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 7

June 21, 2012
9:00 a.m.
Wendell Chino Building
1220 South St. Francis Drive
Porter Hall, Room 102
Santa Fe, New Mexico

THE COMMISSION:

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GREG BLOOM, Commissioner

DR. ROBERT BALCH, Commissioner

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EXHIBITS

(Note: In session at 9:00.)

CHAIRPERSON BAILEY: Good morning. It's Thursday, June 21st. This is a continuation of the Oil Conservation Commission hearing. It's the 21st and all three commissioners are here so we do have a quorum. Let's hope that the noise outside the room subsides so we can have air circulation here.

As I recall, Dr. Neeper was in the process of cross-examining Mr. Mullins following Mr. Mullins' direct examination. So if you would like to continue your cross-examination.

THOMAS MULLINS

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

CROSS-EXAMINATION CONTINUED

BY DR. NEEPER

Q. Good morning, Mr. Mullins.

A. Good morning, Dr. Neeper.

Q. In your representation of your pit in the HELP model, did you have a mound or a slope on the surface of the pit, which I understand the HELP will allow?

A. I had a slope, and the slope was the same percentage as what the Oil Conservation Division used. I would have to refer to the exhibit that

contains the HELP models to tell you the percentage, but I believe it was approximately 1 percent surface slope.

Q. You say that was according to a regulation for drainage?

A. No, I utilized the same surface slope that the Oil Conservation Division used in the 2007/2009 modeling.

Q. In the previous calculations?

A. That's correct.

Q. Thank you. Do you know of any other calculations that might be available anywhere that would support Dr. Buchanan's assertion that contaminants cannot move upward into the vadose zone? We recognize your model simply can't treat that situation.

A. I can think of one off the top of my head. I believe there's a reference document by the Environmental Protection Agency that discusses all models related to vadose zone modeling. I think it's in the 1996 vintage and I think it covers a broad number of models. I can't think of the specifics off the top of my head, but I would refer you to that.

Q. But so far as you know, you are saying it

is a code that could run such a problem perhaps but you are not aware of any application to New Mexico situations with that, any results?

A. I couldn't speak specifically to that. I believe the HELP model is an appropriate model because it does handle that surface section and the vegetation and the cover areas. So I think what we have tried to utilize with our industry modeling and the prior Oil Conservation Division modeling tries to take that area into account.

Q. In your HELP model did water collect in the liner of your pit?

A. I don't believe it did.

Q. If that is the case, if the liner stayed dry then, the pit itself transmitted the total infiltration; that is, what arrived at the top of the liner went out the bottom of the liner?

A. That's my understanding, yes.

Q. And did HELP remove any moisture from the pit layer itself? Or did it do its input and output just from the top layer?

A. The initial saturations, the initial moisture was set for each of the layers so it did not -- in the normal -- from that initial point it obviously would change, but I started with those set

conditions.

Q. Yes, but it did not remove as the years went by -- it was not removing moisture --

A. No, I don't believe so.

Q. -- from the pit region? So when the total transmission of moisture was determined strictly by the top layer, what came out the bottom of the top layer was the infiltration?

A. I don't believe that's exactly correct because there's initial moisture content or saturation set for each layer, so that included in my modeling the top six inches, the next 36 inches, another six more inches for a total of 48 for the cover. Then the 12 1/2 feet of the waste, and then at that point we switched models and there's initial saturation that was placed into the Multimed model from there. So it didn't reach an equilibrium condition similar to my understanding of your model.

Q. I understand your response. What I'm getting at is the dynamics as the years go by. We understood that moisture could go into the very top 48 inches and the code would determine how much would be evaporated, how much goes to plants, how much goes down. The next layer then is the pit, but there's no moisture going into or out of the pit

other than what the top layer transmits because you didn't have drains or things like that?

A. That would be correct.

Q. So that means the total infiltration was established by the top 48 inches?

A. Actually from the input to the top layer, which would be effectively the precipitation. And the majority of the movement is obviously confined in that evaporative zone depth which in my model was that top 48 inches.

Q. Maybe I can simplify what I am trying to get at. At the bottom of the top 48 inches some moisture moved downward into the pit.

A. Yes.

Q. And eventually one millimeter per year of moisture was the output. It must have been one millimeter per year in the long-run going into the pit because there was no other place for the moisture to go.

A. I don't believe that to be correct. I believe the output on the HELP model, if I'm not mistaken, indicates at each layer boundary what the movement is across that into the next cell or boundary. So what I know is the input at the top, which is the precipitation, coming into that top 48

inches. So I couldn't say there's one -- yes, I'm trying to follow your logic.

Q. Maybe if we put up the diagram.

A. I will put up the diagram.

Q. Because you and I know what we are talking about.

A. I think I know what you are talking about. Is this the diagram you are referring to?

Q. That's the diagram. Would it help if I rephrased my question?

A. Yes, please.

MR. NEEPER: Permission to approach the diagram?

CHAIRPERSON BAILEY: Yes.

Q. The HELP model has some moisture coming out of the bottom of this zone.

A. Correct.

Q. The infiltration or the rainfall and snowfall drops to the very top. The code determines how that should be divided and some moisture comes out the bottom?

A. Correct.

Q. If I understood you correctly there is no withdrawal of moisture on the 12 feet of drill cuttings?

A. That would be correct.

Q. Therefore, whatever comes out of the evaporative zone is the total infiltration to the whole process?

A. Yes, that's correct.

Q. Would that then mean if you could simply guess or estimate what comes out of this layer you could then use that as the input, one millimeter per year, shall we say, to the subsequent Multimed model?

A. It would not have passed through the liner material in my model, which would be Layer 3 and Layer 4, and it would not have potentially been retarded or accelerated. Well, I don't think there would be much acceleration. It would be retarded in that flow.

Q. But since there's no place for moisture to go, you had to have one millimeter per year coming out of here if there was one millimeter per year coming out of there.

CHAIRPERSON BAILEY: For the record, Dr. Neeper, could you please say what layer you are talking about?

MR. NEEPER: Very good, Madam Chairwoman.

Q. If there is one millimeter per year coming

out of the bottom of the evaporative zone and there is no other moisture removed from the problem, then the same one millimeter per year must be what comes out of the bottom of the liner.

A. The bottom of the liner would be Layer 4. I think there's a pointer here. I will try not to shoot anybody in the eye. Layer 4 ends right at that point there with the X. At that point is where the HELP model has its output. That infiltration rate is put in the Multimed model at that point. Depending upon the criteria put into the Multimed model and porosity and the path, tortuosity, I guess, just to use that term, you could adjust that infiltration rate at the time it reaches the mixing zone or the top of the aquifer. But for our purposes, one and a half -- approximately one and a half millimeters per year of infiltration coming out of the bottom of the pit.

Q. That is the same amount then, is it not, that comes out of the bottom of the evaporative zone?

A. It should be, yes. I believe so.

Q. So the question is, if we could somehow guess what comes out of the bottom of the evaporative zone we would not need other modeling

because that would be the same as the input in the Multimed?

A. I don't believe that to be correct, because you could have retardation, and obviously you need to pass through the liner materials whether it had a top liner or bottom liner from the evaporative zone, so I do think you need to cover the entire pit contents and what you are flowing through so you are coming out of the bottom of the drill cuttings or waste. We haven't factored in the contribution of the liner.

Q. All right. And all of your calculations use the same liner?

A. That's correct.

Q. And I understood you yesterday, I believe, in response to one of my questions, to say you had not tried different liners in test studies because you didn't believe it would make a lot of difference to the problem?

A. I believe that's accurate for what I said.

Q. The old pit shown in Dr. Buchanan's study, the bottom of that old pit, was it about three feet beneath the ground surface?

A. Excuse me, the top of the pit was three feet from the surface?

Q. My note here says that the bottom of the pit material was approximately three feet below ground surface.

A. That doesn't agree with my memory, but as I recall, there was only three feet of cover. The pit that was referenced in that report was in the northwest, an older closure, I think, 40 some odd years. It had three feet of surface material over the pit waste and then the pit waste extended some depth. I can't recall specifically, approximately 11 feet or so down maybe. I don't recall. And then below that point was the discussion that I recall that you had with Dr. Buchanan about the movement.

Q. All right. Since we don't have that diagram up we have different impressions and different memories of it, so I can't ask the question about it. But would it be normal to have a reserve pit with its bottom at 16 feet below ground surface? My view of pits is a berm has some depth to the pit and 16 feet seems deep to me. Am I in error?

A. I'm glad you brought that up because I didn't get an opportunity to talk about the angle of repose in the construction of pits. Especially in the northwest we tend to -- our pits are much

smaller than in the southeast and we tend to construct them with a bulldozer running one direction basically. So we have a rather vertical slope on two sides of the pit and a more gradual slope so that the bulldozer can come in and out.

The reason -- there are several reasons to that. Our well locations are very difficult to spot and we are under site limitations. So because of the -- if we were on a two to one slope we would have a massive area for the construction of the pit so we tend to dig that back and forth with the bulldozer scraping and stockpiling the material.

So on two sides of the pit, usually next to where the rig operation is, it's nearly vertical. Not quite vertical. But then on the other two sides it's sloped gaining access to the pit. So those are the reasons that I think we were looking for some adjustment in the Pit Rule, because having a fixed slope was not -- we would be asking for a variance every single time if that wasn't already within the rule. I'm not sure if I answered the question.

Q. I think you did, yes. For me and for the other people. I think with that clarification on the angle of repose I have no further questions. I thank you for your patience with my questions.

CHAIRPERSON BAILEY: Dr. Bartlett, do you have questions?

DR. BARTLETT: No.

CHAIRPERSON BAILEY: Mr. Fort?

MR. FORT: Madam Chair, no.

CHAIRPERSON BAILEY: Commissioner Bloom?

COMMISSIONER BLOOM: Yes, a few questions. Good morning, Mr. Mullins.

THE WITNESS: Good morning.

COMMISSIONER BLOOM: I wasn't here in 2007 or 2009 when parts of the model was first presented to the commission, so if you will indulge me on just a few background questions.

THE WITNESS: Sure.

COMMISSIONER BLOOM: Can we turn to Slide 2 of your presentation?

MS. FOSTER: Which exhibit?

THE WITNESS: Six, I believe.

COMMISSIONER BLOOM: Yes. The infiltration rate is going to be as low as 0.03 millimeter per year to 0.1 millimeter per year?

THE WITNESS: Correct.

COMMISSIONER BLOOM: Is the .1 millimeter per year on the high end or is this the low range of .03 millimeter per year to .1 millimeter per year?

THE WITNESS: In that particular study it was a model. It was not actual field-tested results. There are numerous studies. It was summarized in a report prepared by Daniel B. Stephens in 2007. He did a good job putting all the references together in relation to existing infiltration rates in New Mexico so that is one of the reports, one of the references in that.

COMMISSIONER BLOOM: Let me try again. So is this the low range or is the high end of the range .1 milliliter?

THE WITNESS: Well, the infiltration rates could be much higher in New Mexico at different points. The range that my modeling represented around up to one and a half millimeters per year is normal, representative of the areas that I modeled. It could be -- if you are looking for a range where it could be higher, it could be 8 millimeters, ten. Again, it depends on the location.

Scanlon, first name is Bridget, did some work. We were discussing nuclear testing and there's some reports that were done from Tridium and chloride 36 ions or chloride 36 where they measured that at 1.4 millimeters per year and as probably more recent data. So there's a number of studies

that cover a range of infiltration rates. This representation here is it could be as low as, so it's more on the low end, I guess to answer your question.

COMMISSIONER BLOOM: You used higher rates also when you were working through your models?

THE WITNESS: There were -- if you run the models from the Oil Conservation Division in 2007 and 2009, their infiltration rate with two feet -- this was two feet of soil cover, no liners whatsoever at all, different soil texture characteristics actually that would allow a little quicker movement than the remaining four-foot models. They had a peak of 29 millimeters per year, and I indicated Dr. Neeper's evaluation, his highest infiltration rate was 88.9 millimeters per year. His middle range was 35 and his low range was 1.27.

COMMISSIONER BLOOM: Turning to Slide 5, please, of the same exhibit, the HELP model input parameters.

THE WITNESS: Yes, I have it.

COMMISSIONER BLOOM: So looking at this across New Mexico, we're looking at a rule that will serve the whole state. We will see very different numbers of layers, layer thickness. How does the

model account for that variability across New Mexico?

THE WITNESS: Well, I think we have to remember we are talking about the -- we are dealing with the unsaturated portion of the flow so again we are not talking about river bottoms, areas that would obtain a lot of surface flow ideally, which would then be under some hydraulic conditions. The overall -- I guess to take the key criteria, which is the evaporative zone depth, to jump to that, the evaporative zone depth, I believe, will be consistent, more consistent across the state with the range, you know -- there's indication -- about half of the state if you look -- there's a map of it within the HELP model. Half of the state could be as much as 60 inches and the other half of the state is in the 48-inch range. That's the main driving area, because it's the recipe, it's the limit to the recipe, I guess as Dr. Neeper said, where you are getting the movement back and forth.

The other values, I think the precipitation values are pre consistent across the state and that's the main driver.

COMMISSIONER BLOOM: That question might have been better asked with respect to the Multimed

model perhaps.

THE WITNESS: Once you reach the Multimed model, it becomes irrelevant of its geographical location because it's now -- it no longer has that input. Once you have the output from the HELP model, that's where you are geographically taking into account those considerations. And the output of the HELP model would then be put in the non-geographical portion of the Multimed model.

COMMISSIONER BLOOM: Multimed must --

THE WITNESS: It's because the Multimed model uses the output from the HELP model.

COMMISSIONER BLOOM: But the Multimed doesn't account for various strata?

THE WITNESS: It can, yes. In the modeling I presented I stayed with the same strata.

COMMISSIONER BLOOM: Sandy loam.

THE WITNESS: I made a single-layer model of the vadose zone interval. I would have to reference exactly, but it's a sandy loam, represented as a sandy loam.

COMMISSIONER BLOOM: If that strata was different would we see then essentially faster or slower movement across?

THE WITNESS: You could if you modeled it.

Normally, obviously, there's multiple layers in the soil, and the tighter, more clay-like layers would slow things down. The more porous intervals would speed that up. I think that was represented by Dr. Neeper in his model.

COMMISSIONER BLOOM: Did you run this model with a top liner at all?

THE WITNESS: I did not in my modeling. It was run in 2007 and 2009 by the Oil Conservation Division.

COMMISSIONER BLOOM: Then on Page 24 of IPANM's proposed changes to the Pit Rule it discussed testing of discolored soil. So what we are looking at here -- I just want to clarify -- is that you would -- a company would test but not report that it did testing?

THE WITNESS: That's correct if it was -- the concern that industry had is that we were taking this beyond the below-grade tank area. In the below-grade tank area obviously we are already filling out a report on the closure of the below-grade tank. The concern was now that we could be outside of the below-grade tank closure portion of the rule and we have some wet or discolored soil and we are recommending just testing that rather

than filing reports and being at the submittal of material level.

COMMISSIONER BLOOM: I think one concern we could have is we wouldn't have any data on how often we would see those sorts of minor leaks.

THE WITNESS: That's covered under the Spill Rule, so that's what we are saying. Rather than having the Pit Rule begin to conflict with the Spill Rule that we follow the Spill Rule guidelines.

COMMISSIONER BLOOM: Mr. Mullins, can you speak to Exhibit 16? Ms. Foster, I don't know if it was 16.

THE WITNESS: If that's the economics, I didn't --

COMMISSIONER BLOOM: I'm sorry, Exhibit 14.

MS. FOSTER: That's the USGS?

COMMISSIONER BLOOM: Yes. Can you summarize how you see this supporting IPANM's petition here?

THE WITNESS: Well, I believe I testified this gives some background information, especially in arid environments. The comments within the report that I recall indicate that vegetative cover obviously was a positive influence in minimizing

infiltration rates even in arid environments. It also indicated some long time periods, obviously in arid environments where water movement occurs. It's more background information really than being specifically applied.

COMMISSIONER BLOOM: If you turn to the third page, if you go down a couple paragraphs, I had some concern with this paragraph here on the right about backfilling, saying "Backfilling with very dry material will, at least initially, increase the importance of vapor flow as a potential transport mechanism in the trench fill." Can you speak to that a little bit?

THE WITNESS: Well, I think this gets to what Dr. Neeper was talking about if you have what the saturated condition is in the soil. It obviously is going to reach some saturation level but it won't go below potentially. So if you are backfilling dirt that is dry, it's been drying, baking in the heat of the sun, it has hardly any moisture content at all and now you are putting it down in the trench so it could pull moisture up until it reaches an equilibrium level.

COMMISSIONER BLOOM: If you could go to the next page, in the first paragraph we see sort of

a summary. "In addition, although significant advances have been made in the development of soil water flow models, the lack of long-term field data has resulted in these models remaining largely untested as to how well they represent flow systems in arid sites." Can you speak to that?

THE WITNESS: Well, I think in general, especially when you look at the short summary version, my opinion might be they are saying that we should appreciate some more funding to continue our analysis and obviously would like to have more funding to do more work.

COMMISSIONER BLOOM: Thank you. No further questions.

COMMISSIONER BALCH: I'm not going to comment on the last. Good morning, Mr. Mullins.

THE WITNESS: Good morning.

COMMISSIONER BALCH: As you can probably imagine, most of my questions have to do with your model.

THE WITNESS: Yes.

COMMISSIONER BALCH: I think Dr. Neeper did a good job of asking you questions about the effect of the model but I'm going to ask some more nuts and bolts questions.

THE WITNESS: I anticipated that. Hopefully I will be able to answer those.

COMMISSIONER BALCH: Part of it is because of a philosophy thing that I have about modeling and simulation in general, but I think it's possible for models to be an excellent tool to project into the future what you might expect. A lot of times we don't have ten years or 100 years or 1,000 or 10,000 years to wait and see the effect of a raindrop on the surface and does that eventually end up 500 feet away.

However, for a model to rise to the bar of providing data, there has to be some assurances about the construction of the model, the data that goes into it, the use of the model. So I think the first thing you are looking for is an accurate model. Doesn't matter if it's simple or complex and you can have a very complex simulation with a customized equation state and still end up with a bad output or you could have a simple empirical relationship, which I believe is the basis of the HELP and Multimed models. If it's based on data which adequately represents what you are trying to show, that can be an effective solution.

So usually to get a measure of the

accuracy of your model you will compare it to some data in a simulation. You will do a history match where you try to predict variables that were not used in the model, for example, or you might use exclusion testing of data. If you have a ten-year dataset, you leave off the last year, build your model with the first nine years and predict the last year to get a measure of how accurate the model can image reality. Of course, none of these models really give you reality; they give you something that might be close.

So my first question on that train of thought is about the validation of the HELP model by the Army Corps of Engineers when they developed it. Do you recall -- I didn't have a chance to read the entire manual. Do you recall how they tested their model's accuracy?

THE WITNESS: I don't off the top of my head, no.

COMMISSIONER BALCH: Some questions were also raised about limitations of the model with regards to measuring low chlorides, because nominally it's supposed to pick up the infiltration rate. There's a component where it will pick up chlorides or some other material in the soil and

then carry that down. Could you address how or what limitations are in the model with regard to chloride transport?

THE WITNESS: Specifically, the chloride input didn't go in until the initial concentration of the Multimed --

COMMISSIONER BALCH: That's another --

THE WITNESS: -- point. So there was no contaminant in the HELP model. That was to derive the infiltration rate. The contaminant was first put in at the Multimed model input level and that's where I selected the 100,000 milligrams per liter or the 1,000 milligrams per liter input.

COMMISSIONER BALCH: How does that compare to what the previous people that have used the modeling software in regards to the question in 2007 and 2009?

THE WITNESS: It is the same representation in 2007 at the 100,000 milligrams per liter level. In 2007 the Oil Conservation Division did multiple concentrations, multiple initial concentrations.

COMMISSIONER BALCH: And they settled on the 100,000?

THE WITNESS: They utilized for Southeast

New Mexico the 100,000 level. At that time it was for the same reason, that the threshold standard that they were recommending initially was 5,000 milligrams per liter SPLP threshold, so that worked its way into why they were running the 100,000 milligrams per liter initial concentration, because the burial standard was set for a three to one mixing ratio.

COMMISSIONER BALCH: Okay. On the HELP model itself I noticed in the manual -- I skimmed through it -- that that was Version 3. There were a couple other versions before it. That implies that there's some utilization of the software for it to reach that third version, so we had to use the second version and have said, "There's something wrong with it, we need to fix it." Are you aware of any future versions of HELP?

THE WITNESS: This is the latest version of HELP. I believe -- obviously, I would add, this is the DOS-based program. The mathematics in the characterization were carried on to Windows-based pretty color picture versions.

COMMISSIONER BALCH: So subsequent changes to the model really were in the interface.

THE WITNESS: It actually evolved with the

capabilities to -- there's a brief summary in the manual on the different versions and what criteria were added and capabilities. I don't recall those specifically, but the version I used was the same version that the Oil Conservation Division used. It's the most -- it's publicly available. It's free software.

COMMISSIONER BALCH: Similar to --

THE WITNESS: Right. You just have to pick up the manuals and get into it.

COMMISSIONER BALCH: So is this model in wide use? I think you said it's used in Wyoming.

THE WITNESS: It is used in Wyoming, as I recall. I can't remember the specific aspect off the top of my head. We have some natural gas properties up in Wyoming and I was reading some regulation -- I can't tell you specifically -- and they were referencing the applicability of utilizing the HELP model on a regular basis to comply with their rule, but I can't tell you which one that is.

COMMISSIONER BALCH: Certainly there's landfills everywhere.

THE WITNESS: Right.

COMMISSIONER BALCH: When you go to obtain the software where do you get it at?

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THE WITNESS: I believe it's the U.S. Army Corps of Engineers website, freeware version. It's a little difficult to find because they have some other versions of other software that you can get but it's available from the link. I would be happy to supply those.

COMMISSIONER BALCH: I was just curious. It's permanently placed somewhere where people --

THE WITNESS: It comes up immediately when you put it in Google. When you see the screen you keep asking yourself, "Is this the download?"

COMMISSIONER BALCH: If you type HELP model in Google it's the first result?

THE WITNESS: EPA HELP model, contaminant, that sort of thing. It comes up, yes.

COMMISSIONER BALCH: Fairly easy to find? There was a question raised by Dr. Neeper as to the resolution of the model. I think he was questioning whether you could resolve the 1 in 355 difference. Would it really come down to significant figures and accuracy of the input empirical relationship?

THE WITNESS: Well, I guess the -- I'm not familiar with the code enough to know what that -- within the evaporative zone what that cell size is within that. So I'm not sure how to answer that

question. Maybe you could ask it one more time.

COMMISSIONER BALCH: A computer will give you as many digits as it's programmed to give you. Eight, 16, 24, a million, however many you want. Assuming the figures, of course, is related to the input data, how many of those decimals actually have meaning in the calculation. But then the other effect that could impact the accuracy is the relationship itself, whatever relationship they used to generate the algorithm. It could have some limitation on accuracy.

THE WITNESS: I understand your point. Starting with a low significant figure input relative of accuracy but then taking that out to a much higher degree of accuracy in your output. I'm not sure I can comment on that. I worked with the available information that I had. I put in as many significant digits, I guess, as I could for my input.

COMMISSIONER BALCH: Hopefully that you could justify.

THE WITNESS: Yes. Obviously, when we are converting -- and I have a representation of that on Exhibit 16. I attached a spreadsheet that had my conversion factors that I used from inputs to

outputs, so when I'm converting the units I'm trying to carry as many units appropriately that the software will allow.

COMMISSIONER BALCH: Okay. So the next thing I look at in a model -- I will give you my list of questions if you don't mind.

THE WITNESS: It's been a long time since I have been in class.

COMMISSIONER BALCH: You had physics so you are okay.

THE WITNESS: I started off as a physics major. I didn't end as a physics major.

COMMISSIONER BALCH: As Dr. Neeper said, you had a good start. Sensitivity testing is important for understanding kind of the range of response of the system that you are modeling.

THE WITNESS: Yes.

COMMISSIONER BALCH: And then you can compare those ranges to find out if they are acceptable in comparison to other published data, other studies, common sense, a number of other features.

THE WITNESS: Yes.

COMMISSIONER BALCH: When you did your sensitivity testing you mentioned that you made a

lot of runs and you did some sensitivity testing. Which variables did you look at and where did you come up with your input ranges for your sensitivity analysis?

THE WITNESS: Obviously, the key variable that I changed was the evaporative zone depth. I went back and looked specifically at the 2007/2009 hearing information to find out how -- was there any comments on how the 20 inches was selected to begin with, and I didn't find it was even raised as a discussion item.

So I tried to find well, let's take a look at that. So I did run the models at the 20-inch evaporative zone depth. It had a significant difference resulting in higher infiltration rates than using 48 inches and, of course, I limited it to 48 inches. I couldn't go beyond that point. I varied, obviously, the precipitation inputs, varied that.

I actually tried not to deviate too much from the soil texture levels. I just said if I start playing with the conductivities of the soil I can change dramatically the outputs. I could put in more layers. I could put in a bentonite clay layer, for instance, because we have spud mud. It's that

bentonite clay layer, as Dr. Thomas indicated, is going to be on the bottom of the pit. It's actually going to have a decent thickness value. I didn't run that run but I know what it would do.

And I looked at the relative outputs from the good liner, poor liner, liner existence and liner quality in the bottom of the pit made very minor changes in the overall flow. It's obviously necessary to hold the liquids while the liquids are in the pit. But those, I guess, are the main ones I was looking at.

COMMISSIONER BALCH: Maybe if we looked at Slide 5. And I wasn't here for the 2007 or 2009 hearings. Well, I was one day in the audience for the 2007.

MS. FOSTER: That's Exhibit 6 so the record is clear.

COMMISSIONER BALCH: Exhibit 6, Slide 5.

THE WITNESS: One of the reasons I stuck with this model rather than going with the new computerized colored pretty graphs is it has already been in the record and much of the background and support information I could reference and rely upon.

COMMISSIONER BALCH: In 2007 and 2009 these models were primarily presented by the OCD.

THE WITNESS: They were presented by Ed Hanson with the Oil Conservation Division.

COMMISSIONER BALCH: I am asking you to remember a few years back. We can also look this up in the record.

THE WITNESS: And I did duplicate their models so that I could talk about them, yes.

COMMISSIONER BALCH: Did you find, as you mentioned, the soil conductivity is a sensitive variable.

THE WITNESS: Yes.

COMMISSIONER BALCH: Did you consider the value that was used in the model to be appropriate?

THE WITNESS: I believe so for the soil types that are referenced in New Mexico.

COMMISSIONER BALCH: From your recollection in 2007/2009, were these variables the sensitive variables questioned.

