

STATE OF NORTH DAKOTA  
PUBLIC SERVICE COMMISSION

Coyote Creek Mining Company, L.L.C. : Case No.  
Permit NACC-1302 : RC-13-850  
Application :

TRANSCRIPT OF  
FORMAL HEARING  
VOLUME II - (Pages 149-351)

Taken At  
State Capitol  
Bismarck, North Dakota  
December 23, 2014

BEFORE WADE MANN  
-- ADMINISTRATIVE LAW JUDGE --

**A P P E A R A N C E S**

COMMISSIONERS PRESENT:

COMMISSIONER BRIAN P. KALK  
COMMISSIONER JULIE FEDORCHAK  
COMMISSIONER RANDY CHRISTMANN

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MR. BRIAN R. BJELLA  
MR. BLAINE T. JOHNSON  
Crowley Fleck PLLP  
Attorneys at Law  
100 East Broadway, Suite 250  
P.O. Box 2798  
Bismarck, North Dakota 58502-2798

FOR THE APPLICANT.

-----

MR. DERRICK BRAATEN  
MR. J.J. ENGLAND  
Baumstark Braaten Law Partners  
Attorneys at Law  
109 North Fourth Street, Suite 100  
Bismarck, North Dakota 58501

FOR THE COMPLAINANT.

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MS. ILLONA A. JEFFCOAT-SACCO  
General Counsel  
Public Service Commission  
600 East Boulevard Avenue, Dept. 408  
Bismarck, North Dakota 58505-0480

FOR THE COMMISSION.

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**VOIGT EXHIBITS:**

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3	Coyote Creek Alluvial Valley Floor Study by Dakota Westmoreland Corporation, October 2009 Revision		188
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1           (The proceedings were continued,  
2           commencing at 8:30 a.m., Tuesday, December 23,  
3           2014, as follows:)

4           JUDGE MANN: Good morning, everybody.  
5           We'll go ahead and get started.

6           Let the record show that it's 8:30 a.m. on  
7           December 23rd. This is the continuation of the  
8           formal hearing in Public Service Commission Case  
9           No. RC-13-850. It's the matter of the Coyote Creek  
10          Mining Company, L.L.C.'s Permit No. NACC-1302.

11          This is a continuation of the hearing that  
12          began last Friday, December 19. Initially ALJ  
13          Janet Seaworth was the procedural ALJ in this  
14          matter. She has had a family emergency and is  
15          unable to preside over today's part of the hearing.

16          My name is Wade Mann, and I'm the director  
17          of OAH and also an administrative law judge, and I  
18          will be presiding over the remainder of this  
19          hearing as the procedural administrative law judge.

20          It's my understanding that we took  
21          testimony from Mr. Voigt on Friday and also members  
22          of the public. I don't think we need to go through  
23          all of the preliminaries at this point, but I  
24          would, just for my benefit and maybe the benefit of  
25          anybody in the audience and listening, just have

1 everybody note their appearances again for me for  
2 the record, beginning with Coyote Creek.

3 MR. BJELLA: Yes, Your Honor. My name is  
4 Brian Bjella with the law firm of Crowley Fleck in  
5 Bismarck representing Coyote Creek Mining Company.  
6 Along with me is Mr. Blaine Johnson of our firm and  
7 quite a few members of the Coyote Creek Mining  
8 Company.

9 JUDGE MANN: Could you just identify who  
10 is at the table with you?

11 MR. BJELLA: Mr. Donn Steffen, D-o-n-n  
12 S-t-e-f-f-e-n, environmental manager, Coyote Creek,  
13 and Sarah Flath, F-l-a-t-h, environmental  
14 specialist at Coyote Creek.

15 JUDGE MANN: Mr. Braaten.

16 MR. BRAATEN: Derrick Braaten with  
17 Baumstark Braaten Law Partners in Bismarck on  
18 behalf of Casey Voigt, who requested the hearing.  
19 I also have with me J.J. England, another attorney  
20 in the firm, and right behind me is Mark Anderson,  
21 one of our experts who will be testifying today.

22 MS. JEFFCOAT-SACCO: Illona Jeffcoat-Sacco  
23 as Commission counsel, and with me is the director  
24 of the reclamation program, Jim Deutsch; assistant  
25 director, Dean Moos; and one of the environmental

1 scientists, Guy Welch.

2 JUDGE MANN: And before, I guess, we begin  
3 with the testimony, are there any additional  
4 preliminary matters, Mr. Bjella?

5 MR. BJELLA: No, Your Honor.

6 JUDGE MANN: Mr. Braaten?

7 MR. BRAATEN: Yeah, I would bring up one  
8 thing. Ms. Jeffcoat-Sacco mentioned on Friday that  
9 she would like the ability for some of her staff  
10 members to be able to ask questions of the expert  
11 witnesses that we put on, and at the time I had  
12 said I would like to reserve my objection. I would  
13 like to reserve it for individual questions  
14 depending on what's being asked. In general I'm  
15 okay with that, as long as everybody is willing to  
16 indulge me consulting with my experts during my  
17 examination of others as well.

18 JUDGE MANN: Okay. Ms. Jeffcoat-Sacco?

19 MS. JEFFCOAT-SACCO: Sir, we did --  
20 Derrick and I did discuss that after the hearing  
21 and I think we're on the same page, and I'm okay  
22 with that also.

23 JUDGE MANN: You're comfortable with that?

24 MS. JEFFCOAT-SACCO: Yes.

25 JUDGE MANN: Mr. -- okay. Go ahead. Go

1 ahead, Ms. Jeffcoat-Sacco.

2 MS. JEFFCOAT-SACCO: This was a different  
3 topic, if Mr. Bjella has a --

4 JUDGE MANN: Mr. Bjella?

5 MR. BJELLA: Yes, we're fine with that.

6 JUDGE MANN: Okay. So Mr. Deutsch will be  
7 able to ask questions and, Mr. Braaten, you'll be  
8 able to consult with your experts, if necessary,  
9 during your questioning.

10 Ms. Jeffcoat-Sacco, other preliminary  
11 issues?

12 MS. JEFFCOAT-SACCO: Well, only that --  
13 I'm not sure if the little indicator of the first  
14 two topics means that you might misunderstand, but  
15 the order of the presentations today is not the  
16 company first like a normal application. It's the  
17 landowner first and then the company and then the  
18 Commission.

19 JUDGE MANN: Judge Seaworth did indicate  
20 that that's how we were proceeding. Okay. Thank  
21 you.

22 Before we get started, Commissioners, do  
23 you have anything to say before we get going?  
24 Commissioner Christmann?

25 COMMISSIONER CHRISTMANN: Not really,

1       except to point out that there was some discussion  
2       about needing a third day and I think there was  
3       some dates floated around and discussion. I don't  
4       know if anything is finalized on that. I'm still  
5       hopeful that, you know, if we can get done today,  
6       that that would be nice, but if we need to bring  
7       people back, the most important thing is, in my  
8       mind, that we get all the information necessary to  
9       make a good decision.

10                JUDGE MANN: Sure. Commissioner Kalk?

11                COMMISSIONER KALK: No, Your Honor.

12                JUDGE MANN: Commissioner Fedorchak?

13                COMMISSIONER FEDORCHAK: No comments.

14                JUDGE MANN: Mr. Braaten, is Mr. Voigt's  
15       testimony complete? Are you on to your next  
16       witness then?

17                MR. BRAATEN: Yes, Your Honor. We're  
18       calling one of our first expert witnesses, who is  
19       going to be testifying by phone this morning.

20                JUDGE MANN: Okay. What's the witness's  
21       name?

22                MR. BRAATEN: His name is Charles Norris.

23                COMMISSIONER KALK: Chuck.

24                MR. BRAATEN: It is Chuck.

25                JUDGE MANN: Mr. Norris?

1 MR. NORRIS: Yes.

2 JUDGE MANN: This is Wade Mann. I'm the  
3 administrative law judge, and we've got you on the  
4 speaker in the hearing room at the Public Service  
5 Commission.

6 MR. NORRIS: Okay.

7 JUDGE MANN: And are you prepared to  
8 testify?

9 MR. NORRIS: I am.

10 JUDGE MANN: All right. Before doing so,  
11 I'm required to give an oath and I need to advise  
12 you of the penalty for perjury. In North Dakota it  
13 is a Class C felony, punishable by a maximum fine  
14 of \$10,000, maximum five years imprisonment or  
15 both.

16 (Witness sworn.)

17 JUDGE MANN: All right. Go ahead,  
18 Mr. Braaten.

19 MR. BRAATEN: Just one thing  
20 preliminarily. I would like to cover some of  
21 Mr. Norris's background. I've just handed  
22 everybody basically a resume that has his full  
23 qualifications. What I would like to ask opposing  
24 counsel is if we could stipulate to the expertise  
25 as represented on this, and that way I can just

1 cover his background very briefly rather than going  
2 through it in detail and just save some time today.

3 JUDGE MANN: Mr. Bjella?

4 MR. BJELLA: No objection, Your Honor.

5 MS. JEFFCOAT-SACCO: Your Honor.

6 JUDGE MANN: Sorry.

7 MS. JEFFCOAT-SACCO: I have no objection,  
8 but I thought -- I think for the record perhaps you  
9 should state the topic or topics or subject areas  
10 that you are qualifying him as an expert in.

11 MR. BRAATEN: Sure.

12 JUDGE MANN: Hang on. Also then I assume  
13 you'd like the CV or the resume marked as an  
14 exhibit as well.

15 MR. BRAATEN: Yes, I would, if there's no  
16 objection.

17 JUDGE MANN: And I guess I don't know how  
18 we started. I think there was only one exhibit in  
19 last time and it was identified as Coyote Creek No.  
20 1. Should we identify this as Voigt No. 1? Would  
21 that be the easiest, I think?

22 MR. BRAATEN: Yeah, that makes sense to  
23 me.

24 JUDGE MANN: Let's do that. It will be  
25 Voigt Exhibit No. 1. Then you can go ahead.



1 here in Colorado. Geo-Hydro is essentially a  
2 full-service consulting company in geology but  
3 specializes in water issues.

4 In the course of my career I've done a  
5 great deal of consulting for -- related to surface  
6 mining throughout Appalachia, the middle part of  
7 the country, and out here in the west. Clients  
8 vary from individual citizens to small citizens  
9 groups to larger consulting companies to coal  
10 companies and power companies, and have served on  
11 assessment committees -- or an assessment committee  
12 for West Virginia with respect to a yearlong  
13 program looking at assessing their cumulative  
14 hydrologic impact assessments.

15 Q. And can you give us just a brief  
16 description of the testimony that you're going to  
17 give today with respect to your expertise?

18 A. Yes. I will be testifying with respect to  
19 alluvial valley floor determinations for the Coyote  
20 Creek mine area.

21 Q. Okay. Can you give us just a very brief  
22 description of your experience analyzing or looking  
23 at information related to alluvial valley floor  
24 determinations?

25 A. Yeah. And anytime one is involved with

1 looking at a mine permit or mine operations west of  
2 the hundredth meridian, alluvial valley floors  
3 become an issue with respect to mine plans and mine  
4 design. I've personally been involved with those  
5 -- that aspect of mines at Alton Coal Mine in Utah,  
6 currently Otter Creek in Montana. Several years  
7 ago I analyzed in detail the AVF information for  
8 South Heart in North Dakota and now the Coyote  
9 Creek Mine. I've also looked at a mine on behalf  
10 of Pittsburg & Midway Coal Company, the York Canyon  
11 Mine in New Mexico. The issues I was looking at  
12 there were water quality issues, however, rather  
13 than specifically alluvial valley floor issues.

14 Q. Okay. And have you reviewed documentation  
15 related to the Coyote Creek mine permit that is  
16 pertinent to the issue of alluvial valley floors?

17 A. Yes.

18 Q. Okay. And in your opinion, is there  
19 sufficient information within the actual permit  
20 application for someone to make a scientifically  
21 valid determination with respect to alluvial valley  
22 floors?

23 A. There is not.

24 Q. Okay. And what parts of the actual permit  
25 application address alluvial valley floors?

1           A.     Within the permit application itself, I  
2 found discussion of alluvial valley floors, which,  
3 if it's all right, I will tend to refer to AVFs  
4 just for convenience sake.

5           Q.     Sure.

6           A.     In parts -- Section 2.6.1, which is  
7 entitled alluvial valley floor determination, and  
8 Section 2.6.2, which is a map of various AVF  
9 determination areas.

10          Q.     And what data was presented in Sections  
11 2.6.1 and 2.6.2 of the application?

12          A.     No data pertinent to a determination of  
13 AVF within the impact area of the proposed mine  
14 were presented.

15          Q.     Okay. And if no data were presented, what  
16 was presented in those sections of the permit  
17 application?

18          A.     Section 2.6.2 was a map that displayed  
19 various areas that were part of one or more AVF  
20 studies in the area. Section 2.6.1 presented a  
21 one-paragraph summary of an initial study by Dr.  
22 Bickel dated the 20th of March, 2013, Alluvial  
23 Valley Floor Determination Report. It included an  
24 agency letter of deficiencies with respect to that  
25 report that was dated the 13th of May, 2013, and

1 the company's response to the deficiency letter  
2 with a revised report of 20 August 2013, and  
3 finally presented the agency's determination of no  
4 AVF on 26 of August, 2013.

5 Q. Okay. And did the agency produce any  
6 other documents related to the alluvial valley  
7 floor determination?

8 A. Yes.

9 Q. And what was that?

10 A. Well, it presented a discussion in a  
11 cumulative hydrologic impact assessment of AVF.

12 Q. And what discussion was provided? My  
13 understanding is that cumulative hydrologic impact  
14 assessment is often shortened to CHIA. Is it all  
15 right if we refer to it as that?

16 A. I would from habit tend to automatically  
17 call it CHIA, and I'm very amenable to that.

18 Q. Can you tell us what was discussed in the  
19 CHIA?

20 A. The CHIA identified the 2013 initial and  
21 revised Bickel reports, that was the Coyote Creek  
22 AVF report, and identified the August 26th, 2013,  
23 determination by the agency that there were no  
24 AVFs. The CHIA referenced a 2009 AVF report by  
25 Dakota Westmoreland Company that was produced as

1 part of a revision of permit KRSB-8603 that  
2 overlapped the area of the Bickel report of 2013.  
3 The agency asserted that the Coyote Creek AVF  
4 report information, quote, was based on existing  
5 information available in published work, approved  
6 mining permits and related data in the public  
7 domain from the surface mining reclamation and  
8 regulatory process, and observations of  
9 professionals involved in the acquisition of  
10 baseline data for the application of Permits  
11 NACC-1301 and NACC-1302.

12 Q. Okay. So a similar question to before.  
13 Did the CHIA provide any independent data with  
14 respect to the presence or absence of alluvial  
15 valley floors?

16 A. No.

17 Q. Okay. Did the CHIA include the 2013  
18 Bickel report?

19 A. The Bickel report was not attached to the  
20 CHIA.

21 Q. Okay. And what about the Dakota  
22 Westmoreland Company 2009 report, was that included  
23 in the CHIA?

24 A. No.

25 Q. Okay. And you said the CHIA mentioned

1 existing information available in the published  
2 work, approved mining permits and related data in  
3 the public domain from the surface mining  
4 reclamation and regulatory process, and  
5 observations of professionals. Were any of those  
6 items included within the CHIA?

7 A. No, they were not specifically identified  
8 and none were included.

9 MR. BRAATEN: Okay. Just as a side note  
10 for the folks in the room and the commissioners, I  
11 passed out the various reports he's discussing.  
12 I'm going to be asking for one of them to be  
13 admitted into evidence, but, otherwise, I'm just  
14 giving them to you so you can reference them while  
15 he's testifying about them.

16 Q. (MR. BRAATEN CONTINUING) We talked about  
17 the 2013 report by Bickel. Did you have an  
18 opportunity to review that?

19 A. I did.

20 Q. Okay. And did that report include any  
21 independent data regarding the presence or absence  
22 of alluvial valley floors?

23 A. No.

24 Q. Okay. What did that report provide?

25 A. It provided a summary of previous work in

1 the area, including reference to the Dakota  
2 Westmoreland Company 2009 report and excerpts from  
3 a 1985 report entitled Draft Reconnaissance Maps to  
4 Assist in Identifying Alluvial Valley Floors West  
5 Central North Dakota by the Office of Surface  
6 Mining Reclamation and Enforcement, which for  
7 convenience sake, if it's acceptable, I will just  
8 refer to that organization as OSM from here on out.

9 Q. Sure.

10 A. It also similarly asserted reliance like  
11 the CHIA to, quote, existing information available  
12 in published work, approved mining permits and  
13 related data in the public domain from surface  
14 mining reclamation and regulatory process.

15 Q. Okay. Did the report provide any  
16 information from any new investigations of the  
17 site?

18 A. No.

19 Q. And independent of the contents of the  
20 permit application in the CHIA, did you have an  
21 opportunity to review the 1985 OSM Draft  
22 Reconnaissance Report that we referenced?

23 A. Yes, I did.

24 Q. And did that report provide any  
25 independent data or observations with respect to

1 the existence of alluvial valley floors at the mine  
2 site?

3 A. Yes, it did.

4 Q. Can you describe what that was for us?

5 A. Data or observations were provided with  
6 respect to the land forms or geomorphology of  
7 Coyote Creek valley and with respect to the  
8 implications of remote imagery that existed for the  
9 area.

10 Q. Okay. And what observations were made  
11 regarding the land forms and geomorphology?

12 A. On page 16 of the 1985 OSM report, Coyote  
13 Creek was described as a perennial stream with  
14 multiple alluvial terraces, the higher of which  
15 could be flood irrigated. In the upper reaches of  
16 the creek a single terrace is also described that  
17 is flood irrigable and partially floods naturally.

18 MR. BRAATEN: For those following along,  
19 it looks like the numbering was a little bit  
20 different on one of the documents we gave to  
21 Mr. Norris, but in the ones we handed out here,  
22 this information would appear on page 20.

23 THE WITNESS: The number -- the page 16, I  
24 believe, is the document page number.

25 Q. (MR. BRAATEN CONTINUING) Right. And I'm

1 not sure if you covered this, but were there  
2 observations made regarding implications of the  
3 available remote imagery for the area?

4 A. Yes, there was. The imagery that was  
5 available is Landsat imagery, and from the  
6 frequency of the imaging that was done,  
7 subirrigation was inferred based upon moisture  
8 content that was indicated for the vegetation.  
9 Where imagery indicated that vegetative growth in  
10 the late growing season occurred for most of the  
11 five years of reviewed data, that is, they  
12 eliminated the wet years, where vegetative growth  
13 late in the season was indicated, subirrigation was  
14 inferred.

15 COMMISSIONER FEDORCHAK: Excuse me. Can  
16 you restate what page we're on in this report  
17 because the page numbers are kind of cut off on  
18 some of the copies?

19 MR. BRAATEN: It would be page 20 as the  
20 numbers appear on the very bottom in the middle.  
21 There's a section on that page for Coyote Creek  
22 specifically.

23 MS. JEFFCOAT-SACCO: Could we take a  
24 minute and --

25 COMMISSIONER FEDORCHAK: I don't see that.

1 MS. JEFFCOAT-SACCO: -- number the pages  
2 because we don't have any numbers on our copy.

3 COMMISSIONER FEDORCHAK: So we just count  
4 20 pages in and we'll be there?

5 MR. BRAATEN: No.

6 MS. JEFFCOAT-SACCO: No, because there's a  
7 different cover.

8 JUDGE MANN: About five pages from the  
9 back.

10 (Discussion had off the record.)

11 Q. (MR. BRAATEN CONTINUING) Okay.  
12 Mr. Norris, was there an assessment in this report  
13 made with respect to alluvial valley floors in the  
14 Coyote Creek valley?

15 A. Yes, there was. It was assessed as a  
16 potential AVF in part because, quote, subirrigation  
17 of natural flood irrigation are important, end of  
18 quote, and that's found on page 11 of the  
19 document -- or the page that is designated 11 in  
20 the document.

21 And then quoting from page 1, this means  
22 that the area is one that is likely, and "likely"  
23 is emphasized in the OSM document, which means that  
24 the area is one that is likely to meet the  
25 definition of AVF, end of quote.

1           Q.     Can you explain the significance of  
2     subirrigation and natural irrigation with respect  
3     to alluvial valley floors and their importance?

4           A.     Yes.   The concept of alluvial valley  
5     floors in the surface mining law is that areas that  
6     are irrigated or irrigable are an important  
7     economic feature for agriculture in the arid west,  
8     and that when the water is available in alluvial  
9     sediments for irrigation, that those lands are  
10    afforded additional protection under the  
11    regulations.   And the use of the water in an  
12    alluvial valley can either be anthropogenic, that  
13    is, human -- human-engineered systems that make  
14    water that's available in the valley available to  
15    the crops or water in the sediments that occurs at  
16    depths that they are available to enhance the  
17    production of crops beyond what would exist in  
18    areas where that subsurface water is not available,  
19    and that natural subsurface irrigation of  
20    agricultural crops is called subirrigation.

21          Q.     Okay.   And we also talked about a 2009  
22    report produced by Dakota Westmoreland Company.  
23    Did you have an opportunity to review that?

24          A.     Yes, I did.

25          Q.     And did that report provide any

1 independent data with respect to the potential  
2 existence of AVF?

3 A. Yes, it did.

4 Q. And what independent data or observations  
5 did that report contain?

6 A. The report presented anecdotal information  
7 to the effect that hay production on the alluvial  
8 valley terrace of the Voigt property was  
9 significantly greater than hay production on the  
10 uplands on the ranch. The report also provided an  
11 anecdotal description of visual observations of  
12 vegetative conditions on the alluvial terrace at  
13 the Voigt property during a walkover of the  
14 property conducted in the spring of 2009, perhaps  
15 in mid-May.

16 Q. And maybe this is something we should have  
17 started with, but we've been talking about  
18 subirrigation and flood irrigation, and so forth,  
19 and you explained the connection for us between  
20 subirrigation and alluvial valley floors, but can I  
21 have you just back up for a moment and just give us  
22 a description or a definition of alluvial valley  
23 floors and their importance?

24 A. Alluvial valley floors are areas that are  
25 composed of alluvial sediments, which are

1       unconsolidated water-deposited sediments associated  
2       with streams and rivers that have sufficient water  
3       in the alluvial sediments and/or the stream that  
4       allow irrigation, either artificially man-designed  
5       irrigation or natural subirrigation, the results of  
6       which are enhanced agricultural production.

7           Q.     Okay.  And is there a definition for a  
8       perennial stream?

9           A.     Perennial stream is a stream that flows  
10       all year long.  It's not one that dries out --  
11       routinely dries out during the dry season.  It  
12       still has water in it 365 days a year.

13          Q.     Okay.  And there was a comment in the  
14       Dakota Westmoreland Company report stating that the  
15       terrace was comprised of water-deposited  
16       unconsolidated sediments.  Actually I should ask,  
17       did the report determine that?

18          A.     The Westmoreland report accepted existing  
19       interpretations that the sediments in Coyote Creek  
20       were water-deposited unconsolidated sediments.  
21       That was not an investigation they expressly did of  
22       the sediments themselves.  They just accepted that  
23       based on existing data and previous opinions,  
24       including relying on the 1985 OSM report.

25          Q.     Okay.  And same question with respect to

1 Coyote Creek being a perennial stream, did the  
2 Dakota Westmoreland report make that determination?

3 A. No. As with the nature of the sediments,  
4 the report did accept that as being the case based  
5 upon existing data and previous studies.

6 Q. Okay. And did the Dakota Westmoreland  
7 report make a determination as to whether or not  
8 AVF existed in the Coyote Creek Valley?

9 A. Yes, it did.

10 Q. And what was that finding?

11 A. The report in the summary conclusions on  
12 page 30 concluded that Coyote Creek Valley contains  
13 no AVF within the study area.

14 Q. Okay. And what was the rationale or basis  
15 for that finding?

16 A. There were four subfindings that led to  
17 the summary conclusion. Those four subfindings are  
18 found on page 30 of the report.

19 The first subfinding was an acknowledgment  
20 that alluvial sediments are in the valley, that the  
21 unconsolidated sediments in the valley are alluvial  
22 sediments, and that is one of the requirements for  
23 AVF.

24 The second and third conclusions were,  
25 respectively, that artificial flood irrigation of

1 the Voigt land was not presently occurring and that  
2 there was no evidence that it had occurred -- had  
3 ever occurred. Such irrigation would be evidence  
4 for AVF had there been such flood irrigation.

5 The fourth conclusion and, therefore, the  
6 controlling one in this case, was that  
7 subirrigation does not play a role in enhancement  
8 of crop production in the study area. That  
9 conclusion that there is no subirrigation then is  
10 what precipitates the summary conclusion that there  
11 is no AVF.

12 Q. Okay. And so do you agree with that  
13 fourth conclusion regarding the existence of  
14 subirrigation enhancing crop production?

15 A. No, I do not.

16 Q. Okay. And do you hold that opinion to a  
17 reasonable degree of scientific certainty?

18 A. I do.

19 Q. And would you explain the basis for your  
20 opinion?

21 A. Certainly. The entirety of the  
22 investigation when it's reviewed, it is apparent  
23 that the sole basis for asserting no role for  
24 subirrigation is the subjective perception that  
25 plant vigor and density may have decreased as one

1 walked from the edge of the valley toward the  
2 creek.

3           Two sentences of this 31-page report  
4 comprise really the entirety of the case against  
5 the role of subirrigation for crop enhancement.  
6 Those two sentences are found in the last paragraph  
7 on page 29, and I'd like to emphasize those,  
8 quoting that paragraph, "Surveys revealed that  
9 those plants nearest to the creek which should have  
10 the best access to subirrigation were, if anything,  
11 in poorer condition and/or had poorer population  
12 densities than the average plant in the field. The  
13 most productive plants were the beneficiaries of  
14 additional surface water, not ground water, by  
15 virtue of their location in or near the footslope  
16 position."

