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STATE OF MISSOURI
PUBLIC SERVICE COMMISSION

TRANSCRIPT OF PROCEEDINGS
Hearing
November 12, 2014
Jefferson City, Missouri
Volume 12

In the Matter of the Application)
of Grain Belt Express Clean Line)
LLC for a Certificate of Convenience))
and Necessity Authorizing it to)
Construct, Own, Operate, Control,) File No.
Manage and Maintain a High Voltage,) EA-2014-0207
Direct Current Transmission Line)
and an Associated Converter Station)
Providing an Interconnection on the)
Maywood - Montgomery 345 kV)
Transmission Line.)

MICHAEL BUSHMANN, Presiding,
Regulatory LAW JUDGE.
ROBERT S. KENNEY, Chairman
STEPHEN M. STOLL,
WILLIAM KENNEY,
DANIEL Y. HALL,
SCOTT T. RUPP,
COMMISSIONERS.

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1 P R O C E E D I N G S

2 (WHEREUPON, the hearing began at

3 8:30 a.m.)

4 JUDGE BUSHMANN: Good morning. Today
5 is Wednesday, November 12th, 8:30 a.m. This is the
6 second day of the hearing in File No. EA-2014-0207.

7 Before we proceed to take any witness
8 testimony, just a couple of preliminary things. As
9 far as scheduling, today the Commissioners have a
10 public agenda meeting at noon. So I'm afraid that,
11 regardless of where we are in the testimony and
12 anybody's questioning, we're going to have to stop
13 no later than 11:55 so that they can go upstairs
14 for their meeting. And my anticipation would be
15 that we would then resume at one o'clock.

16 And I think also Missouri Landowners
17 Alliance had something relating to an exhibit from
18 last time; is that correct?

19 MR. AGATHAN: I do, Judge. Thank
20 you. My name is Paul Agathan from the Missouri
21 Landowners Alliance.

22 Yesterday, Judge, we offered
23 Exhibit 314, to which Mr. Zobrist objected. I
24 looked over the contents of that exhibit last
25 night, and I'm confident that I got in

1 cross-examination everything that I wanted to get
2 in anyway through the exhibit. So I will withdraw
3 the offer of Exhibit 314.

4 JUDGE BUSHMANN: Very good. I'll
5 indicate that that exhibit has been withdrawn. Any
6 other preliminary matters that any parties need to
7 bring up? Mr. Jarrett?

8 MR. JARRETT: Yes. Thank you, Judge.
9 Maybe sometime later today, probably closer maybe
10 as we go through the testimony today, but I have a
11 witness that is scheduled to fly in and testify on
12 Friday from Wisconsin. So I thought maybe a short
13 discussion later on today about scheduling and
14 seeing where we are might be a good idea so I can
15 let him know.

16 JUDGE BUSHMANN: Maybe we could do
17 that around mid-afternoon break when we kind of get
18 a feel for how things are going, and then we can
19 see how your witness will be able to accommodate
20 it.

21 MR. JARRETT: Perfect. Thank you,
22 Judge.

23 MR. WILLIAMS: Judge, there's
24 something that's come up more than once, and it's
25 been this subject to check. I'm not quite sure

1 what that means. I understand it may have been a
2 practice here at the Commission in the past. It's
3 not one that I've seen since I've been employed
4 here. If it -- I'm not sure who's doing what
5 checking, I guess, basically.

6 JUDGE BUSHMANN: Any of the parties
7 that have been using that term or phrase want to
8 explain what they mean by that?

9 MR. AGATHAN: I have been for one at
10 least. If I ask the witness to accept subject to
11 check that 25 times 8.643 or something equals a
12 certain number and he says he will accept that
13 subject to check, that would give the witness the
14 opportunity later to do that checking and come back
15 and say, no, you were wrong, your math is wrong.

16 Or if I accept -- for example, ask
17 him to accept subject to check that a certain
18 document on a certain page says the following and
19 he accepts that subject to check, then that witness
20 could go back later and verify it or, if he
21 disputes it, come back and dispute it.

22 It's just a time-saving mechanism to
23 avoid going through the math or going through and
24 handing the witness the document and going back and
25 forth on documents. So I -- the way I use it and

1 have always used it is, it's up to the witness to
2 check what he has accepted subject to check, and if
3 he disputes it, to come back at some point and say
4 I dispute it.

5 JUDGE BUSHMANN: That's how I
6 understood that it was being used. So I guess I
7 could make clear that if I don't hear any
8 objections later from the witness or witness'
9 counsel, I will assume that the statement that was
10 subject to check is correct and it would need no
11 further action on my part.

12 MR. ZOBRIST: And, Judge, I would
13 agree with that. I think the burden is on, for
14 example, the Grain Belt Express witnesses have said
15 that, we have taken a look at a document to review
16 and we think it's -- was incorrect, what he said,
17 then we will advise the Commission or I'll give it
18 to Mr. Agathan. Certainly at the very latest it
19 will appear in post-hearing briefs, but hopefully
20 it will be rectified sooner than that.

21 JUDGE BUSHMANN: That will be good,
22 so that it can be corrected in the record before we
23 do the briefing schedule.

24 MR. ZOBRIST: Correct. Yeah.
25 Hopefully, yes.

1 JUDGE BUSHMANN: That's fine with me.
2 And so long as everybody understands what that
3 means and what their obligations are with regard to
4 that, then I think we're okay. Thank you for
5 bringing that up.

6 Anything else anybody needs to talk
7 about? Okay. Then I think we're ready to proceed
8 with witness testimony. Mr. Zobrist, I believe you
9 wanted to take somebody out of order?

10 MR. ZOBRIST: Yes. We'd like to
11 start with Stanley Blazewicz. He was actually
12 scheduled to be the first witness today, but I
13 would present him to the Commission at this point
14 and then proceed with Anthony Wayne Galli as our
15 second witness today. So with the Commission's
16 consent, I'll call Stanley Blazewicz to the stand.

17 (Witness sworn.)

18 STANLEY BLAZEWICZ testified as follows:

19 DIRECT EXAMINATION BY MR. ZOBRIST:

20 Q. Please state your name.

21 A. Stan Blazewicz.

22 Q. And where do you work?

23 A. National Grid.

24 Q. And what is your position there?

25 A. I'm the vice president for U.S.

1 business development.

2 Q. Now, Mr. Blazewicz, did you prepare
3 surrebuttal testimony in this case which I have
4 marked as Exhibit 103?

5 A. Yes.

6 Q. Do you have any corrections to your
7 testimony?

8 A. Yes. On page 5 -- page 5, line 7,
9 where it says Great America Holdings, LLC, that
10 should actually be Great America Holdings, Inc. So
11 the LLC should be replaced with Inc.

12 Q. Capital I-n-c period?

13 A. I-n-c period, that's correct.

14 Q. Any other corrections to your
15 testimony?

16 A. No.

17 Q. And if I were to ask you these
18 questions, would your answers be given as here?

19 A. Yes.

20 Q. And they were given under oath?

21 A. That's correct.

22 MR. ZOBRIST: Judge, I move the
23 admission of Exhibit 103.

24 JUDGE BUSHMANN: Any objections?

25 (No response.)

1 JUDGE BUSHMANN: Hearing none,
2 Exhibit 103 will be received into the record.

3 (GRAIN BELT EXPRESS EXHIBIT NO. 103
4 WAS MARKED AND RECEIVED INTO EVIDENCE.)

5 MR. ZOBRIST: And I tender the
6 witness for cross-examination.

7 JUDGE BUSHMANN: First cross would be
8 Wind on the Wires Wind Coalition.

9 MR. REED: No cross. Thank you.

10 JUDGE BUSHMANN: Commission Staff?

11 MR. WILLIAMS: No questions.

12 JUDGE BUSHMANN: United for Missouri?

13 MR. LINTON: I have no questions.

14 JUDGE BUSHMANN: Rockies Express
15 Pipeline?

16 MS. DURLEY: No questions.

17 JUDGE BUSHMANN: Reicherts and
18 Meyers?

19 MR. DRAG: No questions, your Honor.

20 JUDGE BUSHMANN: Show-Me Concerned
21 Landowners?

22 MR. JARRETT: Yes, Judge. Just a
23 few. Thank you.

24 CROSS-EXAMINATION BY MR. JARRETT:

25 Q. Good morning.

1 A. Good morning.

2 Q. You have a copy of your surrebuttal
3 testimony in front of you, don't you?

4 A. That's correct, yeah.

5 Q. And referring to page 5, right where
6 you were making that correction, you indicate that
7 National Grid made a 48.2 million equity investment
8 in Clean Line in exchange for an approximate
9 40 percent ownership interest; is that correct?

10 A. That's correct.

11 Q. And what was the purpose of those
12 funds? Was it for development --

13 A. Yes.

14 Q. -- costs?

15 A. For development.

16 Q. It wasn't for any construction or
17 operations costs; is that correct?

18 A. That's correct. It was for con-- I'm
19 sorry. It was for development.

20 Q. Okay. And does National Grid have
21 any plans to construct or operate the Grain Belt
22 Express?

23 A. We've -- our rationale behind
24 investing in Clean Line was we were looking for
25 and -- we're looking for investments in

1 transmission in the U.S. That's our -- our
2 business in the UK and the U.S. We're one of the
3 largest owners of electric transmission assets in
4 the world. So we're looking for opportunities,
5 projects for electric transmission.

6 So our purpose behind investing in
7 Clean Line was to get access to those types of
8 projects that we could build, own and operate.

9 **Q. Okay. So is it your intention, do**
10 **you have any plans to construct and operate it?**

11 A. We're going to -- the way we've --
12 the way we do development and the way we make these
13 investments is we set certain milestones for the
14 projects, and whether they're a Clean Line-type
15 investment or whether they're our own internal
16 projects, we set specific milestones for those
17 projects. We provide them the funding. They hit
18 those certain milestones. We reassess. We provide
19 them additional funding to move to the next stage.

20 So at this point, it's premature for
21 us to say where exactly we would wind up with the
22 Grain Belt Express, but our purpose -- our original
23 intention of investing in Clean Line was to get
24 access to early-stage development for transmission
25 projects.

1 **Q. All right. So if Grain Belt Express**
2 **doesn't meet certain milestones, you wouldn't**
3 **provide any further funding or for any more**
4 **development or operations, construction?**

5 A. What we typically do is, as we're
6 re-- as we're assessing where any project is at and
7 we look at where they've hit those -- where they
8 were at with the milestones, if they haven't hit a
9 particular milestone, we'll reassess and say, well,
10 are there ways to -- is the milestone just delayed
11 or is it -- or is it insurmountable or is there
12 other work around. So we look at different --
13 different types of options.

14 **Q. Would one of the milestones be Grain**
15 **Belt's signing up of customers on the line?**

16 A. Yes. That's a milestone further down
17 in the development -- in the development process.

18 **Q. And would you agree that Grain Belt**
19 **Express must sell a majority of the project's**
20 **capacity before it can -- can obtain construction**
21 **financing?**

22 A. Yes, that's correct, before it -- it
23 will need to get customers on the line before it
24 enters into construction.

25 **Q. And is there a certain percentage**

1 **there, percentage of capacity that has to be sold?**

2 A. We'd like to see 100 percent. That
3 would be ideal. But at least 70 percent to get
4 comfortable with getting the financing going.

5 **Q. So if Grain Belt hadn't been able to**
6 **achieve a 70 percent sale of capacity on their**
7 **line, it's possible that National Grid would then**
8 **no longer be interested in working with Grain Belt**
9 **Express?**

10 A. If -- if we get that -- if they get
11 to that point where it becomes clear that they
12 can't get the customers for the line, then that
13 will probably be the case.

14 **Q. Thank you. Now, from your testimony,**
15 **you indicate that you have experience in managing**
16 **and developing transmission projects with National**
17 **Grid; is that correct?**

18 A. That's correct.

19 **Q. In your experience in the United**
20 **States, has National Grid ever developed and**
21 **completed a transmission project using Grain Belt**
22 **Express concepts?**

23 A. We've -- yes, we have.

24 **Q. With a high-voltage direct current**
25 **transmission line?**

1 A. Yes. We've -- we have -- we are
2 owners, majority owners of a project called --
3 affectionately called Phase II, but it's a project
4 that was built in the early '90s. It goes from
5 James Bay in Canada to Montreal and then finally
6 lands in Ayer, Massachusetts, just north of Boston.
7 There's a converter station in Montreal. So it's a
8 multi-terminal HVDC system similar to what Grain
9 Belt Express is being proposed, about 923 miles.

10 **Q. And that was built in the 1990s, you**
11 **say?**

12 A. It was early 1990s. It's under a
13 30-year contract with the utilities in New England.
14 That contract comes up for -- for renewal in 2019,
15 I believe. And we've just recently made about a
16 \$75 million investment last year to upgrade the
17 controls in that -- in that project.

18 **Q. Do you know if the economic**
19 **conditions and regulatory conditions in the 1990s**
20 **were the same as they are today?**

21 A. I can't say for sure. I'd have to go
22 back and -- I can't say for sure.

23 **Q. So the answer is you don't know?**

24 A. I don't know the particular economic
25 conditions. I would say that particular project

1 has been -- has been extremely beneficial for our
2 customers in New England. We are -- New England
3 has become heavily dependant on natural gas in the
4 last -- in the last few years. With pipeline
5 constraints into New England, our customers are
6 experiencing very high electricity prices, and this
7 project is certainly helping in doing that,
8 providing us low-cost hydro from Canada. So the
9 planners back in the late '80s, early '90s did a
10 bangup job in developing the project.

11 **Q. And that would have been financed**
12 **back during the economic conditions of the 1990s,**
13 **correct, 1980s?**

14 A. That's correct.

15 **Q. You indicate on page 8 of your**
16 **surrebuttal that -- you talk about financing**
17 **availability and large amounts of liquidity in the**
18 **capital markets, correct?**

19 A. That's correct.

20 **Q. And you're saying that's as of today,**
21 **correct?**

22 A. Yes.

23 **Q. Okay. You can't say with certainty**
24 **what the financial markets will be in, say, two or**
25 **three years, can you?**

1 A. No.

2 MR. JARRETT: I don't have any
3 further questions. Thank you.

4 JUDGE BUSHMANN: Missouri Landowner
5 Alliance?

6 MR. AGATHAN: Thank you, Judge.

7 CROSS-EXAMINATION BY MR. AGATHAN:

8 Q. Good morning.

9 A. Goods morning.

10 Q. My name is Paul Agathan. I'm
11 representing the Missouri Landowners Alliance.

12 A. Good morning, Paul.

13 Q. National Grid has invested
14 approximately, I think you said, \$48 million in
15 Clean Line; is that correct?

16 A. That's correct.

17 Q. And as you say at page 3, line 12 of
18 your testimony, the company's total assets amount
19 to approximately 87 billion; is that correct?

20 A. That's correct.

21 Q. If I divide the \$48 million
22 investment in Clean Line by your total assets of
23 87 billion -- if you've got a pencil, you may want
24 to write this number down -- but I get .000055 if I
25 do the math. Do you accept that subject to check?

1 A. Yes.

2 Q. And that would be about 6/100 of
3 1 percent of your company's assets, right?

4 A. I haven't done the math, but I assume
5 you're correct, yes.

6 Q. And if we divide 6/100 of
7 1 percent by five for the five Clean Line projects,
8 you have perhaps 1/100 of 1 percent of your assets
9 invested in the Grain Belt line; would that be
10 correct, if the math is right?

11 A. That's correct.

12 Q. Directing your attention to page 4 of
13 your testimony, line 17 to 21, you state that Grain
14 Belt line will have -- will move renewable power
15 from the central U.S. to load centers where you
16 believe there's a high demand for renewable energy.
17 Is that essentially correct?

18 A. That's correct.

19 Q. Are you generally familiar with the
20 renewable energy markets throughout the United
21 States?

22 A. Generally, yes.

23 Q. Is it fair to say that in the eastern
24 interconnect, that is the area west -- excuse me --
25 east of the Rocky Mountains, that the highest

1 prices for renewable energy tend to be in the
2 northeast and Atlantic coast areas?

3 A. That's correct, yes.

4 Q. What accounts for the difference in
5 the price for renewable energy in different areas
6 of the country?

7 A. It has to do with many factors,
8 including the RPS standards themselves and how the
9 RPS standards are constructed, how aggressive the
10 RPS standards are. It has to do with what
11 resources are available to meet those standards.
12 Each state has different nuances in terms of the
13 way that the RPS standard is developed.

14 Q. And with the price-dependent part,
15 would one of those factors be the cost to develop
16 new renewable energy in that particular area?

17 A. New -- yeah, the cost to develop
18 renewable energy and also the cost to bring that
19 renewable to where the load center is.

20 Q. Thank you. You know the normal
21 meaning of the term memorandum of understanding as
22 used in the industry, correct?

23 A. Yes.

24 Q. Sometimes called MOU?

25 A. Yes.

1 **Q. For how many years now has Grain Belt**
2 **been attempting to sign MOUs with load-serving**
3 **utilities for the sale of capacity on its line?**

4 A. I don't believe it's -- I don't know
5 the answer to that question.

6 **Q. Do you know if they've signed any**
7 **MOUs with load-serving utilities?**

8 A. No, I don't believe they have.

9 **Q. Okay. How many commitments of any**
10 **kind does Grain Belt have from load-serving**
11 **utilities?**

12 A. I don't believe they have any firm
13 commitments as customers.

14 **Q. How about non-firm commitments?**

15 A. I don't believe they have.

16 **Q. If you go to page 6 of your**
17 **testimony, lines 18 to 20, you say there that the**
18 **projects like Grain Belt will not get full**
19 **construction commitments until it has contracts for**
20 **some portion of the sale of its capacity; is that**
21 **correct?**

22 A. That's correct.

23 **Q. I think you were asked questions**
24 **about this earlier, but do you know what the**
25 **minimum capacity which Grain Belt would need before**

1 **it could sign -- before it could get financing?**

2 A. Well, like I said, we'd like to see
3 100 percent, but 70 percent is sort of the -- would
4 be the minimum, yeah.

5 **Q. As of today, what's your best**
6 **estimate of the total cost of the Grain Belt**
7 **project, including the line, the three converter**
8 **stations, transmission upgrades required by SPP,**
9 **MISO and PJM, and the collection lines to connect**
10 **the wind farms to the eastern -- to the western**
11 **converter station and then any allowance for**
12 **overruns?**

13 A. The -- the Grain Belt Express project
14 is the capital construction cost for the converter
15 stations and the HVDC portion of the project is
16 about 2.2 billion, and the PJM upgrades in the PJM
17 side is about 500 million.

18 **Q. And so what is your best estimate of**
19 **the total all-in cost of the project?**

20 A. For the 2.2 plus the 500 million?

21 **Q. No. For everything that I mentioned.**

22 A. Could you go back and repeat these
23 other items?

24 **Q. Sure. The line itself, the three**
25 **converter stations, transmission upgrades, all**

1 **three transmission upgrades, the collection lines**
2 **that are required to connect the wind farms, and**
3 **any allowances for overruns.**

4 A. So the -- in the -- for the AC
5 collection system, I'm not -- I'm not -- I don't
6 have an answer in terms of what that would cost. I
7 assume you're talking about from what it would cost
8 the wind generators to get to the -- to the
9 converter station?

10 **Q. Well, who's going to pay for that**
11 **cost?**

12 A. I don't know the answer to how much
13 to -- I don't know the answer to your question of
14 how much that's going to cost.

15 **Q. So you don't know the answer at this**
16 **point as you sit here today what the total budget**
17 **will be?**

18 MR. ZOBRIST: Judge, I believe that's
19 an argumentative question. I would like the
20 witness to be able to go back and get clarification
21 on the AC collector system because I wasn't sure in
22 my own mind whether Mr. Agathan was asking about
23 wind generators or costs that Grain Belt Express
24 would pay. So I guess I'm objecting because it's
25 compound and confusing.

1 JUDGE BUSHMANN: Could you restate
2 your question, Mr. Agathan?

3 MR. AGATHAN: I'll try and clarify.

4 BY MR. AGATHAN:

5 Q. There will be certain costs incurred
6 for each wind farm in western Kansas to connect to
7 the converter station, correct?

8 A. That's correct.

9 Q. Do you know who is going to pay that
10 cost?

11 A. Well, the cost of getting the wind to
12 the converter station, including the wind and --
13 including the wind and the transmission upgrades is
14 about 2 to 2 and a half cents a kilowatt hour
15 delivered to the converter station.

16 Q. Who's going to pay the costs of those
17 actual facilities that have to be constructed?

18 A. Well, ultimately it would be the
19 customers that buy the transmission service and the
20 customers that buy the output of the wind farms
21 would pay those -- the costs of those, will pay for
22 the wind -- the wind generation, any AC upgrades
23 required, the converter stations, the HVDC line,
24 all of that will be paid by whoever's taking the
25 wind power.

1 Q. Ultimately?

2 A. Ultimately, that's correct.

3 Q. And my question is, who pays that
4 capital cost up front when that line is built from
5 a wind farm to the converter station?

6 A. I don't have the answer to that
7 question. I don't know if it would be the
8 generators. I'm not sure at this point who that
9 would be.

10 Q. Okay. Directing your attention to
11 page 7, lines 15 to 17 of your testimony. Do you
12 have that?

13 A. Yes.

14 Q. You say you believe Grain Belt has
15 completed sufficient interconnection-related
16 studies and analyses to determine a reasonable
17 estimate of the costs of transmission upgrades; is
18 that correct?

19 A. That's correct.

20 Q. When you wrote your testimony, what
21 was the latest PJM report or analysis that you were
22 familiar with which addressed the costs of the
23 interconnection with PJM?

24 A. There was a -- there was a PJM
25 interconnection study which just came out last

1 month in October, and the costs were around
2 500 million.

3 **Q. And whose projection was that?**

4 A. I don't know who actually did the
5 interconnection study. That was done in the PJM
6 process. So I'm not exactly sure who did that.

7 **Q. Directing your attention to page 8 of**
8 **your testimony, lines 7 to 10. Are you there?**

9 A. Yes.

10 **Q. Generally states that Kansas wind**
11 **represents a low-cost option to many potential**
12 **customers in Missouri, as well as in MISO and PJM.**
13 **Is that essentially correct?**

14 A. That's correct.

15 **Q. Why could any customers in MISO**
16 **outside Missouri possibly find the energy from the**
17 **Grain Belt line to be an attractive option?**

18 A. I'm sorry. I didn't -- I didn't
19 hear -- I didn't understand your question. Repeat
20 it, please.

21 **Q. Yes. There are a number of different**
22 **states other than Missouri in the MISO footprint,**
23 **right?**

24 A. That's correct, yes.

25 **Q. Why would those other states find**

1 **Kansas wind farms to be an attractive option to**
2 **them, other than Missouri?**

3 A. The -- the delivered cost to the wind
4 is -- as we're projecting the numbers that we've
5 looked at, is about 4 to 4 and a half cents a
6 kilowatt hour, and that's a very competitive price
7 for wind generation.

8 I don't know the specifics in the
9 other -- in the other states in MISO, but I would
10 think that that's a pretty competitive price.

11 **Q. For those other states outside of**
12 **Missouri?**

13 A. I believe it would be, but I haven't
14 looked specifically at those other states.

15 **Q. Could you list the many potential**
16 **Missouri customers who you say would find the**
17 **energy from the Grain Belt line to be the most**
18 **economically feasible option?**

19 A. When you say -- I would think the --
20 it would be the customers of the utilities in
21 Missouri. I'm not sure I understand your question.

22 **Q. Yes. Which entities in Missouri? I**
23 **want a list of them. You say there are many**
24 **potential Missouri customers who would find the**
25 **energy from Grain Belt line to be the most**

1 **economically feasible option. Which load-serving**
2 **entities in Missouri would qualify for that**
3 **statement?**

4 A. I think any -- any customers whose
5 utilities are subject to the renewable energy
6 standards would benefit from this. So Ameren's
7 customers, for example, as they're meeting their
8 renewable energy standard, they would be -- they
9 would benefit from this project.

10 **Q. And I'm looking for a list of the**
11 **load-serving entities which actually will deal with**
12 **the wind farms or with Grain Belt.**

13 A. I don't have a list of those, those
14 load-serving entities.

15 MR. AGATHAN: Judge, I'm afraid the
16 rest of my questions deal with a document which
17 Grain Belt understandably has designated as highly
18 confidential.

19 JUDGE BUSHMANN: All right. We'll go
20 in-camera.

21 (REPORTER'S NOTE: At this point, an
22 in-camera session was held, which is contained in
23 Volume 13, pages 425 through 442 of the
24 transcript.)

25

1 JUDGE BUSHMANN: We're back in public
2 session.

3 CHAIRMAN KENNEY: Thank you.

4 QUESTIONS BY CHAIRMAN KENNEY:

5 Q. Your testimony, and I can't remember
6 if it's surrebuttal or rebuttal or the other, or
7 the direct, makes mention of National Grid's
8 ability to designate two seats on the board?

9 A. That's correct.

10 Q. Have you exercised that right? Do
11 you currently have two people that have seats on
12 the board?

13 A. Yes. I'm a member of board and John
14 Flynn. He's our senior vice president for business
15 development. He's my boss. He's also on the
16 board.

17 Q. And are there other high voltage
18 direct current lines being developed in the United
19 States in which National Grid is currently an
20 investor?

21 A. Projects in development?

22 Q. Yeah.

23 A. Yes. We have projects in New England
24 that we're developing.

25 Q. That are high voltage direct current

1 lines?

2 A. That are HVDC lines.

3 Q. And is this -- there was some
4 question about your overall capitalization and what
5 this investment represented as a percentage of that
6 overall capitalization. I'm not going to get into
7 the numbers. But you're obviously making decisions
8 to invest in these because you think they're going
9 to pay off, right?

10 A. Absolutely, yes.

11 Q. So do you have any concerns about the
12 technology itself?

13 A. No. I would -- I would argue that
14 outside of China, National Grid has more experience
15 with HVDC technology than any utility in the world.
16 We've got three gigawatts of -- I'm sorry -- five
17 gigawatts of projects right now that are operating.
18 We've got two gigawatts that are under
19 construction.

20 We've got another -- another gigawatt
21 and a half that's about to go into construction,
22 and we've got about five more gigawatts of HVDC
23 projects in development. So we have lots of
24 experience with this technology.

25 Q. So you have no reservations about the

1 **technology. Do you have any reservation about the**
2 **economic viability of this project specifically?**

3 A. No. We've looked at the -- when we
4 did our due diligence and we continued to update
5 the models as we're -- as assumptions might change
6 and we're continuing to look at the, basically what
7 the price would be to the customer and would the --
8 and is that a -- is that a price that's attractive
9 for the customer, and with that price can we make
10 the attractive returns that we're expecting? And
11 we think that these are economically viable
12 projects.

13 CHAIRMAN KENNEY: All right, sir.
14 Thanks for your time.

15 COMMISSIONER STOLL: No questions for
16 this witness.

17 QUESTIONS BY COMMISSIONER HALL:

18 Q. **Good morning.**

19 A. Good morning.

20 Q. **Could I direct your attention to**
21 **page 4 of your surrebuttal testimony? On line 16**
22 **and 17 you say that, in National Grid's view, this**
23 **particular project is, quote, viable, economically**
24 **attractive investments meeting a market and public**
25 **policy need. Do you see that?**

1 A. Yes.

2 Q. Putting the public policy aside, I
3 want to focus on National Grid's view that this
4 project, there is a market need for this project.
5 Were you involved in making that decision on behalf
6 of National Grid?

7 A. In -- in evaluating the original
8 investments, no, I was not, but I'm responsible to
9 work closely with the Clean Line management to
10 track the progress of all of these projects. So
11 I'm involved in making those decisions moving
12 forward.

13 Q. Were you involved in the due
14 diligence on the front end to make that
15 determination?

16 A. Not two years ago. I've -- my -- my
17 involvement started about six months ago.

18 Q. Are you aware of what due diligence
19 went into making that determination?

20 A. Yes.

21 Q. Did it involve interactions with
22 load-carrying entities in Missouri?

23 A. I don't believe that the -- that
24 during the due diligence phase there was
25 interactions with National Grid and load-serving

1 entities in Missouri.

2 **Q. Did it involve any interactions**
3 **whatsoever with load-carrying entities through an**
4 **intermediary of any sort?**

5 A. We looked at -- we looked at
6 basically the market needs in each of the regions
7 in the states and the regions where these projects
8 would serve. So we're looking at the -- what the
9 size of the RPS standards were by certain states
10 and whether we thought there was going to be a gap
11 in those states, and within that gap, how could
12 that gap be satisfied and would this project -- if
13 we could deliver at a certain price, could it be
14 competitive.

15 **Q. So would it be fair to characterize**
16 **that as you made an objective determination as to**
17 **what you believed load-carrying entities would**
18 **need?**

19 A. That's correct. We have -- we have
20 8 million customers ourselves in New York and
21 New England. So we are on the side of load-serving
22 entities in those states. So we understand energy
23 procurement and what those utilities would be
24 looking for.

25 **Q. So you would -- you're assuming that**

1 the load-carrying entities in Missouri would make a
2 cost/benefit analysis similar to the one that --
3 similar to the ones that you would make in that
4 role?

5 A. Yes. I think you're looking at you
6 have a specific requirement or need for your
7 customers, and you're looking at the best way to --
8 most cost-effective way to meet that need. And
9 again, using that -- using that logic, we concluded
10 that Grain Belt would -- would be a good project.

11 Q. Why wouldn't you go talk to some of
12 the load-carrying entities in Missouri and make
13 sure that they view the cost/benefit the same way
14 you do?

15 A. We've -- are you talking about during
16 the due diligence phase or now or --

17 Q. Well, during the due diligence phase
18 and then I'll -- and then I'll ask during the
19 development, during later stages in a moment.

20 A. I think there's many things that you
21 have to look at during these -- the due -- during
22 the due diligence phase. I'm not -- again, I
23 wasn't a part of that activity a couple years ago.
24 So it may be that they had some -- some information
25 from load-serving entities. I don't know. But

1 there is a lot of -- in a short period of time you
2 have to collect up a lot of information and make
3 your best -- do your best analysis that you can at
4 the time.

5 **Q. Would you agree that the case to be**
6 **made before the board would have been stronger if**
7 **you -- if you or someone from National Grid or**
8 **someone from Clean Line had gone to, say, Ameren**
9 **and said, hey, we're thinking about building this**
10 **line, what do you think, and Ameren says, that's**
11 **great, we'd like to buy 500 megawatts?**

12 **I mean, wouldn't your case have been**
13 **that much stronger before your board if you had**
14 **done that?**

15 **A. If our -- the case that we made with**
16 **our PLC?**

17 **Q. For the initial investment, yes.**

18 **A. It -- it could have been, but given**
19 **the -- given where the projects were at the time,**
20 **this was two years ago, given the level of**
21 **information that we had at the time, our board is**
22 **very sophisticated investors and they were -- and**
23 **at the time that was the information that was**
24 **required for them to make the decision. So we --**
25 **we did get approval from the board two years ago**

1 for the investment.

2 **Q. Have you had any interaction or**
3 **anybody with National Grid had any interactions**
4 **with load-carrying entities since the initial**
5 **investment that increases your confidence that**
6 **there will be a demand for it?**

7 A. We -- no, we have not. National Grid
8 has not, no.

9 **Q. How come?**

10 A. We're -- we rely on the Clean Line
11 management team to develop these projects. We
12 provide them advice, guidance along the way. We
13 provide them specific technical expertise when they
14 require, when they require it and ask for it, but
15 we rely on them to develop the project.

16 **Q. And you've never recommended to Clean**
17 **Line that it have interactions with load-carrying**
18 **entities to determine whether or not there's a**
19 **demand going forward?**

20 A. We've talked about the commercial
21 milestones and the need for -- for -- for when to
22 go talk to customers and when to start signing up
23 customers. We have talked about those milestones,
24 and those are in the -- those are in their plans.
25 It's always best to -- the further along you can

1 get with the project, the easier some of those
2 conversations are. But we have talked to them
3 about when would be the appropriate time to go talk
4 to them.

5 **Q. At what point in -- you discussed**
6 **earlier certain milestones that have to be reached**
7 **in order for National Grid to continue investing;**
8 **is that correct?**

9 A. That's correct.

10 **Q. At what point would the lack of**
11 **any -- of any commitments from load-carrying**
12 **entities begin to cause you concern?**

13 A. It's -- there's milestones leading up
14 to those commitments, so you'd want to -- they have
15 negotiated rate authority with the FERC, so they
16 can go out for an open season. So that's just
17 specific milestones of when we would be seeing that
18 activity happen. We'll see what the results are
19 from the open season.

20 So we're looking for those positive
21 signs along the way before they actually have the
22 customers signed up.

23 **Q. So those positive signs, when -- at**
24 **what point do you need to see those positive signs?**
25 **I mean, is there another injection of capital,**

1 another investment that is contingent upon some
2 commitment or some positive sign of commitment from
3 load-carrying entities?