THE WITNESS: They were not. There was not a discussion. It was all sandy loam, fine sandy loam discussions. There's a classification obviously within the HELP model. I think there's two classification systems that are listed in how they are numerically related to input. It's obviously a number that you select within the HELP

model. And those texture types, there was one texture utilized for the waste material. I didn't get into is the waste material really made up of that, does it have bentonite in it to stabilize it, does it have cement, because obviously when we are cementing the well our cement returns come back into the pit and those happen to have some salt in it sometimes, but it's a more stable form of salt than being saturated salt.

COMMISSIONER BALCH: So if we just go down the list since it wasn't addressed before.

THE WITNESS: I did vary the wind speed. I varied the humidity.

COMMISSIONER BALCH: Was that something you would consider to be a sensitive area or non-sensitive?

THE WITNESS: Non-sensitive from the standpoint of the range that I was working within. From 40 to 55 percent values that I recall for that input. It wasn't significant. I mean, it had -- obviously, the humidity drives that evaporative zone portion.

Wind speed, I varied it slightly a few miles per hour on the average wind speed inputs. Again, it had a minor judgment. The main macro

adjustment criteria relative to the inputs for New Mexico that were reasonable was that evaporative zone depth.

COMMISSIONER BALCH: That was the most sensitive?

THE WITNESS: Yes, it had the largest effect on the output.

COMMISSIONER BALCH: So relative to that half, quarter, 10 percent, what about temperature and humidity?

THE WITNESS: For the areas, less than 5 percent.

COMMISSIONER BALCH: So a very small effect.

THE WITNESS: Because of just the range in New Mexico.

COMMISSIONER BALCH: Solar radiation.

THE WITNESS: It was, again, less than 5 percent.

COMMISSIONER BALCH: These first four variables are really just evaporation?

THE WITNESS: Right. Precipitation was the largest out of that groupings.

COMMISSIONER BALCH: More water you put in, the more water you get out essentially?

THE WITNESS: Yes.

COMMISSIONER BALCH: Daily evaporation index, did you check that variable?

THE WITNESS: I did not. That's more a result and calculation that is created from a synthetic and I didn't go through and look at that.

COMMISSIONER BALCH: I saw that in the description. So number of layers. This is doing a calculation layer by layer and passing the result to the next layer.

THE WITNESS: Correct.

COMMISSIONER BALCH: Number of layers in and of itself would not have an impact. The composition of the layers might, for example.

THE WITNESS: Correct.

COMMISSIONER BALCH: Did you do any sensitivity on the type of layer?

THE WITNESS: Yes. Mainly I stuck with the soil textures that were utilized by the Oil Conservation Division and their difference in hydraulic conductivity which was about roughly 15 percent difference in the hydraulic conductivity of the soil. Obviously, that has a corresponding change in the infiltration rate.

COMMISSIONER BALCH: The outer layer would

be a relatively sensitive layer or sensitive variable?

THE WITNESS: Yes, because the way the HELP model functions, the top layer that you select allows for roots of plants to be in there, so even though it's in that funnel, it allows fluid to move really more quickly through that top six inches. So, for instance, in the 2007 hearing when we had the representation of the two feet of soil cover with no liner in the bottom of the pit, even though that had a different hydraulic conductivity, but because they used the full 24 inches at the top it would allow fluid to move more quickly through the top 24 inches, and then with the evaporative zone limited to 20 inches it would allow the fluid to move more quickly.

COMMISSIONER BALCH: Dr. Buchanan gave testimony about the distance of roots in the soil and that.

THE WITNESS: Yes.

COMMISSIONER BALCH: Is six inches going to be compatible with his testimony?

THE WITNESS: I think we have two different items. His testimony regarding the depth that the roots get to, I understand, could be four

feet even down into the pit waste. There's a slight difference between how the HELP model models that top layer and the evaporative zone where the evaporative zone is always greater than what you select for your root thickness. Because the Oil Conservation Division did not -- within the HELP model there's a leaf area index based upon vegetation.

Obviously, we are not East Texas, for instance. There's not as much surface area of plant material to take water into the area so -- I'm getting lost of my thoughts. Remind me of your question. I don't want to be here all day. Excuse me, I would like to be here all day if you would like me to be.

COMMISSIONER BALCH: We are trying to get you to beat your nine-hour record from last time. It was really the thickness of the root possible layer. Because of the greater infiltration.

THE WITNESS: The evaporative zone depth, which doesn't necessarily correlate, as a general statement, to the root layer.

COMMISSIONER BALCH: So maybe apples and oranges there. Layer thickness? Does it have a net effect?

THE WITNESS: It actually does not necessarily have -- it's more the material -- the hydraulic conductivity.

COMMISSIONER BALCH: Because it's a step calculation. It's not a strong factor.

THE WITNESS: Correct, because we are getting to the infiltration rate and then going from there.

COMMISSIONER BALCH: And soil type also falls into types of layers, so would that be a somewhat sensitive area?

THE WITNESS: It's a sensitive area because the soil type changes the hydraulic conductivity.

COMMISSIONER BALCH: And soil porosity?

THE WITNESS: Porosity and moisture.

COMMISSIONER BALCH: In most of these variables you just used what the Oil Conservation Division used before?

THE WITNESS: I did. I tried not to deviate from anything that had been put in previously. There are standard values associated with those.

COMMISSIONER BALCH: These come from literature?

THE WITNESS: The initial inputs from the HELP model.

COMMISSIONER BALCH: In their data, their upper values, do they give you tables for arid versus semiarid versus other types of regions?

THE WITNESS: They have a map. They have some maps that generally reference evaporative zone depths that could be generally used in those.

COMMISSIONER BALCH: They mapped the evaporative zones?

THE WITNESS: They map leaf area index and those sorts of things.

COMMISSIONER BALCH: On the maps for New Mexico do you see -- how many contours across New Mexico, I guess, would be the question?

THE WITNESS: One.

COMMISSIONER BALCH: It's pretty much --

THE WITNESS: It's 48 inches to 60 inches on the maximum end.

COMMISSIONER BALCH: How many contours total on the map, just from your memory?

THE WITNESS: In the United States?

COMMISSIONER BALCH: Yes. Do you get areas where there's a lot of contours?

THE WITNESS: Yes.

COMMISSIONER BALCH: So it's not necessarily a lack of data that would --

THE WITNESS: No, it's that we are in a semiarid/arid region.

COMMISSIONER BALCH: I don't know what soil field capacity is.

THE WITNESS: Dr. Neeper will get me. I believe that's -- you know, rather than tell you the wrong thing I'm going to refer to the manual if I can.

COMMISSIONER BALCH: Was that a variable that you tested?

THE WITNESS: I did not, no.

COMMISSIONER BALCH: Wilting point. I also don't know what that is.

THE WITNESS: I believe that's the ability for moisture to be taken out of the soil by plants, as I recall.

COMMISSIONER BALCH: And --

THE WITNESS: I did not test that. I stayed with what had been used previously.

COMMISSIONER BALCH: Initial soil moisture, I think, was raised by Commissioner Bloom. Also by Dr. Neeper.

THE WITNESS: It was originally set -- the

conditions were set rather than having -- my understanding is it will calculate what an initial soil moisture is. I stuck with the same initial soil moisture content that was selected by the Oil Conservation Division rather than calculate one. That gets into the discussion with whether you put dry soil in versus wet soil. So the conditions that started at time one, I just tried to use the same ones.

COMMISSIONER BALCH: If you start out with dry soil conceptually over time, there's going to be rain or other events that cause infiltration.

THE WITNESS: It will reach -- we had that discussion about the hysteresis effect on soil. You are going to reach that point where it will go in but only so much will come back out.

COMMISSIONER BALCH: For a four-foot layer versus the 20-inch layer, relatively speaking, to reach that equilibrium what would you consider to be the experience of this model?

THE WITNESS: To reach the equilibrium I did not run -- you know, I did not put in within the model zero saturated and then be able to look somewhere. I'm trying to think if there's a way even within the model, in this particular model, to

look within the layers or the cells to determine at what point -- obviously, the saturations in the moisture content is changing but where do I go to look at that? I'm sure that's somewhere within the code file but I'm not sure where to look on that, so I did not check that.

COMMISSIONER BALCH: Soil moisture basically is set to what the New Mexico value would be?

THE WITNESS: Yes, I set with -- the initial saturation levels for the majority of it is 13 percent, 14 1/2 percent in the main portion of the soil. The top six inches was 13.3. In the waste material it was 14 1/2 and then the cuttings, for instance, in the waste layer was 28 percent saturated level.

COMMISSIONER BALCH: Initial?

THE WITNESS: Initial, yes.

COMMISSIONER BALCH: So for the regular soil, not the waste, it's a 13 percent value. Is that considered typical?

THE WITNESS: I believe so from what I have read.

COMMISSIONER BALCH: Hydraulic conductivity. Is that something that you examined?

THE WITNESS: It went along with the change in soil texture, type. They were hand in hand. When you selected a different USDA soil texture it had a different hydraulic conductivity that was associated with it so those varied at the same time.

COMMISSIONER BALCH: I think you already discussed the quality lines installation. From nothing to torn to pristine.

THE WITNESS: Right. I used the good determination with the number of defects in the liner the same as the Oil Conservation Division had used previously. And then, of course, I ran with no liner.

COMMISSIONER BALCH: You found that to not be a sensitive area?

THE WITNESS: It's obviously sensitive if you had full liquids in there, but it was not sensitive for the cuttings portion.

COMMISSIONER BALCH: Is that how you came to your conclusion that the top liner would not be effective?

THE WITNESS: I believe in New Mexico, and that was the question that Dr. Neeper had. If we were in Louisiana, for instance, where we needed to

create an additional runoff layer over the top of the waste material, then I believe it might be appropriate to have a top liner, but in New Mexico's climate and precipitation and with the evaporation that we have here just predominant, I don't believe there's any necessity for a top liner and the model doesn't indicate it's a necessity if you follow the EPA 100 to one ratio. I mean, it will make a significant difference to put a top liner on.

COMMISSIONER BALCH: Rule 17 in New Mexico we had northeast tacos and southeast burritos and the tacos are open at the top but you fold them over in the southeast so you effectively have a top layer.

THE WITNESS: To a certain degree, yes. You fold over as much of that as you can, yes.

COMMISSIONER BALCH: It's not necessarily a complete top.

THE WITNESS: Correct.

COMMISSIONER BALCH: Slope of cover material, that would really just address the runoff.

THE WITNESS: If you increase the slope of the cover material more of the water would run off rather than go down.

COMMISSIONER BALCH: So you are pushing

any material off to the sides?

THE WITNESS: Correct. Any precipitation would slope away and not proceed down.

COMMISSIONER BALCH: I think Dr. Neeper was asking you about sloping your model and you had a 1 percent?

THE WITNESS: Yeah, I stayed with 1 percent slope.

COMMISSIONER BALCH: Was that for all layers or just the surface?

THE WITNESS: The surface layer is the only layer in my model that had a slope to it. Obviously, you can set a slope on. If you have a liner, you can have that there and then you can have the slope on the liner, too.

COMMISSIONER BALCH: If you were to model a slope on the liner on the bottom of the pit --

THE WITNESS: On the top or bottom?

COMMISSIONER BALCH: Bottom.

THE WITNESS: On the bottom it wouldn't make a difference.

COMMISSIONER BALCH: Not running the material out to one end and concentrating it?

THE WITNESS: The way the liner is set up in the model, obviously the bottom liner is

contained. It's concave.

COMMISSIONER BALCH: Then the most sensitive variable, you said, was the evaporative zone?

THE WITNESS: That's correct.

COMMISSIONER BALCH: What was the range of values that you used?

THE WITNESS: I started with 20 and said this is interesting and did some research on each of the variables to get a better understanding of that, and I did 30, I did 60. Obviously, I could only do 60 if I put five feet of cover on there.

COMMISSIONER BALCH: Did you see an advantage from 60 to 48?

THE WITNESS: It's more -- it's not exactly but I believe it's more an exponential effect. The more you -- what I was -- my visual representation, when I used it, it had more of an exponential effect.

COMMISSIONER BALCH: On which end?

THE WITNESS: On the infiltration scale. So as you moved up from 20 on up the line to 60 it made a significant difference.

COMMISSIONER BALCH: Okay. Thanks for doing the sensitivity study. We don't always get

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that. Let's see. Another important factor for making a model useful for providing data is you need an objective selection of input values. That's one of the reasons why I was questioning each variable. Basically, it's pretty easy to trick ourselves by selecting variables which are maybe not representative or which could be a best or worst case scenario. I have one or two questions relating to risk.

You made some allusions to picking potentially a worst case scenario and some people will say that you want to. Talking about you have to use the worst case scenario in some of your models. Kind of in general for the models you ran, I know a lot of it was based off of previous OCD models, but how would you characterize input selection for your particular model?

THE WITNESS: How would I characterize the input --

COMMISSIONER BALCH: Well, did you try to pick the variables conservatively in a best case/worst case/representative --

THE WITNESS: I guess I tried to have a representative approach rather than pick -- you know, for instance, on precipitation values you can

pull up a map of Southeast New Mexico and look at the different datasets and there's different gauging stations that handle precipitation in that area and obviously I went -- much of the data wasn't convenient but I could click on it and look through and get what's the average precipitation values at all these data points. Is this high, is this low, is this representative. So what I tried to do was cover the range for specifically Southeast New Mexico. That was more of my focus. So a representative approach.

COMMISSIONER BALCH: You weren't picking values on the tail end of distribution?

THE WITNESS: I was not picking values on the tail end, no.

COMMISSIONER BALCH: No 1950s Carlsbad flood but also no extreme drought?

THE WITNESS: Right. But I tried to, I guess -- I was sensitive to when I adjusted the precipitation from the Oil Conservation Division's precipitation figures I wanted to see what does that look at from a high/low precipitation values. And that's what was interesting for me to look at the outputs. I didn't go into the input file, the daily input file that was created but I looked at the

output and it showed what the peak was. It was four inches daily maximum precipitation as opposed to, I think it was, 1.97 for Hobbs. But I couldn't tell you if the next day it was dry entirely or they got another three inches of rain the second day. I couldn't tell you that.

COMMISSIONER BALCH: You were asked about the Walvoord and Scanlon study with a low values in the .01 range and you mentioned the high values might be around 8. Was that study specific to the Southwest or New Mexico?

THE WITNESS: The Walvoord and Scanlon study was for arid/semiarid environments. Could be as low as that. Dr. Stephens' summary material references all of the infiltration rates that are available to -- that he found available, including some he authored and took himself.

COMMISSIONER BALCH: So I don't want you to give his data and testimony, so you don't have to if you don't want to, but what would a typical New Mexico value be?

THE WITNESS: I believe the value that I used.

COMMISSIONER BALCH: Around one and a half?

THE WITNESS: I think it could be as much as three as a typical figure. If I can have a second. His summary sentence says, "In New Mexico typical diffuse natural recharge rates are roughly a few to less than ten millimeters per year; that is, fractions of an inch per year." That's Page 2 of his report, "Fate and Transport Modeling of Chloride and Volatile Constituents in Drilling Reserve Pits in New Mexico."

COMMISSIONER BALCH: So the range is essentially zero to ten millimeters.

THE WITNESS: Ten is what he said but I think he's being generous on the high end if you look at the numbers.

COMMISSIONER BALCH: For New Mexico, the oil and gas producing regions are isolated regionally. You're not going to have your maximum rain rates necessarily in certain parts of the state, so for the northeast, that's more arid in your understanding?

THE WITNESS: In my understanding. I guess coming back to the 2007 hearing where the Oil Conservation Division selected Dulce, New Mexico as a representative condition for the northwest, I think many of us may have driven up through that

area and it's not -- it's a little bit different. The foliage is different on the ground and I think the elevation and the precipitation, temperature.

COMMISSIONER BALCH: Not like driving by Shiprock.

THE WITNESS: Or Lybrook, New Mexico or Aztec. Farmington is a little different.

COMMISSIONER BALCH: Then the southeast is also relatively arid compared to other parts of the State?

THE WITNESS: I believe so. Obviously as you move up in elevation the conditions change, and that's why especially for Southeast New Mexico I tried to take a range of the locations to give representative values to see if one was high, one was low.

COMMISSIONER BALCH: That's a good lead into my last criteria really for model characterization and that's verification of the results. Like I said, you can do that by exclusion testing. You can check your results versus published data or other previous studies. So my first question, and I think I know the answer, was here a direct attempt to try to verify your data by any sort of exclusion testing?

THE WITNESS: No. I utilized the checking with published literature. I brought a stack of the material that I have researched to see does it fall in the range for our climate conditions, and obviously the soil conditions make a difference.

COMMISSIONER BALCH: Would the software even allow you to do that sort of testing?

THE WITNESS: I don't know if it would. I don't know. I think when you say exclusion testing I guess I'm trying to figure out --

COMMISSIONER BALCH: It's not a predictive model. Well, it is, because you are using it to say in 5,000 years this amount of chloride will make it to 100 feet away.

THE WITNESS: I guess I am trying to figure out approaching it from exclusion, are we excluding variables? I guess I am trying to understand the question.

COMMISSIONER BALCH: Well, in this particular sort of model I would probably try to exclude some predicted results but you don't actually have data to compare that to. The best data --

THE WITNESS: Right. I didn't exclude any results, obviously, to say this is an outlier, this

is -- you know, from my presentation. I just --

COMMISSIONER BALCH: Well, that wasn't the direction I was going.

THE WITNESS: Okay.

COMMISSIONER BALCH: Exclusion testing is you have ten years worth of data. You have a model that can predict data to some future point. You calibrate the model or the history match or whatever with nine years of the data and then you use the resultant model to predict what will happen in the year ten and then you compare it to your observed data.

THE WITNESS: Right. Which you would then have or shortly there have. I did not do that. I don't know if this model could do that. I think that's where the study that was done by ConocoPhillips excavating a pit is very useful information because it was done 40 years ago and now you are taking an actual point today.

COMMISSIONER BALCH: That was kind of my question because there is some actual measured data out there that could be used to check models. I don't know if it could be used to check this model. However, the results of that study can be used to validate by comparison.

THE WITNESS: I think I believe that will be a useful study and I'm sure Dr. Buchanan would like to do additional research as well.

COMMISSIONER BALCH: Additional research, yeah. I thought one of the answers to things from Dr. Buchanan's work at the Conoco site and also from -- I think it was Dr. Neeper's field studies was the salt bulge that really seemed to provide a control on infiltration. Does this model give you any sort of a salt bulge?

THE WITNESS: No, it just -- everything is moving down.

COMMISSIONER BALCH: So one thing that -- you know, by analogy, when we are doing acid gas injection we are looking at acid gas injection, CO2 in particular, a lot of times people will present you with a purely volumetric computation and the extent of the CO2 after some amount of time without taking into regard reactive transport, thermal effects and other things that could further reduce that distance. Do you think that your model not presenting a salt bulge would inherently present it as a sort of a conservative estimate or is it irrelevant?

THE WITNESS: I didn't look at it from the

standpoint that you're talking about. I'm actually going to shift models and gears, because your question is directed more towards that upper portion of the soil. I'm going to flip that around and take it to the horizontal portion of the aquifer from the bottom of the reserve pit over to the receptor well where I am not allowing -- in the upper portion of the vadose zone also there was no decay of the contaminant whether biologically or by the biological containment or elongation or spreading.

So I think the answer, the resultant is very -- more worst case, I guess. That would be the quickest that it would arrive at the receptor.

COMMISSIONER BALCH: Not taking into account other variables that were entered?

THE WITNESS: That's correct. Like the Oil Conservation Division did. They also did not try to slow down the arrival of the contaminant with real world effects.

COMMISSIONER BALCH: Just a couple other general model questions. So it's not working the cells, it's going point to point, layer to layer. When you get to the Multimed part you are flipping the layer sideways and then you are talking about that. How many layers in the Multimed portion do

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you have?

THE WITNESS: I don't know.

COMMISSIONER BALCH: Is that an internal --

THE WITNESS: Yes. But to come back to -- there's obviously some cell portion in the recipe box of the evaporative zone depth portion, but then beyond that point I think we are dealing with layer boundary, entry at one layer, exit out the other side. There weren't -- that was one cell, I guess is how I am visualizing that through the HELP model. When it reaches the aquifer I'm not certain of the cell size.

COMMISSIONER BALCH: You don't know how many steps it takes?

THE WITNESS: Correct. I don't know.

COMMISSIONER BALCH: You give it the set distance and it gives it the time of transport to that place, that particular core and molecule?

THE WITNESS: Yes.

COMMISSIONER BALCH: So in the model itself internally, do you know what the time steps were or was that time step variable?

THE WITNESS: Yes, I did vary the time steps. In fact, that's what I had to use. I didn't

have -- even as a DOS-based program, with the new computing power you have to select the time step ranges for calculations, so I did vary that, of course, to find the initial arrival of the contaminant and the peak contaminant level.

COMMISSIONER BALCH: What time step did you end up with on your models?

THE WITNESS: It varied. It would be listed on the output runs. Probably 200-year increments but in order to identify the arrival.

COMMISSIONER BALCH: Times steps were set by the program internally?

THE WITNESS: I would set them. It has a feature. Are you interested in looking at -- what time frames are you interested in looking at?

COMMISSIONER BALCH: A lot of times in a simulation you will do short time steps where things are changing fast and long time steps when things are changing slow. Is there any dynamic changing the time steps in the model?

THE WITNESS: There really wasn't, but I utilized that conceptual technique to find, obviously, the peak concentration point. Because if I started and it was over a 200-year time period for arrival, it might be higher at some incremental

point between that. And so I looked at that.

COMMISSIONER BALCH: You did a sensitivity study on the time step?

THE WITNESS: Just to see, you know, those 50 years. Because say it arrived at 3000 years to 3200 years, I would take more time steps in between 3000 to 3200 to get a better feel for, you know, the contaminant concentrations through that time period of arrival.

COMMISSIONER BALCH: Was there a parallel analysis done by OCD in 2007/2009?

THE WITNESS: I would assume.

COMMISSIONER BALCH: Do you know what time steps they used?

THE WITNESS: It's referenced on their reports. They used -- both the Oil Conservation Division and my representations selected 20 time steps to present on the output plots or output reports. I found when you use more than that, I don't know if it's an internal -- the pages start to print out in not a user-friendly fashion.

COMMISSIONER BALCH: If you have 10,000 time steps you have a lot of pages.

THE WITNESS: Just the representations and the columns, it doesn't print very well, so I tried

to stick with the same 20 that was convenient.

COMMISSIONER BALCH: So something like 25 time steps from the bottom of the waste site where the material reaches the aquifer essentially and then its transport over?

THE WITNESS: Yes.

COMMISSIONER BALCH: You also mentioned that you did sensitivity study on the mixing depth for Multimed?

THE WITNESS: Yes.

COMMISSIONER BALCH: And that --

THE WITNESS: If you reduce the mixing zone interval it increased the concentration that would arrive at the receptor.

COMMISSIONER BALCH: The mixing zone would be transported across the model because that's the portion of the aquifer that's impacted is essentially the mixing zone?

THE WITNESS: Correct, the way this model works. So any dilution that would occur would be limited to the four inches.

COMMISSIONER BALCH: Okay.

THE WITNESS: When four inches was used. It's limited to ten feet when ten feet is used.

COMMISSIONER BALCH: So you are comparing

remarkably different volumes of water.

THE WITNESS: Yes. And/or you have no dilution of your contaminant when you only have four inches in an aquifer.

COMMISSIONER BALCH: I think Dr. Neeper testified that the fusion would cause you to probably cover the entire zone.

THE WITNESS: That's what I recall him saying also.

COMMISSIONER BALCH: So if you did it with a 16 -- three-foot thick aquifer, did you run that case?

THE WITNESS: I did not because I was anticipating that it would be difficult to determine the arrival of the contaminant.

COMMISSIONER BALCH: Why would that be?

THE WITNESS: Just on the resolution of the time steps and the printout.

COMMISSIONER BALCH: It would take too many steps?

THE WITNESS: As you may recall, I was searching for one milligram per liter of arrival from an initial input of 100,000 milligrams per liter in the source and it peaked at 68 at a ten-foot mixing zone.

COMMISSIONER BALCH: Okay. Five more questions but they should be short. Just a couple other follow-ups. Mr. Dangler talked about risk and the appropriateness of selecting worst case scenario. Maybe I'm too pragmatic but I started to think if you always took the worst case scenario in consideration you would never be able to make a business decision. For example, if you had a 1 percent risk that your geologic map was off by one contour some way, from a business perspective what level of risk is -- where do you balance the acceptable risk versus the worst case scenario?

THE WITNESS: I think you need to look at what are the important variables in the decision. You know, mathematically if you decide there's 100 variables that need to go into this and you have a 99 percent success/1 percent error on that but you use that for all 100 variables, it's going to tell you never do the project even though there's really only a 1 percent risk in all of the 100 variables. So you need to use your experience.

COMMISSIONER BALCH: Is it really more -- going back to Ms. Denomy's testimony, sort of a portfolio of risk balance rather than an individual case balance for risk?

THE WITNESS: You need to be -- when you are looking at risk you need to be well educated in the importance of the various parameters to understand the impacts and choose accordingly.

COMMISSIONER BALCH: Another question by Mr. Dangler was about hydraulic fracturing. Obviously, if you are be fracturing at 8,000 feet you will not have a fracture that's going to affect the groundwater. If you are fracturing at 800 feet, would you care to comment on limiting factors for vertical extension of hydraulic fractures?

THE WITNESS: My understanding is that it would not fracture vertically to come up towards the surface. It would be more -- there's not confining -- there's not confining stresses on top of -- at the shallow depths. To come back to the hydraulic fracturing of shale gas wells, for instance, and normal oil and gas wells, I don't see any impact with regard to the vadose zone and the HELP model.

COMMISSIONER BALCH: So if you fracture at an interval, the fracture is going to go in a direction based upon stress?

THE WITNESS: Perpendicular to least principal stress.

COMMISSIONER BALCH: And where is the least principal stress? Typically vertical, isn't it?

THE WITNESS: Normally, yes.

COMMISSIONER BALCH: So fractures will tend to go horizontal rather than vertical.

THE WITNESS: Right. They do have a height component to them but that's typically bounded by the variability in the rock layers.

COMMISSIONER BALCH: Dr. Neeper was asking about where you coming into one of Dr. Neeper's questions the necessity of having your pit location on the map, the C 144 form. And I think to my thinking you would have to have that on that form because you are going to try to geo-reference that location to surface or subsurface locations. I don't think just having it on the APD would be adequate for that case.

THE WITNESS: I don't know that I agree. The plats that we file have, of course, the latitude and longitude position and are to-scale plats of the well location.

COMMISSIONER BALCH: Okay.

THE WITNESS: So when the pit is identified on the well location within six to 13

feet of the wellhead on the non-working side of the well location which is drawn in, I think within six to 13 feet of identification on an existing plat, given the size of a pit, should allow for its identification.