17           The first problem with this two-sentence  
18 conclusion and the observations that were being  
19 looked at, the first problem is that the walkover  
20 of the field was conducted at the worst time of the  
21 year to assess the impact of subirrigation. It was  
22 done in early spring, mid-May, at a time of early  
23 annual growth. Late summer, long after spring  
24 rains, snowmelts, the spring water are gone, is the  
25 appropriate time to investigate subirrigation if

1 there's going to be any.

2 Q. Can you explain why that is?

3 A. It's the time of year when subirrigation  
4 will be supporting the plant growth. During the  
5 spring there's lots of water in virtually any area  
6 for the early growth of crops. It's in the mid and  
7 late summer when things heat up, dry out, that  
8 you've lost the impact of spring rains and  
9 snowmelt, that there is not enough active water  
10 being provided by precipitation for active plant  
11 growth. That's the time of year when the influence  
12 of subirrigation can be observed.

13 Q. Okay. And you mentioned that you had  
14 other problems with this two-sentence conclusion in  
15 the report. Can you tell us what the other  
16 problems were?

17 A. Yes. Another problem is that the  
18 subjective perception that there are progressive  
19 changes of plant vigor and population across the  
20 site is without any supporting data or  
21 documentation at least in the report. I found no  
22 maps in the report depicting the traverses across  
23 the fields. There was no photographic evidence  
24 that I saw of the vegetative trends. There were no  
25 counts of plant density, numbers and varieties or

1 any quantification of plant vigor.

2 If the vegetative -- if the vegetative  
3 trends that were reported did exist in mid-May of  
4 2009, the assessment of the observations did not  
5 address or apparently consider potential causes of  
6 those variations beyond asserting that it is  
7 evidence of the lack of subirrigation.

8 Since the walkover was performed at the  
9 start of the growing season, the observations are  
10 not the result of the twenty-nine -- 2009 growing  
11 season. They're the conditions going into the 2009  
12 growing season. The previous winter, December of  
13 '08, January and February of '09, were  
14 exceptionally wet in Beulah. Those three months  
15 were 250 percent -- precipitation was 250 percent  
16 of the 30-year climatic average. March of 2009  
17 recorded seven and a half times the normal  
18 precipitation. This is based on USDA climate data,  
19 the WETS table, that can be found at  
20 [agacis.rec-acis.org/38057](http://agacis.rec-acis.org/38057).

21 There was no consideration that, for  
22 example, what was being looked at in terms of plant  
23 distributions was not stressed to the area,  
24 observed that the stress to the area was simply the  
25 result of perhaps prolonged submergence and

1 scouring by flood waters in the areas nearest the  
2 stream in response to exceptional March  
3 precipitation that followed immediately after an  
4 unusually wet, snowy winter. Something other than  
5 a dismissal of subirrigation would appropriately  
6 have been considered and discussed, particularly  
7 since it was not the time of year when you can even  
8 see the effects of subirrigation.

9 Q. You discussed the observations made with  
10 respect to the vegetation and the fact that it was  
11 less dense near the river. Assuming those  
12 observations are true, would that change your  
13 opinion with respect to the existence of  
14 subirrigation?

15 A. No. No, it wouldn't. Even were the  
16 anecdotal evidence valid and it were reflective of  
17 persistent conditions, it would simply reflect a  
18 pattern that is common for alluvial valley  
19 floodplains with subirrigation.

20 Q. And did you develop a schematic to explain  
21 why that's common?

22 A. Yes, I did.

23 MR. BRAATEN: And I handed that out to  
24 everyone. I intend it as a demonstrative exhibit  
25 just to aid with Mr. Norris's explanation.

1           Q.     (MR. BRAATEN CONTINUING)   But, Mr. Norris,  
2     we're all looking at the schematic you developed.  
3     Can you just explain what you're showing on that  
4     schematic with respect to subirrigation?

5           A.     Yes.   The schematic shows a half width of  
6     an alluvial valley sediment, an alluvial valley  
7     with -- that has been cut into bedrock and has  
8     alluvial valley sediments in it so that your -- on  
9     the left-hand side of the schematic you've got the  
10    highlands with the bedrock and the soils associated  
11    with the bedrock.   You move in -- as you move to  
12    the right, there is a package of alluvial  
13    sediments, sediments laid by the stream in the  
14    valley, and at the far right is the creek, which in  
15    this case would be Coyote Creek.

16                   Then within the alluvial sediments I have  
17    depicted a water table, if you will, water  
18    saturated sediments at the bottom of the alluvial  
19    sediments, unsaturated sediments at the top, and a  
20    boundary between the two of partially saturated  
21    sediments.   That boundary between saturation and  
22    unsaturation at the position of the creek will be  
23    the elevation of the creek, and as one moves away  
24    from the creek to the left, that saturated -- the  
25    boundary between saturated and unsaturated will

1 gain in elevation as one moves away from the creek.  
2 So the elevation of the -- of the water within the  
3 sediments is higher at the edge of the valley than  
4 it is where the creek is in the valley.

5 In this particular case you will notice  
6 that the creek is depicted as being incised or  
7 eroded down into its own sediments, which is the  
8 condition that's observed in Coyote Creek. The top  
9 of the alluvial floodplain is above the creek  
10 level, so there's a lip or an escarpment at the  
11 face of the -- at the face of the alluvial  
12 sediments next to the creek.

13 So with that description, the point is  
14 that the assertion that the plants nearest the  
15 creek, quote, should have the best access to  
16 subirrigation, unquote, has no scientific basis as  
17 an expectation or rule of thumb for a stream like  
18 Coyote Creek.

19 For a stream that is incised into its  
20 floodplain, as Coyote Creek is, the lip of the  
21 terrace closest to the creek will undergo the  
22 deepest and most rapid decline of groundwater  
23 levels as the creek levels decline in the spring  
24 and summer into the dry season.

25 In areas away from the creek towards the

1 side of the alluvial valley, groundwater levels  
2 decline less and decline more slowly than right at  
3 the creek. Any part of the floodplain terrace --  
4 if any part of the floodplain terrace were to see  
5 groundwater levels drop below the effective depth  
6 for subirrigation, it will be in the areas closest  
7 to the stream, and those would be the areas you  
8 would expect to see dry season stress to the crops.

9 If the plant patterns perceived by the  
10 author in the 2009 report in fact exist, those  
11 patterns reflect drought stress rather than some  
12 other end -- I'm sorry -- if those patterns reflect  
13 drought stress rather than some other process or  
14 event. That stress is found exactly where it would  
15 be expected in the alluvial valley sediments that  
16 do not have subirrigation support. It is a  
17 verification of the observation of OSM in 1985 that  
18 subirrigation in Coyote Creek drainage is important  
19 and it is a confirmation of OSM's expectation that  
20 AVF is likely.

21 Q. And before we move on from the 2009  
22 report, are there any other problems or things that  
23 you would take issue with as far as the findings in  
24 that report?

25 A. Yes, there is. The second sentence of the

1 two-sentence dismissal of the AVF, I think, is  
2 inaccurate or misleading. The assertion that areas  
3 perceived as having denser or more vigorous growth  
4 are not beneficiaries of subirrigation by  
5 groundwater, but of, quote, additional surface  
6 water, unquote, I think is without merit.

7           There is no evidence that any of the crops  
8 are receiving water from anything but groundwater.  
9 For the sake of argument perhaps, there is more  
10 surface water recharging the alluvial valley in the  
11 vicinity of the footslope at the site of the  
12 valley. It's irrelevant. Regardless of its  
13 origin, the water is alluvial groundwater when it  
14 is taken up by the plants on the floodplain, and it  
15 is that groundwater that is taken up by the plants  
16 that enhances the agricultural production. And  
17 everyone agrees that the floodplain has higher  
18 production.

19           None of the groundwater in an alluvial  
20 valley originates in the alluvial aquifer. The  
21 groundwater is a composite of precipitation of  
22 recharge from Coyote Creek when it is high,  
23 discharge from runoff -- I'm sorry -- recharge from  
24 runoff from the uplands, recharge from any side  
25 streams that flow across or onto the alluvial

1 valley and bedrock discharges that flow into it  
2 from the sides or beneath. All those sources of  
3 water contribute to the hydrology of the aquifer.  
4 There is no separate accounting system that negates  
5 the contribution of some particular source of water  
6 with respect to whether or not subirrigation is  
7 effective. All of the water contributes to the  
8 subirrigation when it exists. It all counts.

9 Q. Do you have a professional opinion to a  
10 reasonable degree of scientific certainty as to  
11 whether AVF exists in the Coyote Creek drainage at  
12 the Voigt property?

13 A. Yes.

14 Q. And what's that opinion?

15 A. AVF is demonstrated to exist in the Coyote  
16 Creek drainage where the Voigt property is used for  
17 hay production.

18 Q. And do you have a professional opinion to  
19 a reasonable degree of scientific certainty as to  
20 whether AVF exists elsewhere in the Coyote Creek  
21 drainage?

22 A. Yes.

23 Q. And what's that opinion?

24 A. I share the opinion of OSM in 1985 that  
25 AVF is likely to occur elsewhere in the Coyote

1 Creek drainage.

2 Q. Okay. And you indicate that it likely  
3 occurs, so your opinion is certain with respect to  
4 the Coyote Creek drainage where the Voigt property  
5 is used for hay production and you believe it  
6 likely occurs elsewhere in the Coyote Creek  
7 drainage. Can you explain that?

8 A. Yes. In the Voigt property the vegetative  
9 patterns that are described in the 2009 Dakota  
10 Westmoreland are consistent with a confirmation of  
11 alluvial valley floor in those locations. I have  
12 seen no investigations or data from other areas  
13 that would allow one to move from an opinion of  
14 likely existence to demonstrated existence except  
15 in the Voigt areas.

16 Q. Okay. And have you seen any  
17 investigations or data from other areas of Coyote  
18 Creek -- the Coyote Creek drainage that demonstrate  
19 AVF does not exist?

20 A. No.

21 Q. Okay. And just one more quick question.  
22 We've been talking about the OSM report. Is it  
23 your understanding that this was a report of  
24 findings produced by the Office of Surface Mining?

25 A. Yes.

1 MR. BRAATEN: I have no further questions  
2 and would offer the OSM report in as Voigt Exhibit  
3 No. 2.

4 JUDGE MANN: Mr. Bjella?

5 MR. BJELLA: I have no objection to  
6 Exhibit 2, but I would state that he has --  
7 Mr. Norris has testified substantially from the  
8 Dakota Westmoreland report, so I believe it must be  
9 admitted as an exhibit.

10 JUDGE MANN: Mr. Braaten?

11 MR. BRAATEN: I have no objection. The  
12 reason I'm asking for the OSM report and not the  
13 others, and I'll let Illona correct me if I'm  
14 wrong, but my understanding is that the others are  
15 part of the administrative record and this one  
16 isn't. But if we want to make that an exhibit to  
17 this proceeding, I have no problem with that  
18 either.

19 MS. JEFFCOAT-SACCO: I was going to ask  
20 for the same request as Mr. Bjella. Everything  
21 that's been docketed as part of the administrative  
22 record is not evidence in the evidentiary record of  
23 the hearing, and if we want it in, even the permit,  
24 somebody has got to put it in. So I would also  
25 hope that the Westmoreland report is coming in, and

1 then I'm not sure what the others were here that  
2 we -- if we talked about them or not, if they have  
3 to go in.

4 MR. BRAATEN: There would be two others,  
5 the CHIA, Cumulative Hydrologic Impact Assessment,  
6 which is in the form of a memorandum, I believe,  
7 produced by the PSC. What was the other one? Oh,  
8 and the Bickel report, which I think was produced  
9 by Coyote Creek -- or Mr. Bickel was hired by  
10 Coyote Creek.

11 MS. JEFFCOAT-SACCO: I would ask for them  
12 all to come in and just someone give them their  
13 names and numbers.

14 JUDGE MANN: Mr. Bjella?

15 MR. BJELLA: I would concur, Your Honor.

16 JUDGE MANN: The OSM report will be Voigt  
17 Exhibit No. 2. The Coyote Creek Alluvial Valley  
18 Study, looks like conducted by Dakota Westmoreland,  
19 October 2009 revision, that will be Exhibit --  
20 Voigt Exhibit No. 3. And the October 15th, 2014,  
21 memorandum, Public Service Commission -- what did  
22 you reference that document as?

23 MR. BRAATEN: The CHIA, Cumulative  
24 Hydrologic Impact Assessment.

25 JUDGE MANN: All right. That will be

1 identified as Voigt Exhibit 4.

2 The Alluvial Valley Floor Evaluation  
3 Report prepared by Dr. David Bickel, that will be  
4 Voigt Exhibit No. 5.

5 And then I think it also makes sense to  
6 have in the diagram as well. That will be Voigt  
7 Exhibit No. 6.

8 Mr. Bjella, did you have any objections to  
9 any of these exhibits that have been offered, 2  
10 through 6?

11 MR. BJELLA: Could I just ask a question  
12 of Mr. Norris with respect to No. 6?

13 JUDGE MANN: That's fine. Well, you'll  
14 have the ability to cross-examine him soon, so -- I  
15 mean, if you want to do it right now, just a quick  
16 one before admitting the exhibit, that's fine.

17 Mr. Norris, Mr. Bjella is going to ask you  
18 a question.

19 THE WITNESS: Sure.

20 MR. BJELLA: No. 6, if I understand it, is  
21 just illustrative. This is not an actual diagram  
22 of Coyote Creek; is that correct?

23 THE WITNESS: That's correct.

24 MR. BJELLA: I have no objection.

25 JUDGE MANN: Ms. Jeffcoat-Sacco, any

1 objections to 2 through 6 -- Voigt?

2 MS. JEFFCOAT-SACCO: We have no  
3 objections. We may have a question we'll discuss  
4 with Derrick at the break.

5 JUDGE MANN: Certainly. And, Mr. Braaten,  
6 that concluded your examination at this time?

7 MR. BRAATEN: Yes, Your Honor.

8 JUDGE MANN: Mr. Bjella,  
9 cross-examination?

10 MR. BJELLA: Yes, Your Honor.

11 **EXAMINATION**

12 **BY MR. BJELLA:**

13 Q. Mr. Norris, referring to Exhibit No. 2,  
14 the OSM report -- since you're not here and I can't  
15 show it to you, I assume you have a copy with you.

16 A. Yes, I do.

17 Q. I'm going to turn to page 1, and I'm not  
18 sure if that's what the commissioners have for page  
19 1. It starts at the top, top draft and then the  
20 word "introduction." Do you have that?

21 A. Just a moment. Yes, I have that.

22 Q. It's my page 1, but I'm not sure if it's  
23 everybody else's. And so since I can't show this  
24 to you, if you'd go to the -- I guess it would be  
25 paragraph 4, it starts with the word, "These maps"

1 do you see that?

2 A. Yes. The last paragraph on the page?

3 Q. Right. Could you read those first two  
4 sentences?

5 A. Sure. "These maps represent only a  
6 reconnaissance-level effort in the identification  
7 of areas which are likely -- likely underlined --  
8 to meet this definition, and these areas,  
9 therefore, are called potential -- potential  
10 underlined -- alluvial valley floors. The intent  
11 of this mapping effort is to identify areas which  
12 might at a future date be designated as alluvial  
13 valley floors.

14 Q. So this document is not a criteria in  
15 determination of alluvial valley floor for Coyote  
16 Creek, is it?

17 A. I'm not sure what you mean by "criteria."

18 Q. Well, this doesn't determine that Coyote  
19 Creek is an alluvial valley floor, does it?

20 A. No. It just says that it likely is.

21 Q. And this was a very large-scale study over  
22 a wide area of western North Dakota at a very high  
23 level, was it not?

24 A. Yes.

25 Q. Now, you are aware, are you not, that when

1 alluvial valley floor determinations are submitted  
2 by mining companies to the Public Service  
3 Commission, that the Public Service Commission not  
4 only reviews that report, but makes its own  
5 independent determination and often its own  
6 investigation? Are you aware of that?

7 A. I am aware that the Public Service  
8 Commission can do an independent investigation and  
9 it can collect its own data. I don't know whether  
10 or not that was done in this case.

11 Q. So you're not aware of the letter from the  
12 Public Service Commission to the mining company  
13 which indicates it did its own independent  
14 verification and found and agreed no AVF? You're  
15 not aware of that letter?

16 A. I am aware of the letter indicating that  
17 the agency found -- made a finding of no alluvial  
18 valley floor.

19 Q. And that letter indicates it made an  
20 independent determination of that fact. Are you  
21 aware of that?

22 A. I don't, as I sit here, recall the exact  
23 wording of the agency's letter.

24 Q. So now what we have presented and what you  
25 have presented are two very detailed, long reports

1 prepared by what appear to be experts in the field,  
2 certainly Mr. Bickel and Dakota Westmoreland, both  
3 of which have made studies of Coyote Creek and both  
4 of which have determined there is no AVF. You're  
5 aware of that, are you not?

6 A. I am aware and have read both the Bickel  
7 and the Dakota Westmoreland studies. I've read the  
8 OSM reconnaissance study in both the Bickel -- the  
9 Bickel report simply summarized the previous  
10 reports, and the Westmoreland had a great deal of  
11 data and discussion in it, but the bulk of that was  
12 unrelated to alluvial valley floors, and the only  
13 data and discussions related specifically to  
14 alluvial valley floors in the Westmoreland, which  
15 is, I think, of the documents, the key document.  
16 The only portion of that that really dealt with the  
17 possible evidence for or against alluvial valley  
18 floors was the walkover data.

19 The rest of it was interesting, it  
20 contributes to your understanding of the hydrology  
21 of the lands surrounding Coyote Creek, but it is  
22 not explicitly -- does not explicitly investigate  
23 or is directly applicable to a determination for an  
24 alluvial valley floor determination. There's  
25 remarkably little that actually investigated the

1 potential for alluvial valley floors in either of  
2 those documents.

3 Q. Well, I'm going to refer you to -- it's  
4 your Exhibit 5, this is Mr. Bickel's report, and it  
5 would be page 2, the second paragraph. I'm going  
6 to state -- I'm just going to sort of paraphrase  
7 there because, again, you're not here. It says the  
8 report is based on existing information and  
9 published work, approved mining permits and related  
10 data in the public domain from surface mining  
11 reclamation and regulatory agencies. However,  
12 observations made by environmental professionals  
13 involved in the acquisition of baseline data for  
14 future Coyote Creek Mining Company permit  
15 applications are incorporated and attributed to  
16 individuals where appropriate.

17 That right there is a demonstration of  
18 independent data having been reviewed by  
19 Mr. Bickel, is it not?

20 A. It indicates he reviewed other people's  
21 data -- unspecified data from unspecified people.  
22 It's a generic statement that is repeated verbatim  
23 in the other documents, but these documents do not  
24 present that data, and most of the data that they  
25 do reference and present in these reports are

1     pertinent to hydrologic aspects of the mine area,  
2     but not to alluvial valley floor determination.

3           Q.     With respect to the Bickel report, Exhibit  
4     5, did you review the climate and hydrologic --  
5     hydrology section of the Bickel report, starting on  
6     page 8?

7           A.     I did.

8           Q.     And did you review the soil section of the  
9     Bickel report, starting on page 16?

10          A.     I did.

11          Q.     If you look at those pages, they're full  
12     of independent data. How can you dispute that?

13          A.     I don't dispute that there is a lot of  
14     data presented in those parts of the report.

15          Q.     Mr. Norris, did you visit the Coyote Creek  
16     site to make this assessment you made today?

17          A.     No. I used only the information in -- or  
18     related to the alluvial valley floor discussions in  
19     the permit application and the findings documents.

20          Q.     So to your criticism of the other experts,  
21     you too have made no independent study and  
22     independent data review, have you?

23          A.     That's correct.

24                   MR. BJELLA: I have no further questions.

25                   JUDGE MANN: Ms. Jeffcoat-Sacco.

1 MS. JEFFCOAT-SACCO: I believe this is  
2 Exhibit A for asking if Director Deutsch could  
3 question this witness, please.

4 MR. BRAATEN: Certainly.

5 JUDGE MANN: Go ahead, Mr. Deutsch.

6 **EXAMINATION**

7 **BY MR. DEUTSCH:**

8 Q. Mr. Norris, you mentioned at the beginning  
9 of your testimony that you felt the AVF section of  
10 the actual permit application was deficient. Are  
11 you aware that the state, as well as federal rules,  
12 require the -- a preapplication determination for  
13 alluvial valley floor determinations?

14 A. Yes, I am aware of that. However, I would  
15 -- I did not make any judgments as to whether there  
16 was a deficiency in the application. I merely made  
17 the observation that the documents that were  
18 referenced were not part of the application.

19 Q. But included in the application was a  
20 reference to the studies that had been conducted  
21 then as well as including a copy of the letter that  
22 we issued making our AVF determination? That was  
23 included in the application?

24 A. Yes.

25 Q. With regard to what's been labeled as

1 Voigt Exhibit 2, on that introduction section that  
2 Mr. Bjella mentioned earlier, I noticed on this the  
3 way things were copied that there's some discussion  
4 about the background going in for this  
5 reconnaissance report that was prepared by OSM,  
6 then going to the next page it appears that part of  
7 that is missing. Do you have that available to you  
8 right now? It's part of that -- that paragraph  
9 carries over onto the next page and the top of that  
10 next page is cut off. So it appears what is in  
11 Exhibit 2 here is incomplete. I don't know if  
12 there's anything -- critical comments here that  
13 have been omitted from that, the way it was copied,  
14 or not.

15 JUDGE MANN: What page is that? Can you  
16 identify that again for me?

17 MR. DEUTSCH: It would be on page 1. Then  
18 you go to page 2, then it's -- the copy that we  
19 have, it's sideways and part of it is cut off.  
20 It's marked as page 2.

21 JUDGE MANN: The exhibit that I have it's  
22 not cut off. Do we have a number of different --  
23 why doesn't everybody have the same exhibit, I  
24 guess?

25 MR. BRAATEN: I don't know. I think that

1 one of these copies just got something screwed up  
2 in our printer when we were printing them out. I  
3 don't notice anyone else having that issue, and I  
4 just handed them another one.

5 JUDGE MANN: The record contains a full --  
6 it appears that the record contains a full copy,  
7 but I just want to make sure that everybody who's,  
8 you know, reviewing the documents is looking at the  
9 same thing.

10 COMMISSIONER CHRISTMANN: Your Honor, my  
11 page 2 is cut off.

12 JUDGE MANN: Yours is cut off?

13 COMMISSIONER KALK: I think all three of  
14 ours are.

15 JUDGE MANN: All right.

16 MR. BRAATEN: Sorry about that.

17 JUDGE MANN: I think as long as we have  
18 the full document in the record, it's okay, but I  
19 think it's important that everybody have the  
20 opportunity to -- right now to view the full  
21 document while we're doing examination of the  
22 witness.

23 COMMISSIONER CHRISTMANN: The same thing  
24 happens, Your Honor, on a couple other pages, like  
25 18 and some later than that.

1           JUDGE MANN: Mr. Braaten, do you have any  
2 others? I mean, the one that's in the record, the  
3 one that I've marked as Exhibit 2, appears to be a  
4 full copy of the document. Do you have others that  
5 are like this one?

6           MR. BRAATEN: I have now handed my  
7 others -- all the others.

8           JUDGE MANN: Why don't we just take a real  
9 short break right now and see if we can get full  
10 copies of the Exhibit No. 2 to the commissioners  
11 and the parties. Why don't we do that. Is that  
12 okay? Let's go off the record.

13           (Recess taken at 9:38 a.m. to 9:54 a.m.)

14           JUDGE MANN: Mr. Norris, this is the  
15 administrative law judge again.

16           THE WITNESS: Yes.

17           JUDGE MANN: We're back on the record and  
18 we're going to continue with your examination.  
19 Okay?

20           THE WITNESS: Okay.

21           JUDGE MANN: Mr. Deutsch, did you have  
22 additional questions?

23           MR. DEUTSCH: Just a couple.

24           JUDGE MANN: Go ahead.

25           Q. (MR. DEUTSCH CONTINUING) Mr. Norris, I

1 guess, going to the 2009 Dakota Westmoreland Coyote  
2 Creek AVF study, on -- at the bottom of page 28,  
3 then going to the top of page 29, it discusses some  
4 wells that were in the area of the farmstead  
5 occupied by Casey Voigt, and going to the first  
6 complete paragraph on page 29, would you read those  
7 last two sentences of that paragraph on page 29?

8 A. I am a little confused. You're talking  
9 about the Bickel report?

10 Q. No. I'm talking about the Dakota  
11 Westmoreland.

12 A. Oh, the Dakota Westmoreland. All right.  
13 Just a minute. I'm sorry. And you are on page 28  
14 of the --

15 Q. It started on page 28 under the heading  
16 existing subirrigation, then going to page 29.

17 A. Okay.

18 Q. That first complete paragraph on the top  
19 of page 29, those last two sentences that start  
20 out, "The landowner also reported." Could you read  
21 those two sentences?

22 A. "The landowner has also reported well  
23 water levels at 15 to 20 feet. Root systems of the  
24 annual crops and forage grasses grown in Sections  
25 19, 30, and 31 typically" --

1           JUDGE MANN: Mr. Norris, sorry. Can you  
2 speak up a little.

3           THE WITNESS: Okay. I will try. I will  
4 try again. "The landowner has also reported well  
5 water levels at 15 to 20 feet. Root systems of the  
6 annual crops and forage grasses grown in Sections  
7 19, 30, and 31 typically would not tap water  
8 resources at such depths to significantly increase  
9 yields, nor would rangeland plants subjected to  
10 grazing."