4 A. In the -- in the development plan as
5 we're hitting certain milestones, we make
6 additional investments. In one of those milestones
7 is the commercial commitment from customers. So
8 there is -- after they get that, there will be
9 additional funds that are released after that. So
10 there's sort of a -- that's our philosophy in terms
11 of --

12 Q. So there won't be additional
13 investment until there is positive signs of
14 commitment?

15 A. No. Sorry. Let me explain again.

16 Q. I may have misunderstood.

17 A. No. It's -- those milestones are in
18 the plan. They're just further down the plan than
19 they -- they're not -- they're not -- there's other
20 milestones before we would get to that.

21 COMMISSIONER HALL: Are those
22 milestones in the record somewhere? And I'm
23 looking to counsel for that.

24 MR. ZOBRIST: I think that Mr. Berry
25 talks about those in his testimony. And if not, we

1 can provide you documents. I know that in
2 discovery we have provided presentations, for
3 example, that have been made to load-serving
4 entities. We don't have contracts, but we've got
5 other information, Commissioner, that we can
6 provide to you.

7 COMMISSIONER HALL: Great. Thank
8 you.

9 BY COMMISSIONER HALL:

10 Q. So just in a nutshell, where the
11 project is right now, National Grid is comfortable?

12 A. That's correct.

13 Q. They've -- Clean Line has met every
14 step up to now that you would have wanted them to
15 make?

16 A. That's correct.

17 COMMISSIONER HALL: I have no further
18 questions. Thank you.

19 JUDGE BUSHMANN: Recross based on
20 Bench questions. Wind on the Wires and Wind
21 Coalition?

22 MR. REED: No, thank you.

23 JUDGE BUSHMANN: Commission Staff?

24 MR. WILLIAMS: Thank you.

25 RE-CROSS-EXAMINATION BY MR. WILLIAMS:

1 Q. Do you recall when Commissioner Hall
2 was asking you about market need for the project?

3 A. Yes.

4 Q. Were you -- were your answers based
5 upon the Grain Belt Express project in particular
6 or all of the projects that Clean Line Energy
7 Partners is involved in?

8 A. Both. We've looked at the -- both
9 the -- for every project.

10 Q. Now, for the Grain Belt Express
11 project in particular, did you evaluate that
12 project in terms of market need on the entirety of
13 the project or did you look at pieces of it?

14 And when I'm saying pieces, I know
15 there are two different points of injection.
16 There's 300 megawatts that's going into PJM and
17 there's 500 megawatts that's going into MISO. So
18 I'm asking, did you just look at the project in its
19 entirety or did you look at separate pieces of the
20 project?

21 A. We looked at the separate pieces.

22 Q. And you determined there was a market
23 need then for the 500 megawatts that would be
24 injected into MISO?

25 A. Yes.

1 MR. WILLIAMS: I have no further
2 questions.

3 JUDGE BUSHMANN: United for Missouri?

4 MR. LINTON: No questions.

5 JUDGE BUSHMANN: Rockies Express?

6 MS. DURLEY: No questions.

7 JUDGE BUSHMANN: Reicherts and
8 Meyers?

9 MR. DRAG: One or two questions, your
10 Honor.

11 RECROSS-EXAMINATION BY MR. DRAG:

12 Q. Good morning.

13 A. Good morning. This is a follow-up to
14 Commissioner Kenney's question about other projects
15 you're involved with. Is the Northeast Energy Link
16 project one of those that you're involved with?

17 A. Yes, it is.

18 Q. And do you know the size or capacity
19 of that project and the length?

20 A. It's 1100 megawatts, and I believe
21 it's about 200 or so miles.

22 Q. Anything unusual about that project
23 or groundbreaking, trend setting?

24 A. I'm sure if I asked the project team,
25 they would tell me.

1 Q. Okay.

2 A. But no. I think the -- there
3 isn't -- every project has its own -- is unique and
4 has its own challenges, but nothing really jumps to
5 mind.

6 Q. Now, is it unusual that it's being
7 built right along the interstate corridor?

8 A. Unusual?

9 Q. Strike that question. Let me
10 rephrase. That project is being built along the
11 interstate corridor, correct?

12 A. Well, the project is not being built.
13 It's still under development. So we're actually
14 still assessing the route for the project.

15 Q. But you have proposed doing it along
16 the interstate corridor?

17 A. That was one -- yes, that was one of
18 the proposals was to do that.

19 Q. And was part of that proposal to bury
20 the line along the interstate corridor?

21 A. Yes, it was.

22 MR. DRAG: Thank you very much.

23 JUDGE BUSHMANN: Show-Me Concerned
24 Landowners?

25 MR. JARRETT: Yes, just a couple.

1 RE-CROSS-EXAMINATION BY MR. JARRETT:

2 Q. Do you remember when Chairman Kenney
3 was asking you some questions about economic
4 viability? And specifically you answered one of
5 the questions that National Grid continues to
6 evaluate the project as assumptions change. Do you
7 remember that?

8 A. Yes.

9 Q. What assumptions have changed in the
10 Grain Belt Express project?

11 A. I think it's more of a refinement of
12 assumptions. As you're getting further along,
13 you're understanding better around the capital
14 costs of the project. So we're making sure that
15 we're updating that, making sure that we're still
16 within the returns and being able to deliver at a
17 price comfortable for the customers.

18 Q. Can you give me any specific
19 instances of those requirements?

20 A. It would be things -- around things
21 like capital costs. We look at the markets. We
22 look at changes in policy. So those are the kind
23 of things we're looking for.

24 Q. All right. And what changes have
25 occurred in the Grain Belt case?

1 project development team to have those
2 conversations.

3 MR. JARRETT: Thank you. No further
4 questions.

5 JUDGE BUSHMANN: Missouri Landowners
6 Alliance?

7 MR. AGATHAN: No questions, Judge.
8 Thank you.

9 JUDGE BUSHMANN: Redirect by Grain
10 Belt?

11 MR. ZOBRIST: Yes. Just a couple
12 questions, Judge.

13 REDIRECT EXAMINATION BY MR. ZOBRIST:

14 Q. Mr. Blazewicz, if Grain Belt
15 completes its development milestones, do you
16 believe, based on what you know today, that the
17 financial markets will support the project when
18 it's ready to begin construction?

19 A. Yes. If it -- if it meets all its --
20 meets all of its milestones, it will be a very
21 attractive project for many investors, including
22 National Grid.

23 MR. ZOBRIST: That's all I have.
24 Thank you, sir.

25 JUDGE BUSHMANN: Thank you,

1 Mr. Blazewicz. That completes your testimony. You
2 may step down.

3 THE WITNESS: Great. Thank you.

4 MR. ZOBRIST: Judge, he is planning
5 to leave the state of Missouri. Is that -- may he
6 be excused?

7 JUDGE BUSHMANN: Is there further
8 questions that --

9 THE WITNESS: I'm in no rush.
10 Pushing me out.

11 MR. ZOBRIST: I was going to say, he
12 was planning to fly out of St. Louis.

13 JUDGE BUSHMANN: You may be excused.

14 MR. ZOBRIST: Not exactly flee the
15 jurisdiction.

16 JUDGE BUSHMANN: Since we're between
17 witnesses, why don't we take a short break? We'll
18 be in recess until about five minutes to ten.

19 (A BREAK WAS TAKEN.)

20 JUDGE BUSHMANN: Let's see.

21 Mr. Zobrist, do you want to call your next witness?

22 MR. ZOBRIST: Yes, Judge. I would
23 call Anthony Wayne Galli to the stand.

24 (Witness sworn.)

25 JUDGE BUSHMANN: You may be seated.

1 ANTHONY WAYNE GALLI testified as follows:

2 DIRECT EXAMINATION BY MR. ZOBRIST:

3 Q. Please state your name.

4 A. Anthony Wayne Galli.

5 Q. And where do you work, Dr. Galli?

6 A. I work for Clean Line Energy

7 Partners.

8 Q. What's your position there?

9 A. I'm the executive vice president for
10 transmission and technical services.

11 Q. Now, did you prepare three pieces of
12 testimony: Direct testimony which has been marked
13 Exhibit 111, additional direct testimony marked
14 Exhibit 112, and surrebuttal testimony marked
15 Exhibit 113?

16 A. I did.

17 Q. Do you have any corrections to any of
18 these pieces of testimony?

19 A. I do not.

20 Q. If I were to ask you these questions,
21 would your answers be as set forth in these three
22 exhibits?

23 A. They would be.

24 Q. And they were given under oath,
25 correct?

1 A. That's correct.

2 MR. ZOBRIST: Judge, I would move the
3 admission of Exhibits 111, 112 and 113.

4 JUDGE BUSHMANN: Any objections?
5 Hearing none, those will be received into the
6 record.

7 (GRAIN BELT EXPRESS EXHIBIT NOS. 111,
8 112 AND 113 WERE MARKED AND RECEIVED INTO
9 EVIDENCE.)

10 JUDGE BUSHMANN: Cross-examination by
11 Wind on the Wires, Wind Coalition?

12 MR. REED: No, Judge.

13 JUDGE BUSHMANN: Commission Staff?

14 CROSS-EXAMINATION BY MS. HAMPTON:

15 Q. Good morning, Mr. Galli.

16 A. Good morning.

17 Q. My questions should be pretty brief.

18 I'd like to start out by hammering out some details
19 about the project design.

20 So your testimony is that the project
21 is currently designed to simultaneously deliver
22 500 megawatts of wind power to Missouri converter
23 stations and 3500 to a converter station in Indiana
24 for a total of 4000 megawatts, correct?

25 A. Yes, 4000 megawatts delivered.

1 Q. And before that, the project was
2 designed to deliver only 3500 megawatts, is that
3 correct --

4 A. That is correct.

5 Q. -- at some point?

6 A. Yes.

7 Q. Can you tell me when exactly the
8 project design changed from 3500 megawatts to 4000
9 megawatts?

10 A. Not exactly. I would think
11 approximately around fall of 2012 was about the
12 time frame that we started to make that shift.

13 Q. Okay. And you had stated in your
14 testimony, I believe, that the project design -- so
15 at least as far back as 2000 -- well, let me start
16 over.

17 In your testimony you said the
18 project design had been 4000 megawatts at least as
19 far back as when the application was filed in this
20 court, which was March 26, 2014, correct?

21 A. That's correct, yes.

22 Q. I'd like to ask you about two or
23 three documents regarding the design. Are you
24 familiar with FERC's order conditionally
25 authorizing proposal and granting waivers for Grain

1 **Belt Express in Docket ER14-409-000?**

2 A. Is that the negotiated rate?

3 **Q. This is -- it's order conditionally**
4 **granting -- authorizing proposal and granting**
5 **waivers. It was before FERC. I've got a copy of**
6 **it here.**

7 A. If I could see the copy.

8 **Q. Yes.**

9 A. I'm generally familiar with the
10 negotiated rate filing, but I'm not aware if that
11 is that filing.

12 MS. HAMPTON: May I approach, your
13 Honor?

14 JUDGE BUSHMANN: You may.

15 THE WITNESS: Yes, I'm generally
16 familiar with this one.

17 BY MS. HAMPTON:

18 **Q. Okay. And I actually have copies**
19 **here for any of the parties if they want to see the**
20 **relevant pages.**

21 **Okay. Can you please tell me the**
22 **date that is listed on the front page?**

23 A. It was issued May 8th, 2014.

24 **Q. And can you turn over to the second**
25 **page and read the first two sentences of**

1 **paragraph 3B, which I believe should be**
2 **highlighted?**

3 A. So this is under section B,
4 description of project?

5 **Q. Yes. Yeah.**

6 A. Grain Belt Express' project is a
7 750-mile HVDC transmission system which will be
8 capable of delivering up to 3500 megawatts of
9 power, originating near the Spearville 345 kV
10 substation in Ford County, Kansas and terminating
11 near the Sullivan 765 kV substation in Sullivan
12 County, Indiana. The project will include an
13 intermediate converter station near the Maywood
14 345 kV substation in Missouri. That is the first
15 sentence of the long paragraph.

16 **Q. Okay. Thank you. Do you by chance**
17 **have a copy of the PJM impact study report which**
18 **was attached as Schedule AWG-10 to your**
19 **surrebuttal?**

20 A. I do.

21 **Q. And on the front cover of that**
22 **report, what is the date in the lower right-hand**
23 **corner?**

24 A. It is October of 2014.

25 **Q. Okay. Can you please turn to page 14**

1 and read the first paragraph or first sentence
2 under the heading titled description of project?

3 A. The Bates numbering?

4 Q. I'm sorry?

5 A. The Commission numbering or the
6 actual page number?

7 Q. I believe -- let me make sure here.
8 It's page 14 of 69.

9 A. And read the?

10 Q. The first sentence. Well, it's a
11 one-sentence paragraph.

12 A. The Generation Interconnection
13 Request X3-028 is for the interconnection of two
14 1750 megawatt 600 kV HVDC circuits, configured as a
15 3500 megawatt plus or minus 600 kV bipole, from
16 southwestern Kansas into the American Electric
17 Power, AEP, network in western Indiana.

18 Q. Okay. And then I would like to
19 distribute what I believe will be marked as Staff's
20 Exhibit 210.

21 (STAFF EXHIBIT NO. 210 WAS MARKED FOR
22 IDENTIFICATION BY THE REPORTER.)

23 BY MS. HAMPTON:

24 Q. Can you please identify what I've
25 just handed you?

1 A. This is a response to Data Request
2 No. 200 from Staff to Grain Belt Express.

3 **Q. And did you prepare the response?**

4 A. I did.

5 **Q. Can you tell me the date that the**
6 **response was submitted?**

7 A. November 3rd, 2014.

8 **Q. Thank you.**

9 MS. HAMPTON: Your Honor, at this
10 time I'll submit Staff's DR No. 200 and its
11 response as Exhibit 210.

12 JUDGE BUSHMANN: Any objection?

13 MR. ZOBRIST: No objection.

14 JUDGE BUSHMANN: Exhibit 210 will be
15 received into the record.

16 (STAFF EXHIBIT NO. 210 WAS RECEIVED
17 INTO EVIDENCE.)

18 BY MS. HAMPTON:

19 **Q. Okay. So in this DR Staff had asked**
20 **you to update Schedule AWG-5 to reflect the current**
21 **project design, correct?**

22 A. That is correct.

23 **Q. Okay. And this diagram that is**
24 **attached, the update to AWG-5, can you tell me what**
25 **this diagram represents?**

1 A. Sure. So this is a single-line
2 diagram that is produced in power system modeling
3 software. It's a term of art in the industry is
4 called a slider diagram.

5 **Q. Okay.**

6 A. So if I use that term, it's a single-
7 line diagram. And so what this shows is the
8 mathematical modeling, if you will, or the
9 schematic of the power system that was studied as
10 part of -- I believe this was attached to the
11 Criteria 3.5 studies that were done as part of the
12 SPP requirements.

13 **Q. All right.**

14 A. So this is just a schematic
15 representation of the power system with the Grain
16 Belt Express project represented here.

17 **Q. Okay. In the upper left-hand corner,**
18 **the diagram is labeled GBX injection**
19 **3755.8 megawatts. And that number represents the**
20 **total injection of the Kansas station; is that**
21 **correct?**

22 A. That is correct.

23 **Q. Okay. So can you help me understand**
24 **why it is that the projects had changed to**
25 **4000 megawatts by at least March 26, 2014 but**

1 possibly as far back as 2012 but we're still seeing
2 FERC order, PJM impact study and data requests from
3 just this month that are more consistent with a
4 3500 megawatt design?

5 A. I can attempt to, I think, because as
6 the project evolved, obviously I think there's been
7 some confusion. With respect to the FERC order, I
8 can't really speak to that, other than perhaps we
9 should probably update that with the appropriate
10 megawatt amount at the Maywood station so it's more
11 clear that it is intended to be 3500 to Indiana and
12 500 to Maywood.

13 The reports here with the DR, this --
14 I need to reply back to my original Schedule 5 to
15 see if we -- I want to get the original context of
16 Schedule 5.

17 Q. That's fine. Take your time.

18 A. So the update that we provided was
19 very similar to the original Schedule 5 in that it
20 was produced as part of the SPP Criteria 3.5
21 studies which were approved in late -- early 2013,
22 if I believe -- if I have -- subject to check on
23 that, but I believe that's the correct date, or
24 late 2012.

25 The original Criteria 3.5 studies

1 with SPP looked at a total 3500 megawatts
2 delivered, so 3000 and 500 respectively to Sullivan
3 and the Maywood substation.

4 The original genesis of the project
5 was 3500 megawatts into St. Francis in Missouri,
6 and that was the original genesis of the project,
7 and then it got extended to the Sullivan substation
8 with the midpoint converter in Missouri.

9 So that evolution actually occurred
10 during the SPP Criteria 3.5 studies, if I remember
11 correctly, early on during that phase, and we
12 adjusted the project accordingly.

13 When we evolved the project to
14 4000 megawatts total delivered, we went back to SPP
15 staff and had discussions with SPP staff. We had
16 discussions with Norman Williams, who was the chair
17 of the transmission working group who approved --
18 which is the working group that approved these
19 studies, about the change in size.

20 And it was agreed that when -- when
21 the final design was -- final vendor was selected
22 for final design and we come back for updating the
23 studies, then we would look at the studies again
24 because it would be looking at the impacts on the
25 SPP grid for a slightly increased megawatt amount,

1 roughly 4200 megawatts on the Ford County side.

2 But we're relying on the PJM end to
3 study the 3500 megawatts in detail and the MISO end
4 to study the 500 megawatt injection in detail. Is
5 that clear?

6 Q. Yeah. Yeah, I believe so. With that
7 in mind, has Clean Line made any effort at this
8 point to go back and notify these other entities
9 such as the Kansas Commission, Indiana Commission,
10 FERC, have they made efforts to go back and notify
11 those entities that the project design has changed?

12 A. My recollection with the Kansas
13 application is it identified this as 4000
14 delivered. That's my recollection. Again, with
15 the FERC filing, I'm not aware of any. I'd have to
16 talk to counsel about that.

17 Q. Okay. Do you -- let me step back for
18 a second.

19 Did you read the testimony of Staff
20 witness Dan Beck in preparation for this hearing?

21 A. Yes, I did.

22 Q. Do you have a copy of that?

23 A. I do not.

24 Q. Okay. I'm going to hand you -- I've
25 only printed off, to save space, I suppose, or save

1 paper, the relevant pages. This is, I believe it
2 was Schedule DB-3, DB-3 to his testimony. Again,
3 I've got copies of this, the relevant pages if
4 anyone would like to see one.

5 Okay. This was -- I guess would you
6 identify this as the Order Approving Stipulation &
7 Agreement and Granting Certificate from the Kansas
8 Corporation Commission?

9 A. Yes.

10 Q. Okay. Can you turn that over and
11 look at paragraph 2 and the last full sentence? It
12 starts with "the application stated that". Can you
13 read that sentence for me?

14 A. Yes. The application stated that one
15 of the projects under development is the Grain Belt
16 Express Clean Line, open parenthetical, Grain Belt
17 Express or project, close parenthetical, which will
18 be a 500 to 600 kV high-voltage, direct current
19 HVDC transmission line capable of delivering
20 3500 megawatts of power from Kansas to other load
21 centers.

22 Q. Okay. And now I'm going to do the
23 same thing, hand you the relevant page of DB-5.
24 Okay. Now, if you can, on the second page, read
25 the first sentence of paragraph No. 3 with the

1 **heading The Proposed Project.**

2 A. So this is the state of Indiana,
3 Indiana Utility Regulatory Commission's order,
4 approved May 22nd, 2013. I wasn't sure if you --
5 so the proposed project. The Grain Belt Express
6 Clean Line project, Grain Belt project or the
7 project, is an approximately 700-mile overhead
8 high-voltage, direct current, HVDC, transmission
9 line that is proposed to be built to deliver up to
10 3500 megawatts of wind from western Kansas to
11 communities in Missouri, Illinois, Indiana and
12 states farther east.

13 Q. Now, with those statements in mind,
14 has the company made any effort to go back, you
15 know, and notify Kansas and Indiana that the
16 project design had changed?

17 A. I'm not aware of any.

18 Q. Okay. All right. At this point, do
19 you know if the company has any plans to change
20 back to the 3500 megawatt design or to otherwise
21 change the design of the project?

22 A. So to be clear, when you say 3500
23 megawatt design, are you talking total delivered or
24 just the PJM interconnection?

25 Q. I'm talking total delivered.

1 A. Total delivered. No. At this time
2 we plan on commencing with the 4000 total delivered
3 megawatts with -- because our application with PJM
4 is for 3500 and our application with MISO is for
5 500.

6 **Q. I'd like to ask you about one more**
7 **issue regarding the project design. In your**
8 **surrebuttal you stated that the Missouri converter**
9 **station could be rated as high as 1,000 megawatts.**
10 **Can you say for sure at this point what the rating**
11 **for the Missouri converter station will be?**

12 A. It will ultimately depend upon
13 what -- when we issue an RFI or an RFP rather for
14 the technology vendor, it will ultimately be their
15 determination what the actual rating needs to be.

16 The reason for the rating being
17 slightly higher, as I think I described in some --
18 in some DRs, was the fact that it helps with some
19 of the control issues associated with the design of
20 the project. So with the larger rated
21 transformers, you put a little more inductance in
22 the circuit and it helps you with some control
23 issues. So that's why it could be rated higher if
24 vendors determine the need for it.

25 **Q. But at this point, just to be clear,**

1 you don't know what the rating will be at the
2 Missouri converter station?

3 A. That's correct. We know it will be
4 at least 500.

5 Q. Okay. All right. I'd like to switch
6 gears here for a minute. Did you read the Staff --
7 or read the testimony of Staff witness Shawn Lange
8 in preparation for this case?

9 A. I did.

10 Q. Do you have a copy of that with you?

11 A. No.

12 Q. I'll hand you a copy of that. Can
13 you turn to page 11, and starting at line 17, just
14 follow along with me. The location of -- excuse
15 me. Mr. Lange states, the location of Grain Belt
16 Express' requested Missouri converter station
17 currently has congestion issues. Ameren Missouri's
18 Audrain C2 plant currently has a Special Protection
19 Scheme, or SPS, such that upon high thermal level
20 experienced by the Palmyra substation, the plant's
21 total output would be reduced by approximately
22 30 megawatts.

23 Did I read that correctly?

24 A. Yes.

25 Q. Okay. Do you agree with that

1 **statement?**

2 A. No, and I believe I address that in
3 my surrebuttal.

4 Q. Okay. I would actually like to --
5 I'm going to distribute now what will be marked as
6 Staff's Exhibit 211.

7 (STAFF EXHIBIT NO. 211 WAS MARKED FOR
8 IDENTIFICATION BY THE REPORTER.)

9 BY MS. HAMPTON:

10 Q. All right. Can you identify that
11 exhibit?

12 A. Yes. These are copies from my work
13 papers in preparation of my surrebuttal testimony.

14 Q. Okay. Can you read the first
15 bulletin on that work paper, please?

16 A. The first bullet?

17 Q. Yeah, the first bullet. Sorry.

18 A. So this is in regards to the Audrain
19 Special Protection Scheme. The first bullet reads
20 as, when Audrain units are dispatched to the
21 maximum capacity, loss of line or lines heading
22 south from Audrain causes greater flows northward
23 towards Palmyra, overloading the transformer at
24 Palmyra. See map for reference. So SPS is to
25 limit output of Audrain for loss of line or lines

1 headed south of Audrain.

2 **Q. Thank you.**

3 MS. HAMPTON: Your Honor, I would
4 like to enter Mr. Galli's work paper as Staff
5 Exhibit 211.

6 JUDGE BUSHMANN: Any objections?

7 MR. ZOBRIST: No objection.

8 JUDGE BUSHMANN: That will be
9 received into the record.

10 (STAFF EXHIBIT NO. 211 WAS RECEIVED
11 INTO EVIDENCE.)

12 BY MS. HAMPTON:

13 **Q. So according to this statement, when**
14 **Audrain runs at max capacity, it results in**
15 **northward flows of electricity that overloads the**
16 **transformer at the Palmyra substation when it's --**

17 MR. ZOBRIST: Objection. She's not
18 reading the full statement.

19 MS. HAMPTON: I'm not. I'm sorry.
20 I'm not reading the statement. I'm asking a
21 question.

22 MR. ZOBRIST: All right. Then I
23 withdraw the question.

24 BY MS. HAMPTON:

25 **Q. So do I need to repeat that?**

1 A. No. It doesn't say that. It says
2 with the loss of line or lines, then at 100 percent
3 maximum capacity there is overload. That was --
4 that was what was missing from your statement.

5 MS. HAMPTON: Okay. That's all I
6 have, your Honor. No further questions.

7 JUDGE BUSHMANN: Questions by United
8 for Missouri?

9 MR. LINTON: Yes, your Honor. I have
10 a couple.

11 CROSS-EXAMINATION BY MR. LINTON:

12 **Q. Good morning, Mr. Galli.**

13 A. Good morning.

14 **Q. My name is David Linton. I'm with**
15 **United for Missouri. I have a couple of questions**
16 **just related to functional control.**

17 A. Okay.

18 **Q. If you could turn to your direct**
19 **testimony, page 16 and 17. Probably more**
20 **specifically the top of page 17, line 3.**

21 A. Which line specifically?

22 **Q. Line 3. You state there that you**
23 **have made the decision that you will hand**
24 **functional control off of the project to PJM; is**
25 **that correct?**

1 A. Oh, 17, line 3?

2 Q. Yes.

3 A. That is correct.

4 Q. Have you decided where in your
5 project timeline you will seek this Commission's
6 permission to transfer functional control to PJM?

7 A. To my knowledge, that's not under the
8 statutes of this Commission. That's actually
9 ordered by FERC in our negotiated rate authority
10 that we have to turn over functional control to an
11 RTO or RTO-like entity.

12 Q. Okay. Let's assume that this
13 Commission does have authority to grant or deny
14 your transferring functional control to PJM. Have
15 you considered what would happen, what you would do
16 if that authority was not granted?

17 MR. ZOBRIST: Judge, I'm going to
18 object to the extent it calls for a legal
19 conclusion. I don't have the witness -- I don't
20 have an objection to the witness giving his lay
21 understanding of this, but he's not a lawyer, and I
22 think it's a hypothetical that may or may not be
23 correct as a matter of law.

24 MR. LINTON: I have not asked for his
25 judgment on whether it is a matter of law, but if

1 it is assumed that it is a matter of law that this
2 Commission has jurisdiction, what the company would
3 do.

4 JUDGE BUSHMANN: To the extent that
5 it's just a hypothetical, he can answer if he
6 knows.

7 THE WITNESS: Well, assuming it's a
8 hypothetical, I would have to know what the
9 hypothetical assumptions are around the timing of
10 such hearings and such requests for permissions and
11 that kind of thing before I could speculate as to
12 when we would make that request. So if you have
13 further assumptions, I'd be happy to --

14 BY MR. LINTON:

15 **Q. I guess my question related more that**
16 **the Commission denied your request and you cannot**
17 **transfer functional control to an RTO, what would**
18 **you do?**

19 MR. ZOBRIST: I'm going to make the
20 same objection to the extent it calls for a legal
21 conclusion.

22 MR. LINTON: Same response.

23 JUDGE BUSHMANN: You can answer.

24 THE WITNESS: Hypothetically, then we
25 have a federal entity telling us we have to and a

1 state entity telling us we couldn't. Then I don't
2 know what would happen.

3 MR. LINTON: Thank you very much.

4 JUDGE BUSHMANN: Any other questions?

5 MR. LINTON: No, your Honor.

6 MR. LINTON: Rockies Express?

7 CROSS-EXAMINATION BY MS. DURLEY:

8 Q. Good morning, Dr. Galli.

9 A. Good morning.

10 Q. My name is Colly Durley. I'm here on
11 behalf of Rockies Express.

12 I want to just start with your
13 background. As I understand it, you're an
14 electrical engineer; is that correct?

15 A. That is correct.

16 Q. And you have experience in the
17 electrical transmission line industry?

18 A. That is correct.

19 Q. All right. You are not a pipeline
20 engineer?

21 A. That is correct.

22 Q. All right. And you're not an expert
23 in corrosion of pipelines, correct?

24 A. That is correct.

25 Q. Are you familiar with the National

1 Association of Corrosion Engineers?

2 A. I am familiar with them, yes.

3 Q. Are you a member of that
4 organization?

5 A. I am not.

6 Q. And you have not been certified by
7 that organization?

8 A. I have not.

9 Q. Okay. Let me just ask you, and I
10 don't know the answer to this, does Grain Belt have
11 a pipeline engineer on its staff?

12 A. On its paid staff, no.

13 Q. All right. I want to ask you a
14 little bit just preliminarily about your testimony.
15 You filed direct testimony dated March 26, 2014; is
16 that correct?

17 A. That is correct.

18 Q. All right. And in that direct
19 testimony you talk about a number of different
20 issues and subjects, but there's nothing in that
21 direct testimony filed in March that has anything
22 to do with concerns regarding corrosion of
23 underground pipelines that might be in the vicinity
24 of your transmission line; is that correct?

25 A. That is correct.

1 Q. All right. So in -- subsequently,
2 you filed additional direct testimony, and that
3 does raise that issue and you discuss that to some
4 extent in your additional direct testimony,
5 correct?

6 A. Let me review real quickly.

7 Q. Sure.

8 A. Do you have a reference?

9 Q. It's on page 10 of your additional
10 I'm looking at.

11 A. Yes.

12 Q. Okay. This additional testimony that
13 you presented only came after Rockies Express filed
14 its application to intervene in this matter; is
15 that correct?

16 A. Well, the additional direct was filed
17 in response to several things, including Staff
18 questions around interconnect and that kind of
19 thing, but at that point Rockies had filed
20 intervention, too.

21 Q. And you in this additional direct is
22 the first time that you responded with any
23 testimony regarding some of the concerns that
24 Rockies Express had; would that be a fair
25 statement?

1 A. Yes, it was the first time they were
2 raised.

3 **Q. I'm just curious, were they raised in**
4 **Kansas?**

5 A. I don't recall the questions being
6 raised or being filed in testimony, but that would
7 be subject to review of those.

8 **Q. I was just curious. I hadn't looked**
9 **at that. I just didn't know if you knew.**

10 **Let's look -- I referred to page 10**
11 **of your additional direct testimony that starts on**
12 **page 10, and starting with your line 7, could you**
13 **just read that first sentence for us, please?**

14 A. Since the project is utilizing a
15 dedicated metallic return, during normal operation
16 no current from Grain Belt Express line -- Grain
17 Belt Express line will flow into the ground, and it
18 will not adversely affect any existing cathodic
19 projection for gas pipelines.

20 **Q. And what I want to ask you is, in all**
21 **fairness, is that a bit of an oversimplification?**

22 A. Well, I guess I don't know that it's
23 an oversimplification, but the nature of the fields
24 and the nature of induced currents with DC are very
25 different than AC lines that often parallel gas

1 pipelines which do under normal operation impact
2 cathodic projection systems.

3 Since we use -- most existing HVDC
4 facilities today that were built in the '80s and
5 '90s, for instance, in this country use what they
6 call earth return model where imbalanced currents
7 would flow even during normal operation through the
8 earth. With the use of a dedicated metallic
9 return, any imbalanced current is always flowing on
10 our circuits and not through the earth.

11 **Q. So it helps certainly. But then you**
12 **gone on. Just read the second sentence, when I**
13 **asked if it was a bit oversimplification, there are**
14 **some concerns, and that sentence starts with**
15 **however. Could you read that sentence for us as**
16 **well?**

17 A. However, during lightning strikes on
18 the line or the unlikely event where a pole
19 conductor has fallen to the ground, there is the
20 possibility for current to be momentarily injected
21 into the ground and cause a step or touch potential
22 on or around equipment associated with subsurface
23 utilities that is exposed above the ground, for
24 example, meter stations for pipeline.

25 **Q. All right. And then if you skip down**

1 to the sentence that begins on line 15 with the
2 word these, these voltages if not mitigated. Could
3 you just read that sentence for us as well.

4 A. These voltages, if not mitigated,
5 could create a safety issue for personnel during
6 the faulted conditions.

7 Q. All right. So Grain Belt recognizes
8 that there is a need for mitigation measures so
9 that these voltage concerns don't occur, correct?

10 A. That is correct.

11 Q. All right. I just -- it's just a
12 minor thing, but when you talk about safety issues
13 for personnel, I was curious about your word choice
14 there. On personnel, do you mean transmission line
15 personnel?

16 A. I mean any personnel associated that
17 would be working in the area. So primarily gas
18 pipeline personnel, folks that would be in contact
19 with the meter station in that example.