COMMISSIONER BALCH: If you go to OCD online and pull the files for the well, the APD is going to have the information on that?

THE WITNESS: Correct.

COMMISSIONER BALCH: Dr. Neeper also asked you about multiple well impacts if you had several pits buried within 100 feet of a particular well. What would the typical spacing of pits be at, say, 48 per spacing? Is that a very tight spacing in New Mexico?

THE WITNESS: I prefer to -- I don't want to be Dan Arthur in testimony. I would have to draw it out and represent a square mile for me in order to give you an accurate answer.

COMMISSIONER BALCH: So you have 16 grids.

THE WITNESS: Right.

COMMISSIONER BALCH: One-eighth of a mile, 660 feet between ideal well locations. Obviously, you can have wells that are closer to one end of the boundary or not.

THE WITNESS: It's possible that if you drill more than one well from a pad, for instance, you may only have one pit for --

COMMISSIONER BALCH: That's why I didn't ask you for ten-acre spacing. Because if you were that close you were probably not using -- probably doing multi-well management or vertical/horizontal.

THE WITNESS: Yes.

COMMISSIONER BALCH: I came up with about 330 feet between -- if you put an ideal water well in between two well locations that were centered in a 40-acre spacing, it would be 330 feet minus whatever the dimensions of the pit were.

THE WITNESS: Sounds correct.

COMMISSIONER BALCH: And you went to 20 acres, that would be about 130 or so feet once you pick out the pit boundaries. So you would be at 20-acre spacing before you got to the scenario where you had the possibility of having multiple pits reaching 100 feet to groundwater.

THE WITNESS: That sounds reasonable.

COMMISSIONER BALCH: I want to check my math because I don't think well in acres.

THE WITNESS: That sounds correct.

COMMISSIONER BALCH: One other follow-up

to Dr. Neeper's examination. All the infiltration basically being divided in the top four feet or so, would that vary significantly if you went to a location where you had 60 inches of rain instead of 14 or 15? Do you think -- is it always going to stay in that top calculation?

THE WITNESS: If you are in an area that had 60 inches of precipitation, I believe your evaporative zone depth would not be 48 inches. It would be much shallower.

COMMISSIONER BALCH: But is that something that you set as a model parameter or would the model allow infiltration to occur into the second layer or third layer?

THE WITNESS: You select the evaporative zone depth.

COMMISSIONER BALCH: You would select the more appropriate --

THE WITNESS: Correct. You could obviously run the model with 60 inches of precipitation with that evaporative zone depth, but it would be obvious if you were looking at representative conditions for what you were modeling that the true evaporative zone depth there would be much lower.

COMMISSIONER BALCH: And the last question I have is something raised by Commissioner Bloom on the Spill Rule. You implied that the Spill Rule would cover these little minor discolorations or wetness or less than five-barrel spills. I know there's not a very formal process there, but do you actually make a notice or report for a less-than-five-barrel spill in the Spill Rule?

THE WITNESS: I believe some companies are tracking.

COMMISSIONER BALCH: But is it required for them to report to OCD?

THE WITNESS: I don't believe so. I don't believe so.

COMMISSIONER BALCH: For less than five barrels?

THE WITNESS: No.

COMMISSIONER BALCH: That's all.

CHAIRPERSON BAILEY: Ten-minute break.

(Note: The hearing stood in recess at 10:37 to 10:53.)

CHAIRPERSON BAILEY: Mr. Mullins, you have had a break. You have gone through the process. I'm a bottom-line kind of person and I'm going to ask you results. Let's go specifically to Exhibit

16, Page No. 4. I will ask you a bunch of very simple, very clear questions so I can get very simple, very clear answers because to me these slides are pivotal for this commission. Are you there?

THE WITNESS: I forgot to turn on the projector. Yes.

CHAIRPERSON BAILEY: This slide is labeled 25 Feet to Groundwater Low Chloride Focus. So let's get some of these parameters very clear. This is 25 feet to groundwater from the bottom of the drilling pit that has been buried in place with the taco process where there's no top liner?

THE WITNESS: That's correct, which would be shown on the prior exhibit, Exhibit 3, yes.

CHAIRPERSON BAILEY: So we have a definite connection between the prior Exhibit 3 and this Page No. 4?

THE WITNESS: That's correct.

CHAIRPERSON BAILEY: One does relate to the other?

THE WITNESS: Yes.

CHAIRPERSON BAILEY: Low chloride, we're talking about the 15,000 parts per million chlorides.

THE WITNESS: In a liquid.

CHAIRPERSON BAILEY: In a liquid, yes. But for this burial of the drilling pit waste the pits have been dried to the point where they pass the paint filter test and have been stabilized.

THE WITNESS: Yes.

CHAIRPERSON BAILEY: What is the typical depth of a drilling pit? I know it's going to vary. I know there are a lot of variables but what would be a typical pit depth?

THE WITNESS: I believe the -- as you said, it varies. The representation is that the depth is 16 1/2 feet. I believe that's a reasonable depth for a drilling temporary reserve pit, especially in the northwest where we just enter from one side and work back and forth.

CHAIRPERSON BAILEY: So we can call it 20 feet. It's just a nice round number.

THE WITNESS: Sure.

CHAIRPERSON BAILEY: Added to this 25 feet gives us 45 feet depth to groundwater from the surface.

THE WITNESS: That would be correct.

CHAIRPERSON BAILEY: So all of these figures and for anybody who is investigating will

have to apply this only where the depth to groundwater is a minimum of 45 feet.

THE WITNESS: Yes, looking at it from that standpoint, that's correct.

CHAIRPERSON BAILEY: Years until reaching 100-foot lateral at 25-foot depth.

THE WITNESS: Yes.

CHAIRPERSON BAILEY: 950 in Carlsbad and they never -- the chlorides. Let's be specific. The chlorides will not ever reach 100 foot lateral?

THE WITNESS: I could not determine that with the resolution of the contaminant. Because the infiltration rate was so low in Aztec on my calculations, and if you reference over to Carlsbad, the concentration that arrived at the receptor was 2.3 milligrams per liter. The initial concentration coming out of the bottom of the pit was 1,000 milligrams per liter, so that initial concentration would have been the same in Aztec. It will move and it will reach. I could not resolve, utilizing the model to identify the concentration, because I used a threshold of one milligram per liter to identify the arrival, and I could not determine that arrival in Aztec but I would not say -- I don't think it would be correct to say that it would never

arrive -- that a contaminant would never arrive. It would arrive at so small of a concentration it would be below one milligram per liter.

CHAIRPERSON BAILEY: And that is when the receptor is 100 feet horizontally from the pit location.

THE WITNESS: That's correct.

CHAIRPERSON BAILEY: What is the length of time for true vertical flow?

THE WITNESS: I don't remember off the top of my head. If I -- I'm trying to remember from the prior modeling that was done. I don't remember is the specific answer. In the 2007 and 2009 modeling the receptor was effectively underneath the pit. In 2007 -- I did not run that, I guess, to give you an answer specifically, and I would -- I don't want to give you a wrong answer, but it would be less time, substantially.

I'm going to hazard a guess. It would be half the time, the 500-year range, and that's just a guess that I'm giving you now.

CHAIRPERSON BAILEY: Okay. So unless we go back to the record for 2009, we don't have the number of years to reach groundwater at 45 feet below ground surface?

THE WITNESS: I did not run that. I could obviously do that and present that, but I did not present that run here. I was focusing on the 100-foot distance receptor as opposed to the receptor being right when it touched the groundwater in this instance.

CHAIRPERSON BAILEY: How long would it take you to provide that to the commission for this hearing for this record?

THE WITNESS: My model runs on my other computer for DOS, which I don't have with me here in Santa Fe. I could do that as soon as I got back to Farmington within a day and supply that information to the commission.

CHAIRPERSON BAILEY: So the number of years for the maximum chloride concentration at the receptor 100 feet away from the pit is given as 1350 years in Carlsbad and we don't have the number of years for maximum chloride concentration at a vertical depth. Is that correct?

THE WITNESS: That's correct.

CHAIRPERSON BAILEY: So the last figure we have of the maximum chloride at 100 feet lateral distance, we don't have a number for vertical depth?

THE WITNESS: I do not. I guess the

infiltration rates would obviously give you the indication of when it would reach groundwater simplistically, but looking at what the effective porosity was, I just want to make sure I run that through the model to give you the accurate answer.

CHAIRPERSON BAILEY: I would like to have those three numbers to complete the record for this hearing.

THE WITNESS: At immediately underneath the pit?

CHAIRPERSON BAILEY: Yes.

THE WITNESS: So --

CHAIRPERSON BAILEY: Within three feet.

THE WITNESS: So you would say a receptor that would be at three feet of lateral depth?

CHAIRPERSON BAILEY: Absolutely.

THE WITNESS: For both the Carlsbad case and the Aztec case.

CHAIRPERSON BAILEY: Yes.

MR. SMITH: It needs to be in the context of people being able to cross-examine the figures.

CHAIRPERSON BAILEY: How will we manage that?

MR. SMITH: Telephonically perhaps. I would have to check. I think you can take

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telephonic. But I don't think that we can have him submit calculations to the commission without the opportunity of cross-examination on those.

CHAIRPERSON BAILEY: Well, we will be deliberating probably in July sometime but information would be important for any draft findings and conclusions.

MR. SMITH: I don't doubt that. Just procedurally, I'm saying I think we want to make sure that people have the opportunity to cross on that. I just think that we have to allow that.

CHAIRPERSON BAILEY: Or we can take note of the previous hearings for that portion of the record that pertains to vertical migration.

MR. SMITH: You can take selective administrative notice of that, but you would also have to take administrative notice of all cross-examination.

CHAIRPERSON BAILEY: Maybe that's what -- well, it's not specific to 25 feet.

MR. SMITH: I think you are better off figuring out some way to allow people to cross the witness on whatever figures he comes up with, even if it's having other -- I don't want to get shot here. I don't know what to tell you guys.

CHAIRPERSON BAILEY: Let's hold that question for a while. Let's mull dollars that over.

THE WITNESS: I have located the exhibit from the 2007 Pit Rule hearing which is Case No. 14015. OCD Exhibit 21 would be the reference. They have in here in their representation a ten-foot to groundwater and a 50-foot to groundwater run sensitivity at 100,000 milligrams per liter threshold. If I can look through the exhibit for a few more minutes, there may be a Northwest New Mexico 50-foot reference.

CHAIRPERSON BAILEY: If you can look through during lunchtime, you can get that to us after lunch. Because as Commissioner Balch says, we can extrapolate between ten and 50.

MR. SMITH: I think this is something new being brought up and that would give people the opportunity to cross.

CHAIRPERSON BAILEY: On those points only. Okay. We will have to recall you after lunch then. Still I need interpretation of these last figures which say 2.3 parts per million is the maximum chloride concentration after 1350 years 100 feet away from the pit?

THE WITNESS: That's correct.

CHAIRPERSON BAILEY: Okay. Let's look at Exhibit 6 Page 9.

THE WITNESS: I have that up.

CHAIRPERSON BAILEY: I will run through the same set of questions. The previous Slide 8 relates directly to Slide 9.

THE WITNESS: That's correct.

CHAIRPERSON BAILEY: The 100 feet to groundwater is 100 feet from the bottom of the pit which makes it approximately 120 feet depth to groundwater from the surface?

THE WITNESS: Correct. In my model it would be 116 1/2, I believe, but yes.

CHAIRPERSON BAILEY: And in your calculations, your modeling, we have 3100 years for chlorides to reach a receptor 100 feet away from the buried pit which has the taco burial system?

THE WITNESS: That's correct.

CHAIRPERSON BAILEY: With no upper lining.

THE WITNESS: Correct.

CHAIRPERSON BAILEY: And after 4500 years 68 parts per million as an addition to whatever chlorides are already in the aquifer at that point.

THE WITNESS: That's correct.

CHAIRPERSON BAILEY: I thank you for

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providing that information. That's what we need. That's all the questions I have. We will recall you after lunch if you can find that information from the previous hearing.

THE WITNESS: I believe I should be able to obtain useful information for the commission from the existing documents.

COMMISSIONER BALCH: You said they had it for ten and 50. Do they have it for any other numbers?

THE WITNESS: 350.

COMMISSIONER BALCH: If you could provide us all vertical data that would give us an idea of the distribution.

THE WITNESS: All in the exhibit that I referenced, Exhibit 21 of Case No. 14015 and there's a separate exhibit number that has the specific runs. I will probably have to reference that.

MR. SMITH: I would like to suggest that we do that and have copies of the exhibit made so they can be distributed to everyone for cross as well.

CHAIRPERSON BAILEY: Can you do that during lunch?

MS. FOSTER: If I can use the OCD copier,

yes, I can do it. Yesterday I went to Office Max and made five copies of our petition and it cost me $160 to do that.

CHAIRPERSON BAILEY: We only charge .24 a page.

MS. FOSTER: Okay.

THE WITNESS: Is it possible to make note of it in the case file, the exhibit number? Does it have to be included?

MR. SMITH: No, I think copies need to be made to be distributed to people so they can have it in front of them.

CHAIRPERSON BAILEY: For cross-examination.

MS. FOSTER: How many copies would you need? Six for the commission plus attorneys?

MR. SMITH: However many attorneys there are.

THE WITNESS: As I recall, that exhibit may have over 400 pages in that particular exhibit. I just want to make everyone aware.

CHAIRPERSON BAILEY: All I want is bottom line answer.

COMMISSIONER BALCH: If you could find the two-page summary.

THE WITNESS: I guess I will be busy during lunch getting that down to the appropriate sheets.

CHAIRPERSON BAILEY: We can give you a break at some point during this afternoon. Would that be helpful?

THE WITNESS: Yes.

CHAIRPERSON BAILEY: As I recall, there were not concentrations provided for maximum chloride levels, because your figures today had given us the true impact as calculated by the modeling.

THE WITNESS: The 2007 and 2009 modeling also included concentrations.

CHAIRPERSON BAILEY: Did they have concentrations also?

THE WITNESS: Yes. Over time, yes. And they did a more graphical representation of that but the numeric values are available on the specific run sheets.

CHAIRPERSON BAILEY: We will also be continuing this case this afternoon until tomorrow, so a lot of it may be dependent on your time factor. So we can receive it any time up through tomorrow.

THE WITNESS: I will do my best to have

the information before we are done with this segment of the hearing so that hopefully I don't have to come back at another time.

CHAIRPERSON BAILEY: Thank you. You may be excused for a while. Ms. Foster, do you have another witness?

MS. FOSTER: Yes, I do. Thank you. At this point I would call Mr. Larry Scott. May I ask for Mr. Mullins to stay at the computer so he can run the computer while Mr. Scott is speaking? We do have PowerPoint slides.

CHAIRPERSON BAILEY: Yes.

LARRY SCOTT

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

DIRECT EXAMINATION

BY MS. FOSTER

Q. Good morning, Mr. Scott. If you could please for the record state your name and address.

A. Larry R. Scott. My office address is Post Office Box 1708, Hobbs, New Mexico, 88241.

Q. Mr. Scott, are you currently employed?

A. I'm currently employed by Lynx Petroleum Consultants, Incorporated.

Q. And what type of company is Lynx Petroleum

Consultants?

A. Lynx Petroleum Consultants is an independent oil and gas producer operating wells exclusively in Lea and Eddy Counties, New Mexico.

Q. Lea and Eddy County New Mexico are Southeast New Mexico?

A. Affirmative.

Q. In the Permian Basin?

A. Correct.

Q. What does it mean to be an independent oil and gas producer?

A. That would mean that we derive all of our revenue stream from the production of oil and gas with no revenues coming from downstream activities, which would include pipelining, transportation or refining.

Q. And if you could please tell the commission about your educational experience.

A. I have a Bachelor of Science in electrical engineering from the University of Texas.

Q. And how long have you been with Lynx Petroleum?

A. I was one of the founding partners of Lynx Petroleum in the fall of 1981. I currently serve as president of the company.

Q. And prior to coming to Lynx Petroleum, what was your work experience?

A. I left Continental Oil Company as a supervising production engineer. That was out of Hobbs office.

Q. And do you hold currently any professional designations?

A. I'm a registered professional engineer.

Q. Are you registered in New Mexico?

A. I believe my New Mexico registration is listed as retired. I do have an active registration still in Texas.

Q. Have you testified before the Oil Conservation Commission before?

A. On numerous occasions.

Q. And have you testified before the Environmental Improvement Board before?

A. On one occasion or rather two occasions, I guess, with regard to greenhouse gas.

Q. Did you testify in the 2007 hearing on the Pit Rule issue?

A. I believe I did, yes.

Q. Were you qualified as an expert before the OCD previously?

A. Yes, I have. I have been qualified at

various times as a landman, a geologist and an engineer and as a practical oil man.

Q. And are you a member of any New Mexico professional associations relating to oil and gas?

A. I'm a member of both the Independent Producers Association in New Mexico and New Mexico Oil and Gas Association. I've served as past president -- I am a past president of IPANM and currently serve on the Board of Directors.

MS. FOSTER: At this time I move to qualify Mr. Scott as an expert professional engineer in New Mexico.

CHAIRPERSON BAILEY: He is so qualified.

Q. In relation to this hearing today, is the Board of the Independent Petroleum Association or IPANM giving you any specific responsibilities?

A. Well, I was appointed to the Pit Rule task force, which was a joint effort between IPANM and NMOGA.

Q. And the IPANM Pit Rule task force, were you on that task force with Mr. Mullins?

A. That is correct.

Q. Have you provided exhibits for your testimony today?

A. Yes, I have.

Q. That would be Exhibits 15 and rebuttal Exhibit 17?

A. That's correct.

Q. Did you prepare those exhibits?

A. I prepared the first Exhibit 15 or rather directed that it be prepared. The second exhibit, one sheet is directly out of my files and the charts are from generally published data.

Q. Now, the Independent Petroleum Association filed an amended proposal with the Oil Conservation Commission on May 15th. Have you had a chance to review that proposal?

A. Yes.

Q. Are you familiar with the changes recommended by IPANM?

A. Yes.

Q. Are some of those different from NMOGA's?

A. Yes.

Q. Are you familiar with the closed-loop systems?

A. Yes, I am.

Q. Have you personally used closed-loop systems?

A. Yes, I have.

Q. What do you define as a closed-loop

system?

A. My definition of closed-loop system is solids removal equipment that is in addition to the normal drilling equipment that would be utilized to dewater the solids on location and then remove them from location to a central facility.

Q. So in your mind a closed-loop system is actually part of a drilling operation?

A. Yes.

Q. Is the use of a closed-loop system different than any other tool that you would use, for example a rig during a drilling operation?

A. Not substantially. It is a mechanical equipment placed on location to perform a specific function.

Q. And do you need to specifically register or permit a drilling rig on location when you are drilling a well?

A. Yes, file an application for permit to drill.

Q. But do you need to separately permit your rig?

A. No.

Q. But you do, under the current Rule 17, you need to separately register or permit your

closed-loop system; is that correct?

A. Yes, you would.

Q. Do you have an opinion on the regulation of appropriately engineered closed-loop systems?

MR. JANTZ: Excuse me, Madam Chair. I have a point of clarification. Mr. Scott was qualified as an expert professional engineer but there wasn't any indication about what kind of professional engineer. Are we talking about petroleum engineering? Are we talking about civil engineering? What are we talking about?

THE WITNESS: The examination that I passed was for an electrical engineering professional.

MR. JANTZ: You are being qualified as a professional electrical engineer; is that right?

THE WITNESS: Well, I think I would prefer to wear my practical oil man hat today.

MS. FOSTER: A professional engineer covers a multitude of disciplines. I think Mr. Scott has testified that he has been qualified multiple times as an expert before the Oil Conservation Commission, and he is here and I guess he would be wearing all of those hats. That's why I went for the largest designation possible, which is

a professional year without any specific specifications, but if counsel would like to have that --

MR. JANTZ: The professional engineer, being qualified as a professional engineer doesn't give us any context or area of expertise. It could be anything.

MS. FOSTER: His study and the exam that he took was in electrical engineering. If that suffices for an expert designation then that would be fine. But Mr. Scott also testified that he has been with Lynx Petroleum for 30 years and is an oil man and he is the president and founder of that company. So, therefore, he is familiar with all aspects of owning and operating an oil company.

CHAIRPERSON BAILEY: Maybe if he elaborated on the Lynx Petroleum aspects to show his qualifications as an oil and gas man.

Q (By Ms. Foster) Mr. Scott, if you could please elaborate on your experience as a member of the Lynx Petroleum team.

A. Well, Lynx Petroleum started as three partners in 1981 as a consulting company with the intention of developing our own production via the revenue stream developed by the consulting work.

That business plan is actually -- was actually implemented. Up until last year I operated -- either purchased or drilled or caused to be drilled 60 wells in Lea and Eddy Counties. I was responsible for generating the prospects, the geology with regards to those prospects, the drilling engineering, which was -- well, all aspects, and then putting the deals together, putting the land deals together and causing the wells to be drilled and turned to production.

MR. SMITH: Do you want to give people the opportunity to voir dire the witness? Then you can give Ms. Foster the opportunity to move the witness in however she wants to with respect to expertise and see if you get any objections. I think that's the way to go.

CHAIRPERSON BAILEY: Let's go that way. Would you like to voir dire? Is that the legal term?

MR. SMITH: Voir dire.

MS. FOSTER: I believe he is my witness so if there's another witness who would like to voir dire the witness, that would be fine. I would put the witness up subject to voir dire on his qualifications.

MR. JANTZ: I would love to, Madam Chair.

VOIR DIRE EXAMINATION

BY MR. JANTZ

Q. Good morning, Mr. Scott. Now, in the course of -- you are going to testify primarily on the economic aspects of the Pit Rule and the proposed Pit Rule; is that right?

A. Right.

Q. So in that context, as an owner and operator of an oil drilling company, do you have experience in, for example, producing AFEs?

A. I am responsible for producing AFEs.

Q. So you do that on a regular basis?

A. Yes.

Q. What about taking a look at macro economic trends world-wide, supply and demand, national supply and demand? Do you keep track of that?

A. Not so much.

Q. Do you keep track of your competitors as well? Where you stand in comparison -- where your company stands in comparison to other oil and gas companies in the region?

A. Not so much. Only in respect to perhaps an offset location that somebody else has drilled.

Q. And I assume that you take into account

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the price of the commodity?

A. Absolutely.

Q. I imagined that would be the case. Okay. I think I got what I need to know.

CHAIRPERSON BAILEY: You are accepted as an expert.

MS. FOSTER: So for the purposes of clarification, I would be moving his expertise would be as a professional engineer and practical oil man. Thank you.

DIRECT EXAMINATION CONTINUED

Q. (By Ms. Foster) Now, moving back to the closed-loop system questions, Mr. Scott, do you have an opinion on the regulation of appropriately engineered closed-loop systems?

A. Well, all of the equipment on our location has to be appropriately engineered, but we do not have any regulations with regard to horsepower into the rotary table, horsepower into the mud pumps, generators, or how many suction tanks we have to have on location.

I view solids removal equipment to be of that same genre. It's mechanical equipment placed on location to perform a function and the proof of the pudding is whether it works or not. If the

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solids are coming out, then it's appropriately engineered. If not, we have to do something else.

Q. Okay. So then directing your attention to the IPANM proposal, there is a request by IPANM to remove the language pertaining to having to file on an appropriately engineered system. If you could excuse me for one moment, I'm trying to find that.

MS. GERHOLT: Page 5.

Q. Thank you. Section 19.15.17.9. Permit Application and Registration. A. IPANM's recommendation is that the operator shall use a C 101 form or applicable BLM form to notify the appropriate division office of use of a closed-loop system. However, we have deleted the language about using appropriate engineering principles and practices.

A. I think that's appropriate.

Q. Thank you. Now, have you used closed-loop systems in the drilling phase of your operations?

A. Yes, I have.

Q. And you had to permit that closed-loop system?

A. I did for a fact.

Q. Is it not the case that every well is different and so, therefore, your permit or request

on a closed-loop system might be different depending on your well location?

A. Depending on the depth of the well and the sophistication required with regards to the solids removal, those applications could be somewhat different, yes.

Q. Now, what if you are drilling on a location you would think there might be a problem, like you might end up in an underbalanced situation?

A. I would rather have a reserve pit.

Q. Why is that?

A. Additional flexibility during the operation.

Q. Could you please describe how a reserve pit works as it pertains to obtaining water and how it impacts your penetration rates?

A. The reserve pit, the primary function is to remove solids from the drilling pit. The drill solids are -- designs are typically a double horseshoe with the returns going into one leg of the horseshoe, around the bend and suction picked up in the other end of the horseshoe, the other leg. That drilling fluid as it makes the passage around the horseshoe is at a very low velocity and it loses the drill solids in the pit in the process of making

that transition. We pick the fluids up with mud pumps on the other end of the pit and then we circulate back down the hole.

The conventional reserve pit is a very cost-effective as well as technically effective method to remove those drilled solids. A closed-loop system simulates that action with mechanical equipment, screens, centrifugal force are the primary methods that remove the solids from that drilling fluid and enable you to circulate it back down the hole.

Drilled solids are a major component in how fast you are able to drill. When the content of your drilling fluid exceeds 6 percent drilling solids, penetration rates tend to decline dramatically.

My experience has been that we have much more difficulty with the mechanical equipment keeping those drilled solids below 6 percent than we have had in years past with the reserve pit.

Q. And declined penetration rates means what in terms of the economics of the well?

A. Well, construction rate is how many minutes it takes you to make a foot of hole, and if you half your penetration rate you commence to

adding days to the drilling effort with each day representing $25,000, 1,000 gallons of diesel and a lot more effort.

Q. How about the cost of your closed-loop system, the mechanical closed-loop system as opposed to a reserve pit. Is that an additional cost per day?

A. The mechanical closed-loop systems can vary between $1500 per day up to about $5,000 per day and that is a function of the sophistication required in your solids removal and it is a function of how far you are transporting those solids to the central disposal facility.

Q. Now, have you ever had to file a permit request with the OCD for the use of a closed-loop system in the workover phase?

A. Yes, I have.

Q. And how did that process go for you?

A. I had to file -- and this is just recently on a recompletion workover. I had to file a Form 144 EZ to set a 500-barrel frac tank in order to circulate approximately 100 barrels of well fluid into that frac tank before I went to work. We left nothing on that location that wasn't there when we moved in, and I felt like the requirements for the

closed-loop paperwork were administrative overkill.

Q. All right. So directing your attention to the IPANM proposal Page 1, definition of closed-loop system, IPANM is making the recommendation to take out the word "or workover" on the definition of closed-loop system, correct? So then, therefore, the closed-loop system would pertain to the management of drilling fluids as opposed to workover fluids.

A. Well, occasionally you will circulate and drill during workover. I am not aware of any of those processes that leave cuttings on location but for a simple recompletion or remedial job for which we are required to file an application, the 144 is absolutely not required.