11          Q. (MR. DEUTSCH CONTINUING) Okay. With  
12 regard to that last sentence, kind of the  
13 conclusion that was drawn about the water tables  
14 being down 15 to 20 feet and having -- you know,  
15 with the result of that depth of water table, that  
16 that would be basically insignificant to increasing  
17 yields, would you agree or disagree with that  
18 statement?

19          A. Well, with no more information than that,  
20 I can't agree or disagree with it because the  
21 position of the wells being explicitly talked about  
22 there relative to where the plants are being  
23 observed or the hayfields are is not clear. The  
24 other thing that is important with respect to  
25 subirrigation is an appreciation of the fact that

1 the plant roots do not need to get to the water  
2 table to have the water table providing them useful  
3 water.

4           There is a zone of partial saturation that  
5 extends above the water table, and depending on the  
6 specific types of sediments and the drain sizes,  
7 the partially saturated zone above the water table  
8 can extend for quite a few feet. So that although  
9 the water table -- if the water table were 15 feet  
10 below a terrace level, the crop roots would not  
11 likely hit the water table itself, but they don't  
12 need the water table. They just need sufficient  
13 saturation that the saturation is above the wilting  
14 point of the plant, and that can extend several  
15 feet, in finer sediment five or ten feet above the  
16 water table itself.

17           The crops themselves offer the best  
18 measure of whether or not they're getting that  
19 water. If you want to see whether the crops are  
20 getting the water other than their productivity,  
21 like a second hay crop or something like that, then  
22 you need to put in piezometers at the water table  
23 and watch for the daily fluctuations that represent  
24 plant uptake during the day.

25           None of those studies have been proposed

1 here, but the sentences that you asked me to read  
2 are certainly a caution. It says if there's  
3 subirrigation going on here, it has to be  
4 documented, it has to -- you need to be concerned  
5 if the water level is 15 feet or 20 feet below the  
6 land surface under the crops, but it doesn't  
7 preclude that there's subirrigation going on.

8 Q. Doesn't that statement imply that at those  
9 depths that the root systems would probably get  
10 very little water that will help sustain plant  
11 growth?

12 A. At the point of that well perhaps, but as  
13 you move -- if you're going to have that kind of  
14 depth, based on the unsized nature of that  
15 floodplain, I'm guessing that those wells that are  
16 being talked about are near the creek. As you move  
17 away from the creek and the water table rises, then  
18 that depth to water at the well is going to vary,  
19 is going to decrease as you move to the edge of the  
20 valley.

21 It's just one point, and it's an important  
22 observation, but the suggestion -- the observation  
23 that the crops don't look as good near the lip of  
24 the floodplain, that's what this 10 or 15 would  
25 say, yeah, that might not be surprising. But where

1 the crops are still good and you know the water  
2 table is going to be higher, similarly that depth  
3 in other parts of that field are not going to be  
4 that great.

5 Q. Okay. I guess along those lines, that  
6 gets to the next question I have and that deals  
7 with the diagram that you provided, what was marked  
8 as Exhibit 6.

9 A. Yes.

10 Q. Do you have any data to show that that  
11 actually represents the conditions at Coyote Creek?

12 A. No. There have been -- there have not  
13 been the data collected that allows one to generate  
14 such a diagram for Coyote Creek. That is just a  
15 schematic of what would be expected in a normal  
16 floodplain with homogeneous floodplain materials  
17 that make it up. To my knowledge, there have been  
18 no detailed profiles made across the floodplain  
19 anywhere in Coyote Creek.

20 MR. DEUTSCH: I have nothing further.

21 MS. JEFFCOAT-SACCO: I have a question.

22 JUDGE MANN: Go ahead, Ms. Jeffcoat-Sacco.

23 **EXAMINATION**

24 **BY MS. JEFFCOAT-SACCO:**

25 Q. Mr. Norris, this is Illona, and I just had

1 one question. We're talking fourth-grade level  
2 here. But I need to know precisely what your  
3 recommendation is regarding this permit and this  
4 hearing. You did answer Mr. Deutsch and say you  
5 were not saying the permit information was  
6 deficient, so -- that was going to be one of my  
7 questions -- what is your recommendation?

8 A. I would recommend that the issue of no  
9 alluvial valley floor be revisited, that the  
10 requisite data to resolve ambiguities that have to  
11 be considered existent at this point because of a  
12 lack of information that's been collected, I think  
13 there need to be boring and piezometer profiles  
14 across the alluvial valley system --

15 Q. Could you repeat --

16 A. -- the schematic --

17 Q. Excuse me. Before you go on, could you  
18 repeat that first subrecommendation? There should  
19 be boring and what?

20 A. Piezometer profiles.

21 Q. Can you spell it?

22 A. Water level profiles that will allow --  
23 allow the water table to both be documented at a  
24 given time, but also documented as to fluctuations  
25 in the water table literally on a daily basis,

1 installing pressure transducers that during August  
2 and September can look for daily fluctuations in  
3 the water elevation at the water table that can be  
4 indicative of plant uptake.

5           You literally can have a few hundredths of  
6 a foot of water level decline during the day when  
7 the sun is out and the plants are taking water and  
8 at night the water levels come back up and recover.  
9 It's direct evidence of the plants taking water  
10 from the groundwater. And you have then also the  
11 ability when you put in those piezometers to sample  
12 and describe the sediments that make up a profile  
13 across the Coyote Creek terrace so that you can  
14 fill in the yellow areas of that schematic as to  
15 exactly what exists where in that creek. You've  
16 got an idea of the drain sizes that are applicable  
17 to the floodplain so that you can then project the  
18 capillary fringe to partially saturated interval  
19 from which the plants typically will seek to draw  
20 their water. You can fill in that schematic with  
21 what the real condition is and that, I think, needs  
22 to be done in several places, not just on the Voigt  
23 property, but other places up creek or down creek  
24 from that to have a view as to whether or not the  
25 subirrigation that seems evident on the Voigt

1 property in fact also exists more extensively in  
2 the valley.

3 My recommendation would be a detailed and  
4 meaningful investigation of data that is pertinent  
5 to identifying subirrigation, and that is missing  
6 from what's been done to date.

7 MS. JEFFCOAT-SACCO: Thank you. That's  
8 all I have.

9 JUDGE MANN: Commissioner Christmann.

10 **EXAMINATION**

11 **BY COMMISSIONER CHRISTMANN:**

12 Q. I didn't write it down, but did you say  
13 something kind of earlier in your testimony about  
14 specific or different standard or requirement from  
15 OSM if AVF exists?

16 A. Yes. There are -- there are rules. If  
17 AVF exists, then there are additional parts of the  
18 surface mining law that specifically address the  
19 protection of the hydraulic function of the AVF  
20 areas, the ability of those to during and  
21 postmining continue to support the agriculture that  
22 they do at present.

23 Q. So does what you just said mean that OSM  
24 would require that those lands not be disturbed or  
25 that they be restored back to what they are now?

1           A.     The AVF rules would preclude -- it's been  
2 a while since I specifically read them, but, as I  
3 recall, they would preclude mining through them.  
4 But in this case Coyote Creek is adjacent to, not  
5 -- not within the footprint of mining.

6           At issue here would be that the impacts of  
7 mining outside the actual mine area itself not  
8 interfere with the hydraulic function of those  
9 alluvial valley floors. And it's a -- the first  
10 step of the alluvial valley protection is clearly  
11 identifying whether or not alluvial valley floors  
12 exist, then it goes into a set of regulations that,  
13 okay, if they exist, these are the following  
14 determinations that need to be made, and there, I  
15 know, are sections of exemptions that can be sought  
16 or declared for particular lands or something else.  
17 But any alluvial valley floors that do not become  
18 exempted from the protections then are -- it isn't  
19 just the physical protection of the land from  
20 mining, it is a protection of the hydraulic  
21 function of those alluvial valley floors that make  
22 them work as a contributor to the agricultural  
23 economy.

24           Q.     So none of the areas that you're certain  
25 contain AVF are in the areas that are going to be

1       mined directly?

2             A.     I believe that to be the case, yes.

3             Q.     But just close by so you're concerned that  
4       the adjacent mining will disturb -- will harm them?

5             A.     My concern is that I believe there are  
6       AVFs there that are not being recognized, and by  
7       virtue of that the investigations necessary to  
8       determine whether there is a risk to them have not  
9       been done.

10            I don't have an opinion as to whether  
11       there is risk or is not risk at this point, because  
12       there is so little evidence that has even been  
13       sought for the determination of AVFs, that I think  
14       that is inadequate at the face level.

15            There is, I think, sufficient evidence  
16       that I'm convinced there is AVF under the Voigt  
17       hayfields.  But the question of the risk to them  
18       would require yet further determination of what's  
19       going on out there.  And so it's too early to say  
20       that I'm concerned about the effects on them.  I'm  
21       concerned that there is a determination that  
22       they're not there.

23            Q.     Okay.  This morning Mr. Braaten put quite  
24       a bit of paperwork before us already, and in your  
25       testimony throughout I felt you were pretty

1 critical of some of the studies that have been done  
2 for just kind of -- in one case recycling someone  
3 else's information or not gathering information at  
4 the right times or not gathering very good and  
5 accurate information. And then in response to  
6 Mr. Bjella's last question, we find that you  
7 haven't been here at all.

8 So can you just elaborate on that more,  
9 why I should give a lot more credence to your  
10 assessment than what we should give to the other  
11 assessments that were handed out and were  
12 subsequently kind of criticized by you?

13 A. Yes. I would like to clarify that. The  
14 reports that were produced by Westmoreland and were  
15 produced for Coyote Creek by Bickel are not  
16 invaluable with respect to the issue of water  
17 availability to the Coyote Creek valley. They do  
18 talk about the hydrology, and certainly summary  
19 discussions of the hydrology of areas adjacent to  
20 or obviously within a mine are valuable. And, for  
21 instance, the Bickel report does summarize a lot of  
22 the hydrologic data that is hundreds and hundreds  
23 of pages in the permit application itself, and the  
24 Westmoreland document is the same.

25 To me the importance with respect to

1 alluvial valley floors, though, is not the summary  
2 of the other data that's available, as valuable as  
3 that summary may be, but that data does not address  
4 and does not investigate alluvial valley floors,  
5 which is the issue I'm trying to testify with  
6 respect to.

7           The overwhelming totality of those two  
8 reports is addressing, is there water available to  
9 the Coyote Creek drainage that alluvial valley  
10 floors may exist, and that really is not in dispute  
11 or at issue in that there are all kinds of springs  
12 and seeps and waters that are described as feeding  
13 Coyote Creek and its tributary.

14           Coyote Creek, everyone acknowledges, has a  
15 perennial stream running through it. That then  
16 says, okay, we've got the alluvial valley sediments  
17 that everybody is there -- says is there. We have  
18 a perennial stream, which is kind of absolute  
19 evidence that you have available water in that  
20 drainage. You have at least anecdotal  
21 acknowledgment of increased crop production. The  
22 only issue that really is there is subirrigation.  
23 And the Bickel report does not offer anything  
24 beyond the Westmoreland -- Dakota Westmoreland  
25 report and the OSM.

1           And if you look into the Dakota  
2 Westmoreland report, it too is discussing  
3 availability of water to the valley, but except for  
4 the walkover they made in May, it offers no direct  
5 observations or evidence of anything that addresses  
6 the question of is or is not there subirrigation  
7 that is contributing to the enhanced agriculture  
8 that's there.

9           So it's not that those reports do not have  
10 their value. It's not that they don't give you an  
11 understanding of the relationship between Coyote  
12 Creek and the uplands. They do provide that  
13 summary information, but they don't provide  
14 information that allows you to say that  
15 subirrigation is not operating in that valley. If  
16 anything, at least for the Voigt hayfields, what  
17 limited observations were directly made pertinent  
18 to that are evidence that that enhanced hay  
19 production is due to subirrigation of those fields.

20           Q.    How far upstream of the Voigt ranch is the  
21 origination of Coyote Creek?

22           A.    I don't know. I would have to look at a  
23 map. I believe it's quite a ways south of where  
24 the Voigt ranch is, but how many miles, I don't  
25 know.



1 designs and programs there. In particular one of  
2 the bigger areas -- bigger projects that I worked  
3 on was a -- a reclamation plan that would have  
4 incorporated coal combustion fly ash into the  
5 reclamation plan in an attempt to control acid mine  
6 drainage. A pretty wide range of issues.

7 Q. All right. Thank you, Mr. Norris. I was  
8 just then trying to relate that back to North  
9 Dakota. Would you agree that the mining, the soil  
10 types and the types of coal and the coal depth are  
11 much different in these two states?

12 A. Oh, sure. And the climate, of course, is  
13 dramatically different between the areas.

14 Q. Okay. Then could you just clarify for the  
15 record where exactly the 100th meridian is? Give  
16 me some towns or something other than a hundredth  
17 meridian.

18 A. I, again, would have to go to a map and  
19 look for exactly where the hundredth meridian is.

20 Q. It seemed to me that was a critical point  
21 in your testimony about the hundredth meridian and  
22 how that tied into alluvial valley floors, so I  
23 would just like to get that location in relation to  
24 North Dakota coal.

25 A. Well, I could take a moment and look at a

1 map, but the importance of the hundredth meridian  
2 is that it is -- west of it the surface mining law  
3 considers -- I mean, alluvial valley floors do not  
4 exist within the surface mine east of the hundredth  
5 meridian. It is designed to protect the  
6 agricultural -- or the irrigation-dependent  
7 agriculture of the arid west.

8 Q. But you see my question, Mr. Norris, we're  
9 trying to relate this to North Dakota. So that's  
10 not for you, I guess. But I'll just move on then.

11 Commissioner Christmann kind of went down  
12 this road a little bit, but I want to just clarify.  
13 Are you questioning the data or the interpretation  
14 of the data or just lack of data?

15 A. Certainly I think there is a lack of data,  
16 but I also interpret -- or I also question the  
17 interpretation of the data. The issue of  
18 subirrigation under the Voigt properties, the  
19 pertinent data consists of what was described by  
20 somebody walking over the property in May, and that  
21 was the basis of the determination or the  
22 conclusion in the Dakota Westmoreland that  
23 subirrigation did not play a part. I question that  
24 interpretation. The description, the data that  
25 that delivered was a description that would be

1 perfectly consistent with the geometry between the  
2 alluvial terrace and the creek and affected  
3 subirrigation over parts of those hayfields.

4 Q. Mr. Norris, if I could just keep going.  
5 When did you start your work on this project?

6 A. About three weeks ago.

7 Q. So you feel that's given you enough time  
8 to fully look at all the literature that's tied to  
9 the history of these projects -- these type of  
10 projects in North Dakota?

11 A. I would very much have liked to have had  
12 more data -- or, I mean, more time, but it  
13 actually, I think, was adequate for the issue of  
14 the subirrigation finding. With more time I would  
15 have liked to have looked at other parts of the  
16 permit, but I'm comfortable that I understand what  
17 was in the permit application and what data was  
18 relied upon to come to -- to the conclusion there  
19 was no alluvial valley floor.

20 Q. And then in general for those doing  
21 research, wouldn't you trust the research of  
22 somebody doing a field study more than you would a  
23 report that you read? Wouldn't you rather have a  
24 determination being somebody who went out and  
25 walked the ground, looked at the soil types, looked

1 at the flow who had experience? Wouldn't that  
2 generally be preferred?

3 A. Boots on the ground is, given the  
4 opportunity, probably my first choice.

5 Q. And then just a couple questions about  
6 your illustration of the alluvial floodplain. When  
7 you say that -- I'm using your chart here, the blue  
8 area, alluvium, is that a makeup of O horizon, A  
9 horizon? Which soil horizon is that made up of, or  
10 what is it exactly?

11 A. Without borings in it, we don't know other  
12 than they are -- there is a general consensus it is  
13 unconsolidated water lane deposits, but certainly  
14 the bulk of what we're looking at there would be  
15 below the typical soil zonation designations.  
16 Those are just sediments that are not -- they  
17 underlie the soils, but the bulk of what we're  
18 looking at on that diagram would not be a soil  
19 profile.

20 Q. It has to be something. It's every an O  
21 horizon, an A horizon, an E horizon, B, C, or to  
22 the bedrock. It has to be classified as something.

23 A. Well, it would be a sediment horizon, yes,  
24 and I don't know -- I'm not a soil scientist. I  
25 don't know what the designations of those are.

1 Q. But you're drawing a conclusion, though.

2 A. I'm drawing a hydrologic conclusion.

3 Q. But don't you have to know the soil type  
4 before you can draw that conclusion?

5 A. Not with respect to the schematic that I  
6 drew.

7 Q. But you haven't done any borings out  
8 there.

9 A. No one has, to my knowledge.

10 Q. But then how can you draw the conclusion?

11 A. There are basic principles of groundwater  
12 flow that have to be honored regardless of what the  
13 label of a type of sediment are. A gravel has  
14 certain characteristics regardless of the name  
15 that's given it in terms of a soil designation. A  
16 sand has characteristics. Alluvial sediments  
17 behave in a generally predictable way regardless of  
18 the label that's on them.

19 You can improve greatly your understanding  
20 in the details, and if you had the borings and if  
21 you had the soil descriptions, the sediment  
22 descriptions and the water measurements, you would  
23 almost certainly find that that schematic that I  
24 gave is very oversimplified. The water table would  
25 not be a straight line from one side of the valley

1 to the other. It would have a topography, an  
2 elevation variation on it based on the sediments  
3 it's going through. But the overriding principle  
4 that will be there is that from the side of the  
5 valley to the stream there will be a slope on the  
6 water table that is highest at the valley edge and  
7 lowest at the creek, and that's all the schematic  
8 is trying to show.

9 Q. Understood. And just my last question,  
10 sir. If someone used a data set that had the  
11 different soil horizons that could clearly show the  
12 groundwater depth and used that in their  
13 determination, wouldn't that be considered the most  
14 accurate way to get a determination?

15 A. It would.

16 Q. So if a certain group used that, you would  
17 support that?

18 A. That is the sort of data that I believe,  
19 in response to an earlier question, that I think  
20 needs to be done for this permit.

21 Q. Are you sure that wasn't done? Have you  
22 reviewed all the data and literature that that  
23 maybe wasn't done somewhere when they did their  
24 determination?

25 A. I have not seen any evidence that that was

1 done in the area where Westmoreland came to the  
2 conclusion -- Dakota Westmoreland came to the  
3 conclusion that subirrigation was not a contributor  
4 to the enhanced production.

5 COMMISSIONER KALK: Thank you, sir.

6 JUDGE MANN: Commissioner Fedorchak.

7 COMMISSIONER FEDORCHAK: Thank you, Judge.

8 **EXAMINATION**

9 **BY COMMISSIONER FEDORCHAK:**

10 Q. Thank you, Mr. Norris, for your testimony  
11 so far. I just have a few questions, followup kind  
12 of summarizing your evaluation of the study of this  
13 AVF a little bit further.

14 So I too am, you know, focusing in on a  
15 couple of the statements that you said suggesting  
16 that there wasn't enough info in the permit  
17 application to address AVF and that there was so  
18 little evidence sought in determining the AVF.

19 Did you -- I wasn't quite clear with Jim  
20 -- Mr. Deutsch's questions to you and his reference  
21 to the pre-permit evaluation of the AVF. Did you  
22 read that?

23 A. Did I read what?

24 Q. The pre-permit -- the work done pre-permit  
25 to evaluate AVF.

1           A.     Well --

2           Q.     And what was that?

3           A.     I read the documents that were cited as  
4     having been provided to the agency for the purpose  
5     of their determination, the original and the  
6     revised Bickel reports, the Dakota Westmoreland AVF  
7     study, the OSM 1985 reconnaissance investigation.  
8     Those documents which were cited in the permit  
9     application or mentioned in the permit application  
10    or were mentioned in the findings letter or were  
11    mentioned in the CHIA as being -- underlying the  
12    interpretation that there was no AVF I did review.

13          Q.     And do you believe that that summarizes  
14    what was all the documents relating to the  
15    pre-permit evaluation of the AVF?  Are we talking  
16    about the same thing here?

17          A.     Well, I think -- I think the pre-permit  
18    determination of no AVF also probably relied upon,  
19    for instance, the baseline -- the baseline data  
20    collected for this mine.  I have no reason to  
21    believe that it didn't rely on the types of and  
22    available material that was generically referenced  
23    but not specifically identified as to what was  
24    included.  But where there was -- I mean, they  
25    alluded to a lot of information without indicating

1 exactly what it was they were relying -- I mean,  
2 what those were. There were the generic statements  
3 that were repeated in the Bickel report and in the  
4 CHIA that reference literally everything in all of  
5 the agency's files. Obviously I don't know, and  
6 could not know, what all of that information might  
7 be, nor could any citizen trying to review the  
8 decision. But where specific documents were  
9 provided that seem to provide a core of the  
10 decisions where the documents were explicitly cited  
11 or quoted, yes, I did review all of those.

12 Q. Okay. Thank you. So thank you for  
13 outlining what you feel should be done in terms of  
14 the boring and the water level profiles and the  
15 examination of that data. Can you tell me, is that  
16 the standard -- industry standard for evaluating  
17 AVF? Is that what is typically done in these kind  
18 of permits, boring throughout the permit area to  
19 basically determine the depth of the water tables  
20 throughout the permit area, or what's the standard  
21 for reviewing these?

22 A. It very much varies from state to state,  
23 and it appropriately varies from mine proposal to  
24 mine proposal even within a state. The type of  
25 data I'm talking about is being collected, has been

1 collected, for example, at Otter Creek in Montana  
2 in response to the agency sending the company back  
3 and saying you've got to collect information that  
4 actually does this. So profiles across a number of  
5 streams and a number of areas were -- were  
6 instrumented towards collecting exactly the kind of  
7 data I was talking about.

8 At South Heart in North Dakota there were,  
9 I believe, four or five piezometer profiles across  
10 streams in that -- for that mine that were  
11 installed and instrumented for a period of at least  
12 a full summer season and fall.

13 At Alton Creek in Utah, there the alluvial  
14 valley issue was not so much hydrologic as it was  
15 geologic and whether the sediments were or were not  
16 water lane alluvial sediments.

17 So it isn't a -- it's something that has  
18 to be defined and pursued given the geology and  
19 hydrology that's seen at the site, and I think the  
20 profiling that was done at South Heart in North  
21 Dakota and that has just been finished and is  
22 available for review at Otter Creek in Montana is  
23 the appropriate kind of investigation that needs to  
24 be done at Coyote Creek -- for Coyote Creek.

25 Q. And then in several locations in these

1 reports -- I'm looking specifically at the Dakota  
2 Westmoreland report -- they reference water levels  
3 at 15 to 20 feet throughout. What are those based  
4 on, those references to the water levels?

5 A. They are -- I mean, what you're reading is  
6 really all I know about them. They are wells.  
7 They do not seem to explicitly identify where they  
8 are. They appear to be in some cases relying on  
9 anecdotal information from a landowner as opposed  
10 to physical measurements. They are what they are.  
11 I don't -- I don't consider them reliable enough --  
12 a reliable enough class of information to draw very  
13 many conclusions from them.

14 It suggests that there may be areas that  
15 are below the depth of plant roots, but I don't  
16 know where the wells are and I don't have where the  
17 wells are completed. I mean, it doesn't -- it  
18 doesn't offer very much of an indication other than  
19 at the footprint of that well, alfalfa might have  
20 trouble reaching usable water.

21 Q. And then how --

22 A. But we don't have any real measurements or  
23 anything that allows us to put it into a context.

24 Q. Thank you. To draw water conclusions  
25 about the depth of water tables, how many -- how

1 much data like that do you need, how many wells do  
2 you have to -- can you fairly estimate in a broad  
3 area the depth of the water table by a few borings,  
4 or what's necessary?

5 A. Typically when these kinds of profiles are  
6 made, the wells will be certainly hundreds of feet  
7 apart. You might have -- depending on the width of  
8 the alluvial valley you're trying -- trying to  
9 investigate, three to six wells in a profile would  
10 be the sort of thing you're looking for.

11 Q. And then in terms of the hayfields on  
12 Mr. Voigt's land, how large of an area is that that  
13 you believe that there is a potential for an  
14 alluvial valley to exist?

15 A. The only -- the only data that are there  
16 suggest that the appropriate decision is that there  
17 are alluvial valley floors there. Without detailed  
18 mapping, detailed crop records, further  
19 investigation, I have no way to estimate the  
20 area -- the aerial extent, the acreage that is or  
21 is not supported with subirrigation.

22 Q. So you haven't narrowed it down to any  
23 specific area?

24 A. There is no data with which to narrow it  
25 down, of which I'm aware, anyway.

1           Q.     All right.  And then in the Dakota  
2 Westmoreland study again, you had mentioned that  
3 the data was collected in the spring, which  
4 wouldn't be the appropriate time to indicate a  
5 plant relying on the water from the alluvial valley  
6 floor.  I note on page 2 that the study says that  
7 it was -- used field investigations, interviews  
8 with producers, regulatory and land management  
9 agency, published reports, aerial photographs, and  
10 Landsat imagery.

11                     Could any of that data have been used to  
12 draw the conclusion from this report that would  
13 lead them to the one that you object to, the two  
14 sentences you object to that the survey revealed  
15 that those plants nearest to the creek -- you say  
16 the survey was done at the wrong time -- could they  
17 have relied on other data or do you know that  
18 that's the survey data that was done in May and  
19 that's why that conclusion is in error?

