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 19

January 9, 2013
9:00 a.m.
Wendell Chino Building
1220 South St. Francis Drive
Porter Hall, Room 102
Santa Fe, New Mexico

THE COMMISSION:

JAMI BAILEY, Chairperson

GREG BLOOM, Commissioner

DR. ROBERT BALCH, Commissioner

MARK SMITH, Esq.

FLORENE DAVIDSON, COMMISSION CLERK

REPORTED BY: Jan Gibson, CCR, RPR, CRR
Paul Baca Court Reporters
500 Fourth Street, NW - Suite 105

APPEARANCES

FOR NEW MEXICO OIL & GAS ASSOCIATION (NMOGA):

HOLLAND & HART, LLP
P.O. Box 2208
Santa Fe, New Mexico 87504-2208
505-988-4421
BY: MICHAEL FELDEWERT
mfeldewert@hollandhart.com

JORDEN BISCHOFF & HISER
7272 E. Indian School Road, Rd. Suite 360
Scottsdale, Arizona 85251
480-505-3927
BY: ERIC L. HISER
ehiser@jordenbischoff.com

FOR OIL & GAS ACCOUNTABILITY PROJECT (OGAP):

NEW MEXICO ENVIRONMENTAL LAW CENTER
1405 Luisa Street, Suite 5
Santa Fe, New Mexico 87505
505-989-9022
BY: ERIC D. JANTZ
ejantz@nmelc.org

FOR THE OCD:

GABRIELLE GERHOLT
Assistant General Counsel
1220 St. Francis Drive
Santa Fe, New Mexico 87505
505-476-3210
gabrielle.Gerholt@state.nm.us

APPEARANCES CONTINUED

FOR INDEPENDENT PETROLEUM ASSOCIATION OF NM:

K. FOSTER ASSOCIATES, LLC
5805 Mariola Place, NE
Albuquerque, New Mexico 87111
BY: KARIN FOSTER
505-238-8385
fosterassociates@yahoo.com

FOR THE NEW MEXICO CITIZENS FOR CLEAN AIR & WATER:

DR. DONALD NEEPER and DR. JOHN BARTLIT
2708 B. Walnut Street
Los Alamos, New Mexico 87544
505-662-4592
dneeper@earthlink.net

FOR JALAPENO CORPORATION:

PATRICK FORT
P.O. Box 1608
Albuquerque, New Mexico 87103
patrickfort@msn.com

FOR NEW MEXICO WILDERNESS ALLIANCE:

JUDITH CALMAN
142 Truman Street, Suite B-1
Albuquerque, New Mexico 87108
judy@nmwild.org

FOR NEW MEXICO STATE LAND OFFICE:

HUGH DANGLER
310 Old Santa Fe Trail
P.O. Box 1148
Santa Fe, New Mexico 87504
(505) 827-5756

APPEARANCES CONTINUED

FOR NEARBURG PRODUCING COMPANY:

JAMES G. BRUCE
P.O. Box 1056
Santa Fe, New Mexico 87504
505-982-2043
jamesbruc@aol.com

INDEX

INDEX CONTINUED

EXHIBITS

(Note: In session at 9:00.)

CHAIRPERSON BAILEY: Good morning. this is a meeting of the Oil Conservation Commission at 9:00 o'clock in the morning of Wednesday, January 9th, 2013. To my right is Mr. Greg Bloom, who is designee of the Commissioner of the Public Lands. To my left is Dr. Robert Balch, who is the designee of the Secretary of Energy, Minerals and Natural Resources. I am Jami Bailey, Director of the Oil Conservation Division. All three members of the Commission are here so we do have a quorum.

Commissioner Balch, have you had a chance to look at the Minutes of the December 20 and 21 meeting of the Oil Conservation Commission?

DR. BALCH: I have.

CHAIRPERSON BAILEY: Terry Warnell was the designee of the Commissioner of Public Lands so he was not here to comment on the Minutes. Do I hear a motion to adopt the Minutes of December 20 and 21st?

DR. BALCH: I will make the motion to adopt those Minutes.

CHAIRPERSON BAILEY: And I second. All in favor? Aye. And I will sign on behalf of the Commission and give them to our commission secretary.

Today we call Case No. 14784 and 14785, which are the applications of the New Mexico Oil and Gas Association and the Independent Petroleum Association of New Mexico for amendment of certain provisions of Title 19, Chapter 15 of the New Mexico Administrative Code concerning pits, closed-loop systems, below-grade tanks, sumps and other alternative methods related to the foregoing and amending other rules to conform changes state-wide. I ask for appearances.

MR. FELDEWERT: Madam Chair, Michael Feldewert, Santa Fe office of the law firm of Holland & Hart appearing on behalf of the New Mexico Oil and Gas Association.

MS. FOSTER: Good morning, members of the Commission. I'm Karin Foster on behalf of the Independent Petroleum Association.

MR. JANTZ: Madam Chair, members of the Commission, Eric Jantz, New Mexico Environmental Law Center on behalf of the Oil and Gas Accountability Project.

DR. NEEPER: Good morning. I'm Donald Neeper appearing on behalf of New Mexico Citizens for Clean Air and Water.

MS. GERHOLT: Madam Chair, Commissioners,

I'm Gabrielle Gerholt on behalf of the Oil Conservation Division.

MR. FORT: Patrick Fort on behalf of Jalapeno Corporation.

MR. BRUCE: Madam Chair, Jim Bruce representing Nearburg Producing Company.

MR. DANGLER: Hugh Dangler on behalf of the State Land Office.

DR. BARTLIT: John Bartlit on behalf of the New Mexico Citizens for Clean Air and Water. I believe an appearance was submitted on my behalf.

CHAIRPERSON BAILEY: On November 15th, 2012 the Commission entered an oral order requiring the applicants to submit a revised set of tables using a consistent method of reporting measurements for each value provided in the tables, a final version of the rule-making proposal that correctly indicates which language in the current rule is proposed to be repealed or amended, and reopened the record for the limited purpose of receiving testimony on the revised set of tables submitted by the petitioners.

There have been motions connected with that oral order. One is the Petitioner's Motion to Exclude Witnesses Identified in OGAP's Notice of

Intent to Present Testimony, and a response to Petitioner's Motion to Include Witnesses. We also have a third Motion to Exclude Portion of Exhibit 6 and Related Testimony Identified in NMCCA and W's prehearing statement for the January 9th hearing.

We will first take up the matter of the Motion to Exclude Witnesses identified in OGAP's Notice of Intent to Present Testimony. I would like to hear some arguments and we will ask for guidance from the commission counsel following those arguments.

MR. FELDEWERT: Madam Chair, Michael Feldewert for the New Mexico Oil and Gas Association. We filed both motions, and with your permission, since the arguments are essentially the same, I will go ahead and address both motions at this point if that's okay.

CHAIRPERSON BAILEY: We will not rule on the second one until we have ruled on the first one.

MR. FELDEWERT: Okay. Under the Order that was issued at your hearing on November 15th and again subsequently as noted in the subsequent public notice, this hearing today is limited today, as you expressed, to the revisions to the tables that have been filed by Petitioners, nothing more.

Any modifications to those revisions filed by the Petitioners had to be filed by December 24th. No modifications were filed so there are none to consider. The only topic for testimony and hearing today are the limited revisions to tables filed by the petitioners, and the testimonies that has been identified by OGAP do not address the revisions filed by the petitioners or the reasons for the revisions to the tables that were filed by the Petitioners.

And I think it's important to go back and look at the reasons for the revisions, because it is clear from the transcript from the November 15th hearing. If you look at the transcript at Page 4, this body was concerned with chlorides only at that time, and your concern was limited to the fact that the proposed tables used milligrams per kilogram for chlorides in Table 1 and milligrams per liter for chlorides in Table 2, and a question arose with this body as to whether there should be the same standard for chlorides in both tables; for example, whether Table 2 should be milligrams per kilograms rather than milligrams per liter.

So to address that narrow issue this body did two things. It voted to require Petitioners to

submit a revised set of tables, and at your transcript on Page 6, Line 6, instructions were, "Submit a revised set of tables providing a consistent method of reporting measurements for each value provided in the tables." You then voted to hold a public hearing for the following limited purpose. And again, this is borne out in the transcript at Page 6, Line 13 and I quote: "For the limited purpose of receiving testimony on the revised set of tables submitted by the Petitioners." You also asked at that time that the Petitioners include in their filing corrections to the pages of strikeouts in NMOGA's Exhibit 1 because some of those pages of strikeouts was missing some limited text from the 2009 amendments. And the Commission observed that was a minor issue but since we were going to file those corrections you wanted those included in the submission.

So as a result pursuant to that order, NMOGA filed what they entitled Notice of Corrections to the Proposed Amendments and they substituted NMOGA Exhibit 20 for NMOGA Exhibit 1, and as a side note, NMOGA Exhibit 20 has the same pagination as NMOGA Exhibit 1. So if we have a reference in the transcript to certain pages of those exhibits, it

applies equally to the substituted Exhibit 20.

That substituted Exhibit 20 accomplishes three things: It inserts the limited text that was missing from the 2009 amendments in the pages of strikeouts in NMOGA's proposal as you instructed. Number two, it incorporates the modifications to NMOGA's proposals that were filed in April and May before any of the hearings commenced. So now the modifications are all in that single document. And finally, and it's important for the hearing here today, it made limited corrections to the Method column for chlorides only in the proposed tables.

If you have in front of you NMOGA's Exhibit 20 which was part of our Notice of Corrections, that's Exhibit 20 and on Page 41, same pagination, are the tables. We made four changes: First, for chlorides in the Methods column, we substituted Method EPA Method 300.0 for EPA Method 300.1. Number two, we moved that asterisk underneath the tables from the entire Method column to the chlorides only because that's really where it fit. Number three, we changed that asterisk to read as it does now, "Or other test methods approved by the division." And finally, number four, we moved the reference to EPA SPLP and SW-846 that was

formally in the asterisk, we moved that directly from the asterisk to the Method column for chlorides in Table 2 because that's where it belongs. Nothing else was changed.

We are going to call Dr. Clay Robinson here today, and he is going to discuss why these limited changes to the testing methods for chlorides in the tables are more accurate and scientifically sound. He is going to discuss why chlorides must be measured in milligrams per kilogram in Table 1 and milligrams per liter for Table 2 and then he is here to answer whatever questions you have or anyone else has about the changes.

That is the subject of this hearing per your directive in November and per the public notice. OGAP wants to strip away any sideboards from the hearing. They want to call two witnesses to testify for eight hours on what they term the impact to the environment from, I quote, the proposed waste concentrations in NMOGA and IPANM's petitions. They want to discuss this limits column as filed in our petitions over a year ago. These limits were provided in September of 2011. They have not disclosed any witness whatsoever to address the subject of this hearing, the revisions to the

tables filed by the Petitioners, and they have done some selective quoting, I would submit, in their response to you to suggest that there are no sideboards in the hearing and essentially they can have a do-over and they can call two more witnesses to address exactly what their rebuttal witness, Ms. Martin, discussed with you back in August.

Now, there's no basis for OGAP to now do a do-over with respect to the conservations that were proposed in September of 2011. This hearing is not noticed to address those issues and these witnesses that they have provided go well beyond the limited purpose you have expressed for the hearing today. So the topic they want to address has been the subject of your deliberations and considerations by the parties since these proposals were first submitted in September of 2011. It was the subject of extensive hearings from May through August before this body, and what they want to discuss has nothing to do with the revisions we have proposed.

So unless you are now removing the sideboards that you carefully placed on this hearing in November and unless we are now going to have a do-over for everybody to submit evidence on the proposals first placed before you in September of

2011, you must preclude their witnesses.

CHAIRPERSON BAILEY: Mr. Jantz? Do you have a response?

MR. JANTZ: Yes, Madam Chair, members of the Commission. In addition to the written response that we provided, I want to make two very brief points to the Commission. First, I think we need to remember why we are here today and the reason why we are here today is to cure the notice problems that came with the fact that NMOGA and IPANM filed petitions based on an incorrect superseded rule. They used the wrong rule as the basis for their petitions.

If you look back at the transcripts from the Commission's deliberation when the mistake was discovered, Volume 18, Pages 3806 through 3808, the discussion among the commissioners clearly shows that the concerns were with the problems of what was omitted from the tables, the 3103 standards as well as the limits. And that goes to the second point, that the Commission on Page 4 of the November 15th transcript, Line 12, 11 through 16, specifically says that there are concerns with the numerical limits.

So based on that fact, I think it's fairly

clear what the Commission intended here is to have a thorough discussion of what these tables really mean.

The second point I want to make, the second big-picture point, is that this is a rule-making and essentially what the petitioners are asking the Commission to do are make evidentiary judgments in limine, which is an judicatory process. That's not appropriate for this rule-making. The only guidepost this Commission has for dealing with evidence in a rule-making is relevancy. If evidence is relevant, it's got to be admitted and it's got to be considered according to the procedural rules that -- Commissions on Procedural Rules. So with that, I believe that there's ample authority and basis to allow OGAP's witnesses to testify in the supplemental hearing. Thank you.

CHAIRPERSON BAILEY: Mr. Smith, do you have guidance for the Commission?

MR. SMITH: Do you want to allow a reply?

CHAIRPERSON BAILEY: Sure.

MR. FELDEWERT: Very brief. With respect to the selective quotation of numerical limits, as they did in their response, the concern was the fact that milligrams per kilogram was used for chlorides

in one table and milligrams per liter in the other. That was the concern with the numerical limits.

Secondly, with respect to the missing text in NMOGA's initial proposal, the Commission carefully looked at that both during your deliberations and at the November 15th hearing. What you said at the November 15th hearing which they do not quote is that the Commission finds that such inconsistency and mistakes in transcription of a language from the current rule. "Because this has occurred only in areas where the current rule language is proposed to be repealed or amended, we do not find any concerns with the current rule-making process, including notice provided to the public." So that is not by any stretch of the imagination a reason we are here today.

The relevant issue here today is the changes that were made to the tables by the petitioners. That is the topic to which relevancy is gauged. And the witnesses that they have disclosed do not purport to offer anything on this relevant topic.

CHAIRPERSON BAILEY: Now do you have guidance for us?

MR. SMITH: Sure. With respect to some of

the broad comments that were made at this point, particularly by Mr. Jantz, it is true, I think, that we were all somewhat taken aback, not just the Commission but everyone here, when you discovered the problem with industry and NMOGA and IPANM having attached an old version of the rule that was black-lined in their petition. I think in the interim, however, and I think that you made this clear at your November 15 meeting, that in the interim you had looked at that and it was not the problem that I think everyone at one point thought that it might be.

With respect to the notion of the only standard being relevance in a rule-making, I do believe that you can give order to your rule-making as you have and move through and not allow ground to be recovered, and particularly when you reopen a hearing I think you can reopen it for a limited purpose. Having said that, in response to Mr. Feldewert's argument morning, you can reopen the hearing and hear anything you want to hear.

It seems to me that the real question here is the notice, and what we have in the motion is the idea that a notice was clearly limited to a particular area, and I believe that Mr. Jantz argues

that that notice was ambiguous and he reads it to be broad enough to encompass what he wants to put on today.

So I think the real issue that you have is what a reasonable person would think could be put on today based on the notice that you put out, and because the notice references your oral ruling at the hearing, I think that you can look at the transcript as well.

So your notice says that the Commission entered an oral order requiring the applicants in the above cases to submit a revised set of tables related to applicants' proposed closure and reclamation requirements. And it goes on to say that you orally ordered that the testimony be taken on the revised tables and it specifically references the meeting of November 15, 2012.

So I think, first of all, you look at the notice and it says that evidence will be taken on the revised tables. Then you look at your transcript from November 15 which both sides have cited, and it seems to me that the important features -- and I'm not going to give page citings or lines. I think everybody has the transcript. The first thing you say about the tables is,

"Second, there was a concern about the contaminant levels in the tables." You go on to say, "The issue with the tables is more serious, and I don't see a way to solve that problem without reopening the record and allowing additional testimony on that point. There is not sufficient testimony in the record about the measurement levels to allow us to correct the problems without getting more input from the parties. These tables use values that are reported as either milligrams per kilogram or milligrams per liter. The tables should use one method of reporting for all values, particularly since the Commission is leaning towards the use of only one table rather than two." Then you go on to recommend that milligrams per kilogram would be the more appropriate method of calculation.

However, since the record does not support any conversion of values currently in the proposal, the Commission cannot make such a conversion on its own. The Commission must require that an amended set of tables be submitted and the testimony must be taken on the amended tables before the Commission can complete deliberation on the rule-making proposal. Then you go on to enter your order.

Now, the question then, I think, before

you all is given the notice and given the transcript of the hearing that is referenced in the notice, what would a reasonable person believe was the subject of this hearing, and I think I have read to you the most relevant portions. So I think that's the issue before you and that is something that I think would not be appropriate for me to decide, but you all need to decide.

I would say that whatever you decide in that regard, I don't think it is necessary to exclude witnesses. I think it is necessary for you to frame what the hearing is about and then move forward.

CHAIRPERSON BAILEY: Thank you for your guidance. Commissioner Balch, do you have an opinion on the motions before us?

DR. BALCH: I believe at least in my mind on November 15th that the intent was to try to understand why there were two different measurements used and that was the primary concern.

CHAIRPERSON BAILEY: Commissioner Bloom?

MR. SMITH: Let me interrupt here. Your intent, I think, is relevant but I think what you need to address is what you think people would get from reading the transcript and from looking at the

notice.

DR. BALCH: From reading the transcript and listening to Mr. Smith talk about it, I thought it was fairly clear that we were discussing why there were milligrams per kilogram and milligrams per liter. I don't think that I would interpret it to mean that we were concerned with the limits themselves, which were discussed in direct and cross-examination here. Now, I also, as you know, think more data is always good. However, I think that when I prepared to come up here today I thought the case was going to be about the tables and the units in the table, not the limits in the table.

CHAIRPERSON BAILEY: Commissioner Bloom, do you have an opinion?

COMMISSIONER BLOOM: Yes. Madam Chair, given the written order that went out and then, of course, your oral order on November 15th, it seems clear to me what we were looking for was to see one standard of units used here, and you mentioned specifically going to milligrams per kilograms. I think that seems quite clear. The existing standard is in milligrams per kilograms and we are going to be going to milligrams per liter so I am very interested in hearing the proponents' reasoning for

making this transition to milligrams per liter.

I think when we see a transition to milligrams per kilogram, if there's a large increase in the chlorides I would be interested in hearing testimony about what the impacts of that would be. I do not feel that we need to go into EPA and BTEX Benzene again. I don't believe we were looking to run through that again. We heard quite a bit of testimony on that, a lot of conversation about it. So just to finalize, I think, the conversation is about chlorides and the standard that we are going to use, milligrams per kilogram or milligrams per liter moving forward.

CHAIRPERSON BAILEY: I also agree that we need to limit testimony in this case to the units of measurements that are being used; that that does not necessarily exclude witnesses if witnesses would like to address those issues, if they are qualified to do so. The question had to do with the units of measurement, not with the values of those analyses.

MR. SMITH: Madam Chair, let me ask again, you need to consider based on the transcript that was referenced, do you believe that that limitation was clear?

CHAIRPERSON BAILEY: I think a reasonable

person would be able to interpret the notice and the order that was given in the transcript as being confined to those areas dealing with the units of measurement.

DR. BALCH: I think the key word is limited. Once you see the word limited, you interpret that to mean there are boundaries.

MR. SMITH: That's fine. I just want to make sure you all consider what I think you should.

COMMISSIONER BLOOM: Mr. Smith, I focus in on Page 4, which we looked at already today, but at Lines 18, 19 and 20. "The table should use one method of reporting for all values, particularly since the Commission is leaning towards use of only one table rather than two."

CHAIRPERSON BAILEY: Then we are in agreement that we will go forward with testimony limited to those specific areas without the exclusion of witnesses if they are qualified to conduct said testimony on that purpose. Then I need to announce that we are back into session and the rule-making --

DR. BALCH: I have a motion.

CHAIRPERSON BAILEY: Go ahead.

DR. BALCH: No, the other motion --

CHAIRPERSON BAILEY: I think the decision for this first series of motions will also apply to the other motion that was connected with Dr. Neeper's -- NMOGA's Motion to Exclude Portions of Exhibit 6 and Related Testimony identified in NCCA&W's statement for January 9th so those portions of New Mexico Citizens for Clean Air and Water testimony will also be limited to those areas that we have allowed for OGAP.

DR. NEEPER: Excuse me, Madam Chairman. I hear that the motion is sustained but I have not been allowed to address the motion; is that correct?

MR. SMITH: I believe that's fair.

CHAIRPERSON BAILEY: That's fair, yes. I would like to hear you.

DR. NEEPER: Because I received the motion only last night, I have not had time to prepare an in-depth response. However, I do have a response. At some risk of repeating some things Mr. Smith said, I will give you my response at length because it pulls together as a single argument.

The Commission ordered testimony be taken on the revised tables. The Commission did not order that testimony be taken on selected elements of those revised tables. The declaration that

discussion must be restricted only to those items in the table that have been changed is a defense designed to thwart the need and the intent of the Commission.

As Chairman Bailey said on November 15th, "There is a concern about the contaminant levels in those tables." Transcript Page 3, Lines 18 and 19. "The issue with the tables is more serious, and I don't see a way to solve that problem without reopening the record and allowing additional testimony on that point. There is not sufficient testimony in the record about the measurement levels to allow us to correct the problems without getting more input from the parties."

This could lead one to believe that you intended to discuss the levels. "The Commission should have concerns about the numerical limits." I accent that. Numerical limits in the tables that are part of Section 19-15-17.13. "These tables use the values that are reported as either milligrams per kilogram or milligrams per liter. The table should use one method of reporting for all values, particularly since the Commission is leaning towards use of only one table rather than two." One changing two tables into one, implies to the reader

that there could be very significant changes, and the Commission needs all the tools it can get to make those changes. "I recommend that since measurements are of soils or waste mixed with soils that milligrams per kilogram would be a more appropriate Method of calculation. However, since the record does not support any conversion of values currently in the proposal, the Commission cannot make such a conversion on its own."

This indicates that the Commission is considering converting values and it should have whatever tools it needs in terms of conversion. These quotes are from the transcript, Page 4, Line 8 to Page 5, Line 1.

The Commission specifically requested a change of units and the Commission stated that its deliberations were constrained because the record contained no method for conversion between various systems of units. I accent the word method there. The applicants did not offer either a revised set of units or a conversion method. It appears that the applicants did not comply with the Commission's request because to comply would change a numerical entry in the table and thereby invite discussion.

This motion then that I am addressing is

an attempt to constrain the Commission's action despite the Commission's own request. If the applicants refused to honor the Commission's request, that is their privilege. However, other parties should be allowed to address the Commission's concern, and to do so necessarily requires discussing elements in the table that the applicants refused to change.

There is a consistent history behind the refusal to alter or to discuss the units in Table 2. I recognized this difficulty of units during the Industry's direct testimony and I tried to get Industry's witnesses to address this difficulty. In cross-examination I asked Mr. Gantner for the context of the numbers. I asked whether routine operations would exceed the limits given in Table 2. He deferred to Mr. Fanning's future testimony and did not discuss the topic.

I asked Mr. Arthur for the equivalents between milligrams per liter and milligrams per kilogram in the pit content. He said he would have to do math and he didn't want to do that on the stand. That's the transcript, Page 701 to 702 and the comment to Mr. Fanning is in the transcript at Page 127.

I asked Dr. Buchanan specifically if he would compare the results of experimental studies which he cited in EC units with the units that appeared in the rule. He answered that the question had been asked earlier and then said, and I quote, "The answer is no." That's Transcript Page 81, Lines 15 through 20.