Q. So it would be your recommendation as to the paperwork that you would notify the OCD when leaving cuttings on location?

A. That is correct.

Q. If we are not leaving cuttings on location it's really irrelevant?

A. That's my opinion.

Q. From a practical perspective there are many companies currently drilling in the Permian Basin who use closed-loop systems. Could you

explain why?

A. Well, you get a permit approved.

Q. Do you not get a permit approved with the reserve pit?

A. That has not been my experience.

Q. When you say you get a permit approved, that would be the 140 EZ form for the closed-loop system that gets approved quickly?

A. That's correct.

Q. In your experience as a professional engineer, do you review the economics of projects in New Mexico?

A. Both New Mexico and Texas.

Q. And how is it that you get to review those numbers in Texas?

A. I'm a non-operated working interest owner in about 15 wells located in the Permian Basin of West Texas.

Q. How do the AFEs or the economics of a well contrast in New Mexico versus Texas operations?

A. The Texas boys are doing substantially better with their AFE costs now than New Mexico AFEs.

Q. Can you describe operations in the Permian on the New Mexico side versus the Texas side as to

geology and climate information, et cetera?

A. Well, climate and geology are very similar. I mean, the Permian Basin doesn't stop at the state line. There are places in New Mexico where casing and cement requirements are more severe than they are in Texas which would add to those costs, but there are many places in New Mexico where outside of the regulatory environment the operational characteristics of the drilling and completion would be virtually identical.

Q. Directing your attention to Exhibit 15, if you could pull that up, please. Did you prepare this exhibit?

A. I asked Baker Hughes, which is my bid company, to prepare this for me.

Q. If you could please describe what information is related on this exhibit to the commission?

A. Those are rig counts in the southeast counties of Chavez, Eddy and Lea and then a total.

Q. So the total is the top line which is in blue?

A. Affirmative.

Q. And the green line would be Eddy, the darker red line would be Lea, and then the bottom

line, I guess, would be Chavez?

A. That is correct.

Q. And if you could relate that slide to the next slide.

A. Well, I had them put this slide together to demonstrate that there has been, over the last five years, what is in effect an oil and gas drilling boom because of high oil prices. And prior to 2008 high gas prices. What this chart, I think, demonstrates is that New Mexico, Southeast New Mexico did not participate in that boom. Our current rig count is roughly the same as it was in 2008.

Q. So at the beginning of the graph there all the way to the left we have a rig count of approximately 70 and then here at the end in 2011 we are also looking at a rig count of approximately 70?

A. That's correct.

Q. We are looking at our totals. Okay. If you could look at the next slide, please.

A. Well, this next slide showed the New Mexico rig activity and compared it to the next as Permian Basin rig activity. That is, we looked at only three Texas Railroad Commission districts that are considered to be Permian Basin districts with

geology, climate, well characteristics, similar to what we have in Southeast New Mexico.

Traditionally, Texas kept about two rigs running for every rig that was running in the Southeast. Starting in 2006, that ratio increased dramatically and there are currently about five and a half rigs running in the Texas Permian for every rig running in Southeast New Mexico.

This also demonstrates what I mentioned earlier about New Mexico failing to participate in the boom that began in 2006.

Q. When you say that New Mexico failed to participate in the boom, you are making that statement based on the fact that on this graph the blue line, which is Railroad Commission District 7C, 8 and 8A, the trajectory of the line is significantly higher than the New Mexico line which is on the bottom of your graph here, which is relatively flat?

A. That's correct.

Q. If we could look at Exhibit 17, please. If you could explain to the commission why it was that this rebuttal exhibit was created.

A. Well, I have heard testimony from several sources that seem to indicate there was little

difference in the cost associated with closed-loop drilling and the cost associated with reserve pit. Also I have heard testimony that the rig counts in Southeast New Mexico or rather the lack of improvement in rig counts in Southeast New Mexico were the result of primarily oil prices only. And I developed this series of exhibits to try to refute that claim.

Q. Now, Page 2 of that exhibit is a cost comparison of reserve pits versus closed-loop systems. Did you prepare that?

A. Yes.

Q. We could go through that document. This highlights two wells; is that correct?

A. It highlights two wells, West Central Eddy County. The two wells were both deep and they are one location, one 40-acre location apart from one another. Now, to be fair, the No. 2 well was drilled in 2006. The No. 3 well was drilled and completed in 2011.

Q. I need to hold you up here because I see the commissioners do not have a copy of this exhibit. It was sent to Ms. Davidson after the initial submission of my rebuttal exhibits because I noticed that Page 2 was missing on the submission.

I believe Commissioner Bailey has it. It's the last page. It was sent at a different time but I see you all have it now. I want to make sure we are on the same page.

All right. So you were saying that Eddy, BD State No. 2 and Eddy BD State No. 3 were two well locations that you had that you originally drilled?

A. That's correct.

Q. They are in a close geographic situation. One is --

A. They are 1320 feet apart.

Q. And so looking at well No. 2, BD No. 2, you stated that this well was located in Southeast New Mexico in Eddy County.

A. East Central, Eddy County, 15 miles east northeast of the town of Carlsbad.

Q. Would that be anywhere near the potash area commonly known as R --

A. Both of the wells are actually within the R-111P potash area; that is correct.

Q. Now, could you please explain the process that you went through to get an application to drill these wells?

A. Well, the Eddy BD No. 2 was permitted in 2005, drilled in 2006 with a conventional reserve

pit, double horseshoe, the way we have been doing it for 25 years.

Q. And you have some costs here. Diamondback Disposal is a cost of a little bit over $25,000. What was that for?

A. Diamondback Disposal and TFH Rental Tools were both dirt contractors. I don't know which one is which, but these are the total costs for digging the pit, lining the pit, emptying got fluids out of the pit and then contouring it to match the original hillside.

Q. So your total cost for digging the reserve pit here was a little bit north of $52,000?

A. That's correct.

Q. That's for Eddy BD State No. 2.

A. That's correct.

Q. So let's look at your numbers for the State No. 3 well.

A. Well, I attempted to permit in 2010 a conventional reserve pit for this well and my first efforts, even with the tech website to help me, were unsuccessful. I hired R.T. Hicks Consultants to assist me with that effort. Over about a three-month period we made no progress getting our permit approved, so two weeks before my rig was

scheduled to move in I filed a 144 EZ, which was approved in a timely manner.

Q. Were you able to drill that well with the rig that you had?

A. Yes, we were.

Q. And I see a cost here for Closed-loop Specialties of $113,000?

A. Yes.

Q. That would have been for what work on the location?

A. That was the solids removal equipment and the personnel required to operate and maintain it.

Q. Now, the solids removal equipment that you are talking about there is your shell shakers and the centrifuges?

A. That's exactly correct.

Q. Did that include any roll-off bins to take the cuttings to a central facility?

A. I believe so. That would fall under the CRI Holdings, LLC cost line item.

Q. The CRI Holdings is the centralized facility you disposed at?

A. That's correct.

Q. The $78,000 cost, did that include the trucking cost to CRI?

A. Yes.

Q. Do you recall how far you were from CRI at this location?

A. That would be approximately ten to 12 miles.

Q. And you also had a cost of $11,000 to Dorado.

A. Dorado is a water hauling company, and I think those costs were included in here because those were the costs to empty the rig shale and suction pits when we moved out.

Q. Okay. And then there's another $51,000 for Mesquite Services?

A. Also water haulers.

Q. So the total is approximately $261,000?

A. That is correct. Now, to be fair, this was a problem well. And had we been able to prosecute this drilling in the 24, 25 days that we originally projected, these costs would have been lower. However, it was a problem well. We ended up spending close to 40 days, as I recall, getting our production casing run and the costs associated with the closed-loop system are daily costs, so during that time period when we weren't drilling, trying to solve our problems, those guys were still on the

payroll.

Q. And at the time of the drilling did you have an appropriately engineered closed-loop system?

A. I felt so at the time.

Q. And why -- did you have problems with the closed-loop system?

A. No, I didn't.

Q. If you would like to explain. You said that you had some trouble with the well and you had to actually be on the location for 40 days instead of 20 something days.

A. This well encountered an overpressured interval that was not present in any of the offset wells. That kicked us four times. Of course, kicks two, three and four were well handled. The first one occurred in a drilling break at 2:00 a.m. on probably a Sunday morning. That's the way it normally works. And we took an approximate 40-barrel gain before the problem was recognized.

One of the additional operational difficulties with the closed-loop system in my case was the lack of readily available storage in which to move fluids in order to effect the kill operation that was required to handle that kick. And I recall standing on the rig floor looking down at a shale

pit with oil bubbling over the lip of the edge of the shale pit.

Q. When you say shale pit, that is a roll-off bin or a steel tank?

A. No, that's one of the pits that is part of the circulation system. Now we are not circulating cuttings up. All we are getting up is oil and gas.

Q. But when you use the word pit, that does not mean a earthen pit in this instance?

A. No, this was a steel pit which is very commonly available on larger drilling rigs. Now, normally there would be three of them, each with about 400 barrels of capacity.

Q. So you actually had an overflow situation on those pits because of a kick?

A. That is correct.

Q. Would that have been the case if you had used a reserve pit?

A. It would not have been.

Q. So you still would have had the kick but you would have been able to manage it?

A. You are exactly correct.

Q. Now, you mentioned that there is an additional cost per day in using closed-loop systems. Previously you said it was a range of

between $1500 and $5,000 per day?

A. Correct.

Q. Could you estimate the cost for industry, the daily cost of closed-loop systems?

A. Yes. That's pretty simple math. Let's take a median round number of $3,000 a day, 70 rigs running in Southeast New Mexico. That's $210,000 a day or $73 million a year plus or minus.

Q. Do you compare the $73 million cost to the cost of damages caused by reserve pits?

A. I'm not aware of any testimony at any of the '07, '09 or current hearings that have placed an economic value on groundwater damage of even one dollar. Ranchers in my part of the country are not bashful, and when they feel they have been wronged or damaged in even the slightest manner, I hear about it at the speed of light. I have never paid any economic damages for groundwater contamination. I am not aware of anyone who has ever paid any economic damages for groundwater contamination and I'm not aware of any testimony here that relates to economic damages for groundwater contamination.

Commissioners, I'm a believer in balance. And $72 million a year versus zero over 70 years is a pretty compelling argument for me.

Q. Now, you used a figure of $3,000 a day for the closed-loop systems. Why did you not use the $5,000 figure? Did you account for the cost of digging a reserve pit?

A. Well, that's one way to look at it. But the other way to look at it would be to use that as a median number. If you want to say that reserve pits -- well, in my instance there were five times -- closed-loop is five times costlier. Let's say it's twice. That still leaves you with $37 million in industry costs over and above what we would incur using reserve pits.

Q. Now, if we could move to Slide No. 1 on Exhibit No. --

CHAIRPERSON BAILEY: Instead of moving to Slide No. 1, it's close to lunchtime. We need to take a break and allow for public comment and take a lunch break. So you are excused until we come back after lunch. We have two people, Bruce Gantner. Would you --

MR. GANTNER: Madam Chairman, if you wish, we will be glad to do both. I talked to Kelly and we will be glad to do our public statements this morning or if you would just as soon because of lunchtime defer that, we will do it this afternoon.

CHAIRPERSON BAILEY: All right. That would be helpful. Kelly Campbell?

UNIDENTIFIED SPEAKER: Yes, ma'am.

CHAIRPERSON BAILEY: You will wait until this afternoon also?

UNIDENTIFIED SPEAKER: Yes, ma'am.

CHAIRPERSON BAILEY: Let's break for lunch and come back at 1:15.

(Note: The hearing stood in recess at 11:56 to 1:15.)

CHAIRPERSON BAILEY: We will go back on the record. We were listening to direct testimony from Mr. Scott, as I recall. You are still under oath.

MS. FOSTER: Madam Commissioner, as a matter of housekeeping I wanted to relate that my witness, Mr. Tom Mullins, did work through the lunch hour trying to get the information from the old Oil Conservation Division exhibits from the 2007 hearing. My understanding is there are too many parameters that are different from the 2007 modeling that was done to get you the answers you are looking for.

What I would ask for would be that Mr. Mullins' complete remodeling as requested and

present that to the commission. Now, the way things are going in terms of our timing, I don't think that we are going to finish by tomorrow. So if we are going to be coming back on another date I would suggest or ask the commission that Mr. Mullins could come back with the additional modeling situation and be subject to cross-examination at that time.

CHAIRPERSON BAILEY: I think that sounds appropriate. We don't need to push people to not eat. So yes, that would be appropriate. When we do return, because I agree with you, it does not appear likely that we will be able to finish direct testimony tomorrow afternoon.

MS. FOSTER: In terms of scheduling as well, I know previously I said I would need to leave by lunchtime tomorrow to get to Hobbs. I have rearranged my schedule so I am available all day tomorrow to stay for testimony. We don't need to stop because of me.

CHAIRPERSON BAILEY: That's good. How about other attorneys? Are you all available tomorrow all day? If we do not finish tomorrow are attorneys and witnesses available on the 28th, which is the next regularly scheduled commission hearing?

MR. JANTZ: Of this month?

CHAIRPERSON BAILEY: Yes.

MR. JANTZ: Madam Chair, I am not available the 28th.

CHAIRPERSON BAILEY: Are you available any time next week?

MR. JANTZ: I am available the 27th and the 29th.

MR. SMITH: I will look and see.

CHAIRPERSON BAILEY: So we can pencil in those potential dates for the 27th and/or the 29th.

MS. FOSTER: Madam Commissioner, at this point it might be relevant to know how many other witnesses there might be. I know we have the OCD's two witnesses and I have no idea how many rebuttal witnesses there will be.

CHAIRPERSON BAILEY: We have Dr. Bartlett who has not yet given his testimony. So we have three direct and rebuttals.

MS. FOSTER: Do we know who will be submitting rebuttal? It would be nice to know if the witness is going to be presented as rebuttal testimony.

CHAIRPERSON BAILEY: That's difficult until we have all of the direct testimony. There could be something who will rebut the OCD witnesses.

At this point we don't know yet.

MS. FOSTER: I'm just asking if counsel does know and if they have called parties and intend to call them as rebuttal witnesses, I would like to have the information as to who the witness is as soon as possible rather than springing it on us at the last minute. That's all I am asking for.

CHAIRPERSON BAILEY: I understand your request.

Q (By Ms. Foster) So, Mr. Scott, we were speaking about Exhibit 17. We are moving on to the slides.

A. This first slide in Exhibit 17 is just rig count in four states: Colorado, Oklahoma, New Mexico on the left scale and Texas on the right scale. This is the time interval 2001 to 2005, and basically I think what this slide demonstrates is that for the very most part the four states had fairly comparable activity trends. If we move to the next slide, now we are in the 2005 to 2011 time frame. We look at late '06/early '07, the New Mexico rig count, rather than continuing to incline, it exhibits a pretty steep and precipitous decline and separates from the rig count in Colorado.

Now, rig counts -- I'm not a statistician

and rig counts are a function of many factors including costs, equipment available and regulatory environment. It appears to me that the regulatory environment in late '06/'07 had some operators making some decisions about whether they wanted to be in New Mexico or not. If you will note in Oklahoma and Texas subsequent to the drop in 2009, that activity has dramatically increased. New Mexico, on the other hand, seems to be stuck in about that 70 count range.

This next slide, also rig count averages. This is just Texas versus New Mexico from 1995 to 2011. Once again, the general trend from the early 2000s up until the Pit Rule was proposed, the two curves pretty nearly tracked. They separate again fairly dramatically about the time Rule 17 came under discussion.

Q. Just before you move on from the slide, how is this slide different from the first one, from Exhibit 15 where it was also a comparison from Texas to New Mexico?

A. The first slide we put up was in relation to Permian Basin rig counts only. That is three Texas Railroad Commission districts and the four counties in Southeast New Mexico. This slide brings

in the entire state of Texas as well as the entire state of New Mexico.

Q. Thank you.

A. There's the next slide showing the rig count ratio, Texas versus New Mexico.

Q. Now, just for the record, if you could please clarify, to the left side of that chart --

A. Prior to the consideration of Rule 17, approximately 14 percent of the rigs running in Texas in number were running in New Mexico. Subsequent to Rule 17 we are looking at about 9.5 percent of the rigs running in Texas are running in New Mexico. Now, this is a state-wide comparison.

This next slide is oil and gas prices. If you recall, New Mexico's drilling activity actually exhibited a decline at about the start of the Rule 17 discussions. But there was a two-year period in '06, '07 and '08 where oil and gas prices increased dramatically so that correlation between oil prices and New Mexico drilling activity falls apart when Rule 17 was proposed.

This is natural gas production. Texas is the lower curve, new Mexico is the red curve and the entire United States would be the blue curve or upper curve. You can draw your own conclusions

about cause and effect, but prior to Rule 17 coming under consideration, gas production in New Mexico was relatively flat as was the production in Texas and the entire United States. Subsequent to the consideration of Rule 17, New Mexico has been on a steady decline.

The next slide shows the same phenomenon, this time comparing New Mexico to Oklahoma.

This next slide is a representation of lost opportunity, and that is, a projection was made of flat gas production for the time period subsequent to Rule 17 coming under consideration. That is, if we had been able to hold New Mexico gas production flat rather than the decline that we have actually exhibited.

Now, the shaded area on this slide indicates our lost opportunity. That is, approximately one trillion cubic feet of natural gas. The average value during that time period was six dollars per M. That is six billion dollars of economic activity lost to the state. If the state is collecting 10 percent of the six billion dollars, that's $600 million dollars in direct lost tax revenue. If you add in royalties you are probably looking at something in excess of $750 million

dollars.

Now, let's go back to the economic damages claims for groundwater contamination. Zero. $700 million dollars plus of lost opportunity is what I think we are demonstrating here.

This next slide is a comparison of New Mexico versus Wyoming. I thought I had heard that comparison made in this hearing. I believe now that it was a comparison that was made in one of the previous hearings that demonstrated that Wyoming and New Mexico more closely correlated than did our neighboring states. The reason that it more closely correlated was that Wyoming had some troubles of their own and it turned out that that was constraints on pipeline capacity. That shale gas play took off up there and they were unable to move gas from where it was being produced to market. And the next slide demonstrates that with the gas prices shown for four hubs including the hub that Wyoming was selling into.

That's all I have. The rest of these exhibits are just the data that supports the charts.

Q. Thank you. Now, Mr. Scott, what are the sources of all this data?

A. Most of this data was available through

the Department of Energy, Wall Street Journal. It's readily available from published sources.

Q. You stated also you used Baker Hughes for some of this?

A. Baker Hughes keeps a very accurate count of drilling rigs operating and is the standard that the industry uses.

Q. Pages 11, 12, 13, 14 through the end, these are actually the hard numbers, figures for all these tables; is that correct?

A. That's correct.

Q. Now, could you draw any conclusions for the Oil Conservation Division based on the review of all this data?

A. It appears to me that something in the time period in early to mid 2006 caused operators not to abandon New Mexico as prospective territory but caused a significant curtailment in those activities, and it appears as though we are paying for that curtailments in lost gas production even through today.

Q. And you mentioned when you were talking about Exhibit 15 that New Mexico had missed the boom. Is that exhibited here on some of these graphs?

A. New Mexico in the '07/'08 period missed the boom. Our rig count declined while product prices were exploding.

Q. But the commodity price of oil right now is high. Isn't the southeast producing right now?

A. What is holding the activity level up is the oil development activities in the southeast. The guys in the northwest can't sell gas and they can't afford to drill for gas because of low gas prices. New Mexico is currently dependent, for drilling activity anyway, almost 100 percent on Southeast New Mexico.

Q. Now, would it be fair to say that small and independent operators are cost-sensitive and also have sensitivities to increased regulations?

A. That would be fair to say.

Q. Now, directing your attention to the multi-well portion of the NMOGA petition, which is section 19.15.17 -- actually, multi-wells are mentioned in several different parts of the petition in terms of the definition, the siting requirements and all that. So let's talk about multi-well fluid management pits. Are you familiar, having talked to the NMOGA folks on the working committee, with this new proposal?

A. Absolutely.

Q. And do you think that a multi-well fluid management pit would actually help you as a southeast operator?

A. Commissioners, this issue of multi-well fluid pits is as critical and perhaps more critical than the issue of drilling is. What is driving our oil and gas economy, as I just described in Southeast New Mexico, is oil development, and that development is occurring in rock that we now consider to be reservoir rock that ten years ago was considered to be tombstone. Horizontal drilling technology and multi-stage fracture stimulation of those horizontal laterals is absolutely critical to the continued health of our industry.

Ten years ago -- now, fracture stimulation has been around since nitroglycerine was dropped in all of them, but even ten to 15 years ago a 5,000 barrel stimulation program would have been considered a fairly large job. A mile-long horizontal in the Bone Springs or Avalon shale in Southeast New Mexico will now require 15 to 25 stages of fracture stimulation each that could be sized to 5,000 barrels.

So we have increased our water

requirements by almost an order of magnitude, and the ability to store, manage and as important as anything else, to recycle less than perfect water utilizing it for frac jobs and then reutilizing it after the flowback, as flowback water from those frac jobs, is going to become more and more important.

When you are pumping 5,000 barrels to stimulate a well, your volume requirements relative to agriculture are inconsequential. If you are now pumping 50,000, 80,000, 100,000 barrel jobs, that situation is different.

I'm of the opinion that freshwater is going to get to be more precious and expensive and we will have to -- we will be required to develop the technology to use less than perfect water, manage that at the surface and utilize that for some of these big stimulation jobs, and I can assure you that the health of the industry is dependent on us being able to carry out those stimulation jobs. So multi-well fluid pits are -- I consider that to be a critical component of this hearing.

Q. Just to put the multi-well fluid management pits into context, you mentioned that a horizontal with multi-stage fracs would use between

50 and 100,000 barrels of water?

A. Could.

Q. How much do you pay for a barrel of water now?

A. We are participating in a well that was just recently completed that had freshwater piped in from two wells on the ranch, and the cost of the water was $1.30 a barrel.

Q. So extrapolate that. It would be $130,000 in water?

A. Yes.

Q. And under the current Rule 17, once you are done with that one well, the horizontal frac, what do you do with the water?

A. Well, right now with the regulations that we are working with now, there are instances where 100 frac tanks are set on and near the location, loaded with freshwater, utilized -- that water is utilized to perform the job and then on the flowback that water goes back into those frac tanks, is hauled to disposal and the frac tanks are then released to another job. It's a very, very expensive operation, and we need to, have to and will develop, I think, the technology to utilize that less than perfect water for stimulation

purposes and then utilize it again if we have got someplace to store it on the surface.

Q. So in your example there was 100 trucks going on and off the location to move the 100 frac tanks of water?

A. Well, each of those frac tanks holds 500 barrels. A transport will haul approximately 130 barrels, so let me round the numbers off. Five transports per tank times 100 tanks. That's 500 truckloads of water.

Q. That goes over county roads to a disposal facility, a water disposal facility?

A. Yes. Now, you will never recover 100 percent of the frac fluid that you put into the formation. You will only recover a portion of it on the order of, low side 20 percent, high side 50 percent.

Q. So with your multi-well fluid management pit you would have the 100,000 barrels of water in the multi-fluid management pit. How would you get that to your well? In other words, the question I'm asking you is: Would you avoid all those truckloads moving water if you use the multi-well fluid management pit?

A. Well, typically those multi-well fluid

management pits would be situated in a location central to maybe a four-section development program and you might, you would try to find piped water into that central location. If you couldn't, you would be trucking it in. And the water out of that pit to each individual location would be via temporary poly line, poly pipe, and high volume transfer pumps to keep somewhere on the order of ten frac tanks loaded and full during the fracture stimulation process.

Q. And is it your understanding that the construction of the multi-well fluid management pits would be different than the regular pit in terms of the liners and the --

A. Constructed to much higher standards and there's good reason for that because they are likely to have fluid in them for a while.

Q. Now, let's look at the variance section of the rule, please, which is going to be Page 47. Sorry, let's look at Page 47. That's actually the permit approval section of the rule. Do you have that in front of you, Mr. Scott?

A. Yes.

Q. In that section there is a provision that IPANM is asking for administrative approval of an

application to drill. Do you support that request in terms of asking for the completeness and asking for the administrative approval?

A. Yes, I do.

Q. And the time frames that are listed here is ten days for administrative completeness determination by the OCD and a total of 60 days for a decision from the OCD, correct?

A. That is my understanding, yes.

Q. Now, are you aware of the OCD application that basically states that if they do not get back to us within the 60 days then the application is deemed administratively denied as opposed to approved?

A. I am aware of that and I strongly disagree.

Q. Why?

A. That's basically denial by neglect, and at that point I've got the option of hiring one of these $400-an-hour guys and coming up here to hearing but I don't know what I did wrong. I don't know why my application was not approved. If I'm going to have -- if the OCD is going to take 60 days to review my application they at least owe me the courtesy, if they are going to deny it, of telling

me why it was denied so I have an opportunity to fix it.

Q. So on the denial, is it the fact that you get bumped into a hearing so quickly that you don't like about that?

A. Well, if I get bumped into a hearing, if I'm denied by neglect I still don't know what I did wrong so I don't know what I need to do to make that right, to even go into hearing.

Q. So what happens now when you file an APD with the OCD? I mean, is there an opportunity for you to go back and forth and have conversations with the OCD if they feel that they need additional information on your application?

A. Yes. In fact, that's the process that we use.

Q. And this formalized process in the petition, this is not something that you are comfortable with?

A. No, I'm not.

Q. Looking at 19.15.17.15, which is the exceptions and variance section on Page 43, so a variance means an authorization from the appropriate division district office to depart from the requirements of the rule, and there is a set

procedure that is put in this section of the rule to ask for a variance. So in other words, you could ask for a variance if you needed something different in the signing of a temporary pit, different fencing, different liners, different concentration limits, right? And do you approve of this, again, formal mechanism put in the Pit Rule concerning asking for a variance?

A. I recognize that we have to have some mechanism to adjudicate unusual circumstances. This formal variance -- I am a bit uncomfortable with this formal variance process because I don't think drilling a well or two or three a year, that I will be very good at it. I don't think that I will be up to speed on the variances that have been previously granted and that I might be able to take advantage of. I guess my last comment would be that I really don't have a good idea how to make this better but I believe that it needs some more work.

Q. Now, I believe during this hearing that NMOGA made a couple of changes to their petition concerning automatic extension time frames which would be 19.15.17.13.E5, which is on Page --

COMMISSIONER BALCH: Page 37, second paragraph from the bottom.

Q. Thank you, Page 37. Thank you, Commissioner. This section talks about the appropriate division office may grant an extension not to exceed three months if an operator is unable to close a permitted temporary pit within six months from the date the operator releases the rig. Did you see that?

A. Yes.

Q. NMOGA earlier in the hearing pushed the extension period back into the variance section. In other words, you would ask for a variance instead of getting the automatic three-month provision. Do you agree with that provision?