20           A.     I think it's -- it's quite evident from  
21 the report and it's leading up to the conclusion  
22 section, in fact, that they are relying on that  
23 site investigation.  I mean, their number four  
24 conclusion discusses a depth of water table that  
25 exceeds 15 feet that appears to be anecdotal

1 evidence, and that the only other thing they  
2 reference is water quality in the vicinity of the  
3 homestead which would make flood irrigating  
4 problematic, but that isn't the issue that's being  
5 done.

6 As I read the report, they are relying on  
7 -- they're relying on that walkover for those  
8 particular lands and not the body of data that  
9 you're talking about.

10 COMMISSIONER FEDORCHAK: Okay. I think  
11 that concludes my questions, Mr. Norris. Thank  
12 you.

13 COMMISSIONER CHRISTMANN: I have one more.

14 JUDGE MANN: Go ahead, Commissioner  
15 Christmann.

16 **FURTHER EXAMINATION**

17 **BY COMMISSIONER CHRISTMANN:**

18 Q. From your expertise, when open pit surface  
19 mining like we do in North Dakota is going to occur  
20 in a region with AVFs, what is your recommendation?  
21 Is it just a particular setback to leave a buffer  
22 zone to avoid damage, or is it specific mine  
23 practices that need to occur just to prevent  
24 damage?

25 A. I don't -- I don't like -- when we're

1 talking about hydrogeology, hydrology, I'm  
2 uncomfortable with general rules of thumbs or  
3 setbacks or things like that. I think it requires  
4 a mine-specific understanding of the hydrology of  
5 the probable hydrologic consequences of this mine  
6 in its geologic and hydrologic setting to determine  
7 what the appropriate mine design and potentially  
8 even location is in order to protect alluvial  
9 valley floors.

10 If you try and establish a criteria of,  
11 say, an arbitrary setback, you're going to end up  
12 with situations where that isn't applicable for a  
13 particular mine and a particular siting. I think  
14 the objective needs to be a set of protocols, a set  
15 of guidances towards the investigation that leads  
16 to an investigation that then generates what's  
17 appropriate for this mine. And I think that's  
18 consistent with my understanding of how SMCRA  
19 works, is the mine plan has to be tied to the  
20 probable hydrologic consequences in order to make  
21 sure that excessive unallowable damage doesn't  
22 occur outside the permit area.

23 COMMISSIONER CHRISTMANN: Thank you.

24 JUDGE MANN: Mr. Braaten?  
25

**FURTHER EXAMINATION**

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**BY MR. BRAATEN:**

Q. Just a couple quick questions.

Mr. Norris, in your resume, which is marked as Voigt Exhibit 1, you list a number of reports and presentations and publications. When you're doing a report such as some of the reports we've been discussing, if you have actual data that provides strong support for conclusions you're drawing, do you typically include that data or a citation to it in your report?

A. Absolutely.

Q. And is that a standard practice in your profession?

A. I -- it should be. It does vary a lot by individual and individual. Not everyone does. I think it's unfortunate.

Q. And when we first spoke about preparation for this hearing, you told me that you would only testify if you could limit your testimony to specific areas; right?

A. Yes.

Q. And that was specifically so that you had the time you thought sufficient to prepare your testimony in those areas?

1           A.     That's correct.

2           MR. BRAATEN:   No further questions.

3           JUDGE MANN:   Mr. Bjella?

4           MR. BJELLA:   No, Your Honor.

5           JUDGE MANN:   Ms. Jeffcoat-Sacco?

6           MS. JEFFCOAT-SACCO:   I might have one.  I  
7     want to talk to Jim.

8           JUDGE MANN:   Sure.

9           MS. JEFFCOAT-SACCO:   We don't have any.

10          JUDGE MANN:   Commissioner Christmann?

11          COMMISSIONER CHRISTMANN:   No.

12          JUDGE MANN:   Commissioner Kalk?

13     Commissioner Fedorchak?

14          COMMISSIONER FEDORCHAK:   No.

15          JUDGE MANN:   Thank you, Mr. Norris.  You  
16     can disconnect.

17          THE WITNESS:   All right.  Thank you for  
18     the opportunity.

19          JUDGE MANN:   Mr. Braaten, you can call  
20     your next witness.

21          MR. BRAATEN:   Okay.  I'm going to very  
22     briefly recall Casey Voigt for just a couple  
23     questions.

24          JUDGE MANN:   Mr. Voigt, it's my  
25     understanding that you were previous -- you

1 previously testified in this matter and were sworn  
2 in.

3 THE WITNESS: On Friday, yes.

4 JUDGE MANN: I don't need to readminister  
5 the oath. You remain under the oath, though.

6 THE WITNESS: I respect that.

7 **CASEY VOIGT,**

8 having been previously duly sworn, was examined and  
9 testified as follows:

10 **FURTHER EXAMINATION**

11 **BY MR. BRAATEN:**

12 Q. Mr. Voigt, I've handed you a document.  
13 The title at the top is Voigt Ranch Alfalfa. Can  
14 you just tell us very briefly what this document  
15 is?

16 A. It's a summary of my production records  
17 from baling alfalfa on those fields and also  
18 included some other reference fields further to the  
19 northwest that would be away from the creek valley.

20 Q. Okay. And so which of these fields are in  
21 the area we've been discussing as potentially  
22 having alluvial valley floors?

23 A. The first two on the left. One is what we  
24 consider the field by the house, which is alfalfa,  
25 and then we also have the one by the scoria.

1           Q.     Okay.  Do you know what the legal  
2 description is of those offhand?

3           A.     No, I do not.

4           Q.     No problem.  And then, just generally  
5 speaking, you have two other fields, branding  
6 corrals (north) and branding corrals (south).  Can  
7 you give me an idea of where those are in location  
8 to the other two fields?

9           A.     About a mile north and west and then --  
10 Section 25, I believe.  The first two would be in  
11 Section 30.

12          Q.     And I notice on here for a number of  
13 these, especially in the house and scoria fields,  
14 you have a row for second cutting.  Can you explain  
15 what that means?

16          A.     Usually I try and start on those fields  
17 earlier because, as is evident, every year I do  
18 consistently get a second cutting alfalfa.  So  
19 after we've cut the first cutting and hauled the  
20 bales off, the growth is usually substantial enough  
21 to where we go back in and take a second cutting.  
22 On normal -- on abnormally wet years, such as this  
23 year, we actually get a regrowth of a third cutting  
24 alfalfa.

25          Q.     Tell us again, how long have you been

1 ranching?

2 A. My parents bought the current ranch in  
3 1971.

4 Q. Okay. And in your experience ranching, is  
5 it unusual to get a second and particularly a third  
6 cutting of alfalfa on a field?

7 A. Yes, particularly on dry years. I have  
8 several neighbors here that can attest to how they  
9 drool over my second cutting dry years.

10 Q. And so in dry years in these areas where  
11 we've been discussing the potential of alluvial  
12 valley floors, even in those dry years you're  
13 getting sufficient water to the alfalfa fields to  
14 get a second and possibly a third cutting?

15 A. Yes. And evident on the production  
16 records in 2012, for example, to my knowledge, is  
17 the driest year in the history of our ranch, and I  
18 had in the studies done by Coyote Creek Mining  
19 pointed that out to Donn Steffen that even on a  
20 year like this I still get second cutting alfalfa  
21 off of these fields.

22 Q. Okay. And do you maintain records of your  
23 production on an annual basis when you do these  
24 cuttings?

25 A. Yes, I do.

1 Q. And to the best of your knowledge, is the  
2 information on this sheet an accurate description  
3 of the cuttings you've had from that alfalfa field?

4 A. Yes, it is.

5 MR. BRAATEN: I would offer this in as --  
6 I don't remember which one we're on.

7 JUDGE MANN: It would be 7.

8 MR. BRAATEN: -- Voigt 7.

9 JUDGE MANN: Mr. Bjella?

10 MR. BJELLA: No objection, Your Honor.

11 JUDGE MANN: Ms. Jeffcoat-Sacco?

12 MS. JEFFCOAT-SACCO: No objection.

13 JUDGE MANN: All right. Voigt Exhibit No.  
14 7 is admitted.

15 MR. BRAATEN: Okay. And I have no further  
16 questions.

17 JUDGE MANN: Mr. Bjella?

18 MR. BJELLA: Yes, Your Honor.

19 **FURTHER EXAMINATION**

20 **BY MR. BJELLA:**

21 Q. Mr. Voigt, looking at 2012, looking at the  
22 yield results you got there, they're substantially  
23 less than the -- let's say '9, '10, and '11, which  
24 were very wet years, were they not?

25 A. Yes.

1 Q. So wouldn't you agree it's by almost half  
2 or more if reduced production in 2012 indicates a  
3 lack of subirrigation, you don't have the  
4 groundwater that's there to keep your fields going?

5 A. No. It just enhances it and then you get  
6 more when you have a combination of surface and  
7 subwater.

8 MR. BJELLA: I have no further questions.

9 JUDGE MANN: Ms. Jeffcoat-Sacco?

10 MS. JEFFCOAT-SACCO: We have no questions.

11 JUDGE MANN: Commissioner Christmann?

12 COMMISSIONER CHRISTMANN: I do not.

13 JUDGE MANN: Commissioner Kalk?

14 **FURTHER EXAMINATION**

15 **BY COMMISSIONER KALK:**

16 Q. Just briefly. Casey, thank you for coming  
17 back up today. I just want to walk through, how  
18 does the water flow in your property? Is it  
19 northwest to southeast? What general groundwater  
20 direction does it flow?

21 A. It flows to the north and most of it is  
22 from springs feeding the creek.

23 Q. Okay. Do you have a general feel or based  
24 on your time out there how deep the groundwater  
25 usually is in different areas? You must have some

1 wells that your family has used over the years.

2 A. Yes. There was one in the yard and one  
3 directly to the north of the yard, and I think the  
4 witness, Mr. Norris, had kind of touched on that,  
5 and I would have to agree with him that both of  
6 those wells are located on the creek banks itself.  
7 They are -- I think, 15 was one and 17 was the  
8 other one. And then I guess it would be my  
9 experience from different seminars and stuff that  
10 I've been to that alfalfa roots will go to 20 feet  
11 and maybe even beyond.

12 COMMISSIONER KALK: Thank you.

13 JUDGE MANN: Commissioner Fedorchak?

14 COMMISSIONER FEDORCHAK: I don't have any  
15 questions. Thank you.

16 JUDGE MANN: Commissioner Christmann.

17 **FURTHER EXAMINATION**

18 **BY COMMISSIONER CHRISTMANN:**

19 Q. Now that I've had the additional couple  
20 minutes to think here, I'm not familiar with the  
21 branding corral areas, but I am with the ground  
22 where your yard is and the valley. The branding  
23 corral areas, those are hilltop --

24 A. Yes.

25 Q. -- higher elevation places? Besides the

1 groundwater issue that we're discussing, in normal  
2 fields in rolling areas isn't there usually better  
3 soil down in the low areas than in the higher  
4 areas, when you're going along with a baler or a  
5 combine, that the better production is in the lower  
6 areas?

7 A. Yes, that is true generally. But like in  
8 this instance, the fields that we are talking about  
9 up by my branding corrals to the northwest is an  
10 area that the PSC has agreed to reestablish back to  
11 cropland after mining, and according to Donn  
12 Steffen's summary of the soil qualities there, I  
13 think he said it was 4 percent less than what the  
14 other soil was on the prime farmland field.

15 COMMISSIONER CHRISTMANN: Thank you.

16 JUDGE MANN: Mr. Braaten, anything else?

17 MR. BRAATEN: No, Your Honor.

18 JUDGE MANN: Mr. Bjella?

19 MR. BJELLA: No, Your Honor.

20 JUDGE MANN: Ms. Jeffcoat-Sacco?

21 MS. JEFFCOAT-SACCO: Nothing. Thanks.

22 JUDGE MANN: Thank you, Mr. Voigt. You  
23 can step down. Or go ahead.

24 Mr. Braaten, you can call your next  
25 witness.

1 MR. BRAATEN: Okay. Our next witness is  
2 Steve Merrill, and he is the second one who will be  
3 testifying by phone.

4 JUDGE MANN: Is this Steve Merrill?

5 MR. MERRILL: Yes, it is.

6 JUDGE MANN: Mr. Merrill, this is the  
7 administrative law judge and we've got you on the  
8 speakerphone at the Public Service Commission's  
9 hearing room. Are you prepared to testify?

10 MR. MERRILL: I am.

11 JUDGE MANN: Okay. Before we do so, I  
12 need to administer an oath and in doing so I need  
13 to advise you of the penalty for perjury in North  
14 Dakota. It's a Class C felony, punishable by a  
15 maximum fine of \$10,000, maximum five years  
16 imprisonment, or both.

17 (Witness sworn.)

18 JUDGE MANN: Okay. Go ahead, Mr. Braaten.

19 **STEPHEN D. MERRILL,**  
20 being first duly sworn, was examined and testified  
21 as follows:

22 **EXAMINATION**

23 **BY MR. BRAATEN:**

24 Q. Hi, Steve. Can I have you state your name  
25 and your address for the record, please.

1           A.     Okay.  My name is Stephen D. Merrill, and  
2     that's spelled M-e-r-r-i-l-l.  My address is 5317  
3     Zenith Avenue South, Minneapolis, Minnesota 55410.

4           Q.     And can you give us a brief description of  
5     your education background?

6           A.     Okay.  I received a bachelor's degree with  
7     a major in physics from Dartmouth College in 1961,  
8     a master's degree in biology from Dartmouth College  
9     in 1963, a Ph.D. from the University of California  
10    at Riverside in 1976.

11          Q.     And can you give us just a general idea of  
12    the classes you were taking when you were seeking  
13    these degrees?

14          A.     Yes.  In the case of the master's degree  
15    with a major in physics, the major consisted of  
16    physics mainly and a heavy dose of mathematics with  
17    some other sciences involved, and I sought quite a  
18    bit of biochemistry.

19                 In the case of the master's degree was a  
20    combination of -- it was a combination of both  
21    zoology and biology, biochemistry.  I've also  
22    received a non-degree resulting -- as a result of  
23    training in biochemistry.  In the case of soil  
24    science, that was coursework in many areas of soil  
25    science and allied areas, such as biology, plant-

1 water relationships, et cetera.

2 Q. Okay. And following or possibly during  
3 your Ph.D., can you give us an idea of what you  
4 were doing professionally?

5 A. Okay. Following my Ph.D. I -- shortly  
6 after -- no, I should say before I got my Ph.D. --  
7 before I got my Ph.D., I became an employee of the  
8 Agricultural Research Service of the USDA in  
9 Riverside, California, and under the designation  
10 of -- I was a junior scientist under the  
11 designation of a physicist, and there I engaged in  
12 plant-soil relationships quite a bit, soil physics  
13 work. Then I obtained my degree and then I began  
14 working for the Agricultural Research Service. I  
15 worked in Mandan, North Dakota, and retired from  
16 the Agricultural Research Service in 2006. But  
17 subsequent to that -- or at the time of my  
18 retirement I became a volunteer scientist, it's  
19 called ARS, USDA -- I'll just abbreviate it -- and  
20 have continued that relationship as a volunteer  
21 scientist until the current time.

22 Q. Okay. And can you give us an idea of what  
23 kind of work you did with ARS, what kind of studies  
24 and what kind of issues you were looking into while  
25 you were there?

1           A.     Okay.  I had done a wide variety of things  
2 with ARS.  At the very start of my term with ARS  
3 starting in 1977, I engaged in a team of scientists  
4 that were involved with mine land reclamation in  
5 the State of North Dakota in the Zap and Mercer  
6 County areas, and I continued that in a very active  
7 form until about the middle '80s.  And after that I  
8 was involved in the science of data analysis and  
9 paperwork preparation, which is a very active form  
10 of science, you just don't have to be out in the  
11 field collecting data.

12                     And then again in 2003 and 2004 I was  
13 actively involved in field studies of mining and  
14 reclamation.  And off and on since then -- in fact  
15 even at the current time right now I am involved in  
16 studies of mine land reclamation, but not in terms  
17 of actually collecting data in the field.

18                     And, of course, I'm involved in many, many  
19 other things within soil science, water erosion,  
20 wind erosion, crop studies, soil quality studies.  
21 I don't know.  I think there's some I've probably  
22 even forgotten about.

23           Q.     Sure.  You mentioned -- and maybe you've  
24 gone through all of this in detail, but you  
25 mentioned that after you retired you continued on

1 as a volunteer scientist. Can you tell us --

2 A. Right.

3 Q. -- about what you were doing as a  
4 volunteer scientist after retirement?

5 A. Okay. My work as a volunteer scientist  
6 has mainly involved crop systems studies, the  
7 studies of how one crop plant through its effects  
8 on the soil affects the following crop plant. And  
9 then that has led to studies of soil quality, soil  
10 quality studies. And right now my main focus of my  
11 work is to take -- or mine land reclamation  
12 experiments done in the 1970s and again in the  
13 2000s, 2003, 2004, and to examine them for soil  
14 quality effects, to reinterpret this data in terms  
15 of the interaction between soil quality effects at  
16 one scale, at the agronomic plant scale of several  
17 meters versus the functional fill slope scale of 50  
18 to a hundred feet.

19 Q. Okay. Let's get some background on that.  
20 You mentioned studies in the '70s and then  
21 relooking at these studies in the 2000s. Can you  
22 give us some detail about what studies you worked  
23 on and were conducted in the '70s related to coal  
24 mine reclamation?

25 A. Okay. In the '70s there was a team of

1 scientists established and they were given the  
2 federal research in the United States. The Mandan  
3 Agricultural Research Laboratory was the point  
4 laboratory for western mine land reclamation  
5 studies. So we had a number of smaller-scale  
6 studies examining specifically the soil respreading  
7 concept, what qualities and depths of soil were  
8 necessary laying down the land to return the --  
9 restore the soil to full productivity.

10 And then we -- under the leadership of a  
11 Dr. Jim Power, now deceased, we designed two very  
12 large-scale reclamation studies in which the main  
13 goal of the studies was to determine as  
14 specifically as possible the significance of soil  
15 material needed to be placed over sodic mine spoils  
16 to restore productivity.

17 And these experiments were done -- there  
18 were two of them. They were done in a form we call  
19 a wedge experiment where a wedge of subsoil  
20 materials varying in depth from zero to four to  
21 eight feet was laid upon the level of mine spoils,  
22 and then topsoil -- typically several depths of  
23 topsoil, anywheres from eight inches to two feet,  
24 were laid upon the subsoil. Okay. So that was --  
25 studies in the 1970s, these wedge experiments. In

1 2003, 2004 --

2 Q. Mr. Merrill, let me stop you there. I  
3 want to ask just one more question about these  
4 wedge experiments. Is it your understanding that  
5 these experiments were used by the regulatory  
6 agencies to determine some of the regulation  
7 standards that they were developing?

8 A. I believe so. They had a considerable  
9 impact. Not that they were the only studies in the  
10 United States or Canada experimenting with topsoil  
11 with the depths of soil overlaying spoil, but they  
12 appeared to have considerable impact.

13 Q. Okay. And then you wanted to talk about  
14 the 2003 research. Before we get into the detail  
15 on that, can you just tell us what, generally  
16 speaking, the experiments were in 2003 and the  
17 purpose for which they were conducted?

18 A. Okay. The purpose of the 2003, 2004  
19 studies was to reexamine the wedge experiments,  
20 both the Zap wedge and the Stanton wedge, the names  
21 of the towns near where these large-scale  
22 experiments were, to reexamine to see were we  
23 receiving the same productivity effects on the  
24 forage crops -- then we only had forage crops in  
25 2003. And this was 28 years after the 1975 start

1 of the original wedge studies. So to examine what  
2 were the productivity effects in terms of were we  
3 getting the same response to the topographic lie of  
4 the land, the runoff effects, because the  
5 original wedge experiments were made in the form of  
6 fill slopes.

7 And then secondary -- and also we wanted  
8 to examine the types of crops, species -- of forage  
9 species that were on the land, because originally  
10 in the original wedge experiments we had planted  
11 long strips of various forage crops and spring  
12 wheat also. Spring wheat was replaced by brome  
13 grass. So we also had alfalfa, crested wheat  
14 grass, Russian wildrye, native mix. We wanted to  
15 see how the species had changed. And, of course,  
16 you always have a change of these species. And  
17 then we also wanted to examine the soil chemistry,  
18 in particular the salt species, the salt loads, and  
19 have the -- have the salt species moved around.

20 Q. Okay. And can you tell us just briefly  
21 what were the specific findings after you conducted  
22 these experiments?

23 A. Okay. The general findings were -- the  
24 general findings, I would say, of the Stanton wedge  
25 was that the productivity in general increased up

1 to a depth of approximately -- I think the abstract  
2 of the paper says four -- three to four feet. But  
3 we observed considerable topographic effects too on  
4 top of that, where the productivity would increase  
5 because of the typical -- now, the fill slopes in  
6 effect were shallow, a grade of, say, 4 percent  
7 down to maybe 2 percent for the most shallow -- the  
8 least slope. Okay. But at the Zap wedge we were  
9 seeing this tremendous topographic effect where the  
10 productivity would increase up to a certain level  
11 and then it would decline towards the summit.

12 Now, at the Zap wedge we saw -- especially  
13 with the forage grass crops we saw that the  
14 topographic effects, runoff effects,  
15 especially in the average rainfall to better than  
16 rainfall effects were quite large, almost  
17 overwhelming. But with the spring wheat crops we  
18 got a different response, because, you see, a lot  
19 of these forage grasses were dominated by cool  
20 season grasses which respond to the spring runoff  
21 and runoff water, and also we theorize that the  
22 new -- newly reconstructed soil did not have the  
23 restoration of what we call mesostructure --  
24 mesostructure, root holes, wormholes, et cetera,  
25 and so, therefore, the runoff effects were a

1 salvage. And so, therefore, the crop effects would  
2 be more pronounced early on in the first -- we  
3 collected data for about, oh, three or four years  
4 or so. But with the spring wheat crops we were  
5 able to see the productivity effects of the  
6 increased depths of overspread soil better because  
7 spring wheat is using its water later in the  
8 season.

9 Q. So after having gathered all this various  
10 evidence and having relooked at these wedge  
11 experiments, it sounds like there's a lot of detail  
12 about the runoff, and so forth, but aside from  
13 that, did you draw any personal conclusions about  
14 the soil health or soil reclamation in general?

15 A. Yes. Because -- one of the conclusions we  
16 drew was that the -- in the restudy conducted in  
17 2003, 2004, that would have been up to 20 years  
18 after the initial reconstruction of the soil, was  
19 that the soil -- it was apparent that the soil was  
20 functioning much better in terms of the near  
21 surface hydrology, the infiltration of water  
22 because of the -- you know, the soil fauna and the  
23 root channels had been much better laid down, so  
24 infiltration was evidently a lot better.

25 And so, therefore, the response of the

1 forage crops was not as -- was not as tightly  
2 linked to runoff and runoff effects, more tightly  
3 linked to the soil quality. And in effect you  
4 could say it was more tightly linked to the soil  
5 depth effect, which is a primary soil quality.

6           You see, these experiments in effect were  
7 large experiments -- large depth experiments and  
8 soil quality that showed why you have to study  
9 soils as a functional unit, meaning, say, the small  
10 fill slope unit.

11           Q. Well, this might be elementary for some of  
12 us, but you're using the term "soil quality." Can  
13 you give us an explanation of what is meant when a  
14 soil scientist uses that phrase?

15           A. Okay. Since ancient times  
16 agriculturalists have had the concept of soil  
17 fertility. Soil quality, often referred to as soil  
18 health, is a modern version of the basic soil  
19 fertility concept. But by soil quality we mean --  
20 it's defined very, very simply involving the  
21 capacity of a soil to function, that is, the  
22 capacity of a soil to support plant growth, crops,  
23 the capacity of a soil to not be eroded, the  
24 capacity of a soil to act as a regulator of the  
25 hydrologic function, to receive rainwaters, store

1 the rainwaters and to release the rainwaters.

2 And we have evolved -- modern soil science  
3 has evolved specific notions, specific ideas about  
4 what the components of soil quality are, both the  
5 biological, the physical and the chemical, but  
6 there has been increasing emphasis on the  
7 biological components of soil quality, and  
8 understanding that the soil biota is what makes the  
9 soil a functioning living natural body, living  
10 natural system.

11 Q. Can you -- and I think you've done this to  
12 some extent, but can you explain how the thinking  
13 within the soil science community has changed from  
14 the time you were doing the Zap wedge experiments  
15 until today?

16 A. It's changed like so much in science.  
17 It's changed in radical ways since the era of the  
18 Zap wedge experiments -- that the wedge experiments  
19 were designed and the era that the -- of course,  
20 the era that the SMCRA law was generated. There  
21 has been a much greater emphasis on understanding  
22 soil not just as a substance in place, but as a  
23 system. Soil is a system, and understanding that  
24 soil is a living system and it has a soil quality  
25 or a health that depends upon -- it depends upon

1 the plants on the soil, in effect the plants that  
2 are feeding carbon into the soil are part of the  
3 soil system, and the microorganisms, the soil  
4 biota, of course, is the most important part of the  
5 soil. So, yes, there has been a tremendous change  
6 in the basic doctrine of soil science since those  
7 early days.

8 Q. So are there ways to measure not only the  
9 mechanical and chemical aspects of soil health, but  
10 ways to measure also the biological aspects of soil  
11 health?

12 A. Yes. Probably the quickest -- I would say  
13 that the three main determinants, the main  
14 methodologies we have for getting access to --  
15 there are many, of course, but I'll list three,  
16 soil respiration, soil microbial biomass carbon,  
17 and the ability of a soil to -- to change the  
18 formula of nitrogen.

19 Q. So if we wanted to utilize these concepts  
20 in soil health during the reclamation process, do  
21 you have any specific recommendations for testing  
22 and how we could do that to get a fuller picture of  
23 soil health during that process?