Industry's witnesses have had multiple opportunities to clarify the various units appearing in the testimony and in the rule, and there are more units in testimony than strictly milligrams per kilogram or milligrams per liter. A significant amount of the testimony deals with the EC units.

Now under a specific request from the Commission, the Industry again has not revised the units and thereby it attempts to prohibit others from doing so under the excuse that to do so would be an improper procedure. In the conduct of hearings, Subsection 19.15.3.12A1 of the rule book says the rules of civil procedure and the rules of evidence shall not apply. Thus, we are not concerned with whether the evidence must be excluded by terms of the rule.

Furthermore, Subsection 19.15.3.12B2 says the Commission shall, and I accent the term shall,

admit relevant evidence unless the evidence is incompetent or unduly repetitious. My competence has already been established before the Commission, and I point out that it is impossible to be repetitious on a topic for which discussion has been repeatedly and deliberately avoided.

Discussion of the units of the rule in the context of the units that appear in the various testimonies and discussion of the origin of the proposed limits in the context of actual operations are elements of evidence very related to the specific requests of the Commission. A contaminant limit has a unit and a context within which it must be understood. Without the context, the limit is simply black marks on white paper. Discussion of the units and the limits of the tables cannot reasonably be excluded from the hearing that was called by the Commission itself for the purpose of revising the tables.

The Commission has itself discussed revising the two tables into one. Revising the two into one might alter any entry or all entries of the proposed two tables, so it is clear that the Commission, by this member of the public, at least, did not intend to restrict consideration only to

those particular entries that the Industry elected to change.

At its own choice, the Industry has repeatedly refused to discuss the content and the context of the tables. The Industry should not be allowed to prevent other parties from discussing those things that it refuses to discuss itself. In as much as NMOGA's Motion to Exclude Portions of our Exhibit 6 and the testimony related to that was served to us only yesterday and was received by myself last night less than 12 hours ago, I have not had sufficient time to prepare a detailed rebuttal. However, I noted some errors on the first page of that motion and that is the only page I have had time to read. Those errors will be clarified if my testimony is on allowed.

First, we do not propose to provide further testimony on the chloride threshold for grasses. We are using data of other authorities, data already in evidence in this hearing, to indicate how EC units may be converted to milligrams per kilogram units. We are not arguing the thresholds, we are comparing two datasets, both of which came from other established authorities to show the conversion between EC and milligram units.

I could have made a different chart to do this. Instead, I chose to use a chart that was already in evidence at the hearing. Had I used a different chart, it could have been labeled with arbitrary names. The word grasses would never have appeared in it, but surely someone would have asked for the details of where the data came from and we would be right back at the beginning, and so I took the simple way out which was to use a chart that was already in the record of the hearing.

Secondly, among these errors NMOGA asserts that we are revising Exhibit 5. To make our presentation understandable we copied a page from Exhibit 5 into Exhibit 6. It is clearly labeled as a page of Exhibit 6, but we have noted on it its origin in Exhibit 5. This changes nothing in Exhibit 5. We could have prepared, as I said, an entirely new chart but we took the simple way out hoping to be more understandable and transparent.

A third point. NMOGA states that our exhibits regarding setbacks are not within the purpose of this hearing. That might seem apparently true. However, we are not arguing the location or the extent of those setbacks. We are showing apparent errors in the wording of the proposed text

of the rule that conflicts with or confounds the application of the limits in the tables, whatever those limits might be. We would be irresponsible if we did not bring such administrative confusion to the attention of the Commission.

In summary, my testimony was crafted to avoid the issues raised in the first page of this motion. I haven't had time to read the successive pages, but I suggest the Commission should hear the testimony, and then if objections are raised the Commission can elect to delete selected sections from the record if it wishes.

If the Commission chooses instead to restrict that testimony, then I would suggest it would be better to continue this hearing into next week to allow me time to respond adequately to portions of this motion which I have not had time to read. Thank you for your attention.

CHAIRPERSON BAILEY: Do you have a response, Mr. Feldewert?

MR. FELDEWERT: We filed a motion yesterday morning with the Commission and served it yesterday morning, so I don't know why Dr. Neeper didn't get it until last night but it was served yesterday morning after reviewing what they had

submitted with their prehearing statement.

As you know, I have gone through and identified what we modified to address your issue and we will discuss why. For example, Commissioner Bloom, we are not changing the unit of measurement. Those remain the same. They are constant. The only things that have changed is the method of testing to more match the units of measurement that have already been proposed, so we will discuss why that's the case and we are going to discuss why you have to have milligrams per kilogram for Table 1 and milligrams per liter in Table 2. So that's the topic.

I could only glean what they want to present from their presentation, from their exhibits that they filed, and they had two conclusions at the end that when you read them are beyond the scope of what you have identified for the hearing and the exhibits related to that. So you made that ruling. What's interesting and what I'm concerned about is that Dr. Neeper seems to indicate that he wants to propose some type of conversions or he wants to propose some changes to the tables. Yet he filed no modifications.

We filed our -- the public notice clearly

said we are going to file -- Petitioners are going to make their changes, and the public, if they want to make modifications to the changes, are to file them by December 24th. That did not occur so it would be inappropriate for them to come in now and suggest modifications to the tables that they never filed.

Now, they can certainly present evidence on our changes. They can certainly cross-examine witnesses about our changes, but they are not in a position today to somehow offer some modifications for changes to the tables. They are not the applicant and they missed their deadline.

CHAIRPERSON BAILEY: Mr. Smith?

MR. SMITH: I would just like to say, first of all, Dr. Neeper, for someone that had very little time to answer the motion, you did an admirable job. Based on Dr. Neeper's arguments, I'm not sure that the ruling that the Commission just made conflicts with what Dr. Neeper wants to do. It sounded to me as though Dr. Neeper, when he began to testify, would be able to explain how the exhibits and the testimony that he aims to give would fall within the parameters of what the Commission has noticed up as the purpose of this hearing. And

given your ruling that you would not exclude witnesses, I'm assuming that means that you will not exclude exhibits until you have heard how they are going to be used and objections that may be lodged at the time. If that's the case, I don't think Dr. Neeper has been heard quite yet.

CHAIRPERSON BAILEY: Commissioner Balch?

DR. BALCH: When I examine the New Mexico Citizens' prehearing statement, I had no issues at all with what they propose to present to us. I thought it was completely within the context of what we had asked to understand; in particular, if you do the conversion, what happens to the values. We need to know that.

As far as drawing conclusions, I think that's left to us so I don't have a problem with his summary statement, and like Mr. Smith just said, we will have a chance to hear testimony and rebuttal from both sides on exhibits and view them as appropriate.

CHAIRPERSON BAILEY: Commissioner Bloom?

COMMISSIONER BLOOM: I would agree with Commissioner Balch. We asked that the measurements be framed in one method, and in doing that, I think that will naturally lead us to wonder what the

impacts of the new values or translated values might be, so I would be interested in hearing what Dr. Neeper and the Citizens for Clean Air and Water have to say on the matter.

CHAIRPERSON BAILEY: I agree with the other commissioners. I look forward to hearing Dr. Neeper's testimony, and if there are objections to particular slides of Exhibit 6 then we can deal with that as they arise, but do I hear a motion from the Commission to deny NMOGA's Motion to Exclude a Portion of Exhibit 6 and related testimony identified in NMCCAW's prehearing statement for the January 9th hearing?

MR. SMITH: May I suggest that you handle this in exactly the same way you handled the motion for OGAP? You have set forth the parameters. I suppose that you could deny both motions with the understanding that you have clarified what testimony and exhibits may address and then move forward so that your denial is only on the notion of excluding in limine, as Mr. Jantz points out, but that you are clearly stating the limits to what will be heard today. It seems to me if you want to do it, deny them both, but you are, as I appreciated, limiting what you will hear today based on the arguments that

Industry made.

CHAIRPERSON BAILEY: Then do I hear a motion to that effect?

DR. BALCH: I will make a motion that we deny both of the motions and then limit the testimony in the manner we discussed.

COMMISSIONER BLOOM: I second that.

CHAIRPERSON BAILEY: All in favor? Aye. Okay. That brings us to opening statements for a clarification of the rule-making hearing participation, which is OCD Rule No. 3 on rule-making so that there is clarification that the Commission will hear non-technical testimony. A person may testify and present an unsworn statement in the rule-making hearing. A person does not need to file prior notification with the commission clerk to present non-technical testimony at the hearing. Members of the general public who wish to present non-technical testimony should indicate their intent at a sign-in sheet at the hearing. We have sign-in sheets right there by the back door for any members of the public. There will be adequate time before lunch and at the end of the day to hear comments from the public who have signed in.

This Commission will also hear technical

testimony in which persons will present technical testimony or cross-examine witnesses, only limited to those people who have filed particular statements. The Commission shall conduct the hearing so as to provide a reasonable opportunity for all persons to be heard without making the hearing unreasonably lengthy or cumbersome and without unnecessary repetition. I refer anyone who is interested in these details for rule-making authority to reference 19.15.3, which has to do with rule-making.

MR. SMITH: I think it would be appropriate before you begin to take evidence to ask the presenters and the lawyers here to bear in mind the limits that you all have placed on the evidence that you aim to take and not to try to push it into areas beyond those limitations.

CHAIRPERSON BAILEY: I'm sure everyone heard those comments and yes, they will be enforced. All right. Opening statements for new testimony?

MR. FELDEWERT: Madam Chairman, members of the Commission, I think I already previewed what we are going to do. What Dr. Clay Robinson has a Ph.D. in soil science and he is going to discuss the EPA testing methods that have been identified in the

revisions and why they and how they fit with the units of measurement that currently exist in the table and why those units of measurement have to remain the same with respect to those testing methods. We will point out that's how laboratories do it. The way the table is structured is scientifically sound.

He will also address the fact that there is no conversion when you are using those EPA testing methods from milligrams per liter back to milligrams per kilogram and he will explain why.

It might be helpful as we go through the testimony -- I have our exhibits that we have filed with tabs on them because I suspect the copies you have may not have tabs, so I do have some extra copies here. I can get up to you through my assistant perhaps so that you have those available to flip through as we go through the testimony. It's not going to take very long. I suspect about an hour, and you will have questions and others will have questions, but that's what we are prepared to present here today.

CHAIRPERSON BAILEY: You may begin.

MS. FOSTER: If I may make a brief statement on behalf of the IPANM. As a result of

the Commission's order on November 15th, the Independent Petroleum Association met with NMOGA and members of Industry and we talked about these tables and the limitations in the order, and we tried to meet the demands of the Commission in the November 15th order. At this time IPANM will not be introducing a witness. We have worked with NMOGA and their witness and we support the testimony to be presented by the NMOGA witness. However, we will reserve our right to present a rebuttal witness if necessary.

CHAIRPERSON BAILEY: Mr. Jantz, do you have a statement?

MR. JANTZ: OGAP does not.

CHAIRPERSON BAILEY: Dr. Neeper?

DR. NEEPER: Madam Chairman, we will attempt to stay within the limits discussed. We will be presenting methods for doing conversions of units which we believe the Commission has requested and we will try to express the limits in terms of various units without altering the limits or without giving any reasons why those limits should be altered. If they are altered, that is entirely up to the Commission.

CHAIRPERSON BAILEY: You may proceed.

MR. FELDEWERT: We will call Dr. Clay Robinson to the stand.

DR. CLAY ROBINSON

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

DIRECT EXAMINATION

BY MR. FELDEWERT

Q. Please state your full name for the record and identify for the Commission your occupation.

A. Clay Robinson. I am a soil scientist.

Q. Mr. Robinson, if I turn to what's been marked as NMOGA Exhibit 21, is that your current resume?

A. It is.

Q. Did you prepare this document?

A. I did.

Q. Does it accurately reflect your educational background and work experience?

A. It does.

MR. FELDEWERT: Madam Chair, I move the admission of NMOGA Exhibit 21.

CHAIRPERSON BAILEY: Any objection?

MR. JANTZ: None.

CHAIRPERSON BAILEY: It is admitted.

(Note: NMOGA Exhibit 21 admitted.)

Q. You summarized your qualifications on the screen here?

A. I have.

Q. It indicates you hold a Ph.D. in soil science from Iowa State University?

A. That's correct.

Q. You obtained that in 1993?

A. Yes.

Q. You are currently a soil scientist?

A. That's true.

Q. What is a soil scientist?

A. A soil scientist is an applied scientist that uses various supporting science or pure sciences -- biology, physics, chemistry, ecology, geology -- integrates all of those in the application to soil in various things, whether it's in natural resources management, agriculture, ecology and restoration. All these things are components of what a soil scientist does.

Q. So do you go beyond just soil physics?

A. I do.

Q. Your resume notes that you have some registrations and certifications on the upper right-hand corner.

A. Yes.

Q. Would you please just identify them for the Commission and explain to them what goes into those, to the acquisition of those certain types of certifications?

A. I am a certified professional soil scientist. This is a certification by the Soil Science Society of America. It requires a certain minimum of core coursework, summarized up here if you'd care to look, but coursework in soil morphology and classification and genesis, so how did soils get to be there and how do you look at them and how do you describe them; what are the relationships between those soils and landscapes. Soil chemistry and mineralogy, so what's in the soil and then how does that work, how does that affect other properties in the soil. Soil fertility and nutrient management, so some of these nutrients that we're going to talk about today, chloride, for example, is a nutrient that plants need and so there's some components there in terms of managing nutrients and in soil fertility that come into play.

Soil physics. Soil physics looks essentially at how water, air and heat move through soil as well as other soil physical properties. Soil biology and ecology, those are the resources,

how do plants exist on the landscape and the organisms within the soil that live there and those relationships. And then land use management, how does soil affect the choices that we make in managing land. So that's the primary core of courses that a soil scientist should have.

For the certification, an individual that's seeking certification does not have to have all of these but has to have a minimum competency of coursework in most of these. With my Ph.D. I have had coursework in all of these areas. Then there's an additional supporting set of coursework associated with agricultural sciences, biological and ecological sciences, chemistry, math, physics, statistics, communications, geoscience as well as human health and land use and some water sciences. So these are -- again, an individual who is seeking certification does not have to have coursework in every one of these, but has to have established a minimum competency in these areas.

Once that's been documented, a person seeking certification is required to pass two exams. The first one is a general knowledge exam, and the second one is a professional practice exam. So the first one is just primarily facts, and the second

one is application of those facts using scenarios and case studies.

Then a person seeking certification is required to have a minimum of five years experience at a bachelor's level or master's or Ph.D., a minimum of three years of experience on top of the degree. So these are the minimum competencies required for a person to qualify as a certified professional soil scientist and then be recognized as one who is qualified to practice soil science in the United States.

Q. How long have you been a certified professional soil scientist?

A. Since 1999. That makes it about 13 years.

Q. And do you currently serve in some capacity with regard to the certification?

A. Yes. I am also on the Council of Soil Science Examiners. This is the body of soil scientists selected from around the nation who are responsible for developing these two exams, that basic knowledge exam and then that professional practice exam. So we come together and we meet yearly to work on those questions, to craft the questions, to define the minimum competencies of a practicing soil scientist.

Q. Are there continuing educational requirements associated with your certification?

A. A certified professional soil scientist must have 40 continuing education units, 40 hours every two years, including one hour in professional ethics, and then the other hours of those are obtained through attending professional meetings for soil science, reading and writing professional articles, manuscripts and other things similar to that.

Q. It also indicates that you are licensed as a professional geoscientist in soils in Texas?

A. Yes. This is a relatively new category but it's analogous to a professional engineer. For many areas a professional engineer needs that license in order to practice their science. The professional geoscientist is a growing license around the United States to qualify people to practice soil science in various states. Texas has this and I am licensed in Texas. New Mexico does not yet have a professional geoscientist license, so my license is good in Texas and other states that have cooperative agreements with Texas.

Q. Now, your resume reflects that in 1994 you began teaching at West Texas A & M University?

A. That's correct.

Q. What was the nature of your teaching obligation?

A. I had a full-time teaching appointment. That meant that I taught essentially 15 semester credit hours every semester. Those were classes in beginning soil science, soil fertility, soil morphology and classification, irrigation, soil and water conservation, soil and plant relationships, soil physics class once. It also involved teaching the labs associated with those classes and soil profile description and introductory soils and some soil fertility kinds of labs and nutrient -- characterizing nutrients, analyzing nutrients that are in the soil and then also some supporting courses in range and forage crops as well as introductory horticulture and coursework in undergraduate and graduate statistics classes.

Q. It indicates you were tenured in 2000?

A. That's correct.

Q. And you became a full professor in 2007?

A. I did.

Q. And then you continued teaching at West Texas A & M University until May of 2011?

A. That's correct.

Q. It reflects then in June of 2011 you took a position as a senior soil scientist at Stetson Engineering?

A. That's correct.

Q. Where does Stetson Engineering have offices?

A. Their headquarters or primary offices are in California but we also have offices in Nevada, Arizona, Colorado and our one office here in New Mexico and that's in Albuquerque, and I work out of that Albuquerque office.

Q. What have been your general job responsibilities since June of 2011?

A. Among many things, but primarily relevant to this hearing, characterizing soil properties on landscapes, and those properties include primarily physical and chemical properties, and then how those properties are related to the various ecosystems in which they exist.

Q. What type of projects have you worked on that would be related to your discussion here today since you became a senior soil scientist at Stetson Engineers?

A. I have done a lot of land classification, walking out on landscapes and describing soils. We

have done topsoil assessment and survey associated with an environmental impact statement for a hardrock mine looking at what soil is there that they can harvest and then when reclamation comes about could reuse, or materials that could be used for topsoil materials. I've looked at the impact or potential impacts of removing a pipeline and how that would affect soil and related revegetation impacts, and then examining soil chemistry and other characteristics and how they would impact vegetation requirements and potential revegetation.

Q. Have you been recognized as an expert in soil science by any judicial administrative body?

A. I was recognized as an expert in soil science in an administrative body before the Nevada State Engineer and I was recognized by a judicial panel in an arbitration as a soil science expert in Potter County, Texas.

Q. As a result of your education and work experience, are you familiar with testing methods for determining inorganic impounds such as chlorides?

A. I am.

Q. In solids and leachates?

A. Yes.

Q. How do these testing methods relate to the work that you have done over the last 20 years?

A. Testing methods for compounds in soil, whether they are agricultural, soil fertility or environmental, have similar basic foundations. And so I began working with these primarily when I was on my Ph.D. doing analysis of things and becoming familiar with testing methods. I continued that in my teaching through teaching on some of these methods, on basic principles and properties of how these methods work, both there are usually two procedures, an extraction and an analysis, so teaching on those and taking students to tour labs, to keep current not only for them but for me on the methodologies of both the extraction and the analyses.

And then since starting at Stetson I have continued that with -- because some of the projects on which we have worked have required me to be familiar with these methodologies and how they apply.

Q. Do you have an NMOGA Exhibit 20 in front of you?

A. I do.

Q. I invite you and the Commission to turn to

Page 41 of NMOGA Exhibit 20.

MR. FELDEWERT: Madam Chair, as a matter of procedure, this was filed with our Notice of Corrections, so I guess out of an abundance of caution I will move the admission of NMOGA Exhibit 20 which I previously described earlier this morning.

CHAIRPERSON BAILEY: Any objections?

MR. JANTZ: No.

CHAIRPERSON BAILEY: It is admitted.

(Note: NMOGA Exhibit 20 admitted.)

Q. Are you familiar, Dr. Robinson, with the tables that NMOGA has proposed on Page 41 of this Exhibit 20?

A. I am.

Q. Are you generally familiar with how they are referenced and utilized in the proposed rule changes?

A. Yes.

Q. And in particular, are you familiar, based on your work experience, with how EPA Method 300.0 that we see after Chloride in Table 1, how that works?

A. Yes.

Q. And are you familiar, based on your work

experience, with how EPA Method SW-846, Method 1312, which we see for chlorides in Table 2, how that process is utilized and how it works?

A. Yes.

MR. FELDEWERT: At this point I tender Dr. Robinson as an expert in soil science and related testing methods for inorganic compounds.

CHAIRPERSON BAILEY: Any objections? He is so admitted.

Q. Dr. Robinson, based on your experience and your knowledge as an expert, are the EPA testing methods identified for chlorides in Tables 1 and 2 appropriate for the type of material being tested under these tables?

A. They are. Table 1 is for soils and EPA 300.0 has an appropriate provision for testing soils. Table 2 is for wastes, and the combination of the SW-846 Method 1312 as an extraction and the Method 300.0 for analysis is appropriate for those wastes.

Q. Based on your experience and expert knowledge on these EPA testing methods, is it appropriate and necessary to measure chlorides in milligrams per kilogram in Table 1 and milligrams per liter in Table 2?

A. It is, because in Table 1 we begin with solid materials, with soils, and because we begin with those soils it's appropriate to report those units in milligrams per kilogram. In Table 2 though, our Method 1312 is designed to test mobility, and it does not begin with dry soils and so it never takes something to a dry component that would allow you to convert units, so milligrams per liter are the appropriate unit for Table 2 for chlorides.

Q. And do these testing methods in the corresponding units comply with laboratory standards?

A. They do.

Q. Based on your experience and expert knowledge, is there a laboratory standard for converting milligrams per liter to milligrams per kilogram for the type of material tested under Table 2?

A. Not when you begin with Method 1312, there is not.

Q. Now, to understand your opinions, I want to first discuss with you how Tables 1 and 2 are utilized in this proposed rule, okay?

A. Yes.

Q. So staying within NMOGA Exhibit 20, if you would please turn to Page 24. On Page 24 we find -- for reference purposes you looked at previously Page 23 at the bottom. By the time we get to Page 24 we are in Section 17.12D and over on Page 24 we see 17.12D6, which based on the title addresses impacted soils found in the removal and placement of below-grade tanks; is that correct?

A. That's correct.

Q. And you will see a reference to Table 2 in 17.12D6 in connection with testing requirements for soils beneath the below-grade tank.

A. Table 1.

Q. I'm sorry, Table 1. Thank you.

A. Yes, that's correct.

Q. If I'm understanding this correctly, if the impacted soils beneath the below-grade tank exceed Table 1 standards then the operator is to proceed with 17.13 closure methods?

A. That's correct.

Q. The next place that we find Table 1 utilized in this rule is over on Page 26, and we are within Section 17.13 and I see Table 1 referenced as part of 17.13A3, A, B and C; is that correct?

A. Correct.

Q. And here we are dealing with impacted soils beneath a pit or a below-grade tank; is that correct?

A. That's correct.

Q. And again, if the impacted soils exceed Table 1 then a division may require additional mediation; is that correct?

A. Correct.

Q. If the impacted soils do not exceed the Table 1 standards then they are backfilled with non-waste containing material and they are covered in contour pursuant to the closure provision.

A. That's correct.

Q. And then the only other place where Table 1 is cited within this rule is found then on Page 28, and for reference purposes we are still within Section 17.13, but by the time we get to Page 28 we are under Subsection B, correct?

A. I believe that's correct.

Q. If I start on Page 26 --

A. That's correct.

Q. -- at the bottom. So we are dealing there with where wastes are destined for burial in place or into nearby Division approved pits or trenches, right?

A. That's correct.

Q. And we see Table 1 referenced over on Page 28 in Section 17.13B9 A, B and C; is that right?

A. Correct.

Q. And again, the same holds true. There's testing of these wastes, and in this case we are dealing with wastes beneath a pit liner. I'm sorry, with impacted soils beneath the pit liner.

A. That's correct.

Q. Because the liner and the waste will already have been removed?

A. That's correct.

Q. Again, it requires testing of the impacted soils beneath the pit. If they meet the Table 1 standards you proceed with closure?

A. That's correct.

Q. If they do not, then there's additional action that's required?

A. That's correct.

Q. All right. So in summary, the way Table 1 is applied here, it's applied, as I understand it, to impacted soils, correct?