20 Q. Would it be broader than that? Would
21 it be any persons in the area? Could be any
22 persons in the area?

23 A. I think in the context of my
24 testimony here, what I'm pointing to is if somebody
25 were, for instance, at that meter station and the

1 associated fault occurred or lightning strike
2 occurred and they were in contact with metallic
3 surface, that the step potential or the touch
4 potential that they would be subjected to would not
5 exceed safe values, so, in other words, harmful
6 values.

7 Q. Okay. I want to ask you -- I have
8 some exhibits that I want to talk with you about.
9 These exhibits, for everyone's information, I put
10 them all together. They're individually numbered,
11 but I thought it would save me some time in passing
12 them out. So I'm going to give them to all of us
13 now, and we'll talk about them individually. Okay.
14 And Cheryl will pass these out so everyone has
15 them.

16 JUDGE BUSHMANN: Do you have copies
17 for the Commissioners?

18 MS. DURLEY: I do.

19 BY MS. DURLEY:

20 Q. All right. The first exhibit is
21 labeled 627. That would be Rockies Express
22 Exhibit 627. Can you identify what that top
23 exhibit is, sir?

24 A. I have 626 labeled in the lower
25 right-hand corner.

1 Q. Oh, did I mark it wrong? I beg your
2 pardon. It is 626. It's the data request
3 response?

4 A. Yes.

5 Q. Okay. Can you now identify what it
6 is and keep me straight?

7 A. I can. So this -- this is data
8 information request from Rockies Express Pipeline,
9 LLC to Grain Belt Express Clean Line in PSC Case
10 No. EA-2014-0207.

11 Q. All right. Thank you. And what the
12 information requested in this data request was
13 asking Grain Belt to provide copies of all studies,
14 reports, papers, et cetera, that Grain Belt had
15 relied on in examining and considering the
16 potential effects of a high-voltage, direct current
17 transmission line on underground pipelines. Is
18 that a fair understanding that you had of what was
19 being requested?

20 A. That is correct.

21 Q. Okay. And in response to that, you
22 have provided several documents, studies, articles,
23 papers that you are saying to us and this
24 Commission that Grain Belt relied on. Is that a
25 fair understanding?

1 A. That is correct.

2 Q. All right. So in the next exhibit
3 then are just the copies of these documents that
4 you produced. The next one in that line is Exhibit
5 No. 627, which is the first report that you
6 provided in response to the data request, correct?

7 A. That is correct.

8 Q. All right. And this one, this
9 particular report is entitled Building Interstate
10 Natural Gas Transmission Pipelines, a Primer. This
11 document in its entirety is about pipeline
12 construction, is it not?

13 A. That is correct.

14 Q. It really has nothing to do with the
15 building or constructing of these high-voltage
16 transmission lines; is that a fair statement?

17 A. That is correct.

18 Q. Okay. And then, in all fairness, you
19 identified one particular page out of this document
20 that you're referring to, and I hopefully have
21 marked that with a little sticky. And the reason I
22 did that is because in your data request you refer
23 to page 114. Those did not print out, so it's a
24 little hard to find that page. But it is a -- I
25 think everybody has it. Did you see where I marked

1 **it there?**

2 A. Yes, ma'am.

3 **Q. Is that the correct page?**

4 A. Yes, it is.

5 **Q. Okay. And what this is, as I read**
6 **it, is a drawing that is instructive to pipelines**
7 **regarding right of way widths that are necessary**
8 **when building close to an existing transmission**
9 **line, correct?**

10 A. That is exactly what it is.

11 **Q. So this study and this particular**
12 **attachment doesn't have anything to do with what**
13 **we're here talking about, which are the potential**
14 **effects of this high-voltage transmission line**
15 **under a -- on an underground pipeline, in all**
16 **fairness. Am I saying that correctly or have I**
17 **missed something in this study?**

18 A. It -- you're correct in that it does
19 not address impacts to subsurface utilities such as
20 underground pipelines. It is addressing
21 construction activities of constructing a pipeline
22 next to a high-voltage transmission line and
23 maintaining appropriate safety clearances.

24 **Q. So in this case, because the REX's**
25 **pipeline are exists, it's going to be the opposite.**

1 We need a study that shows the opposite than this
2 primer that is marked as Exhibit 627, what the
3 transmission line needs to do when there are
4 existing pipelines rather than what a pipeline
5 needs to do when there's already existing
6 transmission lines?

7 A. So from a construction perspective,
8 we would expect that in our -- we would coordinate
9 with the utility, primarily REX in this case or
10 other pipelines which we coordinate with, to find
11 out what appropriate safety clearance is for
12 construction, what sizes of vehicles we could or
13 could not use to access the pipeline right of way,
14 et cetera.

15 So yes, there would have to be
16 coordination there because we could not encroach on
17 their easement without their permission.

18 Q. Let me ask, and I honestly don't know
19 the answer to this question. We're not supposed to
20 do that on cross-examination, I know. But really
21 those discussions with REX and other pipelines in
22 the area have not occurred; is that a fair
23 statement?

24 A. We have not begun all those
25 discussions yet because we do not have a certified

1 route at this time.

2 Q. I know it's a little chicken and the
3 egg kind of thing, but you haven't talked with REX
4 or others yet about the details of the
5 construction?

6 A. Not in details, no.

7 Q. Okay. Then I want to go to the next
8 exhibit which was attached, and this is marked as
9 REX Exhibit No. 628. Are you with me on that one?

10 A. Yes, ma'am.

11 Q. And this one is the -- entitled the
12 New York Regional Interconnection Study: Regional
13 Pipeline. And I tried to struggle through this, so
14 I'm sure I'm not correct in all of my thinking, but
15 this -- first of all, this regional interconnection
16 study which look at transmission and pipeline, this
17 transmission line was never built?

18 A. That is my understanding, yes.

19 Q. Okay. And there are significant
20 differences that are in this proposal for this
21 transmission line and what we're looking at here in
22 Missouri with the Grain Belt and the REX issue, is
23 it not? Let me just ask you --

24 A. By significant differences, I'm not
25 quite sure. I mean, they're two different

1 pipelines and two different transmission lines.

2 **Q. Fair enough.**

3 A. The physics of interaction is
4 arguably the same.

5 **Q. In this study it is a 400 kV**
6 **transmission line, correct?**

7 A. That is correct, as I recall.

8 **Q. The one we're discussing here is a**
9 **600 kV transmission line?**

10 A. That is correct, yes.

11 **Q. I admit I don't know much, but isn't**
12 **that a significant difference?**

13 A. Well, again, when you're talking
14 about the interaction, the physics is the same, but
15 the magnitudes might be different.

16 **Q. All right. So magnitudes are**
17 **different.**

18 A. So the physics of the interaction is
19 the same.

20 **Q. All right.**

21 A. But the magnitudes may or may not be
22 different because a 600 kV line has more clearance
23 to ground than a 400 kV line does.

24 **Q. This one is bipolar, and I understand**
25 **the transmission line in this case would be**

1 **monopolar?**

2 A. I'm trying to recall that. I don't
3 recall that off the top of my head.

4 **Q. If I'm correct, is that -- isn't that**
5 **a significant difference, even in the physics?**

6 A. I believe this is a bipolar as well,
7 but if it were to be a monopolar, it would depend
8 upon the design, whether the physics will still --

9 **Q. And the pipeline in this case, in**
10 **this particular study that we're looking at, I'm**
11 **looking at in particular, is a 30-inch diameter**
12 **pipeline in the study. Do you recall, is that --**

13 A. I don't recall the size of the
14 pipeline. It's the Millennial pipeline, which is
15 interstate gas pipeline. But a 30 to 32-inch would
16 be a typical size for that, yes.

17 **Q. And what is your understanding of the**
18 **REX pipeline dimensions?**

19 A. I believe it's a 42-inch.

20 **Q. Again, 30 versus 42 could be a**
21 **significant difference?**

22 A. Again, on the physics of the
23 interaction, no. I believe the physics doesn't
24 change.

25 **Q. Then in the next study is -- we have**

1 it marked as Rockies Exhibit 629. Have you read
2 this study as well?

3 A. Yes, I have. It's been a while, but
4 I have.

5 Q. Okay. So without going into a lot of
6 detail on this, maybe just read the first sentence
7 under abstract, which gives a little bit of a
8 summary of what this study is about. Could you
9 read that for us?

10 A. So the first sentence standing on its
11 own isn't a lot of context, but I will read it.
12 Underground/underwater pipelines are susceptible to
13 corrosion from DC stray current originating from
14 the operation of high-voltage, direct current,
15 HVDC, transmission systems.

16 Q. Okay. And so what we're really
17 talking about here, one of the concerns -- I know
18 there are many, but one of the concerns is the
19 corrosive effect that can occur from a transmission
20 line such as you're proposing on an underground
21 pipeline such as Rockies Express? Isn't that one
22 of the potential effects that we're concerned
23 about?

24 A. That is one of the potential effects,
25 and this study was done on a -- the case study, so

1 we have things in context here, it was done on a
2 case with a facility, specifically the Quebec/New
3 England line or as Mr. Blazewicz referred to it as
4 Phase II. It is a earth return project. It is not
5 a dedicated metallic return project.

6 **Q. I understand. With all due respect,**
7 **this is a paper that you produced to us to support**
8 **your contention that we were wrong, meaning REX was**
9 **wrong in some of its concerns. That's all I'm**
10 **saying. This is a paper that Grain Belt relied on.**

11 A. Well, I disagree with your
12 characterization of our contention. Our contention
13 was that your witness produced no work papers or
14 studies to justify what he asked for.

15 **Q. Okay.**

16 A. We produced studies and work papers
17 that do show there is potential for problems.
18 Those problems should be studied, which we are
19 willing to do, and that our project is different in
20 that we're using dedicated metallic return. So in
21 the steady state there are not the same problems
22 occurring, but during faulted conditions, there are
23 problems to be studied and to be looked at
24 seriously.

25 **Q. Okay. And actually this study was**

1 produced, the same one was produced by the REX
2 witness, it's my understanding.

3 A. It may have been in his testimony. I
4 don't remember it being delivered as part of his
5 discovery response, but I could be wrong.

6 Q. Sure. Okay. And then the next study
7 that you rely on -- again, remember that we were
8 asking for papers that you relied on to try to get
9 a better handle on this. This is marked as Exhibit
10 No. 630, and this one is a paper that is titled
11 Pipeline AC Mitigation Misconcepts. So this paper
12 is related to AC rather than DC current, correct?

13 A. That is correct.

14 Q. Okay. Really are those significantly
15 different?

16 A. Yes. In their interaction, yes.

17 Q. So this one doesn't really apply
18 either?

19 A. Well, it applies in the fact that you
20 asked for papers, that I was providing you work
21 papers and things of that nature that I used to get
22 my head around the issues.

23 Q. Again, with all due respect, what we
24 were trying to ask for were studies that had
25 already been done to give us all a better handle on

1 some of the concerns. And the studies that you
2 produced, they have some information and data and
3 material that is relevant and useful.

4 But are there any studies that
5 actually study a transmission line with your
6 characteristics, the effects on an underground
7 pipeline with REX's characteristics?

8 A. If you're asking is there a study of
9 a plus or minus 600 kV transmission line parallel
10 to the REX pipeline, which is a 42-inch gas
11 pipeline that studies the impacts, my answer would
12 be there is not one that I know of in the public
13 domain.

14 Q. Okay. And, in fact, this -- several
15 people have called this project unique, and this
16 would be one of the unique characteristics of it,
17 that, in fact, this situation of the transmission
18 line and the pipeline paralleling each for an
19 extended period of miles does not exist anywhere
20 else in the country that you're aware of?

21 A. I believe that Mr. Gaul actually has
22 some just data discovery responses to that that I
23 rely on him to talk about where HVDC lines and gas
24 pipelines parallel I think globally. I can't say
25 authoritatively that this has never happened

1 because there's significant HVDC infrastructure
2 development, for instance, in China and India and
3 elsewhere where the likelihood of this happening
4 has occurred.

5 Q. Okay. But as you sit here, neither
6 you nor I are aware of any particular study that
7 looks at this very specific unique parallel
8 situation between your transmission line and REX's
9 42-inch natural gas pipeline?

10 A. No. But again, the physics of
11 interaction, whether it's 30-inch or 42-inch, 600
12 kV or 400 kV, is similar.

13 Q. Okay. And then I go to the final
14 study just so we go through these documents. This
15 is identified as REX Exhibit No. 631. And this one
16 is the Influence of High Voltage DC Power Lines on
17 Metallic Pipelines, and you're familiar with this
18 study, correct?

19 A. Yes, I am.

20 Q. All right. And in this study it
21 specifically says in the overview that's on page 1
22 that this only should be applied to the specific
23 pipelines or HVDC lines that were studied for this
24 study, correct? That's in Note 1 you noted that?

25 A. Note 1. Yes, the version of this

1 guideline. So the engineers here were developing a
2 guideline utilizing this particular example.

3 Q. Okay. And then going over to what is
4 marked as page 1-1, project scope.

5 A. Yes.

6 Q. All right. In that first paragraph
7 talks about the interactions between AC power and
8 underground pipelines has been studied, and then it
9 goes on to say, in the middle of that paragraph,
10 there appears to be no similar guidelines for HVDC
11 lines, especially those being proposed in the
12 province of Alberta.

13 So in other words, there are no
14 guidelines or standard or industry standards for
15 the exact situation we're here talking about today,
16 correct?

17 A. That is correct.

18 Q. All right. Then I want to move on to
19 the recommendations that REX made and that you
20 responded to. And REX made -- and we don't have to
21 go all of them, I think, in detail, but REX made
22 nine recommendations, and then you responded to all
23 of those.

24 The first recommendation that REX
25 made was that the Grain Belt transmission line

1 should be required to be 1,000 feet away from REX's
2 pipeline. Do you remember that recommendation?

3 A. I do.

4 Q. And that recommendation was rejected?

5 A. Yes.

6 Q. Okay. That's -- in the opening there
7 was a comment that there were nine made, three were
8 accepted, five were going to be studied, one was
9 rejected. I want to make clear in my mind at least
10 that the one that was rejected by Grain Belt was
11 1,000 feet?

12 A. Correct.

13 Q. Okay. And what you said in your
14 response is that the reason you disagreed with this
15 requirement to be 1,000 feet away from the pipeline
16 was it was not a common industry practice, was not
17 a good routing practice and was unnecessary for
18 safety.

19 Haven't we already established that
20 there are no industry standards for this situation?

21 A. I would say there are no published
22 industry standards. There is experience in the
23 industry, though. In my previous career, my
24 previous employer, we actually did studies, but
25 those studies again are not publicly available.

1 **Q.** Okay. But as we sit here and the
2 information available to all of us, there's no
3 common industry standard or best practice that says
4 how close this size of a transmission line should
5 be to a 42-inch natural gas pipeline?

6 A. There is a best practice to
7 coordinate with neighboring utilities and
8 potentially affected utilities.

9 **Q.** Okay.

10 A. So there is not -- so that I would
11 say that there is a best practice that this be
12 studied with REX and other affiliated -- or other
13 affected pipelines.

14 **Q.** And that reminds me, in these studies
15 that I tried to read, it said that the only
16 industry practice that they were aware of is the
17 practice that, Grain Belt in your case, the
18 transmission line should talk with the pipeline?

19 A. Correct.

20 **Q.** That hasn't occurred?

21 A. Not in detail, no.

22 **Q.** So you're rejecting the
23 recommendation and no discussion yet, correct? We
24 hope there'll be one. I'm not saying there's not
25 going to. But at this point there has not been?

1 A. At this point, no, there has not
2 been.

3 **Q. Okay. Now, what I want to ask you,**
4 **if 1,000 feet is too big, what is a safe and**
5 **reliable spacing between the transmission line and**
6 **the underground pipelines?**

7 A. Well, I would say zero feet is
8 unsafe.

9 **Q. And would you explain to the**
10 **Commissioners and all of us why it's unsafe?**

11 A. Because you -- I was being somewhat
12 facetious.

13 **Q. I know. I know, but seriously. I**
14 **don't --**

15 A. Because you'd be drilling on top of
16 the pipeline.

17 **Q. And what's the problem there?**

18 A. Well, the pipeline has the easement,
19 and you're not allowed to.

20 **Q. Okay. That's a property thing.**
21 **Let's talk about safety.**

22 A. Any time you cut into a pipeline,
23 it's not a good thing.

24 **Q. And tell us why. If you puncture the**
25 **pipeline, what happens?**

1 A. Potential explosion.

2 Q. That's the safety risk that we're
3 talking about primarily for this natural gas
4 pipeline, that either through puncturing or
5 corrosion or voltage of some manner, that there
6 could be an explosion?

7 A. Potential.

8 Q. Potentially. So back there when I
9 said about asking you about personnel and you said,
10 well, the meter station, this and that, but truly
11 we're talking about the safety of anybody who's in
12 the vicinity if there is an explosion?

13 A. The context of what we were talking
14 about earlier was with regard to step and touch
15 potential, not to explosion. So yes, there is a
16 safety measure that does concern explosion whether
17 there is the presence of a transmission line or
18 not.

19 Q. Okay. And the reason we were talking
20 about the step and touch potential because that was
21 in your testimony. You didn't put in your
22 testimony anything about the explosion potential,
23 did you?

24 A. No, I did not.

25 Q. All right. But that is something

1 we're really -- that's really the heart of what
2 we're talking about. What is a safe distance
3 between your transmission line and REX's 42-inch
4 natural gas pipeline?

5 A. So a safe distance, in my opinion,
6 can be achieved with appropriate mitigation
7 measures. So if, for instance, as we have done, we
8 have sited parallel to the existing infrastructure
9 in certain cases and crossing it. We are not
10 within the right of way of REX or any other
11 pipelines. We have -- our right of way is adjacent
12 to it, which means our centerline is approximately
13 100 feet from -- that is where the piles will be
14 placed -- approximately 100 feet from the edge of
15 the existing right of way.

16 When the studies begin, they will
17 look at the appropriate circumstances where
18 potential for corrosion impacts occur, and then
19 necessary mitigation measures would be made so that
20 it is a safe distance.

21 Q. All right. Fair enough. And what I
22 want to emphasize is that when this recommendation
23 number one of 1,000 feet is rejected and that Grain
24 Belt is unwilling to do it, really what we're
25 saying is that there must be appropriate

1 mitigations that are employed as to a safe distance
2 and that you're not really rejecting this, you're
3 just saying we don't know yet what the safe
4 distance is; would that be fair?

5 A. We're saying that we would -- well,
6 we didn't say this specifically, but would I say is
7 that what we're saying is that, given the current
8 route because of the other constraints that are
9 associated with routing -- and Mr. Gaul can talk
10 explicitly about land use and things of that nature
11 and why we routed where we route --we would study
12 the impacts so that it was a safe distance.

13 Q. Okay.

14 A. We're not saying there's a minimum
15 distance. We're saying this is the distance. We
16 will study it. We will determine the impacts and
17 the necessary mitigation to ensure the safety of
18 the pipeline.

19 Q. And in terms of the testimony that
20 was provided that you responded to by Mr. Allen,
21 what he is saying, the thousand feet is an
22 abundance of caution, this would be a safe
23 distance, and there may be something less than
24 that, but this will be determined after studies so
25 that it's coordinated with the pipelines, it's

1 coordinated with your company to dealt what is an
2 appropriate distance and how other mitigations will
3 be done, correct?

4 A. That was a really long question.
5 Could you --

6 Q. I'll withdraw the question. I
7 couldn't remember it again anyway.

8 Recommendation No. 2 that was made is
9 that your company would agree to conduct a DC
10 interference analysis to determine the mitigation
11 measures necessary. You've already agreed to that,
12 and that's --

13 A. Yes.

14 Q. -- what you just said you were going
15 to do?

16 A. Yes.

17 Q. That's a better statement of what I
18 was trying to ask you.

19 Recommendation No. 3, that you will
20 confirm all data before doing the DC interference
21 analysis, and you have accepted that?

22 A. Yes.

23 Q. And when we talk about the data,
24 these are some of the details that we're not
25 talking about up here, but it is the information

1 about the pipeline, about the coating that's been
2 used, the type of pipe, all of those different
3 factors that will make a difference to us at least,
4 REX, you will confirm all of that before you do any
5 of these studies?

6 A. That is correct. And I would
7 anticipate they're actually in conjunction with the
8 pipelines.

9 Q. And when we say pipelines, I'm here
10 talking about REX.

11 A. Yes.

12 Q. There are other pipelines that are in
13 this corridor, are there not?

14 A. I'd rely on Mr. Gaul, but I would be
15 surprised if there are not.

16 Q. Okay. And those pipelines are
17 different. They carry different product, different
18 size, different depth, different coatings, all
19 those factors, but you really need to look at
20 exactly what's under the ground where you're near
21 or above, correct?

22 A. Exactly, yes.

23 Q. Okay. Now, the next recommendation
24 No. 4, our recommendation is that you keep the
25 crossings at 90 degree angles, and you rejected

1 that, or you said you did not agree. Tell me -- I
2 mean, that seems like a best practice. Is there a
3 standard practice for angling of this size
4 transmission line with a 42-inch natural gas
5 pipeline?

6 A. Is there a standard practice?

7 Q. Well, your answer to the thing was
8 that they are -- that it's -- this doesn't comply
9 with the industry standards. So I guess I'm asking
10 you first, what are the industry standards for
11 crossings?

12 A. Could you point me to my answer
13 please, so I'm --

14 Q. Yes.

15 A. -- sure it's in context? Not that I
16 doubt you.

17 Q. Well, you can look.

18 MR. ZOBRIST: Look at page 11 of your
19 direct.

20 MS. DURLEY: No, no, no. It wouldn't
21 be I his direct. It has to be in his surrebuttal.

22 MR. ZOBRIST: Surrebuttal.

23 BY MS. DURLEY:

24 Q. We admit there's no industry
25 standards, and would you agree with that? I'll put

1 it that way. That's on page 11, starting at
2 line 5. Give you a chance to read that a minute.

3 A. Yes. The question again? Sorry.

4 Q. The question is, our recommendation
5 was that it be at a 90 degree, and your response,
6 Grain Belt's response was that do you not agree,
7 and then your response is that there are no
8 industry standards or best practices.

9 A. Yes. Mr. Allen actually conceded
10 that.

11 Q. And you agree that?

12 A. Yeah.

13 Q. Okay. So that is another one of
14 those issues that needs to be addressed and sorted
15 out about if the angle of the crossing is important
16 and why it's important and the physics of it that
17 you talked about before?

18 A. Yeah. Something interesting in the
19 Canadian study that was done this year on the
20 Alberta lines, they actually talk about angles of
21 crossing and how it needs to be studied. So
22 it's -- small angles, actually you assume that it's
23 running in parallel.

24 Q. So that's why you're looking for the
25 90 degrees so that you --

1 Q. Well, the 90 degree is actually
2 pertinent to AC for specific reasons, and that
3 is -- I -- especially for railroads, they typically
4 require a 90 degree crossing for AC because of the
5 inductive effects associated with a constant AC
6 current. So that is practice with AC because of
7 the alternating nature and the physics associated
8 with coupling. It's not necessarily appropriate
9 for DC. That's railways specifically.

10 Q. Right.

11 A. I know many pipelines that are
12 crossed at very small angles by AC lines, too.

13 Q. And what the concern is, is at this
14 point we just really don't know, and there's no
15 best practices that you're aware of, and if we're
16 having this discussion ten years from now, there
17 well might be some industry standards and
18 practices?

19 A. There are no standards published.
20 The studies are not uncommon. They have been done.
21 Again, most of the time it's done proprietary as
22 part of the transmission owner and the gas pipeline
23 owner. But best practice is coordination with the
24 affected utilities.

25 Q. All right. Recommendation No. 5, no

1 towers closer than 300 feet, which you responded to
2 that recommendation that you do not agree, and
3 again, you've agreed to provide pole locations.
4 And this will be one of those things that has to be
5 worked out before you can determine or we can agree
6 on where those poles need to be and how far -- how
7 far or how close to the pipeline, correct?

8 A. Yes. Specifically the 300 feet
9 requirement was in regards to crossings, just so
10 everybody's clear.

11 Q. All right.

12 A. And yes, we did not agree that --
13 again, that was an arbitrary number by Mr. Allen
14 out of his abundance of caution without any
15 support.

16 Q. Okay.

17 A. My answer would be similar to the
18 parallel and distance question that you asked
19 earlier, that whatever distance that is, whether
20 it's 50 feet outside the pipeline right of way or
21 300 feet, we would ensure that mitigation was taken
22 such that it was implemented and safety was not
23 compromised.

24 Q. All right. The sixth recommendation
25 that REX made was that the ground towers on the

1 side farthest from the pipeline and you use certain
2 kind of grounding rods. Can we agree as a general
3 principle that the farther away the grounding
4 system is from the pipeline, the safer it would be,
5 or the less possible interference? I don't know if
6 safe is the word.

7 A. Can you restate the question? You're
8 saying the farther away the grounding system is
9 from the pipeline, the safer you --

10 Q. The safer it would be or -- let me
11 ask it this way: If there would be a lesser chance
12 for interference with the pipeline the farther the
13 grounding is away?

14 A. It's really not enough information to
15 answer that question. I would say not necessarily.

16 Q. Okay.

17 A. In concept, you might make that
18 argument, but there's a lot of or factors that
19 impact where current will flow in the earth.

20 Q. All right. Then recommendation
21 No. 7, REX recommends that you install a DC voltage
22 monitoring system at each crossing, and then you
23 respond that that's unacceptable and say that
24 studies will be done to determine what is necessary
25 and what is required; is that correct?

1 A. I'm just refreshing myself.

2 Q. Sure. Sure. That's in your
3 surrebuttal.

4 A. Yes, we say unacceptable as proposed.

5 Q. Was there a difference between
6 unacceptable and rejected?

7 A. Well, I think, you know, when we say
8 it's unacceptable or unacceptable as proposed, what
9 we're saying is that we don't necessarily disagree
10 that there might be a need for it, but again, you
11 know, we need to work together and study these
12 things as a collaborative effort.

13 Q. And then No. 8 -- and the reason I
14 ask that question, No. 8, the recommendation is
15 that Grain Belt be required to notify REX when a
16 fault occurs anywhere on the HVDC line, and your
17 response is that you disagree with this one.

18 That's why I was trying to get, is
19 there a difference between disagree and
20 unacceptable. What's your problem -- why aren't
21 you willing to notify REX when a fault occurs?

22 A. Well, again, it's somewhat of a broad
23 recommendation that has a lot of encumbrances.
24 There's an awful lot of difference types of faults
25 that could occur. And if you look back at the

1 previous, the thought about implementing voltage
2 monitoring and things like that, if they -- if it
3 is such -- if it is prescribed, then REX would have
4 the ability to notice something had happened.

5 So it was more of a, you know, this
6 is more kind of a big encumbrance in terms of --
7 and a very broad generalization. You could have a
8 fault, for instance, you know, inside the DC switch
9 yard that's cleared very quickly and have no ground
10 currents flowing anywhere in the middle of the
11 line.

12 So, you know, it's just a very broad
13 request, and I think with appropriate studies and
14 monitoring as part of the mitigation, that it's not
15 necessary.

16 **Q. Okay. It's not necessary as broadly**
17 **as REX has said, but you would agree it is**
18 **necessary in certain circumstances, we just don't**
19 **yet know what those circumstances are?**

20 A. Potentially, yes. Yes.

21 **Q. And the reason that REX wants to know**
22 **this is so that it has the ability to look at**
23 **whether the fault caused any damage to its**
24 **pipeline?**

25 A. Correct.

1 Q. And that's something we all want,
2 correct?

3 A. Yes.

4 Q. All right. And then the last
5 recommendation is No. 9, which is to conduct a DC
6 interference analysis respect with converter
7 station. You've agreed to that one and have
8 accepted it, correct?

9 A. Yes.

10 Q. All right. And I don't know that we
11 need to get into here about these issues, but in
12 terms of these studies and all the things that
13 we're doing, is Grain Belt agreeing to pay for
14 this?

15 A. I think it's our obligation to do so,
16 yes.

17 Q. Okay. And then in terms of all the
18 mitigation or whatever mitigation is required is
19 required, Grain Belt would pay for the mitigation
20 costs?

21 A. Correct.

22 Q. In several testimonies we've talked
23 about damage and damage that landowners must -- may
24 sustain as a result of this construction and the
25 operation. It would be true that you would pay to

1 **REX for any damage that your transmission line**
2 **caused to the operation of the pipeline or the**
3 **pipeline itself, those kind of things?**

4 A. That sounds like an indemnification
5 question or a legal question that I'm probably not
6 qualified to answer. But I think it would be
7 typical practice that if -- and, you know, I would
8 subject this to counsel, that if during
9 construction or some operational mechanism caused
10 damage to any facility, there's probably some sort
11 of liability there. But I -- again, I'm not an
12 attorney, and I can't speculate on those kind of
13 issues.

14 Q. All right. Well, let me just put it
15 in this context, and I'm not trying to put you on
16 the spot necessarily, I guess. In your surrebuttal
17 testimony, you agree to fully compensate any
18 landowner for damages that occur as a result of
19 anything. That's on page 31, line 7 and 8. So
20 that --

21 A. Surrebuttal.

22 Q. Your surrebuttal, page 31, lines 7
23 and 8, is your statement that you agree -- not you
24 personally, obviously, but Grain Belt agrees to
25 compensate landowners for damages. I think I've

1 written it down right. Are you seeing it?

2 A. Yes. So this is -- this is I think
3 intended to respond to Mr. Kruse about in the event
4 of storms, you know, there likely could be lots of
5 damage to crops or land because of access issues
6 and that kind of thing. So we are committed in our
7 easement agreements to compensate landowners for
8 those damages.

9 Q. And I was just trying to make sure,
10 it wasn't in your testimony, but that you would
11 agree -- Grain Belt would agree to compensate REX
12 for any damages that occurs during storms or during
13 your operation of your transmission line?

14 MR. ZOBRIST: Well, let me object.
15 We have storms and then we have transmission lines.
16 So I object. It's a compound question.

17 MS. DURLEY: Well, storms.

18 MR. ZOBRIST: That's different from
19 the other one.

20 BY MS. DURLEY:

21 Q. If a storm caused damages to the
22 pipeline by virtue of the fact there's a
23 transmission line, which you've already talked
24 about the step and the touch, voltages, the
25 lightning strikes, you talked about that in your

1 testimony, if that caused damages to the pipeline,
2 you would agree to pay for those damages?

3 A. If a lightning strike caused damage
4 to the pipeline, I don't know that we would pay
5 damages. But again, this is -- this is a -- we're
6 getting into the realm of indemnifications and
7 warranties. I'm an engineer, not a lawyer.

8 Q. Okay. Once these studies are done,
9 what I'm curious about is what's the mechanism for
10 making sure that these mitigation issues are put
11 into place and the recommendations are followed and
12 that there's some way to make sure all of this is
13 done? And you may not be the appropriate person.
14 I just wondered --

15 A. My guess would be these would be
16 contractual in nature, that again as part of best
17 practice we will collaborate with effected
18 subsurface utilities and other effected utilities.
19 As an example, a very easy example is when you
20 cross another transmission line you have to get
21 permission from the existing utility and you have
22 to meet their criteria, and that is more than not
23 subject typically to negotiation in how that is
24 done. So it ends up being a contractual issue.

25 Q. Contractual issue that's ordered by

1 **the Commission?**

2 A. Typically I've not seen that in my
3 experience. Again, this is just best practice that
4 we are typically required to coordinate with all
5 other effected utilities. And I would assume that
6 if the effected utility -- my understanding is this
7 Commission in particular has jurisdiction over
8 pipeline safety.

9 For instance, if REX found that --
10 I'm starting to play lawyer here, I guess. I
11 apologize. But if REX found that there was
12 something unacceptable from the studies or that
13 mitigation was not being taken seriously, then they
14 could raise a hearing by -- or they could request a
15 hearing in front of this commission. That's my
16 understanding.

17 **Q. Well, the reason I'm asking that is**
18 **just because in your responses when you don't**
19 **accept the recommendations from REX, there's**
20 **clearly big room for disagreement and what should**
21 **and should not be done and what's necessary and**
22 **what's best practices since we don't know, but we**
23 **just have to have some mechanism to see whose best**
24 **practice wins out. You would agree with that?**

25 A. Well, yeah. I think it's reasonable

1 minds sitting together, you know, engineering and
2 legal, and coming up with the appropriate
3 solutions. And if there isn't, there does need to
4 be a means to pursue that. I would -- again, my
5 understanding is that can be through this
6 Commission with a requested hearing.

7 Q. Okay. And let me just -- I kind of
8 jumped ahead. I want to make sure that everyone
9 understands that, in your experience and based on
10 the studies that you have seen and we know that are
11 available, you understand that an HVDC transmission
12 line can cause damage to the pipeline coating;
13 would you agree with that?

14 A. If unmitigated, yes.

15 Q. Okay. And it can cause damage to the
16 pipeline in the form of corrosion, kind of the same
17 thing, the coating gets damaged, corrosion occurs,
18 et cetera?