24 A. Yes. Yes, I do. Yes, I do. I think, you  
25 know, soil as a system -- given that soil is a

1 system, that the land -- the floor of the land has  
2 to be stable, and the physical -- well, to make a  
3 long story short, I think right away there has to  
4 be a topographic reconnaissance, perhaps no more  
5 than one year -- it should be one year after the  
6 new soil is laid down, but before two seasons are  
7 out, and specifically examination of the soil  
8 floor, sinkholes and general physical ability of  
9 the land form and a penetrometer test, a soil  
10 strength test to detect compacted zones. That  
11 would be the first stage.

12           Then the general soil reconnaissance.  
13 There has to be a general soil reconnaissance at  
14 some point after reclamation and after revegetation  
15 has gone on. I would recommend four years after --  
16 three to four years after. And that would consist  
17 of a resurvey of the land. You know, all of our  
18 lands in this country and all over the world are  
19 surveyed for the soil type, and that means  
20 examining the profile of the slope, and that means  
21 by a qualified soil surveyor, several pits,  
22 examining the profile structure of the soil and the  
23 corings to, I would recommend, a minimum depth of  
24 four feet.

25           And at that time the soil structure should

1 be examined, the degree of root penetration of a  
2 plant should be documented, also any compaction of  
3 the soil through a penetrometer survey and an early  
4 sampling, a grosser level of sampling for salinity  
5 problems, so-called electrical conductivity,  
6 acidity or -- through pH. And at the same time --  
7 at the same time then a more detailed soil health  
8 examination of the upper foot of the soil, the  
9 several layers could be done. And as a minimum I  
10 would recommend these following tests: Soil  
11 organic carbon, microbial biomass carbon,  
12 infiltration, and soil aggregate stability, and  
13 soil respiration.

14 Q. Okay. Are there any additional items that  
15 you would suggest testing for to give a fuller  
16 picture of the soil's health?

17 A. Yes. What I've laid down is, I consider,  
18 just sort of a very basic minimal level. There are  
19 many other tests. Let's see. PMN, the ability --  
20 okay, probably nitrogen content, the total nitrogen  
21 content, total process content. There are many  
22 enzymatic -- primary soil enzyme tests. There are  
23 some others, but --

24 MR. BRAATEN: Okay. I have no further  
25 questions right now.

1 JUDGE MANN: Mr. Bjella?

2 MR. BJELLA: No questions, Your Honor.

3 JUDGE MANN: Ms. Jeffcoat-Sacco?

4 MS. JEFFCOAT-SACCO: I'd like permission  
5 for Assistant Director Dean Moos to ask, please.

6 JUDGE MANN: Any objection to that?

7 MR. BRAATEN: No.

8 JUDGE MANN: Go ahead.

9

**EXAMINATION**

10 **BY MR. MOOS:**

11 Q. Good morning, Steve. Dean Moos,  
12 Reclamation Division. What you're proposing, these  
13 studies, are you proposing that these would be done  
14 on all reclaimed land or as a research study? What  
15 exactly are you looking at or recommending?

16 A. I'll tell you what -- what I'm  
17 recommending is that I think this should be done, a  
18 study of the soil health and a viewing of what is  
19 the new soil, what is its health being done as a  
20 matter of course, because all of the more modern  
21 farmers in this country and around the world study  
22 their soil health as a matter of course. And so,  
23 therefore, I just think that mine land reclamation  
24 practice needs to be brought into a phase with  
25 modern soil science and as it is applied to modern

1 farming.

2 MR. MOOS: I guess no further questions.

3 THE WITNESS: Okay.

4 MS. JEFFCOAT-SACCO: I have one.

5 **EXAMINATION**

6 **BY MS. JEFFCOAT-SACCO:**

7 Q. I have a followup to that. This is Illona  
8 Jeffcoat-Sacco, counsel for the Commission.

9 A. Okay.

10 Q. And this just stems from my lack of  
11 knowledge about what really goes on out there at  
12 reclamation time. Are you saying that these tests  
13 that you have just recommended and this analysis of  
14 soil types should be got like as the company is  
15 respreading subsoil and topsoil at reclamation  
16 time, that that's when you would perform these  
17 tests to see just what that soil is that's going  
18 back down in one location or another, which seems  
19 to maybe be a moving target, but is that what  
20 you're recommending?

21 A. No. No, not at all.

22 Q. Sorry.

23 A. In fact, that would be -- that would not  
24 work.

25 Q. Right.

1           A.     That would not work because, you know, an  
2     ordinary soil survey and the examination of  
3     soils -- these soils have been around for hundreds  
4     or thousands of years. Okay. So we are creating  
5     new soils. We are creating new soils and so, you  
6     know, to be examining them as they are created is  
7     not going to work. But I think some reasonable  
8     length of time that should not be too great a  
9     length of time, say -- I'm going to throw out four  
10    years, we'll say. There ought to be some sort of  
11    examination of these new soils, what do we have  
12    there. Certainly after four years of time.

13                 And let me say that I realize that there  
14    are productivity standards equal to or better than  
15    before to see has the soil been returned to  
16    productivity by a yield test, and then in the case  
17    of grasslands -- that's in the case of croplands,  
18    but in the case of rangelands and grasslands, the  
19    test is productivity, cover, and the species  
20    diversity.

21                 Well, yes, that does indicate that the  
22    soil has been restored to some productivity, but  
23    these tests are -- the yields vary so much from  
24    year to year and depending on how the management  
25    is, you're going to get different results,

1 especially with the forage standards, so there has  
2 to be something else from that.

3 Q. I'm glad you brought up productivity  
4 because I am trying to figure out now if you do  
5 these tests four years into -- after you've  
6 reclaimed and then four year into it you do these  
7 tests, would the objective be simply to provide the  
8 landowner, the surface user, with better  
9 information for farming going forward, because now  
10 you have the analysis, or would the objective be to  
11 change what you did despite -- the productivity  
12 records are over here on the other side, and we're  
13 going to be taking those for a number of years  
14 after reclamation, so would you -- once these soil  
15 tests are done at the four-year point, are you  
16 recommending that then something be revised,  
17 different soil go in depending on what the results  
18 are, or just produce useful information for use in  
19 going forward?

20 A. Okay. Yes, they would provide useful  
21 information, but they would also provide a public  
22 record of what kind of soil has been created, much  
23 more information than beyond just mere yield tests  
24 or examination of the vegetation. And, for  
25 example, if certain kinds of problems are seen with

1 a test -- with a soil health reconnaissance -- soil  
2 survey and soil health reconnaissance at, say, the  
3 three- or four-year stage, one might detect the  
4 effects of management.

5 How the plants are managed, how the soil  
6 is managed can have a great effect especially on  
7 new soil, how you disturb new soil that's evolving  
8 very fast. And so if certain kinds of problems are  
9 determined at, say, the three- or four-year stage,  
10 the management can be changed, and that would be  
11 very important so that the management could be made  
12 more soil-building management.

13 For example, if you have a piece of land  
14 and it's cropland and it's being put under -- this  
15 is the worst-case scenario, it's being put under  
16 spring wheat fallow -- spring wheat fallow, that  
17 means you've got a crop -- you've got plant life  
18 out there every three months out of two years, the  
19 soil carbon is guaranteed to go down; right? So, I  
20 mean, I bring that up as a worst-case example of  
21 this. But --

22 MS. JEFFCOAT-SACCO: Okay. Thank you.  
23 That completes our questioning.

24 JUDGE MANN: Commissioner Christmann?  
25

**EXAMINATION**

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**BY COMMISSIONER CHRISTMANN:**

Q. Is there perfectly healthy soil, or is -- are all these statistics pretty arbitrary?

A. Sir, I guess I don't quite understand what you're saying.

Q. During the first day of our hearing we had some dialogue about bond release and whether it occurs as quickly as it should or too quickly or at appropriate rates of speed. So with a lot of the things you've talked about and a lot more data development from one to four years after reclamation occurs, there's going to be a lot more things to debate whether it's appropriate or not.

A. Right.

Q. And so would you ever find soil then that everyone would agree is correct, or would your suggestion just take us to a level of data to where no matter what soil you were looking at, you could find something wrong with it?

A. I don't think so. I think it's how the information is used, how the scientific -- how the reconnaissance is used. If it's used -- and I don't think -- one of the chief problems, for example, would be soil could become compacted --

1 overcompaction of the soil. If, say, soil health  
2 reconnaissance turned up compaction effects, then  
3 deep tillage and certain kinds of crop plants that  
4 have deep roots could ameliorate that. But I don't  
5 see -- I don't see a soil reconnaissance being used  
6 as a way to change the whole bond release issue.

7 Q. So if I'm understanding you right then,  
8 this reconnaissance, your objective would be to  
9 early on in the reclamation process catch whatever  
10 concerns there are and alter the management  
11 practices in the subsequent years before bond  
12 release to correct them at least to a reasonable  
13 extent?

14 A. Right. Absolutely. That's why -- you  
15 know, I believe the bond release period is ten  
16 years in your state, and that's why the primary  
17 soil reconnaissance and soil health examination has  
18 to be done, you have to wait about at least two or  
19 three years for the soil to sort of settle in and  
20 see what the current stage of management is doing  
21 to the soils. But you shouldn't wait too long. I  
22 think waiting to, say, six or seven years is too  
23 long.

24 COMMISSIONER CHRISTMANN: I have no other  
25 questions, but thank you.

1 JUDGE MANN: Commissioner Kalk?

2 COMMISSIONER KALK: Thank you, Your Honor.

3 EXAMINATION

4 BY COMMISSIONER KALK:

5 Q. Thank you, Stephen, for your testimony.  
6 You're certainly an energetic soil scientist. I  
7 love to hear that.

8 Just a little background. So when you  
9 worked in Mandan, did you work with the soil  
10 conservation districts around the state as well?

11 A. Yes, we did work with them.

12 Q. So in your experience -- you know, I think  
13 we've got a pretty good data set of all the soil  
14 types around the state through the data sets, I  
15 think it's the soil conservation districts, all  
16 those different manuals. I mean, how accurate do  
17 you think our data set is of our soil types and  
18 depths in the state?

19 A. I think they're pretty well done. A lot  
20 depends upon what resources are brought to bear,  
21 and if you really want to know on a given piece of  
22 land, as is done in the mining industry, you have  
23 to have a really detailed soil survey, more  
24 detailed than the type of standard soil survey.

25 Q. Okay. Because one of the things that --

1 this is outside of this hearing, but just general  
2 thought, is we do so much work with putting the  
3 coal mines back to the way they were, but as a  
4 state we haven't delved into wind farm reclamation,  
5 we're working on pipeline reclamation. So I do  
6 appreciate your testimony today. It may help in a  
7 lot of different areas.

8           When you talk about soil health, I  
9 think I'm hearing you say soil health is different  
10 than productivity. Am I hearing that correctly or  
11 are they related, or how do you view that?

12           A. They are related. They are related. A  
13 soil high quality or high soil health, the terms  
14 are interchangeable, will be able to support crops  
15 year after year without -- without fertilizer,  
16 without a lot of fertilization. Now, I realize  
17 that we have to have fertilization. We can't feed  
18 seven billion people without fertilizer obviously.  
19 But at the same time, having said that, you have to  
20 realize that healthy soil is going to be able to --  
21 to, you know, not erode, to support crop plants  
22 without a lot of inputs.

23           Q. So that's where I think we're agreeing or  
24 I interpret what you're saying is that us measuring  
25 the productivity is probably the best measure of

1 soil health that we have right now with the current  
2 system?

3 A. Yes and no. The trouble with a  
4 productivity test, with just measuring yield, is  
5 that -- you know, I guess, I'll put it in kind of a  
6 crude way, sir. I could take a parking lot -- take  
7 any parking lot covered with a foot of good  
8 topsoil, put in some pipes -- a pipe field to  
9 provide drainage between the soil and the asphalt  
10 surface, provide lots of fertilizer, micronutrients  
11 and you can produce a hundred bushels of corn. I  
12 mean, that is productivity.

13 I mean, I realize this is crude and I'm  
14 kind of overstating the point perhaps, but I think  
15 you have to have -- I think any viable system that  
16 moves forward is going to have to examine both crop  
17 yields, productivity, plant types, and the soil  
18 factors, soil health, the soil.

19 Q. Have you ever in your -- the research  
20 you've done submitted things to the national  
21 organizations or state organizations recommending  
22 changes in practices, or is this something you're  
23 just now getting involved in? Well, you've been  
24 involved in it a long time. Have you ever  
25 submitted it for changes anywhere, any bodies?

1           A.     This is something that -- the kinds of  
2 thoughts I'm laying out for you right now in this  
3 hearing is something that just started to first  
4 occur to me in October of this year when I went to  
5 a meeting in Montana sponsored by the Western  
6 Organization of Resource Councils.

7           Q.     Okay. Fair enough. And, I guess, just  
8 the last couple of questions, sir. What is the  
9 depth of crops -- I know you've got a lot of  
10 cropping research you've done. Give me your best  
11 guess of the root depth of alfalfa, maybe some  
12 other crops that are grown in the central part of  
13 North Dakota.

14          A.     I don't have a lot of work with alfalfa,  
15 but I do have quite a bit of work specifically  
16 aimed at crop root growth, the details of that, and  
17 probably sunflower and safflower. Sunflower and  
18 safflower crops, even in glacial till soils such as  
19 found west of the river, can get down to six feet  
20 or more.

21          Q.     And then finally you talked about the  
22 amount of rainfall was maybe the controlling factor  
23 in production. How does groundwater tie in to the  
24 soil health?

25          A.     Groundwater ties in to it in the sense

1 that the cycles of groundwater have many different  
2 scales, and one of the -- at the smaller scale, the  
3 scale of, say, ten yards -- five yards or ten  
4 yards, the water that enters the soil, infiltrates  
5 into the soil and moves parallel to a surface and  
6 then waters the lower part of the profile, it's a  
7 species of groundwater but smaller scale, and that  
8 is a very important part of a functioning of a  
9 soil. And soil is not just, you know, just soil  
10 right in this square yard or that square yard.  
11 Soil has to be in a functioning unit. So, yes, the  
12 groundwater and the ability of the soil to  
13 infiltrate the water and to conduct the water in  
14 what we call subsurface flow is a very important  
15 part of a healthy soil.

16 COMMISSIONER KALK: Okay. Thank you, sir.

17 JUDGE MANN: Commissioner Fedorchak?

18 **EXAMINATION**

19 **BY COMMISSIONER FEDORCHAK:**

20 Q. Thank you, sir, for your testimony this  
21 morning. Despite being by phone you've been very  
22 engaging to listen to.

23 I'm curious about just following up on  
24 some of my colleagues' points and questions. What  
25 is, with your expertise, the best measurement of

1 soil health?

2 A. Active soil organic carbon. That is the  
3 holy grail of soil health.

4 Q. And how do you -- if you were to use that  
5 as a measuring tool for reclamation, how would you  
6 establish the standard to be met on any given soil  
7 or in soil in an entire mining permit?

8 A. Okay. I think -- I think the standard has  
9 to be a moving target. I don't want to be  
10 offensive to the whole -- what I call the magic  
11 numbers. The magic numbers thing has always  
12 bothered me. But I think that you want to  
13 establish some sort of a reasonable standard that  
14 the soil is moving towards, acquiring active  
15 organic carbon in a way so that it's becoming like  
16 the premining soils given -- you know, given the  
17 type of soil it is.

18 Q. So you'd measure the active organic carbon  
19 at premining and then you would have a postmining  
20 standard that was the same that you would have to  
21 reach at the ten-year bond release point? Is that  
22 what you're suggesting?

23 A. I'm not going to go so far as to say it  
24 has to be absolutely the same number. In fact, I  
25 think that would be a mistake. I think you need to

1 have -- you need to have set standards, but you  
2 need to write your standards in such a way so that  
3 you don't put yourselves into -- from  
4 functionality. And I don't want to comment on the  
5 current system of bond release, but you know what  
6 I'm saying here.

7           So I think -- so I think you have to --  
8 because soils are really systems. They're either  
9 staying about the same, at a certain level, they  
10 are getting healthier, or they're going downhill.  
11 So I think you need to show that the soil in terms  
12 of its basic soil quality, soil health is moving in  
13 a substantial way towards the premining state. But  
14 I really -- I really don't think you want to get  
15 into absolute numbers standards.

16           And let me say this, that the SMCRA law  
17 and the state laws -- and we know the State of  
18 North Dakota was a leader in mine land reclamation,  
19 right, but that was a long time ago. We had a much  
20 different understanding of basic soil science and  
21 that this phrase "equal to or better than before,"  
22 I think that's a wonderful goal, but I'm just  
23 saying there has to be some sort of flexibility in  
24 the writing of these -- of the code.

25           Q.     And tell me how the -- you described as a

1 gold standard the presence of active carbon. Tell  
2 me, how does that show itself through the current  
3 standard which is productivity?

4 A. That it shows itself that the productivity  
5 is -- of course, all the other elements too. I  
6 mean, that is one of the principal elements of a  
7 healthy soil, but you can have a soil that has, you  
8 know, huge amounts of organic carbon -- active  
9 organic carbon, but if that soil has terrible --  
10 has high -- high EC, high electrical conductivity,  
11 it's got acid problems. So you have to have -- you  
12 have to have a balance of all of the elements,  
13 physical, biological and chemical, elements of soil  
14 quality for the soil to be really productive soil.

15 Q. So if I understood what you were just  
16 saying, you said that -- did you say that you could  
17 have soil that had a lot of the active carbon but  
18 still wasn't productive because there's something  
19 else wrong with it?

20 A. Absolutely. Active -- active organic  
21 carbon is one element. In terms of modern soil  
22 science it's an element that is probably emphasized  
23 above others as a keystone, a keystone part, but  
24 it's only one of many. The soils are very, very  
25 complex bodies.

1           Q.     Well, it sounds to me that what you're  
2     just suggesting is that perhaps the productivity is  
3     the way that you measure it to gauge all of those  
4     factors, it takes into consideration the chemical  
5     and the biological and all the factors, it's  
6     probably the one measurement that does capture all  
7     of those qualities of the soil, or did I  
8     misunderstand you?

9           A.     Well, yeah, it can as the performance  
10    standards, but, again, you can have a -- you can  
11    have a very, very productive soil that you can have  
12    high yields in wetter years, but that soil can be  
13    an unstable soil, it can be a frazzled soil for  
14    various reasons. So I think you have to look at  
15    the totality of the elements of soil quality and  
16    soil health. And I don't think over the long run  
17    that just having a plant productivity standard as  
18    the totality is going to work. It's not going to  
19    work. It might work in the short run, but over the  
20    long run it's not.

21          Q.     Do we have proof of that in looking at  
22    some of the mine lands that have been reclaimed and  
23    have been bond released? Do we have proof of that,  
24    that this isn't standing the test of time, the  
25    current standards?

1           A.     Okay.  You're getting outside of my range  
2 of expertise here quite a bit.

3           Q.     It seems like that's exactly what you're  
4 saying, though, is that --

5           A.     No.

6           Q.     -- it might work at certain periods of  
7 time, but over the long haul it might not pay out,  
8 that we should be looking at more things to make  
9 sure that the long-term soil health is stable and  
10 strong.

11          A.     You're right.  You're absolutely right.  I  
12 would agree with that, yes.

13          Q.     So then if the current standards aren't  
14 proving that, then we should be able to look at  
15 mine lands that have been reclaimed years ago and  
16 see that the land isn't productive and isn't able  
17 to sustain crops or grazing.  And so I'm wondering  
18 if we had that, I'd love to see that kind of data  
19 because I think it is important to look at that.

20          A.     I would agree with that quite a bit.

21          Q.     But you don't have any of that data  
22 yourself that you've seen or have access to?

23          A.     No, I don't.  No, I don't.

24                    COMMISSIONER FEDORCHAK:  Okay.  Thank you,  
25 sir, for your time this morning.  Appreciate it.

1 JUDGE MANN: Mr. Braaten, any followup?

2 MR. BRAATEN: Yeah.

3 **FURTHER EXAMINATION**

4 **BY MR. BRAATEN:**

5 Q. Just a couple questions to sort of recap,  
6 Mr. Merrill. My understanding is that what you're  
7 proposing specifically is a soil reconnaissance  
8 which would give us more holistic and better  
9 understanding of soil health. Is that a fair  
10 explanation of your testimony?

11 A. Yes, it is. Yes, it is.

12 Q. And do you believe, particularly in  
13 situations where they might be running into  
14 problems with the reclamation process, that  
15 gathering this information would allow them to  
16 identify specifically what those problems are and  
17 address them?

18 A. Yes, I do.

19 MR. BRAATEN: Okay. No further questions.

20 JUDGE MANN: Go ahead, Commissioner.

21 **FURTHER EXAMINATION**

22 **BY COMMISSIONER FEDORCHAK:**

23 Q. I had one other question I forgot to ask.  
24 Sir, is there anything that's -- so if the  
25 companies could -- would do this, do you think that

1 they would be able to achieve the productivity  
2 levels and get out of bond release sooner if they  
3 were doing this today -- these soil examinations  
4 that you're describing?

5 A. Yes, they would, but let me add a caveat  
6 to that answer. Yes, they would in terms of  
7 strictly soils issues. But soil is a system. You  
8 know, you have to look at the hill slope or even  
9 the water -- the small watershed in different  
10 scales and the hydrology of the soils.

11 Q. Sure.

12 A. Different scales. Just the hydrology over  
13 the water flowing into the soil, through the soil  
14 and out again in different scales is also part of  
15 the soil health. And any answer I give to you does  
16 not include any of that.

17 Q. Sure.

18 A. And I'm not a hydrologist, but I've heard  
19 enough and know enough, and I think we all know  
20 enough, that that is an issue that is connected  
21 with soil health, but it also can be viewed  
22 functionally as a separate issue.

23 Q. Is there anything that you're aware of  
24 that precludes the companies from doing what you're  
25 describing? Have you had any that have talked to

1 you about it and expressed interest in kind of  
2 pursuing this angle to improve their reclamation  
3 standards and their chances of meeting their  
4 ten-year bond release time period?

5 A. No, they haven't. Because I've only had  
6 this thought since October of this year, frankly.

7 Q. So this is really new kind of cutting edge  
8 concepts; is that right?

9 A. Well, for me it is. And I don't know if  
10 other people are -- I suspect that there are other  
11 -- I would say that there's quite a bit of research  
12 within the soil science community, I know, in  
13 examining these past mine lands, the new mine  
14 soils, but I've only recently started to access  
15 this line and to read this.

16 COMMISSIONER FEDORCHAK: Okay. Thank you,  
17 sir.

18 JUDGE MANN: Mr. Bjella, any further  
19 followup?

20 MR. BJELLA: No, Your Honor.

21 JUDGE MANN: Ms. Jeffcoat-Sacco?

22 MS. JEFFCOAT-SACCO: Mr. Deutsch would  
23 like to ask one question.

24 JUDGE MANN: Okay. Go ahead.

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**EXAMINATION**

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**BY MR. DEUTSCH:**

Q. Steve, in your testimony earlier and some of the discussion, I guess, talking about changes over time, going back to when you went back and looked at those 1970 wedge plots at Indian Head and Glenharold, did you overall feel that there was an improvement or decline in soil health from when those studies were completed back in the late '70s?

A. Oh, I would say that there is evidence especially from the pattern of forage grass growth. That pattern -- overall pattern can be interpreted as a -- as a pretty large improvement in soil health. I should say that this is evidence, pretty strong evidence, in my view, that the soil structure -- you know, the ability of the soil to infiltrate the water and to carry it through the soil and not just have the water run off the soil has improved quite a bit. The establishment of wormholes, and there's all these other animals in the soil, the mesofauna that are digging holes in the soil and then the plants grow and their roots die so you have these holes, and that's very important, the physical elements of soil health. So I think we have evidence that that has improved

1 a great deal.

2 MR. DEUTSCH: Thank you.

3 JUDGE MANN: Commissioner Fedorchak.

4 **FURTHER EXAMINATION**

5 **BY COMMISSIONER FEDORCHAK:**

6 Q. I need to just -- I heard this earlier and  
7 I thought I misunderstood and I'm still wondering  
8 if I'm hearing this correctly.

9 The wedge study that was -- that you're  
10 referring to, Steve, is a before and after of a  
11 mined area; is that correct?

12 A. Let's see. Well, no, it was not a before  
13 and after. It was -- because the original wedge  
14 study was on reclaimed soils, but they were  
15 reclaimed in an experimental manner, different  
16 depths of soil and in different combinations of  
17 topsoil and subsoil laid over -- in the case of a  
18 standard wedge it was a fairly newly mined sodic  
19 mine spoil. In the case of the Zap wedge, it was  
20 an older mine spoil, pre-SMCRA mine spoil. So that  
21 was the original study conducted between '75 and  
22 about the '80 -- I think I quit working on that  
23 actively in about '81. And then the follow-on  
24 study 2003, 2004 was to reexamine these -- these  
25 experimental reclamation lands.

1 COMMISSIONER FEDORCHAK: Okay. Thank you.

2 JUDGE MANN: Commissioner Christmann,  
3 anything else?

4 COMMISSIONER CHRISTMANN: No.

5 JUDGE MANN: Commissioner Kalk?  
6 Mr. Braaten, is that it for the witness?

7 MR. BRAATEN: Yeah. Yeah. No further  
8 questions.

9 JUDGE MANN: Mr. Bjella, anything?

10 MR. BJELLA: No, Your Honor.

11 JUDGE MANN: All right. Mr. Merrill, you  
12 can disconnect. Thank you.

13 THE WITNESS: I would like to thank  
14 everybody in the PSC and everybody involved here  
15 for this great opportunity for me to -- because I  
16 think this has been a good day for soil science.