A. That's correct.

Q. That are beneath a lined pit or a below-grade tank.

A. Correct.

Q. Now, if I then go to Page 41, which are the tables, does the title of that table, is it consistent with how Table 1 is used within the rule?

A. Yes. The title says that these are closure criteria for soils beneath pits and below-grade tanks, and that is consistent with the appropriate sections that we have just addressed.

Q. Okay. So with this understanding of how it's used, you testified that EPA Method 300.0 is an appropriate method for testing chlorides in these impacted soils beneath a pit or below-grade tank.

A. That's correct.

Q. Now, I would like to have you turn to what's been marked as NMOGA Exhibit 22. Do you recognize this exhibit?

A. I do.

Q. Did you assist in putting it together?

A. I did.

Q. And it's comprised of how many pages?

A. Four pages.

Q. Are you familiar with the publication that is referenced on the first page of the exhibit?

A. "Method 300.0, Determination of Inorganic Anions by Ion Chromatography." This is an extract

of a larger document that's 28 pages.

Q. Is this an official EPA publication?

A. It is.

Q. Is it available to the website or by other means?

A. It is.

Q. Are the four pages that you have chosen here, are they accurate copies of the pages from this official EPA publication?

A. They are.

MR. FELDEWERT: I would move the admission of NMOGA Exhibit 22.

CHAIRPERSON BAILEY: Any objections?

MR. JANTZ: No.

CHAIRPERSON BAILEY: Admitted.

(Note: NMOGA Exhibit 22 admitted.)

Q. Dr. Robinson, would you please explain, using first this exhibit, why EPA Method 300.0 is appropriate for testing the soils that are the subject of Table 1.

A. If you would look on the second page of this exhibit under the scope and application, Part A, 1.1 Part A identifies that chloride is one of the components that can be analyzed by this method. Under Section 1.2.1 highlighted up here what the

matrices applicable to the method are, it can be used to sample drinking water, surface water, groundwater, reagent water, wastewater and leachates, but there's also a component in 300.0 for analyzing solids. Our concern in Table 1, those solids are going to be soils after an extraction, and 300.0 defines the extraction for those solids.

Q. If I go to third page of the exhibit there's a section, Summary of Method, correct?

A. Yes.

Q. And there's a Section 2.3 that again references that extraction procedure for solids that you just referenced, Section 11.7?

A. That's correct.

Q. Then if I go to the last page of the exhibit, does it describe that extraction process, 11.7?

A. It does, and a key point in that is in the second line. It says, "Add an amount of reagent water equal to ten times the weight of the dry solid material." So if you would allow, I will give a brief summary of how this Method 300.0 works.

Q. Let me ask you first, you said the key term is weight of dry solid material.

A. Yes.

Q. How does a lab, for example, get to a dry solid material?

A. Common laboratory practice for when you see the word dry means dried to a constant weight. Technically what that means is it's been dried at a temperature slightly above boiling, typically 105 degrees C for approximately 12 to 24 hours until it reaches a constant weight so you are dealing with a dry mass of the material that's going to be tested, and that's the common laboratory practice when you see the word dry.

Q. Then would you please briefly explain for the commissioners the process that is 300.0 with the 11.7 extraction process?

A. Again, this is a much larger document. I will summarize briefly how it's used in testing these solids for now. So this is our Method 300.0 based on this extraction that's defined in 11.7 for solid materials. In our case those solids are soils.

So again, we begin with these dry solids, which in practice, common laboratory practice means oven-dried. So you start with an oven-dried soil. The ratio is defined as ten parts of reagent water to one part of the mass of that dry soil. You mix

that together for a certain amount of time and then you filter it. You collect the filtrate and you feed it into the ion chromatograph which is the analysis method. So you have an extraction again and an analysis.

This ion chromatograph has been calibrated to provide units in milligrams per liter because of the way we established the standards. Take a certain amount of chloride, put it into a liter of distilled deionized water and you have got a standard amount in milligrams per liter. Then you look at the reading from the instrument, and based on the standards it gives you an output in milligrams per liter.

However, that's not the end of the story because now we started with an oven-dried solid, and oven-dried mass of those soils, and so since we started with a known dry mass, we can convert directly from milligrams per liter to milligrams per kilogram using that oven-dried mass, which is what allows us to come to a concentration of the chlorides in that soil of milligrams per kilogram.

Q. Dr. Robinson, is it appropriate and necessary to use milligrams per kilogram as the unit of measurement?

A. It is.

Q. Where EPA Method 300.0 is used for soils beneath lined pits and below-grade tanks?

A. It is.

Q. When you are testing these soils, are the results always reported by labs in milligrams per kilogram?

A. When testing soils the results are always reported in milligrams of whatever the element is per kilogram of soil, and that really means kilogram of dry soil.

Q. So if I'm an operator out there and I go out and do the testing that's required by the rule for the purposes of Table 1 and I get my soil samples and I take them to the lab and I say, "Test this using EPA Method 300.0," am I going to get results in milligrams per kilogram?

A. Yes, you are.

Q. Are the test results on these dry soils ever reported in milligrams per liter to someone like an operator?

A. No, they would not be.

Q. And why is that?

A. Again, it's the beginning point. If you start with that the soil that we dry, we are

concerned about the concentration of the element, in this case chlorides, that's present in that dry soil. And the dry soil is always used as the reference point in this and in soil characterization, so the units are always in milligrams of the element per kilogram of the dry soil.

Q. I want to now turn to the topic of Table 2. And I want to again use NMOGA Exhibit No. 20, but first provide a textural reference as to where Table 2 is utilized within the proposed rule submitted by NMOGA. And the only place it was utilized, Dr. Robinson, is on Page 27 of NMOGA Exhibit 20, and again, by reference to the prior Page 26 we are within Section 17.13. And we find the textural reference to Table 2 on Page 27 in Section 17.13B 5, 6 and 8.

A. That's correct.

Q. In this circumstance, what is involved are the contents of lined pits, below-grade tanks and in some circumstances dry goods, correct?

A. That's correct.

Q. For someone in your profession, when you are dealing with these types of contents, how do you describe those wastes? What's the common parlance?

A. These are mixed-phase wastes. Now, I will give some definition for what that is similar to when my soil physics professor came in and he said soil was a dynamic heterogeneous free-phase media. What does that mean? Well, mixed-phase waste means that there is still some liquid in those. An undefined amount. They are not saturated by any means, so the first step with these wastes is they must pass a paint filter test.

If you think of a sponge for a moment, if you take the sponge and put it in the sink and get that thing completely wet, when you take the sponge out of the sink, water drains out of the sponge. That's like the paint filter test. There's a point, though, where all the water that's going to drip out of the sponge has dripped out of the sponge.

These mixed-phase wastes have that same characteristic. There's a lot of soil physics and properties of capillaries and properties of surface area of the waste itself that determine how much water is going to drip out freely under just the influence of gravity. So that's what a mixed-phase waste is.

Q. Okay. The sections here that reference Table 2 on Page 27, they determine if the contents

of lined pits, below-grade tanks or drying pads can be buried on-site?

A. That's correct.

Q. So if they meet the Table 2 standards they can be buried on-site pursuant to the closure provisions?

A. That's correct.

Q. If they do not, they have to be dealt with?

A. That's right.

Q. Okay. That's the only place within this rule in which Table 2 is used?

A. That's correct.

Q. If I then go back to Page 41, does the title to this Table 2 correspond to the textual references that we just examined?

A. It does. These are the closure criteria for wastes left in place in temporary pits and burial trenches.

Q. So we are not dealing here in Table 2 with impacted soils?

A. No, we are not characterizing soils in any way with this method with this table.

Q. And here where we are addressing the contents of these pits, lined pits or below-grade

tanks, for chlorides there is a method that's described as EPA SW-846 Method 1312 SPLP, correct?

A. That's correct.

Q. And then in conjunction with that there's another reference then to EPA Method 300.0.

A. That's correct.

Q. We have looked at 300.0 but would you then turn to what's been marked as NMOGA Exhibit 23. It has in bold in the first page the EPA symbol and then SW-846 Online, correct?

A. That's correct.

Q. Do you recognize this exhibit?

A. I do.

Q. Did you assist in putting it together?

A. I did.

Q. Is it comprised of seven pages?

A. It is.

Q. Are you familiar with the publication from which these -- let me ask you, are these pages an extraction from an official EPA publication?

A. Page 1 is the official EPA web page that is the overall page for the suite of methods known as SW-846 for water quality. The second page is from an introductory web page, again from the EPA site addressing another subset of those methods, and

then the last five pages of this are an extract of Method 1312, which is a larger document of 30 pages. So we have extracted five of the 30 pages for you.

Q. Were the documents utilized here public documents?

A. They are.

Q. Available on the EPA website or by other means?

A. They are.

Q. And pages that you have chosen, are they accurate copies of the pages from these official EPA publications?

A. They are.

MR. FELDEWERT: Madam Chair, I move the admission of NMOGA Exhibit 23.

MR. JANTZ: No objection.

CHAIRPERSON BAILEY: It is admitted and let's take a ten-minute break.

(Note: NMOGA Exhibit 23 admitted.)

(Note: The hearing stood in recess at 10:37 to 10:47.)

CHAIRPERSON BAILEY: We have just admitted your Exhibit No. 23, I believe.

MR. FELDEWERT: Yes, and I want to stay on Exhibit 23.

Q. Dr. Robinson, just to put everything together, if I look at the first page of Exhibit No. 23 on the right-hand side, I see a reference to a 1000 series, correct?

A. That's correct.

Q. Then if I go to the second page at the top in bold is 1000 series methods?

A. Correct.

Q. And if I go down that column to almost the bottom I see Method 1312.

A. Yes.

Q. Then if I go to the third page, this is then the first page of Method 1312?

A. Right. This is the first page of these five that are extracted from that 30-page publication that entails the entire method.

Q. Now, we reviewed the combination of testing methods that are listed in Table 2 for chlorides which included this SW-846 Method 1312 and Method 300.0.

A. Correct.

Q. Is this combination of EPA testing methods appropriate when dealing with the contents of lined pits, below-grade tanks and drying pads?

A. It is appropriate, yes, to determine the

mobility of the contents of those pits.

Q. If I look at Page 3 of our Exhibit 23, Method 1312, there's a Section called 1.1 and it says Method 1312 is assigned to determine mobility, correct?

A. That's correct, as we noted up here just as a summary. This is a synthetic precipitation leaching procedure. It is designed to determine, as it says here, the scope and application 1.1, designed to determine the mobility of both organic and inorganic anolytes that are present in liquids, soils and wastes, and the focus here is on the wastes and these inorganic anolytes, that would be in this case chlorides.

Q. If I go down to Section 2.2, your reference there is separating the liquid phase as appropriate from the solid phase, correct?

A. That's correct.

Q. They use the term throughout that section "solid phase." How does that solid phase referenced in here differ from the dry solid that you discussed earlier when addressing 300.0?

A. It might be useful to begin a little bit of an overview of this method in answering that question because they have a different definition

for what a solid phase is. If you read through this entire method, as in 300.0 with soils, they said dry solid material. This one just said solid phase. So a quick overview of the method will take us at least to answer that question.

So the first question that this asks is are these wastes mixed-phase or are these materials that go in mixed-phase. And go back a few minutes ago. We talked about that sponge. You got it wet, you took it out, water drained freely by gravity and so it passes a paint filter test.

Is that sponge dry? I asked my students questions like this all the time when I was teaching. And the answer is of course it's not. It's still got water in it. It just won't flow out under the influence of gravity. That's what the paint filter test identifies.

So then the next thing is well, if there's some water in it or liquid in it, can I get some of that out? And so the answer is yes. How do I get that out? Well, the sponge, you might just squeeze it gently. If the answer is yes here in this method, what they do is take that material and they put it on a glass filter and then they gradually add air pressure onto it to force some of that liquid

out. And they gradually increase the pressure to 50 PSI, 50 pounds per square inch. So that's the pressure at which they are pushing water out. So they are using a pressure extraction technique in this method.

So the question then is well, so I add the pressure, I catch whatever comes out of that filter in one side and that's my liquid phase as this method has defined it. Is that stuff on the filter dry? And the answer is still no, because the definition of dry, you will remember, is oven dry. So this material is nowhere close to oven dry because it's just had pressure applied to it.

Fifty PSI -- and I know the Commission has heard testimony on plants and things, so they have a frame of reference. Fifty PSI is approximately three bars. If you remember, and it's long time to remember for your quiz, 15 bars is approximately the limit for what many agricultural plants can readily take water from the soil. That's a moving target and it's plant dependent. But for the purposes of this quiz and this concept, three bars is nowhere near 15 bars, so there's still a fair amount of liquid in this stuff that remains on the filter.

Well, how much liquid is in that, you

might ask? And the answer is, unfortunately, it depends. It depends on the physical and to a degree on the chemical characteristics of that waste product. What did they put in the pit? What were they using as their drilling fluids? Were they using drilling mud? What was the nature of the stuff they were drilling through? All of those things determine how much water is left in the stuff that's still on the filter when you put 50 PSI of pressure on it, and it can range a couple order of magnitudes actually on what's still in there, depending if you had a really course sand versus a bentonitic, smectitic drilling mud. Sorry, those are hard words.

Q. Dr. Robinson, you mentioned something to me when I was trying to visualize this. Is it like, you said, having a sponge with large holes versus small holes? I might squeeze it, put pressure, and if it has larger holes I get more water out than it does if it has smaller holes? Is that a good analogy?

A. That's correct. So the way this method defines the solid phase is what is left on that glass filter? This material is what is defined as the solid phase. This material is not dry, and in

this method, this material is never dried so we don't have a frame of reference for, you know, what's the amount of dry solids that are in that waste. That's never done in the context of this method. It defines solid phase as what's left on the filter after I put my pressure through it and collected the stuff that drips out on the side.

Q. Just before we leave that point, and before we continue here, if I look at our Exhibit 23 and I look at the page at the bottom that says 1312.6, about two or three pages from the end, there's a section in there at 7.0 which is titled Procedure, and down below there in Section 7.1.1 on Page 1312.6, is that where it defines what the solid phase is that they are referencing?

A. Yes. This defines the percent solids as that fraction of a waste sample as a percentage of the total sample from which no liquid may be forced out by an applied pressure. So we are applying our pressure. Once we have the 50 PSI everything drips out, it's at equilibrium. I can't force any more liquid out. That's what we defined in this method as the solid phase.

They can calculate their percent solids here as a fraction of the total mass that you

started with. And again, a quick distinction from this and from soil science, soil science does not use that total mass as the frame of reference. Soil science always uses the dry mass of the soil as the frame of reference.

Q. In this definition here when it says "by defined pressure," it defines the pressure that you applied there, correct?

A. The maximum pressure that's applied there is 50 PSI.

Q. And in my parlance it determines how much you squeeze the sponge?

A. Right. How strong are you when you squeeze the sponge. If you squeeze it gently and then a little bit harder and at some point you stop squeezing.

Q. Then would you continue with how this Method SW-846 Method 1312 is utilized?

A. So once I have my undried solid phase, what remained on the filter, I weigh that material, and again, it's got an unknown quantity of water in it that's related to the physical and chemical properties of the material itself, of that waste. I take an acid extractant. The pH is 4.2, a relatively strong acid, and I mix it with this solid

phase material. This provides us a worst case scenario of mobility because it dissolves other things that water would not.

Once I have mixed that together, I filter it, and again I collect the liquid, the filtrate from that. This now gives me two legs in Method 1312. One of them was if I had liquid in it to start with and it's been pushed out, and I've got that liquid phase filtrate. Then I have got another leg that was when I mixed my solid phase with the acid extractant and I have a filtrate.

Both of these then go to the next step, and the question is are these two filtrates compatible? What that means is if you mix them together will they stay mixed or will they separate? If they stay mixed, the method says well, combine them. If they will separate, the method says well, do them separately.

So what do we do? Well, again, you can either combine them or you don't combine them, you take all three of them back to the same spot. Because now I have done an extraction. If you go back to the beginning I said that all test methods essentially have two components, an extraction and a way to determine what's in it once I extracted it.

So I go to my Method 300 again to determine how much chloride is in this stuff that's been extracted, how much is in these filtrates.

Method 300.0 for liquids and filtrates is shorter, simpler. Because now I start with something that's a liquid rather than a solid when I was dealing with soils. So I don't have to use an extraction; I already have a liquid. I put it in the instrument that's been calibrated to read in milligrams per liter, and I get my chloride concentration now in milligrams per liter as the output from my machine.

So now then I'm not done with Method 1312 yet. We are just to this point where we now have chloride concentrations. Actually, I am done if I could combine my waste streams. If I could combine the two filtrates, I'm done. If I had to run those separately then I do a volume weighted average. Volume times concentration plus volume times concentration divided by total volume. So I get a weighted mean, and the answer in that, again, is milligrams per liter.

So my output from the combination of methods in Table 2, Method SW-846 Method 1312 as the extraction and Method 300.0 for analysis in

determining the mobility of these chlorides in the waste is in milligrams per liter.

Q. So if I take the contents of these pits -- if I'm an operator and I take the contents of these pits after I've gone through the paint filter test and I have this analyzed by a laboratory using Method SW-846 Method 1312 as my extraction process and 300.0 as the analysis, would the laboratory's results be in milligrams per liter?

A. They will.

Q. Is it practical for operators or laboratories to then convert the milligrams per liter results from the EPA testing methods into milligrams per kilogram?

A. It is not. Because 1312 method does not provide the data to make that conversion.

Q. You don't have the dry mass?

A. You do not have a dry mass upon which to base those concentrations.

Q. Now, I want to shift gears for one minute. Do you have the Exhibit 6 that has been proffered by New Mexico Citizens for Clean Air and Water by way of their prehearing statement?

A. Yes.

MR. FELDEWERT: I would ask the Commission

to indulge us and pull that out for one moment.

Q. I want to go to a slide. Page 3 of that particular exhibit, which is one of the pages that was not the subject of our motion.

DR. NEEPER: Just a question of procedure, Madam Chairman? This is beginning to sound like a rebuttal prior to testimony.

MR. SMITH: I think he can enter whatever testimony he wants to at this point and then Dr. Neeper can address that.

CHAIRPERSON BAILEY: In his direct?

MR. SMITH: Yes or in his cross, whenever the man wants to.

MR. FELDEWERT: Again, this is not one of the slides that we filed an objection to.

CHAIRPERSON BAILEY: Then Dr. Neeper, your objection is overruled and you will have the opportunity to address that at a later time.

Q (By Mr. Feldewert) Now, as I read this, Dr. Robinson, and if I'm wrong, perhaps Dr. Neeper can let me know, but it seems to suggest that you can simply multiply the milligrams per liter results from the EPA testing methods by 20, by a factor of 20, to come to a milligrams per kilogram result?

A. That's what this does seem to be, what

this slide purports.

Q. Is that correct?

A. The 20 comes from the extraction ratio. I said we had a solid phase -- again, this solid phase is not dry -- and we had an acid extractant, strong acid extractant that was added in a 20 to one ratio, so that's where the 20 is derived on this. However, this implied conversion here is not technically feasible and sound because that one kilogram of solid waste that he is showing here as a starting point is not dry. So there's no dry mass that you know at the beginning in order to allow a concentration conversion from a volume, milligrams per liter, to a mass, milligrams per kilogram.

If you had a dry mass of that solid waste you could make that conversion, but Method 1312 never requires in this process -- well, let me rephrase that. Method 1312 does not require you to find the oven-dry or the dry solid mass. It just uses the mass of that material that remains on the filter, never sees an oven, so you never know what is the dry mass of that material. So you do not have a reference point to make this conversion.

Q. So the process doesn't provide for any kind of a drying of the mass?

A. The process does not provide that.

Q. So would it be inconsistent with laboratory processes to simply take the one milligram per liter result from EPA 1312 and multiply by 20 to come up with a milligrams per kilogram measurement?

A. It is inconsistent with standard laboratory practice.

Q. So would a laboratory using Method 1312 multiply the milligram per liter results by 20 to get milligrams per kilogram?

A. They would not.

Q. Would a soil scientist using Method 1312 take the milligrams per kilogram results and multiply -- I'm sorry, take the milligrams per liter results and multiply by 20 to get milligrams per kilogram?

A. No, they would not.

Q. If I was an operator and went to a laboratory and said, "Use EPA Testing Method SW-846 and 1312 along with 300.0" and told them I wanted it reported in milligrams per kilogram, would they do that in their laboratory practices?

A. Not if they were a reputable lab. That violates standard laboratory practice.

Q. So as an expert, just to finalize this, in soil science and in these testing methods, in your opinion is it scientifically accurate to take the milligrams per liter results from EPA 1312 and multiply by 20 to get milligrams per kilogram?

A. It is not.

Q. Now, I want to look at the origin of EPA SW-846 Method 1312, okay?

A. Okay.

Q. Again, by way of background, that was always in the proposal submitted by NMOGA. The only difference is it was in a footnote rather than directly -- it was in an asterisk for the Method column rather than directly in the Method column, but I want to go to the origin of the testing.

If you turn to Exhibit No. 20, NMOGA Exhibit No. 20, and in particular I would like to go to Page 34. Now, Dr. Robinson, this particular page is in a series of pages that were proposed to be stricken by NMOGA and essentially replaced with the tables to make it a little simpler. On Page 34 we are dealing with, if you look at the prior page, on-site trench burial.

A. Yes.

Q. If I look at Page 34 under Subsection C,

little C, in reference to chlorides under the existing rule, there is noted here the use of EPA SW-846 Method 1312; is that correct?

A. That's correct.

Q. That's the same method that's in NMOGA's current tables?

A. It is.

Q. That has not changed?

A. It has not.

Q. The only thing that has changed is rather than EPA method 300.1 NMOGA has suggested that the method be changed to 300.0.

A. That's correct.

Q. Is that an appropriate change, in your opinion?

A. It is.

Q. Why is that, briefly?

A. Let me provide a bit of background here that outlines or a brief contrast and comparison of the methods. In 300.0 in general for soils and then we will talk about the thing for pit contents, because 1312 is followed by the analysis technique in 300.0 for the pit contents, again, the big difference between these in terms of finding out units at the end is related to whether or not the

materials are dry. Method 300.0 defines dry solids. Method 1312 defines its solid phase through pressure extraction.

We already summed this up. We know dry mass for soils so we can do a unit conversion. We don't know a dry mass when we are working with Method 1312. We cannot.

Now, why would NMOGA propose using Method 300.0 as opposed to Method 300.1? In general, 300.0 is broader, more general purpose. 300.1 has a specific purpose. The similarities between these methods are both can be used to look at concentrations in reagent water, in groundwater, in surface water and there's a subtle distinction between drinking water in 300.0 and finished drinking water in 300.1.

Now, that distinction is associated with again this purpose of these methods. 300.1, in looking at finished drinking water, is considering methods to determine lower concentrations of chlorides or whatever the anions are. So it's using larger volumes to go through the instrument in order to detect low concentrations. The limit is, I believe, .002 milligrams per kilogram, so that would be about two parts per billion for frame of

reference. So it's a very sensitive method for low concentrations.

Again, for our 300.0, it's also appropriate for wastewater and leachates and our solids after extraction. So general purpose versus specific, solids defined on how to do it for 300.0 and 300.1 there is no provision in 300.1 for testing solids. So 300.1 is entirely inappropriate for Table 1. For Table 2, you could use it but there's really no point because you are not dealing with two parts per billion, you are dealing with much higher concentrations, and 300.0 determines those completely adequately.