19 A. Yes. Any time you change the ground
20 around the pipeline, whether it's another pipeline
21 or a transmission line or a telephone line or
22 fiberoptics, it could potentially need to be
23 analyzed and mitigated.

24 Q. And a pipeline, and REX in
25 particular, has cathodic protection, which you are

1 **aware of and probably know?**

2 A. Yes.

3 **Q. But the HVDC transmission can cause**
4 **damage to that cathodic protection, can it not?**

5 A. Under what circumstances?

6 **Q. Well --**

7 A. Under faulted conditions, there could
8 be impacts, yes.

9 **Q. We're kind of just making sure**
10 **everybody understands that there's lots of**
11 **different areas of damage we're concerned about,**
12 **and an HVDC line can cause corrosion to the control**
13 **equipment?**

14 A. Define control equipment, because in
15 my mind, I don't see that it would cause corrosion
16 to the control equipment.

17 **Q. How about monitoring equipment?**

18 A. It could potentially impact certain
19 monitoring equipment depending on where it's
20 installed and how it's installed.

21 **Q. All right. So it can cause damage to**
22 **the pipeline itself, it can cause damage to the**
23 **operation and integrity of the system overall if**
24 **there's not appropriate mitigation?**

25 A. Without appropriate mitigation, under

1 certain circumstances, I would agree with your
2 statement.

3 MS. DURLEY: All right. Just one
4 minute. I think I'm done. I think that's it.
5 Thank you, sir.

6 THE WITNESS: Thank you.

7 MS. DURLEY: Oh, before I end --

8 JUDGE BUSHMANN: Did you intend to
9 offer those exhibits?

10 MS. DURLEY: Yes. I would like to
11 offer the exhibits that is Nos. 626 through 631.
12 Excuse me, Judge.

13 JUDGE BUSHMANN: Any objections?

14 MR. ZOBRIST: No objection.

15 JUDGE BUSHMANN: Hearing none,
16 Exhibits 626 through 631 are received into the
17 record.

18 (ROCKIES EXPRESS EXHIBIT NOS. 626 -
19 631 WERE MARKED AND RECEIVED INTO EVIDENCE.)

20 JUDGE BUSHMANN: Cross-examination by
21 Reicherts and Meyers?

22 MR. DRAG: Yes your Honor.

23 CROSS-EXAMINATION BY MR. DRAG:

24 Q. Good morning, Dr. Galli.

25 A. Good morning.

1 **Q. My name is Gary Drag, and I represent**
2 **Matthew and Christina Reichert and Raymond and**
3 **Roseanne Meyer.**

4 A. Could you speak a little closer to
5 your microphone?

6 **Q. I'm sorry. I have a frog in my**
7 **throat.**

8 MR. DRAG: Your Honor, may I approach
9 the witness?

10 JUDGE BUSHMANN: Yes.

11 BY MR. DRAG:

12 **Q. Dr. Galli, do you recognize these**
13 **documents?**

14 A. This appears to be a presentation
15 done by Brian Furumasu who is employed by Power
16 Engineers.

17 **Q. Can you read the title for us for the**
18 **record?**

19 A. Overhead and underground DC
20 transmission, Brian Furumasu.

21 **Q. Now, I will state that that -- those**
22 **are select pages. I didn't print the whole**
23 **document.**

24 A. Okay.

25 **Q. So if you were paging through, you**

1 **may see parts missing.**

2 A. Okay.

3 **Q. May I have that back for a minute?**

4 A. Yes.

5 **Q. Now, I'd like you to go and read the**
6 **heading of this page and also the bullets in the**
7 **record.**

8 A. So the heading states, electrical
9 environment under DC line. The bullets are as
10 follows: Electric fields, magnetic fields, audible
11 noise, parenthetically AN, radio interference,
12 parenthetically RI, TV interference,
13 parenthetically TVI, ion field and ion currents.

14 **Q. Okay. Thank you. Now, do you -- do**
15 **you agree that those are issues under DC lines?**
16 **Not issues. Let me rephrase. That --**

17 JUDGE BUSHMANN: Could you use your
18 microphone, please, Mr. Drag?

19 MR. DRAG: Pardon?

20 JUDGE BUSHMANN: Could you use your
21 microphone?

22 MR. DRAG: Yeah. Sorry.

23 BY MR. DRAG:

24 **Q. Now, do you agree that those are**
25 **environmental issues under a DC line?**

1 A. Those are part of the electrical
2 environment under a DC line or under any
3 transmission line.

4 **Q. Thank you. Now, my first question,**
5 **if you would turn to your surrebuttal, page 30,**
6 **line 7 through 10, and can you read the last**
7 **sentence, please?**

8 A. As discussed in my direct testimony,
9 it is extremely unlikely that the project will
10 interfere with GPS signals because the frequencies
11 that are used to communicate between orbiting
12 satellites and GPS units, including those
13 associated with farm equipment, are much higher than
14 the frequency of radio noise from the project's
15 transmission line.

16 **Q. Now, do you -- okay. So we have**
17 **that. And then if you skip down to line 13, you**
18 **reference a study, two studies published in 2011**
19 **and 2012. The 2012 study is a validation of GMSS**
20 **under 5 -- well, it says 5,000 (sic) volt, which**
21 **would be 500 kilovolt. But what about the 2011**
22 **study, do you know what the kilovolts of those**
23 **lines were?**

24 A. Both of those were conducted under
25 the Manitoba hydro bipole one and twos, which both

1 of those, to my recollection, are plus or minus
2 500 kV bipoles.

3 **Q. Now, in terms of the interference in**
4 **the electrical environment, as you ramp up the**
5 **kilovolts, so if you go from 500 to 600, is the**
6 **effect on let's say interference, is that a linear**
7 **scale or logarithmic scale?**

8 A. Well, that depends on which one of
9 those environmental electrics that you're talking
10 about.

11 **Q. Well, the context of potential GPS**
12 **interference.**

13 A. I don't believe the effects would be
14 any different because in the context of the GPS
15 interference, you're typically worried about
16 potential radio noise produced by the corona. That
17 is a function of voltage. Typically you seek to
18 minimize corona discharge because it's considered a
19 loss.

20 And so as you go up in voltage, you
21 increase conductor size, you increase conductor
22 bundling to minimize corona discharge and minimize
23 your losses. So additionally you have a higher
24 clearance, so that noise would be farther away in
25 that case.

1 Q. So --

2 A. I probably wasn't responsive whether
3 it's linear or exponential. Typically radio noise
4 is measured in terms of DB, which is a logarithmic
5 function, but -- that's decibels, but it would have
6 to be -- based on studies that we've done, it's of
7 the same order of magnitude as existing
8 transmission lines.

9 Q. Okay. So basically, to summarize,
10 and since I don't have an EE degree, electrical
11 engineering degree, so going from a 500 kilovolt
12 line to 600 kilovolt line, you would increase the
13 size of the conductor line, and would that mean
14 that the -- and you're saying, if I understand
15 correctly, that the corona noise would basically
16 stay the same at the higher voltage?

17 A. Of the same orders of magnitude, yes.
18 Yes.

19 Q. Okay.

20 A. I mean, it would not be the exact
21 same number, but of the same orders of magnitude.

22 Q. Okay. Thank you. You'll have to
23 excuse me. I have too many papers in front of me,
24 so I'm hopping around.

25 Now, in terms of the interference,

1 you say it would not -- there would be no
2 interference of GPS signals. Would that be
3 something that Grain Belt would be willing to be
4 contractually bound in the easement agreement so
5 you would set a certain -- you know, just set it at
6 that point. Would that be something that you would
7 guarantee, be willing to guarantee that there is no
8 interference and, if there was interference, you
9 would mitigate it some way? Would you be willing
10 to stop there?

11 A. What was the question?

12 Q. Strike all that. Would Grain Belt be
13 willing to go and contractually set standards so
14 that there would be -- that if there was GPS
15 interference, that they would mitigate that at
16 their cost?

17 A. So I believe I actually state -- or
18 maybe I did not state in my surrebuttal, or maybe
19 it was discovery response. The likely interference
20 would be on the ground-based controller on the RTK
21 system, and if we had to move that as part of
22 mitigation, we would certainly move that as part of
23 mitigation. So if interference was noted, we would
24 definitely take it seriously and study it.

25 Q. What do you mean by ground-based

1 **controller?**

2 A. So like RTK controllers, they usually
3 have a differential GPS. So there's a -- there's a
4 base station sometimes on the farm. Sometimes it's
5 a neighboring farm. If, for instance, one of our
6 towers were to obstruct that, in the unlikely
7 circumstance that it would, we would pay to move
8 that station so that the interference would not
9 occur.

10 **Q. Okay. Are you willing to**
11 **contractually agree to that in the easement**
12 **agreement?**

13 A. That's kind of a legal question. I
14 would defer that to legal minds.

15 **Q. That's fine. I understand. That's**
16 **putting you on the spot to a certain extent.**

17 **You made -- you made a comment**
18 **earlier, and you made it in your surrebuttal, about**
19 **Grain Belt reimbursing the property owners for**
20 **damages?**

21 A. Correct. That's part of our easement
22 agreement, as I understand it.

23 **Q. Do you have Exhibit 556 with you or**
24 **not? If not, I'll provide it.**

25 A. Is that one of my schedules?

1 **Q.** **No. It's one that we entered into**
2 **the hearing.**

3 A. I do not.

4 MR. DRAG: May I approach the
5 witness, your Honor?

6 JUDGE BUSHMANN: Yes.

7 BY MR. DRAG:

8 **Q.** **If you -- on Exhibit 556, if you turn**
9 **the cover page, what this -- can you read the**
10 **first, the main heading?**

11 A. Transmission line easement agreement.

12 **Q.** **And do you recognize that?**

13 A. This appears to be our easement
14 agreement for Grain Belt Express, yes.

15 **Q.** **Okay. Now, will you go to -- turn**
16 **the page to page 2, paragraph 3. And if you read**
17 **that, the first sentence says, Grain Belt will**
18 **repair or pay at Grain Belt's option landowner or**
19 **its tenants for any damage to landowner's or**
20 **landowner's tenant's improvements, et cetera. Is**
21 **that what it says there?**

22 A. Yes, it is.

23 **Q.** **I'm not asking you for a legal**
24 **opinion. Just from a lay opinion, when it says at**
25 **Grain Belt's option, how would you interpret that?**

1 A. That it is the company's -- Grain
2 Belt's choice as to whether we physically repair
3 any damages or whether we pay the landowner for
4 those damages. That would be my lay understanding.

5 **Q. Could that be -- never mind. Strike**
6 **that. Thank you on that.**

7 **In terms of the -- on page 27,**
8 **line 16 through 18 of your surrebuttal, you talk**
9 **about the noise levels.**

10 A. Yes.

11 **Q. And you state that the audible noise**
12 **will be in the range of 25 to 45 dBA?**

13 A. Correct.

14 **Q. And do you still agree with that?**

15 A. Yeah, based on the studies.

16 **Q. Can you tell me how many conductor**
17 **bundles you're going to have in the lines?**

18 A. If -- it may be helpful if I refer to
19 a diagram.

20 **Q. Sure.**

21 A. I believe I have a Schedule 2 of my
22 testimony. Schedule AWG-2, do you have that?

23 **Q. Not easily. It's computer. Go**
24 **ahead.**

25 MR. ZOBRIST: Judge, I've got a

1 diagram I might be going to show the witness. Did
2 you just want a diagram of the tower?

3 THE WITNESS: Yeah. Yeah. Just so I
4 could talk to it. It would be maybe easier than a
5 description.

6 So your question as stated was how
7 many -- sorry, Carl.

8 BY MR. DRAG:

9 Q. Let me strike that question and
10 restate it. I'm going to show you another document
11 that may help both of us.

12 A. Okay. Well, I was --

13 MR. ZOBRIST: Mr. Drag, I've got the
14 number. I just need to look it up here.

15 MR. DRAG: Carl, I'm just going to
16 show him this. That will be easier, I think.

17 MR. ZOBRIST: Go ahead and mark it
18 Exhibit 121, and then Mr. Drag can go ahead and do
19 what he wants, but if you'd mark that Exhibit 121.

20 (GRAIN BELT EXPRESS EXHIBIT NO. 121
21 WAS MARKED FOR IDENTIFICATION BY THE REPORTER.)

22 MR. DRAG: May I approach, your
23 Honor?

24 JUDGE BUSHMANN: Yes.

25 BY MR. DRAG:

1 **Q.** I'm handing you back the document,
2 **and can you read the document I --**

3 A. Yes. This is the presentation,
4 Overhead and Underground DC Transmission by Brian
5 Furumasu, PE, December 9, 2010.

6 **Q.** Can you turn to the -- where the
7 **yellow tab is?**

8 A. Yes.

9 **Q.** So on that page it lists the size of
10 **the bundles at various altitudes and to maintain a**
11 **45 DB or less noise factor; is that correct?**

12 A. That is -- that is what it presumes
13 to show, yes.

14 **Q.** Why don't you read that heading into
15 **the record, please?**

16 A. The heading states, HVDC conductor
17 bundles for 45 DB maximum.

18 **Q.** And then there's a graph on that
19 **page?**

20 A. Yes.

21 **Q.** And it lists the altitude on one
22 **side?**

23 A. Yes.

24 **Q.** And then across is, I think, the
25 **voltage?**

1 A. Yes.

2 Q. Okay. So my question is, based on --
3 is going to that, is how many -- what will be your
4 bundling on this line to maintain a 45 DB or less
5 noise factor?

6 A. We have -- we have a triple bundle,
7 so the three bundles. So you -- if you look at the
8 600 kV, the bundling configuration that you see at
9 the bottom.

10 Q. What's the maximum altitude for that?

11 A. I would not characterize this as a
12 maximum or a standard. This is kind of a rule of
13 thumb, but 500 meters.

14 Q. Okay. Which --

15 A. Roughly 1,500 feet, give or take.

16 Q. Okay. Thank you on that.

17 A. Little bit more.

18 Q. Now, would you turn to your
19 surrebuttal on page 28, line 13.

20 A. Page 28?

21 Q. 28, starting on line 13.

22 A. Okay.

23 Q. And you talk about EMF fields or
24 magnetic fields in that section.

25 A. Yes, I do.

1 **Q.** And the way I read that is basically
2 you are saying that the magnetic field underlying
3 would basically be equivalent to the earth's
4 magnetic fields?

5 A. Yes, in the same order of magnitude.

6 **Q.** Is there a way to electronically
7 measure that and monitor that?

8 A. You can monitor a magnetic field
9 through the use of a Gauss meter, yes.

10 **Q.** I'm going to skip back, just quickly
11 back to the DB. Are you able to monitor that also
12 electronically?

13 A. Through a sound level meter, yes.
14 Sometimes it's -- it's complicated in an open
15 environment because of wind noise and other things
16 that it may pick up, but yes, technically you can
17 measure sound level.

18 **Q.** And then if you would turn to
19 page 25, lines 22, starting on line 22.

20 A. Okay.

21 **Q.** And there you're talking about --
22 well, wait. Did I get -- I'm sorry. I'm confusing
23 myself. Okay. There you were talking about stray
24 voltage?

25 A. Yes.

1 **Q. Is it possible to electronically**
2 **monitor that stray voltage?**

3 A. Well, I wouldn't call it monitoring.
4 I would call it possibly to -- possible to
5 electronically detect.

6 **Q. Okay.**

7 A. Stray voltage is something you
8 typically don't want, so you don't necessarily have
9 to monitor it.

10 **Q. I understand.**

11 A. But you can detect it and mitigate
12 it, yes.

13 **Q. Okay. But there is equipment**
14 **available to go and do that?**

15 A. Yeah. Yes.

16 **Q. Are you aware that there's been a lot**
17 **of concerns voiced by the landowners regarding**
18 **EMFs, magnetic fields, GPS interference and stray**
19 **voltage?**

20 A. I am.

21 **Q. Would Grain -- is it possible to go**
22 **and set minimum -- or maximum standards for those**
23 **items, so, like, for instance, in noise that there**
24 **would be no -- that coming off the line there would**
25 **be not any more than 45 DB?**

1 A. Who are you talking about setting
2 those standards?

3 **Q. What I -- that to alleviate the**
4 **concerns of the landowners, would Grain Belt be**
5 **willing to go and set target maximum levels for DB,**
6 **magnetic fields, stray voltage? Well, stray**
7 **voltage shouldn't be anything. Would that be**
8 **something that Grain Belt would be willing to do?**

9 A. There's a couple of -- you kind of --
10 it's kind of a weighty, I guess, topic. So there
11 are -- I would say there are no standards that we
12 can abide by. There are means to design to
13 minimize, for instance, noise from radio, but
14 that's dependent upon a lot of environmental
15 factors. So the noise that is produced is
16 dependent upon humidity, wind speed, you know, a
17 number of environmental factors. So it would be
18 very difficult to guarantee a 24 by 7 by 365 kind
19 of maximum. But these are the -- these are the
20 ranges of magnitudes that we are designing to, and
21 these are typical ranges that are designed to in
22 the industry. There are no state statutes that
23 have required.

24 There are certain states, handful of
25 states in this country that do have statutes

1 around -- around those things. But this state or
2 any of the states that we're in do not have
3 specific statutes.

4 **Q. In terms of the states that do have**
5 **statutes, though, how -- from what you know, not**
6 **asking for a legal opinion, do they set a -- do**
7 **they set maximums? Do they set ranges?**

8 A. My understanding is they set maximums
9 typically at the edge of right of way, is typically
10 how it's done, the posts. That's my understanding.

11 **Q. And where the state sets statutes,**
12 **how are -- how are those maximum -- how is the**
13 **transmission line monitored to make sure that it's**
14 **staying within those?**

15 A. I don't know that it's monitored. My
16 understanding is they have to oblige by this
17 through design and design studies, is how that they
18 get the approval for the line. So whether they go
19 back and continually monitor, I do not know.
20 Probably is incumbent upon filed complaint before
21 monitoring occurs.

22 **Q. Now, is it theoretically possible to**
23 **go and set up monitoring stations along the**
24 **transmission line to monitor these issues so that**
25 **it will be in essence an early warning system?**

1 A. Well, it's theoretically possible to
2 set up monitoring stations, yes.

3 **Q. And again, theoretically, what would**
4 **be the spacing of those monitoring stations that**
5 **would tend to make sense?**

6 A. Which -- what are you trying to
7 measure?

8 **Q. Well --**

9 A. Which environmental variable? Any of
10 them?

11 **Q. For an easy answer, all of them.**

12 A. All of them?

13 **Q. It would depend on the -- what you're**
14 **trying to measure and where you're trying to**
15 **measure it from. So if you're interested in noise**
16 **from corona, you would probably want to monitor,**
17 **you know, every few spans at the edge of the right**
18 **of way. If you were concerned about the noise**
19 **from, you know, 1,500 feet away, you would set a**
20 **device 1,500 feet away.**

21 But it just kind of depends on your
22 parameters for what you want to measure where you
23 would set those stations and how many you would
24 set.

25 **Q. In terms of monitoring, what would --**

1 of those parameters, what would -- which of those
2 environmental issues would require the closest, the
3 most frequent monitoring stations?

4 A. Most frequent as in where they're
5 staged?

6 Q. Yes.

7 A. It kind of depends upon your interest
8 and what you want monitored and why you want it to
9 be monitored.

10 Q. Well --

11 A. I'm not trying to be evasive. It's a
12 very broad question and has a lot of it depends
13 answers. So if you want to measure the magnetic
14 fields in the middle of every span at the height of
15 a human head, you would need to put a monitor at
16 the height of a human head in the middle of every
17 span along the transmission line.

18 If you wanted to measure the magnetic
19 field at the edge of the right of way for a -- for
20 a typical span, you might pick one span along at
21 transmission line and set a Gauss meter there.

22 So it just really depends on what you
23 monitor and what you're trying to get out of the
24 data.

25 Q. That's fine. I'm just trying to

1 establish that the technology is feasible and that
2 it is possible. The specifics I'm not trying to
3 work into.

4 Now, do you intend on these towers to
5 have cellular monitoring, like, for instance,
6 monitoring stations along your towers hooked into a
7 cellular system?

8 A. No.

9 Q. No. So there will be -- along the
10 line and none of the towers would have monitoring
11 stations just for your own tracking of stability or
12 the safety of the system?

13 A. No. All that detection, the
14 necessary detection occurs at the end points.

15 Q. Okay. But is it possible to go and
16 do put monitoring stations at the towers with --
17 and do that through a cell coverage? Like we were
18 talking, let's say monitoring DB noise. So if you
19 say, okay, every mile that we're going to monitor
20 noise coming off the line, how would you
21 implement -- would cell -- basically putting a cell
22 transmitter on the tower, would that be how you
23 would accomplish it?

24 A. Well, so if your desire is to measure
25 noise and do it and have some sort of remote data

1 acquisition capability, I imagine you might could
2 do that through cellular or some other means of
3 communication by which that data would be sent to
4 whoever is monitoring.

5 **Q. Okay. Are your towers capable of**
6 **doing signal, basically data collection lines, like**
7 **signal lines for monitoring?**

8 A. The towers are just kind of --
9 they're essentially dumb steel.

10 **Q. No, no. I understand that. I mean,**
11 **are they -- are you able to run a separate line to**
12 **monitor signals?**

13 A. A separate line to monitor signals?

14 **Q. Right. To do data collection. I'm**
15 **just trying to define --**

16 A. So this is really in the realm of
17 very abstract stuff.

18 **Q. Okay.**

19 A. But you could -- for instance, one of
20 the static wires will be optical wire, so it will
21 have fiberoptics embedded in it for use for
22 communication between the stations. So
23 theoretically you could, you know, utilize some
24 dark fiber that was available to transmit data from
25 the middle of the line back to whoever wanted it,

1 you know.

2 Q. Okay. Thank you. That's exactly
3 what I wanted to know. Thank you

4 Very quick question for you. I'm
5 familiar with AC circuits on a very general level.
6 So, for instance, if you wanted to run, you know,
7 240, you basically run two conductors. 480 you
8 run four. That's kind of how you build up your
9 voltage. Is it possible to go and carry 600 kV DC
10 using two 300 kV DC lines?

11 A. So I'm trying to think of how to
12 repeat your question. Are you asking about the
13 capacity capability? Because voltage is not
14 necessarily a capacity. It's not apples and
15 oranges. I'm trying to understand what you're
16 getting at.

17 Q. Okay.

18 A. Are you asking can we move
19 3500 megawatts on two 300 plus minus 300 kV HV
20 lines?

21 Q. Yes.

22 A. Okay. I don't -- I think the losses
23 would not be favorable to do that because the lower
24 voltage you have higher current. But you would
25 probably -- at 300 kV you would probably need at

1 least two projects to move 3500 megawatts in an
2 efficient manner.

3 **Q. So when you say two projects --**

4 A. Well, two lines.

5 **Q. Two lines?**

6 A. Two lines. Two plus or minus
7 300 kV circuits.

8 **Q. Now, what is the -- do you know the**
9 **cost per mile of the transmission line, what the**
10 **cost will be?**

11 A. Right now, we anticipate that it's
12 between a million and a half and \$2 million per
13 mile. And Mr. Berry I think has those numbers in
14 his analysis.

15 **Q. And are you familiar with the**
16 **Northeast Energy Link Project?**

17 A. Vaguely.

18 **Q. Vaguely. Okay. And that will be --**
19 **are you familiar that it's going to be a buried**
20 **line?**

21 A. I'm familiar that there was
22 discussion of burying it, yes.

23 **Q. Perchance do you happen to know what**
24 **the cost per mile on that project is going to be?**

25 A. I do not.

1 JUDGE BUSHMANN: Mr. Drag, I just
2 wanted to check to see about how many questions you
3 think you might have.

4 MR. DRAG: I'm pretty close to done.
5 May I approach the witness?

6 JUDGE BUSHMANN: You may.

7 BY MR. DRAG:

8 Q. I am showing you this table. Can you
9 read the heading of that?

10 A. The heading says, What would burial
11 of high-voltage transmission lines cost?

12 Q. And there's a column there that talks
13 about the Northeast Energy Project?

14 A. Yes. The Northern Pass Project?

15 Q. Yeah. Not the Northern Pass.

16 A. Oh, Northeast. There it is. Sorry.
17 Yes.

18 Q. And if you go down, what's the cost
19 per mile on that?

20 A. 5.7 million per mile.

21 Q. And from your experience, does that
22 appear reasonable for a -- for the size line? Now,
23 that line is smaller.

24 A. So I'm not a hundred percent sure of
25 the technology they're using for this.

1 Q. Okay.

2 A. So it really depends on the type of
3 cable they proposed and where they're actually
4 burying it. So I would think that would be on the
5 very low end of typical underground costs.

6 Q. That's good. Thanks. Now, I was
7 asking that because there's been -- just trying to
8 set a benchmark for costs. So --

9 A. It's highly dependent upon the type
10 of cable and the ground.

11 Q. But that helps us, because numbers
12 have been all bantered around.

13 MR. DRAG: If it's acceptable, your
14 Honor, we could pause at this -- I mean, it's
15 11:52.

16 JUDGE BUSHMANN: All right. Why
17 don't we take a break for lunch. We'll be in
18 recess until 1 o'clock.

19 (A BREAK WAS TAKEN.)

20 JUDGE BUSHMANN: I believe where we
21 left off, Mr. Drag was questioning.

22 MR. DRAG: Thank you, your Honor.
23 May I approach the witness?

24 BY MR. DRAG:

25 Q. Dr. Galli, I handed you back a

1 document, Overhead/Underground DC Transmission?

2 A. Yes, you did.

3 Q. I'd like you to turn to the page with
4 the yellow tab. We discussed this page before, the
5 HVDC conductor bundles; is that correct?

6 A. That is correct, yes.

7 Q. Okay. Now, in the -- you filed an
8 amended response to Reicherts' second data request,
9 and in it we asked you, describe -- let me back up.

10 Please describe the maximum load
11 above 600 plus kV DC stated in the application that
12 the physical plant for the project can carry. Do
13 you remember that question?

14 A. Vaguely, yes. Could I --

15 Q. I will put it up here. And you
16 responded to that question that the -- that the
17 nominal voltage is plus or minus 600 kV and that
18 there's a 5 percent overvoltage. Do you stand by
19 what you stated up there under response, under the
20 first data request?

21 A. Yes. So typical -- typical design
22 would be an approximately 5 percent overvoltage
23 design.

24 Q. Okay. Do you still agree --

25 A. So 632 is slightly above that.

1 Q. And you still agree with that?

2 A. Yes.

3 Q. Now, going -- turning back to the
4 HVDC conductor bundles, at the 500-meter altitude,
5 the three conductor bundle is slightly below the
6 600 kV. Do you see that?

7 A. Yes.

8 Q. Would it make more sense to ensure
9 that you did not exceed the 45 DB maximum to have a
10 four conductor bundle since you have an overage of
11 32 kV at maximum?

12 A. Not necessarily, because you wouldn't
13 typically operate at 632. That's typically a
14 temporary operating range if you operate that high.
15 And again, at 500 meters, that's well over
16 1,500 feet. There are a lot of other parameters
17 that play into whether you do triple or quad
18 bundles.

19 Q. Right. But these lines are going to
20 be about -- I think you stated that they would be
21 about 35 feet off the grounds --

22 A. That is --

23 Q. -- with sag?

24 A. That is -- that is the safety
25 clearance requirement they have to meet. So fully

1 loaded lines on a hot summer day, you would expect
2 that they should not be any closer than 35 feet.

3 **Q. Okay. So -- so based on that, isn't**
4 **the three conductor bundle a little bit on the low**
5 **side to ensure that you are not going above the**
6 **45 DB?**

7 A. No. I don't agree with that, because
8 this chart is a handy reference based on very
9 generic examples. You have to take into account
10 very specific parameters around the design of the
11 line, the altitudes that you're at and that sort of
12 thing. And we've actually done that, and the
13 triple bundle conductor is the optimum conductor
14 that we selected.

15 **Q. Okay. And is that information**
16 **available in --**

17 A. Yeah. I believe either in a data
18 response, I believe that we provided studies that
19 were done around this.

20 **Q. Okay. Thank you. I want to do**
21 **another follow-up question about the buried lines.**
22 **What is the reliability of a buried line versus an**
23 **overhead?**

24 A. Could you define what you mean by
25 reliability?

1 **Q.** Okay. In terms of ongoing
2 maintenance costs, a -- what does an overhead
3 line -- let's take a reference point of a 300 kV DC
4 line versus a 300 kV DC buried line. What would
5 have a lower ongoing maintenance cost?

6 A. There's not significant experience
7 with a lot of buried lines, DC buried lines, so
8 it's really hard to answer that question. In a
9 case of ongoing maintenance, when or if you have a
10 failure, a cable takes weeks to repair because you
11 have to locate the failure and you have to
12 excavate. You have to splice and repair the
13 failure.

14 Whereas, an overhead transmission
15 line, if you have a failure, it's typically a
16 matter of days if it's a minor failure or less to
17 repair it.

18 **Q.** Okay. And on that subject, if -- my
19 understanding is -- is that if an underground line,
20 if you have a bipolar system and if one line goes
21 out, depending on the break, you can -- that
22 there's issues of grounding, correct?

23 A. I don't understand the question.

24 **Q.** Okay. This is kind of over my head.
25 Just for informational purposes, from what I read

1 in the literature is that on an under-- is it true
2 on an underground line -- or let me strike that.

3 In the event of a break in the lines
4 on either a -- on a tower, if one -- on a bipolar
5 line, if one line goes out, needs repair in either
6 a tower situation or an underground situation, do
7 you still have -- are they equivalent risks of
8 ground fault, you know, ground -- leakage of
9 current into the ground? Does that make sense?

10 A. Assuming both had a metallic
11 return -- I'm not sure I fully understand the
12 question. But assuming both have the metallic
13 return, the fault currents are -- typically would
14 be limited by the amount of power that's being
15 pushed through the cables and/or the overhead
16 conductors, and so they would probably be very
17 similar in nature.

18 Q. Okay. Thank you. Just
19 clarification. Can you turn to your surrebuttal,
20 page 31, lines 9 through 11. Okay? Do you have
21 that?

22 A. Page 31, line through 11, yes.

23 Q. Yes. You have a statement that
24 your -- that Grain Belt will file a storm
25 restoration plan?

1 A. We would file a storm restoration
2 plan with the Commission.

3 **Q. For a layperson, can you explain what**
4 **that contains?**

5 A. Yes. Typically storm restoration
6 plans are -- are a set of documents and obligations
7 to fulfill to restore a project after, for
8 instance, a severe storm when towers or conductors
9 may be out of service or downed.

10 That plan would include any mutual
11 aid agreements you may have with neighboring
12 utilities. It would probably include contracts
13 that you have in place for emergency response from
14 qualified suppliers and things of that nature,
15 safety protocols as well, company safety protocols,
16 that sort of thing.

17 **Q. Okay. Thank you. In the storm**
18 **restoration plan, are there any items of relevance**
19 **to the landowners?**

20 A. In the plans that I've been involved
21 with, the storm restoration plans include access
22 points, you know, means to access particular
23 parcels if there is a special access point where
24 the access is via the right-of-way, that kind of
25 thing. So that, in my experience, has been kind of

1 what is typical with them. I wouldn't say it's --
2 that's as specific as it would get to landowner
3 interaction.

4 **Q. In terms of the access points, do you**
5 **negotiate those with the landowners before you file**
6 **the storm restoration plan?**

7 A. Yes. All access would be negotiated
8 primarily during construction. So you plan for
9 both construction access, which is always
10 negotiated, and then you also plan for permanent
11 access for maintenance activities and storm
12 restoration. So that would all be negotiated at
13 some point in the future.

14 **Q. Now, in terms of a -- there's been**
15 **prior discussion about storm water pollution**
16 **prevention?**

17 A. Right.

18 **Q. Does -- are there any terms of that**
19 **that are applicable to the landowners?**

20 A. Not to my knowledge. This is -- SWPP
21 permits, the way I understand them, and I'm not an
22 expert on this, but my understanding of them is
23 that these are a construction permit that typically
24 issue by departments of natural resources for
25 states, things like that, that -- where you lay out

1 your plan for storm water prevention during
2 construction and your plan for, I guess,
3 essentially restoration afterwards, so silt fences,
4 for instance, things like that to prevent silt
5 runoff, things like that.

6 Once construction is complete, then
7 it is -- that permit is essentially expired. So --
8 and again, that's my understanding. So I don't
9 know that there's anything specific to landowners
10 in that -- that permit.