17 JUDGE MANN: Thank you.

18 I think at this time we'll take a break  
19 for lunch, start up again at one. So we can go off  
20 the record.

21 (Recess taken at 11:59 a.m. to 1:00 p.m.)

22 JUDGE MANN: We're back on the record.

23 It's 1:00 p.m. And before we get going with  
24 testimony from Mr. Braaten's next witness, we'll  
25 just address any preliminary issues, comments.

1 Commissioner Kalk.

2 COMMISSIONER KALK: If I could, Your  
3 Honor, we had discussion the last time we met about  
4 a third day, and so there are a lot of emails with  
5 commissioners. We met for another item, we kind of  
6 gave it the range of dates, the 30th, 31st, and  
7 January 2nd. I know hearing back from Mr. Bjella  
8 and also from Derrick that it seemed like January  
9 2nd was the date that everybody agreed to. Judge,  
10 you were available that date as well, our general  
11 counsel, Jim, you were available as well.

12 I guess what I would like to do is just to  
13 reaffirm the expectation that we've set the agenda  
14 today to go till about 3, and we've all got things  
15 that we need to wrap up before we go for Christmas  
16 break, and then we come back on January 2nd, start  
17 at 8:30, with the expectation that day we go until  
18 we're done. We'll do that, five o'clock at night,  
19 six o'clock, ten o'clock at night, even have a  
20 backup court reporter because, quite honestly,  
21 after sitting there for several hours, that's a lot  
22 to ask of anyone. So unless someone throws some  
23 big objections, I guess I would like to proceed  
24 with that expectation.

25 MR. BJELLA: We are just curious, Your

1 Honor -- Commissioner, if December 29 had not been  
2 discussed. Was that ruled out?

3 COMMISSIONER KALK: That was a Commission  
4 problem for the three of us. We gave the range of  
5 dates, the 30th, the 31st, and the 2nd is the only  
6 time we could get all three of our schedules  
7 together.

8 MR. BJELLA: Thank you.

9 JUDGE MANN: Commissioner Christmann, any  
10 comments or concerns with what Commissioner Kalk  
11 had said?

12 COMMISSIONER CHRISTMANN: Nothing to add.

13 JUDGE MANN: Commissioner Fedorchak?

14 COMMISSIONER FEDORCHAK: Nothing to add.

15 JUDGE MANN: Anything else before we get  
16 going with testimony?

17 MR. BJELLA: Your Honor, what time would  
18 we start then on the 2nd?

19 JUDGE MANN: 8:30 a.m., I believe, again.

20 COMMISSIONER KALK: Then the expectation  
21 is we'll break for lunch at twelve and if we need  
22 to, we'll break for dinner at five o'clock, but  
23 we're going to finish that hearing that day.

24 COMMISSIONER CHRISTMANN: Maybe the one  
25 thing that should be added. The court reporter is

1 an essential element to what we do here and can  
2 only do so much. Do we need to have a backup,  
3 someone would be available to continue on?

4 THE REPORTER: We'll work it out.

5 JUDGE MANN: I think, Mr. Braaten, you may  
6 call your next witness.

7 MR. BRAATEN: We'll call Mark Anderson.

8 JUDGE MANN: And, Mr. Anderson, before you  
9 testify I'm required to give you an oath and advise  
10 you of the penalty for perjury in North Dakota.  
11 It's a Class C felony, punishable by a maximum fine  
12 of \$10,000, maximum five years imprisonment, or  
13 both.

14 (Witness sworn.)

15 JUDGE MANN: Go ahead, Mr. Braaten.

16 MR. BRAATEN: And similar to Mr. Norris, I  
17 have handed you Mr. Anderson's resume and intend to  
18 cover it briefly, if possible, and hope we can just  
19 stipulate to his expertise rather than going  
20 through it in detail.

21 **MARK A. ANDERSON,**

22 being first duly sworn, was examined and testified  
23 as follows:

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**EXAMINATION**

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**BY MR. BRAATEN:**

Q. First, Mr. Anderson, will you state your name and business address, please?

A. Mark Anderson. Business address is 1102 South Washington Street. Mailing address is Post Office Box 1401, Bismarck, North Dakota 58503.

Q. Can you give us just sort of a brief background of your experience and your education?

A. I graduated from North Dakota State University with a degree called bachelor's of university studies, which is a program that I made myself of the courses that I wanted to. The courses that I concentrated on were agriculture and biological sciences, had a lot of credits in agronomy, range management, soils, and biological sciences.

Q. And after graduation, what has been your professional experience?

A. I worked for the Natural Resources Conservation Service for 35 years, I spent 15 of those years in field offices across the state as a district conservationist, assisting landowners with the installation of various conservation practices, notably grazing management systems, pasture and

1     hayland plantings, rangeland plantings, wildlife  
2     plantings, establishing tree planting plans. I was  
3     also heavily involved in the plant materials  
4     program where we collected native species, grasses,  
5     sedges, forbs for potential propagation for use in  
6     restoration of range sites. I was also involved in  
7     range -- or plant materials trials with specific  
8     plants on farms and ranches and following up with  
9     the results of those plantings.

10         Q.     And I've handed out your resume which you  
11     supplied to us about a week ago. Is that an  
12     accurate representation in summary fashion of your  
13     education and experience?

14         A.     Yes, it is.

15                 MR. BRAATEN:     And I'd offer the resume as  
16     an exhibit.

17                 JUDGE MANN:     Mr. Bjella?

18                 MR. BJELLA:     In what area? Could you  
19     specify, please?

20         Q.     (MR. BRAATEN CONTINUING) Can you give us  
21     just a very brief summary of what you consider to  
22     be your primary areas of expertise?

23         A.     Plant materials and vegetation management,  
24     establishment of vegetation. I was involved in  
25     range plantings in Pierce County when I was a

1 district conservationist there for six years. I  
2 was involved in following up on success of those  
3 plantings, what worked, what didn't work.

4 Q. Do you have a background in soil science  
5 as well?

6 A. I was very close to having a minor in  
7 soils.

8 Q. And so I guess from me as a layman, to  
9 recapitulate I would say that it's in rangeland  
10 management and soils?

11 THE WITNESS: Yes.

12 MR. BJELLA: No objection, Your Honor.

13 JUDGE MANN: Ms. Jeffcoat-Sacco?

14 MS. JEFFCOAT-SACCO: No objection.

15 JUDGE MANN: Voigt Exhibit No. 8 is  
16 admitted. You can continue.

17 Q. (MR. BRAATEN CONTINUING) Can you tell us  
18 briefly what you reviewed in preparation for your  
19 testimony today?

20 A. I looked through the mine permit  
21 application, specifically at revegetation plans and  
22 also at replacement plans for the earth material,  
23 both the surface and subsurface material.

24 Q. And did you look at any information or  
25 studies or anything outside of what was contained

1 in the mine permit application?

2 A. I referenced -- or also referred to  
3 information in the Natural Resources Conservation  
4 Service Technical Guide, which is used for  
5 establishment of vegetation practices and also some  
6 soil health analysis.

7 Q. Did you have any conversations with other  
8 soil scientists or rangeland conservationists about  
9 the materials you were reviewing?

10 A. Yes, I did.

11 Q. And in conducting this review,  
12 particularly with respect to the revegetation plan,  
13 were there any items or issues in there you noted  
14 that gave you concern about the potential success  
15 of reclamation on Mr. Voigt's land?

16 A. One of the concerns I noted was the  
17 percent of tame grass or introduced grasses that  
18 are allowed on the reclaimed land. It does allow  
19 in the standards for reclamation up to 35 percent  
20 of tame grasses, which are actually invasive  
21 species.

22 Q. And why is it a concern that up to 35  
23 percent of the stand can be tame grasses?

24 A. It can result in substantially lower  
25 production and also degrade the seasonal

1 productivity of the land compared to the native  
2 range.

3 Q. And how does that happen?

4 A. The introduced species or the cool season  
5 grasses can start growing earlier in the season  
6 than the natives and they can utilize the moisture  
7 that's available first and gain an advantage over  
8 those native species and it can eventually crowd  
9 them out.

10 Another problem with the introduced  
11 species, one of them crested wheat grass, is it is  
12 very early to grow and to mature and it also is  
13 very early in the year to decline in nutritional  
14 value.

15 Q. And so in general would a higher  
16 percentage of the native grasses be beneficial for  
17 revegetation?

18 A. Definitely.

19 Q. And did you review any information with  
20 respect to the actual percentages of tame grasses  
21 on Mr. Voigt's land?

22 A. Yes, I did. In the permit application,  
23 Section 2.4.7.4, rangeland similarity index, there  
24 is an inventory data sheet for one of the inventory  
25 points that is on the Voigt ranch.

1 Q. And I wanted you to have a copy of what I  
2 just handed out. The document you're referring to  
3 is the document that I just handed you?

4 A. Yes.

5 Q. And what does this document tell us?

6 A. This is an inventory of the species that  
7 were found out there. It was dated August 19,  
8 2012, on the Southeast Quarter of Section 1. It  
9 was an inventory on a range site identified as thin  
10 loamy. And the species are listed in column C by  
11 percentage of the plant community that was present,  
12 and there are about a dozen species roughly on that  
13 list, but most notably on that list is the fact  
14 that the only one that is an introduced species is  
15 Kentucky bluegrass, and the percentage of the  
16 Kentucky bluegrass is 3 percent. That indicates a  
17 very high quality range site to have only 3 percent  
18 introduced species or invasive species.

19 Q. And did you look at any other  
20 documentation of the introduced or invasive  
21 species?

22 A. Yes, I did.

23 Q. And what was that?

24 A. Okay. In Section 2.4.7.2 there is a table  
25 of acreages of the various range ecological sites,

1 and on this table I've highlighted those that are  
2 found on the Voigt ranch for which there was  
3 inventory data available. So the numbers  
4 highlighted yellow then are the acres of the  
5 ecological site, and the top row is the various  
6 ecological sites. Cp stands for claypan. Cy  
7 stands for clayey. CD stands for closed  
8 depression. Ly stands for loamy. Sa stands for  
9 sands. Sy stands for sandy. So it gives a picture  
10 of the diversity of range sites that are out there.

11 Q. Before we go on, let me just back up. I  
12 just handed you a document. I know you have copies  
13 of your own up there. The document you're  
14 referring to is identical to the document I just  
15 handed to you as well; right?

16 A. Yes.

17 Q. And I think you might have covered this,  
18 but I want to make sure we're all clear. There are  
19 some marks that are highlighted and some red pen  
20 circles and some numbers written in. Those were  
21 all written in by you; right?

22 A. Yes.

23 Q. And can you explain to us what each number  
24 means?

25 A. Okay. The original numbers in the table,

1 the typed-in numbers are the acres of that range  
2 site that was found on that legal description. So  
3 I went through the available range inventory sheets  
4 where I could find inventory data available, and  
5 then I circled those on this. So the red circles  
6 indicate the sites for which there is range  
7 inventory data available on the Voigt ranch.

8 The number that I inked in there is the  
9 percentage of invasive or non-native species. And  
10 if you look in the claypan column, there was 3  
11 percent on one of the inventory points, none  
12 identified in another one.

13 On the loamy site there was no invasive  
14 species identified.

15 On the sands range sites there were two of  
16 those that were inventoried, no invasives on one of  
17 the sites, 7 percent on the other.

18 On one of the sandy range sites, 3 percent  
19 invasive or introduced species and only 1 percent  
20 on the other one.

21 Then there was two sites on the thin loamy  
22 ecological site, 3 percent invasive on one, none on  
23 the other.

24 The bottom line is here the Voigt ranch  
25 has an exceptionally low percentage of invasive

1 species on the unit.

2 Q. Okay. So do you have any specific  
3 recommendations with respect to how you can show  
4 production on the Voigt ranch and successfully  
5 reclaim that native grassland?

6 A. Could you repeat the question, please?

7 Q. Yeah. Do you have any specific  
8 recommendations as to what should be done in the  
9 reclamation process on Mr. Voigt's land to ensure  
10 that he's getting back the same productivity in the  
11 same land postmining?

12 A. Mr. Voigt will want the same quality of  
13 plant community back that he has now. He won't  
14 want any more invasive species out there than what  
15 he has currently.

16 Q. So your suggestion is that what he gets  
17 back is not at a 35 percent threshold but at the  
18 threshold shown on the rangeland index that you put  
19 together?

20 A. Yes. That's correct.

21 Q. Okay. And we've been talking about  
22 invasive tame grasses. Did you look at the issue  
23 of invasive noxious weeds at all?

24 A. Yes.

25 Q. And did you have any concerns with respect

1 to that?

2 A. The noxious weeds, I can remember from my  
3 time in field offices as a district conservationist  
4 you could really see the corridors where they'd  
5 installed pipelines or buried fiberoptic cable  
6 because the absinth wormwood showed those corridors  
7 show up for years. They were weed nurseries. And  
8 it's just a known fact that bare soil, disturbed  
9 soils are an open invitation for these invasive  
10 weeds to take over, get a foothold and be a real  
11 problem. Mr. Voigt does not currently have great  
12 problems with noxious weeds and he does not want  
13 them on his unit.

14 Q. And what do you suggest in terms of  
15 mitigating against that or ensuring that the  
16 noxious weeds don't take over?

17 A. In the mine permit application there is  
18 reference that spraying operations will be used to  
19 control the weeds. Sometimes it takes more than  
20 just spraying with big equipment. Sometimes it  
21 takes small equipment and actually spot spraying,  
22 and I believe it does refer to that in the mine  
23 application permit also.

24 In one of the range seedings that I  
25 assisted a producer with, I went out and looked at

1       it after it had started growing and discovered that  
2       the range seeding had a heavy stand of cheatgrass  
3       or Japanese brome grass, and the producer was not  
4       familiar with it as a weed and how much of a threat  
5       it posed to the stand, so I assisted him. We spent  
6       an afternoon and we pulled the weeds by hand  
7       because there's no way to spray those out. And we  
8       filled up a pickup box with those. If that had  
9       gone unchecked for another couple months, that seed  
10      would have matured and possibly ruined that  
11      seeding.

12             Q.     Okay.

13             A.     So it does take intensive management to  
14      control these weeds.

15             MR. BRAATEN: I just want to back up. I  
16      think there's going to be a discussion among the  
17      attorneys at some point about what constitutes the  
18      record, whether the docket is part of the record,  
19      and so forth. So one of these exhibits is already  
20      in the permit application. The other one, 2.4.7.2,  
21      is as well, but as Mr. Anderson has testified, he's  
22      marked this exhibit with some other information, so  
23      I would offer the one that is marked as an exhibit  
24      before we move on.

25             JUDGE MANN: You don't want to offer the

1 other as an exhibit?

2 MR. BRAATEN: Well --

3 JUDGE MANN: I understand that it's part  
4 of the application, but it's not that uncommon to  
5 make the application part of the record in the  
6 Public Service Commission's proceedings. So, I  
7 mean -- and it might be understood that it is part  
8 of the application, but it might be easier if we  
9 just go ahead and mark it as an exhibit. It  
10 doesn't hurt anything.

11 MR. BRAATEN: That's fine.

12 JUDGE MANN: Let's mark the first one, the  
13 Rangeland Similarity Index, that will be Voigt  
14 Exhibit No. 9, and then the second document that  
15 you passed out that Mr. Anderson had made notations  
16 on, that will be Voigt Exhibit No. 10.

17 Mr. Bjella, do you have objections to  
18 either of those documents?

19 MR. BJELLA: No, Your Honor.

20 JUDGE MANN: Ms. Jeffcoat-Sacco?

21 MS. JEFFCOAT-SACCO: No. Thank you for  
22 including 9.

23 JUDGE MANN: Yes. Voigt Exhibits 9 and 10  
24 are admitted and you can continue.

25 COMMISSIONER CHRISTMANN: Judge, can you

1 repeat which one was 9 and which was 10.

2 JUDGE MANN: Yes. This one is 9, the  
3 Rangeland Similarity Index.

4 Q. (MR. BRAATEN CONTINUING) We talked about  
5 the introduced cool season grasses or the tame  
6 grasses, and I think you've touched on this, but  
7 can you explain why it's undesirable to have them  
8 in a native grass seeding in a native pasture?

9 A. The introduced invasive species tend to  
10 take over the community -- the plant community.  
11 They tend to be shallow rooted, the Kentucky  
12 bluegrass, the smooth brome grass and, therefore,  
13 they have less ability to utilize the soil profile.

14 Cool season grasses grow by a different  
15 biochemical process, and it's less efficient than  
16 warm season grasses. They require more nitrogen  
17 and water to produce the same amount of biomass.  
18 Warm season grasses grow faster in warm weather  
19 compared to the cool season species, and those are  
20 important factors in semiarid areas like Coyote  
21 Creek.

22 Q. Okay. If we don't want the tame grasses  
23 introduced, do we still want to see a diversity of  
24 species in the native prairie, though?

25 A. Yes. Diversity in the plant community is

1 important, and it's a sign of a healthy plant  
2 community. I can remember in 1988 and 1989 when I  
3 worked in Pierce County, the drought there was  
4 extreme. One farmer told me he recorded four  
5 inches of rainfall for the entire year of 1988. In  
6 parts of the county there was only one grass that  
7 was visible to be growing at all that was green,  
8 and that was prairie sandreed. Prairie sandreed is  
9 on the list of species that is in the mine permit,  
10 but I do want to emphasize the point that diversity  
11 of species is important. Prairie sandreed is not  
12 only drought tolerant, but it's also grasshopper  
13 resistant. So it's these qualities of the diverse  
14 species that are important.

15 Blue grama is a grass that's noted for  
16 retaining its nutritional value for a long period.  
17 Most grasses decline to a very low nutritional  
18 level by the end of the growing season. But blue  
19 grama retains significantly higher nutritional  
20 level, protein level, even through the dormant  
21 period. So if you have a good growth of blue grama  
22 the previous year, it can be a useful grazing  
23 source, residual grazing the following spring.

24 Q. And so when we're talking about diversity,  
25 is it just the grasses with respect to what's

1 beneficial to have diversity of, or are there other  
2 things that you want mixed -- or other plants you  
3 want with the native grasses?

4 A. Yes. The forbs are also an important  
5 component of the rangeland. Forbs are the  
6 broadleaf plants. And there are a number of forbs  
7 inventoried on the Voigt ranch. And some of the  
8 native forbs are legumes, meaning they are plant-  
9 fixed nitrogen which serves as a fertilizer for the  
10 grasses. And it's -- the forbs are also utilized  
11 by wildlife, which Mr. Voigt considers part of the  
12 productivity of his ranch. So the forbs can be  
13 utilized by wildlife species, some of those also by  
14 his cattle, and he does not want to sacrifice the  
15 diversity of those species that he has present.

16 Q. So with respect to the plantings and the  
17 native grasses and forbs, do you have any specific  
18 recommendations as to how -- what proportions to  
19 use or any other recommendations to make sure this  
20 gets back to the same level of productivity that  
21 Mr. Voigt's land is at now?

22 A. I would recommend that the reclamation  
23 should attain or restore 95 percent of the native  
24 grass species -- or the desirable native grass  
25 species on his unit that he has now. And,

1 likewise, for forbs, I think 95 percent restoration  
2 would be a reasonable request.

3 Q. Okay. And you also mentioned forbs. Do  
4 you have any specific recommendations as far as the  
5 level of forb reseeding that should be done?

6 A. Seeding of forbs is tricky because there  
7 are so many seeds per ounce that reaching an  
8 optimum level is -- can be a little bit difficult.  
9 I would defer to the range management experts, the  
10 NRCS plant material specialists for actual  
11 recommendations on species and proportions and  
12 amounts per acre.

13 Q. Okay. I want to move on a little bit  
14 to -- we discussed a little bit the thickness of  
15 the suitable plant growth material. But before I  
16 move on, is there anything else with respect to the  
17 revegetation of the native grasses or desirable  
18 species that you want to add?

19 A. Yes. One of the big concerns is that the  
20 Standards For Evaluation of Revegetation Success  
21 states that -- and I'm quoting from the standards  
22 from the Public Service Commission -- for final  
23 bond release the permittee must demonstrate that at  
24 least five native grass species are present on the  
25 reclaimed tract and the native plant species

1       comprise at least 65 percent of the total  
2       composition by cover or weight.

3                So that -- of those five species,  
4       Mr. Voigt has at least 10 species or 12 species of  
5       grasses on his unit. He does not want to give up  
6       any of the diversity of those native grasses that  
7       he has now.

8                In looking further at the requirements for  
9       diversity and seasonality, it states that Kentucky  
10       bluegrass on the reclaimed tract may be counted  
11       towards meeting the 65 percent total native species  
12       composition requirement. That is not acceptable to  
13       Mr. Voigt.

14               He stands to lose substantially in  
15       production and quality forage if such a low  
16       standard is all that's met, because if he, first of  
17       all, has -- only 65 percent natives can be -- is  
18       sufficient, then of that 65 percent, one of those  
19       can be Kentucky bluegrass, that virtually leaves no  
20       native requirement except for where it states  
21       further that for the native grass species must  
22       contribute at least 3 percent relative live basal  
23       or at least 5 percent relative composition by  
24       weight during the year sampling data is used.

25               So while there are requirements to have 15

1 percent warm season grasses on the site, that's  
2 really about the only requirement that's in there.  
3 That and to have one native cool season grass.

4 Q. Okay.

5 A. That bar is set way too low. It would not  
6 come anywhere near meeting what Mr. Voigt has on  
7 his ranch at this time.

8 Q. And what I just mentioned was more of a  
9 soils issue, but I know that this ties in very  
10 closely to revegetation, and so did you look at the  
11 varying thicknesses of suitable plant growth  
12 material and how that might impact revegetation in  
13 your review?

14 A. I did.

15 Q. Okay. And what's your understanding of  
16 what's required right now for revegetation or for  
17 replacement of topsoil on Mr. Voigt's land?

18 A. The thicknesses are dependent on the  
19 suitability for the electrical conductivity and  
20 sodium adsorption ratio of the spoil material that  
21 is placed below it. It requires a maximum of 48  
22 inches of total suitable plant growth material.  
23 Okay. So if the sodium adsorption ratio was less  
24 than 12, electrical conductivity is less than 8 on  
25 medium or finer textured material, respread

1 thickness is -- required is 24 inches.

2 If the sodium adsorption ratio is between  
3 12 and 20, electrical conductivity is less than 8,  
4 the respread thickness requirement is 36 inches.  
5 And if the sodium adsorption ratio is greater than  
6 20, regardless of texture, and if the electrical  
7 conductivity is greater than 8, then 48 inches of  
8 suitable plant growth material is required.

9 MR. BJELLA: Could we just clarify, what  
10 is he reading from there?

11 JUDGE MANN: Can you identify that  
12 document? Mr. Braaten, do you know what it is?

13 MR. BRAATEN: Yeah. I mean, I know where  
14 those numbers come from. It comes from the  
15 revegetation guide used by the PSC, and Mr. Deutsch  
16 probably can give a little more information on what  
17 exactly that document is, if that's all right.

18 JUDGE MANN: Go ahead.

19 MR. DEUTSCH: Actually I believe he's  
20 reading from our rules, the one option for  
21 respraying suitable plant growth material.

22 MR. BRAATEN: From the admin rules?

23 MR. DEUTSCH: Correct.

24 JUDGE MANN: Do you know -- can you  
25 identify what section or at least the chapter?

1 MS. JEFFCOAT-SACCO: He has them  
2 memorized.

3 COMMISSIONER KALK: Jim wrote them.

4 MR. DEUTSCH: It's that that are laid out  
5 in North Dakota Administrative Code Section  
6 69-05.2-15-04.

7 JUDGE MANN: Okay.

8 MR. DEUTSCH: I believe that's what he's  
9 probably reading from.

10 JUDGE MANN: Thank you. Go ahead,  
11 Mr. Braaten.

12 Q. (MR. BRAATEN CONTINUING) Did you look at  
13 any other documents with respect to the actual  
14 depths of suitable plant growth material on the  
15 Voigt property?

16 A. Yes. I looked at Natural Resources  
17 Conservation Service information, in the ecological  
18 site descriptions, and it lists in there -- in the  
19 ecological site descriptions it lists ranges of the  
20 minimum depth and maximum depth to a restrictive  
21 layer.

22 COMMISSIONER FEDORCHAK: Are you going to  
23 pass these out to the rest? Sorry.

24 Q. (MR. BRAATEN CONTINUING) Okay. Continue.

25 A. On this Exhibit 2.4.7.3, ecosite

1 production summary, I've highlighted some figures  
2 in four columns. And these four columns are four  
3 of the range sites that the Voigt ranch has  
4 substantial acreage of. There's -- Cy stands for  
5 the clayey range site. Ly stands for the loamy  
6 range site. Sa stands for the sands range site.  
7 Sy stands for the sandy range site. The original  
8 numbers that are typed into this table are the  
9 pounds of forage that are produced on these various  
10 tracts -- or on the range ecological sites on those  
11 tracts of land, and it's expressed in pounds, the  
12 production.

13 So, for example, if you look at the first  
14 upper left number that's highlighted, it's 1,218,  
15 that's pounds of production on the clayey  
16 ecological site in the -- in a parcel on Section 6.  
17 So these ecological sites have ranges of depths to  
18 the restrictive layer.

19 Q. And how are you able to determine that  
20 these sites had varying depths to the restrictive  
21 layer?

22 A. Okay. It's listed in the ecological  
23 sites, and I believe those are part of the mine  
24 application.

25 Q. Okay. I would -- go ahead.

1           A.     The depth range for the clayey ecological  
2 site is minimum depth of 20 inches, maximum depth  
3 of 72 inches to the restrictive layer. It's the  
4 same for the loamy and sandy range sites, minimum  
5 of 20-inch depth, maximum 72-inch depth. For the  
6 sands range site, the ecological site description  
7 says that the minimum depth to restrictive layer is  
8 40 inches, maximum depth is 60 inches.