Q. Let me have you turn to what's marked as NMOGA Exhibit 24. Do you recognize this exhibit?

A. I do.

Q. Did you assist in putting it together?

A. I did.

Q. Is it comprised of three pages?

A. It is.

Q. And are you familiar with the publication referenced on the first page of this exhibit?

A. I am.

Q. Are these pages an extraction from that publication?

A. These three pages are extracted from the 40-page document that completely defines and describes Method 300.1.

Q. As with the other documents we have seen of this nature, is this an official publication of the EPA?

A. It is.

Q. And a public document available for review?

A. It is.

Q. And are the pages that you have copied accurate copies of the pages from this particular document?

A. They are.

MR. FELDEWERT: Madam Chair, I move the admission of NMOGA Exhibit 24.

CHAIRPERSON BAILEY: Any objection?

MR. JANTZ: No objection.

CHAIRPERSON BAILEY: It is admitted.

(Note: NMOGA Exhibit 24 admitted.)

Q. And you have already referenced the differences here. The only thing I want to go to is the second page of this Exhibit 24 under Section 1.0, Scope and Application. In particular Section 1.1 identifies what you have just discussed, and

that is the reach of Method 300.0, is it not?

A. That is correct.

Q. Has the Oil Conservation Division, Dr. Robinson, previously recognized EPA Method 300.0 as an appropriate substitute for addressing the types of waste that were involved in Tables 1 and 2?

A. They have.

Q. If I turn to what's been marked to NMOGA Exhibit 25, have you reviewed this memorandum prior to today?

A. I have.

Q. And it's the official memorandum from the New Mexico Energy, Minerals and Natural Resources?

A. Yes.

Q. By its face it appears, does it not, to be a public document?

A. It does.

Q. Issued by the Division on July 24, 2008?

A. Correct.

Q. And it contains the signature of the Division Director, Mark Fesmire at that time, does it not?

A. It does.

Q. Is this the memorandum that you referenced where the Division previously recognized EPA Method

300.0 as appropriate for the types of wastes being addressed under the Pit Rule?

A. Yes, it identifies that 300.0 is an other approved method with the extraction utilizing deionized water.

MR. FELDEWERT: I move into evidence NMOGA Exhibit 25.

CHAIRPERSON BAILEY: Any objection?

MR. JANTZ: I object on foundation. The witness isn't the author of this memorandum and NMOGA hasn't offered any testimony as to the voracity of the contents or any nuances to the contents, and as somebody who is not the author, the witness can't testify to that.

CHAIRPERSON BAILEY: Any other comments? It is a public document issued by the Energy, Minerals and Natural Resources Department. It will be admitted.

(Note: NMOGA Exhibit 25 admitted.)

Q (By Mr. Feldewert) Dr. Robinson, I am just about finished. I want to wrap some things up. If we go back to Page 41 of NMOGA Exhibit 20 where we are talking about the changes that have been made in NMOGA's proposal with respect to the EPA testing methods in the Method column, particularly and only

with respect to chlorides, looking at Table 1, in your expert opinion is EPA Method 300.0 as referenced in Table 1 the appropriate testing method for addressing chlorides in impacted soils underneath a liner or a below-grade tank?

A. It is.

Q. In your expert opinion, is milligrams per kilogram the appropriate and necessary unit of measurement where EPA Testing Method 300.0 is utilized for those types of soils under pits and below-grade tanks?

A. It is the appropriate unit.

Q. Then look at Table 2. In your expert opinion, is the combination of EPA Method SW-846 Method 1312 and EPA Method 300.0 the appropriate testing method for addressing chlorides in the contents of lined pits, below-grade tanks and drying pads?

A. It is the appropriate method for testing the mobility of those chlorides in those pit wastes to be left in place.

Q. In your expert opinion, is milligrams per liter the appropriate and necessary unit of measurement where this combination of EPA testing methods are utilized?

A. It is the appropriate unit because the foundation to convert to milligrams per kilogram is not available through Method 1312.

Q. In your expert opinion, are the testing methods and corresponding units of measurement for chlorides set forth in these tables feasible for operators and laboratories to follow and apply?

A. They are.

Q. And finally, Dr. Robinson, is it appropriate and necessary to have two tables as NMOGA has proposed here?

A. In order to answer that, let's try to give a brief synopsis of how these tables are used and what is their purpose. So the first question is are we dealing with soils beneath pits, below-grade tanks, so under the liners, under those tanks. If the answer is yes that we are dealing with the soils beneath those pits or tanks, we are dealing with Table 1 and using Table 1 to address those soils.

Method 300.0 is appropriate. It measures the concentration of those -- in this case we are dealing with chlorides. It measures the concentration of chlorides in those soils, characterizes those soils beneath the pit and beneath the tanks. And because it's dealing with

soil, milligrams per kilogram is the appropriate unit.

If our answer up there was no, we are not dealing with soils, well, in this case our option is we are looking at wastes that are left in place in temporary pits and burial trenches. We have got those mixed-phase wastes we defined earlier. And that's the purpose of Table 2. And Table 2 uses the combination of SW-846 Method 1312 as the extraction procedure to determine the mobility and EPA 300.0 to measure the concentration, and the appropriate units because of the structure of Method 1312, the appropriate units have to be milligrams per liter.

Q. So in your opinion is it appropriate and necessary to have the two tables as NMOGA has proposed?

A. It is.

Q. Is it appropriate and necessary to have the two different units of measurement for chlorides as proposed in NMOGA's tables on Page 41 of Exhibit 20?

A. It is.

MR. FELDEWERT: Madam Chair, the only thing I have left then is if you would like -- I would like to admit, I guess, as NMOGA Exhibit 26

the demonstrative slides that Dr. Robinson has put together and which has been refined over the last couple of days to bring the testimony down to as short as possible in the interest of time. They do nothing more than present in a summary format the exact testimony that he has just provided here in the record, and I suggest it might be helpful to have that as you are reviewing the record.

CHAIRPERSON BAILEY: Any objections?

MR. JANTZ: No objection.

CHAIRPERSON BAILEY: Then Exhibit 26 is admitted. Do you have copies for the Commission and the reporter?

MR. FELDEWERT: I do.

(Note: NMOGA Exhibit 26 admitted.)

MR. SMITH: May I ask a question? When you say the demonstrative slides, you are talking about giving a hard copy of what the Commission just viewed on the screen; is that correct?

MR. FELDEWERT: Yes, sir. With that, Members of the Commission, that concludes our presentation of the witness.

CHAIRPERSON BAILEY: Before we start cross-examination, it's 11:30. We can take lunch now, which would help people going to restaurants in

Santa Fe. And we can continue at 12:30, taking an hour for lunch. This seems to be a logical break. We will definitely take public comments right now, but this seems to be a logical time for that break. We have had a request for an hour and a quarter which brings us back at a quarter to 1:00. Any comments? No one signed in for public comment so we will be in recess.

MR. JANTZ: Before we break, I have a quick question. If it's okay with the Commission, Dr. Neeper and I have agreed that he will conduct cross-examination first before OGAP, and OGAP will follow in the cross-examination of the witness.

CHAIRPERSON BAILEY: I see no reason why we can't do that.

MR. JANTZ: Thank you.

(Note: The hearing stood in recess at 11:30 to 12:45.)

CHAIRPERSON BAILEY: I believe it is time for Dr. Neeper to cross-examine the witness; is that correct?

MS. FOSTER: Actually, as the petitioner of the case, I think I have the opportunity to question the witness.

CHAIRPERSON BAILEY: Of course. I'm

sorry, Ms. Foster.

MS. FOSTER: Thank you. Actually, at this time, given the limited scope of the testimony that occurred this morning, IPANM will not ask the witness any questions. Thank you.

CHAIRPERSON BAILEY: Now, Dr. Neeper?

CROSS-EXAMINATION

BY DR. NEEPER

Q. Good afternoon.

A. Good afternoon.

Q. The only solid substance that I see discussed in the rule tables is chloride. Why are we focusing on chloride? Why does the soil science focus on chloride?

A. In the soil system, chloride is essentially the most mobile, most soluble, and therefore potentially the most mobile element that is common in the soil and in the wastes we are talking about.

Q. So therefore, for example, if we had a plume of material leaching out into the soil, chloride would be the logical thing to look for at the leading edge to see how far it went; is that correct?

A. As a tracer, yes.

Q. So if chloride is highly mobile, why is it necessary to have an elaborate leach test including acids?

A. I did not design the EPA SW-846 Method 1312 test. They have chosen to use this method and the acid extractant as the method specifies to determine the mobility of the elements, in this case the inorganic and anion chloride, to identify the mobility, and those are the inputs in terms of this that have been used in other models to look at how that chloride is moving. So if you -- again, that's the purpose of the test. That's why it's there and that's what the Commission has used in the previous rule and that's the one that's continued to be proposed here.

Q. But the previous rule dealt with many other contaminants that are much less mobile; is that correct?

A. I don't know. I haven't reviewed the previous rule in detail.

Q. Very good. You have shown a few tables and the tables are treating regarding pit waste on the one hand and the other table is treating soils and you have distinguished them. Why are pit wastes inherently different from soil?

A. Well, there are several reasons for which these materials are different. First, when we are talking about soils, the materials beneath the pit or under a below-grade tank, those materials underneath those are relatively undisturbed, and they have the physical characteristics, properties of soils, and subsoil materials. There's a lot of variability in these materials, depending on how they got there and what their source was. Did they -- you know, a lot of the areas where the wells are associated with which I'm familiar are in old ancient riverbeds and so they have alluvial materials.

Well, those are inherently different from something that formed in a windblown sediment or something that formed from bedrock that's decomposing in place. So there's a variety of different physical properties and chemical properties related to the nature of how that soil came to be, but those properties are relatively undisturbed when you dug out a pit or a tank and it's the material below it.

The contents of the pit are entirely different in their nature. First, there's a lot of liquid in them initially because there's liquid

that's used as part of the drilling process. These drilling fluids have a lot of, depending on which kind of drilling fluid they are using, they have a lot of variable properties themselves. If they happen to use the drilling muds that are high in these smectitic clays, those are very much different than the standard soils that are underneath one of those pits. If they are drilling -- depending on the formations through which they are drilling, there's a lot of different materials that may be brought up as they're drilling and dumped into a pit. So there's a tremendous variability of the properties in the pit, these wastes, depending on the drilling materials and fluids that were used and the formations through which they were drug. So these materials are vastly different in their properties and characteristics.

And then there's also some differences relative to what's going to be done with these materials when you're done, when you're finished. One of them is going to be at least proposed to be left in place covered, and the other one is just going to be covered with up to four feet or four feet of material.

So there's a difference in the materials

1 themselves and there's a difference in how they will
2 be handled once it's finished.
3 Q. But both of these sets of materials,
4 obviously, are really porous media; is that not
5 correct, that appear like soils?
6 A. They are porous media. As a physicist
7 they are free-phased porous media. There is some
8 air in there, too. You have to be careful with a
9 soil scientist saying that something is like soil
10 because the pit contents are nothing like soil.
11 They are a free-phased porous media. They have
12 liquids, they have solids and in that connection
13 they have similar properties as soils.
14 Q. But you are maintaining then that they
15 would be inherently different from what you might
16 find under a leaking tank or what you might find
17 under a leaky pit?
18 A. Yes, I am, because of the nature of the
19 drilling fluids that are used and the nature of the
20 formations that are being drilled through. Some of
21 those drilling fluids are extremely different.
22 Again, I will pick on drilling muds, smectitic
23 clays, extremely high shrink/swell capacities. They
24 can hold up to 250 percent of their dry weight in
25 water. Native soils are nothing like that. So very

dramatically different properties potentially depending on the nature of how that well was drilled.

Q. Is the mobility of chloride inherently different, particularly when you use an exhaustive ten to one or 20 to one leachate?

A. You've asked about the ten to one or 20 to one, so those are references specifically to Method 300.0 and Method 1312. The ten to one method is using reagent water. That's distilled deionized water. It's mixing a known quantity of dry soil with ten times the quantity of water and finding out how much of that, in this case chloride, comes off those soil particles into solution. It's filtered and then the chloride that is in that solution is measured, so you have a content.

The 20 to one uses a strong acid, pH of 4.2, sulfuric nitric acid, 60 to 40 ratio. Because the purpose of the test, 1312 for Table 2, 300.0 for Table 1, is different. So Table 2, with that strong acid, extracts -- dissolves, if you will, a lot more of the chloride that is in those wastes than distilled water would. And so these two methods result in different amounts of chloride that are present in the solution at the end, because in one

case you are using water and in the other case you are using acid.

And so are the properties of chloride and chloride mobility the same? Well, if you have a chloride ion in the soil, yes, it will move just like any other chloride ion in the soil. But relative to the purpose of these tables and the purpose of these methods, the amount of stuff that's dissolved and the amount of chloride that's in that material that's from Table 1 and a ten to one extraction versus what's in Table 2 and a 20 to one acid extraction, those give dramatically different or potentially dramatically different results based on, again, all the other things related to what's in the pit contents.

Q. I understood you just to say a chloride ion in one has mobility just like chloride ion in the other. They both move with the water. Now, if the chloride ion moves with the water, what difference would it make the solid matrix from which it came?

A. There are two assumptions behind your question, I think. You can correct me if I'm wrong. The first assumption is that this chloride ion is free in a soil matrix, not contained in a pit. And

then the second assumption is that there is water available to move that chloride ion. So what I said was that, you know, this chloride ion in the soil and this chloride ion in the soil are going to have similar properties and similar mobilities regardless of where they started, what their source is. That much, that is true. Now, I'll stop there.

Q. So the test doesn't really know where the soils came from? You flush chloride off and that's what you get?

A. In terms of the tests themselves, once you feed that liquid, that filtrate, into your ion chromatograph, the ion chromatograph doesn't know where the chloride ion started. That's true. But the person that's running the ion chromatograph knows that the materials came from different sources because they know the methods they were using so they apply the appropriate methodology as has been specified in those exhibits that we have already presented today.

Q. You said the 1312 leach procedure first extracts as much liquid as it can by pressure and then leaches with water; is that correct?

A. That is not correct.

Q. Not correct?

A. The leach that's used in 1312 is the strong acid, 20 to one, 4.2 pH, 60 percent, 40 percent sulfuric acid, nitric acid. It does not use reagent water in 1312.

Q. I stand corrected. If the pressure-produced liquid does not separate, then the two liquids are later combined. Did I understand you to say that correctly?

A. That's what the method allows. You have got the extract from the solid phase with the acid and what came out through the pressure filtration. If those will mix without separating, then they combine those two filtrate streams.

Q. For an imaginary kilogram of testing material, about how much water might be extracted by the pressure or how much liquid -- I should use that term?

A. There is no way to know without looking at the material because it could be anywhere from nothing, if the material starts out relatively dry, to essentially a weight equal to the dry mass of the solid phase of the soil solid. That's not soil -- the dry mass of those pit contents.

Q. So at the extreme case, the mass of the liquid might be as great as the dry mass of the

testing material?

A. There are potentially circumstances where it might be -- well, I would have to look at things in more detail because there are many properties of the physical properties that affect how much water will come out under pressure and there's really no way to give you an approximate that would fit all cases.

Q. Very good. You gave us the maximum and --

A. Well, I wouldn't say that's an absolute maximum.

Q. Not an absolute. Are you aware that pit contents are very often mixed with clean soils to make a substance that will bear some weight?

A. They can be mixed up to a ratio of three to one.

Q. Three to one?

A. According to the rule.

Q. Therefore, they might tend to take on more of the properties of soils than strictly the properties of the mud; is that correct?

A. I suppose that would depend on what you meant by the properties.

Q. I will clarify that. We have in our minds some of this waste material and probably it's been

mixed with some soil, if you can imagine that. The amount of water contained therein is not -- in most cases if it's going to be load-bearing -- greater than the porosity of that solid material. Is that a fair assessment?

A. That would be a fair assessment. Let me qualify that though. Unless there's a high proportion of those drilling muds. Because those drilling muds will hold water not only in the pores or the porosity, the pore space between particles, but drilling muds will also hold water in the layers. If you would imagine that a drilling mud is a little bit like a deck of cards or a sheet of papers like this, other particles hold only water -- or traditional soil particles, rock, gravel -- hold water only on the outside of the particle and in the spaces between separate particles. But drilling muds have this unique ability to expand and hold little shelves of water between every one of the layers because they are called layer silicates. They have the ability to hold water between every one of those little layers of the clay particle, the drilling mud. So in that case they can hold a substantially greater amount of water than the porosity of the matrix.

Q. With that knowledge, what would be the error in assuming that essentially all of the chloride appeared in the leached fluid? And we know volume of the leached fluid.

A. Are you making reference now to the Method 1312 or to Method 300.0? For soils or for the pit contents?

Q. For the pit contents, and I will clarify this. Let us assume I had a kilogram of material and it went through the leach procedure and I knew how much chloride was in the leached fluid. Some chloride may be also in the fluid that was pushed out by pressure. If I have simply analyzed or took the amount of chloride in that leached fluid and related it back to the mass of solids that I started with -- and you're saying I don't know the mass. But if I dry that mass, what would be the error? You have criticized -- I will clarify this further. You have criticized my 20 to one ratio. What would be the error in that 20 to one ratio?

A. In terms of just making a simple multiplication as you proposed?

Q. Well, should it have been 40 to one or is the error 20.4 to one? Is it a small fraction or a large fraction of the 20?

A. Again, there's not a simple, easy answer for this because the properties of the waste, as I have already told you, can vary dramatically based on things like particle size. What do you start with? Well, is there a lot of gravel-sized particles, which are defined as those between two millimeters or just under a tenth of an inch all the way up to something that's about three inches in diameter or effective diameter gravel?

So if there's a lot of gravels it's a different material than if you have sand-sized particles, which are the ones that are kind of course and gritty and hence the name that we have of sandpaper. And the numbers that you see on sandpaper are associated with the size of the screens, so the size of the sandpaper, those little gritty things.

Or if you have silt-sized particles which if you are thinking about that and want a connection, think about flour. Roughly the same size as flour. Or the clay-type particles, which are very tiny, have this kind of characteristic and can hold dramatically different amounts of water.

So I can't say it's always this or always that, but I can tell you that it could be in some

cases as much as an order of magnitude difference, ten times sometimes. So in general maybe not, but in some cases it can be a dramatically different amount where it's related to the clays, drilling muds. Because they have just a huge amount of ability to hold water. Up to two-and-a-half times their weight in water they can hold at least, sometimes more.

So depending on the nature of the material you can have at least a factor of two, three, four times kind of commonly. It could be that error. And in some cases much more extreme.

Q. But that water would have come out with the pressure test.

A. No, it will not come out with the pressure test. That water on those clays particularly is held so tightly that it can only come out by oven-drying. And then, just as a matter of note that's not relevant to this, if you keep increasing the temperature, those clays hold water so tightly that they will continue to lose water if you ramp up the temperature to two or three or 400 degree C. Because they hold so much water and so tightly that even oven-drying doesn't get rid of all the water. But it gets us to a standard, so that's why we

define standard as a temperature and a constant weight for what we mean as dry.

Q. The tables show Method 300.0 for both waste and soil. Why can't both be leached by the same procedure?

A. In answering the question why can't they both be leached by the same procedure, technically, physically they could. But if what you want to know is to characterize the amount of chloride in the material below a pit or a tank and you want to know the concentration of that, proposing that you use 300.0, leaching or mixing the solids, dry solids beneath that pit with a ratio of ten parts reagent water to one part dry soil, analyzing it and finding the concentration of chlorides in that material, characterizing the soil that way.

If you only wanted to know the concentration of the materials in the pit and weren't concerned with mobility the way that it's been defined by the EPA in SW-846 Method 1312, then certainly you could use 300.0, and only consider the concentration. But it does not provide the answer that EPA SW-846 Method 1312 provides, which is mobility, and it does not provide the input that has been used in the models to look at chloride movement

in the soils or in the vadose zone beneath the pits.

So if you are only interested in concentration, absolutely, you could use the same. But if you truly are interested in mobility of the contents of that pit, that's where Method 1312 comes in because that's how the EPA has chosen to monitor or to determine mobility is with that method.

Q. And is it your understanding then that we should not be concerned with the mobility of chloride underneath the pit where a pit has leaked or underneath a tank where the tank has leaked?

A. Well, again, you are dealing with different media, pit waste versus soil. Does that material under the pit have the potential -- if it's got chlorides in it, do those chlorides have the potential to move? Yes. What's going to cause them to move? Water. Salts do not move if water is not there to move it. So since water is our only issue of concern there, then the 300.0 that uses reagent water, which is actually purer water than you will ever find in a soil solution, it's going to measure the amount of chloride that is soluble in that matrix, those materials that are under the pit. So it's measuring the solubility of the chloride, how much of the chloride can come -- if you take a glass

and you pour some salt in it, get some water in it and you stir the glass, the salt dissolves. That's what essentially what Method 300.0 does is you add water and if there's salt there it will dissolve into the water. And once the salt is dissolved, the chloride is present in the water.

Can it move if there is a head, a pressure head to force the water to continue to move downward or if there's a water table below it that would cause the potential for water to move upward, yes, the chloride in the soil could move once it's in a soluble phase.

Q. Thank you. I'm not sure I heard it right. What we are meaning by this is once it can get into the water, that's what we are concerned with, that soluble phase?

A. When you say into the water, again, I'm defining this material in the soil underneath the pit at this point. You have the free-phase porous media, some air, some solids and some liquids. In the water is a little less -- it's not the term that a soil science would use. They talk about the chloride being in the soil solution. So that's the liquid that exists in between those pores in the soil. So in the soil solution, that's where the

chloride would be.

Q. Finally, you had said that soil science always specifies in milligrams per kilogram dry mass; is that correct?

A. For concentration of nutrients, concentration of elements, contaminants like pesticides or everything with which I am familiar, and I have a methods book over there that's this thick for soil science methodology. When we are testing things in soils, we always report the results in milligrams per kilogram.

Q. Because buried waste ultimately becomes part of the soil, why then should we not talk about it in terms that are common to soil science, namely milligrams per kilogram?

A. Are you sure that buried wastes become a part of the soil? Because it's my understanding that you've got some sort of a liner that is going to be covered on the bottom, on the sides and on the top so they are excluded from the soil, if I understand the closure methods and the closure methods are done correctly.

DR. NEEPER: Madam Chairman, we may be beyond the limits that are allowed in discussion in this hearing. I could ask another question about

that but I do not wish to violate the rules, and this has to do with the methods used of closure.

CHAIRPERSON BAILEY: If it goes beyond the scope of the hearing I'm sure Mr. Feldewert will object.

DR. NEEPER: Very good.

Q. My question is then, if the pit were closed by mixing with soil and the mixing is done with a backhoe, do you have any professional reason to believe that the liner survives intact?

MR. FELDEWERT: Objection. I think that does go beyond what we are talking about here, and that is the EPA testing methods.

DR. NEEPER: May I answer the objection?

CHAIRPERSON BAILEY: Yes.

DR. NEEPER: The witness said that the liner would contain and thereby immobilize the contents of the waste. I was questioning the integrity of that liner. It was the witness' own words.

CHAIRPERSON BAILEY: The objection is overruled.

A. And I have no opinion on that. I have not observed a pit being closed. I have read the rules but I have no opinion on whether that liner would --

the integrity of the liner would survive closure.

DR. NEEPER: No further questions.

CHAIRPERSON BAILEY: Mr. Jantz, do you have any questions?

MR. JANTZ: I have a few.

CROSS-EXAMINATION

BY MR. JANTZ

Q. Good afternoon.

A. Good afternoon.

Q. Dr. Neeper asked you about the waste, pit waste and soils being leached by the same procedure, and your response was they could be; is that right? Did I understand that correctly?