A. I don't have a staff to handle variance issues. If I had my preference I would have a strong preference for automatic extension rather than having to come up here through the hearing process.

Q. And that would go through the same thing for Section 6, which is the automatic approval extension of six months for closing a drying pad in relation to a closed-loop system?

A. Same comment would apply to all those circumstances.

Q. Finally, the last thing I wanted to ask

you was if you asked for a variance -- two more questions. If you asked for a variance there is a requirement here that you need to prove that your variance request is more protective to the environment, public health and the environment, and there's a couple of other things in here, safety and livestock that are included. Do you agree with that requirement if you are asking for a hearing on a variance?

A. No, I don't. And that's a big problem for a small operator because we don't have those resources internally. It leaves me having to hire outside counsel consultants to try to generate that, and it's expensive and time-consuming.

Q. How is it that you would demonstrate that you would have additional protections for livestock in the variance request?

A. Offhand, I don't know.

Q. In fact, as a small operator, do you think small operators would go through this variance process as it's outlined in this proposal?

A. In very, very limited circumstances, I would think.

Q. Do you believe that the IPANM proposal is appropriate for the protection of freshwater as

designated by the State Engineer, public health and the environment?

A. Yes, I do.

Q. Do you believe that the IPANM proposal is appropriate for the protection of correlative rights and the prevention of waste?

A. Yes, I do.

MS. FOSTER: I have no further questions for the witness. I pass the witness.

MR. CARR: No questions.

MR. JANTZ: If we could take a quick break?

CHAIRPERSON BAILEY: We will take a break and be back at 2:00 o'clock.

(Note: The hearing stood in recess at 1:50 to 2:00.)

CHAIRPERSON BAILEY: We are back on the record. Mr. Jantz, you were about to cross-examine Mr. Scott.

CROSS-EXAMINATION

BY MR. JANTZ

Q. Good afternoon, Mr. Scott. Were you here for Ms. Denomy's testimony?

A. A portion of it, yes.

Q. Do you remember her discussing AFEs?

A. Yes.

Q. Could you give me your perspective on what goes into an AFE?

A. For a drilling well?

Q. Yes.

A. A drilling well AFE will contain tangible and intangible drilling well costs along with the cost to construct a tank.

Q. Could you explain what intangible costs are?

A. Okay. Let's start with the intangibles.

Q. Okay.

A. Intangible drilling costs are expenses that will be incurred on that project that have no residual value. Starting at the top of the list, it would be roads and locations, damages and right-of-way, drilling rig day work, drilling rig footage, completion rig, day work water, transportation, fuel, logging, cementing, supervision, miscellaneous -- I don't remember the last two or three line items -- would all come under intangible drilling costs.

The tangible drilling costs are primarily tubules, wellhead and tubules. This would include the various sizes of casing that we will have to run

along with tubing packers, pumping unit and rods. Now, the tank battery is normally a separate series of line items below that and will include separation equipment, any pipelines that might be required and your on-site on-location tankage.

Q. That's the extent of a drilling AFE?

A. Yes.

Q. Ms. Denomy, if I recall correctly, talked about the anticipated production of the well, the life of well costs and the anticipated returns. Is that something is that you consider when you draft AFEs?

A. Well, an AFE, an authority for expenditure is just that. That is a document that you prepare with your estimated costs to send to your partners for their approval before you move ahead with the project. Now, the economics considerations that go into a project prior to you preparing the AFE certainly take into consideration what you think your expenses will be as well as your projected production.

Q. So your partners don't care what the life of well cost will be in a potential production or do they? I mean, when you are talking about AFEs, my understanding is all of these considerations are put

into that document.

MS. FOSTER: Objection, I believe the witness just stated that information is not included in an AFE so you might to rephrase the question.

MR. JANTZ: That wasn't clear to me, Ms. Foster.

Q. Let me rephrase it. In the AFEs that you produce do your partners want to know the life of well costs?

A. No, sir. It is standard industry practice when I receive an AFE, that is an estimate of the expected costs only. It's up to me to develop my own internal economics to determine whether I want to participate or not.

Now, I know from experience that a Bone Springs pumping well is going to cost me about $2500 a month to operate. A gas well should cost about $1,000 a month to operate. I can plug those projected expenses into a cash flow projection to generate what kind of rate of return that project will effect, but that doesn't come with an AFE.

Q. Let me ask you this then: For your cost comparison for the Eddy No. 2 and Eddy No. 3 -- do we have a slide?

MS. FOSTER: There was no slide for that.

Q. Oh, there was no slide for that? Okay. Did you do an economic -- were there economic considerations or economical calculations done for each of these wells?

A. Internally, yes.

Q. Those included life of the well cost?

A. No. Well, yes.

Q. They did?

A. Yes.

Q. And did they also include the anticipated rates of return?

A. Yes.

Q. And the anticipated amount of resource that you get out of each well?

A. Yes.

Q. But you didn't include that here?

A. No.

Q. No, you didn't.

A. This sheet represents the actual costs that came out of my general ledger for the pit construction and closure on the Eddy BD 2 and my actual costs of the closed-loop system on the Eddy BD No. 3. That's all.

Q. But that's not the entire consideration that you make when you drill a well?

A. Oh, absolutely not.

Q. Okay. Are you willing to make the economic analysis available?

MS. FOSTER: Objection. I don't think that's relevant.

MR. JANTZ: Sure it is. If we are talking about the economic impact of the Pit Rule we should be able to look at the cost in the context of each individual well, the life of well costs along with the anticipated rate of return in order to get a clear picture of what these costs really mean.

MS. FOSTER: I think it's a fishing expedition, to tell you the truth. That goes into the business decisions that are made by the small independent operator and the decision whether to invest or participate in a well really is not information that OGAP needs to have or is part of this hearing.

CHAIRPERSON BAILEY: Objection is sustained.

Q (By Mr. Jantz) Let's take a look at this cost analysis. Could you tell me -- let's take a look at Eddy No. 2 first. Could you tell me what the Banta Oil Field Services, Inc., what that expenditure is for?

A. Banta Oil Field Services is a general contractor roustabout and that was a miscellaneous line item that was entered into the pit subdivision on my general ledger. I can't tell you -- it's probably -- I would have guessed it was for fencing but I'm guessing.

Q. Okay. Diamondback Disposal, what was that for?

A. Both Diamondback Disposal and TFH do both dirt work, pit lining and water hauling. Mesquite Services was exclusively a water hauler.

Q. Is that for digging the pit and taking away the water?

A. Yes.

Q. Does that include the liners?

A. Yes.

Q. Let's go over to Eddy No. 3. Closed-loop Specialties, I'm assuming that's the closed-loop system?

A. That was the solids removal equipment rental along with the personnel to man and operate that equipment while it was on location.

Q. Okay. And that's over what time period?

A. That was approximately 40 days. I want to say 38 to 40 days.

Q. And that includes the problems you had with this well?

A. That would be correct.

Q. Did you do a calculation to subtract the amount of money that you spent here that you might not have otherwise spent if it had been a normal well and hadn't had the problems?

A. I didn't do that, but those are pretty much daily charges, and I believe we AFE'd that well at 26 days, so 14 of the 40 days would be problem charges.

Q. CRI Holdings?

A. That's the central disposal facility.

Q. That doesn't include the unanticipated problems with the well or does it?

A. Well, the railroad bins are a daily charge. The actual disposal of the cuttings is on a per-load basis, so while we were having troubles we obviously weren't generating any cuttings so those would not have been ongoing.

Q. You did pay for the rentals during those days?

A. Yes.

Q. Dorado?

A. Trucking company.

Q. Trucking company. Does that figure reflect, the $11,000 figure reflect the additional costs for the unanticipated problems?

A. Yes, sir, probably would.

Q. Mesquite Services?

A. Also a trucking company.

Q. Also reflects the unanticipated additional cost for the unanticipated problems?

A. A portion of it would have been, yes. Now, we would have some trucking charges there regardless. Obviously, 26 days is going to incur water hauling charges but a portion of those would be attributable to the trouble we had.

Q. R.T. Hicks Consultants?

A. That was a consultant I hired to try to get a reserve pit approved which I was unsuccessful with. And his charges were added into the pit subdivision in my general ledger.

Q. Okay. So that was sort of a -- that's not generally associated with the closed-loop system?

A. I would agree with you.

Q. Okay. And Roadrunner Environmental?

A. Trucking company.

Q. And does that reflect additional costs due to the --

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A. Well, it doesn't look like we used them much. There's only $700 there, so I don't know.

Q. Okay. So can you give me an estimate, since you did the original AFE, what the difference between the original AFE on Eddy No. 3 and this figure that you have here on your slide, can you tell me the difference between the two?

A. Repeat the question.

Q. So your original AFE calculated the cost of the well, right? Without the unanticipated costs of the problems that you actually had with that well; is that correct?

A. That's correct.

Q. Can you tell me the difference between that cost from your AFE and the cost that you ultimately give here after you accounted for the increased cost of the unanticipated problems?

A. Okay. I can ballpark that for you.

Q. Please do.

A. A rig on location will generally run somewhere around $25,000 per day. That's all the costs included. So if we take 14 days at $25,000 per day, we are looking at $325,000 of additional costs on the well as a result of the difficulties that we had.

Q. If I understand you correctly, Lynx operates exclusively in New Mexico; is that right? Is that what you said?

A. Affirmative.

Q. But you are registered to operate in Texas; is that true?

A. We sold our Texas leases some ten or twelve years ago, currently operate no wells in Texas but have interest as a non-operator in about 15.

Q. Okay, but you could operate in Texas should you so desire?

A. Well, I suppose I could. I really don't own any leases over there and no rights to develop anything.

Q. Well, it made me wonder if the regulatory environment in New Mexico is so hostile, why don't you move your interests to Texas rather than elect to drill in New Mexico? Because the Eddy No. 3 is a decent well, is it not?

A. Sir, I had 25 years invested in acquiring some 8,000 acres of leases in Lea, Eddy and Chavez Counties. I couldn't go anywhere else. That's why I drilled in New Mexico.

Q. Lynx has working interests in wells in

Texas; is that right?

A. As a non-operator, yes.

Q. Did you do a comparison between your AFEs from Texas wells versus New Mexico wells?

A. I haven't done a detailed comparison. I can tell you that AFEs that we receive in Texas for a similar depth and completion technique well are substantially less expensive.

Q. But you don't have that cost breakdown?

A. No.

Q. Let's talk a little bit about the charts comparing the Texas and New Mexico -- well, New Mexico and other states' drilling breakdowns, and if we could have those slides. Now, as a preface to your discussion on these charts you said that there are a lot of factors that go into drilling a well, a lot of factors that an operator considers when drilling a well?

A. It's a business decision. You bet.

Q. Sure. So you want to look at your costs certainly. What goes into some of the cost considerations? The location of the resources? Is that something that bears on costs?

A. Are you asking whether lease acquisition costs are a factor?

Q. Yes.
A. The answer is yes.
Q. So lease acquisition costs. What about depth to the resource?
A. Also certainly a factor.
Q. The kind of geology that you have to deal with? I'm assuming that some geological formations are more difficult to get to than others?
A. Also a factor.
Q. Your taxes that you have to pay?
A. Also a factor.
Q. You obviously think regulations are a factor?
A. I do think regulations are a factor.
Q. The tax incentives? Are they a factor as well?
A. They have never been an incentive for me.
Q. Is that right?
A. That's correct.
Q. So tax incentives for states like Texas don't impact your decisions about whether -- versus New Mexico? Assuming you could drill in Texas or you had leases in Texas?
A. Well, no experience. I can't answer the question.

Q. Okay. So the bottom line is that there are a lot of factors that could go into this decision about whether to drill or not to drill?

A. (Witness nods).

Q. Could we have the next slide, please? On these charts, though, the conclusion you drew was that the Pit Rule -- and correct me if I'm wrong about this -- was a determinative factor in New Mexico's, as you called it, decline in oil and gas production or rig counts?

A. I believe that to be true.

Q. Okay. And it's missing out on the oil boom of -- what was it, 2006 and '7?

A. I believe that to be true, '07, '08 and into '09, actually.

Q. Now, if we look at this chart here, you realize that the Pit Rule didn't go into effect until May of '08?

A. I understand that.

Q. So if we look at the graphs here, in New Mexico it looks like it tanks around March of '07; is that right?

A. Plus or minus, yes.

Q. And that's before the Pit Rule was enacted?

A. That is correct.
Q. And then it starts an upswing around March, April, May of '08?
A. Yes.
Q. Which is about when the Pit Rule was enacted?
A. And also about the time oil and gas prices skyrocketed.
Q. And after that point New Mexico's line seems to follow the lines of the rest of the states, including Colorado, which seems to be neck to neck for Colorado.
A. Uh-huh.
Q. Colorado doesn't have a Pit Rule like New Mexico, does it?
A. I don't know.
Q. You don't know. Okay. Let's talk a little bit about your testimony on multi-well fluid management pits. You said you had knowledge of multi-well fluid management pits based on your discussions with NMOGA working group?
A. And personal experience.
Q. Could you explain your personal experience?
A. Well, we dug a freshwater impoundment that

is appropriately permitted under the current regulations because we are not putting anything in it but freshwater. But if we, in the future, were allowed to put flowback water or less than freshwater into that pit it would serve the same purpose.

Q. How big is the pit?

A. I think it's approximately 100,000 barrels.

Q. How many acre feet is that?

A. I don't have that conversion fact. With a quick calculator I can get to it but I don't have it in my head.

Q. Okay. And if it becomes a multi-well fluid management pit how many wells do you anticipate it would serve?

A. It could serve up to 16 as it is centrally located in an area where we have interest in roughly four sections of mineral leases.

Q. You talked about water use in the context of multi-well fluid management pits.

A. Yes, sir.

Q. Have you ever taken into account the potential evaporation losses from the larger surface area of a multi-well pit?

A. The evaporation losses are a fact of life.

Q. Sure, but did you include that in your calculations or your thinking or analysis of the water savings that multi-well fluid management pits might give you?

A. I don't believe that was a major consideration, no.

Q. Did you calculate any economic costs and benefits for multi-well fluid management pits versus traditional pits or what's currently permitted and allowed under the Pit Rule?

A. I did not.

Q. Did you consider analyzing the environmental impacts including air quality impacts from multi-well fluid management pits versus what's permitted now?

A. I did not.

Q. Does it bother you that the liners in the proposed regulations for multi-well fluid management pits are not as thick as they are for a permanent pit?

A. It's my understanding that the construction specifications for multi-well fluid management pits are more stringent than they are for temporary reserve pits with double liners and leak

detection.

Q. So if my representation is, in fact, correct that multi-well fluid management pits only require 20 mil liners while permanent pits require thicker than that, that doesn't bother you or does it?

A. It doesn't.

Q. Couple last questions. You said with respect to the variance provision that you oppose variance denials by neglect, I think was your phrase?

A. Yes.

Q. Do you support variance granting by neglect?

A. If I am going to take the time and the trouble to fill out an application, I feel like the OCD owes me an evaluation of that application in a timely manner and if they are unwilling or unable to provide that timely evaluation then my permit should be approved.

Q. Thank you. I think that's all I have.

MS. FOSTER: Madam Commissioner, I just realized that I had forgotten to move Exhibits 15 and 17 into evidence at the conclusion of Mr. Scott's testimony. Mr. Jantz pulled up our

slide for use and testimony so we would ask to have Exhibits 15 and Exhibit 17 moved into evidence at this time.

CHAIRPERSON BAILEY: Any objection?

MR. JANTZ: No.

CHAIRPERSON BAILEY: They are admitted.

(Note: IPANM Exhibits 15 and 17 admitted.)

CHAIRPERSON BAILEY: Ms. Gerholt, do you have any questions?

MS. GERHOLT: I do have a couple questions for Mr. Scott.

CROSS-EXAMINATION

BY MS. GERHOLT

Q. Good afternoon, Mr. Scott.

A. Good afternoon, Ms. Gerholt.

Q. If the commission were to adopt notification of closed-loop systems, based upon your experience if an APD or a C 103, a sundry, had a check box that said "Closed-loop systems," would that be an appropriate notification? If you as the operator were just required to check a box that yes, on this site we are going to use a closed-loop system?

A. I'm happy with that.

Q. I believe your testimony on direct was that when you file an APD with the district there's occasion for some back and forth; is that correct?

A. Yes.

Q. In regards to a variance request, do you see that you would stop your communication with the district?

A. Well, ideally what I think I would like to see was that those variance requests be handled between the operator at the district level.

Q. Correct.

A. In a back and forth manner.

Q. And you would like to see that?

A. Yes.

Q. Just like you have in the APD?

A. Yes.

Q. Mr. Scott, have you had an opportunity to apply for an exception under current Rule 17?

A. Yes.

Q. Given that you have had that opportunity, you have a certain level of experience then with that exception process as it currently stands, correct?

A. Yes.

Q. Would you say that the proposal -- and

that's why I handed you the notebook. It would be Exhibit 2, Page 43.

A. No page numbers.

Q. On the bottom left-hand side, the very small print. We like to test every one's eyesight.

A. Got it.

Q. Do you believe, understanding you have some issue with the variance language as written, but do you believe that this submittal, this modification, allows for more opportunity for variance than the current exception process?

MS. FOSTER: Madam Commissioner, my page numbers are different from Ms. Gerholt's on my copy. If we could point me to the section of the rule we are talking about.

MS. GERHOLT: 19.15.17.15.

A. Given my past experience with the exception process, I would find it difficult to believe that you could make it any worse.

Q. And then if I could draw your attention to Page 37 of OCD's Exhibit 2, and that would be 19.15.17.13 -- I believe it's E as in Edward 5 and 6. Do you see that, Mr. Scott?

A. Yes.

Q. In regards to granting extensions for

temporary pits, the OCD has recommended that there be an extension granted not to exceed three months; is that correct? For a temporary pit?

A. Yes, that's what I see.

Q. That's in agreement with IPANM's recommendation?

A. Yes, I believe it is.

Q. And if I could have you look at Paragraph 6, the extension grant of six months for a drying pad using a closed-loop system?

A. Yes.

Q. Does that agree with IPANM's proposal?

A. Yes, I believe it does.

Q. No further questions. Thank you.

CHAIRPERSON BAILEY: Mr. Dangler, do you have any questions?

MR. DANGLER: Yes, I do.

CROSS-EXAMINATION

BY MR. DANGLER

Q. Good afternoon.

MR. DANGLER: May I approach the witness and the controller to show them the slide I would like?

CHAIRPERSON BAILEY: Yes.

Q. I'm trying to rationalize this conclusion

with other evidence that I have been listening to in the course of the hearings. My understanding, and it wasn't feature testimony but I believe I did hear it in the course of these hearings, is that the price of natural gas is now so low that people are filling up the warehouses rather than trying to sell it on the open market; is that your understanding?

A. You are correct.

Q. So it's not necessarily a good thing to be putting more of your natural gas on the market right now, wouldn't you conclude from that?

A. I am not drilling for natural gas, so I guess the answer to your question would be yes.

Q. It seems to me it's preferential to store it rather than sell it. My understanding also is that a lot of our natural gas is being produced in the San Juan Basin?

A. A lot of natural gas is produced in the San Juan Basin.

Q. And my understanding about our San Juan Basin is essentially that is a declining field.

A. Well, now, I might need to defer to someone more expert with conditions in the northwest. My expertise is in the southeast, and given the advances in our technology over the last

few years, I would have to disagree with that for the southeast.

Q. And, in fact, it may revive. Our advances in technology may revive the San Juan Basin because of new technologies?

A. Yes.

Q. But isn't it fair to say that those new technologies have opened up pretty big fields everywhere in the United States?

A. With the exception, substantial exception of New Mexico.

Q. And, in fact, some of these natural gas fields we just didn't really believe existed in the not too distant past?

A. That's correct.

Q. Now we believe we have something well over 100 years of supply of natural gas?

A. That is correct.

Q. And that was not the belief, say, ten years ago?

A. That is correct.

Q. So if you can't rule out a declining field in this graph --

A. Drilling activity, the production decline is a function of continued drilling activity. Your

reservoirs will deplete a little every day unless you actively attempt to develop new resources. Now, New Mexico is blessed with multiple shale reservoirs that have not been developed in this last shale boom that you describe.

Q. Right.

A. And the reason they weren't developed was because of, I think, because of our regulatory restrictions.

Q. That's your belief?

A. Yes.

Q. But wouldn't it be fair to say that there may be a lot of other factors involved, particularly price at this point, for the not developing of the --

A. There is no question that multiple factors are involved in reservoir development. Cost, taxes, product price, all are a consideration.

Q. And in terms of economics, isn't it fair to say that this price differential that has occurred recently between natural gas and oil is the most dramatic price differential that we have seen in our lifetimes?

A. That's fair to say.

Q. That's going to have certain unintended

consequences, isn't that fair to say?

A. That is fair to say.

Q. Even to the point that sometimes you have to use other hydrocarbon products in order to create the natural gas that you are pulling out of the ground and sometimes your costs go up. If the price of oil is at 80, 82, whatever it is now, versus the price of natural gas, it becomes even more cost prohibitive to develop natural gas.

A. What cost would you have in mind with that? Tell me.

Q. It could be any number of components of the operations in the field, but a lot of the components in the operations of the field depend on the product that you are buying that's based on the hydrocarbon cost.

A. Well, I'm not aware of any significant volumes of natural gas in the state shut in due to prices. I think that is the case in some scattered circumstances but not regular circumstances.

Q. Okay. Thank you for helping me with that. Going back to your example of the two wells, and thank you for being honest about how one was a bit of an anomaly because you had difficulty with that well. How many times have you used closed-loop

systems, your company, if you know?

A. As an operator, two.

Q. Two times, okay. Were your costs similar in the other instance that you used the closed-loop system?

A. My cost in the other closed-loop system on a 28-day well ran about $3500 a day.

Q. Did you do that one before or after the one --

A. Before.

Q. Okay. Do you think when you are used to a system that you have been using for a number of years you get particularly adept at using that system as opposed to the new?

A. You bet you.

Q. Don't you think it's human nature when you are faced with a crisis, your ability to rely on years and years of experience with a particular system allows you to operate in that crisis at a higher level of efficiency?

A. You bet. The people that are keeping rigs busy 100 percent of the time, are hiring this solids control equipment, fine tuning it to that rig, moving it with the rig, keeping the same personnel all the time, and they are probably doing better

than I am with regards to their daily costs. Now, they are not doing a whole lot better because my costs have been in line with what I have seen in the range.

Q. Speaking of your costs, when you went to hire companies to do the closed-loop system for you, did you get three bids?

A. No. We evaluated -- oh, for the one that's the example in this book, we evaluated two different outfits and picked one of them.

Q. Did you consider, in choosing between those two or even in deciding whether or not to have bids, did you consider whether a company would charge you for down time at the regular rate?

A. That is universally the case.

Q. Okay. So if there was a company that didn't charge for down time that would be news to you?

A. That would be an anomaly.

Q. We will talk afterwards. One of the things I'm really interested in, and I don't know if you have information as to this, is I think you said in terms of the big pits, the multi-well fluid management pits, that we will be required to develop the technology.

A. Yes.

Q. Because it's got to happen. One of the things that intrigues me about this entire problem is it appears that the cost for closed-loop systems are declining as technology advances and I am wondering if you have any experience with that?

A. Well, in my two projects, my daily costs were both approximately as we were projecting them. In the second instance I just had a lot of trouble on the well where those daily costs kept accumulating. And in both instances, I can't recall any significant reduction in what I was projecting for costs between the first and the second well.

Q. But as a good businessman, which I'm sure you are, if you were to use closed-loop technology into the future you would look for ways to lower that cost, wouldn't you?

A. Goes without saying.

Q. There has been some discussion, and, in fact, I think it was entered because it was not -- because we wanted attribution for it, of a Texas Railroad Commission study about costs of closed-loop systems. Are you aware of that study?

A. No, sir, I'm not.

Q. Okay.

A. I do have a piece of evidence that I have not discussed yet in that my drilling company is ADF Drilling Fluids based in Midland, Texas. I had a discussion with the regional sales manager two weeks ago in conjunction with this subject and I asked him how many rigs their company was watching after in Texas. The total was 43, and 13 of those were in South Texas working in the Eagle Ford Shale. My next question was how many of these are running closed-loop systems? One, in a subdivision.

Q. So this leads into my final area of inquiry, which is you have had your experience. You have had two instances of using the closed-loop system. In one there was an unanticipated problem that, as we discussed, would have been a lot easier for you to handle with a system that you were very familiar with and you would have been able to fix?

A. Without question. Not only me, but anyone would have been in the same bind.

Q. Right, although perhaps if you were familiar with closed-loop systems and you foresaw that problem you might be able to --

A. Can't rule that out.

Q. -- handle that situation, right?

A. Can't rule that out.

Q. We are creative human beings. And you also made some kind of startling jumps from your situation to all the number of wells in the southeast and you come up with a very high number, and you have interpreted some graphs that we have looked at. Have you reviewed any studies, any economic studies like the one by the Texas Railroad Commission of closed-loop systems and their costs and their benefits?

A. Not a one.

Q. I have no further questions. Thank you very much.

CHAIRPERSON BAILEY: Dr. Neeper, do you have questions of this witness?

MR. NEEPER: I have some, but I would prefer if Dr. Bartlett went first and he may take care of all of the questions.

CHAIRPERSON BAILEY: All right.

CROSS-EXAMINATION

BY DR. BARTLETT

Q. Good afternoon, Mr. Scott.

A. Good afternoon.

Q. I will try to avoid areas that have been dealt with before and some will be dealt with after and how these fit together will not be perfectly

matched, but I will try to match the information with the question. The rig counts -- is rig counts a leading indicator of oil and gas economic health in a general sense?

A. I would say probably not because all of the larger companies require a little bit of time to change directions based on changes in prices, regulatory environment and whatever.

Q. Is it commonly considered to be an indicator of economic health now and in the near future in an area? Is that a common belief among people who put money into the oil and gas business?

A. I can assure you the economic health of the communities in which I reside are directly tied to rig count.

Q. Rig count?

A. Yes, sir.

Q. And figures used as a leading -- or the leading one used for that?

A. I would think that rig count -- the changes in the rig count lag changes in commodity prices and expenses and taxes and would generally lag all external changes because companies that are much larger than me are unable to change directions immediately.

Q. Lag by how much? Are we talking years, months?

A. Depends on the size of the company. I can change directions in two weeks but ConocoPhillips probably takes a little longer.

Q. You have an advantage over ConocoPhillips in some cases?

A. In that respect, yes.

Q. In fact, that is one of the advantages of being a smaller operator really; isn't that correct?

A. Yes.

Q. So I don't work in the oil and gas industry. I can read, as you can, about rig counts in general literature, and I read that they are generally considered a leading indicator of economic health of the oil and gas industry now and in the near future. Am I misinterpreting what I read?

