, whether they are legally contaminants or they're just called contaminants by people, including the chlorides. Just those kinds of movements that we can document and then use that information to go check your model to see if your model makes sense. I wonder if you have ever done that?

A. I have done that but not for this specific case in here.

Q. Thank you. No further questions.

CHAIRPERSON BAILEY: Commissioner Bloom?

MR. NEEPER: Madam Chairman, is it possible to have other questions before the Commission?

CHAIRPERSON BAILEY: Yes, please do. I

did not see that you were wanting to.

CROSS-EXAMINATION

BY MR. NEEPER

Q. Mr. Mullins, my question deals with your response to an immediately previous question. Do you recall your testimony?

A. I noticed your face twist there.

Q. In response to a question you testified that to your best estimate, the presence of a liner in your HELP calculation did not affect significantly the evapotranspiration, that is the rejection of water back to the surface in the model; is that correct?

A. In the modeling that I performed, that's correct.

Q. In the modeling.

A. But if I placed a liner higher up in the profile within the evaporative zone depth, then that would not -- then I would have a different answer, but I did not do that.

Q. In your model calculations, the calculations showed on the average, depending on the location, an average of several millimeters of saturated water on the liner; is that not correct?

A. I believe the HELP model would indicate

inches of water above the liner -- above Layer 4, so it wouldn't be in millimeters, it would be in inches, and it would be referenced in the specific exhibit.

Q. But to your memory did it not show then a significant fraction of an inch to inches of water on the average on the liner?

A. Yes. It held that there was water in the column above the liner, that is correct.

Q. So now I think my final question: How can you maintain a saturated zone at four feet deep and yet at the same time maintain it does not affect the evapotranspiration? That's equivalent to having groundwater at four feet.

A. Well, I guess I'm not understanding your statement.

Q. I will rephrase the question.

A. The liner in this particular incident in the modeling that I performed is not within the evapotranspiration zone. It's deeper than that. So the recipe, as we talked about ahead of time, is removing the water at the top part, but there is water in the column that is referenced within the HELP model that is present on top of the liner material effectively. Now, whether that's all

directly in contact with one another, it's within the profile above the liner material. It's in Layer 1, 2 and 3 in this particular instance. So I guess I'm trying to understand where you are going.

Q. I will try to clarify the question, because I've already been there. What I'm asking about is the comparison between then the model and reality, and if in reality you maintain on the average a saturated region at a depth of four feet, does that not significantly alter the evapotranspiration as compared to what would happen if you had no liner and maintained no saturated zone at that depth?

A. I'm not trying to avoid the question. The moisture content of the soil is going to control the amount of water above the liner material. So ask me -- you're saying at four feet, which -- are you going hypothetically? Because the liner material and everything that we have is deeper than four feet.

Q. I'm sorry, I heard 48 inches.

A. That's the evaporative zone depth. The liners in all the instances I'm talking about are deeper than that interval. Then I tried to clarify by stating the amount of water above the liner

material is the water, as indicated in the HELP model, above the liner.

Q. Would you give us then just an example of depth to liner? Six feet?

A. Well, if I could reference my drawing on one of our prior exhibits, I know we had four feet of soil covering material, and I recall twelve and a half feet of waste without looking at the exhibit at the moment.

Q. My question is the same really. At that depth, if you maintain saturated at that depth, have you not altered the conditions and a return to the surface compared to what would happen if you had no saturation? It would make no difference whether you had groundwater at that depth or no groundwater at that depth?

A. I'm just not understanding your question, Dr. Neeper. I'm trying to get to an answer but I'm not understanding your question.

Q. I will try just one more time and get off it. I don't want to delay the Commission. You have stated that the liner, in your professional estimation, made no difference effectively to the --

A. No. No. I said the presence of the liner made a minor amount of difference with regard to the

calculation of the infiltration rate that would come out of the HELP model. That's what I stated. I didn't say that the liner wouldn't make any difference. It wouldn't make any difference because it's not involved in the evaporative zone depth. If it was, it would.

Q. The model?

A. Correct.

Q. In reality, which is what I'm trying to get at, if you maintain a saturated zone at that depth, it would certainly alter the evapotranspiration.