A. The technology does not prevent using the same procedure. The purpose is what defines the procedure that's used.

Q. Conversely, one could oven-dry pit contents after dilution, three to one mixing, just the same way you dry soil?

A. If you did, you would no longer be following the protocol that's defined in Method 1312.

Q. Sure, but you could, to get a milligrams per kilogram?

A. Physically, again, you could, but the

method does not allow for that. So if you did that, you would be changing the methods, the defined methods and how those methods are applied.

Q. So it's contingent on the method?

A. (Witness nods).

Q. All right. And you say the method was chosen for chlorides then, the 1312, in order to talk about or determine mobility of chlorides; is that right?

A. Yes. If you look at the Exhibit 23, Page 23, NMOGA Exhibit 23, Page 3, which is Method 1312, Page 1, Section 1.1 under Scope and Application specifies, "Method 1312 is designed to determine the mobility of both organic and inorganic anolytes present in liquids, soils and waste." So it's designed to determine mobility. And the inorganic for this hearing is chloride.

Q. So if that's the case, does that mean BTEX is immobile?

MR. FORT: Objection. That exceeds the scope of his testimony on direct. We did not get into any other thing except chlorides.

MS. GERHOLT: Madam Chair, on behalf of the Division, the parties that filed prehearing statements were NMOGA, IPANM, OGAP and New Mexico

Citizens for Clean Air and Water and the Oil Conservation Division, and the notice required that to cross-examine witnesses they had to file a prehearing statement.

MR. FORT: She is absolutely right, and I did not file because I read it and the only thing that was going to be discussed today was, again, the limited testimony that the Commission agreed to. Had I known -- I was the one who objected the longest to the rebuttal testimony by OGAP because they have gotten two bites of the apple and now they wanted three. Had I known that they in any way were going to take your order and ask for additional testimony, I would have filed.

But the attorney for OCD is correct, I didn't file one. But I'm not, in terms of asking -- I'm not asking any questions. But when he raises BTEX, that wasn't in there. That was not advised, it was just the chlorides is what he testified to, and yes, if I need to sit down then somebody can pick up this argument.

MR. SMITH: He may be laying a foundation. Let him ask the question and see where he goes with it.

MR. FELDEWERT: Can I say anything? I do

object. I mean, his question was about mobility of BTEX, I believe, wasn't it?

MR. JANTZ: Yes.

MR. FELDEWERT: Which is certainly outside of the scope of his direct. I mean, we didn't discuss the mobility of any particular constituent. He was here to discuss the purpose of 1312. The purpose of 1312 was to address mobility. That was the purpose of the testimony.

It's also outside the scope of what the rule is all about. We are not here to revisit the mobility of certain constituents but to address the changes that were made to this table. I respectfully disagree that I'm not sure he is laying a foundation. He asked him directly about the mobility of BTEX. That is not laying a foundation. That is asking for an opinion and an answer which is outside the scope of the hearing and certainly outside the scope of what he testified to on direct.

MR. SMITH: I didn't understand that he was. I said he may be. Why don't we ask, are you laying a foundation for a further question?

MR. JANTZ: It does lay the foundation for a policy conclusion that I would like to ask the witness and it does have to do with chlorides.

MR. SMITH: Let him ask it.

CHAIRPERSON BAILEY: Objection overruled.

Q (By Mr. Jantz) So am I to understand that BTEX is immobile?

A. That's outside the scope of what I was asked to examine, what I was asked to prepare to do, so I have no comment on that.

Q. Do you know, as a professional and an expert in soil science, whether BTEX is mobile or not?

MR. FELDEWERT: Same objection.

MR. JANTZ: Same response.

CHAIRPERSON BAILEY: Same overruled.

A. BTEX is a hydrocarbon. I'm not a hydrocarbon expert so I have no opinion on the mobility of BTEX. I did not prepare for that so I did not review the mobility characteristics of these hydrocarbons before I came in.

Q. But your resume indicates that you have expertise in fate and transport of contaminants. Is that limited to chlorides only?

A. Where did you see that on my resume? I'm curious.

Q. Just give me a moment.

MR. FELDEWERT: Exhibit 21.

THE WITNESS: That would be my resume, yes.

MR. JANTZ: Perhaps my memory failed me in this case, but my question stands.

Q. Is your expertise -- are you only familiar with movement of chlorides in soils?

A. I think I have answered this multiple times, but had I reviewed information on mobility of hydrocarbons, I could potentially answer that. I have done some in the past, looked at mobility of some substances, so I am not limited to chlorides, but for the sake of this hearing and for the sake of the materials that I prepared, I focused on chlorides and I don't have a professional opinion associated with the hydrocarbons.

Q. So you don't know whether they are mobile or not?

A. That's -- I said I don't have an opinion on that.

MR. SMITH: Are you saying you can't answer the man's question? He didn't ask if you had an opinion, he asked you a direct question. Do you know the answer to that or not?

THE WITNESS: Well, I know that there is -- I know that hydrocarbons have coefficients

associated with solubility that affect their potential for movement just like other ions have coefficients for solubility that affect their movement. I have not reviewed the exact nature of those coefficients to be able to answer his question today.

MR. SMITH: So you cannot answer his question?

THE WITNESS: Not the way he asked it today. I cannot.

Q (By Mr. Jantz) Let me ask for clarification. When you say there are coefficients that affect mobility, what does that mean in layman's terms? Does that mean hydrocarbons move through soil or not?

A. It means that things don't move the same.

Q. Okay, but they do move?

A. It depends on their coefficients. And I will divert for a moment to pesticides because that's what I know more about, and pesticides are hydrocarbons of a sort, many of them, that have been engineered, if you will, chemically, to have certain effects on target organisms: Weeds, insects. Depending on the nature of how those hydrocarbons are put together, some of them have extremely low

solubility. They absorb extremely strongly to soil particles and organic materials in the soil and they essentially do not move at all.

Other organic compounds, pesticides, and you may be familiar with things like Atrazine that you have heard of being in groundwater, it has characteristics much more similar to an anion like chloride or nitrate, so it's not bound to the soil, not bound to the organic material in the soil and it moves freely. What I'm saying is that without reviewing those coefficients for these hydrocarbons listed in the table, I cannot answer his question because some hydrocarbons move, others don't move at all.

There's also some things associated with chemistry and how those hydrocarbons bind with the soil that affect things. So it's more complex than to say yes, they move, or no, they don't. There's some chemical properties that I would need to know and have to review of those hydrocarbons in order to answer his question, and I was not asked to prepare for that for this hearing.

Q. Let me ask a follow-up then. Assuming that hydrocarbons may move, depending, wouldn't it be wise as a policy matter to test for mobility the

same way you test chlorides for mobility?

MS. FOSTER: I object. I'm sorry. The change that were made and the purpose of the hearing are specifically as to the standards used to test for chlorides, and the standards used for testing for all the other items in the table are something that OGAP had the opportunity to cross-examine on and discuss and present in their case on direct since at least IPANM put our initial petition in, which was a year ago, which was November 29, 2011. So I really do feel that this is getting well beyond the scope of what we are here for, specifically the testing methods relating to chlorides.

MR. JANTZ: Again, if I may, the purpose is to determine why we are using inconsistent methods, units of measurement, and that's directly -- my question goes directly to that issue. The witness testified that chlorides were in milligrams per liter because they are soluble and we're concerned with mobility.

MS. FOSTER: That's fine if the question pertained to chlorides, but it doesn't. He is expanding it to hydrocarbons. He is using the term generally, hydrocarbons.

CHAIRPERSON BAILEY: The order does not

specify chlorides. The order says, "These tables use values that are reported as either milligrams per kilogram or milligrams per liter. The table should use one method of reporting for all values." It's not limited to chlorides as far as the scope of the hearing.

THE WITNESS: If that is the nature of your question, I can answer that without going anywhere. Methods.

MS. FOSTER: But before the witness answers, I would like to respond to that. Madam Commissioner, with all due respect, again, we are here to have OGAP respond to the items that were changed by IPANM and NMOGA in the table. OGAP wants to reopen the entire hearing to discuss all the items that are on every single line of the table. I think that's well beyond your order. With all due respect, I understand you just read to me the portion of the order, but my understanding of the conversation this morning and the discussion this morning and the intent behind the commission requesting for additional information was to have consistent reporting levels and weight ratios for chlorides.

MR. SMITH: Let me offer an observation of

the ignorant. It seems to me that the Commission asked for a conversion. The response was the testing method in some way or another prevents that sort of conversion. If this question goes to why should there be a different testing method, then I think that's a fair question in the context of the conversation that is being held in front of the Commission right now. Originally, I thought it was going to be a good objection, but I think based on Mr. Jantz' response, it sounds like a fair question to ask to me.

CHAIRPERSON BAILEY: Thank you for your legal advice. The objection is overruled. The question stands. If you will please repeat it.

MR. JANTZ: Yes.

Q. If mobility is the concern and that's the rationale for placing chlorides -- measuring chlorides in milligrams per liter versus milligrams per kilogram in pit waste, and assuming that BTEX, hydrocarbons may be mobile, why not test those constituents for mobility as well?

A. Again, begging the Commission's pardon on, I have not reviewed in detail the methods that are cited for the hydrocarbons. However, in response to the distinction and the reason the different units

are used, I did review these Methods 8021B or 8015M with enough detail to note that they do not use the same methodology and because they use a methodology that does use a dry weight then they can report results in milligrams per kilogram.

Now, we don't have a copy of those exhibits here, those methods here, to look at the purpose and see if the purpose of those is related to mobility or not, and I did not review that in the context of this meeting because I was not asked to. Could you use Method 1312 and 300.0 to measure the hydrocarbons? I'm not sure. I would have to review those methods in more detail. But the acids that are used in 1312 would have little impact on the hydrocarbons. They are not going to dissolve the hydrocarbons, and that's about as far as I can tell you from what I know of hydrocarbons and the methods that are proposed.

But why do you have milligrams per liter in one case and milligrams per kilogram in the other? As I stated repeatedly, the issue is associated with the nature of the method and how the method works. So a method has a purpose, and because of the purpose it has a certain process, and because of that process the units will either be in

milligrams per kilogram or milligrams per liter but it's associated with the method and the process of the method. Whether or not methods 8015M and 8021B address mobility of those hydrocarbons, I do not know.

Q. I think I have one more question. The concern with chlorides in the waste material versus the soil is mobility; is that right? That's why one is milligrams per kilogram and one is milligrams per liter?

A. The purpose of the method in Table 1 is to determine the content of chlorides in characterizing the materials underneath the pit or a below-grade tank. The purpose of the method used in Table 2 is to determine the mobility of that as the EPA methods have -- SW-846 has defined mobility as it's associated with water quality, which is what the SW-846 suite of methods are for.

MR. JANTZ: I'm not going to ask my final question. I think we will stop with that.

CROSS-EXAMINATION

BY MS. GERHOLT

Q. Good afternoon.

A. Good afternoon.

Q. Starting with the methods, EPA Method

300.0, you have had the opportunity to conduct that method personally, correct?

A. I have not from beginning to end done Method 300.0 as it's defined. I have used similar methods, water extraction, which is the foundation of that, and then the Method 300.0 uses an ion chromatograph to determine the concentration. I used other -- I used colorimetric methods and titration methods not with 300.0. Not with chlorides.

I have used other methods in the analysis so I have not specifically used 300.0 from beginning to end. I am familiar with all the processes of the extraction and the analysis but I haven't done it from beginning to end.

Q. Have you conducted EPA Method SW-846 SPLP?

A. I have not done that one personally.

Q. But you have been qualified here today as an expert in these methods.

A. In testing methods, yes.

Q. In testing methods?

A. Not specifically related to those but more generally testing methods.

Q. Thank you. On direct examination you testified that the origin of the -- I'm going to

refer to it as SPLP, the 1312 -- that that method could be found on Page 34 of NMOGA's Exhibit 20. Do you recall that?

A. That it has been referenced, yes, on Page 34 of Exhibit 20.

Q. And then if I could draw your attention to two lines below that, it further states "the chloride concentration as determined by EPA method 300.1." Do you see that, sir?

A. Yes.

Q. And you also testified, and it was per NMOGA Exhibit 25, that the OCD accepted Method 300 in place of method 300.1 for chloride. Do you recall that?

A. It accepted it as an other approved method, yes.

Q. Correct. So here we see the origin for the SPLP method and then it would be logical that the EPA Method 300 would also be acceptable?

A. (Witness nods).

Q. If I could now draw your attention to Page 32, Exhibit 20 of NMOGA, and specifically Paragraph F2B, and this paragraph is in regards to in-place burial. It would be the third line from the bottom on Page 32. "As determined by EPA method 300.1 did

not exceed 500 milligrams per kilogram." So via the EPA method 300.1 there was a milligrams per kilogram concentration, correct?

A. Yes, there is, and 300 -- I did not have anything to do with that, but 300.1 as written in the method does not allow that conversion. It does not specify a dilution rate, so a laboratory would have had to choose the extractant soil ratio to develop that and get an answer in milligrams per kilogram. But yes, it provides an answer in milligrams per kilogram.

Q. And the lab would have to choose the extraction rate. For Method 300 the extraction rate is ten to one; am I correct?

A. 300.1, the method for solids is specified as ten to one. Method 300.1, if you recall, does not claim to be used or to be useful to test leachates, wastes or solids.

Q. Okay.

A. So at some point in the past they made the wrong choice on which method to use.

Q. Then they corrected it by issuing the memo that Method 300 could be used in place of?

A. Yes.

Q. And that could provide potentially

milligrams per kilogram because there is a ten to one extraction?

A. For Table 1 if you are dealing with solids or what's now Table 2, but not if you started with the SPLP procedure.

Q. Yet Page 32 was in-place burial which was waste, and there was a determination that there could be a concentration presented in milligrams per kilogram?

A. Just because it's on paper doesn't mean it's correct. Again, if you follow the SPLP method, it does not specify that you have to have an oven-dried mass and therefore you do not have the foundation to make the conversion.

Q. During Dr. Neeper's examination there was discussion about the difference between soils and pit contents. Do you recall that?

A. Yes.

Q. One of your comments in regards to soils was that they're relatively undisturbed and then there's different physical characteristics, correct?

A. Correct.

Q. And then pit content may contain lots of liquid and that drilling fluid has a lot of variable properties. Do you recall that?

A. Correct.

Q. Isn't one of those variables for the drilling fluids the level of chloride?

A. Absolutely.

Q. And if you have the fluid that already contains chloride, could you run Method 300.0 on that fluid?

A. That's essentially what 1312 does. If you would allow me to pull up this presentation.

Q. Please.

A. So in answering your question let's go back and look here. This addresses that question. If you have a liquid that can be forced out with this pressure that we talked about earlier, that liquid that would have chlorides in it is collected and it is analyzed separately for the chloride content or at least potentially. Then the solid phase is mixed with the extractant.

Q. If I could interrupt you, this is in regards to a mixed waste. What if you just start with a liquid base? Why would you need to leach a liquid phase?

A. Actually, the interesting thing about Method 1312, if you begin with strictly a liquid that has less than .5 percent solids -- and I

apologize to the Commission. We didn't print off all 28, 30, 40 pages, whatever this one was. But if you start with something that has less than .5 percent solids, so essentially a liquid, and you're not dealing with a mixed phase, Method 1312 still requires you to mix that liquid with the acid extractant in their process.

Now, to answer directly your question not related to this method, if you had that liquid could you run Method 300.0? Absolutely. Because the machine, all it knows is that you put a liquid in it and it registered a certain amount of chlorides and that's all the machine knows. So if you start with a liquid, put the liquid in the machine, it gives you a measurement.

Q. Would that measurement be a volumetric measurement?

A. Yes, it's a concentration in mass per volume because when we calibrate the machine originally we take different beakers, if you will. We put a liter of deionized water in each one and estimate what the range of chloride concentration is going to be, and we measure out so many milligrams of chloride in this beaker, more milligrams in this one, more in this one. So we have five milligrams,

ten milligrams, 20 milligrams of chloride per liter. We establish the standards, use the machine then, use the standards to calibrate the machine. So the readings we get from the machine are milligrams of chloride per liter because that's how we established the standards so it's volumetric.

Q. Staying with the differences between soils and pit contents, would you agree that another difference for that is pit contents are contained by a liner?

A. It's my understanding.

Q. Okay. And soil is not contained?

A. Correct.

Q. So we know the bottom of a pit, correct?

A. Yes.

Q. But we don't necessarily know the bottom of the soil; is that correct?

A. Yes.

Q. So if there's a spill on that soil, how would you determine where the bottom is?

A. Let me see if I have your question correct. Are you asking how would you determine to what depth that spill might have an impact?

Q. Yes.

A. That's the point of sampling. Now, you

sample to determine the plume, whether it's horizontal or vertical, to determine what depth or to what extent any of that movement might have occurred. Now -- I'll stop there.

Q. One last question. In regards to the SPLP procedure, this leaching procedure, you stated in response to some earlier question that chloride in soil and chloride in pit contents could potentially both be leached by using SPLP, correct?

A. Correct.

Q. But that the pit content, that the models used in measuring the mobility of those pit contents nears the SPLP method; is that correct?

A. That's correct. Or that's my understanding.

Q. In the models, are you referring to the HELP model?

A. I was not here during all of those, so I can't specify exactly. It's just my understanding that this is the input to the models that were used. The Commission knows what models were used and I will have to defer to that because that's all I was told that this is what is used as inputs to models that were presented before the Commission.

Q. Thank you, Dr. Robinson. I have no

further questions.

A. Thank you.

CHAIRPERSON BAILEY: Mr. Dangler?

CROSS-EXAMINATION

BY MR. DANGLER

Q. Going back to your beginning explanation of the dry sample testing, I may have misheard but I wanted to make sure what I had heard. I thought you had testified that there was a point in that process where it was milligrams per liter?

A. To which method are you referring?

Q. I'm referring to the first, the 300.0 method.

A. For Table 1?

Q. Yes.

A. Yes.

Q. Okay. And I understand the problem that you presented with the test for Table 2 and converting that back to kilograms. Is there a similar problem if you took that measurement, the liter, and translated the kilograms to liters?

A. Again, you are referring to 300.0 for Table 1?

Q. Yes, because in the natural process they hit something that is per liter, would there be a

problem in taking that number rather than the number they converted into, which is per kilograms?

A. I think it might be appropriate if the Commission would allow an example of why this works for Table 1 and Method 300.0 for soils. Because the Commission had asked for a conversion from milligrams per liter to milligrams per kilogram, if that were possible, and now it may seem confusing that Method 300.0 is used both in Table 1 and Table 2 and in different applications. In one case I told you yes, in Table 1 for solids 300.0 can be used and it give us units of milligrams per kilogram. In the other case we are using an extraction before that but we are using 300.0 and getting milligrams per liter. So Dr. Robinson, what's the story? Is it one or is it the other?

So if you allow, let's go back to one of my basic soil classes here and talk about how does that work and why does it work with 300.1 to use a volume conversion to a mass. So let's pull some assumptions. Say I have 20 grams of oven-dried soil. Method 300.0 says I need a ten to one reagent ratio. How much water? Ten times 20, right? So I get 200 grams of reagent water that I'm adding to my dry soil.

Based on the density, specific gravity of water, we know that one gram cubic centimeter of water or one gram is equal at one cubic centimeter of water at 20 degree C. So essentially we get to this point where 20 grams of water or 200 grams of water is 200 milliliters, which is two-tenths of a liter of water.

So we have an extraction ratio of two-tenths of a liter of water to 20 grams of dry soil. Let's say we put this stuff in, we collected the filtrate, we run it through the instrument and we get a number. This is the question that you asked, Mr. Dangler, because I have a number in milligrams per liter. Now what? It's a fair question.

So now what is this: The conversion uses the concentration that I got from my instrument. That extraction ratio, the amount of the volume of reagent water to the oven-dried mass of the soil, and a unit conversion. So I have my number that I got out of my instrument, 15 milligrams per liter of chloride. I have my extracted ratio we looked at earlier. We used 200 grams or ten times as much water as dry soil. It was two-tenths of a liter for 20 grams of soil so I've got a ratio. Then I need a

conversion of how many grams are in a kilogram. So there are 1,000 grams in a kilogram. As I take my students through this, we have to make sure our units play fairly with one another, so just showing with my strikeouts here that liters cancels, grams cancels.

So in the end we end up doing 15 essentially times ten, which is our ratio at the beginning and we get 150 milligrams of chloride per kilogram of dried soil. And then because we are a little lazy we just say that's 150 milligrams per kilogram and we leave out the dry soil part.

But that's why in Method 300.0 for solids in Table 1 we can go from an intermediate reading that the instrument gives us of milligrams per liter and convert that to milligrams per kilogram of dry material, because again, going back to the very beginning, we know how much oven-dried soil we started with.

Q. Right. And the reason you can't do this method for the other is because you didn't start out with dry soil?

A. That's right.

Q. But that's not exactly my question.

A. Okay.

Q. But I appreciate that explanation. My question is, in this earlier methodology at some point it was in milligrams per liter.

A. Correct.

Q. So if we are trying to compare, if the mission is to compare apples to apples and for some reason the Commission would like to see all the numbers in the same format, what would be wrong with using the per liter number that you would normally get out of the testing process in order to compare the tables and make them equivalent -- and I'm sure there may be a problem with this. It just occurred to me as you were saying this that we have been focusing on trying to make it into kilograms. Is there an equivalent problem in taking this first testing and changing it into liters so the Commission could have apples to apples?

A. It violates standard laboratory procedures for soil testing, and that would be my primary objection to that. And then because different extraction processes are used, the numbers still aren't going to be apples to apples. You are still going to be apples to oranges because in one case you used reagent water and another case you used a strong acid. Even though there's an intermediate

step of milligrams per kilogram there, it's not an equal comparison of the methods to one another because the extraction material, the extractant is different, water versus acid, so you are not going to have the same piece of information. You are not going to be able to interpret those correctly. Again, the other point is it violates the standard soil testing laboratory procedures.

Q. So you answered that question and I appreciate it. I have a couple more questions. As I understand what your testimony is -- and I need to summarize it and make sure I'm not lost. I can do pictures in the air which the record won't reflect but we have pit contents and then the surrounding ground around it, correct?

A. Uh-huh.

Q. And what you say is the correct test for the pit contents is a mobility test and the correct test for the surrounding contents is a concentration test. Am I summarizing that correctly?

A. Yes, those are the methods that are proposed.

Q. And there are some assumptions that you revealed on cross-examination that I just want to make sure I understand. One of those assumptions is

there's a separation between the pit content and the soil which leads to the continuing differentiation between pit contents and soil, and that makes you comfortable with the different testing methodologies?

A. Yes.

Q. Is that fair to say?

A. That's fair to say.

Q. So just for the hypothetical of it, if we wanted to know the concentrations of the materials inside the pit for health or safety reasons or maybe we wanted to know what the failsafe position was if there was no liner and things fell apart, as regulators that might be an interesting question. Does that make sense?

A. Yes.

Q. And if that's what is wanted by the Commission, is there a scientifically defensible method of telling us what the concentration of chlorides is in the pit contents? Is there a test that we would order and have people do in order to get equivalent numbers for the purpose of establishing numerical values that we could be comfortable with as a society?

A. So let me break that into two pieces.

Q. That's fair.

A. The first question, is there a method that you could use to determine the concentration of chlorides in the pit waste. And the answer is yes, 300.0 would readily give you the concentration of chlorides in the pit wastes.

Now, the second part of that, which I think is the more important part, you're still not comparing apples to apples if you look at the concentration of pit wastes, of chlorides in pit wastes to the concentration of chlorides in soil materials, in the soil surrounding that. Yes, the number is an apples to apples comparison because you have used the same method, used the same procedure, so you get a number. But the interpretation of that number is what becomes problematic.

What is the number of chlorides concentration in that pit that is the target? To my knowledge -- I didn't sit through all the hearings and procedures so I don't know -- but to my knowledge, none of the materials presented to the Commission addressed and used the absolute concentration of chlorides in the pit.