9           So the depth to that restrictive layer is  
10 an equivalent of suitable plant growth material  
11 thickness. So, in other words, if you have 72  
12 inches to that restrictive layer, that means you  
13 have six feet of suitable plant growth material,  
14 material that plants can root into.

15          Q.     And is that important for the health of  
16 native grasslands?

17          A.     It is not so much a matter of the health  
18 of the rangeland, but it is absolutely a factor in  
19 the productivity of the rangeland. So if you look  
20 at these columns, in the production that he's  
21 obtaining from these various range sites in those  
22 columns highlighted, the production may be  
23 dependent on a lot of soils that are six feet deep.

24                 Now, we don't know directly from the  
25 ecological sites what the depths of soils are on

1 Mr. Voigt's ranch. However, that information may  
2 be able to be extracted from the soil survey that  
3 was done on his unit.

4 So the bottom line is Mr. Voigt has a  
5 highly productive ranch, and it may be because he  
6 has a lot of relatively thick soils, soils that are  
7 substantially thicker or have a substantially  
8 deeper potential rooting zone than what the -- than  
9 what the guidelines require for reclamation.

10 Q. Okay. I've just handed you an image with  
11 the root zones of a number of plants, and I think  
12 that this illustrates to some extent what you're  
13 talking about, but can you talk about this exhibit  
14 a little bit and what it shows us?

15 A. The diagram is a chart. If you'll notice,  
16 it shows the rooting depth below the ground surface  
17 of the various plants, of the species identified up  
18 above. And on the left-hand side of the chart is a  
19 rooting depth expressed in feet. And if you will  
20 go over to the fifth species on there, for example,  
21 sideoats grama, it shows as having a rooting depth  
22 of about seven to eight feet. And there is  
23 definitely sideoats grama on the Voigt ranch.

24 Moving over further, I'll mention dotted  
25 gayfeather. Even though it didn't show up on any

1 of the inventory sites on the ranch, there's strong  
2 chance that there is dotted gayfeather on his ranch  
3 right now because it is a fairly common range  
4 plant. And you'll notice that the rooting depth of  
5 dotted gayfeather is greater than 14 feet.

6 And, again, native forbs have value to  
7 that unit either as livestock forage or to native  
8 wildlife species or to pollinators. And those  
9 pollinators are important in the state of North  
10 Dakota not only just for honey production for bees,  
11 but also to -- diversity of the plants that are out  
12 there.

13 Q. And if you had compacted mine spoil 48  
14 inches below the surface, how would that affect the  
15 growth and viability of some of these deeper  
16 rooting plants?

17 A. It's highly likely that if the spoil  
18 material beneath is compacted, rooting will stop  
19 right there. Or if it's too high in sodium content  
20 or electrical conductivity, that's where plant  
21 growth will stop. And that's just addressing the  
22 spoil material underneath.

23 Another concern is the compaction. If the  
24 soils are compacted, even if the material is  
25 physically and chemically -- if it's chemically

1 acceptable for plant growth material, meaning it  
2 doesn't have too much salt, it still may be  
3 unavailable for the plants to root into it if it's  
4 compacted too hard.

5 Q. So with respect to the varying thicknesses  
6 of the suitable plant growth material, do you have  
7 any specific recommendations of what could be done  
8 at the Voigt ranch to ensure a healthy native  
9 grassland after reclamation?

10 A. First of all, for the material that will  
11 be replaced, Mr. Voigt will not want any less  
12 rooting depth than what he has currently. Now,  
13 understandably, there are different rooting depths  
14 on the soils on his ranch right now. Some of them  
15 are relatively shallow. Some are deep.  
16 Accumulatively he wants the same production  
17 potential that is available as a result of existing  
18 thickness of topsoil plus subsoil that is suitable  
19 for rooting or, in reclamation terms, suitable  
20 plant growth material.

21 Q. Okay. And you heard earlier Steve Merrill  
22 was testifying by phone and he was discussing a lot  
23 of issues more related to soils and soils in  
24 general, and I'd like to ask you about that  
25 generally, and I guess my first question would be,

1 as a person who has worked within the soil science  
2 field, are you familiar with these ideas of soil  
3 health and soil quality that were discussed by  
4 Mr. Merrill?

5 A. Yes, I am.

6 Q. Okay. And are there any aspects of soil  
7 health as he was discussing it that you feel he  
8 didn't cover, or is there anything you want to add  
9 to that testimony regarding the way soil scientists  
10 are looking at soil health nowadays?

11 A. I would really like to emphasize the  
12 compaction factor, because I think that's one of  
13 the reasons that -- or one of the greatest concerns  
14 out there for restoration. If those soils --  
15 suitable plant growth material, if it's compacted  
16 too hard, it just will not be possible for those  
17 plants to root into it and to utilize the nutrients  
18 and moisture that should be stored in that soil  
19 profile.

20 Q. Do you have any specific recommendations,  
21 either in literature you've seen or elsewhere, on  
22 how you can deal with the issue of compaction?

23 A. I would like to refer to a document that  
24 was just handed out, Restoration and Reclamation  
25 Review from the University of Minnesota. It's

1 titled Soil factors affecting reclamation of  
2 abandoned coal mine land and methods of soil  
3 preparation.

4           This article goes on -- describes the  
5 disruption of soil that results from mining,  
6 disrupts the soil structure, soil microbe  
7 populations, and nutrient cycles that are crucial  
8 to sustaining a healthy ecosystem. Ecosystems  
9 function optimally as a process of recycling  
10 nutrients--a balance of growth rates and  
11 decomposition rates of plant and animal matter.  
12 Soil provides the foundation for this process, so  
13 its composition and density directly affect the  
14 future stability of the restored plant community.

15           Soil may be negatively affected by one or  
16 more events associated with coal mining: Initial  
17 removal of soil from the site as mining activities  
18 begin, storing or stockpiling soil, respreading  
19 soil upon completion of mining activities, and  
20 post-spreading conditions. Reclamation strategies  
21 must address soil structure, microbe populations  
22 and nutrient cycling in order to return the land as  
23 closely as possible to its predisturbance condition  
24 and continue as a self-sustaining ecosystem.

25           The first component addressed during

1 reclamation is the structure of the soil itself as  
2 it is replaced onto the reclamation site. Soil  
3 structure includes soil aggregation, or the way in  
4 which soil particles are held together, and the  
5 size of the particles comprising the layers at  
6 different depths.

7           Soil aggregation affects the degree to  
8 which oxygen, water, and nutrients flow through the  
9 soil and may reduce erosion potential. Aggregate  
10 structure breaks down as successive layers of soil  
11 are removed and stockpiled elsewhere on the site  
12 when mining begins. The resulting compaction  
13 reduces water holding capacity and aeration.

14           The degree to which soil is loosely  
15 constructed versus compacted can be altered during  
16 reclamation by the method of replacement used.  
17 Compaction can be minimized by using a mining wheel  
18 rather than scrapers to dig stored soil.  
19 Transporting soil from the stockpile to the  
20 reclamation site on a conveyor belt with trundling  
21 action improves soil structure by breaking up  
22 massive aggregates. As smaller aggregates continue  
23 to tumble, they tend to acquire an agglomerative  
24 skin of fine particles which promotes loose soil  
25 structure. Minimal use of bulldozers to level soil

1 at the reclamation site further reduces compaction.

2 Loosely constructed, or fritted, subsoil  
3 is very important to plant root systems. The  
4 extent of the root system determines a plant's  
5 ability to maximize its surface area and access a  
6 greater volume of water and soil nutrients. Plants  
7 grown in fritted subsoil have root patterns with  
8 extensive vertical and lateral penetration. Root  
9 patterns in compacted soils are limited to cracks  
10 occurring in the substrate and achieve little  
11 additional soil penetration.

12 Q. And beyond the compaction issue, with  
13 respect to some of the biological components of  
14 soil health discussed by Merrill earlier, do you  
15 have any specific concerns or things that you'd  
16 want to add regarding the importance of soil health  
17 in looking at reclamation success?

18 MR. BJELLA: Are we going to admit any --

19 JUDGE MANN: Yeah. We've gone -- there  
20 have been a number of exhibits, I've got them  
21 marked as 11, 12 and 13, with 11 being the table,  
22 Section 2.4.7.3, ecosite and production site  
23 summary that Mr. Anderson has marked up. I've got  
24 that identified as Exhibit No. -- Voigt Exhibit 11.  
25 Let's start with that first.

1           Mr. Bjella, did you have any objection to  
2 that exhibit?

3           MR. BJELLA: No, Your Honor.

4           JUDGE MANN: Ms. Jeffcoat-Sacco?

5           MS. JEFFCOAT-SACCO: No, Your Honor.

6           JUDGE MANN: Okay. And then the next  
7 exhibit that was testified to was the root systems  
8 document that identifies the root depths of the  
9 various plants, and I've got that marked as Voigt  
10 Exhibit No. 12.

11           Mr. Bjella, any objection to that document  
12 being admitted?

13           MR. BJELLA: May I ask a few questions,  
14 Your Honor?

15           JUDGE MANN: Certainly.

16           MR. BJELLA: Now, where does this Exhibit  
17 12 come from?

18           THE WITNESS: I don't know what the  
19 publication was. I obtained it from the Natural  
20 Resources Conservation Service state range  
21 conservationist Jeff Prince.

22           MR. BJELLA: So you have no idea where  
23 this comes from, what book or what reference  
24 source?

25           THE WITNESS: No, I do not.

1           MR. BJELLA: And also it is certainly not  
2 representative of what might occur on Mr. Voigt's  
3 soil either, is it, as to depths that the plant  
4 roots might grow? I mean, it's totally dependent  
5 upon the soil type and many other factors, isn't  
6 that true?

7           THE WITNESS: This does not correlate to  
8 the soils on his unit, but it is representative of  
9 some of the grass species that he has present on  
10 his unit, specifically sideoats grama and little  
11 bluestem and blue grama.

12          MR. BJELLA: Yeah, but you would just be  
13 speculating to say it represents how far the roots  
14 could grow into Mr. Voigt's soil compared to what's  
15 depicted on this map; isn't that true?

16          THE WITNESS: Yes, you are correct. I  
17 cannot make a conclusion or an assumption from this  
18 document the rooting depth on Mr. Voigt's ranch.  
19 However, that data is probably available and  
20 attainable from the soil survey that was done on  
21 the unit.

22          MR. BJELLA: I guess, Your Honor, we would  
23 object to this exhibit for lack of foundation. We  
24 have no basis to know where it came from or who  
25 printed it or who wrote it.

1 JUDGE MANN: Ms. Jeffcoat-Sacco?

2 MS. JEFFCOAT-SACCO: We don't really have  
3 a position. If the party can produce the  
4 reference, it seems to me we can admit it.

5 THE WITNESS: I can't at this time.

6 MS. JEFFCOAT-SACCO: I don't mean the  
7 witness. I mean Mr. Braaten.

8 JUDGE MANN: Mr. Braaten, can you do that?

9 MR. BRAATEN: I probably could. I mean,  
10 it was intended as a demonstrative exhibit anyway,  
11 but if -- so I'm fine with it not being admitted.  
12 If we want it admitted, I'm sure that Mr. Anderson  
13 could track down the source if that's the only  
14 issue.

15 JUDGE MANN: Here's the thing. I'll admit  
16 it. You know, the Commission can address whatever  
17 weight, if any, that it wishes to give to this  
18 exhibit. Mr. Bjella, you've addressed some of the  
19 foundational issues that do exist and you can  
20 address those in cross-examination as well. I'll  
21 admit the Exhibit No. 12 subject to Mr. Braaten  
22 providing the source of the document as part of a  
23 late-filed exhibit, I guess.

24 And then with respect to the last  
25 document, the article that Mr. Anderson was reading

1 from, I've got that marked as Voigt Exhibit No. 13.

2 Mr. Bjella, any objection to that document  
3 being admitted?

4 MR. BJELLA: May I ask a few questions,  
5 Your Honor?

6 JUDGE MANN: Go ahead.

7 MR. BJELLA: Mr. Anderson, reviewing both  
8 the title of this document and also some of the  
9 substance in it, this appears to be entirely and  
10 solely related to reclamation of abandoned coal  
11 mines, which we will not have in the Coyote Creek  
12 situation; isn't that correct?

13 THE WITNESS: It will not be an abandoned  
14 coal mine, I suppose, but I believe the principles  
15 apply to the principles of mine reclamation.

16 MR. BJELLA: Abandoned coal mines are  
17 typically -- we used to have them in North Dakota.  
18 They would be huge spoil piles just sitting around,  
19 totally different from respread, recontoured,  
20 subsoil and topsoil respread land, wouldn't you  
21 agree?

22 THE WITNESS: Could you restate the  
23 question, please?

24 MR. BJELLA: Well, abandoned coal mines,  
25 when we used to have them in North Dakota, you

1 would see them around. They're huge spoil piles --

2 THE WITNESS: Yes.

3 MR. BJELLA: -- of basically overburden  
4 that have been left for whatever, 30, 40, 50 years.  
5 That will contrast dramatically and totally with  
6 what we'll have at Coyote Creek, which will be  
7 lands that will be recontoured to the original  
8 contours, subsoil respread, topsoil respread? It's  
9 an entirely different situation, isn't it?

10 THE WITNESS: No.

11 MR. BJELLA: How isn't it?

12 THE WITNESS: We're not arguing the  
13 recontouring of the land. The concerns here are  
14 the compaction, the replacement of the suitable  
15 plant growth material.

16 MR. BJELLA: But how can there be any  
17 correlation between an abandoned coal mine and  
18 land, as it says right in here, was unable to  
19 support healthy native plant communities? How can  
20 that at all correlate to a newly reclaimed coal  
21 mine done pursuant to modern methods?

22 THE WITNESS: Whether it's compacted a  
23 year ago or 50 years ago, if it's compacted, it's  
24 compacted. The plants won't care. They're not  
25 going to be able to root through it anyway if it's

1 compacted. The fact that you're dealing with  
2 immediate reclamation doesn't make compaction any  
3 less of a problem.

4 MR. BJELLA: Well, it says soil factors  
5 affecting reclamation of abandoned coal mines, and  
6 abandoned coal mines are a totally different  
7 scenario.

8 I guess I would object to this exhibit as  
9 being irrelevant and misleading because it deals  
10 with a situation which we do not have here. We do  
11 not have an abandoned coal mine.

12 JUDGE MANN: Ms. Jeffcoat-Sacco?

13 MS. JEFFCOAT-SACCO: We don't have a  
14 position.

15 JUDGE MANN: And I think I'm going to do  
16 the same thing with respect to this exhibit. I'll  
17 allow it. I'll admit it as Voigt Exhibit No. 13  
18 into evidence. Again, I'll note your objection and  
19 allow you to address the points that you brought up  
20 in cross-examination and through your witnesses.  
21 But I'll go ahead and admit it and the  
22 commissioners can give it whatever weight they feel  
23 is appropriate.

24 You can continue, Mr. Braaten.

25 Q. (MR. BRAATEN CONTINUING) Mr. Anderson,

1 the exhibit we've just been discussing, have you  
2 reviewed that article in full, the U of M article  
3 that's Exhibit Voigt 13?

4 A. Yes, I have.

5 Q. And there are a number of different issues  
6 discussed in here with respect to reclamation,  
7 including bacteria, soil pH, reestablishing  
8 nutrient cycles, carbon cycles. These issues and  
9 the suggestions and information contained in the  
10 article, is it your opinion that the principles and  
11 suggestions apply equally to reclaiming any mine  
12 land, whether abandoned or not?

13 A. Definitely, yes.

14 Q. And before we started discussing the  
15 exhibit in general, you had been talking about  
16 compaction, and I wanted to move on and just give  
17 you the opportunity again following Mr. Merrill's  
18 testimony to indicate if there are any other  
19 factors within the soil health concept that you  
20 thought maybe he didn't cover as fully or that are  
21 important to you and that you have suggestions  
22 regarding.

23 A. In this same publication, the University  
24 of Minnesota publication, it does mention  
25 mycorrhizal fungi. Mycorrhizal fungi are organisms

1 that have a symbiotic relation to plants. They  
2 create a halo around the roots of plants that  
3 enable the plants to extract more nutrients and  
4 moisture from the soil. And it's important to  
5 establish that biotic component in the soil for the  
6 plants to reach their potential productivity.

7 Q. Okay.

8 A. And techniques can be used in the  
9 reclamation process such as growing cover crops  
10 that are noted for improving or restoring  
11 mycorrhizal fungi, and that should be considered as  
12 a means of accelerating the restoration of the  
13 biotic component of the soil.

14 Q. And so in sum, can you tell us what your  
15 primary concerns are with respect to the success of  
16 revegetation at the Coyote Creek mine?

17 A. From the standpoint of the vegetation, the  
18 concerns are not just pounds of production but also  
19 quality of production. Mr. Voigt doesn't want to  
20 sacrifice the seasonal high-quality vegetation that  
21 he produces now, combination of warm season species  
22 and cool season species.

23 If the reclamation guidelines -- if the  
24 bare minimum was met where, for example, 60 percent  
25 of the stand could be Kentucky bluegrass, there's

1 no way that he would achieve that production  
2 potential. So he wants the same quality back in  
3 forage production. He wants the seasonal  
4 availability of it. He wants the same diversity  
5 that provides the health and resiliency to his  
6 rangeland community.

7 The production that he has on his ranch is  
8 also a product of the thickness of the topsoil and  
9 subsoil, is suitable for rooting on his ranch. He  
10 wants as many acres of the same depth back as what  
11 he has now. Recognizing that there are differences  
12 in the different soil map units on his land, he  
13 wants the same rooting potential back.

14 Q. Just one final question. From the  
15 perspective of a rangeland conservationist, if you  
16 end up with, for example, the possibility of 60  
17 percent Kentucky bluegrass on his fields, will  
18 those fields be as productive as they were prior to  
19 mining?

20 A. No.

21 MR. BRAATEN: No further questions.

22 JUDGE MANN: Mr. Bjella.

23 MR. BJELLA: Yes, Your Honor.

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25

**EXAMINATION**

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**BY MR. BJELLA:**

Q. Mr. Anderson, what is your experience with reclaiming mine lands in North Dakota?

A. I have no direct experience in reclamation on rangelands in North Dakota or any other state.

Q. There was a lot of talk today about the 35 percent guideline, I guess we'll call it. That guideline -- or standard, I guess is probably a better word, comes from the Public Service Commission Standards For Evaluation of Revegetation Success; is that correct?

A. Yes.

Q. So if, for instance, Coyote Creek was to say our goal is to establish 65 percent, that would meet the required standards set by the Public Service Commission; is that correct?

A. That's correct.

Q. If you look at Exhibit No. 9, please.

A. Is that the thin loamy range inventory?

Q. Section 2.4.7.4.

A. Yes.

Q. Okay. As I read the data on this tract, this tract, which is on Mr. Voigt's land, would not meet the PSC standards even as they're written

1 today; is that correct?

2 A. I don't see why not.

3 Q. Well, because four species must contribute  
4 5 percent by weight, and it doesn't do that, so it  
5 doesn't meet the standards as they currently exist  
6 today, and this is a piece of Mr. Voigt's land;  
7 isn't that correct?

8 A. Could you please repeat that, why it does  
9 not meet.

10 MR. STEFFEN: He quoted the rule.

11 MS. FLATH: It doesn't meet the diversity  
12 requirements.

13 JUDGE MANN: Only Mr. Bjella can question.  
14 Go ahead.

15 MR. BJELLA: If I might, Your Honor, could  
16 I have Ms. Flath ask this question because it's a  
17 portion I don't understand.

18 JUDGE MANN: Why don't you just take a  
19 minute and confer, that would be better, and then  
20 you can ask it.

21 (Short recess.)

22 Q. (MR. BJELLA CONTINUING) It's our  
23 understanding that under current regulations four  
24 species must contribute 5 percent by weight for  
25 native grasslands under the current standards.

1 There's only three here that do that. So this  
2 tract of land of Mr. Voigt's wouldn't meet that  
3 existing PSC standard.

4 A. Only three native species?

5 MR. STEFFEN: Three native grasses.

6 Q. (MR. BJELLA CONTINUING) Three native  
7 grass species, yes.

8 A. I count little bluestem as a native,  
9 needle-and-thread as a native, plains muhly is a  
10 native, porcupine grass is a native, sideoats grama  
11 is a native, threadleaf sedge is a native.

12 Q. But you must have all -- you must have  
13 four at least 5 percent?

14 A. I'll agree, there are not four species on  
15 there.

16 Q. And this is a parcel of Mr. Voigt's land  
17 as it currently exists today; right?

18 A. Yes.

19 Q. Also under the existing PSC standards two  
20 of these grasses must be warm season. You only  
21 have one here; isn't that correct?

22 A. No.

23 Q. 5 percent -- to meet the 5 percent  
24 guideline.

25 A. Yes, the little bluestem.

1 Q. So it fails on two points -- two factors  
2 to meet existing PSC standards?

3 A. Yes. It's a valid point. I think it  
4 calls for revisit of the current standards, because  
5 I think you could talk to any range  
6 conservationist -- unbiased range conservationist  
7 and they would describe this as an excellent  
8 quality range ecological site or plant community.

9 Q. Mr. Anderson, in your experience, is the  
10 trend for all native grass sites in North Dakota --  
11 virtually all that introduced species composition  
12 is going up?

13 A. No, it's not a trend on all grasslands.  
14 No.

15 Q. I said virtually all.

16 A. No.

17 Q. On a great -- on a large extent of them  
18 composition is going up?

19 MR. BRAATEN: I'm going to object to the  
20 form of the question. It's vague.

21 JUDGE MANN: I'll overrule it. You can  
22 answer it if you're able.

23 THE WITNESS: I need more specific basis  
24 for -- what do you mean by a large extent?

25 Q. (MR. BJELLA CONTINUING) Well, in your

1 experience, have you seen that in native grasslands  
2 in North Dakota that introduced species composition  
3 has been going up?

4 A. I've seen a lot of it, yes.

5 Q. Given that there's at least a reasonable  
6 likelihood that if Mr. Voigt's land was never  
7 mined, his introduced species composition would  
8 likely increase; wouldn't that be true?

9 A. I don't believe so. There's -- to me the  
10 current status of this rangeland is excellent.  
11 He's told me he's using a twice-over grazing system  
12 and he is, to my understanding, an intensive --  
13 intensively concerned about his vegetation  
14 management. I see no reason to expect the invasive  
15 to increase on Mr. Voigt's ranch.

16 Q. And did you review the soil depth  
17 information, Section 2.5, of the permit for  
18 Mr. Voigt's land?

19 A. No.

20 Q. And what was your source for saying there  
21 is compaction if you haven't been on a coal mine?

22 A. The concern raised by Mr. Voigt and his  
23 mention of other individuals that have actually  
24 worked on the mines, and the fact that I attended a  
25 Saltwater Conservation Society meeting back -- I

1 don't know what the year was -- back in the 1980s  
2 or 1990s when one of the researchers from the  
3 Mandan Agricultural Research Service -- I don't  
4 recall his last name, I believe his first name was  
5 Padom, he referred to the reclamation procedures as  
6 subsurface paving.

7 MR. BJELLA: I have no further questions.

8 JUDGE MANN: Ms. Jeffcoat-Sacco?

9 MS. JEFFCOAT-SACCO: I believe Mr. Deutsch  
10 will have a couple questions, but before that I  
11 would like to get the revegetation success  
12 standards into evidence. They are not rules and  
13 they are not law. They are standards. But I think  
14 because there's been so much testimony about them,  
15 and maybe a little bit more with Mr. Deutsch's  
16 question, I would like to have the book. We will  
17 get one for the record --

18 JUDGE MANN: Okay.

19 MS. JEFFCOAT-SACCO: -- in the record.

20 JUDGE MANN: Okay.

21 MS. JEFFCOAT-SACCO: And I'll just give  
22 this to Jim.

23 **EXAMINATION**

24 **BY MR. DEUTSCH:**

25 Q. Mr. Anderson, with regard to your

1 testimony about allowing Kentucky bluegrass on the  
2 reclaimed tract that may count towards meeting that  
3 65 percent of the total native composition  
4 requirement, I'm assuming that came from our  
5 revegetation guidelines.

6 A. Yes.

7 Q. Do you have a copy of that particular page  
8 with you right now?

9 A. No.

10 Q. Well, that statement that you made about  
11 that counting, there's -- that's qualified, and  
12 I'll read from it. It says, also up to its percent  
13 composition on the approved reference area,  
14 Kentucky bluegrass on the reclaimed tract may be  
15 counted towards meeting the 65 percent native  
16 species composition requirement. However, it  
17 cannot otherwise be counted as a native species for  
18 diversity standards. And I'm assuming you're  
19 familiar with what a reference area is.

20 A. Yes.

21 Q. Now, if a reference area is set up on  
22 Mr. Voigt's -- some undisturbed land that does not  
23 have Kentucky blue, then Kentucky blue couldn't be  
24 counted based on the way this is written; isn't  
25 that correct?

1           A.     Well, if that's what it means, then  
2 Mr. Voigt is fine with that.

3           Q.     Okay. That is the way that requirement is  
4 written, it can only be counted if it's present on  
5 the approved reference area, so --

6           A.     Okay. Thank you.

7           MR. DEUTSCH: Thank you. That's all I  
8 have.

9           JUDGE MANN: Can I just have you identify  
10 like the section and maybe page, I guess.

11          MR. DEUTSCH: Yeah. That's in the native  
12 grassland portion. It's under requirements for  
13 diversity and seasonality, and it's on page -- the  
14 title at the top is native grassland. It's  
15 II-D-10.