11 **Q. Now, my familiarity with storm water**
12 **pollution prevention plans is from an industrial**
13 **facility perspective, and they have to do -- to**
14 **file -- do that on an annual basis. Will you have**
15 **to be maintaining a storm water permit on an annual**
16 **basis in the event of repairs?**

17 A. I don't know. I've not seen that in
18 the industry. It's typically construction permit
19 for transmissions.

20 **Q. Okay.**

21 A. But I don't know for sure.

22 **Q. Thank you. If you would please turn**
23 **to, in your surrebuttal, page 29, line 7 through**
24 **14, and you discuss in there your -- you're making**
25 **a response about irrigation systems. What -- what**

1 **is the minimum distance that water spray has to be**
2 **kept from the lines or towers?**

3 A. Are you asking if there's a standard
4 or --

5 **Q. Standard, best practice or what Grain**
6 **Belt would --**

7 A. I would -- in an abundance of caution
8 as used by another witness in this case, I would
9 say you would want it to be as far as possible, but
10 probably you would be reasonable in that you would
11 not have the stream come into contact with it.

12 Typical safety clearances usually
13 have what they refer to as about an 18-foot hot box
14 around a conductor. So you thought about an
15 18-foot radius around the conductor bundle, that
16 would -- you probably would not want to encroach on
17 that from an OSHA perspective.

18 **Q. Okay. Thank you. Now, in your**
19 **surrebuttal, page -- starting on page 29, line 7**
20 **going through 31, line 4, you talk about a number**
21 **of environmental issues, EMF, magnetic fields.**

22 MR. ZOBRIST: I'm sorry. What page
23 is that?

24 BY MR. DRAG:

25 **Q. Starting on page 29, line 7. There's**

1 a number of questions regarding magnetic fields.
2 Actually, it starts even prior to that. Starts on
3 28, line 13.

4 So these questions are really related
5 to safety concerns. They're not -- the first one
6 is on crop dusting. What would be the minimum
7 distance that a plane would have to maintain from
8 the towers, do you know?

9 A. I don't see a question on crop
10 dusting. I'm sorry.

11 Q. No, there isn't. But you were
12 generally talking about safety issues, and since
13 you're knowledgeable about the transmission lines
14 and safety issues, I'm just trying to establish,
15 what is the safe distance a plane would have to
16 maintain from transmission lines, from your
17 perspective?

18 A. Well, I'm not a pilot. My
19 understanding is aerial applicators fly extremely
20 close to the ground. But again, I think from a
21 safety perspective, subject to check on the 18-foot
22 distance, but this hot box that I mentioned within
23 18-foot diameter around the 600 kV line would be
24 the closest that you would want to approach that
25 line without specific safety gear.

1 Q. Okay.

2 A. Specifically the conductor, not just
3 the tower. Specifically the energized conductor.

4 Q. So a crop-dusting plane would not
5 have to stay outside of the right of way? You
6 know, you have a 200-foot right of way, 150 to a
7 200-foot right of way. They could theoretically go
8 closer to dust the fields?

9 A. I would think so, but again, I'm not
10 a pilot.

11 Q. As long as they maintained that
12 18-foot roughly?

13 A. (Witness nodded.)

14 Q. Okay. That's helpful. Thank you.
15 Now, one of the new technologies that's coming
16 along is drones. So would that same safety
17 criteria apply to drones, the use of drones?

18 A. I would think potentially, yes. I
19 mean, there's not personnel safety associated with
20 drones, unless it falls on somebody, but there -- I
21 would typically -- that's just a typical safety
22 clearance distance. So perhaps it would apply.
23 But I would -- drones are new beasts, so it's kind
24 of hard to really answer that question.

25 Q. Now, has there been any studies

1 **related to drone usage around high voltage DC**
2 **lines?**

3 A. I don't know of any studies
4 pertaining specifically to drones around DC lines.
5 I do know that there are a number of companies now
6 that are utilizing drones for power line inspection
7 as opposed to personnel in helicopters, things like
8 that.

9 So -- and I do know that subject --
10 they -- commercially, this is still not approved by
11 the FAA, but that, you know, they get close enough
12 to inspect insulators and things like that. So
13 they're within very close distance. Of course,
14 that is the company inspecting the T line, not an
15 agricultural drone per se.

16 **Q. And those are -- are those**
17 **transmission lines AC or DC?**

18 A. The ones that I'm familiar with using
19 drones are only AC.

20 **Q. Would there be any kind of**
21 **differences in interference with the radio signals**
22 **between an AC versus a DC line?**

23 A. No.

24 **Q. One question on that follow-up**
25 **question about the drone usage. The technology is**

1 changing so rapidly. Who would have thought we
2 would be using drones to do farming? What is your
3 opinion -- and this is strictly from your
4 perspective as a technical person. What is your
5 opinion regarding the lock-in that transmission
6 lines cause into -- let me strike that. Let me
7 back up.

8 In the public hearings there were a
9 lot of concerns about locking in the farmers into
10 technologies as of 2014. One of the issues that
11 was brought up is oncoming usage of drones. How --
12 from your perspective, how do you see the
13 transmission line hindering the use of future
14 technologies in farming?

15 A. Specifically around drones, you know,
16 one of the biggest challenges that developers of
17 drones have is battery life and payload capability.
18 So I don't see transmission lines as being a
19 hindrance for use of -- you know, the area
20 underneath the transmission line from a drone
21 perspective as being any hindrance whatsoever.

22 Q. On existing lines, has there ever
23 been discussions or negotiations between landowners
24 and the power companies regarding use of new
25 technology that the existing lines have prevented?

1 Do you know of anything like that?

2 A. You kind of lost me.

3 Q. That's fine.

4 A. Could you reask that?

5 Q. Where there have been existing lines
6 and has there been any instances where those lines
7 have pre-- that you know of have prevented the use
8 of newer technologies, bigger equipment, et cetera?

9 A. To my knowledge, I've never
10 encountered that.

11 Q. Thank you. Now, if you'd turn back
12 to page 31 of your surrebuttal, again lines 7
13 through 11, and you're talking about repairs. What
14 is the risk of soil compaction when doing repairs
15 on the line?

16 A. I believe we have a witness that
17 talks more specifically about soil compaction,
18 but -- and I'm far from an expert on it, but a lot
19 of it would depend upon the nature of what's going
20 on during the time of restoration. If the ground
21 is frozen, to my knowledge, it would be less
22 likely. If the ground is muddy, then you probably
23 have bigger concerns that need to be restored, to
24 restore the ground.

25 Q. So there is a risk?

1 A. Yes, there is a risk.

2 Q. Okay. Generally when you do repairs,
3 are you using heavy track vehicles or is it
4 strictly trucks?

5 A. Depends on the nature of the repair.
6 So if a tower has come down, for instance, then --
7 and you have to get a crane out there to replace a
8 tower, you would have a heavier piece of equipment.
9 If it's repairing and splicing a conductor, it's
10 probably just some bucket trucks, things of that
11 nature.

12 Q. Now, I know I handed you the easement
13 agreement. How familiar are you with that easement
14 agreement?

15 A. I've read it once or twice or three
16 times in the past, but it's been a long time since
17 I've read it.

18 Q. Do you recall if there was any
19 statement in there about mitigating the damages
20 caused from repairs?

21 A. I don't recall specifically if there
22 was.

23 Q. Do you want to see the easement
24 agreement?

25 A. That would --

1 Q. May I approach?

2 A. I guess I should ask if you want me
3 to see it.

4 Q. Exhibit 556, if you --

5 A. Oh, do you want me to look for it?

6 Q. Yeah, if you see anything. Don't
7 spend a lot of time. I mean, if it just refreshes
8 your memory if there is or isn't.

9 A. Sir, just a quick glance here --

10 MR. ZOBRIST: I'm sorry. Was there a
11 question?

12 MR. DRAG: I'm just trying to
13 establish whether or not there is a clause in the
14 agreement that states that ongoing damages to the
15 right of way will be mitigated.

16 MR. ZOBRIST: Well, I'm just saying
17 respectfully if you could direct him to the right
18 section. It's a five-page document, and he's not
19 our development witness.

20 MR. DRAG: Okay. I'm sorry.

21 MR. ZOBRIST: That's all right.

22 Thank you.

23 BY MR. DRAG:

24 Q. I'll just leave it at that. I'll
25 withdraw that question.

1 Okay. This is the -- I'm sorry.
2 This is our -- your amended response to Reicherts'
3 second set of data requests. If you look at Data
4 Request 2, we ask what kind of modifications will
5 be required to upgrade physical plant to go above
6 600 kV. And can you -- on reading that response
7 there, do you still agree with that response, which
8 is --

9 A. I do.

10 Q. So can you read -- would you please
11 read the last two sentences, starting with
12 modifications?

13 A. Modifications to operate at a higher
14 voltage would likely be significant as all
15 clearances would necessarily have to be increased
16 and substation equipment insulation requirements
17 increased as well. Increased clearances from
18 conductor to towers would be required, resulting in
19 additional insulation in the towers and longer
20 lines and likely resulting in taller towers.

21 Q. Now, I know you're a facilities
22 individual, but would upgrading to -- to your
23 knowledge, and not being a legal opinion, would
24 upgrading require you to come back before the PSC
25 for --

1 MR. ZOBRIST: Well, Judge, that is a
2 legal question, so I object. It calls for a legal
3 conclusion.

4 MR. DRAG: I'll withdraw the
5 question. I'm sorry.

6 BY MR. DRAG:

7 Q. And then so finally, just if you can
8 turn back to Exhibit 556, and on the very first
9 page of the agreement, line -- Section 2,
10 paragraph B --

11 A. Okay.

12 Q. -- and it states, The easement
13 includes rights to construct, reconstruct, repair
14 and expand with the easement. So this would give
15 you the authority to expand, correct, if you wanted
16 to replace towers?

17 A. That would be my lay understanding.

18 Q. That's fine. That's all I'm asking
19 is your lay understanding.

20 This is more -- this is just a
21 follow-up to get the information to the reference
22 point, what we were talking about earlier about
23 burial costs. I'm going to hand you back a
24 document.

25 MR. DRAG: May I approach the

1 witness?

2 JUDGE BUSHMANN: You may.

3 BY MR. DRAG:

4 Q. I am handing the witness the
5 document, What would burial of high voltage
6 transmission lines cost? Before you said that
7 burial -- while it varied, the burial would be --
8 before you said that the -- under the burial, while
9 it would vary, the 5.7 million per mile was
10 within -- maybe on the low side, if I remember.

11 A. I think that was correct.

12 Q. Okay. Just so we have a point of
13 reference, can you give the length and capacity of
14 that line?

15 A. For the northeastern energy link?

16 Q. Yes.

17 A. The length is 230 miles, and the
18 rating is 1100 megawatts.

19 Q. Okay. Good. And just -- this is, I
20 think --

21 A. There's no specification of voltage,
22 though.

23 Q. Thank you. If the -- if you were
24 burying the line, if you were burying two 300 kV DC
25 lines, assuming we're using 5.-- that's a 300 kV DC

1 line. Assuming that you were putting two lines
2 down, what would be the increase in cost? Would it
3 be like 50 percent higher, just from your
4 experience?

5 A. So from a reliability perspective you
6 would not put both lines in the same trenches. So
7 the cost would be roughly the same per mile for the
8 second line.

9 Q. Okay.

10 A. So you would be over \$11 million per
11 mile, based on this assumption.

12 MR. DRAG: Thank you. I have no
13 further questions. Thank you for your time. I
14 appreciate it.

15 THE WITNESS: Thank you.

16 JUDGE BUSHMANN: Show-Me Concerned
17 Landowners?

18 MR. JARRETT: Thank you, Judge.

19 CROSS-EXAMINATION BY MR. JARRETT:

20 Q. Good afternoon, Dr. Galli.

21 A. Thank you. Good afternoon.

22 Q. I'm Terry Jarrett, and I represent
23 the Show-Me Concerned Landowners and the Farm
24 Bureau, Missouri Farm Bureau in this case.

25 And I'll give you same disclaimer

1 that Mr. Drag gave you. I'm not an engineer. So
2 if I ask any inartful questions or you need one of
3 my questions restated or clarified, you will not
4 hurt my feelings at all.

5 A. Okay. Very good.

6 Q. I want to start with your surrebuttal
7 testimony, so if you've got a copy of that here --

8 A. I do.

9 Q. -- right there in front of you.
10 Specifically page 18, and down there at line 16
11 where the question begins, question there is, Has
12 Grain Belt Express recently received the PJM system
13 study -- impact study, SIS report? And your
14 response is yes, you received it on October 1st; is
15 that correct?

16 A. That is correct.

17 Q. And then you attached a copy of that
18 study as a schedule to your surrebuttal, correct?

19 A. That is correct.

20 Q. And your surrebuttal was filed on
21 October 14th; is that correct?

22 A. Yes, that's correct.

23 Q. Do you know when these studies were
24 released by PJM? Do they make them public and put
25 them on its website?

1 A. Yes, typically.

2 Q. And then I know it's on Grain Belt's
3 website as well. Do you know about when that was
4 put on Grain Belt's website?

5 A. I don't.

6 Q. Going -- starting on line 20, the
7 next question where it asks about system upgrades
8 to accommodate the interconnection of Grain Belt
9 Express to PJM, do you see that?

10 A. Starting at line 20?

11 Q. At line 20.

12 A. Yes.

13 Q. And then you -- you indicate there
14 that there were some system upgrades, going on to
15 the next page, to the Sullivan/Reynolds 765 kV
16 line, and that is a \$500 million -- has a
17 \$500 million price tag on it?

18 A. That's correct.

19 Q. And are these -- is this a network
20 upgrade required to interconnect the project to the
21 grid?

22 A. Yes.

23 Q. And then you also identify two other
24 upgrades, one at the Dumont station at a cost of
25 1 million, and then one at the New Reynolds 345 kV

1 **station, correct?**

2 A. Yes. Those are subject to final
3 coordination with the neighboring RTOs.

4 **Q. Okay. And you indicate -- the study**
5 **doesn't provide any estimate, but you estimated it**
6 **at 5 to 10 million?**

7 A. I would have to check the study,
8 because I don't know that we made those numbers up
9 or they were probably told to us by PJM if they
10 were not in the study, but they should be in the
11 study.

12 **Q. Well, it says no estimate has yet**
13 **been provided, so does that refresh your memory?**

14 A. Can you point me to that language?

15 **Q. Yes. It's on that second bullet on**
16 **page 19.**

17 A. Oh, for the second upgrade?

18 **Q. Yeah.**

19 A. So reworking a break arrangement and
20 line arrangement I believe it was 345. So the
21 first one has an estimated cost. And the second
22 one they had not provided it because that does
23 require coordination with MISO, and -- but based
24 upon similar upgrades in the system, a lot of that
25 information is publicly available through the

1 regional planning activities and that nature, and
2 so we estimated it based off of that.

3 Q. All right. And then on page 20,
4 there at the top of the page, there are some other
5 additions, upgrades, I mean, that you estimate that
6 PJM is estimated to be about 3.447 million; is that
7 correct?

8 A. Yes. These -- these are what they
9 refer to as the attachment facilities, so they're
10 are not necessarily what I refer to as network
11 upgrades. The attachment facilities are actually
12 what's required to physically connect our
13 conductors to the PJM system, so expansion of the
14 Sullivan substation, et cetera.

15 Q. Got you. And are all -- is Grain
16 Belt Express responsible for the cost of all of
17 those upgrades that we've talked about?

18 A. We are.

19 Q. Okay. I want to refer you to your
20 schedule, AWG-10.

21 MR. ZOBRIST: I'm sorry. AWG?

22 MR. JARRETT: AWG-10. That's the PJM
23 impact study report.

24 BY MR. JARRETT:

25 Q. Now, it refers to queue position

1 X3-028. So X3-028 is the Grain Belt Express
2 project?

3 A. That is correct.

4 Q. And going to page 3 of that document,
5 and I believe you talked about that this is the --
6 the interconnection that we talked about
7 3.447 million already?

8 A. That's correct.

9 Q. Okay. And let's go to page 5.
10 Page 5 starts off with network impacts.

11 A. Yes.

12 Q. And then the first -- there's a table
13 there, but the heading above that table is
14 generator deliverability, and then underneath that
15 it says single or N minus 1 contingencies for the
16 capacity portion only of the interconnection.
17 Well, what does this table tell us?

18 A. So this is in the interconnection
19 process. There are two numbers you typically file.
20 One is the megawatt size capacity of the project in
21 total, and then if you wish, you can ask for a
22 certain amount to be considered as capacity.

23 So in our initial request that
24 capacity number is 1500 megawatts. And so that
25 means if they want to consider that injection of

1 1500 megawatts, it has to be deliverable to PJM
2 under all circumstances. And so this is listing of
3 the various contingencies that they are studying
4 only for that capacity portion of the project.

5 Q. Okay.

6 A. And that allows you to bid into the
7 capacity market as opposed to just the energy
8 market.

9 Q. All right. Would you turn now to
10 your Appendix 1 -- not your Appendix 1, but the
11 report's Appendix 1. Excuse me.

12 A. Yes.

13 Q. I believe that's on page 1 of the
14 report.

15 A. I'm there.

16 Q. Okay. And there that looks to me
17 like that is the same line that is listed on No. 1
18 on that table on page 5, the 05 Meadow-05 Reynold
19 345 kV line?

20 A. Yes. I'm making sure the contingency
21 is the same. Yeah, it appears to be the same
22 monitored element and contingency element.

23 Q. And there at the last sentence there
24 under that -- in that first paragraph it says, this
25 project contributes approximately 116.11 megawatts

1 to the thermal violation. What does thermal
2 violation mean?

3 A. Sir, that would be violating the
4 thermal limit of the transmission line.

5 Q. And is that a NAERC standard, North
6 American Electrical Reliability Council?

7 A. The rating of the transmission line
8 is not a NAERC standard. That's determined by the
9 utility.

10 Q. Well, but the overheating of the
11 equipment -- a thermal violation is a NAERC
12 violation, is it not?

13 A. In what context are you -- in a
14 planning context?

15 Q. In any context. If -- well, in
16 operational context, if --

17 A. It's potentially a NAERC violation.
18 It's not necessarily a NAERC violation. Because if
19 corrective measures can be taken, then you have not
20 violated some criteria you're operating under.

21 Q. I'm just saying, I mean, the report
22 says this project contributes approximately
23 116.11 megawatts to the thermal violation, so...

24 A. That's using the term violation there
25 relative to the rating of the transmission line.

1 **Q.** All right. Let's go back to page 5
2 in that table again. Let's start with No. 1. It
3 talks about the loading. If you go further over to
4 the right, the heading loading --

5 A. Yeah.

6 **Q.** -- and it has initial of 89.4 and
7 final of 101.28 --

8 A. Correct.

9 **Q.** -- is that correct?

10 A. That is correct.

11 **Q.** What does that mean?

12 A. So this is the initial loading in the
13 base case of the system study was looking at --
14 again, this is for the capacity portion, so they
15 were injecting 1500 megawatts into the Breed 345 kV
16 substation from our project, the Grain Belt
17 project. The initial loading of that line, the
18 Reynold -- Meadow to Reynolds line was at
19 89.4 megawatts.

20 **Q.** Okay.

21 A. When they took the contingency, which
22 is -- I don't have the name of the line there, but
23 it's opening a certain line on the system labeled
24 in the third column as 4689 underscore B2
25 underscore TOR15257. When they take the

1 contingency of that line, that means they take that
2 line out of service, the Meadow to Reynolds line
3 loading goes from 89.4 to 101.28.

4 Q. Okay. And I guess that's the
5 question I wanted to ask you is, the facility
6 description is -- it is what? That's the -- what
7 they're testing?

8 A. That's what's typically referred to
9 as the monitored element. So it's the element that
10 you're concerned about overloading under a
11 particular contingency.

12 Q. And so in Appendix 1, it indicates
13 that there's a thermal violation of whatever it
14 was, 116.11 megawatts. Does that then kick into a
15 contingency to do away with the thermal violation?
16 Is that what that is?

17 A. I don't understand what you mean by
18 kick in the contingency.

19 Q. Well, if you have a thermal violation
20 at this -- at this spot, don't you have to take
21 mitigation measures to do away with the thermal
22 violation?

23 A. Yes.

24 Q. Okay. And isn't -- isn't the
25 contingency there, isn't that the way to solve that

1 thermal violation?

2 A. No.

3 Q. What would you do to solve the
4 thermal violation?

5 A. So thermal violations are solved by
6 the upgrades that were recommended by PJM in the
7 system impact study.

8 Q. So when it says this project
9 contributes approximately 116.11 megawatts to the
10 thermal violation, it's not causing the thermal
11 violation, it's helping it?

12 A. No.

13 Q. Okay. I -- like I said, I'm not an
14 engineer. So explain to me what that means.

15 A. So the contingency is -- is that in
16 the base case study, as you mention on page 5,
17 we're looking at the capacity, the ability to have
18 1500 megawatts of capacity.

19 So in the initialization of the
20 study, the project is dispatched to 1500 megawatts.
21 Then they take -- they look at the loading on this
22 Meadows to Reynolds line, and it's at roughly
23 9 megawatts.

24 Then in the model they take the
25 contingency. That means they take that second line

1 out of service. So the contingency, we see in this
2 kind of archaic code under the paragraph in the
3 next line, it says contingency and it gives the
4 definition of a contingency.

5 **Q. Right.**

6 A. Okay. So they take that contingency,
7 they resolve the case, and they notice the
8 overload. Whereas, sans the project or without the
9 project, if they ran that contingency they wouldn't
10 see the overload.

11 So it's the project plus the
12 contingency creates the overload. They identify
13 that overload, and then they identify mitigations
14 for those overloads in the study. So the
15 appendix -- appendices are pointing out details
16 around the contingencies on the system that they
17 studied that drove the upgrades that they
18 identified as being required to allow the project
19 to interconnect.

20 **Q. Got you. So when we're talking about**
21 **these on this first table on page 5, then we go**
22 **over to multiple facility contingencies on the next**
23 **page, and there's 12 of them there. If you go**
24 **through all of these appendices, they list thermal**
25 **violations for each facility. Would that apply to**

1 all of these tables?

2 A. Yes.

3 Q. And so they identify the problem and
4 then part of this is figuring out what upgrades are
5 needed to solve these problems?

6 A. That's correct.

7 Q. Page 7, under the steady state
8 voltage requirement -- well, first of all, before
9 we go to there, right at the very top of page 7, it
10 says that AEP submitted a supplemental project to
11 completely rebuild the Breed 345 kV station. The
12 Breed station rebuild will utilize new 63 kA
13 breakers.

14 Is that one of the upgrades that's
15 identified in this study or is that an additional
16 one?

17 A. No, I believe that's currently in
18 AEP's capital expenditure.

19 Q. Okay. So Grain Belt Express isn't
20 responsible for that?

21 A. That's correct.

22 Q. Now, let's go to the steady state
23 voltage requirement in here. And there's a table,
24 but then there's a note it says underneath there.
25 Note: For the contingencies above involving the

1 loss of the Rockport-Jefferson 765 kV line, there's
2 an operating procedure in PJM manual MO3 which
3 states to reduce the Rockport generation to
4 50 percent, paren, assumed to be approximately
5 1310 megawatt total output, end paren, to prevent
6 stability issues on the system, period. This was
7 modeled and tested, period. There is still a
8 voltage collapse for the above contingencies while
9 the Rockport generation is reduced to 50 percent of
10 the total output. This is due to the dispatch and
11 contribution of X3-028, which is the Grain Belt
12 project, correct?

13 A. Correct.

14 Q. What is a voltage collapse in this
15 context?

16 A. In simple terms, it is essentially
17 you have too much power transferred across a line
18 or into an area and that causes a voltage drop that
19 cannot be recovered from.

20 Q. All right. And is that addressed in
21 one of the upgrades identified in the PJM study?

22 A. Yes.

23 Q. And then the next paragraph, the last
24 two sentences states, If another contingency occurs
25 on the nearby system with an impact on Rockport

1 plant, mechanical power of the Rockport plant shall
2 be reduced permanently to 50 percent to alleviate
3 system instabilities, period. At this point system
4 will be operating under an N minus 2 or N minus 1
5 minus 1 conditions with Rockport plant at
6 50 percent.

7 What are N minus 2 or N minus 1 minus
8 1 conditions?

9 A. So in the system planning, we're all
10 in the operational world. You're always worried
11 about what happens next, and that's in terms of
12 contingencies. So in very basic terms, the
13 N minus 1 contingency means you've lost one element
14 of the system. So that could be a line, a
15 transformer, a breaker, that kind of thing.

16 And NAERC TPL standards require that
17 your system always be planned so that it is N minus
18 1 secure at least from a planning perspective.

19 Then there are other levels of
20 contingencies that are -- as engineers are risk
21 averse, and we want a reliable system that you
22 typically study and look at, such as N minus 2,
23 which means you simultaneously lose two elements on
24 the grid. So that could be two transmission lines
25 or two transformers, for example.

1 So oddly enough, N minus 1 minus 1
2 does not equal N minus 2, but what that means is
3 the first N minus 1 is you've lost a transmission
4 line or element on the system. You have time to
5 then correct the system.

6 So, for instance, if that N minus 1
7 creates a thermal violation on a transmission line,
8 thermal overload on the transmission line, there is
9 a period of time where you can redispatch the
10 system, and then you take the second contingency.

11 So it's meant to more or less reflect
12 how things happen operationally, because N minus 2
13 are typically not as common as the ability to take
14 a con-- have a contingency occur, readjust the
15 system before a second contingency occurs.

16 **Q. What does it mean when it says that**
17 **the mechanical power of the Rockport plant shall be**
18 **reduced permanently to 50 percent in that scenario?**
19 **Does that mean forever?**

20 A. I think while those conditions exist.

21 **Q. And then the next page, page 8, the**
22 **second heading there is MISO impacts, and it says**
23 **to be determined in the facility study.**

24 A. Yes.

25 **Q. Now, I believe you talk about it, I**

1 think it's either in your additional direct or even
2 maybe in your direct, in additional direct, that
3 the PJM studies are done in three phases?

4 A. Correct.

5 Q. And this phase is the second phase,
6 and the facility studies is the third phase?

7 A. That's correct.

8 Q. And I believe in your -- I think it
9 was in your additional direct testimony -- again,
10 I'm sorry -- that within 30 days of receiving this
11 report, Grain Belt Express planned to get with PJM
12 to start the process of starting that third study,
13 correct?

14 A. That's correct.

15 Q. And has Grain Belt Express done that
16 yet?

17 A. We have. We have signed the facility
18 study agreement and provided the deposits to PJM.

19 Q. And then you further say in your
20 additional direct that this facility study with PJM
21 typically takes 12 to 18 months?

22 A. Yes. Rule of thumb, yeah.

23 Q. And then you have a footnote, I
24 believe, at the bottom of that page that says RTOs
25 often delay these studies due to circumstances

1 either in or beyond their control?

2 A. They normally take longer than they
3 are requested to take, yes.

4 Q. So it could be longer than 24 months?

5 A. It could be.

6 Q. And then under the -- still on page 8
7 of the study, stability and reactive power
8 requirement, it says that X3-028 -- again, that's
9 the Grain Belt Express project -- failed to meet
10 criteria for a number of study contingencies
11 summarized below. And then there's three bullet
12 points with three different -- I guess three
13 different contingencies, correct?

14 A. Yes.

15 Q. Okay. And then it -- going to the
16 next page, the last paragraph under that heading,
17 and there's a sentence -- the first sentence is
18 bolded. It says, As X3-028 is required to stay
19 connected to the system for all faults, an updated
20 model that exhibits this behavior is needed. The
21 results suggest that further transmission
22 reinforcement may also be required. The extent of
23 this reinforcement cannot be identified prior to an
24 updated X3-028 dynamic model being updated.

25 What is a dynamic model?

1 A. So there's -- within a system impact
2 study, the planners take a look at different
3 phenomena that occurs on the system. So steady
4 state phenomena is the system is operating in
5 steady state. It's assumed to be -- is stable.
6 You take contingencies and you look for thermal
7 overloads.

8 Then there's the dynamic model, which
9 you think about -- dynamics you think in terms of
10 motion. The system is actually a large machine
11 that's -- that's essentially in motion, if you
12 will. And if you thump the system, if you will, if
13 you think about it that way, you have a
14 contingency, there are transient events that occur
15 in the system. So there's -- there's movement of
16 generators. There's movement of power flow.
17 There's differences and changes in reactive power.

18 And so the transient dynamic studies
19 look in the time that we have. So it's not just a
20 snapshot in time. It actually looks at a time step
21 simulation of what's going on in the system for a
22 period of time to ensure that it returns to a
23 stable operating state.

24 **Q. Okay. And so who performs this**
25 **dynamic model?**

1 A. PJM has oversight of the studies. I
2 don't know whether they actually ran the studies or
3 if they gave them to AEP to run, but in general PJM
4 has the responsibility.

5 **Q. About how long does it take for those**
6 **dynamic models to be done?**

7 A. In a typical study, it greatly varies
8 depending on the complexity of the study and the
9 contingencies and how long it takes them to get to
10 an initial solving point.

11 The study time frame is usually, once
12 you have a good model, you know, you can probably
13 run the study in a couple of weeks, and then it
14 probably takes a few more weeks to -- to actually
15 produce the report and the output and everything.

16 So there -- that would be what I
17 would say is a -- based on my experience with folks
18 that are on those studies, that would be a -- kind
19 of your minimum time frame.

20 **Q. And would this be something that they**
21 **would normally run during the facility study**
22 **process or would that be outside the facility study**
23 **process?**

24 A. On a project like ours, because the
25 models that are available, and similar with

1 generator interconnections, too, once you have a
2 final design of your control systems, you're in the
3 facility study phase, they would typically want to
4 take a better model than what's kind of available
5 off the shelf and rerun those during the facility
6 study phase.

7 **Q. And when it says that the results**
8 **suggest that further transmission reinforcement may**
9 **also be required, do they mean system upgrades?**
10 **What do they mean by further transmission**
11 **reinforcement?**

12 **A.** They could mean additional upgrades.
13 I think in the context of the studies and our
14 understanding, because we performed the studies
15 ourselves, they need to be looking at, for
16 instance, fast-acting dynamic reactive equipment.
17 So these issues are related to a voltage stability,
18 not an angular stability issue.

19 **Q. Okay. And then under new system**
20 **reinforcements is the next heading, I believe.**
21 **That's what it talks about when you talk about the**
22 **upgrades that are necessary, and there's five of**
23 **them there on that page?**

24 **A.** Yes.

25 **Q. The first four of them look like they**

1 don't cost -- there's no cost to upgrade those, the
2 way I see them. The fifth one is the 500 million
3 upgrade that we talked about before?

4 A. That's correct.

5 Q. But there under No. 5, the second
6 paragraph, this talks about the -- it says, No. 5
7 is a segment of the MISO, paren, unapproved, end of
8 paren, pioneer project to build a new
9 Sullivan-Reynolds 765 kV line. It says the cost of
10 the project is estimated to be 500 million, and it
11 is Grain Belt's responsibility. And then the next
12 paragraph says it will take Pioneer, LLC three to
13 four years to build this section of the 765 kV line
14 from the time the CSA is signed.

15 Now, is a CSA a construction service
16 agreement?

17 A. That is correct.

18 Q. Okay. And under the process here,
19 when would that normally take place that the CSA be
20 signed?

21 A. Typically it would be after the
22 facility study is complete and an interconnection
23 services agreement is finalized and filed with
24 FERC.

25 Q. So --

1 A. Could be in parallel.

2 Q. So when is -- so refresh my memory.
3 What is Grain Belt's estimate right now on when
4 they will get the PJM facility studies and all the
5 studies done and get an agreement at --
6 interconnection agreement at FERC approved? What
7 is -- what's the time frame for getting that done?

8 A. I don't have a project schedule in
9 front of me now, so I'm relying on memory. But
10 with the facility study, we did update the
11 agreement, update the in-service date to 20 --
12 2019. So it's incumbent upon PJM to give us enough
13 time in our construction schedule, et cetera, to --
14 to be able to meet that in-service date.

15 So this is currently 2014. I would
16 hope that -- that by the end of next year we have
17 the facility study complete and then we can be
18 working on the interconnection services agreement
19 and the construction services agreement in parallel
20 early -- you know, late 2015 or early 2016. Kind
21 of shooting from the hip here.

22 Q. And let's say PJM stays on schedule
23 with the facility studies and it takes 24 months.
24 That would be two years. That would put you to the
25 end of 2016. Then how long would it be -- and

1 **there's other studies. I know MISO and SPP,**
2 **correct, have more studies to do as well. So all**
3 **of those studies have to be completed before you**
4 **even go to FERC?**

5 A. Well, typically this file at FERC
6 would be the interconnection agreement with, for
7 instance, PJM. So there will be separate
8 interconnection agreements that are filed, one with
9 PJM, one with MISO, one with Southeast Power Pool,
10 so three different interconnection agreements.

11 Those may -- so each one of those
12 would ensure -- you would be at a point where you
13 were ensured that all the necessary system upgrades
14 were studied and known in order to get that signed
15 and filed.