Now, the other point -- again, your assumption is what if it all fell apart. Is that

correct? If the pit liner failed?

Q. From a regulatory point of view you might want to take the worst case scenario when you set your standards and your regulations. You might want to not have the assumptions that it's all functioning.

A. In answering that worst case scenario, the Method SPLP is a worst case scenario in terms of the amount or the potential of mobility for salts to move, for chloride to use. Because it uses a strong acid which dissolves more chlorides than would be dissolved in water, and so it shows you what essentially again the maximum potential mobility of chlorides in those pit contents are. If you use 300.0 and just the concentration of the absolute concentration of the pit contents, you wouldn't get the same reading. So to understand mobility and the worst case scenario, use an acid leachate, and that's what 1312 does.

Q. Okay. In terms of setting the correct levels, the correct numbers, why wouldn't the concentration of chlorides in the pit waste be of interest to a regulatory body?

A. Well, I'm not a regulatory body personally, and I think the regulatory bodies have

been relying on other regulatory agencies like the EPA to define for them what are the issues of. Concern. How should we approach these issues? And in so doing have relied on the EPA methodologies that they have defined as those that the regulatory agencies would choose to set their limits.

The EPA methods for this case have been -- and Dr. Neeper identified that there's some concern for chloride's mobility and so with mobility the concern is water, and so EPA water quality methods are those that are used and defined for setting these limits, and so I think it's the fact that regulatory agencies depend on other regulatory agencies that define what are the limits that we want to use for concern? What are the methods that we want to use to define those limits.

Again, my understanding is there's a fairly large body of research that uses the output of Method 1312 in looking at the potential effects on water quality, and that same body of research does not exist, my understanding, for just the absolute value of the concentration.

Q. But if you had to, could you give the Commission approximate numbers in kilograms for what the current standards are in Table 2? Could you do

that translation? And it goes back to the margin of error question that you did answer once before but I'm going to ask it in a more general term. What would be your comfort level with making that translation?

A. Not today I could not. I don't have any comfort level in trying to give you a number or a translation today.

Q. But it could be done?

A. Limits could conceivably be determined, but there would be a need for a whole lot more data, as you like. There would be a need for a great deal more data to be collected to interpret those, because at this point we don't know what the absolute concentration of the pits are. All the data that the Commission has collected to date that the producers have had to file does not report the absolute concentration of the pit contents. The dry weights, because of the methodology that's been recommended, the dry weights are not there to be able to translate those no into mass units, milligrams per kilogram.

So there are many variables that would have to be answered, many questions that have to be asked, in order to approach changing the units for

chlorides in Table 2 to mass units to reflect a consistent unit of measurement all the way across.

Q. I still have a couple more questions. So I understand Table 2 to have a set measurement in liters, milligrams per liter?

A. Correct.

Q. And above that you have to take the contents out and below that you get to keep them there.

A. Right.

Q. What I'm saying is if you just take that number and translated it into kilograms -- you explained that you didn't like the 20 times. Just that number, not the data out there and everything else, but just that number, and then you assign to it what I am assuming will be some margin of error, and I'm guessing that that's where you may need the data in order to determine your margin of error; am I correct?

A. That really cannot be done on a general basis. Because of the variability that exists, you really need site-specific data, and having not seen the site-specific data on these -- again, what's in those pits? Well, there's a variety of things in those pits, and the characteristics are dramatically

different. Even when you are stabilizing and mixing it with three to one native soil, well, the soils in the northwest aren't necessarily like the soils in the southeast. And even the soils in one part of the northwest might not be like the soils two miles away.

So the site-specific nature of these data are such that without a good bit more site-specific data I couldn't even assign a reasonable estimate of a margin of error. If I did, I would be guilty of things that I would have flunked my students for in my stats class. So I can't make those kinds of things without some data to support it and to give me a foundation for that kind of a conversion.

Q. Do you find it somewhat ironic that you are reluctant to convert numbers without site-specific data and yet the entire hearing is about setting numbers without that same site-specific data?

A. You are asking for a number conversion for a specific table that has a specific method already done or a suite of methods that are already defined, and the suite of those methods that are defined have readily available numbers, readily available standard lab procedure outputs. And what you are

asking me to do is to introduce a lot of unknowns and try to take that number that is standardized according to lab procedures and divine some sort of a conversion and I don't find it -- I'm a soil science, so I don't find that at all incongruous that I am unwilling to give you a conversion because I understand what's in soil, I understand how soil works and I understand how these methods work.

And, you know, there's a point where when you look at something you say this is not equal to this. I can't get from here to here. And with the data provided in Method 1312, because of the way it works, you can't get from Point A to Point B. The data is not available. And trying to divine some sort of conversion without understanding all the variability that exists out there and all the unknowns, my professional opinion is that's misguided because it violates standard laboratory procedures, it violates some of the things again that as a professor I would have said, "This doesn't work" to my grad students working on a thesis, "You can't do this." And so it violates standard lab procedures and violates some of the basic principles of science that go into this foundation for the methods and how the methods work.

Q. So you testified about the methods and that they work and they have been used and other regulatory agencies used these methods, and I think it's fair to ask then or reveal my incredible stupidity because I do not know the answer. The number that is currently set for milligrams per liter, is that a number replicated in other regulatory agencies? Is that a number -- where does the number come from, if you know?

A. I do not know the source of that number and I have not reviewed -- I could tell you maybe what the acceptable chloride contents are in drinking water but that really is not relevant to pit contents. So I do not know the source of that number.

Q. So let me be clear. When you say we may rely on all this methodology and the history of this test, that does not necessarily refer to the actual number that's been proposed in the data?

A. That is correct. However, if you changed the method you still wouldn't have the ability to interpret the number.

Q. You answered my questions. I appreciate it. Thank you, Madam Chair.

CHAIRPERSON BAILEY: Mr. Fort? Do you

have questions?

MR. FORT: No, ma'am.

CHAIRPERSON BAILEY: Dr. Bartlit? Do you have questions?

DR. BARTLIT: No, ma'am.

CHAIRPERSON BAILEY: Mr. Bruce? Is he here?

MR. SMITH: Just to make it clear, you offered the opportunity to cross to Mr. Fort, and I think he has already said he didn't file a notice with the Commission and I think that would foreclose him from the opportunity to cross-examine.

CHAIRPERSON BAILEY: Okay. Then it's time for the commissioners to ask their questions. Commissioner Balch?

DR. BALCH: Good afternoon, Dr. Robinson.

THE WITNESS: Good afternoon.

DR. BALCH: If I may say, Clay is an appropriate first name for a soil scientist.

THE WITNESS: Some have noted my alter ego is Dr. Dirt and my license plate on my plate is Dr. Dirt. You can go doctordirt.org and find fun activities with soil for your kids.

DR. BALCH: I will keep that in mind. I'm going to probably be asking you the same question,

although most of them will be asked so that I can then ask my follow-ups so you will have to be patient with that.

THE WITNESS: Okay.

DR. BALCH: Also I have a background in physics, so I apologize, I am the one who recommended we move to one table because I wanted to lump everything into one single homogeneous mass.

The reason for that confusion perhaps is the mixing. You close the pit, you mix it three to one with soil. That could be native or it could have come somewhere else. You don't know where. You mix it with the dry pit contents so you don't really have free liquids when you are doing the mixing, or you shouldn't anyway. It's supposed to pass the paint filter test before you mix the up to three to one soil in with it. So to my mind, I'm thinking that's essentially a soil with some contamination in it.

THE WITNESS: Okay.

DR. BALCH: That was the motivation for trying to simplify the tables down to one and have a similar standard for a contaminant that's free on the surface of the soil versus a contaminant that's mixed in with what I presume to be a soil as well.

So I think from your direct and cross-examination you are saying that pit contents mixed with soil is not really soil.

THE WITNESS: They certainly would share some similar characteristics, physical characteristics. The chemical characteristics are going to be much different because of the nature of the pit contents, and even some of the physical characteristics may be much different because of the nature of the drilling fluids used.

DR. BALCH: So what we are interested in here, and the models and other testimony that was given before were primarily due to transport by infiltration. So you have some fluid landing on the surface of the area above the waste or the pit. That water would percolate down, pick up salts and transport them down towards a water table or something like that. So the concern that we really had is not necessarily with the pit contents, I think you correctly stated, but with what comes out the bottom of the pit contents.

I believe you answered Mr. Dangler's question by saying that you could not specify a ratio of salt in a pit waste versus what comes out of the infiltration.

THE WITNESS: I think that's a correct understanding of what I said.

DR. BALCH: And further, and I'm trying to clarify this in my head, the acid used in the 1312 testing would give you a worst case scenario. That would be the maximum amount of chloride that could leach out of the material given an amount of water falling through.

THE WITNESS: That's correct. It would be more than water could leach out.

DR. BALCH: Do you have a feel for how much more? Just in a generic sense, general soil?

THE WITNESS: Soils in this area -- so I will do it regionally. Semiarid and all the state of New Mexico is either semiarid or arid in terms of soil characterizations and classifications. Most of the state is a desert, right? That's not true with some of the mountains. Some of the mountains are not semiarid and arid. That's why you have nice trees growing up there.

So these soils in arid and semiarid regions are alkalin, and many of them are calcareous. The pH is high and they have a lot of calcium carbon compounds like caliche or gypsum in them. Calcium is a strong cation. Chloride is an

anion. When you put them in the room together they like to play with each other and hold on to each other pretty strongly, a little more strongly than water can generally dissolve. Sodium chloride is very soluble and moves readily. Calcium chloride is not as soluble; it does not move as readily.

Now, if you have mixed your pit contents with native soils or even sub soils that have this high amount of calcium, the calcium and the chloride form some precipitants, they form some salts that are sparingly soluble. They are soluble but they're not highly soluble. You mix it in water, some of those will come off but not all of them. You add the acid extractant, all of those guys split up. And there are other cations that are present that would match up with the chlorides as well. You mix it with water and not all of those come apart. You mix it with a strong acid, all the of those come out.

So again, there's so many different varieties of soils. If you have a sand, that's not going to be a big difference because sand doesn't have a buffering capacity to hold much of the calcium or the chloride. You mix it with a native soil that has a lot of clay in it or caliche and the

number skyrockets. So it could be about the same if you are dealing with something that's pretty sandy to several -- a few orders of magnitude if you are dealing with that clay. Because if you just run water through that, it's got a high calcium carbonate; caliche with clays, you don't get a whole lot chlorides coming out the bottom because the calcium his holding on to it. You mix that stuff with a strong acid, all of that dissolves.

And we have some soils in this area that would have 50,000 parts per million calcium. So you match that up, that will hold on to approximately 50,000 parts per million chlorides, one-to-one roughly -- not exactly, because -- pretty close. Calcium is 40 and chloride is 35, so approximately one-to-one.

So you run water, reagent water through that, you don't get a lot of chloride coming out the bottom. You put it in a strong acid, all of that comes out essentially. So you could have again several orders of magnitude difference in the amount of chloride that comes out the bottom using water or using acid.

DR. BALCH: All right. So perhaps if you would be willing to say conservative to what level?

Just use a descriptive adjective and not give a number to it? Slightly? Very? Somewhat? Conservative as far as the estimate of mobile chloride using the acid test in typical New Mexico soil with pit contents mixed in.

THE WITNESS: If you use the acid test, 1312, it is an extremely conservative test because it dramatically overestimates the amount of chloride that's going to be available to leach under rainfall.

DR. BALCH: Now, clay, I believe that most of the pit waste that would be buried is going to be non-hydrocarbon drilling fluid because there's hydrocarbon limits to what can be buried. That's going to most likely have at least some component of bentonite clays added to it, so I'm very curious about the same kind of discussion we just made about the native soils in regards to a clay-rich mixed contaminant and soil material.

THE WITNESS: Go back to this idea. Those clays that are used in drilling muds have a tremendous amount of surface area, both external and internal because you can have access to those layers of the clay in between those. So again, as a frame of reference, if you took 100 grams, that's about a

little less than a quarter of a pound of sand, and you could take every one of those particles and lay it out flat, it might have enough surface area to cover about half of this desk, this table, because sands are big particles. They don't have much space on them.

If you took the silt, the next smallest size particles, and you spread them out, laid them out flat, 100 grams of silt, you might have enough to cover roughly this room in terms of surface area.

If you take what would be kind of a standard clay material, it might cover a basketball court if you could take every one of those particles and lay it out.

But if you take one of those drilling muds, you are getting close to a football field of surface area, and every bit of that surface area in these kinds of clays is charged and it has the ability to hold on to cations like calcium, like potassium, like magnesium, and those guys are charged. So it's a little bit like taking magnets and sticking them together. This one holds on to this one but then something else can get stuck out here.

So you have a negatively charged clay

particle and a positively charged cation and a negatively charged ion and you start building these out. So a lot of the chloride can be held and attached to those particles.

DR. BALCH: Free chloride? And if you apply infiltrated water to that?

THE WITNESS: And I'm getting to that point. So that determines, at least to a degree, some of the solubility of these chlorides that are present in that soil because some of them are not going to be free when you add water because they are adsorbed. They are being held too tightly for the water to let go of them because of the electrical double layer, the electrical charges that are in place.

So some of those are not going to be released when you add water because they are bound, physically bound to the structure of the soil and the cations that are present.

DR. BALCH: Which is why when you kiln-dry clay you have to have much higher temperatures.

THE WITNESS: Yes. Again, you get kind of the same thing though when you add distilled water versus some of these -- versus the extractant, the acid extractant. Distilled water, deionized water,

no anions or cations in it until you mix it with the soil or the media. Your acid extractant is 60 percent sulfuric, 40 percent nitric acid. That means you have sulphate, which is a very strong anion, highly active, with two negative charges. If I'm losing everybody else, I'm sorry.

DR. BALCH: I'm following you. That's all that's important.

THE WITNESS: We are talking science here. So nitrate is an anion, reactive, one negative charge. When you put such a strong concentration of anions together in the same place, they become the bullies in the room and they kick all the chlorides off that were being held to those cations and soil particles. They kick them all off and they take their place. So now those, the chlorides, are out in the soil solution and they are going to leach. Because the nitrates and the sulphates in the acid material kicked them off the sides.

So in essence it's a similar result as to what happened when you used that with the high calcium carbonate soil. You will get again probably a few orders of -- at least a multiples more chloride that comes off with the acid and maybe as much as ten times as much or more, and that's kind

of a ballpark, but you are going to get significantly more chloride that comes off even of those pit contents with drilling mud in them with acid than you would with water.

So again, that 1312 becomes an extremely conservative test because it vastly overestimates the amount of chloride that's really going to move in the solution.

DR. BALCH: So the chlorides that are in the clay components of the mixed soil material are largely immobile for water?

THE WITNESS: Many of them, yeah. Chlorides are very seldom present or anions are very seldom present in soil without cations to match up with them. So it's the combination of the cations held to the soil and the anions held to the cations that causes them to become less mobile especially in soil with a small amount of clay. Doesn't say they are not mobile but less mobile with the drilling muds than with the standard soil, if we use whatever standard soil is.

DR. BALCH: All right. So going back to what's coming out the bottom under a normal infiltration or even a worst case infiltration scenario, the 300.0 test, where they put, I think

you said 20 times or ten times the amount of water --

THE WITNESS: Ten times.

DR. BALCH: -- through by weight, and that's the sample that you're looking at and that's considered to be a reasonable estimate of ultimate maximum infiltration response?

THE WITNESS: No, that has nothing to do actually with precipitation or characteristics. That's just an extraction technique. And the purpose of that ultimately is to make sure you have enough stuff that comes out the bottom to be able to run through your instrument and do the analysis.

DR. BALCH: So it's overkill?

THE WITNESS: It's overkill.

DR. BALCH: General curiosity. I looked at density of soils but what's the mass of a liter of soil?

THE WITNESS: We don't usually talk about it in liters. The traditional units for defining density of soil, it ranges depending on the texture from about 1.1 grams per cubic centimeter, and that's a dry soil. Soil scientists always talk about dry stuff. Engineers will do other weird stuff with that and make it wet because they want to

know how much it will weigh when they haul it away, but soil scientists are concerned about that dry weight so 1.1 up to a sand it might be about 1.6 grams per cubic centimeter or megagrams per cubic meter and you have no idea what that means so let me try to find one that's more appropriate.

If you have a cubic foot of soil, so that's going to weigh 75 to about 100 pounds and that's the dry bulk density of the soil. So if you have a foot of soil, one foot by one foot by one foot, somewhere between about 70 and 100 pounds is approximately what that would weigh before you add any water to it. In that same rough amount of soil, probably depending on the soil, it will take two to four inches of rainfall to get that amount of soil from really dry to wet.

DR. BALCH: I think that answered my question.

CHAIRPERSON BAILEY: Do you have many more?

DR. BALCH: Just a couple more. I'm pretty close here. I believe that you replied to Mr. Jantz that you couldn't really use Method 300.0 for the mixed waste appropriately in a regulatory sense. You would be violating laboratory standards

set by EPA.

THE WITNESS: The EPA laboratory standards are about water quality. So if your interest is in water quality, that's the process you would use. If you wanted to know the absolute concentration, you could use 300.0. But again, that's not as conservative as the Method 1312 because 300.0 just uses water so it's a less conservative method than 1312 is.

DR. BALCH: Let's say we have a worst case scenario using 1312. We have one liter of 2500 milligrams per liter chloride water come out of the bottom of the pit waste. What's the impact of that on the soil? What kind of concentration will you have?

THE WITNESS: How much?

DR. BALCH: 2500 milligrams per liter which is the proposed limit in the regulation.

THE WITNESS: You have 2500 milligrams per liter that comes out the bottom, what is the impact on the soil?

DR. BALCH: You have a liter of that. What's the impact of that on a kilogram of soil? What's the concentration?

THE WITNESS: Hang on just a minute. I

have to think about my math for a moment.

DR. BALCH: We get to ask questions that are harder than the lawyers.

THE WITNESS: That's okay. The impact on one kilogram of soil is going to be -- on the concentration of chloride in that one kilogram of soil is fairly insignificant, right? Because you have put 2500 milligrams per liter or 25,000 milligrams per liter in that one kilogram of soil underneath the pit. But in reality, you are dealing with a much larger volume of soil and that once you get it there, if there's any liquid at all you will have a little bit of dispersion, and so that effect begins to be ameliorated a little bit as the chlorides begin to move out a little bit in all directions.

And I think the real issue there, though, other than the effect on the one kilogram of soil is a practical issue. If that one kilogram of soil that's been affected by 25,000 milligrams per liter is below a pit that's been removed and whatever, if it was above that, it's been remediated and removed and that's not an issue. So if you are just underneath the limit, you've got 24,999, we can leave it there. What do we do? We cover it with

four feet of material and put something on the top to revegetate. Background level of the topsoil or one foot.

Now you have something that's 25,000 milligrams per liter that's four feet below the surface. It's not going to have any -- doesn't really have any impact on plant growth because you are planting the vegetation on something that's four feet away. The number of times in the current climate that we are going to have precipitation to get enough water through the four feet of overburden down to where the 25,000 milligrams per liter is and cause it to move down in this current climate where the soils spend nine months of their year almost air dry, it's going to have very little environmental impact when you cover it with four feet of material.

DR. BALCH: Let me phrase that just a little bit differently. A lot of the direct testimony in this case has had to do with the fate of chlorides that get below the pit waste. So there's various models or scientific interpretations of what happens and how much comes out the bottom, and then what comes out the bottom is then applied to a couple of different modeling techniques to demonstrate its transport. So we are maybe a little

less worried about upward movement than downward movement.

So I think my better question might be how many liters of the 2500 milligrams of fluid can fit into that kilogram of the actual soil, real dirt, not the mixed soil. So it's going to be a sub soil.

THE WITNESS: There are several components to trying to answer that question, and a lot of assumptions that would have to go in. I'm willing to do the math. It will take a long time though. But conceptually, let me try to address the question.

Page 41, the tables. Say 20,000 is the limit for a water table that's greater than 100 feet from the surface. That's the limit I see in Table 1. That means between the bottom of the pit and the surface of a water table there's approximately -- say 96 feet of material, right? We buried it and put four feet on top of it. We will use the easy thing, 100 feet.

There's 100 feet of soil material above the water table. You have got a pit and that material just below it, tested it -- that was 20,000, so say we will put it at 20,000 milligrams per liter. If you have the water to drive it down,

and some of the models that I looked at made assumptions that for this climate are not appropriate, and I'm not here to testify about models but I did look at some of them. Some of them assume that water is going to move down so they actually had the negative soil water contents in the surface in order to allow enough water to fill the model to make stuff go down.

So until we have the next ice age and this is a tropical forest, we are not likely to see much availability of water without preferential flow to force anything down. And even if we have that, we have 100 foot of material through which this 25,000 or 20,000 milligrams per liter chloride is going to be dispersed, so the concentration is going to drop as it goes down.

Then on top of that, the chemistry of the soil. They have got calcium, potassium, magnesium and sodium, so some of that chloride is going to precipitate, and I don't know that any of the models, at least the ones that I briefly reviewed, addressed the chemistry of what happens in the soil as those chlorides go down. Because some of them are going to precipitate.

DR. BALCH: I am really more asking your

opinion as a soil scientist.

CHAIRPERSON BAILEY: Let's hear that after a 15-minute break.

(Note: The hearing stood in recess at 2:51 to 3:00.)

CHAIRPERSON BAILEY: I believe Commissioner Balch, you were questioning the witness.

DR. BALCH: I was. I have to admit I got a little carried away because I always like to interrogate bright minds under oath.

THE WITNESS: Thank you. I will take that as a compliment. I wanted to clarify something.

DR. BALCH: That's okay. Actually, I just have two quick questions really. In your estimation, 1312 is a very conservative way to estimate the potential mobile chlorides and pit contents?

THE WITNESS: It is.

DR. BALCH: Second question, and it eluded me.

THE WITNESS: While you are thinking, I think I misspoke because we were bounced between Table 1 and Table 2. In Table 2 on Page 41 of the NMOGA Exhibit 20 we have 2500 milligrams per liter

and that's what you were talking about coming out as the limit. That would be 25 to 50 feet below a trench or pit. I did the math for you just for a moment so if you have that one cubic foot of soil and you put 2500 milligrams per kilogram of chloride in it, in that one cubic foot of soil when you dispersed it, the concentration would only be 62 milligrams per kilogram.

DR. BALCH: My other question has to do with the number of tables. In your opinion is there any way to treat this as one table or are we really stuck with the dual units systems? We can't make it Table 1 that only deals with milligrams per liter in chlorides and we can't make a Table 2 that deals with milligrams per kilogram for chlorides.

THE WITNESS: That's correct. Given the testing methods that are here and given the purposes I think that the Commission has, and again, I'm putting some motives on you, I don't think that you can feasibly combine these tables. It seems to me they have a different purpose and the Commission has a different purpose.

DR. BALCH: So if you went to EPA and said, "How do I test this material, which is a mixed pit waste with soil," they would tell you to go to

1312?

THE WITNESS: If the concern is water quality.

DR. BALCH: Thank you. That's all my questions.

COMMISSIONER BLOOM: Good afternoon. Just in terms of background, having a standard expressed as milligrams per liter, what does that tell us about -- are you saying that's mobility? What more do we know about mobility because it's expressed in milligrams per liter?

THE WITNESS: Again, this is a leach test, and that's the concept of a leach test is you are pouring something in, in this case a strong acid, and it's defining essentially the upwards bounds of how much of the chloride in the pit contents could be mobile under the worst circumstances.

COMMISSIONER BLOOM: Okay. I think that's my last question. I was really interested in why we needed a separate test but Dr. Balch went into that with some degree of depth, so thank you.