A. If you maintain saturation at depth --

Q. Whatever the depth the liner is?

A. At the depth that the liner is. Does that also imply, Dr. Neeper, saturation occurs from the liner back up to the surface?

Q. Not at all, but it certainly implies that you can conduct water backwards.

A. Yes, I'm saying that in this particular instance, the modeling that I performed is limited to 48 inches because of where the depth of the liner is.

Q. Okay. I'll give it up. No further questions.

CHAIRPERSON BAILEY: Commissioner Bloom?

COMMISSIONER BLOOM: No questions.

CHAIRPERSON BAILEY: Dr. Balch?

DR. BALCH: I think I have exhausted the questioning of you. Thank you for your time.

CHAIRPERSON BAILEY: Just a couple. None of the testimony today refuted your conclusion that the concentration of chlorides at water that's found at 25 feet exceeded -- that the maximum chloride level at that depth was 13.3 parts per million; is that correct?

THE WITNESS: That's what my modeling showed, that's correct.

CHAIRPERSON BAILEY: And that that was based on an initial leachate of 1,000 milligrams per liter?

THE WITNESS: Correct.

CHAIRPERSON BAILEY: Does that directly transfer over to the low chloride drilling fluids of 15,000 parts per million of chlorides in the drilling fluids?

THE WITNESS: I believe it would be applicable, yes.

CHAIRPERSON BAILEY: So our bottom line, once again, is if we are using low chloride drilling

fluids, the contents -- the fluid is removed from the pit, the contents of the pit are stabilized so they pass the paint filter test, that there's a bottom liner but no top liner, four feet of soil, earthen material put on top of the buried pit with vegetation; that the groundwater at 25 feet would not be contaminated beyond groundwater quality control commission regulations.

THE WITNESS: That's correct. It would not be above 250 milligrams per liter.

CHAIRPERSON BAILEY: That's all I have. Do you have any redirect?

MS. FOSTER: No, I do not. Thank you.

CHAIRPERSON BAILEY: Your witness may be excused. It is now 4:00 o'clock. We are ready for Dr. Buchanan but I would expect that he would take more than an hour.

MR. CARR: I suspect with cross it will go beyond that.

CHAIRPERSON BAILEY: Then we shall reconvene tomorrow morning at 9:00 a.m.

MS. GERHOLT: Excuse me, public comment?

CHAIRPERSON BAILEY: Yes. Do we have any other? No one has signed up today. Okay. Is Dr. Buchanan the last witness that we will have?

MR. CARR: I believe so.

CHAIRPERSON BAILEY: Then we will be able to wrap up tomorrow?

MR. CARR: Yes.

MS. FOSTER: Do you want closing statements orally or written? If I recall from the discussion previously you wanted everything written?

CHAIRPERSON BAILEY: Yes. We have asked for the attorneys to present closing statements and what is your request?

MR. SMITH: Findings and conclusions citing the specific spots in the record.

MS. FOSTER: That's what I recall.

MR. SMITH: What was the date?

CHAIRPERSON BAILEY: September 17th for closing statements to be presented to the Commission.

MR. SMITH: Closing statements, findings and conclusions?

CHAIRPERSON BAILEY: Exactly. And a week later we will begin deliberations, September 24th. Is there any other business before the Commission today?

MR. JANTZ: What was the discussion?

CHAIRPERSON BAILEY: The closing

statements, findings of fact and conclusions are due to the commission on September 17th.

MR. JANTZ: Thank you.

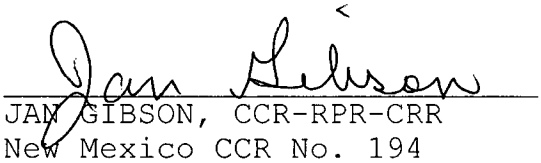
CHAIRPERSON BAILEY: Is there any other business before the commission today? Then we will adjourn until tomorrow morning.

(Note: The hearing was adjourned for the day at 4:00)

REPORTER'S CERTIFICATE

I, JAN GIBSON, Certified Court Reporter for the State of New Mexico, 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 and was reduced to printed form under my direct supervision.

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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