16          JUDGE MANN: Okay. And, Illona, I guess,  
17 what document was that, what's it entitled, and  
18 maybe we can get that marked as Exhibit 14 and see  
19 if we can get that into the record.

20          MS. JEFFCOAT-SACCO: I'll take a minute to  
21 get one to be marked, but it is literally the  
22 Public Service Commission Reclamation Division  
23 Standards for Evaluation of Revegetation Success,  
24 and then it's a little longer, and Recommended  
25 Procedures for Pre- and Postmining Vegetation

1 Assessments. But I think the whole document needs  
2 to go in because, otherwise, these things are out  
3 of context.

4 JUDGE MANN: Sure. And I think once we  
5 get it, we'll mark it as Voigt Exhibit No. 14.

6 Mr. Braaten, do you have any objection as  
7 to admitting that into evidence?

8 MR. BRAATEN: No, I don't.

9 JUDGE MANN: Mr. Bjella?

10 MR. BJELLA: No, Your Honor.

11 JUDGE MANN: Okay. Once we get the copy  
12 of that, we'll mark that as Voigt Exhibit No. 14  
13 and it will be admitted.

14 Do you have any other questions at this  
15 point, Ms. Jeffcoat-Sacco?

16 MS. JEFFCOAT-SACCO: No.

17 JUDGE MANN: Okay. Commissioner  
18 Christmann.

19 **EXAMINATION**

20 **BY COMMISSIONER CHRISTMANN:**

21 Q. In Exhibit No. 9, the list of the plant  
22 species, is Kentucky bluegrass the only one that  
23 you would consider invasive nonnative species of  
24 these that are listed?

25 A. Yes. On that sample site, yes.

1           Q.    The rest you would all consider to be  
2 native?

3           A.    Native, yes.

4           Q.    And then on Exhibit No. 11, I'm not really  
5 understanding the exhibit very well.  So I'm  
6 looking at the second column that's with  
7 highlighting, the top one that's highlighted,  
8 166,656.  So what does that mean as opposed to the  
9 state tract above it that's 363,000?  I don't have  
10 any kind of a correlation.

11          A.    That number is the pounds of production on  
12 that ecological site within that parcel of land.  
13 If you look at the --

14          Q.    But these parcels are all different sizes;  
15 right?

16          A.    Yes.

17          Q.    So if the parcel above it is slightly more  
18 than twice as large, then they would be  
19 substantially equal in that category?

20          A.    I'm not sure how that was calculated, but  
21 they may have factored in the productivity of the  
22 site based on actual clipping.  So if his site was  
23 clipped with a higher yield, that may be different  
24 than on adjoining property.

25          Q.    So maybe you can just take another stab at

1 explaining to me what I should take out of these  
2 numbers.

3 A. Okay. The important thing I want you to  
4 understand on this is that Mr. Voigt has  
5 substantial acreage of these range sites that I've  
6 underlined and highlighted. Even though these  
7 represent pounds of production, suffice it to say  
8 that they also represent substantial acreages of  
9 these range sites. And on those range sites the  
10 rooting depth for these range sites can be from 60  
11 to 72 inches of maximum depth. The clayey, the  
12 loamy, and, I believe, the sandy site have maximum  
13 rooting potential of 72 inches -- it's either sandy  
14 or sands. I don't recall which right offhand.

15 Q. Is there something here that proves it is,  
16 though? I mean, could they be less than that too  
17 depending on just whatever Mother Nature has put  
18 there?

19 A. They could be closer to the minimum of 20  
20 inches, but bottom line is Mr. Voigt is concerned  
21 that he gets back the same thickness of suitable  
22 plant growth material.

23 Q. And then on number 13, when this deals  
24 with abandoned mine land, weren't by definition the  
25 abandoned mine lands mined in such a way that

1 overburden and the subsoil and topsoil was all  
2 mixed together and so when it's getting respread in  
3 this study, there could be tens of feet of hard  
4 clay mixed in with the topsoil and such that would  
5 compact much more likely than what the subsoil or  
6 topsoil of modern mining practices would compact?

7 A. I don't think there's any way you can  
8 compare the two because from my understanding of  
9 the old abandoned mines, they just moved overburden  
10 and soil, and I don't think they separated or  
11 segregated anything and it was just thrown on  
12 there. It appears it was just side grasped by  
13 draglines. So that material might be compacted far  
14 less because there was no equipment run on it to  
15 level it out.

16 Q. That's my understanding too, but then if  
17 you would reclaim it, you would move it around, and  
18 so wouldn't that pack even worse than what our  
19 subsoil does, because you would have all that clay  
20 and stuff from far below with the overburden mixed  
21 in?

22 A. It may.

23 Q. Your description of the amount of Kentucky  
24 bluegrass that can be counted as native -- and then  
25 I'm anxious to see that exhibit, I guess, now and

1 read it more clearly and refresh myself personally.  
2 But you seemed surprised by Mr. Deutsch's  
3 description of the rest of that, so had you read  
4 that, or where did you get your information about  
5 that allowance if you hadn't read that?

6 A. I was reading a summary of the data, and  
7 that was one detail that I did not fully  
8 understand.

9 Q. But you're comfortable with the PSC  
10 requirement if it says as Mr. Deutsch stated it?

11 A. Yes.

12 Q. You said Mr. Voigt's ranch is 10 to 12  
13 native species.

14 A. Yes.

15 Q. Is that -- in western North Dakota where  
16 there's areas that are substantially undisturbed,  
17 you know, larger tracts like that, is that common  
18 or is that extraordinary?

19 A. With as many different range sites as he  
20 has, I would say it would be fairly common --  
21 fairly common and definitely commendable, the  
22 number of species that he has.

23 Q. And when these areas are studied, how big  
24 of an area do they look at, and do they take a  
25 square yard? Or how big an area do they study; do

1 you know?

2 A. I don't know what size the sample plot is.

3 Q. So I don't know if you'll know this then.

4 When you say 10 or 12, is that 10 or 12 that cover

5 all the spots that were studied over the whole

6 extent of his ranch, or is that each study area

7 averages 10 or 12 different species?

8 A. No. The 10 or 12 species that I mentioned

9 was a count of the species that showed up on the

10 inventory sheets for sampling that was done on his

11 ranch.

12 Q. All of them.

13 A. So there may be other species that were

14 not -- there may be other species present on his

15 ranch, and probably are other species present on

16 his ranch, that did not show up on the inventory

17 sheets. I can count up the grasses that did appear

18 that were native. There was little bluestem,

19 needle-and-thread, plains muhly, porcupine,

20 sideoats. Threadleaf sedge is a grasslike species.

21 Western wheatgrass, inland saltgrass. Sun sedge is

22 a grasslike species. And Wilcox panicum.

23 Q. Okay. And I think my last one, Your

24 Honor, is with -- what do you call the -- what was

25 the term you used for the subsoil suitable for

1 growing?

2 A. Suitable plant growth material.

3 Q. If that is two feet and -- let's say it  
4 was two feet on a third of the land that's going to  
5 be mined and four feet on a third and six feet on a  
6 third. Is it advantageous to have it reclaimed  
7 that way so there's some areas with extraordinary  
8 depths, but also some areas with not very good  
9 depths, or would it be over the whole ranch equal  
10 if that was reclaimed all at four feet?

11 A. I can't answer that. And that's one of  
12 the questions I had in my mind too. If we had more  
13 time, I think it would have -- I would have liked  
14 to have done some calculations based on the soil  
15 survey and see what the production potentials are  
16 for those soils and see if in fact he will get  
17 equal production back based on that average or if  
18 the variety of different thicknesses he has right  
19 now actually produces more. I would not rule out  
20 the possibility that he is better off with that  
21 range -- wider range in suitable plant growth  
22 material thicknesses that he has right now.

23 Q. Is that what -- I mean, you're here as an  
24 expert. Is that what you expect or --

25 A. I couldn't say. I would need to -- need

1 to do the work to determine that.

2 Q. Okay.

3 A. It is a recommendation that I would make  
4 to the Public Service -- to the Commission, is to  
5 consider -- consider that as a possibility or  
6 potential.

7 COMMISSIONER CHRISTMANN: Thank you.

8 JUDGE MANN: Commissioner Kalk.

9 COMMISSIONER KALK: Thank you, Your Honor.

10 **EXAMINATION**

11 **BY COMMISSIONER KALK:**

12 Q. Thank you, Mr. Anderson, for your  
13 testimony and your work in rangeland and being a  
14 Bison, of course, as well.

15 I will just jump right to Exhibit 13 and  
16 kind of follow on Commissioner Christmann's  
17 questions. I used to work in academia and it  
18 seemed like you could always find one report that  
19 liked something and one that didn't tell something.

20 So tell me again how you found this  
21 document, the one that -- restoration reclamation  
22 review.

23 A. By Internet search.

24 Q. Did you find any other in Internet search,  
25 or is this the only one that was out there?

1           A.     That was definitely not the only one that  
2 was out there. I did find one that was quite  
3 similar and more detailed and it appeared to be a  
4 lot of the same language that is in this document.

5           Q.     Would you agree, though, you could find  
6 something on the Internet that shows research that  
7 reclaimed coal land is better than when it started?

8           A.     Pardon me?

9           Q.     Would you agree that you could probably  
10 search the Internet and find a document that  
11 completely contradicts this document?

12          A.     I don't know.

13          Q.     Okay. And then do you know anything about  
14 the author's credentials? I don't see a master's  
15 of science, a Ph.D. or anything behind it.

16          A.     No, I don't.

17          Q.     And, like I said, this is not criticizing  
18 you at all. I'm just trying to figure out the  
19 document.

20                   Then just a couple other ones. It sounds  
21 like you value the soil survey data that's  
22 available very highly in what you do in your range  
23 work.

24          A.     Yes.

25          Q.     And then when you talked about -- earlier

1 about reclamation that you've seen in pipelines or  
2 fiber optic cable installations, do you know if  
3 there's any standards that are available that those  
4 companies are held to right now?

5 A. I would guess that they're probably bound  
6 only by the state noxious weed law. And I would  
7 point out that the state noxious weed law offers  
8 very little help in a situation like this. The  
9 state noxious weed law, as I understand it,  
10 addresses efforts to control the weeds. It is not  
11 defined by results. Results are what matters to  
12 Mr. Voigt.

13 Q. Well, and I certainly agree with that. Do  
14 you have an understanding of -- in pipelines that  
15 if a pipeline is jurisdictional to the PSC, there's  
16 standards that we hold them to; if the pipeline is  
17 not jurisdictional, there's no standards for  
18 reclamation?

19 A. Okay. I'm not familiar with the  
20 current --

21 Q. Well, and I'm just walking down a road  
22 here that it seemed to me that in your testimony  
23 you were trying to compare what might happen at the  
24 coal mine that has very strict reclamation  
25 standards to what's happening out there in fiber

1 optics and pipelines, that the reclamation that  
2 you've seen for those that aren't jurisdictional to  
3 us would somehow relate to this stuff that is  
4 jurisdictional to us.

5 A. The point I would like to make is that  
6 bare ground is where invasive species show up and  
7 noxious weeds, sites that are disturbed. And until  
8 the grasses are firmly established on the reclaimed  
9 sites, they are -- those -- I consider those acres  
10 to be highly vulnerable to invasion by noxious  
11 weeds and other non-noxious weeds invasive species.

12 Q. And I would certainly agree with you on  
13 that. I think that we're trying to get to the same  
14 end here, we want the land to go back to better  
15 than it was if possible. So I just want to make  
16 clear that there is -- I see there's a large  
17 difference trying to compare what you'd see in a  
18 pipeline that's not jurisdictional or a power line  
19 to what you might see in something we have  
20 jurisdictional on.

21 Just a couple more, sir. You talked a lot  
22 about what is acceptable or not acceptable with  
23 Mr. Voigt. How do you know that? How did you go  
24 through all this data with him?

25 A. I didn't go through all the data with him,

1 but in the discussion I had with Mr. Voigt, he has  
2 expressed that he wants the same productivity and  
3 health that he has in his plant communities  
4 currently.

5 Q. Okay.

6 A. Both in terms of quantity and quality.

7 Q. And I always enjoy the discussion about  
8 native and non-native. Are pheasants native or not  
9 native to North Dakota?

10 A. They are introduced.

11 Q. People love them, don't they?

12 A. Yes.

13 Q. And I think that's the same discussion  
14 that range purists have with -- and it's not a bad  
15 thing, but you want to have the native grasslands  
16 back to the way they were, but I do appreciate the  
17 dialogue that took place on that.

18 How do you measure compaction?

19 A. There is an instrument called a  
20 penetrometer, that it measures -- it's a probe --  
21 pointed probe you can push down into the soil and  
22 then read it in pounds of pressure required to push  
23 the probe into it. That's one technique that I'm  
24 familiar with.

25 Q. Because one of the discussions we've --

1 I've had about soils over the years is back when  
2 the glaciers were sitting on there, there was a  
3 certain level of compaction, but centuries later  
4 things evolve, soils break apart, so time is going  
5 to make better soil. I've always viewed  
6 reclamation the same way, that whatever compaction  
7 we have, we want to reduce it, but there's going to  
8 be some level but time will fix these things. Do  
9 you disagree with that?

10 A. I agree with you. I would also like to  
11 point out that the big question is time. How long  
12 is it going to take for those soils to loosen up by  
13 natural processes. If the roots can't get in  
14 there, that's one process that is stopped.  
15 Freeze-thaw is another action that typically  
16 loosens up soils somewhat. However, the deeper --  
17 deeper materials we're talking about will not go  
18 through a lot of freeze-thaw cycles in one year.  
19 The deeper material will tend to freeze up, stay  
20 froze and then thaw out, so it's only going through  
21 one freeze-thaw cycle per year -- a lot of this  
22 material. And it's repeated freeze-thaw cycles  
23 that really helps with that aspect of the  
24 expansion-contraction.

25 Q. So the breaking up of -- no, it's not

1 better. Breaking up in the initial phases when  
2 it's exposed to that is much different than what  
3 would happen once you put the topsoil on?

4 A. Yes.

5 COMMISSIONER KALK: Okay. Thank you.

6 JUDGE MANN: Commissioner Fedorchak.

7 **EXAMINATION**

8 **BY COMMISSIONER FEDORCHAK:**

9 Q. Mr. Anderson, thanks for being here. Tell  
10 me -- judging by your resume, it looks to me like  
11 you were at the NRCS for about 36 years?

12 A. Yes.

13 Q. And just recently left there in the last  
14 year -- this year?

15 A. Yes.

16 Q. Tell me, one of the agencies that is  
17 communicated with during this whole process is the  
18 NRCS and apparently they have provided comments on  
19 this permit application. Have you read those  
20 comments?

21 A. No, I have not.

22 Q. Are you -- when you were with the NRCS,  
23 were you ever involved in the review process of  
24 these permits and the commenting -- or commenting  
25 on them?

1           A.    No.

2           Q.    So would you say that, you know, the NRCS  
3           comments -- why wouldn't you look for those, I  
4           guess? I mean, they seem like the one that has  
5           expertise that you are bringing to the table on an  
6           issue that you feel, you know, is important.  
7           Wouldn't their comments or lack thereof offer some  
8           additional authority or some outside third-party  
9           perspective on these issues that would be relevant  
10          to this discussion?

11          A.    I would expect they will.

12          Q.    So if we look at those comments and see  
13          what they've said and how that's been implemented,  
14          that can be something that myself as a commissioner  
15          trying to get to the bottom of the issues here  
16          should put some stake in, in the NRCS, what they're  
17          saying about this permit application?

18          A.    Yes, I agree.

19          Q.    Okay. Good. I haven't read them either,  
20          but I'm going to look for them.

21                    You've mentioned a couple times that  
22          Mr. Voigt isn't just interested in the quantity of  
23          production but the quality. Tell me again what you  
24          mean by that.

25          A.    From the standpoint of his livestock, he

1 wants a plant community that's capable of producing  
2 vegetation of a relatively high nutritional quality  
3 throughout the growing season for as long as  
4 possible through the grazing season. And right now  
5 he has that with the combination of warm season,  
6 cool season grasses.

7 Q. Okay. So in the reclamation process we  
8 secure that kind of quality that he wants to make  
9 sure he has long term by the mixture of the species  
10 in the reclamation; correct?

11 A. Pardon me?

12 Q. So if we reach that 65 percent process,  
13 we're getting at the quality as well as the  
14 quantity?

15 A. That starts to address it. There is also  
16 the concern of forbs. Right now I don't read  
17 anything in the standard referring to any  
18 requirements for forbs.

19 Q. Okay. So how do you measure? I mean, if  
20 the quantity is the production level, the forage on  
21 the end of the measurement of that that gets at the  
22 quantity -- at least I'm assuming that's how you  
23 get at the quantity. Then the quality, how do you  
24 measure that in terms of bond release?

25 A. Because you have to deal with other

1 variables like weather -- under real dry conditions  
2 it's going to be hard to determine whether or not  
3 the full potential of the sites have been restored.  
4 And that's why I think there needs to be a very  
5 heavy emphasis on the foundation for that plant  
6 production potential, and that's the soil. Do you  
7 have the thickness of suitable plant growth  
8 material? Does it have the physical  
9 characteristics necessary to allow rooting and to  
10 allow maximum growth -- does it have the biological  
11 components or microbiological components that  
12 enhance plant growth?

13 Q. I'm going to follow up with our experts on  
14 this when they get up there, but I have been on a  
15 few of the mine sites to observe the mining process  
16 and the reclamation process and I've seen the  
17 pillars. Have you been out there to see how they  
18 do this? We see the pillars -- I call them  
19 pillars. That's not the technical term. Maybe  
20 it's monuments or something like that. It shows  
21 the different layers of the earth and it shows --  
22 you can really see where the topsoil is and the  
23 subsoil and the overburden or whatever the lowest  
24 level is.

25 My understanding is that they reclaim to

1 the depth of those pillars, but I want to confirm  
2 that. And if that's true, then I believe  
3 Mr. Voigt's subsoil and topsoil would be reclaimed  
4 similar to how it was before it was mined, but I  
5 will confirm that. If that's the case, does that  
6 get at that issue in terms of the active vegetation  
7 material, the depth of it?

8 A. I'm not familiar with this aspect of the  
9 reference points that you're describing.

10 Q. Okay.

11 A. My experience -- actual experience on  
12 mines has been evaluating wetlands, which is a  
13 whole different world.

14 COMMISSIONER FEDORCHAK: Okay. And I  
15 could be wrong that that's how it's done, but I  
16 guess that's from my tours and review of this,  
17 that's what I believe it to be, so I want to  
18 confirm that. Thank you.

19 JUDGE MANN: Mr. Braaten, do you have any  
20 followup?

21 MR. BRAATEN: Yeah, just a couple.

22 **FURTHER EXAMINATION**

23 **BY MR. BRAATEN:**

24 Q. Mr. Anderson, you were provided a number  
25 of documents and materials from the attorneys you

1 were working with; right?

2 A. Yes.

3 Q. And with respect to the Kentucky bluegrass  
4 issue that Mr. Deutsch brought up, the materials  
5 you were provided with were provided by the  
6 lawyers; right?

7 A. Yes.

8 Q. And the lawyers didn't provide you with  
9 the NRCS letter that was part of the record?

10 A. That's correct.

11 Q. And so the fact that you didn't have those  
12 is the lawyers' fault?

13 A. Yes.

14 Q. I do want to go back to the bluegrass  
15 issue, though. Putting aside the amount of  
16 Kentucky bluegrass we're discussing and let's just  
17 say there isn't any, do you think that a field that  
18 has 35 percent tame grasses is as productive as a  
19 field that is, for example, 5 percent tame grasses?

20 A. No.

21 Q. And we discussed a little bit the  
22 reclamation guide, which we are now putting into  
23 the record and had a discussion of that, and you  
24 obviously had reviewed that. Have you reviewed any  
25 of the specific statutes on performance standards

1 and reclamation that are used by the PSC?

2 A. Yes.

3 Q. Okay. And I'd like to get your opinion on  
4 one of these with respect to the reclamation plans  
5 at the Coyote Creek mine.

6 MR. BRAATEN: And for the record and the  
7 lawyers, I'm reading from North Dakota Century Code  
8 38-14.1-24, Subsection 17.

9 Q. And the standard in the statute is, "For  
10 those lands which are to be rehabilitated to native  
11 grasslands, a diverse, effective, and permanent  
12 vegetative cover must be established of the same  
13 seasonal variety native to the area to be affected  
14 and capable of self-regeneration, plant succession,  
15 and at least equal in extent of cover and  
16 productivity to the natural vegetation of the  
17 area."

18 In your opinion, based on what you have  
19 looked at in the application permit, does it appear  
20 that that is going -- that Coyote Creek is going to  
21 be able to successfully meet that standard?

22 A. No.

23 MR. BRAATEN: I have no further questions.

24 JUDGE MANN: Mr. Bjella?  
25

**FURTHER EXAMINATION**

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**BY MR. BJELLA:**

Q. Following up with that last question, as there has been no mining at Coyote Creek, there's been no reclamation, you're purely speculating as to what the end result is going to be; isn't that correct?

A. No.

Q. How can you not be speculating? There's nothing to evaluate.

A. I evaluated the reclamation plan and I looked at the depths of the soil that are going to be placed back, and I looked at, for example, the revegetation seeding plan and I counted fewer species on there than what Mr. Voigt has on his ranch currently. So I believe I based the opinion on the evidence at hand.

Q. So you're essentially saying that the North Dakota reclamation program is dead wrong and that all these mines that are being reclaimed around the state are being reclaimed to the wrong standards? That's essentially what you're saying; isn't that correct?

A. No, I'm not saying it's all wrong. I'm saying there is room for improvement.



1 same answer as far as topsoil? I'm assuming  
2 that in --

3 A. Yes.

4 Q. -- in pastures a lot of times on the  
5 hilltops the topsoil is pretty thin and in the  
6 valleys it might be a little thicker. Could you --

7 A. I --

8 Q. No opinion as far as what averaging it  
9 would do?

10 A. That's correct.

11 COMMISSIONER CHRISTMANN: Okay. Thank  
12 you.

13 JUDGE MANN: Commissioner Kalk?

14 COMMISSIONER KALK: No, Your Honor.

15 JUDGE MANN: Commissioner Fedorchak?

16 COMMISSIONER FEDORCHAK: No.

17 JUDGE MANN: Anything further,

18 Mr. Braaten?

19 MR. BRAATEN: No, Your Honor.

20 JUDGE MANN: You can step down. Thank  
21 you.

22 Do you have other witnesses?

23 MR. BRAATEN: We don't have any other  
24 witnesses and we'll rest.

25 JUDGE MANN: Okay. Are there any members

1 of the public who didn't have the opportunity to  
2 testify last Friday that would like to offer  
3 testimony relevant to this proceeding? None.

4 Mr. Bjella, it's our intention to adjourn  
5 at 3:00. Did you want to try to call any witnesses  
6 before that point, or would you prefer to wait  
7 until the 2nd?

8 MR. BJELLA: I think we might as well  
9 wait, Your Honor, because it will take me at least  
10 15 minutes for our first witness just on my direct,  
11 so at least we wouldn't finish with him by 3.

12 JUDGE MANN: Yeah.

13 MR. BJELLA: So I guess we --

14 JUDGE MANN: I think that's probably the  
15 best approach. I guess before we adjourn today,  
16 are there any other issues we should address at  
17 this point?

18 COMMISSIONER KALK: Your Honor, if I could  
19 throw something out.

20 JUDGE MANN: Go ahead, Commissioner Kalk.

21 COMMISSIONER KALK: There has been a lot  
22 of discussion about what's in the record, what's  
23 not in the record. If the attorneys could get all  
24 that sorted out and get it all submitted prior to  
25 January 2nd, then all of us can review stuff,

1 because we'll spend a lot of time reviewing the  
2 documents up to this point, and then it's nice to  
3 get this stuff in as soon as possible.

4 JUDGE MANN: Mr. Braaten, anything before  
5 we adjourn?

6 MR. BRAATEN: No Your Honor.

7 JUDGE MANN: Mr. Bjella?

8 MR. BJELLA: No, Your Honor.

9 JUDGE MANN: Ms. Jeffcoat-Sacco?

10 MS. JEFFCOAT-SACCO: I think we can get  
11 this vegetation success standard document marked.  
12 I don't have all of them, but I have one to mark.

13 JUDGE MANN: Okay. I think I already  
14 asked, but there was no objection from counsel for  
15 admitting that as Voigt Exhibit 14?

16 MR. BJELLA: No, Your Honor.

17 JUDGE MANN: Ms. Jeffcoat-Sacco, anything  
18 else before we adjourn? Did you have anything?

19 MS. JEFFCOAT-SACCO: Nothing further.  
20 Thanks.

21 JUDGE MANN: Commissioner Christmann?

22 COMMISSIONER CHRISTMANN: No other  
23 comments.

24 JUDGE MANN: Commissioner Kalk?  
25 Commissioner Fedorchak?

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COMMISSIONER FEDORCHAK: No.

JUDGE MANN: All right. Thank you. We will adjourn and we will return at 8:30 on January 2nd for the continuation of the formal hearing. Thank you.

(Adjourned at 2:46 p.m., Tuesday, December 23, 2014.)

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CERTIFICATE OF COURT REPORTER

I, Denise M. Andahl, a Registered Professional Reporter,

DO HEREBY CERTIFY that I recorded in shorthand the foregoing proceedings had and made of record at the time and place hereinbefore indicated.

I DO HEREBY FURTHER CERTIFY that the foregoing typewritten pages contain an accurate transcript of my shorthand notes then and there taken.

Bismarck, North Dakota, this 9th day of February, 2015.

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Denise M. Andahl  
Registered Professional Reporter

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