CHAIRPERSON BAILEY: I have a couple of questions. On Page 34 of NMOGA Exhibit No. 20, the reference was made to the use of Method EPA SW-846 Method 1312. That was brought out or other EPA

leaching procedures. But I would like for you to go to the page just before that that indicates that that particular test had to do with the on-site trench burial of waste. The Table 2 as presented on Page 41 makes no distinction between on-site trench burials and in-place burials, so if you'll go to Page 32, as Ms. Gerholt pointed out, the third line from the bottom, the analysis that was referenced for in-place burials was 300.1. I would like to hear one succinct answer as to why we should use the leach system that's referenced in the trench burials as opposed to the 300 method that's referenced in the in-site in-place burials.

THE WITNESS: I'll try to be succinct in two parts. The reference on Page 32 to Method 300.1, that is not the correct method to use.

CHAIRPERSON BAILEY: I understand that.

THE WITNESS: So that is inappropriate.

CHAIRPERSON BAILEY: But the appropriate one is 300.0, correct?

THE WITNESS: Yes, 300.0 would work. Now, let me also call your attention to the follow-ups, and I'm not addressing limits for the sake of limits but to note that in those two different methods that were proposed for in-place burial and for trench

burial, when they use different methods they also used different limits, and the limit with the 1312 which is a more conservative method, they showed a higher chloride limit because again, it understands that the acid is going to dissolve more of the chloride.

It's the Commission's responsibility, as I understand it, to decide whether you have one or two tables. As long as you have a different purpose for those tables it's my professional opinion that you need two, because they have a different purpose and you are measuring different materials. That's about as succinct as I can get.

CHAIRPERSON BAILEY: We have heard quite a bit about EPA SW-846 followed by Method 1312 which is SPLP. There was a touch of 8015M and 8021B but are there other methods -- is there an alternative to what you have presented today for measurement of chlorides that would give us a the milligrams per kilogram?

THE WITNESS: Certainly there are. Again, if the Commission chose, 300.0 could be used to determine a unit in milligrams per kilogram of chlorides. It is a less conservative approach, and again, the leaching models that the Commission has

seen, they were using -- they are based on those worst case scenario in Method 1312 SPLP. Their laboratories have a variety of methods that could be used to determine chlorides and report the results in milligrams per kilogram, so that's the simple answer to that because methods are just extraction and analysis. So yes, there are methods that would do an extraction, do the analysis and present a result of chloride in milligrams per kilogram.

If the Commission's intent is to have the most conservative approach, then those standard -- the Method 1312 is more appropriate and it has -- you know, it gives milligrams per liter. But I've got a methods book over there that has several alternative methods for determining chlorides.

CHAIRPERSON BAILEY: Yes, because we have been given a limited number and I'm curious if there aren't other appropriate methods out there in the universe.

THE WITNESS: And essentially, all those methods use a similar process if they are just measuring content of chlorides. They are going to use either reagent water or a weak -- some sort of a weak salt solution to get the chloride out and then I'm thinking maybe a sodium acetate or something, so

there would be some sort of a weak extractant that they would use to get the chlorides out and measure them using some sort of a technique like the IC, the ion chromatography, but there are a myriad of things that can detect what's there once you get it into a filtrate.

CHAIRPERSON BAILEY: Pull out your calculator. I like to work backwards.

THE WITNESS: Okay.

CHAIRPERSON BAILEY: We are given this 2500 milligrams per liter for a limit on chloride where the depth to unconfined groundwater is less than 10,000 milligrams per liter TDS.

THE WITNESS: Right.

CHAIRPERSON BAILEY: The 2500 is a product of analysis by SW-846 and Method 1312?

THE WITNESS: Correct.

CHAIRPERSON BAILEY: Both of which have dilution factors?

THE WITNESS: With Method 300.0 after 1312 there's no further dilution.

CHAIRPERSON BAILEY: Even though the SPLP analysis --

THE WITNESS: The dilution is in the SPLP. There's no further dilution when you take the

extract from SPLP 1312 and put it into 300.0. It does not do another dilution.

CHAIRPERSON BAILEY: So according to SPLP we have a 20 times dilution?

THE WITNESS: Twenty to one amount of acid extractant to solid phase.

CHAIRPERSON BAILEY: So working backwards, if we have a 20 times dilution and we arrive at 2500, then we are starting off with 50,000 milligrams per liter?

THE WITNESS: In what is defined there -- and yes, that math is correct. Interpreting that, even within the context of Method 1312 is sometimes a little fuzzy, but yes. That's correct.

CHAIRPERSON BAILEY: So given 50,000 milligrams per liter, that's a result of mixing three to one of the soil and waste materials, so that would actually be 200,000 prior to stabilization with soils and dilution during the extraction analysis.

THE WITNESS: Potentially.

CHAIRPERSON BAILEY: Okay. Just so I understand.

THE WITNESS: Because what you are dealing with are the contents of a pit and the drilling

materials that are coming out of that pit.

CHAIRPERSON BAILEY: 200,000 milligrams per liter at 25 to 50 feet below the trench is what's recommended there.

THE WITNESS: But that's not how you are leaving the material.

CHAIRPERSON BAILEY: No, but that's what the original --

THE WITNESS: That might be what's in the pit before you mix it with the three to one ratio to dilute it and change the amount -- the relative amount there by adding more soil materials to it.

CHAIRPERSON BAILEY: Then I would like your help in interpreting something. NMOGA's Exhibit 20 has a definition of low chloride fluids on Page 2 of Exhibit 20. And the definition reads, "Low chloride fluids means fluids that contain less than 15,000 milligrams per liter of chlorides determined by analysis or process knowledge." Without knowing what method is used for analysis to arrive at 15,000 milligrams per liter, that could originally be a much different number. Is that your interpretation?

THE WITNESS: Well, you're looking at whatever that section is, 19.15.17.7I. The key is

there low chloride fluids. The things that you have been talking about in the pit and the dilutions and the mixing soil, those are not fluids. If you start with a fluid you can run that fluid directly through a 300.0 and you get an answer without any kind of dilutions.

Now, the other standard lab practice with things is if I've got too much, my solution is too hot. My instrument can't read it. I dilute it, yes, until I can read it, but I keep track of all the dilutions. When I'm done, I back-calculate to present the result relative to the original volume that I had.

So the only place that that seems to -- you know, the Method 1312 is the one where it's a little fuzzy. But in this case where it says low chloride fluids, any lab result that you get on the fluid that you submit to them, the result is going to be reported relative to the original volume so they are not going to dilute it two times and say, oh, well -- if you start with 20,000 and they dilute it twice and they say well, you've only got 5,000 milligrams per liter. They are not going to do that. They are going to go back to the original volume.

So that result is not going to be dependent -- in low chloride fluids, that is not dependent upon the method because the laboratory standards require them to report that in the appropriate units relative to, in something like this, the original volume that you got. A lab that didn't do that would be in danger of losing their certification.

CHAIRPERSON BAILEY: I just needed your opinion on this so it would be clear on the record that this did not require an analysis method.

THE WITNESS: If you wanted to define an analysis method, 300.0 or other approved would be appropriate.

CHAIRPERSON BAILEY: Those are all the questions I have. Do you have redirect?

MR. FELDEWERT: Just a few points.

REDIRECT EXAMINATION

BY MR. FELDEWERT

Q. Would you go to -- you and Dr. Neeper had a discussion and I think it was on Page 3 of Dr. Neeper's Exhibit 6. I think he invited you to explain the error of the 20 to one ratio that you described as shown on this exhibit, correct?

A. Yes.

Q. I think Mr. Dangler had a similar question in that he was trying to get to some kind of a ratio of milligrams per kilogram as compared to milligrams per liter. Now, if I understood you correctly, or let me ask you, is the error really in trying to do a ratio of this nature? I mean, are there just simply too many variables to do this kind of a ratio with any certainty?

A. The amount of uncertainty in the physical properties of the solid waste when it has not been dried and you don't know the nature of those physical characteristics is what creates all the uncertainty, and it's why I, as a practicing soil scientist, would not have any confidence or desire to try to give you a conversion factor to go from milligrams per liter to milligrams per kilogram.

Q. By the same token, neither would a lab, correct?

A. Neither would a lab.

Q. I'm looking at Page 41, NMOGA's Exhibit 20. And there has been not with you, but by others, extensive testimony in prior hearings on the effects of the proposed limits on the environment and public health and safety. My question to you is, if we begin to change -- given the EPA testing methods

that were identified in association with these numbers when they were proposed and discussed, if we start to try to change those levels with some hypothetical conversions, milligrams per liter to milligrams per kilogram, would you be concerned that we would be getting away from the testimony that supported these limits in the tables?

A. I would, because my understanding, particularly for Table 2, is that the chloride -- testimony associated with chlorides and leaching has used milligrams per liter, so moving away from that would be moving away from the testimony the Commission has heard.

Q. Now, you are aware, are you not, Dr. Robinson, that when these tables were initially proposed back in September of 2011 that the EPA SW-846 Method 1312 was part of the method for that table from the beginning, correct?

A. Correct.

Q. And it was contained within a footnote?

A. Yes.

Q. And what NMOGA has done is just taken that footnote and put it directly into the Method column to make it very clear that that applies?

A. Correct.

Q. And with respect to the SW-846 Method 1312, this is not a method that you came up with, it's not a method that NMOGA came up with. This is the EPA method?

A. Correct.

Q. And as we saw, for example, if we look at Page 34 of NMOGA Exhibit 20 that Commissioner Bailey took you to, when dealing under the current rule with on-site trench burial and looking at Subparagraph C, the Division itself under the current rule couples for chlorides, EPA Method SW-846 Method 1312 along with EPA Method 300.1, correct?

A. Yes.

Q. And when you look at that page and do that, the Division does it under the current rule, the result is milligrams per liter, correct?

A. Correct.

Q. And we don't know why, but in other aspects of the rule, for example, over on Page 33, if you look at Subparagraph B on Page 33, you will see for chlorides a measurement of simply milligrams per kilogram, right?

A. Correct.

Q. Using EPA Method 300.1 but it's not

coupled with any kind of a leaching procedure like SW-846 or Method 1312?

A. Correct.

Q. All right. So in essence what NMOGA has done here is taken the testing methods that the Division already acknowledges and accepted for these types of waste, in particular the trench burial being discussed in Table 2, and put them into the tables, correct? This is not something they just made up?

A. That's correct.

Q. And no one else has proposed any other testing method for dealing with these wastes that you are aware of?

A. Not that I'm aware of.

Q. And the only change that NMOGA has proposed to the testing methods that are utilized in the rule is to move from 300.1 to 300.0 and you testified why.

A. Yes.

Q. That's all the questions I have. Thank you?

CHAIRPERSON BAILEY: You may be excused. Do you have any other witnesses?

MR. FELDEWERT: I do not. This is the

witness to address the subjects that we understood would be at issue here today.

CHAIRPERSON BAILEY: Do you rest your case?

MR. FELDEWERT: We do.

CHAIRPERSON BAILEY: Mr. Jantz, do you have witnesses that can testify to the scope of what is allowed?

MR. JANTZ: If it's okay with the Commission, again, Dr. Neeper and I propose that Dr. Neeper testify before OGAP.

CHAIRPERSON BAILEY: Dr. Neeper, you are frowning.

DR. NEEPER: I might have heard you wrong. I wasn't testifying for OGAP.

MR. JANTZ: Before.

CHAIRPERSON BAILEY: I had the same problem that I didn't hear it correctly.

DR. DONALD NEEPER

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

DR. NEEPER: Madam Chairman, members of the Commission, I am Donald Neeper. I am speaking on behalf of New Mexico Citizens for Clean Air and Water. A notarized certificate authorizing both

myself and Dr. Bartlit to speak on behalf of the organization was filed as Exhibit 1 with the prehearing statement for these combined cases.

Although I have been qualified in these combined cases and in prior cases as an expert in soil physics, I will review a portion of my qualifications today because I did not previously dwell on my experience that I think applies directly to today's discussion. And the discussion really focuses on the limits to certain contaminants that may be abandoned on the soil or in burial units or the methods for measuring those units. I will at this point ask Dr. Bartlit to put at the back of the room copies of the prehearing statement and the attendant exhibits. They are in my briefcase in a manila folder. I should have placed those prior to testimony.

Exhibit 4 is a slightly revised prehearing -- in the prehearing statement. What changed from the original Exhibit 4 which was already accepted into evidence is my E-mail address and my two newest publications are listed by citation to the journal rather than simply as having been accepted for publication?

I regret the revised exhibit, I think, was

accidentally left out of the electronic copy, and I apologize for that, but there are copies that should be going to the back of the room which people may have. Nothing has changed in that except my E-mail address and the actual citation, publication citation of my papers.

I have previously described my education as a Ph.D. in thermal physics after which I conducted post-doctoral research in liquid helium. After coming to Los Alamos in 1968 I conducted computer modeling of thermonuclear weapons and modeling of solar buildings. In the late 1990s I was interested in a particular mode of transport of vapor contaminants in porous media, particularly in the soil, and this led to my supervision of the environmental investigation of four sites at Los Alamos that contained buried wastes. The burial units were shafts and pits as deep as 60 feet. One or two units had been shallow ponds not unlike temporary drilling pits. A major task of our team was to assess the movement, if any, of the contaminants. In that investigation we sampled surface soils as well as drill cores and vapors from as deep as a few hundred feet.

After official retirement in 1993 I spent

several years in consulting in that investigation and similar investigations regarding contaminant transport. About ten years ago I returned to Los Alamos National Laboratories as a guest scientist with a personal project of understanding the measurements we had already made in the subsurface movement of chemical vapors that are similar to petroleum vapors.

Starting in 2001 I served three years on the governing board of STRONGER, a nonprofit organization funded by the EPA and by the American Petroleum Institute to review the environmental regulations of petroleum producing states. I also turned my attention to New Mexico's regulatory procedures. I remember participating in the 2003 pit hearing and subsequent work groups and other hearings and in remediation proposals.

In preparation for the 2007 pit hearing I privately conducted both surface sampling and subsurface drilling of old pits. I initiated computer simulation of chloride transport using the FEHM, and that is its name, FEHM code of the numerical hydrology group at Los Alamos. This code is an ever-evolving research tool that simulates the movement of water, gases and chemicals strictly in

soils. It was used in support of the Yucca Mountain nuclear waste repository. It is used internationally by some experts and it is available to the public. But I would caution it should be used only by experts who are in close contact with the people who continually revise the code.

Although I worked out the equations that could represent the effects of extremely large salt concentrations, as the salt effects the vapor pressure, the viscosity, the surface tension and the pore water, I did not have the many months of time that would have been required to implement these extreme effects in the code, so my personal calculations simulated much less extreme conditions. However, last month a former colleague called me to ask questions about the equations which he is now implementing in the code as it is being applied to subsurface sequestration of carbon dioxide containing hot, saturated brines.

Why do I go through this? I am establishing my relevance to today's kinds of discussions. I have physically been in pits, landfill pits, large enough and deep enough to contain several houses, and I have been in or on oil field pits as small as a couple thousand square

feet. I am offering this expanded description of my experience because I realize my previous presentations before this Commission may have been too abbreviated. As one observer said, I tend to present two concepts and leave out three missing steps in between and I am trying not to do that today.

I am offering my multiple experiences with computer simulation of physical systems, my experience in both simulating chloride transport, scientifically vetted code and my experience with various units that come up when you deal with waste in the soils and the possible contaminants.

I know that to understand the impact of specific regulations it is necessary to use measurement units but to use them within the context where under physical circumstances the rule is applied. You have to know what the units mean. For example, water in soil might be quantified as a fraction of mass, grams per kilogram, or as a fraction of porosity called saturation, or as a moisture potential that drives movement, and each expression presents a different view of the same thing, which is water in the soil.

With that, I offer myself as an expert

qualified to evaluate the measurement and characterization of contaminants in the soils and I offer my updated resume which the Commission has as NMCCA and W Exhibit 4 revised for the record of the hearing.

CHAIRPERSON BAILEY: Any objections?

MR. FELDEWERT: Could I ask a few questions?

CHAIRPERSON BAILEY: Sure.

VOIR DIRE EXAMINATION

BY MR. FELDEWERT

Q. Dr. Neeper, you qualify yourself as what? I'm sorry, could you repeat that?

A. I will try to repeat the exact words used here, which is hopefully in agreement with what was previously occurred in this hearing. I offer myself as an expert in soils physics qualified to evaluate the measurement and characterization of contaminant in the soils.

Q. Now, in terms of your experience with measurement, have you ever utilized EPA Method 300.0?

A. I have probably specified, and you are now asking me to remember back about 20 years, specified which lab methods might be used, but in general

those specifications were issued by a higher authority and operating lab-wide. In my own investigation of chlorides in drilling-affected soils I did my own measurement by a technique which I could describe to you.

Q. That's all right.

A. Which I used the standard laboratory.

Q. But you weren't involved using EPA Method 300.0?

A. I did not myself operate the chromatograph under Method 300.0 nor did I dilute samples exactly as specified by 300.0.

Q. Have you ever taught -- would the same hold true with respect to SW-846 Method 1312?

A. SW-846 I look on as sort of a catalog of many methods, and the one you asked about is a dilution procedure of 1312. It's frequently used. I did not go about myself diluting the samples, the many samples we had at Los Alamos.

Q. So you have never utilized yourself that procedure?

A. I have not conducted that procedure.

Q. Have you ever taught about these particular procedures?

A. Have I taught about them in class?

Q. Yes.

A. No, I have not taught classes on these procedures.

Q. And you said to the extent that they were required to be used, it was dictated by a higher authority?

A. In most of the sampling of solids, at that time in the environmental restoration, higher authority established the chain of custody and the laboratory testing methods that would be used. There are exceptions to that, and one of those exceptions might be with the vapor sampling, a good part of which we developed ourselves.

Q. Are you intending to offer testimony today on these particular EPA testing methods?

A. Let me think of what you mean by testimony on the methods. I will certainly have testimony related to the methods. I certainly will probably use the term dilution. I may refer to the leach as described by these methods.

Q. Okay. Are you going to be offering today some other type of testing method for consideration by the Commission?

A. Yes. If I have time to deviate from my prepared testimony I would mention one other method,

but that would simply be in stating a convenient method that might be available for an operator if he were uncertain of his wastes and he wanted to take care of them right away.

Q. But you have not proposed any modifications to the testing methods that NMOGA has submitted?

A. For that I need to -- I have not proposed as yet a replacement for those methods. You may find me supportive of some things already said today. Back in my testimony there may be some comments on the simplified field method, and so I would need to review the record to see if indeed I have offered that to the Commission but not as a replacement for a laboratory test.

Q. You are aware if you were going off of such modifications you were supposed to file them by December 24th so we would all be aware of what you were proposing, correct?

A. If I were proposing a replacement table for the rule then I would have needed to have submitted that ahead of time. If I'm going to discuss the rule and try to provide enlightenment as to its applications, I did not see a need to supply that.

Q. I was talking specifically to the extent that you had proposed use of some other type of testing method. You are not going to do that here today?

A. Not a testing method that has not already been discussed today.

CHAIRPERSON BAILEY: At this point why not go ahead and let Dr. Neeper testify and then you can object at that point.

MR. FELDEWERT: Yes, ma'am. Thank you.

DR. NEEPER: I would offer then myself to the Commission under the terms as I stated to be qualified as an expert witness.

CHAIRPERSON BAILEY: Are there objections?

MS. FOSTER: For clarification, he is qualified as an expert in soil physics again, which I believe is what he was qualified in previously?

CHAIRPERSON BAILEY: Soil physics with -- you added something?

DR. NEEPER: I will make the statement again. I offer myself as an expert in soil physics qualified to evaluate the measurement and characterization of contaminants in soils.

MR. FELDEWERT: No objection.

CHAIRPERSON BAILEY: We accept you as an

expert under those terms.

DR. NEEPER: For information, what I was really doing is saying I have not worked in soils mechanics.

I usually offer my testimony in a very conversational manner, as the Commission is aware. However, I notice that in some cases my conversational words do not carry the intended meaning when expressed in the written form in the record, and that is no criticism of the scribe. That is simply noting the difference between written English and spoken English. Therefore, I may read large portions of my testimony today because I need to use exact words.

I realize that one purpose of this reopened hearing is to establish a particular clarity in the record, and I want the record to be helpful to the Commission.

This is an extract copied from the transcript of the November 15 meeting of the Commission, and here I risk repeating what I think Mr. Smith made, but to this I have accented some words in red. The Commission has asked specifically for units in milligrams per kilogram and for the record to contain a method for converting units.

The revised table submitted by Industry appeared not to respond to these requests. I offer the proposed limits of milligrams per kilogram, and I will offer some conversion arithmetic, although we have testimony saying you can't have an exact conversion. My conversion and my purpose for doing that is to give clarity to the Commission and room for the Commission to move and discuss the things they need to discuss. I will also present other units with an approximate conversion which may provide a greater understanding of the table. And finally, I shall present possibly erroneous text in the rule as it may leads to conflicting interpretations of how Table 2 is applied. This is not trying to alter the rule, this is pointing out something that may be in error of which the Commission might want to be advised.

Conversion between the milligrams per kilogram solid and milligrams per liter for liquid in the EPA leach test. We have already heard testimony that you cannot make such a conversion exactly. However, in the Commission's desire to express things in one table if they can, you have some need to understand what are you dealing with. Some of the questions today dealt with what size are

we dealing with? So I take an example of a kilogram of solid waste and I say if it had 20 milligrams of chloride, those would all, nearly all appear somewhere in the leach and the liquid that comes out of the 1312 test.

If you have a milligrams per liter in the combined liquids that came out, all of that had to come somewhere from the original waste, so you would imply with about 20 liters that you would have about 20 milligrams per kilogram in the original waste.

What is the uncertainty in this? The uncertainty is what was squeezed out in the pressure test. The amount of the liquid squeezed out of most of our wastes, I would suggest, would have to be less than the total volume of the waste. And the total volume of the waste as we heard as estimate of density today was somewhere between 1.1 and 1.6 kilograms per liter of waste.

So very roughly we can say somewhere -- the chloride that was going to get removed from the waste wound up in 20 liters of leach or possibly 21 total liters of liquid and a combined -- if the combined concentration there were one milligram per liter, that would indicate about 20 milligrams per kilogram in the waste sample plus or minus one in

20. Could be off by about one in 20 or five percent, but at least for understanding what you are doing, you could multiply by 20 and have some idea of where the numbers are taking you.

There are other units that appear in the record, particularly when the effects of waste or waste constituents on life forms were being considered. One of those units that appears in several parts of the testimony is the EC or electrical conductivity units. However, no conversion between EC and milligrams per kilogram was offered in testimony. I am saying here there is no exact conversion and you can find that statement in the literature. In part, because a mixture of a saturated paste of waste in soil which gives you EC is a relative thing. Somebody may use one or more drops of soil than somebody else does in making the paste. The amount of water added to the paste is inexact.

But as an approximation, to convert milligrams per kilogram you can multiply the EC value by about 169. I warn you that deviation from this kind of linear approximation occurs above an EC of 100 because of how the electrical conductivity of salt water relatively decreases as you add salt to

it.

But I provide an example taken from the transcript of the hearing that the EC limit of alkali sacaton is 12. I multiply 12 by 169 and I get something around 2,000 milligrams per kilogram. This is an approximate conversion, as I have said.

You would be correct in asking where does this come from and how do you justify it? And this is where I think we run into possible objections. I will try to show why or how this comes about, how you can relate EC to milligrams per kilogram without getting into life effects.

This is not new information. This is in the record of the hearing, and I used it because it was in the record, but it may be obscure. I am not discussing damage to vegetation, I am using two datasets to show how the conversion between EC and milligrams per kilogram, which is the same as parts per million. It may be done.