16 **Q. Right. So if that's -- let's say**
17 **that's able to be done in the 24-month time frame**
18 **of the PJM facility studies -- wait a second. It**
19 **was 12 to 18 months?**

20 A. 12 to 18, yes. 12 to 18.

21 **Q. Year and a half. Then how long does**
22 **it take to -- normally for FERC to approve an**
23 **interconnection agreement once you file it?**

24 A. If I remember my FERC rules
25 correctly, which I may not, I think it's a 90-day

1 approval period. But I'm not sure. If it's filed
2 uncontested, I don't know that FERC approves it. I
3 think if it's filed contested, there may be, you
4 know, a time frame.

5 **Q. And then -- and then the CSA is**
6 **signed?**

7 A. I think you work on those in parallel
8 as opposed to sequential. On a project like this
9 you would be working on those in parallel, because
10 the CSA will lay out cash flow from us to AEP and
11 that sort of thing so they can start construction.

12 **Q. Right. And you were here earlier**
13 **when Mr. Blazewicz was talking about milestones and**
14 **reaching milestones and so forth. And I would**
15 **assume that if you get to the point where a CSA is**
16 **signed, you've gotten construction financing,**
17 **you've gotten customers signed up, you've met all**
18 **those and you're ready to construct, right?**

19 A. That would be probably a better
20 question directed to Mr. Berry in terms of the
21 financing aspect of it. But you're talking about
22 large dollars at that point. So I generally do not
23 think there would be after we did ours, but this is
24 outside my -- far afield from my area of expertise.

25 **Q. Pioneer, LLC isn't going to build**

1 this project unless Grain Belt is in?

2 A. No. No. Exactly what I'm saying.

3 Q. Okay. All right. And then it looks
4 like on page -- starting on page 10, we're looking
5 at some of the -- some of those from the earlier
6 tables where there's been some -- some of the
7 thermal violation issues, correct? And it's
8 talking about those. The mitigation under number
9 A -- not number A -- the letter A, the
10 X1-020-tap-05 Dumont 765 kV line, underneath that
11 it says mitigation, upgrade wave trap at Dumont
12 station on Dumont-X1-020 765 kV line at an
13 estimated cost of 1 million.

14 Is that the 1 million you've already
15 identified as a system upgrade or is that an
16 additional upgrade?

17 A. That has already been identified.

18 Q. And then B's been marked out. I
19 guess that's probably for whatever reason not a
20 problem anymore.

21 And then on C, which is the 05
22 Meadow-05 Reynold 345 kV line, if you go to the
23 next page it has a mitigation plan, and it says
24 that this is going to be NIPSCO's station. And the
25 final -- the final sentence there says, AEP and PJM

1 need to work with NIPSCO and MISO on this during
2 the facility study. So the issue of how to address
3 that would be addressed in a facility study,
4 correct?

5 A. That's correct.

6 Q. And that could lead to some
7 additional facilities needing to be built or
8 additional equipment that might be needed?

9 A. Assuming something's not already in
10 their capital expansion plan, yes.

11 Q. And would Grain Belt Express be
12 responsible for any additional cost of that kind?

13 A. We would.

14 Q. And then the same thing on D there,
15 another project, the mitigation plan again, it's in
16 NIPSCO's station. Same thing. AEP and PJM would
17 need to work with NIPSCO and MISO during the
18 facility study. So the same situation would apply
19 as the one that I asked you about just before,
20 correct?

21 A. Yeah. And this appears to be the
22 same facility they're looking at correcting, just
23 two different contingencies.

24 Q. Two different things on it. Okay.
25 And the next page is 12, where it talks about

1 delivery of energy portion of interconnection
2 request. Says, PJM also identified the delivery of
3 the energy portion of this interconnection request,
4 period. Any problems identified below are likely
5 to result in operational restrictions of a project
6 under study, period. The developer can proceed
7 with network upgrades to eliminate the operational
8 restriction at their discretion by submitting a
9 merchant transmission interconnection request.

10 So what does that mean?

11 A. Earlier we were discussing the
12 capacity portion of the interconnection study.
13 From the energy portion, they look at the full
14 injection, so the 3500 megawatts in various
15 scenarios. All of these are a snapshot in time.
16 So it doesn't necessarily reflect what will happen
17 operationally, but it reflects their best guess, if
18 you will.

19 So what they have done is they have
20 identified under certain contingencies where the
21 energy portion of the project may need to be
22 curtailed under the security-constrained economic
23 dispatch, also known as a SCED.

24 So in the market scenario, assuming
25 one of those contingencies occurred and all the

1 system -- all the -- everything else in the system
2 at that point in time was identical to what was
3 studied in the model, it's likely that they would
4 have to curtail some of the energy in order to
5 solve the overload.

6 **Q. And when it says the developer can**
7 **proceed with network upgrades to eliminate the**
8 **operational restriction at their discretion by**
9 **submitting a merchant transmission interconnection**
10 **request, are those the network upgrades that have**
11 **already been identified or are these additional**
12 **network upgrades?**

13 A. They would have to -- they would
14 identify probably additional network upgrades if we
15 desired to do that.

16 **Q. And will those be identified in the**
17 **facility study?**

18 A. No.

19 **Q. Okay. So --**

20 A. These would only be if we were
21 required -- if we requested of PJM to allow us to
22 fully inject 3500 megawatts on an energy basis
23 24 by 7 and not rely on the security-constrained
24 dispatch.

25 **Q. So if you're selling 3500 megawatts**

1 of capacity, you're going to want that full 35 to
2 go through, right?

3 A. Well, let's be careful about the use
4 of the term capacity. There's a capacity market
5 and there's capacity of the line. So in the
6 capacity of the line, the 3500 megawatt delivery in
7 an energy market would be subject to the security-
8 constrained economic dispatch. And Mr. Cleveland
9 and Mr. Berry can go into further detail about that
10 on congestion studies.

11 The N minus 1 events here would cause
12 congestion. They're making no guarantees that if
13 we fixed all of these N minus 1 contingencies that
14 we would necessarily still be -- the energy would
15 still be fully protected under this guide.

16 Q. But it says that if you want it
17 fixed, that you can --

18 A. You can -- we can make an option to
19 do that, yeah.

20 Q. But it would be at additional cost to
21 you?

22 A. Yes.

23 Q. Okay. Then it goes on, the next
24 page, page 13 is the stability study report, and
25 then there's an executive summary there. And the

1 last sentence on the first paragraph of that page
2 says, This report describes the dynamic simulation
3 analysis of X3-028 as part of the overall system
4 impact study. What does that mean?

5 A. You said the --

6 Q. The last sentence on the first
7 paragraph there, under the executive summary
8 heading on page 13.

9 A. This -- again, the system impact
10 study is broken up into steady state analysis and
11 dynamic analysis. So this is just saying that this
12 is the dynamic analysis, the stability study
13 analysis of the system impact study.

14 Q. And then it said, The project was
15 tested for compliance with NAERC, PJM and other
16 applicable criteria. 112 fault contingencies were
17 studied, and then it lists several, I guess,
18 conditions there, A through A.

19 And then if you drop down to the
20 sentence above the three bullet points, it says,
21 for a number of the study contingencies, X3-028
22 failed to meet criteria. The first bullet says,
23 For several contingencies the X3-028 HVDC circuits
24 are disconnected from the system, paren,
25 permanently blocked, end of paren, prior to fault

1 **clearing or mid simulation. What does that mean?**

2 A. So in the off-the-shelf dynamic
3 modeling software, the HVDC models, what happens
4 when certain things occur on the system is called
5 pole blocking. So essentially it stops
6 transmitting power for a period of time until you
7 recover from the contingency.

8 So basically saying there are a
9 number of contingencies, and these were identified
10 earlier within the summary part of the report,
11 that -- that the circuit permanently blocked, which
12 means it did not restore when voltage was restored
13 during the simulation.

14 **Q. In the second bullet, the addition of**
15 **the X3-028 HVDC line causes the power ridge at**
16 **Meadow Lake wind farms to trip for several**
17 **contingencies. Can you explain that?**

18 A. Without having the software in front
19 of me, I'm going to have to go back through the
20 report and figure out the contingencies. But there
21 was apparently a dynamic event with the project
22 that also caused tripping of some external
23 generation, plus -- currently existing in the
24 system.

25 **Q. And then the third bullet there,**

1 X3-028 HVDC circuits were manually deblocked,
2 paren, post-fault clearing, end of paren, for the
3 contingencies which caused the DC line to
4 disconnect prior to fault clearing. Tripping of
5 the Faller Ridge and Meadow Lake Wind Farm still
6 occurs.

7 Does that mean they tried to kind of
8 work -- create a work around in the model and it
9 still didn't work?

10 A. That's a correct characterization
11 with the model they were working.

12 Q. And then I think this is almost the
13 same wording as the paragraph we discussed earlier
14 about where the results suggest that further
15 transmission reinforcement may also be required, to
16 the extent of this reinforcement cannot be
17 confirmed prior to an updated X3-028 dynamic model
18 being available.

19 A. Yes.

20 Q. That's -- so I think that's the same,
21 exact --

22 A. Yes.

23 Q. -- paragraph as we discussed before.
24 So that will -- that will be handled under the
25 dynamic model that would be run that we discussed

1 earlier, correct?

2 A. Yes. Yes.

3 Q. Is that actually the same thing, just
4 repeated?

5 A. Yeah. Yeah. This is the more
6 detailed version of everything, so this is the
7 beginning for that report.

8 Q. Again, I apologize. I'm not an
9 engineer. So page 19. So, you know, there's
10 several things on this page that I want to ask you
11 about. If we've already covered them and this is
12 just something that's a summary of what we've
13 already covered, let me know.

14 A. Okay.

15 Q. The first paragraph there that starts
16 of the 78, after the bullets under No. 6, under
17 results, of the 78 contingencies tested on the NTEC
18 network under single possible load flow scenario,
19 26 failed to meet the recovery criteria due to
20 unexpected blocking from the X3-028 circuits, the
21 tripping of multiple units. Is that a scenario
22 we've already covered in some of these other
23 things?

24 A. It is. It is, yes.

25 Q. Okay. And then if you go down

1 underneath the table there it says, Although
2 the -- only one contingency is unstable in the
3 particular results presented in Table 4, multiple
4 contingencies involving the loss of the
5 Rockport-Jefferson 765 kV circuit were found to be
6 unstable following very slight changes to the load
7 flow.

8 Again, is that something we've
9 already covered or is this a new -- new issue?

10 A. It's, in essence, been covered in a
11 little more detail here.

12 Q. And the same thing there for the last
13 paragraph. In addition to the post-fault block of
14 the X3-028 circuits detailed in Table 4, regardless
15 of the presence or otherwise of the dynamic
16 compensation, the X3-028 circuits blocked prior to
17 fault clearing from three phase faults at 345 kV,
18 paren, POI, end paren, Sullivan 765 kV and Rockport
19 765 kV busses, period. In these cases the X3-028
20 circuits needed to be manually deblocked post fault
21 clearing. These results imply that the X3-028
22 dynamic model requires an update.

23 So has that also been covered in our
24 prior discussions?

25 A. In essence, it has. I think of

1 what -- what's important and key in this particular
2 paragraph is the implication of updating of the
3 dynamic model, because the existing off-the-shelf
4 technology is very generic in nature, whereas the
5 control models of these tend to be very proprietary
6 from the vendors. So during the facility study
7 phase we will be working with a consultant to
8 develop a more realistic model, if you will.

9 **Q. And then on page 20, under the**
10 **heading 6.1 outages, down underneath the table**
11 **there, it mentions in addition to the plus 800,**
12 **slash, minus 1000 MVAR dynamic compensation, it**
13 **was found that for an outage on the Breed-West**
14 **Casey 345 kV circuit, the X3-028 injection needs to**
15 **be curtailed to 1500 megawatts, paren, a firm**
16 **transmission injection right value, end paren, to**
17 **maintain stability during a three-phase fault at**
18 **Rockport 765 kV on the Jefferson circuit.**

19 **I don't remember mention of the**
20 **Breed-West Casey kV, although I could be wrong. Is**
21 **that something that we've discussed prior?**

22 **A. I'd have to go back and look, but**
23 **that -- they may not have included that in the**
24 **first part of the report, primarily because there**
25 **was essentially no upgrade cost mitigation**

1 associated with that.

2 Q. But then it says, Further maintenance
3 outage simulations may be required following
4 network reinforcement to resolve stability issues
5 on the NTEC network case. So to me that assumes
6 that there has to be some sort of network
7 reinforcement and then running further maintenance
8 outage simulations. Am I interpreting that
9 correctly?

10 A. I think what it's kind of saying in
11 context is, once system reinforcements are made per
12 the system impact study, because of this they
13 probably want to go back and look at this
14 Breed-West Casey issue to see whether or not we
15 still need to curtail to the 1500 megawatts. That
16 would be my interpretation of that.

17 Q. All right. And then it looks like on
18 page -- starting on page 21 there's a ser-- there's
19 a table, several pages worth. Identifies the
20 various faults, and I guess it talks about whatever
21 the fixes are and they become stable, most of them
22 I guess become stable at the end after they've been
23 fixed. Is that basically what that table -- it's
24 Table 6.

25 A. Yes.

1 Q. Is that basically then just that
2 table?

3 A. Yes.

4 Q. Now, if you would go to page 24 and
5 go down to fault ID 3N24, and over there in the
6 far-right column it's entitled with plus 800 slash
7 minus 1000 MVAR dynamic reactive support, comma,
8 post Pioneer project. In that box under 3 and 24,
9 it's in red and not black like the other -- like
10 the other -- the other type on that page. And it
11 says stable with an asterisk, and under stable with
12 an asterisk it says, Post fault voltage criteria
13 not met.

14 And then if you go down underneath
15 the table there, under the asterisk it says,
16 Although this contingency was stable under the
17 single possible load flow scenario simulated,
18 instability, paren, unanticipated blocking of
19 X3-028 circuits, end of paren, can occur for this
20 contingency under slightly altered load flow
21 conditions.

22 Is that something we've talked about
23 before or is that something new?

24 A. It is. These are -- these are the
25 contingencies where earlier they say that the

1 updated model is needed.

2 Q. Okay. And so that updated model is
3 also needed for 3N25, fault ID 3N25?

4 A. Yes, because these are very close in
5 faults to the other.

6 Q. And then there's several others like
7 that, if you look on, for example, on page 30. All
8 of those have that stable -- it's in red, stable
9 with an asterisk. So it would apply to those as
10 well on page 30?

11 A. That is correct. And they all appear
12 to be very close in faults at the Jefferson
13 substation.

14 Q. Well, all right. Well, thank you. I
15 appreciate you going through the report with me.

16 A. My pleasure.

17 Q. And again, pardon my lack of engineer
18 knowledge. I do have a few more questions, though.

19 A. Okay.

20 MR. JARRETT: Give me a minute, your
21 Honor.

22 MR. ZOBRIST: Judge, I must just say
23 during the break here, I know we have some
24 witnesses from out of town. I would hope that we
25 can go beyond the normal closing hour to try to get

1 some of the folks who don't work for the applicant
2 to present their testimony and attempt to complete
3 themselves today.

4 JUDGE BUSHMANN: I can talk about
5 that with the Commissioners.

6 MR. ZOBRIST: Great. Thank you.
7 Appreciate it.

8 BY MR. JARRETT:

9 Q. I want to go to your additional
10 direct testimony.

11 A. Okay.

12 Q. Specifically pages 3 to 6. Starting
13 on page 3, line 18, you start -- the heading is
14 MISO interconnection study process.

15 A. Okay.

16 Q. And you talk there a little bit about
17 MISO uses three phases but that the second phase is
18 optional, meaning that a party can proceed directly
19 from the first phase to the third phase. Is the
20 Grain Belt Express project, are you using all three
21 phases in the MISO study or are you opting to go
22 from first to third?

23 A. Currently we are -- we've completed
24 the fac-- pardon me -- the first phase, which is
25 the feasibility study. The second phase, which is

1 the SPA study, the system planning and analysis
2 study, is optional. So we are currently
3 essentially parked there, to my recollection. I
4 believe I talk about that in my -- well, we haven't
5 entered that yet, but we can enter that if we
6 choose to.

7 The third phase, the DBP study
8 consists essentially of a system impact study,
9 facility study, and preparation of the
10 interconnection agreement requires the full
11 milestone payments that depend on the size of your
12 connection.

13 **Q. And when you say it's parked, does**
14 **that mean you're just on hold?**

15 A. Well, yeah, in their study process,
16 because it's a cyclical process.

17 **Q. And it's like a queue, you're in line**
18 **and they'll get to it when they get to it?**

19 A. Right. This -- this new process is
20 slightly different. It was developed to try to
21 allow folks that are behind in the queue, if
22 they're ready, to move forward. So a first ready
23 first served process. So you can kind of keep your
24 eye on your project in the SPA, if you will, and
25 then when you're ready to make -- move into the

1 planning phase, you can do so.

2 **Q. How long does that SPA study usually**
3 **take MISO to do?**

4 A. It often depends on the number of
5 projects that are within that queue position in
6 that arena that they study. To be honest with you,
7 I don't have a whole lot of experience with the SPA
8 study, so -- and their length of times, but a
9 couple of months to 6, 12 months maybe.

10 **Q. Now, would it be in the SPA study**
11 **that they would identify any potential network**
12 **upgrades that were needed in MISO?**

13 A. Based on the conditions at that point
14 in time, yes. If you chose to move there to the
15 DPP as soon as you could, you would expect those
16 studies to be similar.

17 **Q. But then -- but the DPP study**
18 **definitely has to be completed, right? There is no**
19 **option?**

20 A. That is correct, yes.

21 **Q. And about how long does that take?**

22 A. Again, there -- I would have to go
23 back and refresh my memory on MISO rules, but it's
24 a cyclical period. I believe they run the studies
25 a couple of times a year. So you enter the study a

1 prescribed date. Other people enter it as well,
2 and then it's usually completed before the next
3 cycle.

4 **Q. And does Grain Belt Express have some**
5 **sort of timetable when they think all of these**
6 **studies in MISO will be completed?**

7 A. We are -- we are currently waiting
8 for the final studies to be completed by PJM before
9 we -- because then they'll have all the necessary
10 information from the injections in PJM to fully
11 understand the impacts in MISO.

12 **Q. So --**

13 A. So I would say sometime next year we
14 would probably enter into that phase.

15 **Q. Okay. So it would be when -- it**
16 **would be sequential. The PJM studies are**
17 **completed, then you would move forward with the**
18 **MISO. They don't run in conjunction with each**
19 **other?**

20 A. As part of that -- well, you know,
21 you want to be sure you don't ever get a cart
22 before a horse, if you will.

23 **Q. Sure.**

24 A. And as part of the PJM study process
25 in the facility studies, they are required to work

1 with other RTOs and affected utilities if they see
2 impacts on those neighboring systems. So we want
3 to be -- ensure that the process is consistent and
4 flows through so that those impacts are identified
5 as part of upgrades required under the affected
6 systems study and then not essentially reidentified
7 in the -- in the DPP phase.

8 **Q. Right.**

9 A. Or take into account -- in account
10 during the DPP phase.

11 **Q. Right. And then page 13 of your --**
12 **of your direct -- I'm sorry. And this is where you**
13 **talk about SPP, I think starting on line 13. I**
14 **take it that there are further steps and studies**
15 **that need to be done in SPP as well?**

16 A. Yes.

17 **Q. Okay. And what's left -- what kind**
18 **of studies are left to be done in SPP?**

19 A. So the primary study prior to an
20 interconnection agreement would be essentially a
21 facility study phase, if you will, that we're
22 currently working on with ITC Great Plains and
23 Sunflower Electric.

24 **Q. About how long do you think those**
25 **studies take?**

1 A. So since there were no -- in SPP
2 criteria studies there were no identified upgrades,
3 network upgrades, basically this will be a study to
4 look at what the attachment facilities will cost
5 them to create. So kind of in a perfect world,
6 it's a relatively easy study, that you work with
7 construction folks to determine the costs of
8 building an interconnection substation, and it
9 should take a couple of months.

10 **Q. And would that -- would you wait to**
11 **do that until after the PJM and MISO studies are**
12 **done or is it going on right now?**

13 A. No. This is going on right now.

14 **Q. Going on right now. And this is like**
15 **an if-you-know question. I'm not implying that you**
16 **should know.**

17 A. Okay.

18 **Q. I'll ask you. Is there a certain**
19 **date that if Grain Belt Express hasn't begun**
20 **construction that they will say, it's too late,**
21 **we're not going to construct?**

22 A. Who's they?

23 **Q. Grain Belt. Has Grain Belt -- has**
24 **Grain Belt identified a date where they will say,**
25 **we're now past a deadline, we can't -- we can't do**

1 the project?

2 A. No.

3 Q. Okay. I think I'm almost done. I
4 did want to ask you one final question on the
5 electric and magnetic fields. I've been talking so
6 much my tongue won't work. Where you talk about
7 GPS signals and you mention that it's highly
8 unlikely that they would be affected, but you don't
9 say for certain they're not affected, correct?

10 A. Proving a negative is arguably
11 impossible, yeah. So, yeah, highly unlikely is the
12 correct term.

13 MR. JARRETT: That's all I have.
14 Thank you for putting up with me.

15 JUDGE BUSHMANN: Let's take a short
16 break. Be in recess until about five minutes after
17 three.

18 (A BREAK WAS TAKEN.)

19 JUDGE BUSHMANN: Let's go ahead and
20 get started again. We'll go back on the record.

21 Final cross-examination is by
22 Missouri Landowners Alliance.

23 MR. AGATHAN: Thank you, your Honor.

24 CROSS-EXAMINATION BY MR. AGATHAN:

25 Q. Good afternoon, Dr. Galli.

1 A. Good afternoon.

2 Q. My name is Paul Agathan. I
3 represent Missouri Landowners Alliance.

4 A. Yes, sir. And for the record,
5 despite my counsel's chagrin, I am a Cardinals fan
6 as well.

7 Q. No questions then.

8 I do have a few questions, and the
9 first ones are prompted by questions from other
10 counsel, just so you know. I didn't want to
11 overlook them at the end.

12 If I recall correctly, during
13 questions from counsel for Rockies Express, you
14 said you had not entered into substantive
15 discussions with the pipeline because you don't
16 have a certified route yet for the line. Is that
17 essentially correct?

18 A. Yes, subject to review of the record,
19 but I think that's essentially right, sir.

20 Q. What did you mean there when you said
21 certified route of the line or words to that
22 effect?

23 A. That we had the certificate to own,
24 operate and construct the line.

25 Q. Okay. You're not implying that

1 **there's one specific -- or are you, that there's**
2 **one specific line that's going to be approved by**
3 **the Commission?**

4 A. I'm not sure I understand the
5 question.

6 Q. **Okay. My recollection is that Monday**
7 **Mr. Lawlor said the Commission does not approve a**
8 **specific route of the line in Missouri. I'm trying**
9 **to get some clarification on Grain Belt's position**
10 **on whether or not you believe the Commission**
11 **approves the specific route of the line.**

12 MR. ZOBRIST: Judge, I think that
13 calls for a legal conclusion and I object.

14 JUDGE BUSHMANN: Mr. Agathan?

15 MR. AGATHAN: I'm just trying to get
16 clarification on the company's position as to what
17 it is that they're asking and what they think they
18 are getting from the Commission.

19 JUDGE BUSHMANN: It does sound like
20 it's getting into the Commission's authority, and
21 that does become a legal issue.

22 MR. AGATHAN: Okay.

23 JUDGE BUSHMANN: So I think that
24 would be a legal conclusion.

25 BY MR. AGATHAN:

1 **Q.** Say you get the certificate from the
2 **Commission.** At that point then or shortly
3 **thereafter you'll begin negotiations with the**
4 **pipelines?**

5 A. That would probably be accurate.

6 **Q.** And it's conceivable at least that
7 **after dealing with the pipelines and going back and**
8 **forth, you may decide that we will move the line,**
9 **your line back a distance, a further distance from**
10 **the pipelines. Is that at least a possibility?**

11 A. I would hesitate to speculate that as
12 a possibility. It would depend on many factors,
13 not just the --

14 **Q.** Are you saying there's no possibility
15 **you would move the line?**

16 A. I'm saying I would hesitate to
17 speculate on a possibility. There's --

18 **Q.** I'm not asking that.

19 A. I didn't say there was no
20 possibility, but I hesitate to speculate because
21 there's many factors, such as routing
22 considerations, engineering considerations --

23 **Q.** Obviously.

24 A. -- topography. Many, many factors.

25 **Q.** But it is a possibility that you

1 would move the line as a result of negotiations
2 with them?

3 A. Within a reasonable --

4 Q. Sure.

5 A. -- determination.

6 Q. And is it possible that when you move
7 the line, you could move it onto property of
8 someone who didn't think the line was going to be
9 on their property?

10 A. I can't speculate on that.

11 Q. But that's conceivable, is it not?

12 A. Again, I don't know the rules around
13 how that would work per the Commission's order or
14 their authority in this case, so I don't know.

15 Q. And that's the problem, of course.
16 The Commission has issued its certificate. You may
17 or may not move the line, but hypothetically at
18 least you said you might move the line, and it's
19 going to be on property where it would have not
20 been before.

21 And my question is, if you know, what
22 process does Grain Belt envision allowing
23 landowners to come in and complain to the
24 Commission if it affects their property when it had
25 not affected their property before that?

1 MR. ZOBRIST: Judge, the way that's
2 phrase, what he's asking about the process to come
3 before the Commission I believe asks for a legal
4 conclusion. I object on that basis.

5 JUDGE BUSHMANN: Is the question
6 about an internal Grain Belt process?

7 MR. AGATHAN: Yes.

8 JUDGE BUSHMANN: Then I would
9 overrule on that basis.

10 THE WITNESS: For that specific
11 circumstance, I am not aware of any official
12 process that we have developed.

13 BY MR. AGATHAN:

14 Q. How about an unofficial process?

15 A. I am not aware of anything. You
16 might ask Mr. Lawlor.

17 Q. Do you recall some questions from
18 Staff counsel about increasing the capacity of your
19 line at some point from 3500 megawatts to 4000?

20 A. I do.

21 Q. The additional 500 megawatts
22 essentially all went to delivery in Indiana,
23 correct?

24 A. That is correct, yes.

25 Q. From an engineering standpoint, could

1 **some of that additional 500 megawatts have been**
2 **used to increase the delivery in Missouri beyond**
3 **the planned 500 megawatt level?**

4 A. So you're saying in lieu of putting
5 3500 megawatts in to Indiana, we would inject say
6 1000 megawatts into --

7 **Q. Well, say 600 or 700 into Missouri.**

8 A. Could you go back and restate the
9 question?

10 **Q. Sure. The additional 500 megawatts**
11 **you added all went to delivery in Indiana**
12 **essentially, correct?**

13 A. The increase in the converter size
14 was in Indiana, correct.

15 **Q. Could you from a technical**
16 **engineering standpoint have planned on and made**
17 **available delivery to Missouri of hypothetically**
18 **600 megawatts and cut back 100 megawatts from the**
19 **delivery in Indiana?**

20 A. Hypothetically, yes.

21 **Q. Or could have been up to 700 in**
22 **Missouri?**

23 A. Hypothetically, yes.

24 **Q. Or 8?**

25 A. Hypothetically, yes.

1 Q. Was the decision not to do that and
2 to stay with 500 in Missouri an economic decision?

3 A. I think for the most part my
4 recollection is it was based on our understanding
5 of the markets and what the markets would bear.

6 Q. Thank you. Back to my regular
7 questions. Do you recall that Mr. Berry testified
8 in his direct testimony that your company received
9 responses to your request for information from
10 26 wind farms with over 13,000 megawatts of
11 capacity or approximately that number?

12 A. I do recall that, yes.

13 Q. That's about three times more than
14 the capacity of your line, right?

15 A. That's correct.

16 Q. Do you recall we asked you in
17 discovery, maybe try and -- for purposes of saving
18 time, asked you if you--all accept, subject to
19 check, that we sent you a Data Request No. 75, and
20 that your answer was as I'll read it to you. Will
21 you accept this subject to check, or do you want me
22 to --

23 A. I'd rather look at it, but --

24 Q. Sure. I'm going to hand you a
25 document which includes our Data Request No. 75 and

1 **your response to it and ask you to read both the**
2 **request and the response into the record.**

3 A. The request and the response?

4 **Q. Yes, please.**

5 A. So this is your data request directly
6 to me and Grain Belt. 75, if at some point -- if
7 at some future point the FERC orders Grain Belt to
8 add another 3500 megawatts of capacity for delivery
9 of additional energy to the Missouri and/or Indiana
10 interconnection, would that require a new set of
11 towers and conductors or could the existing
12 facilities be reconfigured to accommodate the
13 additional 3500 megawatts of capacity?

14 MR. ZOBRIST: Judge, I -- and I
15 apologize to Mr. Agathan. I think we object to
16 that on the basis that it called for a legal
17 conclusion. If there's a physical transmission
18 system question embedded in there, then I don't
19 have an objection. But if this is asking this
20 witness to read a data response that deals with a
21 legal issue, then I don't think it's appropriate.

22 JUDGE BUSHMANN: You're saying you
23 objected to the original --

24 MR. ZOBRIST: I don't -- he
25 doesn't -- Mr. Agathan didn't show me whether we

1 had any objections. We typically when they ask for
2 a legal opinion will object on the basis of asking
3 for a legal conclusion. But if this is a
4 transmission system question, I have no objection
5 at all to the witness talking about how an upgrade
6 might be accomplished.

7 JUDGE BUSHMANN: What's your
8 response, Mr. Agathan?

9 BY MR. AGATHAN:

10 Q. Well, maybe we can cut it short if
11 you'd just read the last sentence where you
12 referred to a different response from Mr. Berry.
13 Do you see that? You say, see also.

14 A. Yes. It says, please see GBX
15 response to MLA-29.Skelly for additional
16 information on expansion of the facilities.

17 MR. AGATHAN: That's all I'm going to
18 ask him.

19 JUDGE BUSHMANN: Okay. Then I don't
20 think that called for a legal conclusion.

21 MR. AGATHAN: I'm going to distribute
22 now a copy of what's been marked as Exhibit 317.

23 (MISSOURI LANDOWNERS ALLIANCE EXHIBIT
24 NO. 317 WAS MARKED FOR IDENTIFICATION BY THE
25 REPORTER.)

1 BY MR. AGATHAN:

2 Q. Is Exhibit 317 a document that you
3 referred to at the end of your response to Data
4 Request 75?

5 A. Yes, it appears to be.

6 Q. And this gives further explanation of
7 the company's -- Grain Belt's position as to what
8 they would have to do if FERC asked or ordered them
9 to add additional capacity in general?

10 A. It's stating that we would be subject
11 to the FERC -- Section 15.4 of the FERC, perform an
12 open access transmission tariff or similar version
13 of that section.

14 MR. AGATHAN: Your Honor, I'll offer
15 Exhibit 317.

16 MR. ZOBRIST: Judge, I don't have an
17 objection to it, but I will note that this was
18 directed to a different witness, but I don't have
19 an objection to it coming into evidence.

20 JUDGE BUSHMANN: Any objections?

21 (No response.)

22 JUDGE BUSHMANN: Then Exhibit 317 is
23 received into the record.

24 (MISSOURI LANDOWNERS ALLIANCE EXHIBIT
25 NO. 317 WAS RECEIVED INTO EVIDENCE.)

1 BY MR. AGATHAN:

2 Q. Dr. Galli, you never did answer our
3 question in Item 75, which was whether or not if
4 you were ordered to add new capacity, would that
5 require a new set of towers and conductors or could
6 the existing facilities be reconfigured to
7 accommodate the additional 3500 megawatts of
8 capacity; is that correct?

9 A. Is what correct? That I didn't
10 answer the question?

11 Q. That you didn't answer it.

12 A. I believe the question got diverted.

13 Q. Pardon?

14 A. I believe the question got diverted a
15 little bit. So I did not answer that specific
16 question, no.

17 Q. On a different subject, all of the
18 interconnection studies that are being conducted at
19 the three RTOs are essentially, as I understand the
20 term, no-harm studies; is that correct?

21 A. That is not correct.

22 Q. Do you know what the term no-harm
23 study means?

24 A. Yes.

25 Q. What does it mean?

1 A. It essentially means that a study is
2 assessed on the system with the project to ensure
3 that the reliability of the system is not
4 compromised.

5 **Q. And that is part of the RTO studies,**
6 **is it not?**

7 A. So the term may be somewhat of a
8 term of art, if you will. It's used quite a bit in
9 MISO for -- for one of our projects, not for this
10 project. The SPP criteria 3.5 studies one might
11 consider as essentially a no-harm study, but that
12 is their transmission-to-transmission
13 interconnection process.

14 The process we were in, in MISO,
15 because they do not have a
16 transmission-to-transmission interconnection
17 process nor do they have a transmission queue, is
18 an interconnection study within their
19 interconnection -- generation interconnection
20 queue, with the recognition that the signed
21 agreement will ultimately have to get -- will be
22 deviated from the typical LGIA, large generator
23 interconnection agreement.