A. Perhaps we are talking apples to oranges here. I mean, if prices are high and rig counts are rising, some economists would probably consider that a leading indicator of future development activity.

Q. Maybe we are using leading differently. Leading can be leading in time or leading in value, quality of measurement. I was using leading indicator to mean a high level valuable indicator of

future economic health in a field.

A. I would think that rig count would be a predictor as to the economic well-being.

Q. The word "predictor" is probably better than mine. Thank you. And it's generally considered that way among people in the oil and gas business who are interested in putting money into the oil and gas business?

A. Yes.

Q. You said you know about AFEs in detail in Texas; is that correct?

A. Yes, sir.

Q. Do you know about AFEs in detail in Oklahoma?

A. No, sir, I do not.

Q. In Colorado?

A. I do not own any interests in any other state outside of New Mexico or Texas.

Q. So you don't know how AFEs or costs in Oklahoma?

A. No, sir.

Q. You know how they compare with Texas and New Mexico.

A. That's correct.

Q. But not in any of these other states?

A. That's correct.

Q. We saw two graphs -- well, we saw a number of graphs. Some showed that Texas and Oklahoma were ahead, if you will, of New Mexico in rig counts and rising rig counts.

A. Yes, sir.

Q. We saw two other graphs that showed in general -- you picked a time period for Colorado, but the general trend shows New Mexico ahead of Wyoming and Colorado in rig counts. You attribute the Texas and Oklahoma situation to the regulatory climate in New Mexico to a large degree?

A. The Texas regulatory climate would not be as onerous as the New Mexico regulatory climate with regard to this issue. As I understand it, 3,000 parts per million of chlorides is land farmable in Texas. Greater than 3,000 parts per million is required to be buried on-site. There is, to my knowledge, no maximum. But I haven't operated in Texas in quite a long time. That's just my --

Q. Well, that wasn't really my point. My point is you showed graphs that showed in Texas and Oklahoma, the rig counts were, I would say, more favorable. The direction was more favorable, in your opinion, than that in New Mexico?

A. Yes, sir.

Q. And you also showed graphs that showed the rig counts in Wyoming and you attribute that in both cases, Oklahoma and Texas, to the more difficult regulatory climate, shall we say, in New Mexico.

A. Yes, sir.

Q. And you showed two other graphs that showed New Mexico's rig counts were doing as well as or better than Wyoming and Colorado.

A. Well, in Wyoming, that particular instance was a consequence -- we were doing as bad as Wyoming because Wyoming couldn't sell any gas.

Q. So you are saying those graphs, sometimes there are other factors that dominate?

A. Absolutely.

Q. And other times -- so the charts you showed us, it may be there's another factor that you don't know about because you don't know about all of them?

A. You are absolutely correct. I leave it to the commission to draw their own conclusions about the gas production in New Mexico versus Oklahoma, gas production in New Mexico versus Texas and the rig counts in correlation to the Pit Rule.

Q. How about in Colorado and Wyoming?

A. Well, I explained --
Q. New Mexico is doing equal to or better than --
A. Now, Wyoming, I believe I already --
Q. You have given --
A. -- explained and Colorado I don't know.
Q. So you are asking the commission to take exactly the conclusions that you have drawn.
A. No, I'm going to ask them to draw their own conclusions from the data provided. That's all I want them to do.
Q. Okay. I disagree. I didn't get that impression from your testimony. You presented the data. thank you. Would you agree that judging by rig counts that the general health of the oil and gas business in New Mexico, judging by rig counts, is healthy and growing?
A. I would say fair in comparison to other parts of the country.
Q. But in and of itself we have an oil and gas industry -- the job of this commission is not to beat Oklahoma in rig counts or the Bakken, what's going on in North Dakota or Pennsylvania. It is to make a balance of economic interests in New Mexico. Wouldn't you agree with that?

A. Yes, sir, I would.

Q. In that sense, the oil and gas industry, not compared to anything else but just the box around New Mexico, is healthy and growing judging by rig counts?

A. No, sir, I disagree with that. I disagree to that with respect to Northwest New Mexico and they are absolutely hammered.

Q. But the rig count, you showed us, was for New Mexico.

A. Yes.

Q. And it was going up in a steady -- now it was going up in a steady -- rising. It looks that the rig count indicates a healthy and growing oil and gas industry in New Mexico.

A. Well, I don't know that I would characterize that as rising. I would characterize it as stable and almost all of those rigs are running in the southeast.

Q. Well, let's show -- maybe we have to look at your graph. Can you bring up the one that shows the rig counts for New Mexico and the Wyoming chart, for example?

A. There is the rig count in Chavez, Eddy and Lea Counties, New Mexico.

Q. No, I want to show that the oil and gas industry in New Mexico --

A. That's it.

Q. You said it was just three counties.

A. That's three counties in Southeast New Mexico.

Q. I want the rig count --

A. Which account for the vast majority of the drilling rigs running in the state.

Q. My question is: What does the slope of the line for rig counts in the oil and gas industry in the state of New Mexico look like?

A. It's stable.

Q. Well, I disagree. We will leave it for others to judge that. Would you consider this a boom time in the oil patch?

CHAIRPERSON BAILEY: There is a graph that shows New Mexico compared to Wyoming?

THE WITNESS: Yes.

CHAIRPERSON BAILEY: Would you put that up, please?

DR. BARTLETT: I asked for that and I didn't get it.

Q. That looks like a rising New Mexico rig count indicating a healthy oil and gas industry in

New Mexico to me. Do you see it as divided in some sense? I leave it for the commission to decide, but this is why I made that statement that New Mexico, judging by rig count --

MS. FOSTER: I'm going to object here. I know Dr. Bartlett is not an attorney but he is definitely testifying as to his own point of view and interpretations of the graph. If he has a question, he can ask it.

CHAIRPERSON BAILEY: I think you do need to ask questions rather than testify.

DR. BARTLETT: I asked the question. He gave the answer. We brought this up. I leave it to the commission.

Q. Would you consider this a boom time in the oil patch?

A. In Southeast New Mexico I would consider times to be good, yes.

Q. Would you call it a boom time?

A. With gas prices where they are, I don't know that I could consider it a boom, but prices currently justify a fairly significant level of activity.

Q. Do large institutions interested in oil and gas finances consider it a boom time?

A. I would think so, yes.
Q. Could you name some of those institutions that would think so?
A. No, I can't.
Q. Are you generally aware of the sales of New Mexico oil and gas leases by the New Mexico Land Office?
A. Yes.
Q. How have the sales gone in the time during -- let's say from 2006 on?
A. Leases are very expensive currently.
Q. They are selling well?
A. Yes.
Q. Do sales of oil and gas leases indicate the prospects of somebody, the mindset, if you will, of somebody that he can come into New Mexico and make an attractive profit in oil and gas operations?
A. Yes.
Q. That's what it means when they put the money down?
A. Yes.
Q. And those are thriving during and since the Pit Rule went into effect?
A. Yes, sir.
Q. Have there even been record years in the

time since the Pit Rule went into effect?

A. Sir, let me make an attempt to put this line of questioning to bed, and that is I think the industry has demonstrated in the years since 2006 that we can and have the ability to overcome the consequences of bad policy and still make a buck.

Q. Make an attractive profit?

A. However, that doesn't make the policy any better.

Q. Prospects of making an attractive profit when they put their money down on the barrel?

A. Yeah.

Q. Others have asked this question. Do you know the total cost of drilling a well?

A. Absolutely.

Q. And do you know for every well you drill?

A. For every well I drill.

Q. Every well everybody else knows, actually. They know also. Do you know the portions of those costs that relate to environmental and protection control in any manner?

A. I don't know that it comes across on an AFE in that manner, no.

Q. Could you extract that data from an AFE with effort? Let me ask the question a slightly

different way: Would it be a good idea to begin to structure your AFEs so that you could extract environmental protection compliance costs, however you want to define that term. Would that be a good practice for industry to begin, in your opinion as a businessman?

A. Those costs are not -- those costs would generally be considered a G & A or overhead for the operator and do not show up anywhere as a line item on a drilling well AFE.

Q. But you could design an AFE for drilling wells that captured environmental compliance and control?

A. I suppose you could.

Q. Would you think that would be a good idea for the industry to do that so when you came to hearings like this we could get something more complete than some anecdotal data on two wells?

MS. FOSTER: Objection. Again, Mr. Bartlett is testifying and I think the question has been answered as to whether an AFE has environmental costs as a line item on it. I think the question has been answered. Mr. Bartlett is now crossing the line into giving us his personal opinions.

DR. BARTLETT: I did ask him would it be a good idea in his opinion for the industry to do that. That can be answered yes or no.

MS. FOSTER: I think the question is answered.

DR. BARTLETT: She said the question was answered. I don't know the answer to the question.

Q. Can you tell me the answer to the question?

A. Well, that would require a fundamental shift in the way charges are billed to joint interest parties to take some of that cost stream out of overhead and move it into an individual well project, and I would have to think about that to give you an answer.

Q. So your answer isn't yes or no but you don't know?

A. It could be.

Q. Does what is left on the land for oil and gas drilling affect the sales price of ranch land?

A. I haven't purchased any ranch land so I don't know that I can give you an accurate answer to that question.

Q. You have no idea whether it would affect the sale price of ranch land?

A. No. I do know that many pits are virtually impossible to find on the land.

Q. But you don't know the answer to the question?

A. I do not.

Q. You talked about dollars that are spent that go to AFEs and that you spent for, let me loosely call, environmental protection/environmental control, right? You have costs on your AFEs in which you do activities. You showed us some activities. One was closed-loop systems but there are many other costs related to environmental control/protection. Shipping cuttings away, shipping waste, lining pits. All of the things you do for the environmental protection/control, there's costs associated with those?

A. Yes.

Q. Where does that money go?

A. Well, it goes to the operators and owners of the solids control equipment, in this case of closed-loop. It goes to the central repository where the cuttings are stored and in the instance of reserve pits it would go to the contractors that build and line the pits.

Q. So it goes to other businesses in New

Mexico?

A. Yes.

Q. And what do they do with that money? For example, do they hire workers with it?

A. I would presume so, yes.

Q. So it creates jobs, other jobs outside of the oil and gas industry with that money that you have had to spend. It shows that the deficit here on your sheet is an income to those other businesses?

A. That's correct.

Q. Which is profit, hopefully profit for them, plus they hire workers in New Mexico to do that work.

A. I believe you would be correct, yes.

Q. And those things are good things, not as a goal in itself but it is not a negative to have those businesses make profits and hire workers.

A. It is a negative to my hip pocket.

Q. What?

A. It's a negative to my hip pocket.

Q. And a positive to his hip pocket. That's how economies work. The loss to one guy is a positive to somebody else and we are discussing that exchange. Is most of the -- the riggers, where do

they come from? Do they come from out of state? Do they move from state to state?

A. The drilling crews?

Q. The drilling crews?

A. The drilling crews will generally be based in the vicinity of where the rig is operating. When the rig moves out of state, either the crews go with it or they find new crews closer to the job site.

Q. This environmental work, hauling, lining and stuff, are those most likely New Mexicans who have always been in New Mexico and will not move out of New Mexico to go to another state to haul water there or haul cuttings?

A. Repeat the question, sir.

Q. The riggers move from state to state?

A. The drilling crews, yes, sir.

Q. Is that also true of the people who haul cuttings, haul waste, haul water, who do the other jobs that you have to pay that's money out of your pocket? Are those more often likely to be people who stay in-state all the time?

A. Well, the central repository where our cuttings go is immovable so those folks will have to.

Q. And the jobs, by the same token, are

in-state jobs?

A. (Witness nods.)

Q. I think that's all I have. Thank you.

CHAIRPERSON BAILEY: Dr. Neeper, do you have questions?

MR. NEEPER: Yes, I have just five questions.

CROSS-EXAMINATION

BY MR. NEEPER

Q. Good afternoon, Mr. Scott.

A. Dr. Neeper.

Q. In your testimony you clarified for us the difficulty you face. In the rule would it be acceptable to you to eliminate the paperwork requirements while retaining the limitations on waste disposal?

A. I would very much like to be able to leave my drill cuttings on-site because of the cost savings associated with being able to do that.

Q. I understand that that would be cheaper. That would be true for any industry, leave its waste wherever it is. But in terms of your operation, again, I will bring the question: Would it be acceptable to you to remove the burdensome paperwork requirements from the rule even if we retain the

protections that we hope from the limitations on waste? Do you feel the two are together?

MS. FOSTER: I'm going to object to the question, Dr. Neeper. I'm sorry. It's extremely broad. Those paperwork requirements, you might have to direct the witness more specifically.

CHAIRPERSON BAILEY: Can you be more specific what paperwork requirements you are discussing?

DR. NEEPER: I understood the witness to speak broadly of paperwork burdens, so I will then cease the question.

Q. I believe I understood in your testimony you believed or had in your experience that drilling permits for closed-loop systems were approved faster than permits for reserve pits. Did I understand you correctly?

A. You are correct.

Q. Would you know whether or not this could be because the regulators do not have to evaluate any environmental consequences with the closed-loop systems but they might have to do that with pit systems?

A. I wouldn't have any idea what's in the mind of the regulator, but I would speculate that

that's the case.

Q. In your testimony you discussed the 60-day limit on an APD. Have you ever had an APD denied when that 60-day limit expired?

A. Not that I recall.

Q. Thank you. You stated that in drilling three wells per year, as I understood your testimony, you would not be practiced at the variance procedure, and you stated that you would like to take advantage of other variances that other operators might have. Did I understand correctly?

A. Well, I believe I stated that I would not be appraised and kept abreast of variances that had been granted to other operators.

Q. Would you regard Rule 17 as existing on a justification then based on public interest; that is, these restrictions are not presumably in your interest? Are they based on some purported public interest?

A. Dr. Neeper, based on the last 60 years in the modeling that I have seen, I am of the opinion that leaving drill cuttings on-site is not detrimental to the public interest.

Q. That wasn't the question but I will try to express the question in a different way. If it were

automatic or very easy to obtain a variance as an almost routine procedure, if the operator can get that easily but the public cannot change the rule easily, does that not then truly violate the purpose for the rule, the only purpose of the rule?

A. If I can obtain at minimal cost, risk and expense a variance, is that harmful to the public's ability to -- is that the question?

Q. No, I will rephrase the question. The public, such as I, has to go to some amount of effort to establish a rule when being without the rule would be obviously cheaper for the industry. If the industry can easily obtain a variance from the rule, does that not cut out the public's participation because the public cannot easily change the rule?

A. I would agree with that statement.

Q. Thank you, sir. Final question. As I have heard your testimony, the extra costs due to Rule 17 are largely associated with the cost of the closed-loop system. I will restate that for clarity. As I have heard the discussion, it sounds, from you and from questions, it sounds as though these excess costs are largely associated with the closed-loop system. Whether or not it's needed,

that that's where the origins of the costs are?

A. There are direct costs associated with having solids-handling equipment on location. There are also indirect costs with regard to decreased operational efficiencies during the drilling process.

Q. Due to that system?

A. Correct.

Q. The closed-loop?

A. Yes, sir.

Q. If you used a reserve pit and Rule 17 still required you to dispose of your solids off-site, what then would be those disposal costs as a fraction of the installed cost of the well and its infrastructure? In other words, not looking at just the cost of a closed-loop system with whatever difficulties it may bring you but just the disposal that you would be required to do. You would have to dispose of it with the closed-loop system and you would have to dispose of it if it came from the pit.

A. Well, I would presume those costs would be approximately the costs detailed in the CRI line item in my exhibit, which was 70 some odd thousand dollars. Add that to the cost of building and lining the pit, and that would be true only if the

OCD did not determine that there was a leak that might require some additional excavation.

Q. And would this ratio of costs be roughly true for the industry as a whole or would you think that your cost might be unique? You said yours would be the CRI. I am wondering can I extrapolate to the industry as a whole that fraction of the cost?

A. You mean for solids disposal only?

Q. Solids disposal.

A. I would think they would be comparable for similar depth well.

Q. Thank you very much.

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

MR. FORT: Madam Chair, I do not have any questions.

CHAIRPERSON BAILEY: Commissioner Bloom?

COMMISSIONER BLOOM: I have questions, thank you.

THE WITNESS: Could we take five minutes?

CHAIRPERSON BAILEY: Let's take ten.

(Note: The hearing stood in recess at 3:21 to 3:30.)

CHAIRPERSON BAILEY: Mr. Bloom, do you

have questions?

COMMISSIONER BLOOM: Good afternoon, Mr. Scott. Just some follow-up questions on your comparing the two Eddy wells.

THE WITNESS: Yes, sir.

COMMISSIONER BLOOM: When I am not here I am working in mineral resources of the State Land Office. When I have companies come in, a lot of times they talk about the cost of wells being 5 million, 8 million, even $10 million. You presented us with figures of $52,000 for drilling, $261,000 for Eddy No. 3. What makes up that difference in cost between the figures you gave us and the --

THE WITNESS: You want the gross numbers on BD 2 and 3?

COMMISSIONER BLOOM: Yes.

THE WITNESS: BD 2 was 4.2 million dollars. The BD 3 was 3.6.

COMMISSIONER BLOOM: One more time.

THE WITNESS: 3.6 million. I'm speaking from recollection but I think those will be in the ballpark.

COMMISSIONER BLOOM: So have you considered the drilling cost as a percentage of the gross cost?

THE WITNESS: The drilling cost as a percentage of the gross cost? All of the intangible items?

COMMISSIONER BLOOM: Correct.

THE WITNESS: Would be about 65, 70 percent, I would think.

COMMISSIONER BLOOM: That was my only question there. Do you believe that -- you talked about the rig count falling. You believe that was because of the cost of drilling became more expensive due to the new Pit Rule?

THE WITNESS: Historically, many operators in Southeast New Mexico are based in Midland, Texas. I have many of those people as partners in various projects, and the anecdotal feedback that I got from several of those folks was that life is too short. We have got opportunities here and we're not going to go there.

COMMISSIONER BLOOM: You mentioned you were talking to someone in Texas that services Texas wells and they mentioned that they had some Eagle Ford wells and one of the 13 was a closed-loop system.

THE WITNESS: I don't know whether that was a shale well or not. He didn't differentiate

which of those 43 that he was discussing was a closed-loop, so I can't say for sure.

COMMISSIONER BLOOM: So there's closed-loop systems being used in Texas?

THE WITNESS: Apparently one.

COMMISSIONER BLOOM: Okay. Do you have any sense of the ratio of closed-loop systems to wells that are using pits in New Mexico?

THE WITNESS: I would think virtually every well in Southeast New Mexico is being drilled closed-loop.

COMMISSIONER BLOOM: And do you have a sense of Texas?

THE WITNESS: Virtually every well in Texas will be drilled using pits.

COMMISSIONER BLOOM: Finally, I want to turn to the multi-well fluid management pits. Could you tell us what sorts of fluids will be in those pits?

THE WITNESS: Well, less than perfect water. If we start with freshwater going in, approximately 20 to 50 percent of that will come back, and as it starts to become formation water it will get saltier. It will be somewhere on the order of 20 to 50,000 parts per million chlorides in it.

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COMMISSIONER BLOOM: Would there be residual chemicals in it?

THE WITNESS: Possibly.

COMMISSIONER BLOOM: Were you here for NMOGA's presentation of multi-well fluid management pits?

THE WITNESS: I was not.

COMMISSIONER BLOOM: I believe one of the things that we saw, there's a picture of a multi-well fluid management pit in Colorado that looked to me -- that we heard off to the side that there was a facility or structure where water was treated before it went back into the pit.

THE WITNESS: Part of the difficulty of reusing flowback water or any water, for that matter, that contains dissolved solids is the difficulty of building viscosity or gel and then scaling tendencies. I can tell you right now that the technology is not completely developed to be able to reuse less than freshwater, but I can also tell you that there are several service companies that are highly interested in trying to get to a point where that water can be recycled because of the concerns of freshwater availability over the long-term.

COMMISSIONER BLOOM: My understanding, though, is the water in the pit would then be reused?

THE WITNESS: Yes.

COMMISSIONER BLOOM: For a frac job. Okay. Do you have any concerns about the fluid sitting out there in the pits and the chemicals in it while it's out there?

THE WITNESS: I don't think I do. But not knowing exactly what chemicals we are discussing here, I don't know that I can give you a definite answer.

COMMISSIONER BLOOM: You mentioned that the regulations provide for a double liner.

THE WITNESS: Uh-huh.

COMMISSIONER BLOOM: Would there necessarily have to be two vinyl liners or could it be something along the lines -- I think we heard from NMOGA the regulation could be read to say one of the layers could be bentonite clay?

THE WITNESS: I was not aware of that. I don't know that I could comment.

COMMISSIONER BLOOM: That's all the questions I have. Thank you.

CHAIRPERSON BAILEY: Commissioner Balch?

COMMISSIONER BALCH: I have a couple questions. I didn't have all night to sleep on it so you won't get as many questions as Mr. Mullins did.

THE WITNESS: Thank you.

COMMISSIONER BALCH: Good afternoon, Mr. Scott. Going back to the Eddy State No. 2 and 3, you mentioned that you had attempted to get a pit on the site.

THE WITNESS: On the site of the No. 3, that is correct.

COMMISSIONER BALCH: And you were unsuccessful.

THE WITNESS: That is correct.

COMMISSIONER BALCH: What was the reason it was unsuccessful?

THE WITNESS: Commissioner, I would have to go back through my records to find out why specifically we were unsuccessful.

COMMISSIONER BALCH: Were you within the tolerances of Rule 17 of structures and groundwater and surface water?

THE WITNESS: Well, we were 190 feet to groundwater with the closest well 3,000 feet away. I was over the hill from a potash tailings mine that

was saturated brine. Again, I would have to go back and review that file to tell you exactly why we didn't -- why we weren't successful.

COMMISSIONER BALCH: How much time did you spend on the process?

THE WITNESS: Seemed like about three months. This invoice to R.T. Hicks Consultants is the outfit that I hired to prosecute that when we got our first denial, and all of the information coming and going to the OCD was coming and going through him.

COMMISSIONER BALCH: So aside from consulting time there was probably also time of your personnel --

THE WITNESS: That's me.

COMMISSIONER BALCH: -- in the process?

THE WITNESS: Yes.

COMMISSIONER BALCH: Is that an additional cost that's not on your list here?

THE WITNESS: That would be correct.

COMMISSIONER BALCH: The opportunity of your time to do something else. I think in Mr. Jantz' questioning you talked about the cost of the closed-loop system in regards to the extra days that were added because of the loss of control of

the well?

THE WITNESS: Yes, sir.

COMMISSIONER BALCH: About 26 out of the 40 days would have been a normal schedule? That's what you planned for?

THE WITNESS: I think we should have been able to drill and run five and a half in about 26 days, that's right.

COMMISSIONER BALCH: So on your exhibit -- I don't know the number, the first page of Exhibit 17, I believe?

MS. FOSTER: Yes.

COMMISSIONER BALCH: That's what I have been talking about. So whatever 26 out of 40 is of about $113,000, probably around $70,000, almost all of the CRI Holdings would be the same because it's primarily a disposal cost.

THE WITNESS: Disposal cost would not be the same because during the period we were having trouble we would not have been generating cuttings to go to the central facility.

COMMISSIONER BALCH: But ultimately the same amount of cuttings would go to the facility.

THE WITNESS: That's correct.

COMMISSIONER BALCH: If the well goes to

the same --

THE WITNESS: That's correct.

COMMISSIONER BALCH: Basically you are adding the rental of the containers for the extra 14 days. That number doesn't change a lot.

THE WITNESS: Correct.

COMMISSIONER BALCH: Dorado was trucking?

THE WITNESS: Correct.

COMMISSIONER BALCH: So that's probably going to be an additional two-thirds of the cost you have listed would be related to the 26 days?

THE WITNESS: That's probably a fair statement, yes.

COMMISSIONER BALCH: And then Mesquite was also trucking?

THE WITNESS: Yes.

COMMISSIONER BALCH: Same thing. So really you would cut about $50,000 off the cost, maybe $60,000 off if you had not had any problems with the well?

THE WITNESS: Probably, yes, that would be perhaps a little conservative. We might have done better than that.

COMMISSIONER BALCH: I don't know if you were around for my cross-examination of Ms. Denomy,

but I noticed that there was something of a disconnect between rig count and wells spudded. Obviously, wells spudded are more likely to result in well production than a rig number.

THE WITNESS: Okay.

COMMISSIONER BALCH: The disconnect that I noticed was in 2007 in New Mexico there were 1728 wells spudded. And I apologize, I don't know the exhibit number. It's Slide 10 of Ms. Denomy's presentation. 1728 wells were spudded in 2007 with 83 exit rigs, 21 rigs per well. In 2011 there were 990 wells spudded, with 81. So the rig count is about the same. The activity is somewhere around 60 percent actually drilling wells.

THE WITNESS: You mean wells spudded versus rigs running?

COMMISSIONER BALCH: Right. So a number of people have brought up the fact that the rig count might not necessarily tell you the whole story so I appreciate you putting together the third slide of Exhibit 14, if you would like to put that one up.

MS. FOSTER: Exhibit 15, I believe.

COMMISSIONER BALCH: Exhibit 15? Okay. This is the Permian Basin rig count slide?

THE WITNESS: Yes, sir.

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COMMISSIONER BALCH: I hope this is a little more apples to apples. Railroad Commission District 7C, 8 and 8A, are those contiguous with Roosevelt, Lea and Eddy Counties?

THE WITNESS: And would be considered the Permian Basin Railroad District.

COMMISSIONER BALCH: Right across the border of those three counties?

THE WITNESS: Correct.

COMMISSIONER BALCH: SO you are looking at essentially the same formations at least right at the border?

THE WITNESS: Correct.

COMMISSIONER BALCH: The same cost to operate generally?

THE WITNESS: Correct.

COMMISSIONER BALCH: There was a large drop in all activity around the end of 2008. To what do you -- I'm sorry, what do you attribute that to?

THE WITNESS: Product prices.

COMMISSIONER BALCH: If you go back to 2003 and 2004, the ratio is fairly steady and then there's a steady increase in Texas of rig count, a large drop that's also in New Mexico in 2008 and

then a steep climb in Texas production, all related to product prices --

THE WITNESS: Yes.

COMMISSIONER BALCH: -- in Texas?

THE WITNESS: Yes.

COMMISSIONER BALCH: You alluded to a loss of opportunity in New Mexico potentially as a result of regulation.

THE WITNESS: I believe that occurred.

COMMISSIONER BALCH: Do you think the potential in New Mexico existed past 2009 to have a greater increase in activity?

THE WITNESS: I think the potential is to get New Mexico back to ratio of about two to one or Texas/New Mexico ratio back to about two to one, as that is historically where we were before the Pit Rule discussions started.

COMMISSIONER BALCH: All right. Water costs. You mention there's about $1.30 a barrel cost to acquire freshwater?