MS. FOSTER: I'm sorry, I have to object to this line of statement made by Dr. Neeper at this time. Again, we are here to discuss the tables that are on Page 41 of NMOGA's exhibit. This conversation about EC Dr. Neeper has already testified to it during the hearing. It is not

directly relevant to the tables. There is no line item here on the table concerning EC or lifelong vegetation.

Again, Dr. Neeper could have added it if he was proposing some sort of modifications to the proposal submitted on November 29th by the Independent Petroleum Association or NMOGA, so I think we are kind of going down a rabbit hole on this EC discussion.

(Note: A discussion was held off the record).

MR. SMITH: What I have said to commissioner Bailey is if this is -- if this presents the same sort of problem to the Commission that the Commission identified with the table, then I think if the Commission wants to hear this, they should. If it isn't the same sort of problem and presents the same issue to the Commission, then I would agree that it ought not be heard. That's something the Commission is going to have to determine.

CHAIRPERSON BAILEY: Commissioner Bloom, do you think this is a question in your mind?

COMMISSIONER BLOOM: We are allowed to proceed. I think today what we are looking at is

trying to define limits, contamination limits, and I understand how that affects the environment and human health, so I think it could be interesting. I think it could be interesting.

MR. SMITH: Let me say, if I understand correctly what you have just outlined, Commissioner, I think that would fall outside the scope of the Commission's clarification earlier today. If this testimony is valuable to you for some sort of conversion issue that you have, I think it's close enough that you can allow it. But based on the sort of interest that you have expressed, Commissioner Bloom, I think that probably goes outside where you are supposed to go today, which doesn't mean that you cannot, if you decide you want to, reopen the hearing for that purpose. It would simply require, I think, further notice and more process.

COMMISSIONER BLOOM: I would say converting the EC number to milligrams to kilograms is getting us closer to understanding a little bit more about some of the effects of the waste we might find in pits.

MR. SMITH: So the conversion is your interest in this testimony?

COMMISSIONER BLOOM: Yes.

MR. SMITH: Okay. Then I think that's fine.

DR. BALCH: I'm kind of along the same line. I think if EC is being presented as an alternative to the milligrams per kilogram or milligrams per liter then I think we should listen to the testimony. Also, given that content, I would like to see what Dr. Neeper has to say about the appropriateness of having two separate tables. So is that where you are kind of going with this? EC is going to be an alternative or a possible alternative?

DR. NEEPER: I am not telling the Commission that they must adopt EC as a measurement unit. That is in my direct testimony, any words I have to that effect. What I am doing is offering a conversion so that as the Commission goes back and looks through the record they have a way of understanding what does one unit mean in terms of the other. And I am doing this specifically, as I said this morning, because I attempted to, in cross-examination, to bring this out of industry witnesses and none of them would answer it. Had they answered the question I would not be offering it today.

Let me add one more thing. I am not discussing damage to vegetation. I am using two datasets to show the conversion between two sets of units.

DR. BALCH: I think in the context of EC as a potential alternative variable name or definition, I would be okay with it. If we go too far beyond that and bring out information already available on direct, I can he we violate what we tried to set the limit to the hearing for.

CHAIRPERSON BAILEY: Then the objection is overruled but a caution is given to Dr. Neeper to stay within the boundaries that have been established for this hearing.

DR. NEEPER: I am trying my best, Madam Chairman, and I understand. That is why I used material already in the record, and the purpose is to show the conversion for the use of the Commission because it has been offered once before as a potential limit in my earlier testimony.

EC is electrical conductivity, and I want you to consider first only the blue points in that dotted line. And they could be labeled with any arbitrary names, A, B, C, D if you wish, but imagine simply moving those points left to the vertical axis

until they are all lined up in the vertical axis. You would have a set of points on the vertical axis between zero and 1400 parts per million or 1400 milligrams per kilogram.

Likewise -- or excuse me, that is data that comes from the Integrated Petroleum Environmental Consortium at the University of Tulsa. I can follow the data backward if you would like. It's not mine. If you picture those same blue circle points and simply move them straight vertically downward to the horizontal axis, you have a series of points going between zero and eight EC units, and those represent EC units as expressed by the U.S. Department of Agricultural for sodium chloride. Now, these two datasets attach the same name to each corresponding point. Those happen to be names of grasses, but I don't care. They could be A, B and C.

If you simply join the two datasets plotting one against the other you get the dotted line with the little blue circles. The red line is nothing more than a fit to the blue line below an EC of about five, and it is from that that one can say that an EC can be multiplied by about 169, come up very roughly with the parts per million. That's all

there is to it. It gives you a handle on the question.

If there's any question where it came from, I can give it in detail if it leads us astray. This is Table 1 of NMOGA's revised proposal. I notice they are based upon depth to groundwater. The purpose of Rule 17 is protection of environment. There's no other reason for it in the rule so I emphasize that groundwater is part of the environment, but that the environment also includes more than groundwater. That is probably why we consider having different concentrations for depth and for surface. I can't rule on that, but I point out the surface is an important part of the environment.

This table applies to a five-point composite sample, and when you are applying it to a leak as it has been expressed in a pit or in a tank, you should be aware that a five-point composite sample may not represent what you would find if you sampled only a wet spot or a stain spot. I marked in green those items that have been changed. I marked with red other things that could be of interest to the Commission. NMOGA has changed EPA 300.1 to 300.0 in the table. I support that change.

It is entirely correct.

We have heard discussions of TPH. The question I have with this is TPH is identified as GRO plus DRO. That is not common in the literature. The term TPH usually includes heavier oils that are also given by the same test.

The proposed chloride limits I express here in terms of milligrams per kilogram as an intuitive unit or an approximate unit. I also expressed them as sodium chloride because we often use the term salt and that has appeared in this testimony. These give you approximations with the conversion, as I expressed it before. It also establishes in the hearing the conversion from chloride to sodium slide should the Commission ever need to use that. Sodium chloride is chloride multiplied by 1.648 for weight or mass.

Table 2 is the closure material for buried mass. I have circled, drawn a box around the revised areas in green and some items to note that I circled in red. We have already heard the discussion of the limits in milligrams per liter so I don't need to do that. I have expressed in the right-hand column the approximation. I have expressed in terms of what you would get in the

solid waste as milligrams per kilogram.

I do not propose making a table such as I have shown on the screen. I propose this for the convenience of the Commission so in their deliberations they are not constrained with a unit that is unfamiliar or to which it is difficult to relate.

I do note that IPANM proposes a slightly different table. It proposed that in the lower left-hand corner that the depth to groundwater be greater than 50 but less than 100 feet, which would leave no restriction if the depth to groundwater was greater than 100 feet as I would read that little part.

I likewise expressed the Table 2 limits in intuitive units according to the conversion that I already gave, the approximate conversion, in which the chloride limit for depths less than 50 feet, for example, comes out to approximately 50,000 milligrams per kilogram. I also expressed that in terms of sodium chloride content because we often talk about whether it is salt coming out of that buried waste.

I thought it might be of use to the Commission to have some idea of where the proposed

limits had come from. I have asked for this in cross-examination and have not received answers, so I propose it here.

MR. FELDEWERT: I object to this line of questioning. I'm not sure -- I understood what he was trying to do up to this point, but now we seem to be getting into limits, and as he put it, he wants to talk about where the limits come from. I don't see how that relates to the issue that's before the Commission today. To me that crosses the line.

CHAIRPERSON BAILEY: Any response?

DR. NEEPER: My response is simply that the origin of the limits has not been expressed. The Industry has never expressed that in its case-in-chief, and yet, it would seem to me if the tables are up for discussion, some idea of what the limits mean in terms of actual experience in the field, in terms of things we have done and things we have seen is appropriate. It would be beneficial to the Commission's consideration. This is not necessarily a proposal to change the limits but it's an idea of how they might operate in the real world.

MR. FELDEWERT: I think I would respond that that was one of the subjects that was

extensively addressed through the May through August hearings when we were dealing with these limits. Because as I understand from the slides, he wants to take these limits and compare them to some study that he did of pit contents at some point in time, and that was all discussed during the hearing. Now we're back here again and we want to do the comparison again between the limits that are not at issue here today and compare them to the contents of the pit. So I don't see how that relates to the conversion issue that you all wanted to have addressed here today.

MR. SMITH: I think if you want to hear this testimony you can hear it, but you have to, I think, reopen the hearing on that with notice going out. In terms of hearing it today in this hearing, it sounds to me as though it has moved beyond the scope of what you described in your notice and clarified earlier today.

CHAIRPERSON BAILEY: I will have to agree with our counsel, that this is outside of those boundaries that were set by the notice and by the order. If in the future we decide to reopen for other topics, we can renotice for that particular topic.

DR. NEEPER: Very well. I would like to respond, however, to the objection, if I may.

CHAIRPERSON BAILEY: Please.

DR. NEEPER: The objection, as I heard it, indicated this would have something to do with my pit sampling. It has nothing to do with my pit sampling.

MR. SMITH: Let's just ask Dr. Neeper, is the testimony that you propose to give with this slide, does it arise from or relate to the conversion issue that has been discussed thus far? When I say that, I mean going from milligrams per liter to milligrams per kilogram?

DR. NEEPER: No. It relates to if you had milligrams per kilogram, what have you experienced in the real world that corresponds to that? How do our wastes as measured in the real world correspond to the milligrams per kilogram or their equivalent in milligrams per liter that may appear in the rule?

MR. SMITH: That sounds to me although it's beyond what you wanted to hear.

CHAIRPERSON BAILEY: I'm afraid you will need to limit yourself to what has been noticed and was discussed as our boundaries for this opening of the record.

DR. NEEPER: Very well. I will skip ahead to the Page 12 and see if this fits within the boundaries, because I am dealing with how the tables are called or interacted with by the rest of the rule, and this is not having to do with changing the tables.

I will give some background. A temporary pit may be off-site, according to the definition given in 19.15.17Q, and we have heard other sections of the rule cited today. The term off-site has been deleted from the trench specifications in Paragraph K of this. Therefore, neither temporary pits nor trenches are necessarily located on-site. Let's look at the implications.

The term on-site closure in 19.15.17.10C implies that this paragraph applies only on-site, which is undefined. Setbacks for trenches appear only in Subparagraph 10C, too. Therefore, although setbacks for pits appear elsewhere, no setbacks are required for any trench regarded as off-site.

MR. FELDEWERT: Dr. Neeper, I want to interrupt you just one minute here. I'm going to object for the record because what he wants to talk about is how the language of the rule impacts siting requirements for trenches, which I don't see how

that's germane to the issues that you have identified here today. More importantly, to the extent that this is indeed an issue, number one, it's something that he could have addressed by way of some other type of proposed modification to the language, which was not done.

I don't know, Dr. Neeper, whether this is addressed in your findings and conclusions that you submitted after the hearings in May through August, but it seems to me that what he is trying to do here is address a subject where he is concerned that there might be some confusion in the rule about the setbacks for trenches. I don't see how that's germane to the issues that we are dealing with here today.

DR. NEEPER: May I respond?

CHAIRPERSON BAILEY: Yes.

DR. NEEPER: We heard testimony today of Table 2 applying to burial and trenches, and the result of this is that trench burial for wastes within those limits do not have the conditions that one might expect from the rule. Now, if that's outside the limits let's just go ahead.

CHAIRPERSON BAILEY: Let's go forward because that does seem to be outside.

DR. NEEPER: Very well. I will withdraw those.

MR. SMITH: Let me ask you, just to make sure we are not making a mistake here, if I were to convert what Dr. Neeper just said, if I understand it, it is that this topic was already opened up in direct testimony by the proponent's witness. If that's true, I think that he could move forward with this, but my question is do you believe that this topic has been opened up by your testimony?

MR. FELDEWERT: Number one, I objected to this early on so I was very conscious of staying within the aspects of the hearing, the germane aspects of the hearing today. Number two, our witness did not address in any sense the setbacks that exist within the rule for these types of trenches. The only thing my witness did with respect to the rule was identify for you as a prelude where Table 1 is cited within the rule and where Table 2 is cited within the rule. That's it.

MR. SMITH: Yes, but what was the purpose of him identifying that? It wasn't just to gratis identify it. There was a purpose behind it.

MR. FELDEWERT: The purpose was to identify the fines of materials, as you recall,

being addressed by Table 1 and Table 2, Table 1 being soils below below-grade tanks and lined pits and Table 2 being the contents of the pits and below-grade tanks.

MR. SMITH: Dr. Neeper, do you perceive that the testimony you were wanting to give here addresses the issue just described by the lawyer over here?

DR. NEEPER: I'm not sure of the meaning of -- the entire meaning of the objection. He has said that his witness did not describe setbacks. His witness described or cited where does this table apply, and I am simply trying to say be aware of where this table applies and where it doesn't apply. That's beyond my legal training, although I have served as a summary court-martial in the military. I don't mean -- the court-martial was not on me. I was the Court.

MR. FELDEWERT: Mr. Smith, I think you will recall that the reason we went to the rule was to identify the media that was involved until Table 1, soils in pits and below-grade tanks; and then the media, the mixed-phase waste, I guess, that was involved with Table 2 as being the contents of pits and below-grade tanks. We didn't get into the

location, the siting issues, nothing.

MR. SMITH: I think that's a good objection.

DR. BALCH: When we are in deliberation, we will hopefully be very thorough in ferreting out all the little mistakes and errors and there are methods to fix the ones we don't catch.

MR. FELDEWERT: I might also add for the record, we did look at this issue that's raised by Dr. Neeper and I think you will find that in all due respect, I think he is wrong. But that's for -- it's not for the issue here today, not to be debated here today.

CHAIRPERSON BAILEY: The objection is sustained. If we could just go forward with your testimony.

DR. NEEPER: I believe this same objection applies here. I heard even Mr. Feldewert use this term today because it lit me up when he said this table will apply if the wastes exceed that limit, and yet there's a conflict in the rule which says you can't have burial if the wastes exceed that limit. So there is a conflict in the rule. I hope you locate it.

MR. SMITH: Let me ask this. If that is

true, the statement that you made, Mr. Feldewert, do you not think that he can testify in response to that?

MR. FELDEWERT: I'm sorry, I missed the statement.

MR. SMITH: Would you repeat what you just said in terms of what you believe Mr. Feldewert said, Dr. Neeper?

DR. NEEPER: Yes. What I believe I heard Mr. Feldewert say in questioning his witness as he was looking, I believe, at the rule, he said the waste then can be buried if they exceed the limits specified. In other words, it was the same wording that I saw in the rule. And that caught my attention because I felt this was an unintentional error in the rule but it had profound impact.

MR. FELDEWERT: I don't recall saying that. I think it's where Table 1 was used and Table 2 was used and the statement was if it meets the Table 1 it can remain and if it doesn't, action has to be taken. It certainly never went to the provisions that Dr. Neeper is concerned about in the slides.

CHAIRPERSON BAILEY: The objection is sustained.

DR. NEEPER: I submit for the record of the hearing, New Mexico Citizens for Clean Air and Water Exhibit 6, Pages 1 through 9.

CHAIRPERSON BAILEY: Any objection?

MR. FELDEWERT: I think we have already lodged our objections to the exhibit.

MS. FOSTER: No objection on admittance from IPANM.

MS. GERHOLT: No objection.

MR. JANTZ: No objection.

MR. SMITH: This included the portions of the exhibit to which you did object?

MR. FELDEWERT: I just looked. Yes.

CHAIRPERSON BAILEY: Then Exhibit 6 pages 1 through 9 are admitted into the record.

(Note: NMCCA&W Exhibit 6, Pages 1 through 9 admitted.)

CHAIRPERSON BAILEY: Does that conclude your presentation?

DR. NEEPER: That concludes my presentation.

CHAIRPERSON BAILEY: You are ready for cross-examination?

DR. NEEPER: I am prepared for questions.

CHAIRPERSON BAILEY: Mr. Feldewert?

CROSS-EXAMINATION

BY MR. FELDEWERT

Q. Dr. Neeper, I'm looking at Page 4, and I understand that you already addressed the fact that all you are doing here is an approximation.

A. That's correct.

Q. And I'm assuming then that it contains certain assumptions.

A. I offer this as an approximation because we have heard it repeated that there is no exact conversion. I'm acknowledging there is no exact conversion but you may need to know what you are talking about, and I presented the reasoning behind it, the assumptions behind it are that the Institute for Petroleum, IPEC, did not err tremendously in their data, and that the U.S. Department of Agriculture did not err tremendously in their data so I can compare the two datasets. That is an assumption.

Q. And this is where you are doing an approximation to convert EC to milligrams per kilogram, correct?

A. I will show the graph, a straight line which is the red would be the 169. Someone else may draw a line slightly off from that if they wish.

You can see from the scatter of the points what you might think of as the error in the method, but at least it lets you understand about where a particular EC winds up in terms of a particular milligrams per kilogram or part per million.

Q. Would you agree there could be different interpretations with respect to the graph that you put up there as Page 5?

A. I could not agree to that necessarily. Somebody would have to give their interpretation before I could see if I agreed with it.

Q. On Page 7 you have some limits here expressed as a percentage of sodium chloride, correct?

A. That's expressing the milligrams per kilogram of chloride as how it would appear if you said sodium chloride.

Q. Sodium chloride, right?

A. Yes.

Q. Are there some assumptions that go into this conversion?

A. Yes. The assumptions are the atomic weights of sodium and chloride and chlorine as given in the Chemical Rubber Handbook of Chemistry and Physics.

Q. Any other assumptions?

A. No.

Q. Did you account -- I'm not a soil physicist or anything, but my understanding is there's a lot of different chlorides. You were focusing on sodium chloride. Did you account at all for non-sodium components such as potassium chloride?

A. I said this is how it would appear if you interpreted the limit all as what we commonly call salt or sodium chloride. Often other chlorides are referred to as salt, salt being the result of an acid base reaction.

Q. But your assumption is, and this is based on the assumption that it was all sodium chloride?

A. I didn't have to assume that. I said if you did consider it to be all sodium chloride, this is what you would see. In my other direct testimony elsewhere at times I have shown indeed it is not necessarily all sodium chloride. Sometimes there are other ions in the waste.

Q. Now, this whole concept of converting to EC from milligrams per kilogram, I guess I'm wondering why. Because as I understand it, and correct me if I'm wrong, this idea of EC is not used

by any national or state regulatory standards for waste, is it? I mean, you don't go out and find a standard of EC.

A. You will find it as a standard recommended by the American Petroleum Institute expressed in EC. Your own witness expressed all of his results in EC.

Q. Now, I'm focusing here on waste, not soils, not topsoils, for example. I'm focusing on waste. There's no state or national regulatory standards where they look at waste in terms of what's its electrical conductivity.

A. I don't know, because I don't deal with national regulatory standards. For petroleum wastes there aren't any.

Q. If I'm understanding here today, you don't have any -- the approximation that you show on Page 4, for example, you don't cite any supporting literature for that, do you?

A. Supporting literature is on Page 5, and if you want it --

Q. That's the only --

A. -- it will take me 20 minutes but I will take you to it right down to the last number.

Q. And that's the only support that you cite then for your approximation, right?

A. That is where it came from.

Q. Now, if I'm looking at Slide A, for example, I think here is where we start combining a lot of concepts, if I'm understanding. Your Slide 8 is where you take your approximations -- let me ask you this: Is Slide 8 based solely on your hypothesis that you can multiply milligrams per liter by 20 to get milligrams per kilogram?

A. It is.

Q. And you don't have any supporting literature for that conversion, do you? That multiplication by 20? I don't see any cite.

A. I don't. Your previous witness does. He addressed this.

Q. You're right.

A. Roughly the same number that's in the EPA 15.12. I could go get it out of there.

Q. You're right. There was some discussion on that. But outside of the criticisms that Dr. Robinson had about it this morning, any response to that? I mean, you don't have any literature supporting your conversion of 20 to one?

A. There couldn't be any supporting literature. That comes out of the definition of the EPA test and you apply what limits could occur

within that procedure.

Q. Okay. Have you ever asked a lab to take the results in milligrams per liter using the EPA method cited and convert them to milligrams per kilogram?

A. No. Every lab test I ever got and every lab test the OCD has got including tests of pit contents came back in milligrams per kilogram, and if the hearing went on another day I would take opportunity to do some rebuttal on that topic.

Q. Well, at least you will agree with me then that the EPA Testing Method 1312, as identified in the current Pit Rule and any proposals by NMOGA, yields a result in milligrams per liter, correct?

A. In the laboratory.

Q. That's how labs report it?

A. You come out. Let me expand on that. In the laboratory your method in Table 1 also comes out, and by your own witness today, every measurement method he could think of required dilution of the chloride from the solid with a liquid, usually water in this case. So every measurement you ultimately make is going to be on the chloride in the liquid. Now, how you relate that back to what your original solid sample was is

going to be up to you.

Q. But the laboratory has a method for dealing with that, correct? They have a standard method that's recognized for doing the conversion based upon the material that is being analyzed?

A. I can't speak for the laboratory. I can call one up and ask and they said, "We do this as a matter of course." 300.0 delivers answer in milligrams per liter. Ultimately that's what it is. It has to be related back. The difference is whether or not you dry the waste to get a mass measurement of the solid object.

Q. I want to ask you something on Page 4. You said you cited to the transcript for your example down in the middle, EC limit of alkali sacaton equals 12. Do you see that?

A. Yes.

Q. You cite to Page 2314 of the transcript.

A. That's the citation on Line 16.

Q. And that's Dr. Buchanan's testimony, correct?

A. Yes. That's where -- notice the asterisk. That's where the EC limit came from. I'm not arguing EC limits.

Q. But you cite it, and you recognize, do you

not, that Dr. Buchanan, when you look at that transcript, testified and the studies show that the EC limits for native grasses to be twice as high, up to 24, correct?

A. I wasn't citing native grasses, I simply plucked one and put in a number.

Q. But where you plucked it from, the testimony is that the EC limit for native grasses is twice as high, correct?

A. I'm not testifying on the EC limit for native grasses, and you're wrong, but that is a topic for a different hearing. If you are going to open up the hearing for EC on native grasses, I will be glad to have the discussion with you.

Q. I was just curious what you cited there.

A. I needed an example because it's possible the Commission could say, where have we used EC? Where has EC entered the hearing and how would I use this? So I said okay, for example, but I'd better use some example that's already in the record of the hearing. Otherwise, I'm introducing new testimony.

Q. I understand. Where this was being used, correct -- and correct me if I'm wrong -- was that they were examining the ability of plants to germinate, correct?

A. I can't state whether he was using the 50 percent foliage damage or whether he was using seed germination at that point. I have been through other literature and I can find a range of values, depending on how you wanted to define damage.

Q. But you will agree with me where you plucked this from is where the witness was examining the four foot of cover that is required by the closure?

A. It has nothing to do with four foot of cover.

Q. That's where it was being examined, correct?

A. Whatever was going on at that time is what was going on at that time, but he gave an EC limit. It was a statement in the hearing. I could have taken something off that other graph.

CHAIRPERSON BAILEY: Mr. Feldewert, I think you have strayed outside the scope.

MR. FELDEWERT: Okay. I saw that cite and I was trying to --

CHAIRPERSON BAILEY: Do you have any other questions?

MR. FELDEWERT: I do not.

CHAIRPERSON BAILEY: Why don't we break

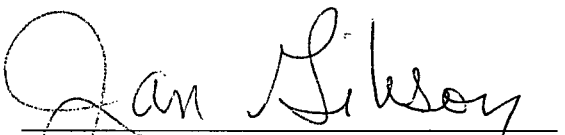
for the day, continue the case until tomorrow for further questions and rebuttal. We will continue this case at 9:00 o'clock tomorrow morning, Thursday, January 10th. Is there public comment? Okay, thank you.

(Note: The hearing was adjourned at 4:45).

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
License Expires: 12/31/12