24 In PJM it's a transmission
25 interconnection process. So it's similar to a

1 generation interconnection process that looks at
2 what upgrades are required to meet FERC
3 reliability. So a no-harm study, in my opinion,
4 is -- is essentially an ad hoc study that doesn't
5 have a process associated with it in the context of
6 the RTOs.

7 Q. I misused the term, I assume.
8 You may have answered this already in questions
9 with Mr. Jarrett, but this may have been pieces
10 looking for a total picture. Is Grain Belt going
11 to be responsible for all of the upgrades required
12 by all three RTOs?

13 A. Yes.

14 Q. On another subject, you're familiar
15 with Clean Line's case at the Arkansas Commission
16 involving your Plains and Eastern Line, are you
17 not?

18 A. I am.

19 Q. And the Arkansas Commission denied
20 the application in that case?

21 A. My understanding is -- is they
22 rejected without prejudice the application.

23 Q. You weren't proposing to build a
24 converter station in Arkansas as part of that case,
25 were you?

1 A. At that point in time, no, we were
2 not.

3 **Q. But you did tell the Arkansas**
4 **Commission that you were looking into**
5 **interconnection with energy within the state of**
6 **Arkansas, did you not?**

7 A. There was a period of time where we
8 analyzed interconnection points with Entergy for
9 the project.

10 **Q. And that would have permitted the**
11 **sale of Kansas wind energy to Entergy and its**
12 **customers in Arkansas?**

13 A. Primarily Oklahoma wind, but some
14 Kansas wind as well.

15 **Q. Wherever the wind was coming from for**
16 **that particular line could have been sold in**
17 **Arkansas?**

18 A. Yes.

19 **Q. Do you recall testifying about this**
20 **subject in questions from members of the Arkansas**
21 **Commission back in December of 2010?**

22 A. I have vague recollection of it, yes.

23 **Q. Did they have a process where the**
24 **Commissioners all basically did the questioning of**
25 **the witnesses?**

1 MR. ZOBRIST: Judge, I'm going to
2 object to what was going on in the Arkansas
3 project -- pardon me -- the Arkansas proceeding on
4 another project. I don't see its relevancy to the
5 Grain Belt Express project.

6 JUDGE BUSHMANN: How is this relevant
7 to this procedure?

8 MR. AGATHAN: Well, I think Arkansas
9 and Missouri share a lot of similarities. They're
10 both sort of a sandwich state between the eastern
11 and western terminals. So we don't get the
12 benefits of either Arkansas or Missouri of having
13 wind farms built in our state, nor is the main
14 delivery point in our state.

15 So I think it's obviously not binding
16 precedent, but what the Arkansas did -- Arkansas
17 Commission did and the reason behind what they did
18 are somewhat a precedent that this Commission can
19 look to.

20 JUDGE BUSHMANN: And you're asking
21 about Mr. Galli's testimony in Arkansas?

22 MR. AGATHAN: Yes. Just the fact
23 that they presented to the Arkansas Commission
24 evidence that they could, in fact, provide wind
25 energy to end users in the state of Arkansas.

1 JUDGE BUSHMANN: I gave you a lot of
2 leeway the other day talking about Arkansas, but I
3 did say that Mr. Skelly's testimony at the Arkansas
4 Commission was not relevant. So I would similarly
5 conclude that anything Mr. Galli testified to with
6 the Arkansas Commission would not be relevant here
7 either. And I would say that your questions about
8 Arkansas are -- can only be relevant if they relate
9 particularly to how that might affect this
10 application.

11 BY MR. AGATHAN:

12 Q. On a different issue, you've conceded
13 in your direct testimony, as I understand it, at
14 page 8, lines 20 to 21, that the Grain Belt project
15 is not intended to prevent bulk power systems from
16 falling below some pre-determined minimum level of
17 reliability; is that correct?

18 A. That's right. The intention of the
19 project is not as a -- fully a reliability project.

20 Q. So you're not testifying that the
21 bulk power system in Missouri is unreliable, are
22 you?

23 A. That's correct.

24 Q. And you're not testifying that the
25 project is required in order to make the Missouri

1 electric system more reliable, are you?

2 A. No, I am not.

3 Q. Is it true that the analysis of your
4 line by the three RTOs do not evaluate whether the
5 line is needed for reliability purposes?

6 A. Yes. They are analyzing that and
7 ensuring that a reliable interconnection is
8 obtained.

9 Q. Pardon me?

10 A. They are analyzing -- their job is to
11 analyze the application for the interconnection to
12 ensure that a robust and reliable interconnection
13 is obtained.

14 Q. But that is not needed to add to the
15 reliability of the existing facilities?

16 A. That is correct. They're not
17 analyzing that.

18 Q. You're not aware of any studies or
19 analyses which conclude that the bulk power system
20 in Missouri is presently below some level of
21 reliability generally considered acceptable under
22 good utility practices, are you?

23 A. I'm not aware of such things.

24 Q. Or any studies or analyses which
25 conclude that at some future date the bulk power

1 system in Missouri will fall below some level of
2 reliability generally considered acceptable under
3 good utility practice?

4 A. I'm not aware of any studies that
5 conclude that presently.

6 Q. Assuming the project is approved,
7 could the energy from the Kansas wind farms be
8 delivered to all the states on the east coast?

9 A. Yes.

10 Q. All the other states in the PJM
11 footprint, of course, would also be able to buy
12 energy from Kansas wind?

13 A. Yes.

14 Q. On a different issue, who is
15 Dr. David Carpenter?

16 A. I don't have recollection of
17 Dr. David Carpenter.

18 Q. Isn't he the director of the
19 Institute for Health and Environment at the
20 University of Albany in New York?

21 A. I do not know.

22 Q. How about Dr. Carl F. Blackman of
23 Raleigh, North Carolina?

24 A. I do not know him.

25 Q. And Dr. -- this is Ph.D. and M.D.,

1 **Dr. Martha Herbert?**

2 A. I do not know her.

3 **Q. Aren't these all contributors to the**
4 **BioInitiative report which Dr. Smith cited in his**
5 **rebuttal and included as part of his Schedule DSS-5**
6 **of his testimony?**

7 A. I'm not aware if they're authors or
8 contributors or not.

9 **Q. You didn't read that?**

10 A. There were quite a number of names in
11 there. So I did look at the report and I did look
12 at Dr. Smith's testimony, but I can't tell whether
13 those specific people, from my memory, were on
14 there or not.

15 **Q. There were 28 contributors, were**
16 **there not, approximately?**

17 A. Somewhere in that.

18 **Q. And according to you, they're all**
19 **just of bunch of activists, is that correct, in**
20 **your words?**

21 A. Could you point me to where I said
22 that?

23 **Q. I'm handing you a copy of some of**
24 **your answers to our data requests, and direct your**
25 **attention to Item 36, and particularly the**

1 highlighted language, bottom of page 7, and your
2 answer. Wonder if you could read that into the
3 record, please.

4 A. I'm aware of the BioInitiative
5 report, open paren, BIR, close paren. The BIR is
6 not an independent study. It was conducted by a
7 group of activists. The conclusions of the
8 self-published, non-peer-reviewed BIR are wholly
9 inconsistent with the conclusions of authoritative
10 health risk assessments conducted by national and
11 international governmental health and scientific
12 agencies such as those listed above.

13 Q. And when you referred to them all as
14 a group of activists, what do you mean by the term
15 activists?

16 A. From the report -- and Dr. Bailey
17 does a much better job of describing the weaknesses
18 in the BioInitiative report, but from the --
19 looking at their website and whatnot, they're -- it
20 seems to be that their -- their specific charter
21 in -- in producing this report is cherry picking
22 studies, if you will, to prove their point, taking
23 text -- they don't say this, but it seems apparent
24 from the website and from the way that they
25 published these studies without peer review to

1 prove a particular point and -- and advance their
2 agenda that way.

3 **Q. That makes every one of them an**
4 **activist in your words?**

5 A. It may be a harsh characterization,
6 but the group in general seems to have an activist
7 tint to it, in my opinion.

8 **Q. What's the education and professional**
9 **background of Dr. David Carpenter?**

10 A. I do not know.

11 **Q. What would lead you to dismiss that**
12 **particular individual as an activist?**

13 A. Again, it's just the tone and
14 approach of the way that they have produced the
15 report.

16 **Q. How about Dr. Martha Herbert?**

17 A. Same answer.

18 **Q. Do you know anything about the**
19 **background and professional qualifications of any**
20 **of these activists?**

21 A. I looked into it at one point, but I
22 don't recall, no. Some are physicians --

23 **Q. You did look at their backgrounds?**

24 A. I looked at who they claimed to be on
25 their website. I assume that that's accurate.

1 Some of them are physicians and some of them are
2 scientists. Some of them are policy -- health
3 policy individuals. So there's a mixture.

4 **Q. And what is their reputation in the**
5 **community?**

6 A. I cannot answer that.

7 **Q. Did they appear to be very well**
8 **qualified based on what you looked at?**

9 A. Again, based on what they represented
10 themselves as, perhaps.

11 **Q. Did you look at any other source of**
12 **information other than what they represented**
13 **themselves to be?**

14 A. No.

15 **Q. You also dismiss the BioInitiative**
16 **report on the grounds that it was not independent;**
17 **is that correct?**

18 A. That is correct.

19 **Q. If it's not independent, on who was**
20 **it dependant?**

21 A. The authors and not the scientific
22 community at large.

23 **Q. Who funded the report?**

24 A. I don't recall.

25 **Q. How could you say that it's**

1 **independent or not if you don't know who funded it?**

2 A. It -- my assumption is that it's
3 self-funded by the authors, but I don't know that
4 for a fact because there was no peer review on it.

5 **Q. What made you assume that without**
6 **knowing it?**

7 A. No other information available. So
8 it's an assumption.

9 **Q. Did you look into who funded it?**

10 MR. ZOBRIST: Judge, asked and
11 answered and argumentative.

12 MR. AGATHAN: I will withdraw that.

13 BY MR. AGATHAN:

14 **Q. Have you yourself done any original**
15 **research on the possible links between adverse**
16 **health effects and living in close proximity to**
17 **either AC or DC transmission lines?**

18 A. I have not done individual research.

19 **Q. So the only evidence you presented to**
20 **the Commission in your direct case consisted of**
21 **references to the literature, right?**

22 A. References to the industry and global
23 scientifically accepted references, yes.

24 **Q. That's just a reference, too?**

25 A. Yes.

1 Q. You state in your direct testimony at
2 page 27, lines 6 to 7 -- give you a moment to get
3 there. Do you have that?

4 A. I do.

5 Q. You say that your conclusions
6 regarding EMFs are based primarily on the 2006
7 report produced by the Oak Ridge National
8 Laboratory; is that correct?

9 A. That's correct.

10 Q. And that was attached as
11 Schedule AWG-7 to your testimony; is that correct?

12 A. That is correct.

13 Q. That report would be eight years old
14 now, would it not?

15 A. Yes.

16 Q. And it wouldn't have included any
17 references to any of the EMF studies reported over
18 the last eight years?

19 A. No. But I do go on to say that there
20 have been more other studies that were cited in my
21 testimony which are more recent, were relied on as
22 well.

23 Q. At some point aren't there enough
24 studies which are not included in a compilations
25 that you've lost the most recent versions of all of

1 the EMF studies? In other words, a report from
2 2006 is not going to include numerous reports on
3 EMF, is it not?

4 A. Depending on the numbers of reports
5 that were produced between 2006 and the current
6 date.

7 Q. And how many were produced in that
8 time?

9 A. I don't know.

10 Q. Do you have a copy of your primary
11 report you're relying on, the Oak Ridge National
12 Laboratory report?

13 A. I do.

14 Q. And what led you to believe that that
15 was published in 2006? I'm looking at page 4.

16 A. Yes. There's -- I believe there was
17 actually an update to it, but it does say published
18 in 1997. So perhaps that is a correction that
19 needs to be made. But as I recall, there may have
20 been an update to this report.

21 Q. You don't have an update?

22 A. I don't recall, so that could be a --

23 Q. Did you file one with the Commission?

24 A. I didn't, no. We didn't file any
25 update, but I'm serving off memory that maybe there

1 was a later version of this.

2 **Q. Maybe or maybe not?**

3 A. Maybe or maybe not.

4 **Q. So if you do the math for me, how**
5 **many years ago was it that the main source that**
6 **you're relying on was published based on the**
7 **document that we had?**

8 A. 18 years. 18-ish years.

9 **Q. Pardon?**

10 A. Roughly 18 years or so. 17.

11 **Q. And the studies that your report**
12 **relies on go back as far as the 1930s, don't they?**

13 A. This particular study, I would have
14 to -- I'd have to review it, but it's possible that
15 some of the references are old references around --

16 **Q. Going back to the 1930s?**

17 A. It's possible, without looking at all
18 their references.

19 **Q. Well, just looking at page 28, in the**
20 **middle of the page there, there's a reference to a**
21 **study published in 1935. Looks like line 4 under**
22 **behavioral and psychological.**

23 A. I'm sorry. Could you -- page 28 of
24 the study or page 28 of --

25 **Q. Your schedule, page 28 of 128.**

1 A. Okay.

2 Q. The main paragraph in the middle
3 there, well, the fourth line.

4 A. Yes, so they do reference some
5 studies from the '30s.

6 Q. And then page 32, again of your
7 schedule, page 32 of 128 under mood and
8 performance, the second line there makes reference
9 to a study in 1931 and then another study in 1935?

10 A. They do.

11 Q. Those are just examples, right?

12 A. Sure. Yes.

13 Q. So the BioInitiative report relied on
14 by Dr. Smith was published some 34 years after the
15 document you're primarily relying on, right?

16 A. Yes. This is not the only document
17 I'm relying on, though.

18 Q. That's the primary is what you said,
19 right? Correct?

20 A. Correct.

21 Q. When we asked you in discovery to
22 list the studies you're aware of which show or tend
23 to show that electric transmission lines may
24 produce adverse effects on humans, the only study
25 that you mentioned to us was the BioInitiative

1 **report; is that correct?**

2 A. Could you show me the DR, please?

3 **Q. If I can find it. Hand you a copy of**
4 **the same DR we looked at earlier, No. 36, and the**
5 **question was, please identify any studies of which**
6 **you are aware which show or tend to show that**
7 **electric transmission lines may produce adverse**
8 **effects on humans, birds, animals, many forms of**
9 **plant life or crop fields.**

10 **Ask you if you provided us a**
11 **reference to any report other than the**
12 **BioInitiative report we've been talking about?**

13 A. Yes. I cited several studies from
14 the early to mid 2000s.

15 **Q. Which show that there were adverse**
16 **health effects?**

17 A. Those studies are a compilation of
18 studies that look at the cumulative scientific
19 evidence that's available, so both adverse studies
20 and studies that show no adverse effect. Then they
21 weight the evidence of the studies to make
22 determinations that there are no -- there's no
23 known effects associated with these.

24 **Q. Did any of these particular studies**
25 **determine that there were adverse health effects on**

1 **humans?**

2 A. Again, those studies are compilations
3 that look at the whole body of literature, both
4 adverse studies that show adverse effects as well
5 as studies that show no adverse effects.

6 **Q. And did any of the studies you listed**
7 **conclude that there were adverse health effects?**

8 A. They did not, not in the whole.

9 **Q. You didn't list any of the studies**
10 **that Dr. Smith included in his analysis, did you,**
11 **in answer to that data request?**

12 A. I don't recall all the studies that
13 Dr. Smith leaned on, so --

14 **Q. Did you --**

15 MR. ZOBRIST: I don't think the
16 witness was finished with his answer.

17 THE WITNESS: I don't know. Without
18 looking at Dr. Smith's testimony again in detail
19 and comparing them to that list, I cannot answer
20 your question because I do not know.

21 BY MR. AGATHAN:

22 **Q. Well, did he include in his report,**
23 **to the best of your knowledge, the International**
24 **Agency for Research on Cancer?**

25 A. I do not know if he did or not.

1 **Q. How about the National Radiological**
2 **Protection Board of Great Britain?**

3 A. I do not know if he did or not.

4 **Q. The World Health Organization?**

5 A. I do not know if he did or not.

6 **Q. Did you read his testimony?**

7 A. I read a lot of testimony.

8 **Q. Were you aware of all of the studies**
9 **that he reported on when you wrote your direct**
10 **testimony?**

11 A. I can't answer that I was aware
12 of all of them, but again, I don't know the
13 specific -- I don't recall the specific studies
14 that he cited, so I can't remember.

15 **Q. So you can't name any that you were**
16 **aware of when you wrote your direct testimony?**

17 A. Any what that I was aware of?

18 **Q. Any -- can you tell us that you knew**
19 **of any specific report relied on by Dr. Smith when**
20 **you filed your direct testimony?**

21 MR. ZOBRIST: Well, wait a minute.
22 He's asking if he knew what Dr. Smith was going to
23 cite in his rebuttal testimony when he wrote his
24 direct testimony.

25 MR. AGATHAN: No. Just was he aware

1 of the document that Dr. Smith relied on when he
2 wrote his direct testimony.

3 THE WITNESS: Which document
4 specifically are you asking about?

5 BY MR. AGATHAN:

6 Q. Any of them.

7 A. Well, again, I don't recall all of
8 the documents that Dr. Smith included in his
9 testimony. Was I aware of the BioInitiative
10 report? I was.

11 Q. All right. And that's the only one
12 you list in the answer to our data request?

13 A. No. I listed several reports.

14 Q. None of them cited by Dr. Smith,
15 though, right?

16 A. I don't recall if he cited those
17 studies or not. But as Dr. Bailey will testify
18 later, he probably should have.

19 Q. We're not really interested in that
20 right now. That will come later. All right? Has
21 there ever been a proposition put forth which, in
22 your words, is inconsistent with conclusions of
23 authoritative health risk assessments conducted by
24 national and international governmental, health and
25 scientific agencies, but which nevertheless proved

1 to be true?

2 MR. ZOBRIST: Objection. Vague and
3 ambiguous. In the entire world on any subject?

4 MR. AGATHAN: Yes.

5 MR. ZOBRIST: I object. Vague and
6 ambiguous and irrelevant.

7 JUDGE BUSHMANN: I didn't understand
8 the question, so the witness probably didn't. If
9 you could restate?

10 MR. AGATHAN: Sure.

11 BY MR. AGATHAN:

12 Q. In your answer to our data request,
13 you say that the conclusions of the BioInitiative
14 report are wholly inconsistent with conclusions of
15 authoritative health risk assessments conducted by
16 national and international governmental, health and
17 scientific agencies. Do you recall that?

18 A. I do.

19 Q. Has there ever been a proposition put
20 forth which proved to be true, regardless of that
21 fact?

22 MR. ZOBRIST: Objection, irrelevant.

23 JUDGE BUSHMANN: What's the
24 relevance, Mr. Agathan?

25 MR. AGATHAN: Well, he's dismissing

1 the whole report for several reasons, one of which
2 is that it's not consistent at this point with
3 science as we know it. And my question basically
4 is, isn't that true in other cases in the past,
5 science absolutely believes a certain proposition
6 and it proves to be untrue?

7 JUDGE BUSHMANN: I'll allow the
8 question, if the witness has knowledge.

9 THE WITNESS: I don't have any
10 knowledge off the top of my head of such
11 propositions.

12 MR. AGATHAN: That's all I have,
13 Judge.

14 JUDGE BUSHMANN: Questions from
15 Commissioners?

16 CHAIRMAN KENNEY: Not many.

17 QUESTIONS BY CHAIRMAN KENNEY:

18 Q. Good afternoon.

19 A. Good afternoon, sir.

20 Q. And some of this may be redundant of
21 other questions that were asked, but I need to kind
22 of encapsulate and make sure I understand. The
23 whole project is slated to cost \$2.2 billion,
24 correct?

25 A. Yes, sir.

1 **Q. Does that \$2.2 billion include all of**
2 **the potential upgrades that would be required by**
3 **PJM, SPP and MISO?**

4 A. Yes, sir. Mr. Berry includes those
5 in his pro forma analysis in the economics of the
6 project. So he would be able to give you more
7 details of orders of magnitude. Typically we have
8 to include those to ensure that the project is
9 feasible.

10 **Q. There was a question asked of you a**
11 **while ago about studies concerning the relationship**
12 **of high voltage DC transmission lines and 42-inch**
13 **cathode protected gas pipe.**

14 A. I remember the discussion.

15 **Q. And there was -- specifically you**
16 **were asked about a study that examined the**
17 **relationship between the two, and you said there**
18 **was no study in the public domain. Do you remember**
19 **that answer?**

20 A. Yes, sir. My recollection is we
21 clarified that question as are there any studies
22 with 600 kV 3500 megawatt ratings and 42-inch gas
23 pipelines.

24 **Q. And you said none in the public**
25 **domain?**

1 A. Not that I'm aware of.

2 Q. I gathered from your answer, and I
3 maybe shouldn't have inferred this, but you said
4 there were no studies in the public domain. Were
5 there studies elsewhere, a private study that's
6 been done?

7 A. I can't -- in that very specific
8 concept, 600 megawatts -- I'm sorry -- 600 kV and
9 3500 megawatts and 42-inch pipe, I am not
10 personally aware of. I am personally aware of
11 studies that I have been involved with on other
12 size transmission lines and pipes, which, again, I
13 believe that the physics is exactly the same. It's
14 just the magnitude that impacts.

15 Q. So this project is not needed for
16 reliability, right?

17 A. This is not being proposed as a
18 reliability project, that is correct.

19 Q. Are you familiar with how MISO
20 characterizes transmission projects, baseline
21 reliability projects --

22 A. For the most part.

23 Q. -- and multi-value projects?

24 A. For the most part, yes.

25 Q. Are you generally familiar with the

1 characteristics of each of those categories, so
2 what constitutes a baseline reliability project
3 versus a market efficiency project development?

4 A. Sure. Yes.

5 Q. Are you able to say which of those
6 three categories Clean Line, the Grain Belt Express
7 would be most analogous to, if you can?

8 A. Well, as Mr. Zavadil will testify
9 later, there are reliability benefits associated
10 with it, and we generally tout this as a project
11 that brings economic benefits associated with it to
12 the grid in terms of operation. So in that sense,
13 being kind of a mixed package, it would be, in my
14 opinion, more analogous to an MVP-type project.

15 Q. So it has multiple benefits in terms
16 of market efficiency, public policy and perhaps
17 some reliability benefits?

18 A. Yes, sir.

19 Q. But it's not being proposed to
20 satisfy some NAERC reliability standards or some
21 other governmental-imposed reliability standard?

22 A. That's correct.

23 Q. But it will have reliability
24 benefits?

25 A. Yes.

1 **Q. So there was discussion of the system**
2 **impact study from PJM?**

3 A. Yes, sir.

4 **Q. Have MISO and SPP conducted similar**
5 **studies?**

6 A. So MISO -- again, it's a different
7 interconnection. We're in the generation
8 interconnection process because they don't have the
9 transmission interconnection process per se. But
10 when we started this project, we sat down with MISO
11 to determine where do we plant the proverbial flag,
12 if you will, to get the project studied and
13 interconnective reliability. So we went into the
14 generation interconnection process.

15 So it's a very similar process that
16 you, in their phraseology, do a feasibility study
17 and you have the optional SPA study, which I
18 believe I misspoke earlier and said that that
19 was -- we had not entered that, but we actually
20 have entered that process. I reviewed my testimony
21 over the break. And then finally the definitive
22 planning phase. So those would lead you through to
23 essentially both the facility study and a signed
24 interconnection agreement within MISO.

25 And then SPP does not have a

1 transmission interconnection process per se. And
2 the SPP criteria, specifically criteria 3.5, they
3 have a transmission-to-transmission interconnection
4 process, if you will, that involves a set of
5 studies with all affected parties around the table
6 that helped scope the studies. Then the results of
7 those studies are -- are presented to the SPP
8 transmission working group, and the SPP
9 transmission working group approves the studies and
10 approves the interconnection.

11 **Q. And each of those processes is in**
12 **process -- proceeding?**

13 A. Yes, sir. The criteria 3.5 studies,
14 the initial arm was actually completed, and the SPP
15 TWG moved to accept the studies. They did ask us
16 to, when we have completed final design and
17 selected a vendor, refresh the studies based on the
18 specific control algorithms that that vendor will
19 utilize.

20 **Q. Will the line increase congestion in**
21 **SPP, MISO or PJM?**

22 A. No. I think we've got a lot of
23 testimony around that that shows that it does not
24 increase congestion, primarily Mr. Berry and
25 Mr. Cleveland.

1 CHAIRMAN KENNEY: I don't have any
2 other questions. Thank you. I think that's it for
3 me.

4 JUDGE BUSHMANN: Commissioner Stoll?

5 COMMISSIONER STOLL: Thank you.

6 QUESTIONS BY COMMISSIONER STOLL:

7 Q. Good afternoon.

8 A. Good afternoon.

9 Q. I have a couple of questions just
10 regarding how the system operates in general. In
11 your direct testimony on page 14, you talk about
12 Grain Belt Express anticipated injecting 3500
13 megawatts of power into the MISO markets at the
14 St. Francis 345 station in eastern Missouri. Just
15 is the -- is that substation an Ameren substation
16 or is that a -- do you happen to know?

17 A. That is an Ameren submission.

18 Q. Okay. And then after working with
19 MISO, and I guess what I wanted to know about that
20 is, how does it work as far as you worked with MISO
21 and how does Ameren fit into this? You're looking
22 to drop so much power there. How does Ameren fit
23 into that picture with MISO?

24 A. So in the -- in the studies, the RTO
25 brings to the table all the affected parties. So

1 primarily in the early phases it's with the
2 transmission owner that you are interconnecting
3 with. So in the kick-off calls and scoping
4 meetings, those entities are involved with it, and
5 many times the RTO actually kind of -- it's opaque
6 to us, but behind the scenes when we're running the
7 studies, those are iterative with the planning
8 departments of the TO with whom we're
9 interconnecting.

10 Q. And then once it was determined that
11 it would be cost prohibitive to do that, at least
12 uneconomical, and then -- oh, of the -- let's see.
13 Of the 3500 megawatts that was being planned to be
14 delivered and I guess converted at the -- at that
15 St. Francis substation, is that where it's
16 converted from DC to AC --

17 A. Yes.

18 Q. -- to go east?

19 A. Yes, sir.

20 Q. And everything is converted there?

21 A. Yes.

22 Q. All the power? So then with the new
23 alternative that was examined, the -- as it says,
24 the -- under the current plan of injecting a small
25 portion of the power into MISO, so if, say, the

1 proposal is for 500 megawatts to be dropped in to
2 MISO at that point in eastern Missouri, is all the
3 power converted to AC at that point? It didn't
4 seem like it to me because then they talk about the
5 Sullivan, Indiana converter. Could you tell me how
6 that works?

7 A. Oh, absolutely. So the -- you can
8 think of the -- the Maywood facility converter
9 station 500 megawatts essentially being a tap of
10 the line. So it essentially taps off 500
11 megawatts. And then the remaining 3500 megawatts
12 will go to the Sullivan substation and be converted
13 to AC, injected into the AC grid there.

14 Q. So the -- as the balance of that
15 power moves east, it's DC power?

16 A. Yes, sir.

17 Q. Okay. The other question I had
18 was -- and there were a lot of good questions asked
19 today. As far as the -- on page 18 of your direct
20 testimony, it says -- you say that the company has
21 supplier agreements with ABB, Hubble, and General
22 Cable. And I think it was the testimony yesterday
23 of Mr. Lawlor, he talks about forming partnerships.
24 Could you tell is a little bit about how that
25 works? What is a -- how does a supplier agreement

1 **work?**

2 A. So in this case, one of the, I guess,
3 guiding principles, if you will, of the company is
4 to source local labor and suppliers that are
5 qualified. And so within the project footprint
6 there are actually several suppliers of equipment
7 that we can use. And so we work with them and
8 essentially sign memorandums of understanding with
9 them that they are a preferred supplier.

10 So subject to, you know, conditions
11 around market pricing and things like that, we
12 won't necessarily use competitive process, assuming
13 we can benchmark pricing from the supplies that
14 they would give us and utilize them as a preferred
15 supplier of that particular product.

16 **Q. And is that -- how are they -- who**
17 **chooses them then? Is it Clean Line or does**
18 **another entity involved in the project actually**
19 **select those suppliers?**

20 A. These relationships have been built
21 and decided upon by Clean Line.

22 **Q. Okay. And it also -- let's see. I**
23 **think it's in here. Yes. It talks a little bit**
24 **about what each of the suppliers would bring to the**
25 **project. And how about forming partnerships with**

1 vendors, is that something that you spoke to in
2 your testimony or is that probably -- or is that
3 for someone else? Like, let's say, land surveyors,
4 other possible vendors, they --

5 A. Other services involved during
6 construction, things like that?

7 Q. Yeah. Yeah.

8 A. We through our public outreach that
9 we perform -- and Mr. Lawlor probably touched on
10 this, if I recall correctly. One of the things
11 that we do do is seek, you know, local folks such
12 as surveying companies, geotech companies,
13 clearing, folks that have capability of doing
14 clearing. We have conversations with hoteliers,
15 all of the folks that would be involved and/or
16 impacted and benefited by, you know, construction
17 opportunities better associated with this kind of
18 construction. So it's a pretty normal, again, kind
19 of guiding principle for all the developers.

20 Q. So you kind of let all these possible
21 vendors know about the project and then is there
22 like a RFP that's put out?

23 A. Right now there is -- the development
24 team collects -- collects their information and
25 maintains it in a database. And so ultimately

1 there will be an RFP process probably for a lot of
2 those services, and that would be led primarily by
3 the folks -- the person or entity that is -- will
4 construction manage the process.

5 **Q. Okay. That's Power?**

6 A. Well, Power is our owner's engineer.
7 So it could be that they provide the bid
8 specifications.

9 **Q. Okay.**

10 A. But ultimately there will be a
11 large -- need for a large construction contractor
12 and construction manager. So that could be someone
13 like a Kiewit or a Fluor or Quanta Services are big
14 in the industry space that can project manage this.
15 So ultimately that will -- they would issue those
16 RFPs and those bid specs. And typically the way we
17 would have to work with that is an open book
18 process so we can make determinations around if a
19 local supplier, for instance, may be a little more
20 expensive but is higher qualified, you know, our
21 preference would be to go with the local supplier.
22 But again, that's depending on the -- the activity
23 they may be performing.

24 COMMISSIONER STOLL: I think that's
25 it. Thank you.

1 THE WITNESS: My pleasure.

2 JUDGE BUSHMANN: Commissioner Kenney?

3 QUESTIONS BY COMMISSIONER W. KENNEY:

4 Q. Thank you, Dr. Galli. I really
5 enjoyed hearing your testimony. I learned a lot
6 from you and Mr. Skelly. I do have a follow-up
7 question on what Commissioner Stoll just asked you.
8 You have a memorandum of understanding?

9 A. Yes, sir.

10 Q. But there's no guarantee that you're
11 going to use any vendors in Missouri? I mean,
12 there's no guarantee?

13 A. There's no absolute guarantee, no.

14 Q. All right. Yeah. But, I mean, it
15 could be -- I heard testimony from some families on
16 our trips on our route around the state where they
17 had linemen who were working outside of our state
18 because that's where they had to find work.

19 A. Right.

20 Q. It's a competitive market.

21 A. It is a competitive market. Those
22 MOUs are written such that we would agree on when
23 we would move to an actual supply contract, that we
24 would agree upon some metric by which --

25 Q. I understand. Great. I do have a

1 question on the -- I tried to go back in my notes
2 when Mr. Lawlor came through and gave some great
3 presentations to our Commission. I appreciate the
4 way the company did some things coming before it
5 early on. But I don't remember Missouri being a
6 drop-off part -- I'm sorry. I don't remember
7 Missouri being a point of drop off.

8 At what point did Clean Line make a
9 decision to drop 500 megawatts into Missouri? Was
10 that the original decision or when was that made?

11 A. Well, originally the project was
12 envisioned as the full 3500 megawatts into the
13 St. Francis substation I was talking with
14 Commission Stoll about. And when -- we kind of
15 went through the analysis of that putting
16 500 megawatts into the 3500 kV sub like St. Francis
17 was not practically feasible, if you will. So
18 we've always had a delivery point in Missouri.

19 Q. But that 3500 still wasn't going to
20 be in Missouri, was it?

21 A. Well, it would be for the markets
22 that had access at that point. So within the MISO
23 and between MISO and PJM it could be transferred,
24 right. But whether Missouri could use the full
25 18 million megawatt hours of energy or not, I don't

1 remember that analysis. But -- so we've always had
2 a drop-off point in Missouri, and so when we
3 extended -- decided to extend to Sullivan, we
4 actually kept the decision to have a drop-off point
5 in -- in Missouri.