THE WITNESS: That was our cost on the last -- the water acquired for a multi-stage fracture stimulation, yes.

COMMISSIONER BALCH: Going back to the potential for recycling for the multi-well fluid

management systems, what is the cost of disposing of water in New Mexico?

THE WITNESS: In some places it runs up to a dollar per barrel plus trucking charges.

COMMISSIONER BALCH: And 20 to 50 percent of that initial cost, if you spend $103,000 on water for the project and then you have to spend 20 to 50 percent of the cost to dispose of the water, would it be beneficial to recycle instead?

THE WITNESS: If the water can be made compatible with the fracture stimulation process at a reasonable cost, you are correct.

COMMISSIONER BALCH: You follow trade journals, trade organizations?

THE WITNESS: Yes.

COMMISSIONER BALCH: Keep an eye on what's happening in other states?

THE WITNESS: Yes.

COMMISSIONER BALCH: How close do you think we might be to that technology?

THE WITNESS: I am aware of some laboratory testing that is going on now that may be getting close to building frac fluid out of 20,000 part per million TDS water.

COMMISSIONER BALCH: So if nothing else,

you can dilute the water periodically and still get some recycling done?

THE WITNESS: That's under discussion.

COMMISSIONER BALCH: I think Mr. Jantz was asking about a Colorado Pit Rule on one of your slides. Let's see. Slide 2 of Exhibit 17. It might be interesting to note that in the fall of 2008 there was a Colorado Pit Rule put in place. I'm not personally appraised of what was put into that. If you go to Slide 4, this is the rig counts Texas v. New Mexico.

THE WITNESS: That ratio was for the entire state of New Mexico versus the entire state of Texas, not just the Permian Basin.

COMMISSIONER BALCH: That's a clarification on that. If you go to Slide 6 -- the one before that. Our slides are numbered differently.

MS. FOSTER: What's the name of the slide?

COMMISSIONER BALCH: Natural Gas Production, Slide 7. I like comparing resource analysis and spudded wells and things better than comparing rig counts because it's a more direct comparison in my mind of what is benefiting the state of New Mexico. That's the amount of

royalties.

THE WITNESS: Yes, sir.

COMMISSIONER BALCH: United States in the last five or six years has seen a great boom in shale gas and somewhat more also in shale oil. New Mexico is getting a little bit of the shale oil boom, not much of the shale gas boom.

THE WITNESS: You are exactly correct.

COMMISSIONER BALCH: In the decline -- I believe Mr. Dangler was asking about the decline of gas production in New Mexico which he stated he thought it was largely from northwest New Mexico. I think that does thwart the gas production from the southeast? Is that correct?

THE WITNESS: I don't know that I have that number off the top of my head.

COMMISSIONER BALCH: Certainly Mora, other associated oil and gas in the southeast, but it's a smaller portion of the total natural gas production of the state?

THE WITNESS: I have seen that number and I can't recall.

COMMISSIONER BALCH: For this time period, do you think the drilling reserves for San Juan Basin has declined?

THE WITNESS: Yes.

COMMISSIONER BALCH: And that's a result of what?

THE WITNESS: Lack of development, I take it.

COMMISSIONER BALCH: They are not getting to the reserves with the drill?

THE WITNESS: Correct. If you look back at the price slide, we were getting in 2008 $14 an MCF for our gas for a while. Those gas prices just went through the roof there for a bit. But that did not get reflected in any increased production in Southeast New Mexico or the northwest. That gas production slide is for the entire state.

COMMISSIONER BALCH: If you go back in time, and I know that the data you presented doesn't go before 2001, would there have been other times where there's been a decline in natural gas production in the northwest?

THE WITNESS: Yes.

COMMISSIONER BALCH: Primarily based on?

THE WITNESS: Economics.

COMMISSIONER BALCH: Economics. So every time the economics are right or some technology comes along, those reserves go back up to a more

sustainable level?

THE WITNESS: I would agree with that.

COMMISSIONER BALCH: Okay. So on the next slide, which is Slide 8, that's New Mexico versus Oklahoma for comparison. You mentioned that you keep track of what's going on in the rest of the country. Is there a shale play active in Oklahoma?

THE WITNESS: I don't know that I can say for sure whether that Barnett gets up into Oklahoma or not.

COMMISSIONER BALCH: Barnett shale started in '95?

THE WITNESS: Well, it was active until a few years ago over in North Texas.

COMMISSIONER BALCH: Right. That's kind of on the down side anyway. So do you believe that Oklahoma and New Mexico is a fair comparison for gas? A lot of associated gas, obviously, in Oklahoma compared to pure gas?

THE WITNESS: I am of the opinion that we could have at least been able, given similar economic circumstances, to hold somewhere in the vicinity of the decline curves in the neighboring states.

COMMISSIONER BALCH: I believe those are

all the questions I have for you. Thank you.

CHAIRPERSON BAILEY: And all my questions were asked and answered and there's no need to be repetitive so you are excused.

THE WITNESS: Thank you very much.

CHAIRPERSON BAILEY: There may be redirect.

MS. FOSTER: I only have one question on redirect.

REDIRECT EXAMINATION

BY MS. FOSTER

Q. Mr. Scott, in response to the question by Ms. Gerholt concerning the facility of having a box on a form to check off, how would you like to have that box titled? You know, just the use of a closed-loop system or would you prefer you check off the box that says "no solids left on location"?

A. I would prefer a check off box that says "no solids left on location" or "no material," solid or liquid.

MS. FOSTER: Thank you. No further questions.

CHAIRPERSON BAILEY: Now you may be excused. Dr. Neeper, you gave your testimony but Dr. Bartlett was not able to at that time. Why

don't we call Dr. Bartlett for his testimony at this point.

JOHN BARTLETT

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

DIRECT EXAMINATION'

BY MR. NEEPER

Q. Dr. Bartlett, would you state your name for the record?

A. John Bartlett.

Q. Would you give us your education?

A. Yes. I have a bachelor's degree in chemical engineering from Purdue University. That included courses in chemical engineering, cost estimation and process engineering economics, which are -- I think some of those were required courses and some were selected. I also have a doctorate in chemical engineering from Yale University.

Q. Would you give us your job experience in engineering?

A. Yes. I worked -- well, aside from three summer jobs as a student at oil refineries, which is the extent of my experience in oil and gas, I was a full-time employee at Los Alamos National Laboratory from '62 to '93. In that context I designed,

processed and purchased chemical engineering equipment and managed an engineering project of several million dollars annual budget.

Q. Are you currently employed?

A. I am retired.

Q. Have you testified before the Oil Conservation Commission previously?

A. Yes, I have.

Q. Have you testified before the Environmental Improvement Board previously?

A. I have testified on numerous occasions before the Environmental Improvement Board over the years, beginning in 1969 before there was an Environmental Improvement board on environmental regulatory issues.

Q. Have you participated in other regulatory actions?

A. Yes, and in that regard with the testimony, I gave testimony -- I cross-examined witnesses in all of those other venues previously, made sworn testimony subject to cross-examination, analyzed economic effects of pollution control equipment, especially at the Four Corners Power Plant.

Q. Have you had experience on the Mining

Commission?

A. Yes, I was a member -- I was nominated by Governor Gary Johnson to the Mining Commission and served from 1997 to 2002.

Q. Do you have any other particular environmental experience as it relates to compliance or costs that you would care to share at this time?

A. Yes. There's several listed here. I was a member of a U.S. Office of Technology Assessment Panel in Washington in the mid '60s. It was about a 15-member panel, mostly industry people. General Motors was on there, Three M, others, to examine the impact of environmental public safety and health regulation on the nation's economy. I see the date there was 1975, and a report was written on that.

I also have, as an individual, I talk to industry a lot, and I have proposed environmental pollution control improvements to them, some notable ones which they have accepted and made significant improvements in pollution control and at very limited cost. One of the major ones was the Four Corners Power Plant in which you need a bypass of the scrubber in order to maintain enough heat to reheat the stack plume so you get adequate plume rise. After they had been doing that for a decade

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or more, I asked the engineer if they had optimized the bypass; in other words, reduced the bypass enough so you get enough plume rise, reheat and plume rise. But if you bypass the scrubber -- well, the scrubber cools off the plume. If you bypass less, you scrub more and you get more pollution control.

He said, "No, we haven't looked at that. I will." They did, and I think they improved their sulfur control from something like 72 percent to over 80 percent by that change, which cost them very little. And I suggested it and I am proud of that.

And I have done similar things also, made similar suggestions that I can't remember right now to the chip industry, Intel primarily in Rio Rancho, and also oil and gas people where I had less success.

MR. NEEPER: I would submit then to the commission and offer Dr. Bartlett as an engineer qualified in industrial systems as related to environmental protection.

CHAIRPERSON BAILEY: Any objections?

MR. JANTZ: None, Your Honor.

MR. CARR: No objection.

MS. FOSTER: No objection.

MS. GERHOLT: No objection.

MR. FORT: No objection.

CHAIRPERSON BAILEY: He is so admitted.

Q. Go ahead with your testimony.

A. Okay. Let me outline briefly what I hope to do. The story of regulation, particularly with the OCD, but in general has been there's a science phase and there's an economics aspect. Both are equally important, in my view, and I gather from Mr. Scott he would agree with that.

We heard earlier that we needed more sound science in dealing with regulatory issues, particularly the Pit Rule. We have come a long way in the last six or seven years in the science that comes out at a hearing. We saw a lot of that yesterday. You would not hear a long cross-examination of a long effort related to environmental issues five years ago. And I take this occasion to say that Dr. Neeper has been a driver of that. He certainly is not the only one who has done it. Mr. Mullins contributed. Many people, all sides have contributed but it's been a major theme of him, and that's made a change, I think, and I am proud of that.

I think the economics is now in a stage

where science was a long time ago. The seriousness, the quality, the depth of analysis of economics is only suddenly -- almost in this hearing perhaps -- has become more of a real subject of real discussion with real data of a substantive nature.

The hearing before this one, I remember, the economic analysis was that if you raised the price of controls a nickel -- there was a graph -- you would put in jeopardy all of the contracts. And there were many people that came and testified that we heard if the Pit Rule passed bad things would happen.

That is not economic analysis. I compliment Mr. Scott. He did bring in what is beginning to get closer to significant data to discuss, and the message I want to leave is ultimately we need to have the quality analysis, the quality of discussion, the quality of debate and the reality of debate in economics every bit as much as the science. We are not there yet, but with further efforts we move in that direction. I hope to get that point across.

This is U.S. land rig count by states for essentially all energy states. Baker Hughes rig counts that you heard a great deal about, the energy

states. On the bottom, the big blue is Texas, the biggest by far. Next, the burnt umber is Oklahoma. Above that is the green, Louisiana. Above that is New Mexico. Above that is Wyoming, Colorado and so on up the list as they get to smaller energy states.

These are the rig counts from 1997 to 2011 in all those states. The rig counts is really the band width of each color over time. Here is Texas and then the band width of the brown there. That changing band width shows the rig counts over time in Oklahoma, and Louisiana is the green above it and above that is New Mexico followed by Wyoming, and Colorado is the orange color.

Over that long period of time you see a strong parallelism. Now, this chart minimizes the differences from state to state over very short time periods. The exhibit shown by Mr. Scott maximized the differences from state to state over very short time periods and blotted out the other. All of the story is part of the story, but this is a large part of the story.

Look at the blue, how it goes. Up here it's crashing commodity prices, way down and back up. Here is Oklahoma. Here is where Oklahoma was before. Here is where it is now. There's not any

order of magnitude change. There's some detail change we saw that in Mr. Scott's graph. Louisiana is pretty constant. Now it's gotten bigger here. New Mexico was here. It's now back to here. We showed the graph of rig count and I will show it again. It is healthy and growing. It lost some in here, as did all the states. Texas actually lost more than we did in the big crash but it came back faster. True, those are true statements.

I think what this chart encompasses, you look at the chart of all those rig counts in all those states over all those years. Encompassed in that chart are these factors that vary widely among states. Tax structures and tax rates. Think of how they vary over all those states over all those years. Available oil and gas infrastructure. That means roads, pipelines, businesses that know about the technology to do oil and gas. There's a body of geologic data on oil and gas formations. New Mexico is a relatively mature state that has relatively good data on the geologic data. Newer states have less.

Historical and evolving oil and gas activities in the state. We heard a lot about that. Those are things that change. All of those are

changing over all of this graphing in many different ways in many different states. And here is what we see that ties to oil prices. I don't suggest any more than others do that it's the only factor. It's clearly the dominant factor.

New technologies for production or environmental control. These don't vary so much state to state but they certainly vary from year to year and all states have access to new technology and production and new technology in environmental control, for an example, of fracking, horizontal drilling, various ways of treating pits. Those continue to evolve.

Regulatory climate and structures. They vary all over the map over the years and this is what he we see. Elections and election outcomes. Campaigns for elections and election outcomes. The parties in control in all these states over all those years have changing tremendously. You sometimes hear we have to vote for this party in or out in order to get the right regulatory structure, whether it's more strict or less strict.

All of that is encompassed in the chart. They are changing administrations, of different philosophies. State economics and policy

variations. Those are all things that are involved in that.

I think this is -- I'm going to a large context, large picture. I believe that's where this discussion, the improved debate of economics in a serious manner needs to begin. I was pleased to see that Mr. Scott brought in this kind of data, selective indeed, anecdotal indeed. Nevertheless, this kind of data. That's a step forward and I applaud a step forward.

This is to show the New Mexico side. This is an NMOGA slide. This tracks what was on the previous slide if you just go back one. That chart I just showed you is a more finer detail of that line. There it is, and I maintain that the oil and gas industry by rig count in the state of New Mexico, not in a county, not in oil, not here, there, whatever, is healthy and growing, and I rest that case on this NMOGA data that shows that steady progress in rig count. This is confirming for New Mexico what the larger chart showed.

Economics and rule-making for drilling pits. Let me say first I view the Pit Rule like most environmental rules as inherently as a balancing of business interests. Oil and gas

businesses, environmental protection services and equipment business, and I talked about that. I asked questions about that in my cross-examination.

Environmental protection service and equipment business is an industry. It deserves attention by this commission just as much as any other. I do not suggest the reason to pass rules is to make business and jobs in that industry, but if you are going to discount lost something, jobs, productivity, opportunity, in one industry, you have to include gained business, jobs, profits, opportunity in the other. They are just parallel. They are mirrors of each other almost, and it's important to remember that.

Ranching business, land values and water values over long periods of time in all of those. The balancing of those economic interests is the mission of regulation in my view. It is not to protect the maximized one. It is to protect the health of all of those, if you will. They all need to be healthy. If any of them drastically falls, has problems, that's bad for the State. It's bad for the people in that business.

So that is the point I make. I talked about the rig counts in the 18 states for 14 years

and the general trends clearly tie most clearly to prices, and all those other variables. I mentioned half a dozen. I mentioned eight or ten variables: Political climate, regulatory climate, new technologies, data existing. Those don't show on that big chart in any major way. What shows on the big chart is the prices for the commodity. Are there smaller effects of other things? Yes. Of many different things. But I'm putting this in a larger context and structure.

My Point 3, witnesses are obligated to tell the whole truth about the known history. I maintain that -- go back to my first slide. I maintain that that whole truth there never began to be discussed in prior hearings. It was raised late in this hearing by Mr. Scott. And that is larger than any other factors we are talking about. The other factors are real, but this is also real, and witnesses are obligated to tell the whole truth about the known history. This was never mentioned -- this concept to my knowledge was never mentioned until I, a person who doesn't work in the oil and gas industry but can read the literature, brought it forward. I think that says something about how far the economic discussion of the

component that affects regulation is behind where it needs to be.

The technical components have come very far in the last half dozen years. We like to think a lot of that was driven by environmental interest. Other people also have interests. The interests are always there. It's the driving that's important.

The same thing has to happen with economics. It's very important. The whole story is important. Not little pieces. Little segments can always be made to tell the story. I don't claim to have the whole story. I am making a plea to give economics the quality of testimony and depth of testimony it deserves to make informed decisions which are technical and economic, and I am maintaining that the economic discussion has fallen -- it's barely existed until this hearing and it's getting better and it needs to go a long way further.

The table of economic numbers exists for every well drilled. This really refers to some form of the AFD. What's the data that was shown before. We need to have the economic numbers for the effects of regulation, not a sampling, not a tidbit that shows it was a disaster here or didn't matter here.

It's a big subject that needs serious discussion in-depth with full data. That's the big plea I am making here.

I made a big point in my cross-examination. I asked questions about the companies. Well, in my next point, dollars for disposal are income profit in wages in New Mexico companies. It is not just an oil business that needs to be healthy in New Mexico. Yes, it has to be healthy. It's vital. It's larger and more important than some others. But a guy making his money on disposal of waste and handling them properly and trucking them, that's his livelihood just as much as it's the livelihood to a oil and gas industry.

I'm not making a plea to regulate in order to make jobs. Our plea, and we have made it -- Don has made it ad nauseam and we keep pushing it -- is environmental regulation. But the economic impacts of that are not all negative. It's the livelihood of industries, and they count, too. I'm not saying they are more important, but they are certainly -- maybe a dollar to a guy that hauls waste to a dump is more important than a dollar to a driller because they have fewer of them. I don't know and I don't

claim to know. But it's a very important part of the discussion and the dialogue.

Economic data in context are vital for sound decision-making. This is part of what I tried to do. I brought up the -- that's really all that I have. These are my major points. It's to put economics on a similar basis to the technology. Ten years ago the technology of environmental protection was zippo in discussions before the Oil and Gas Commission. I think people would agree. It was our fault as much as anybody else's. Times change. It is now a big discussion of a lot of technology and a lot of facts brought in by different people on different sides of the issue and you begin to get a meaningful picture.

We are far behind that in economics and the economic portion is just as important as the technical portion. The decision has to be a good technical decision in which the economics -- you can't economically damage any significant interest and a job for a hauler of waste is as important to that guy as a job mining or drilling. I do not advocate jobs in waste handling to make jobs, but I do not discount them as jobs either, and I want to make that very important. They count. Those are

incomes. Those benefit people.

The unemployed now in the southeast corner of the state is, I think, in the area of 3 percent and it is for two reasons: One is because there are more jobs in oil and gas, as we saw. Times are good down there. And there's other jobs from people hauling waste, and all the things you do for environmental protection are jobs that are needed and count and pay wages and are valuable. This is the main point that I want to make.

We talked about the oil and gas leases. Those are booming also. They are not destroyed by the regulation. That's the future of New Mexico. This is good.

Perhaps with that I will conclude. My theme is economic. My theme is broad. My theme is we are not there yet in the depth, the quality, the sincerity of the discussion of economics needs to get where we are beginning to get in the technical areas. They are both equal partners in the decision and I am maintaining that we are only beginning to get significant discussion, serious discussion, integrated discussion, if you will, in the economics area. With that I conclude.

MR. NEEPER: Madam Chairman, I have no

other questions I will use in direct in order to save time that others can do cross if they wish. I will return control to you.

CHAIRPERSON BAILEY: Do you have any questions?

MR. CARR: I don't have questions. Were the exhibits admitted?

MR. NEEPER: I apologize.

DR. BARTLETT: We are very bad lawyers.

MR. NEEPER: I move for acceptance of the exhibit.

CHAIRPERSON BAILEY: Any objections?

MS. FOSTER: No.

CHAIRPERSON BAILEY: The exhibits are admitted as CCWA-1.

DR. BARTLETT: The three slides and my credentials.

CHAIRPERSON BAILEY: Yes. They are labeled Exhibit 3. You h e no questions?

MR. CARR: No, I do not. They are Exhibits, I believe, 2 and 3. Dr. Bartlett's credentials are 2. I have no questions.

(Note: CCWA Exhibits 1, 2 and 3 admitted.)

MS. FOSTER: No questions for the witness.

CHAIRPERSON BAILEY: Mr. Jantz.

MR. JANTZ: No questions.

MS. GERHOLT: No questions.

MR. DANGLER: No questions.

MR. FORT: No questions.

COMMISSIONER BLOOM: No questions.

COMMISSIONER BALCH: I might have a question just because nobody else has.

THE WITNESS: Thank you.

COMMISSIONER BALCH: I am also interested in applying economic studies to the regulatory study. On your Exhibit 3, Page 1, that's the chart of rig count by state, did you also chart this at some point with oil and gas price? The assertion was made that this tracks oil and gas price.

THE WITNESS: No, I don't have that. Oil and gas people could confirm that faster than I could but they won't.

COMMISSIONER BALCH: Actually, I really don't doubt it does. If you follow this far enough back though into the '80s, the rig count is twice what it was now so there's other things that go into rig count.

THE WITNESS: By the way, I don't know that I mentioned this is the same rig count that they were using and there are other rig counts.

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COMMISSIONER BALCH: Do you recall my analysis of Ms. Denomy's data with regard to rig count and spudded wells in New Mexico?

THE WITNESS: No, I wasn't here for that.

COMMISSIONER BALCH: I gave a little statement about that a moment ago but I can repeat that.

THE WITNESS: I did hear what you said. I got the general idea.

COMMISSIONER BALCH: There were 1728 wells spudded in 2007 and 800 and some spudded in 2011 while the rig count remained the same. So my problem with using rig count as a pure indicator of production potential or even number of wells drilled is there's a disconnect between the type of resources being chased. For example, if you are drilling an 800-foot depth Fruitland coal well you might be able to get 20 of those in the same rig in one year. Whereas, if you are drilling a mile-long Avalon shale gas well, that same rig might be there for a month.

So purely rig count, I don't know if it's a great indicator of actual results of the production, although I do think you are right, that rig count does track overall nationally the health

of the industry.

THE WITNESS: It's certainly used that way. Not by me but it's talked about all the time in the literature as -- of course, there's many. I mention a whole list of things that can change from state to state but nevertheless, the money tends to flow to rig count is what I read. I'm not in the industry. I am an engineer. I understand dollars and I understand graphs and I'm not an oil engineer. I told you all those things. And from what I see, what I read and what I understand, the rig count is the single most often used indicator and I only use it because that's what the industry tells me.

COMMISSIONER BALCH: I think the industry agrees because they present their data the same way.

THE WITNESS: In a sense, that's why there is rig counters. That's why there's a Baker Hughes rig count. That's why those guys do the stuff is the industry finds it useful.

COMMISSIONER BALCH: Nevertheless, in New Mexico rig count, at least over the last four years, according to Ms. Denomy's data that she presented from New Mexico Go-Tech, which I think is pretty solid, doesn't really show that there's an increase in activity. It shows a decrease in activity over

that time period.

THE WITNESS: What time period?

COMMISSIONER BALCH: 2007 to 2011. Rig count is the same.

THE WITNESS: Show the next slide. It's going up.

COMMISSIONER BALCH: In 2007 I think Ms. Denomy said there were 81 or 83 rigs. So that looks to be consistent with that plot.

THE WITNESS: That's NMOGA's. I got that from NMOGA.

COMMISSIONER BALCH: 2011 approximately the same number of rigs were presented, which I think is also in agreement with this plot. You have around 80 rigs around 2007 and around 80 rigs in 2011. However, in 2007 you had 1700 wells spudded, wells drilled, and you had 800 drilled if 2011 in New Mexico. So I think rig count to me is a good national indicator but if we start to subdivide by state you lose the information that it provides, which is a barometer of health of the industry.

THE WITNESS: You notice when I questioned the previous witness, I asked about rig count for the whole state and he immediately focused it down in the southeast corner. I said no, I meant the

whole state and he put it down there and we finally got the discussion on the whole state. They do vary from parts of the state and that's true of any other state.

COMMISSIONER BALCH: Very dramatically. I think there were three active rigs in the northwest last year.

THE WITNESS: But nevertheless, that is used by investors.

COMMISSIONER BALCH: I think investors look at more than just rig count. I imagine they look at the economics of the entire thing. But you also made an assertion that because of the upper rise from 2009 through 2012 of the rig count that the industry in New Mexico is vigorous and healthy.

THE WITNESS: I think healthy and growing.

COMMISSIONER BALCH: Healthy and growing. By Ms. Denomy's data that I think came from a reliable source, the records of the State of New Mexico, says that 60 percent of the wells were drilled in 2011 compared to the number drilled in 2007. So that indicates that you have a 40 percent decrease in the number of wells actually drilled irregardless of the rig count. So I think the variables are disconnected. The relative growth of

resource base is not necessarily tied to rig count. Do you care to address that?

THE WITNESS: I'm not sure I can. I don't claim to be an expert in this if field. I do know that if you go to the literature you will find a lot of emphasize on rig count. And I mention -- we even saw some of this in today's hearing. I mention all kind -- go back to the previous slide. Thank you.

I mentioned all the parameters that are subsumed in there, covered up, if you will. Tax structures and tax rates available, oil and gas, body of geologic data, historical evolving oil and gas activity, regulatory climate, elections, state economies and policies. That's all in there and yet you see those strong correlations in all those states over all those years. And that can't be chance.

COMMISSIONER BALCH: I guess I would be interested in seeing rig count plotted versus production that resulted from those wells drilled.

THE WITNESS: I don't have that data.

COMMISSIONER BALCH: You are familiar with the Ouroboros, the snake that eats its own tail. If you regulate an industry out of existence then you also get rid of those jobs that are created by the

regulation.

THE WITNESS: Regulating out of existence is a very bad thing.

COMMISSIONER BALCH: There has to be some balance and that's hopefully what we are achieving.

THE WITNESS: That's my theme, I think. There has to be some balance. And it all counts. The truckers count, the haulers, the pit liners. All the technology, all the evolving technology, it all counts. I'm not saying make jobs hauling waste by more rules. That's the last thing I'm saying. But it's equally not meaningful to say those jobs don't count. You can regulate them out of existence. There's no indication that's happened, I'm contending.

It's a healthy industry in New Mexico. Is another state marginally healthier because they have lower rules? Perhaps. Do they have marginally fewer other auxiliary jobs in hauling and handling waste? Maybe. It's a big picture. It's a big system, and in these hearings only the part -- you know, Mr. Scott's answer to the haulers and the waste disposal industry was that's money out of my pocket. It's true, you know. I'm not saying he is lying. It's absolutely true. By the same token

it's money in their pocket and there's people who can haul waste that can't drill oil wells and they have got to work, too. Again, I am not saying regulate to create jobs, but they count also.

COMMISSIONER BALCH: Sure. My very first day on the commission Mr. Carr was quick to remind all of us that our primary concern is to protect the correlative rights and prevent waste. So it's not necessarily our job to consider every single aspect of a regulation. We have to kind of look at it through a prism of those two things and then some associated added responsibilities such as protection of water and public health, things like that that go along with it.

THE WITNESS: But you are not suggesting that a job in oil and gas production counts and a job in waste handling doesn't count.

COMMISSIONER BALCH: I think what counts is the amount of royalties that come to the State and whether the resources are produced or not produced.

THE WITNESS: Right. We addressed that. I addressed the thing about the sales of future leases. They are growing. They are booming. Mr. Scott confirmed that. I can confirm it with

other stuff if you want to. The industry is not dying and with it comes all these other things. That's good. I'm not suggesting otherwise.

But you can paint a picture of a dying industry in any little section if that's all you want to do. Everybody knows that. And this industry is healthy and growing. Has it grown a little more in some other state? Perhaps. Did that same state suffer a bigger loss when the price hit rock bottom? Yes. Has it come back and grown more? Yes. Those are all true statements?

My plea is to count it all. And the forces that will argue only for the industry, for the economic interests of the oil and gas industry are very strong in this forum, not because of the forum so much as they show up and talk in great number. And I am presenting further economic data and pleaing for even more substantive, more broader -- the thing that has happened in the technical arena, the science arena, it's expanded and gotten deeper and broader tremendously in the last eight years before these commission hearings. The same thing is beginning to happen a little bit in economics and it's got to happen more, and I hope to push it.

COMMISSIONER BALCH: We can end on agreement then. Thank you very much for your testimony.

CHAIRPERSON BAILEY: No other questions? Any redirect?

MR. NEEPER: No redirect.

CHAIRPERSON BAILEY: Then you may be excused. Thank you very much. We do have some public comments today. Bruce Gantner. I will remind all persons who wish to make public comment that we do have the five-minute time limit and that you can provide comment sworn or unsworn statement. Would you like to make a sworn or unsworn statement?

THE WITNESS: It will be sworn, but just to clarify, I am here to make public statement on behalf of Dugan Production Corporation. None of them could be there but I know them well. I helped them prepare their context so what I will read would be a sworn statement but it is theirs.

BRUCE GANTNER

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

CHAIRPERSON BAILEY: Please state your name and place of residence.

THE WITNESS: My name is Bruce Gantner.

As you know, I testified earlier. I'm an employee of ConocoPhillips but I'm here to give a public statement on behalf of Dugan Production Corporation. Dugan Production corporation is an independent oil and gas producing company located in Farmington, New Mexico with operations primarily in the San Juan Basin in Northwest New Mexico. We have been actively developing and operating oil and gas wells for over 50 years and currently operate approximately 860 active wells.

During 2011 we produced an average of 22 million cubic feet of gas per day and 341 barrels per day of oil and condensate and was included in NMOGA's list of top 50 New Mexico producers, No. 20 for gas and No. 49 for oil. We have an established a reputation of being able to operate oil and gas wells that other operators consider to be marginally productive.

As a result, our operating economics in many of our areas of operation are very sensitive to our costs for development and operation. The subject Pit Rule is a prime example of regulatory compliance expenditures that have resulted in a significant increase of our cost to operate and have produced little to no corresponding benefit to

anyone.

Prior to the Pit Rule we averaged drilling 39 pits per year ranging from 28 to 52 during the eight-year period from 2001 through 2008, and during the last three years we have only drilled a total of 33 wells, 12 in 2009, seven in 2010 and 14 in 2011. Admittedly, decreasing oil and gas prices are factors; however, increasing regulatory costs is also a big factor when planning our drilling program.

Dugan Production strives to be a good environmental steward. During the past 53 of our operation and the 90 years that the oil and gas industry has been active in Northwest New Mexico, we are not aware of any incident of groundwater contaminated by a temporary pit used to drill oil and gas wells. We do believe that the current requirements to remove drilling pit contents and haul them to an authorized land farm facility not only concentrates potential contaminants at one location but also produces a significant air emission issue from numerous truckloads of material being relocated from the well site to a land farm.

There are many factors that affect our costs for compliance with the current Pit Rule.

However, typically they are to prepare 25-plus page permit applications, construct and line the pit for use while drilling, timely removal removing the pit contents and transporting the material 30 to 75 miles to an authorized land farm, formally closing the drilling site pit and preparing a 25-plus page pit closure report will require significant work effort and increase our well drilling costs approximately 20 percent.

This is a significant increase that has forced us to review our drilling program and to establish what our development drilling priorities will be, especially while gas prices are depressed.

Getting close to closing, Dugan Production believers that the current Pit Rule serves no benefit, has resulted in harm to the environment and has increased cost to develop and operate oil and gas wells in New Mexico. We would like to see the current Pit Rule be totally eliminated not only because it serves no beneficial purpose and increases cost of operating oil and gas wells but we also have a serious concern about the political process used to develop the Pit Rule.

In a recently released book by Harvey Yates, Jr., "Governor Richardson and Crony

Capitalism," there are many events presented as to the questionable and possibly illegal political process that was used to produce the Pit Rule. I am attaching four copies of this book, one for each commissioner and one for the case file and I encourage each of you to read it prior to making any final decision on this case.

Sincerely, Thomas A. Dugan, President, Dugan Production Corporation. So I have a copy of the book for each of you as well as for the record.

CHAIRPERSON BAILEY: Commission counsel, we are not allowed to accept the book, are we?

MR. SMITH: No, we are not.

CHAIRPERSON BAILEY: As a sworn commenter, you are open for any questions. Are there any questions for this person?

DR. BARTLETT: If he is not going to give the books to you, could I have one?

THE WITNESS: I will surely give you one.

CHAIRPERSON BAILEY: Thank you for your comments.

MR. JANTZ: Actually, Madam Chair, I have a couple questions. The book, could you repeat the author?

THE WITNESS: It's Harvey E. Yates, Jr.

MR. JANTZ: Harvey Yates, the oil company owner?

THE WITNESS: I would presume that's the same Harvey Yates that we know.

MR. JANTZ: Was there any indication from Dugan about how many wells they would have drilled absent the Pit Rule?

THE WITNESS: There is not.

MR. JANTZ: Any indication of whether they forewent any resources because of the Pit Rule?

THE WITNESS: Not in this comment.

MR. JANTZ: Thank you. That's all.

CHAIRPERSON BAILEY: Thank you. Kelly Campbell? Would you like to make a sworn or unsworn statement?

THE WITNESS: I would like to do it unsworn but I will do it sworn.

KELLY CAMPBELL

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

My name is Kelly J. Campbell and I am the safety and environmental coordinator for Energen Resources, San Juan Basin. Madam Commissioner and commissioners, thank you for this opportunity to provide comment regarding the cost associated with

the closed-loop systems on-site disposal. Energen resources is located primarily in Northwestern New Mexico and Southwestern Colorado and is the third largest gas producer in the state with 88 employees in the Farmington district.

In response to the newly proposed Pit Rule, Energen Resources has prepared a cost analysis report. The report separates costs into multiple categories for each well utilizing closed-loop systems or on-site disposal.

In 2011, ERC San Juan Basin drilled a total of 42 wells. Twelve wells were reviewed demonstrating approximately 30 percent of overall wells. There was no adverse weather conditions impacting the transportation of the drill cuttings.

The first group of four wells was within the Jicarilla reservation located south of Bloomfield off of Highway 550 and north of Highway 537. A disposal facility was a distance of approximately 100 miles. Well 3 encountered drilling complications which resulted in additional days on location significantly increasing the cost of the equipment rental. Well 1 and 3 utilized closed-loop systems with 100 percent transport of all cuttings with a total cost in excess of $200,000

each. Wells 2 and 4 used line pits with on-site burial according to current Pit Rules with the total current pit construction and closure less than $340,000 each. Wells 5 and 6 located on the Carson National Forest. Depths were in excess of 7,000 feet, 30 drill days or more and are located greater than 100 miles from an approved facility for disposal. Well 5 was a closed-loop system and Well 6 was an on-site burial with an approved lined pit. Well 5 had a total cost in excess of $300,000 while Well 6 cost less than $44,000.

The third group, Wells 7 through 12, is located in close proximity to a disposal facility less than 25 miles and are of shallow depth, less than 2500 feet. Wells 7 through 11 utilized closed-loop systems, 100 percent transport, with a cost ranging between 22- and $54,000 each. Well 12 utilized the pit with the construction and closure cost of less than $17,000.

The overall cost differences of drilling Group 3 wells compared to Group 1 and 2 are due to shallow drilling depth, the ability to utilize smaller rigs and shorter distances of travel. The closed-loop systems costs were in excess of $30,000 each. Even though the analysis indicates 7 through

11 may be cost affordable, they are a small percentage of the future wells proposed on federal or tribal surfaces. Wells located on federal or tribal surfaces do not have equitable disposal options. Shallow wells located near a disposal facility still have uncertainty with operational issues which could cause a well to exceed the economic practicality.

In summary, the closed-loop systems in Groups 1 and 2 cost the operator an average of $200,000 more than using on-site burial as demonstrated in Table 1 of our report. Key factors in evaluating closed-loop systems are cost of equipment rental, additional movement of equipment, increased hauling and disposal fees. With the use of newer techniques such as directional drilling, it has led to some uncertainties such as number of days to drill. This uncertainty creates variable cost when evaluating closed-loop systems unlike a lined pit.

On-site disposal options do not incur additional costs a day if there are delays in drilling. Additionally, Wells 1 and 3 were required to utilize closed-loop systems due to siting criteria in the existing rule. If applied, the

newly proposed siting criteria would not have required the closed-loop systems. It's a cost of $400,000 on those two wells.

There is no question that closed-loop systems have extensive costs. These costs can be enough to adversely affect development, particularly on economically marginal wells drilled mainly with freshwater mud systems in the northwest. The eight wells that utilized closed-loop systems add an approximated $800,000 to drilling cost in 2011 for ERC. Thank you very much.

MR. SMITH: I think these people as public commenters, if their testimony is relevant and non-technical, can submit exhibits. I think the issue -- let me just read to you here so you know. For public participation, a person may also offer exhibits in connection with the testimony -- this is for non-technical testimony -- so long as the exhibits are relevant to the proposed rule change and do not unduly repeat the testimony.

Now, for technical testimony the exhibits have to be filed before the hearing. So the issue is, I think, was the author of the book relevant and the issue here is, is this technical testimony?

CHAIRPERSON BAILEY: Okay. The author of

the book was going to present or give us information that was not relevant to the applications here.

MR. SMITH: I would say whatever allegation of skullduggery there might have been, it's not relevant to your proceeding here.

CHAIRPERSON BAILEY: So we can reject the acceptance?

MR. SMITH: Yes, but not for the reason that we thought.

CHAIRPERSON BAILEY: Okay.

MR. SMITH: I just think we need to do it right.

UNIDENTIFIED SPEAKER: The answer is still no.

CHAIRPERSON BAILEY: So the information that Ms. Campbell gave was not technical but it was an exhibit for her comment so we can accept it because it did not get into the technicalities.

MR. SMITH: If it was not technical, I think that's the issue. Was it technical?

CHAIRPERSON BAILEY: Commission, do you think it was technical?

COMMISSIONER BLOOM: Depends on the definition of technical.

MR. JANTZ: Madam Chair, members of the

commission, just to help you along, I would like to object to this as technical/economic testimony.

MR. CARR: May it please the commission, since we are objecting, if you can accept a compilation of numbers, which you have done in this proceeding, you can accept a compilation of numbers showing the costs -- and I haven't seen the document -- but showing the cost of horizontal drilling and drilling with a closed-loop system.

CHAIRPERSON BAILEY: That's true.

MR. CARR: It's compiling economic data no more than if she was presenting an AFE and you have done that and we will come back in a week or two and I will volunteer to come in with her and we will present some AFEs.

MR. SMITH: Do you think there's a distinction between the AFE and this prepared document? The AFE is a public document.

MS. FOSTER: No, it is not a public document.

MR. SMITH: It is not?

MS. FOSTER: It is not. The contrast here is her testimony is her company's numbers relating to their operations. It is not in relation to the Pit Rule. It is just data that they have about

closed-loop systems. She did not make a comment whatsoever about the Pit Rule and there's nothing in the exhibit concerning the application in front of us, which is what would be technical testimony.

MR. JANTZ: I respectfully disagree with Ms. Foster. The testimony was all about this application and the economic impacts of the Pit Rule on the company's operations. We are delving into the same issues that Mr. Scott talked about, Dr. Bartlett talked about and Ms. Denomy talked about, all of whom were expert and presented technical testimony.

MR. CARR: The question isn't whether Dr. Bartlett or Ms. Denomy were qualified as experts in some field and offered some technical testimony in some field. That is not the question. The question is whether or not this testimony is technical, and Dr. Bartlett was testifying about a wide variety of things, some of them technical and some of them not, but that's not precedent. It says telling you what something costs is technical. If I tell you I spent $45 and it's either my AFE or this report, that's not technical. That's just information that is not a technical nature. If this is technical, an awful lot of people have presented

statement that have to prefile because their statements would be technical.

MR. SMITH: I think Mr. Carr has a better argument.

CHAIRPERSON BAILEY: We will accept the report.

MR. CARR: Wait. Is she a sworn witness?

CHAIRPERSON BAILEY: Yes.

MR. CARR: This report indicates that Energen has been using closed-loop systems; is that correct?

THE WITNESS: That is correct.

MR. CARR: How many wells has Energen drilled with closed-loop systems?

THE WITNESS: Somewhere between 50 and 100. A lot.

MR. CARR: For how long have you been doing drilling with closed-loop systems?

THE WITNESS: Since at least 2005.

MR. CARR: Since that time have there been technological advancements in drilling with closed-loop systems?

THE WITNESS: Very little.

MR. CARR: What has happened to the cost of using the closed-loop system in the periods from

2005 to 2011?

THE WITNESS: I didn't specifically look at that but in the last year or so, two years, it's actually been an increase, and I don't have that documented in the report but the availability of equipment, the demand for equipment did cause a slight increase in the closed-loop system.

MR. CARR: That's all.

MS. FOSTER: And if I may, you said, Ms. Campbell, that you are in Northwest New Mexico?

THE WITNESS: Yes.

MS. FOSTER: What disposal facility do you use?

THE WITNESS: Industrial Ecosystems typically. Envirotech is also available not too far away.

MS. FOSTER: Are both of those OCD-approved disposal facilities?

THE WITNESS: Yes.

MS. FOSTER: And what is going to happen when the Mancos shale takes off in the San Juan Basin and all those wells are going to have to be hauled to the facilities as well? Do you think the cost of hauling will increase?

MR. JANTZ: Objection. This is, I think,

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getting into technical testimony.

THE WITNESS: And I don't know the answer.

MR. JANTZ: Objection withdrawn.

MS. FOSTER: I have no further questions.

CHAIRPERSON BAILEY: Any other questions?

MR. JANTZ: I have a few questions, Madam Chair. This is a legitimate question. I don't know the answer and maybe you can provide me with some guidance. You said some of the wells were operating on Jicarilla?

THE WITNESS: Yes, sir.

MR. JANTZ: Is the Pit Rule applicable on tribal lands?

THE WITNESS: Absolutely.

MR. JANTZ: I really didn't know the answer to that. The other question I had is has your company foregone any resources because of the Pit Rule?

THE WITNESS: I probably honestly cannot answer that. I'm not involved in that part of the business.

MR. JANTZ: Thank you.

MR. CARR: I would like to thank Mr. Jantz for identifying his question as legitimate and I won't go beyond that.

CHAIRPERSON BAILEY: Dr. Neeper, you have questions?

DR. NEEPER: I will try to keep the questions legitimate. Could you tell us why your company chose to use closed-loop system?

THE WITNESS: Several reasons. Obviously, we were using closed-loop systems prior to the rule. Energen is a prudent operator. We have some wells where the depth to groundwater -- I can't tell you the exact depth to groundwater but it was close enough that Energen made the decision to utilize closed-loop systems.

DR. NEEPER: So it is not just the impact of Rule 17 that's making you use closed-loop systems; is that correct? Do I understand that correctly?

THE WITNESS: That would be correct. Because we were using closed-loop systems prior to the rule.

DR. NEEPER: Thank you very much.

CHAIRPERSON BAILEY: Mr. Dangler?

MR. DANGLER: You may not know the answer to this one either. Does your company's insurance factor into this? Do they weigh in on the closed-loop system usage?

THE WITNESS: I have no idea.

MR. DANGLER: Thank you.

MS. GERHOLT: No questions.

CHAIRPERSON BAILEY: Thank you for your --

COMMISSIONER BALCH: I have a question. Did the way you use closed-loop systems change as a result of Rule 17? Did the number of systems that you used, the number of applications, places you used change as a result?

THE WITNESS: Yes. Just like I spoke about the two wells that we had in Jicarilla, they actually, under the proposed siting criteria of the newly proposed rule, they would not have required closed-loop systems. Under Rule 17 they did require closed-loop systems so that's two -- with a total of -- that was in my public statement, a total of $400,000 in two wells. Yes, $400,000.

COMMISSIONER BALCH: Correct me if I'm wrong. Before 2008 you used them when the situation required it or suggested it would be prudent environmentally and afterwards you used it because you had to?

THE WITNESS: There's multiple answers to that. One of the reasons is once you have the closed-loop system in place, let's say for the rule

or for -- whether you determine it because of the rule or because you are being a prudent operator, once the system is in place you have signed contracts that if you don't use it you are still paying for the equipment rental, whether you haul it back to town, now you pay for trucking taking it to town. So really even though it costs more to keep using the closed-loop system, it costs less than sending it back to town to pay the standby time on it.

COMMISSIONER BALCH: So if you want to have the rig available for your operations it's more prudent for you to fill out C 144 EZ and keep going?

THE WITNESS: Yes.

CHAIRPERSON BAILEY: Commissioner Bloom?

COMMISSIONER BLOOM: No questions.

CHAIRPERSON BAILEY: Now you may be excused.

MR. SMITH: If I could, let me point out one more thing. I think you need to give six sets to the commission and copies to everyone who has filed an intent to present technical testimony. You may need to make more copies in order to present this tomorrow.

THE WITNESS: I will bring the copies in

the morning, sir.

CHAIRPERSON BAILEY: The next person on the list for public comment is Michelle Miato. Would you like to make sworn or unsworn?

THE WITNESS: Unsworn.

CHAIRPERSON BAILEY: Please state your name and place of residence.

THE WITNESS: My name is Michelle Miato and I live in Albuquerque, New Mexico. Sister Joan Brown could not be here today so I have been asked to read this letter for the public comment on behalf of New Mexico Interfaith Power and Light.

Dear Oil Conservation Commission: My name is Sister Joan Brown, executive director of New Mexico Interfaith Power and Light. New Mexico Interfaith Power and Light has more than 200 member and partner faith congregations throughout New Mexico. In addition, we are a state affiliate of National Interfaith Power and Light with affiliates in 39 states. Responsible extraction of oil and gas for our energy uses is one of the issues that we are concerned with and work on at the national and local levels.

People of faith support guidelines to protect the water, which is a sacred gift of the

Creator. Every faith tradition holds documents and teachings and we continue to emphasize these and bring them to light in statements such as the United Methodist social principles which address "stewardship of water, air, soil, minerals, plants and energy resource utilization and global climate stewardship."

The New Mexico Conference of Bishops in their Statement on the Environment: Partnership for the Future: A Pastoral Statement of the Roman Catholic Bishops of New Mexico addressed the issue of responsible extractive industry related to water concerns in 2000. "Our own state, New Mexico, is not exempt from the increasing global and regional environmental crisis. At the same time there are particular issues which confront us here. Water, especially in our desert environment, its careful and equitable use while protecting it from pollution, places before us the continuing challenge of responsible stewardship. In several areas of our state waste deposits and mining pollution affect both human settlements and the natural environment."

NMIPL representing faith communities in New Mexico supports the current Pit Rules which protects our water, communities, businesses,

families, children, God's creation and the future. Such guidelines represent thoughtful, responsible stewardship expressed in ethical choices that care for the common good. Please keep the Pit Rule which has been working. We are stewards of God's creation whose ethical decisions affect individuals and communities throughout the state. In peace and good, Sister Joan Brown.

CHAIRPERSON BAILEY: Thank you. Gwen Lasser. Would you like to make sworn or unsworn?

THE WITNESS: Unsworn. So it's a day for making comments on behalf of other individuals and organizations. These are comments on behalf of Josh Joswick at San Juan Citizens Alliance.

Commissioners, please accept this letter as written comment from the Farmington, New Mexico chapter of the San Juan Citizens Alliance. The Alliance has been working for 25 years to see that natural resource development is done right minimizing its impact to the communities in which it is done.

In 2007 the New Mexico Pit Rule was developed with extensive input from oil and gas industry representatives, ranchers and conservation organizations to protect New Mexico's water, soil

and public health from toxic drilling and fracking waste. That was a rigorous stakeholders process, and like most rigorous stakeholders processes, the end result was a carefully considered rule that balanced the participating parties' concerns and interests.

As your aware, that rule requires that companies use pitless (closed-loop) drilling systems and companies can bury their waste on-site if the chloride content is 3,000 milligrams per liter. In short, it does nothing to restrict or prohibit drilling and drilling has proceeded apace under this rule. The rule just makes drilling cleaner and less intrusive.

But cleaner and less intrusive is evidently not something the industry can live with. Evidently, that is not an image that works for them. Industry wants to be able to leave wastes that have a chloride content approaching the chloride content of sea water. Waste with such high salt levels have left untold number of pit sites across New Mexico barren where nothing has grown in decades. This is a lesson as old as Carthage; nothing grows in salt.

According to the data from the New Mexico Energy, Minerals and Natural Resources Department,

between the mid 1980s and 2003 the New Mexico Environmental Bureau recorded 6700 cases of pits causing soil and water contamination. In 2005 the New Mexico Oil Conservation Division released data showing that close to 400 incidents of groundwater contamination had been documented from oil and gas pits.

But since the Pit Rule was adopted in 2008 there have been no reported incidents of contamination from pits. The Pit Rule works. But today the industry, fully aware of this information, is saying that they can't live with the Pit Rule or any standards whatsoever. Yet when pits fail, they cost companies a lot of money to try to clean up contaminated soil and groundwater. That is, if the companies can be made to clean up their messes. And that is a story for another day.

There has been no analysis from industry to demonstrate that the current Pit Rule is costing them more or less money (closed-loop drilling systems are saving companies money) or that it is okay to build a pit where groundwater is within 25 feet of the surface of the land or that it's okay to locate a pit 100 from a school or livestock well. The bottom line, they don't want to deal with their

waste responsibly. They want to be able to bury their drilling and fracking waste anywhere they want.

People already call the Four Corners area the Cut Corners area because of its notorious history of lax regulatory oversight and enforcement and the attitudes of anything goes so let's make some bucks. Don't live up to the reputation industry would have you promulgate for New Mexico. It's where the industry comes to play. There are people here in New Mexico, too, and groundwater is precious here.

So my question is, why is it that the industry should automatically get what it wants regardless of the consequences to our communities? Natural gas development is industrial development. Just by wrapping the words "jobs" and "revenues" and "developing our resources" and "national security" around it does not take away the fact that like all industrial developments there are serious detrimental impacts to our land, air and water associated with them. That is not environmentalist rhetoric and conjecture. That is real world fact. Listen to the people who can tell you about that real world and do not condescendingly dismiss their

stories as anecdotal. Their stories are real, not manufactured. Their motives are not greed. Their goal is self-preservation and you have the power to build or destroy this goal.

I'm not telling you anything you did not already know, so I am asking that you give that knowledge some weight in your deliberations and your decision. Thank you for your time. Josh Joswick, Energy Issues Organizer, San Juan Citizens Alliance.

CHAIRPERSON BAILEY: Thank you.

MR. SMITH: To be clear, I don't think that that can be accepted as a written comment as requested. You can give it to the court reporter in order to help her with transcription but we have to have that in the record orally because written comments --

THE WITNESS: Right. Similar to them, they were unable to be here and submit their comments before the deadlines last week so they asked us to deliver it today.

CHAIRPERSON BAILEY: Thank you. Kathy Martin. Would you like sworn or unsworn?

THE WITNESS: I am also reading something into the record so unsworn.

CHAIRPERSON BAILEY: State your name and

place of residence.

THE WITNESS: My name is Kathy Martin. My place of residence is Norman, Oklahoma. This public comment is from Jerry Nivens, who is with the Caballo concerned Citizen Group out of Truth or Consequences. I worked with Jerry for two-and-a-half years on the Dairy Rule. He is just recuperating from chemo from leukemia, so he was not able to come. He was supposed to be here Wednesday.

Pit Rule June 21. The Pit Rule was developed with extensive input from oil and gas industry representatives, ranchers and conservation organizations in 2007 to protect New Mexico's water, soil and public health from toxic drilling and fracking waste. Many thousands of dollars of taxpayer money were spent in extended hearings and research concerning this rule. This is simply a measure of protecting soil and water from dumping of drilling waste.

By looking at other states, it's very easy where we will be heading if we don't have these rules. These are not severely restrictive to business, although that claim is always made when any attempt is made to regulate the oil industry. Is there anyone that thinks that any of us, as

private citizens or individual private businesses, could dump this byproduct of highly toxic matter coming from drilling without any number of agencies prohibiting that release and having support all the way up to the governor.

Governor Martinez vowed to repeal the Pit Rule during her campaign and now the New Mexico Oil and Gas Association thinks it has the votes on the oil commission to do the deal.

I am always amazed by any number of Johnny-Come-Latelies such as this administration immediately attempting to offset many rules and regulations that were passed and adopted for good reasons after years of work and research. A very good recent issue is the rollback of energy-efficient building codes. The New Mexico Construction Industry Commission violated numerous laws when it rolled back the energy-efficient building codes adopted in 2010. The commission did not meet the requirements to give the public the right to effectively participate in the making of the laws and that required decision-makers to explain their actions.

In April 2011 the commission decided it would consider changes proposed by New Mexico

Construction Energy Division to New Mexico Electrical Code, the New Mexico Energy Conservation Code, the New Mexico Mechanical Code and the New Mexico Plumbing Code. After holding simultaneous public hearings around the state and accepting public comments the commission accepted the proposed changes in 2011.

The people of New Mexico are not asking the petroleum industry to bear a weight no other carries. Private citizens cannot dump toxic materials on private land. Municipal landfills accept toxic materials under strict conditions. Even relatively beneficial fertilizer cannot flow from farms into watercourses. Oil and gasways cannot being exempted. The Pit Rule protects our irreplaceable water, soil and air. Closed-loop waste management creates jobs and an industry that can't or won't cover its own real cost is an unsound base for our economy.

We anticipate that constant bending of these laws will result in breaking of our laws and our society. Jerry Nivens, Caballo Concerned Citizens Group, Caballo, New Mexico.

CHAIRPERSON BAILEY: Thank you. We will continue at 9:00 o'clock in the morning. See you

then.

(Note: The hearing was adjourned for the day at 5:20).

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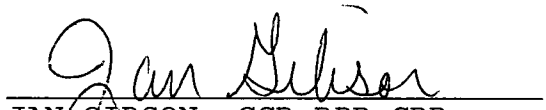
REPORTER'S CERTIFICATE

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.



JAN GIBSON, CCR-RPR-CRR
New Mexico CCR No. 194
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