6 And at that point -- and I'm really
7 scratching the dusty brain cells to figure out when
8 that was -- we actually ran an RFI with the HVDC
9 suppliers to basically do a sanity check on the
10 feasibility of that third terminal and having a
11 three-terminal system. So that was -- I remember
12 that was a rather big process. I just really don't
13 remember the time frame. It seems like that was
14 about three years ago.

15 **Q. That's what I'm saying. You would**
16 **drop off 500 megawatts. That's \$100 million.**

17 A. It is. That's very expensive, yes.

18 **Q. I was just curious as to why at that**
19 **point and why 500 megawatts. I'm just curious. I**
20 **heard that question asked earlier.**

21 A. And it's based on what I think -- you
22 know, we think that the market will bear for, you
23 know, the RPSs that are in place for the MISO
24 region. As the MISO -- the MVP projects have
25 evolved, and the primary goal of the MVP projects

1 were to ensure that states within the MISO
2 footprint could meet their renewable energy
3 standards. So the full 3500 megawatts would be
4 overkill in that context.

5 **Q. I appreciate that. Are you familiar**
6 **with your -- are you a good guy to ask about your**
7 **easements?**

8 A. In terms of easements?

9 **Q. Yeah. Easements and things like**
10 **that.**

11 A. All depends on the question.

12 **Q. So they cross fence, right, as long**
13 **as they provide a gate at every cross fence; is**
14 **that correct?**

15 A. I don't know how it reads. Typically
16 in my experience with transmission lines, if
17 there's need to cross fence, typically it's
18 negotiated with a gate installed.

19 **Q. So that would be negotiated early on.**
20 **I saw something in here about cross fencing. I**
21 **know a lot of ranchers like to rotate.**

22 A. Right.

23 **Q. Move those fences around quite often.**

24 A. Right.

25 **Q. Okay. How close to a tower can a**

1 farmer plant crops? And if you don't know --

2 A. I don't know within feet. Just from
3 experience and observation, they get pretty darn
4 close, you know.

5 Q. But there's -- so the limitations are
6 pretty liberal as far as how close they can get?

7 A. Yeah. We wouldn't have a
8 requirement.

9 Q. Okay.

10 A. We wouldn't have a zone, no.

11 Q. And I know in your sample of -- the
12 sample document of the easement that was handed out
13 allows for Clean Line to have ingress and egress at
14 any time, and that's during a crop harvest or
15 during crops could even damage a bunch of crops.
16 Is that something that's worked out ahead of time
17 in the -- in the easement process or damage of
18 crops and things like that?

19 A. So my understanding of the easement
20 agreement and typical industry practice is that
21 the -- there would be evaluation made of the damage
22 by an independent party, and then that -- depending
23 on what the crop was. So, for example, if it's
24 corn, anticipated market price for that corn would
25 be compensated.

1 **Q. Is that all worked out ahead of time**
2 **in the lease arrangement?**

3 A. In terms of like pricing?

4 **Q. Not pricing. Just the damage**
5 **situation.**

6 A. Without reviewing the lease, I
7 honestly can't remember, Commissioner.

8 **Q. Okay. Are you familiar with the blue**
9 **line -- EPA's blue line stream buffer zones?**

10 A. I recall reading something about
11 this, but I don't --

12 **Q. I was just wondering how that affects**
13 **you as far as tree removal and tree replacement.**
14 **Do you know anything about that on your company's**
15 **standpoint? I know you have to remove a lot of**
16 **trees when you do a transmission.**

17 A. Right. Right. You know, a lot of
18 that depends on environmental permitting, is my
19 understanding. And, you know, obviously you can't
20 have trees growing under your transmission line.
21 So in an area that is wood, you would do, you know,
22 tree removal and, you know, any -- what they term
23 as danger tree removal, if the tree might have a
24 possibility of falling on the transmission line and
25 that sort of thing.

1 **Q.** **Okay. So you don't have a big grasp**
2 **of that?**

3 **A.** This EPA blue stream buffer zone? I
4 do not have a grasp of that.

5 COMMISSIONER KENNEY: I think that's
6 all I have. Thank you.

7 JUDGE BUSHMANN: Commissioner Stoll?

8 COMMISSIONER STOLL: Quick follow-up
9 maybe.

10 FURTHER QUESTIONS BY COMMISSIONER STOLL:

11 **Q.** **On the issue that I was talking about**
12 **with a converter station in Missouri, if -- in**
13 **order for -- to drop say the -- up to 500 megawatts**
14 **in Missouri, you would -- Clean Line, Grain Belt**
15 **Express would have contracts with load-serving -- a**
16 **load-serving entity or entities at that point? How**
17 **does that work?**

18 I mean. Let's say that if Ameren
19 says, you know, we appreciate it, but we're not
20 going to -- we don't need this power, they have
21 other sources, what happens then?

22 **A.** Well, the power could still be used
23 within the MISO market.

24 **Q.** **Okay. That's what I was --**

25 **A.** For supplying renewable energy

1 credits or supplying energy to another entity
2 within the MISO market. So we would have -- our
3 agreements would essentially not be for the energy.
4 Our agreements would be for capacity on the line.
5 And that could be either with load-serving entities
6 or with generators. And then the load-serving
7 entities and the generators would get together to
8 negotiate, you know, the power purchase agreements.

9 **Q. Would those purchase agreements be**
10 **best suited for, I guess, then southern Illinois**
11 **and that region and distance?**

12 A. It's -- you know, you're injecting in
13 the MISO market. So depending on delivery --
14 delivery rules and price and that kind of thing, it
15 would greatly depend.

16 **Q. Okay. And so would the plan be to**
17 **deliver up to 500 megawatts and -- and inject that**
18 **into the system for sale someplace? How does that**
19 **work if you -- with MISO? You know what I mean?**
20 **If -- would you have a contract with a generator**
21 **in --**

22 A. So I think the simplest -- simplest
23 way to answer that and maybe a pretty simplistic
24 term would be that somebody has capacity, owns
25 capacity on our project, and that is an amount of

1 capacity. Let's say they own the full

2 500 megawatts --

3 **Q. Okay.**

4 A. -- on our project, and it's the
5 500 megawatts to the Missouri converter. So they
6 would either be buying capacity to the Missouri
7 converter or the Indiana converter. So somebody
8 owns that. Could be a load-serving entity. Could
9 be a generator.

10 **Q. Yeah.**

11 A. For sake of argument, let's assume
12 it's a generator. There's a couple of ways they
13 could transact on that. They could either bid into
14 the energy market and say, well, you know, my bid
15 into the energy market for MISO to dispatch me is
16 this, you know. And then they would essentially
17 utilize the market to dispatch them to that level.
18 And so the MISO market machine, if you will, would
19 crank the numbers and dispatch them.

20 The other is that they could have a
21 specific power purchase agreement for delivery of a
22 certain number of megawatt hours to a load-serving
23 entity, and then contractually they would dispatch
24 against that.

25 COMMISSIONER STOLL: Okay. I think

1 that answered my questions. Thank you.

2 QUESTIONS BY COMMISSIONER HALL:

3 Q. Good afternoon.

4 A. Good afternoon, sir.

5 Q. If I understand your testimony
6 correctly, MISO has not identified this project or
7 in any way identified this project as one that is
8 needed in the MISO footprint?

9 A. That's correct. MISO doesn't have a
10 process for determining a need of a merchant
11 project.

12 Q. That's actually exactly where I'm
13 going. So the fact that they haven't said it's
14 needed is not a -- should not be a significant
15 factor to us in determining whether it's needed or
16 not, right?

17 A. That's correct.

18 Q. And that's because -- could you say
19 again why that's not a significant factor for us?

20 A. MISO doesn't have a process for
21 determining whether there is a need for a merchant
22 project such as ours. Their process is focused
23 solely on projects within their footprint that
24 would be cost allocated to the ratepayers of their
25 footprint. There is also not a mechanisms as of

1 yet by which interregional projects such as this
2 are analyzed by the RTOs for the basis of need.

3 **Q. You testified that the company has**
4 **determined that -- that you will give functional**
5 **control of the line to PJM?**

6 A. Correct.

7 **Q. Explain to me how it would work for**
8 **the 500 megawatts in the MISO footprint. How would**
9 **the demand or the lack of demand by an LSE be**
10 **communicated and effectuated if it's not MISO that**
11 **is in control of PJM?**

12 A. So when we talk about functional
13 control, there's a couple of aspects of functional
14 control. Primary aspect of functional control in
15 the FERC is for transparency. So you have an
16 independent party that is managing the tariff
17 aspects of the project. So what would have to --
18 what would -- what will evolve will be operational
19 agreements between PJM and MISO and SPP. So all
20 three of those entities will ultimately have --
21 they're sometimes referred to as joint operating
22 agreements, JOAs, and seams agreements.

23 But essentially, if the project is
24 viewed as under the control of PJM, it creates a --
25 an additional seam, if you will, between PJM and

1 MISO that has to be managed per their seams policy.
2 That's how it would be effectuated, that the
3 entities would manage that through their typical
4 seams policies and joint operating agreements.

5 **Q. So it wouldn't be cumbersome?**

6 A. It should not be cumbersome.

7 **Q. Any more cumbersome than the current**
8 **process?**

9 A. That's correct.

10 **Q. Your direct testimony on page 4**
11 **indicates that the project will be capable of**
12 **delivering up to 3500 megawatt hours of power into**
13 **the PJM market and 500 into the MISO market. If**
14 **there was not a demand for the 500 in the MISO**
15 **market, would it be technically possible to send**
16 **more than the 3500 into PJM?**

17 A. Technically. Not legally but
18 technically, if you design the converter station on
19 the PJM side at the right ratings. At this point
20 we don't have plans for that. The converter
21 station is designed at this point or will be
22 designed to deliver 3500 megawatts. You would have
23 to design it to deliver above that.

24 **Q. And right now, there -- there are no**
25 **plans to do so. So if the -- so if the demand was**

1 not there for the 500, you're not going to increase
2 it to 3500?

3 A. To my knowledge, we don't have any
4 plans to do that.

5 Q. And here -- your certificate with
6 Indiana only allowed for 3500; is that correct?

7 A. That's my recollection, yes, sir.

8 Q. And what you're seeking in Illinois
9 is only 3500?

10 A. That's correct.

11 Q. And what you're seeking here is only
12 3500?

13 A. Yes.

14 Q. So if you want to do -- to deliver
15 more, not only would you have to make some
16 technical modification to the converter, you'd also
17 have to seek a waiver or variance or somehow come
18 back before these three commissions?

19 A. If that would be --

20 Q. If you're not able to answer that --

21 A. I would just say based on my lay
22 understanding and my previous experience with
23 commissions, if the order is -- it is that
24 specific, something would have to be filed or
25 something would have to happen. So what the

1 logistics are in Missouri, I can't speak to that in
2 specific.

3 Q. Looking at Footnote 1 on page 4
4 again of your direct testimony, you mention the
5 500 megawatt converter in Ralls County, and you
6 indicate that -- and I want to make sure I'm
7 reading this correctly -- that it will be built to
8 handle 1000, but you only plan on using 500?

9 A. Yes, sir. That's what that reads.

10 Q. So if -- and why is that? Why are
11 you building to 1000?

12 A. So there's a couple of technical
13 reasons other than that we probably -- I think we
14 included later in DR responses that we made sure we
15 included this footnote. When you have a
16 multi-terminal HVDC project such as this one,
17 typical application is Point A to Point B. When
18 you add a third converter, it is costly, and it
19 puts into place additional control parameters that
20 you have to implement in the control systems of the
21 converter.

22 During a system contingency, if
23 that -- if that midpoint is relatively small
24 compared to your largest converter, so in this case
25 we have 500 megawatt converter, and our largest

1 converter would be on the windward side rated about
2 42 megawatts. If you have that relative -- that
3 large difference there, when you do the studies,
4 you see that there's some problems recovering the
5 midpoint during faulted conditions.

6 So if you design it at a higher
7 rating, essentially what happens is you build
8 bigger transformers, they insert some electrical
9 parameters into the system that prevent those
10 control issues from occurring.

11 So there's a technical aspect as to
12 why you might rate it higher. The initial design,
13 though, would not allow you just because of that
14 rating on the transformers and converter hall are
15 higher, would still not allow you to inject more
16 than 500 megawatts because that would still require
17 some additional upgrades on the AC side of the
18 converter station. Does that -- it's pretty long
19 and complicated.

20 Q. Well, in the footnote it says, it
21 will be rated at 1000 in the event market demand
22 later necessitates it.

23 A. Yes.

24 Q. Okay. That doesn't seem -- that
25 seems to be that it's market driven as opposed to

1 **driven by the -- by the technological issues that**
2 **you mentioned.**

3 A. It's a little bit of both, and
4 that's -- I was trying to make clear, and I
5 probably didn't do a good job of it, was that
6 initially, you know, this is how we explained that
7 the rating would be somewhat higher, that if there
8 was future demand we'd be more than happy to take
9 advantage of that future demand within MISO.

10 But there are technical reasons
11 behind a higher rating. There are other aspects
12 that would require you -- other than just the
13 rating of the transformers and the valves that you
14 would be required to do in order to inject more
15 than 500 megawatts based on our current design. So
16 you would add some filter banks and things like
17 that that we aren't planning.

18 **Q. On page 23 of your surrebuttal, you**
19 **say that it would be technically -- it would not be**
20 **technically feasible to bury the line?**

21 A. That's correct.

22 **Q. Would it be technically feasible to**
23 **bury a portion of a line?**

24 A. I think in general the logistics,
25 et cetera, associated with this would make it still

1 technically infeasible, meaning not likely or
2 logical to do so.

3 Q. So it wouldn't be possible to, if
4 there was one particular part along the route that
5 we didn't want that -- that we wanted to bury the
6 line, if there was 100 feet, that would be a huge
7 problem?

8 A. I think from a -- from a -- I don't
9 want to -- I don't want to split hairs. From an
10 engineering perspective, could you engineer it?
11 Potentially. From a cost perspective and from a
12 financing perspective, it would be extremely
13 challenging, because nobody at 600 kV and
14 3500 megawatts has a cable system that does that.
15 So it would be -- essentially we would be the alpha
16 project associated with that. So again, it makes
17 it very improbable that you could obtain financing
18 around that kind of thing.

19 Q. That actually is -- because I wasn't
20 clear from reading your testimony. You said that
21 it's never been done before to bury a line of
22 this -- of this -- of this power rating for this
23 distance. But what I -- what I couldn't tell is
24 whether it had ever been buried for -- whether a
25 line of this power rating had ever been buried for

1 any amount of -- of distance?

2 A. No. No, it has not.

3 COMMISSIONER HALL: That's all I
4 have. Thank you.

5 THE WITNESS: Thank you, sir.

6 QUESTIONS BY COMMISSIONER RUPP:

7 Q. Good evening, sir. Just following up
8 on a couple of the Commissioners' questions. Let's
9 say that there is -- well, let's just say this
10 Commission believes that in order for there to be a
11 public interest, we need 750 megawatts dumped into
12 Missouri. So you go ahead and do that right now
13 because you're building it to 1000 megawatts, and
14 is that something that you guys could do or would
15 that upset your agreements within Indiana? So is
16 there a minimum of 3500 you have to supply or how
17 would that affect it?

18 A. Well, I don't want to start
19 negotiating a deal with you right now, but -- so if
20 you mean -- if it would mean from taking -- you
21 know, sending less power to Indiana and diverting
22 it to an operating converter station as opposed to
23 keeping the amount the same and just adding power,
24 it's kind of two different scenarios.

25 In the latter, you would have to

1 upgrade your windward side converter. So -- so
2 your question is whether or not the 750 megawatts
3 would upset kind of the business plan and technical
4 specifications?

5 It could potentially insert some
6 delay, because we have to go and refurbish, go back
7 through the study processes that we've been in both
8 PJM. PJM would not be as arduous because we are
9 reducing the amount of power. MISO, we would have
10 to increase our request there and go through the
11 process. So it could essentially put us kind of
12 back in the queue process. From a technical
13 perspective, engineering perspective, it's not that
14 much more of a challenge.

15 **Q. Seems like your plan is not dependent**
16 **but enhanced by the need, the want, the desire to**
17 **have cleaner energy, whether or not that's being**
18 **regulated or each state has their own goals they**
19 **want to hit. How much of the proposed 111(D)**
20 **regulations -- let's just say that they were thrown**
21 **out tomorrow in a lawsuit. Would that affect the**
22 **financial viability of this project if those**
23 **demands were not coming down from the federal**
24 **government in the near future?**

25 A. To date we haven't spent a lot of

1 time basing the economics of our projects on
2 111(D). You know, we started before they were even
3 published rules. So as of -- as of now, you know,
4 we don't really look at the 111(D) impacts in
5 detail for the pro forma analysis of our projects.
6 So if they were thrown out tomorrow, I don't think
7 it impacts, you know, kind of our analysis of that.
8 Mr. Berry would be a much better talker about that
9 aspect of it.

10 Q. And then there's been -- and there's
11 some testimony, and I just can't dig through and
12 find it, but what is the financial difference on
13 the cost per -- per hour if the wind production
14 credits were eliminated and your producers were not
15 allowed to use those? Let's say they were thrown
16 out. How competitive would this power be without
17 those credits?

18 Q. So compared to -- and Mr. Berry, I
19 think, gets in very detail about this. But
20 compared to new generation sources, we're still
21 competitive. So it adds about 20, \$23 to the
22 overall price per megawatt hour, subject to check
23 with Mr. Berry, but we still find them to be
24 competitive within the PJM market.

25 COMMISSIONER RUPP: That's all I

1 have.

2 JUDGE BUSHMANN: Okay. Any recross
3 based on Bench questions, Wind on the Wires Wind
4 Coalition?

5 Commission Staff?

6 MS. HAMPTON: I do have a couple of
7 questions.

8 CROSS-EXAMINATION by MS. HAMPTON:

9 Q. All right. So you had mentioned that
10 the Missouri converter station would only be used
11 for 500 megawatts, and you're also saying that
12 there are no circumstances under which it would be
13 used to inject more than 500 megawatts even under
14 like fault conditions, for example?

15 A. That's correct. The -- one of the
16 benefits of HVDC during fault conditions is you
17 don't add to short circuit current through the
18 converter. So it doesn't inject more power into
19 the grid during the fault condition.

20 Q. Okay. I'd like to follow up on a
21 question from Chairman Kenney regarding the RTO
22 studies. You had mentioned the need to refresh one
23 study, and so it kind of made me think or wonder
24 which other studies need to be refreshed. So my
25 question is, which, if any, of the studies have

1 studied the current 4000 megawatt design of the
2 1000 megawatt converter station?

3 A. So currently both PJM and MISO are
4 studying that for the interconnection requests.

5 Q. Okay. But none of the ones that have
6 been completed so far have studied that?

7 A. Well, the PJM system impact study is
8 complete, as well as the MISO feasibility study,
9 and we're in the SPA process right now there, in
10 process. So the PJM -- I'm sorry. PJM system
11 impact study, if I misspoke earlier, has been
12 completed.

13 Q. And that --

14 A. That assumes -- it assumes
15 3500 megawatts into PJM per the request, and they
16 are aware that there is the 500 megawatt drop-off
17 in MISO. How they accounted for that in the
18 studies, I don't know, but they are aware of that
19 in the process.

20 Q. Okay. So you can't say if they've
21 studied it at 4000, including the 500 megawatts in
22 Missouri or if they studied it at 3500 and 500; is
23 that correct?

24 A. Let me just say what they have
25 studied.

1 Q. Okay.

2 A. They have studied -- PJM has studied
3 the 3500 megawatt injection.

4 Q. Total?

5 A. Total.

6 Q. Okay.

7 A. To the PJM system.

8 Q. Okay.

9 A. As part of that, now we're moving
10 into the feasibility study phase, and part of that
11 is an affected system study they have to perform,
12 you know, per tariff rules and reliability rules
13 with MISO. So that affected system study will be
14 looking at the MISO injection, the 500 megawatts,
15 plus the 3500 megawatts.

16 When PJM did their
17 3500 megawatt study, they are aware of the
18 500 megawatt drop-off into Missouri. How they
19 accounted for that in their study, I don't know.
20 There's nothing explicit in the study report that
21 says they did or did not, but they are aware of --
22 that that is a configuration of the project.

23 Q. Okay. So it's possible that the
24 study is 3500 total, including the 500 in Missouri?

25 A. No.

1 Q. Are you telling me it's not possible?

2 A. No, no. What the reality is, it's
3 3500 megawatts injected into PJM.

4 Q. Okay.

5 A. Okay. And --

6 Q. I see what you're saying.

7 A. And whether or not they included into
8 their analysis an injection into MISO or not, I
9 can't say for sure, but they are aware that that is
10 the configuration.

11 Q. Okay. I'm going to move on. This
12 next question I'm going to try to phrase in a way
13 that does not ask for a legal opinion, but I'm
14 certain your attorney will stop me if I do. So
15 let's say hypothetically the CCM is granted and,
16 you know, you were still waiting on these studies
17 to be done. So if these studies yield an
18 unfavorable result that might cause Grain Belt to
19 somehow alter the project design or the route, is
20 it Grain Belt's intention to come before the
21 Commission again to seek its approval or consent?

22 A. I think it would be subject to how
23 the Order is written, you know. Again, in my
24 experience, depending upon state rules and statutes
25 and what the Commission orders, it's highly

1 dependent on what is written and what is ordered.

2 And that's just been my experience in other
3 jurisdictions.

4 **Q. Okay. You had also mentioned, I**
5 **believe that you had -- that the SPA study had been**
6 **completed or you were in the process?**

7 A. Well, we went into the SPA study --

8 **Q. Okay.**

9 A. -- I believe it was in May of this
10 year.

11 **Q. Okay. And after that you're planning**
12 **on going into the DPP?**

13 A. Assuming the PJM studies have
14 progressed appropriately and we have the option to,
15 quote, unquote, park the SPA study before we enter
16 the DPP. But at some point in time, assuming PJM
17 is finished with the system studies with MISO, we
18 would move into the DPP phase.

19 **Q. Okay. Are you aware of any time**
20 **constraints as far as how long you're allowed to**
21 **park the SPA?**

22 A. I believe it's 18 months.

23 MS. HAMPTON: Okay. That's all I've
24 got.

25 JUDGE BUSHMANN: United for Missouri?

1 MR. LINTON: I have no questions.

2 JUDGE BUSHMANN: Rockies Express?

3 MS. DURLEY: No questions.

4 JUDGE BUSHMANN: Show-Me Concerned
5 Landowners?

6 MR. JARRETT: Yes, Judge. Thank you.
7 Just a couple.

8 CROSS-EXAMINATION BY MR. JARRETT:

9 Q. And this first one is -- I'm not
10 trying to play gotcha in any way. I'm just trying
11 to -- I'm just trying to make sure I understand the
12 total updated current estimated cost of the
13 project. Chairman Kenney asked you a couple of
14 questions about the cost, and you indicated that
15 the cost is 2.2 billion, did you?

16 A. That's correct.

17 Q. Okay. And you indicated, I think to
18 Chairman Kenney, that that included the upgrades
19 identified in the PJM SIS study; is that accurate?

20 A. To my knowledge, we have always
21 included a level of upgrades, you know, of that
22 order of magnitude. Mr. Berry knows the details on
23 those and he'll be testifying later in the evening,
24 hopefully. But he -- he'll have more details on
25 exactly what he included in his analysis.

1 But my understanding is that we do
2 include upgrade costs, whether it was the exact
3 number identified in PJM or not. I haven't looked
4 at the pro forma in quite a while, but it's of
5 that -- that order of magnitude.

6 **Q. And I know you say in your**
7 **surrebuttal, you say that the levelized cost energy**
8 **model presented in David Berry's direct testimony**
9 **includes an estimate of network upgrade costs?**

10 A. Yes.

11 **Q. In his surrebuttal testimony**
12 **Mr. Berry updates his model to include the**
13 **estimated upgrade costs from the PJM system impact**
14 **study which I discuss below. That seems to**
15 **indicate to me that he didn't include the estimated**
16 **upgrade costs from the PJM system impact study in**
17 **his original direct testimony.**

18 A. My understanding is that we've always
19 included some level of upgrade costs in the -- in
20 the models that Mr. Berry runs for economic costs.

21 **Q. Again, I'm not trying to play gotcha,**
22 **but -- and I can show you this. I'm looking at**
23 **Grain Belt's application. And I'm happy to show**
24 **it, but I'll just read it and you can take a look**
25 **if you want to check it.**

1 **Grain Belt Express estimates that the**
2 **total cost of the project will be approximately**
3 **2.2 billion. And then there's a Footnote 2, and**
4 **Footnote 2 says, This figure does not include the**
5 **cost of network upgrades required to interject the**
6 **project to the electric transmission grid.**

7 A. Okay.

8 **Q. So what's the true cost right now of**
9 **the project?**

10 A. Well, it's my --

11 **Q. 2.2? 2.7?**

12 A. So my understanding in my discussions
13 with Mr. Berry around this is we've always included
14 some levels of upgrades in the model. You can't
15 drop 3500 megawatts into any substation and not
16 expect there to be some level of upgrades
17 associated with it. And so we've always included
18 some order of magnitude in that number. Now,
19 whether that 2.2 included them or not, we're kind
20 of discussing some semantics here, but I've always
21 thought that the total price included it.

22 MR. ZOBRIST: Judge, I'll state for
23 the record, just to Mr. Jarrett's point, the
24 application is correct. It is 2.2 billion plus
25 other costs, and Mr. Berry will be able to testify

1 to that.

2 But the cost of the project,
3 Mr. Jarrett, is \$2.2 billion. There are other
4 costs that have been included in the company's
5 financial model, and Mr. Berry can answer and
6 explain that.

7 MR. JARRETT: Okay. Fair enough.

8 BY MR. JARRETT:

9 Q. And then I have one other question.

10 Commissioner Rupp was asking you about the
11 production tax credits, and if they were not
12 available, would Grain Belt's price still be
13 competitive. And I believe you said something to
14 the effect that you've run the models or Grain Belt
15 Express has run it and that you would be
16 competitive in PJM?

17 A. I think that's what I said.

18 Q. That's what you said?

19 A. But in general we should -- we will
20 be competitive with new forms of generation.

21 Q. That was my question. You are aware
22 that prices in PJM are higher than they are in
23 MISO --

24 A. Yes.

25 Q. -- Missouri?

1 A. This is on a levelized cost of energy
2 basis that Mr. Berry talks extensively about, yes.

3 **Q. So you would now include Missouri in**
4 **MISO and --**

5 A. Yes.

6 **Q. -- say you would be competitive there**
7 **as well?**

8 A. Yes.

9 MR. JARRETT: That's all I have.
10 Thanks.

11 JUDGE BUSHMANN: Missouri Landowners
12 Alliance?

13 MR. AGATHAN: I have nothing, Judge,

14 JUDGE BUSHMANN: Redirect?

15 MR. ZOBRIST: I'm going to cover a
16 lot of territory, Judge, but I think I can get this
17 done.

18 REDIRECT EXAMINATION BY MR. ZOBRIST:

19 **Q. You were asked some questions,**
20 **Dr. Galli, about whether you had a pipeline**
21 **engineer on staff and you said you did not. Do you**
22 **recall that?**

23 A. I do recall.

24 **Q. Do you have any relationships with**
25 **existing vendors who have professional pipeline**

1 **engineers on staff?**

2 A. Sure. Our owner's engineer who we
3 use extensively, Power Engineers, Incorporated, has
4 relevant expertise in doing these sorts of studies
5 and understands negotiations.

6 **Q. And just remind the Commission, if**
7 **you would please, who is Power Engineers?**

8 A. Power Engineers is our owner's
9 engineer. You mean specifically who they are?

10 **Q. Well, just what does owner's engineer**
11 **mean?**

12 A. They are the folks that essentially
13 augment our staff as necessary and provide design
14 expertise in areas that we don't have staff
15 associated with.

16 **Q. Now, you were asked some questions**
17 **earlier today by Rockies Express counsel regarding**
18 **coordination with pipelines. Is it common for**
19 **electric transmission companies to coordinate with**
20 **pipelines prior to construction but after receipt**
21 **of regulatory approvals?**

22 A. Yes.

23 **Q. Why is it premature at this point in**
24 **time not to talk to Rockies Express or other**
25 **natural gas pipelines?**

1 A. There's a lot of engineering and
2 siting activities to be done even between approval
3 from a commission and final siting of lines. So
4 there's need to perform geotechnical studies.
5 There's need to do final design of the transmission
6 line, all those things that can make for a
7 productive in-depth conversation with -- with
8 another utility.

9 **Q. And is that the policy that -- and**
10 **the objective that Grain Belt Express intends to**
11 **carry forth is that they will conduct these studies**
12 **and make certain that all the reliability and**
13 **safety issues are addressed consistent with**
14 **existing standards?**

15 A. Absolutely. It's in everybody's
16 interest that we do.

17 **Q. You were asked some questions, I**
18 **believe, by Mr. Jarrett when he was going through**
19 **the PJM system impact study with you. Is it Grain**
20 **Belt Express' intention to comply with all NAERC**
21 **and other applicable reliability requirements that**
22 **may be required by any MISO, PJM or SPP**
23 **interconnection studies?**

24 A. Yes.

25 **Q. Rockies Express counsel showed you a**

1 number of copies of reports. Do you have those
2 reports in front of you?

3 A. I believe I do.

4 Q. If you would turn to the INGAA
5 Foundation report, which I believe is Exhibit 627.

6 A. Okay.

7 Q. Would you turn to page 90?

8 A. Is that the diagram?

9 Q. No. Page 90 is text.

10 A. I'm there.

11 Q. Do you see the first bolded line
12 there that says collocation adjacent to existing
13 power line right of way?

14 A. I do.

15 Q. Okay. What does that paragraph
16 generally deal with?

17 A. It generally deals with safety
18 standards and construction standards during
19 collocating a pipelines near transmission lines.

20 Q. And although this report is dated
21 January 2013, have generally transmission lines
22 been collocated say in the past 20 years with
23 natural gas pipelines?

24 A. It's been my experience, yes.

25 Q. Now, if you would turn to the diagram

1 that she mentioned. I believe it's drawing No. 5
2 that's referred to on that page.

3 A. I see it.

4 MR. ZOBRIST: Judge, I'm going to ask
5 that this one diagram be marked which is in color
6 as Grain Belt Exhibit 122.

7 BY MR. ZOBRIST:

8 Q. And, Dr. Galli, Exhibit 122, is that
9 a color photograph of that drawing that you were
10 shown by Rockies Express counsel down here today?

11 A. Yes.

12 Q. And what does this illustrate?

13 A. This illustrates safety clearances
14 for various voltage transmission lines and
15 collocating next to -- or various-sized pipelines
16 collocating next to transmission lines during
17 construction.

18 Q. And the transmission tower depicted
19 with the blue bubbles is -- what's the kV on that?

20 A. 500 kV.

21 Q. Okay. And where is the pipeline
22 located here?

23 A. Approximately -- my clearance is
24 here. Do we want to assume a certain size
25 pipeline?

1 Q. Let's do 42 inches for Rockies

2 Express.

3 A. So they're showing a clearance to the
4 edge of the construction right of way from the
5 conductor as 50 feet, and then from the edge of
6 construction right of way to the center of the
7 pipeline as 30 feet. So it's 80 feet away from the
8 edge of the -- from the conductor.

9 Q. And for us non-engineers, the little
10 green ball that's in the trench there, that's the
11 pipeline, right?

12 A. Yes, sir.

13 Q. And the table that you referred to
14 below also presumes a diameter pipe of 48 inches;
15 is that correct?

16 A. That's correct.

17 MR. ZOBRIST: I offer Exhibit 122,
18 Judge.

19 JUDGE BUSHMANN: Any objections?

20 (No response.)

21 JUDGE BUSHMANN: Exhibit 122 is
22 received into the record.

23 (GRAIN BELT EXPRESS EXHIBIT NO. 122
24 WAS MARKED AND RECEIVED INTO EVIDENCE.)

25 BY MR. ZOBRIST:

1 **Q. Would you turn please to Exhibit 628,**
2 **the exponent study regarding the New York Regional**
3 **Interconnection Study?**

4 A. I'm there.

5 **Q. Would you turn to page 9 of that**
6 **study?**

7 A. I'm there.

8 **Q. There's a Footnote 6 there. What**
9 **does Footnote 6 indicate?**

10 A. It says, based on an e-mail from NYRI
11 dated 10/10/2007, the Millennium pipeline is a
12 30-inch diameter coated pipeline. It will be
13 located 100 feet away from the DC transmission
14 centerline and 36 inches below the ground surface.
15 A second looping pipeline may be installed in the
16 future and may be located at the edge of a pipeline
17 right of way or about 75 feet from the tower
18 centerline shown in Figure 3.

19 **Q. And so it's the natural gas pipeline**
20 **that's a 30-inch pipeline that was planned to be**
21 **100 feet away from the HVDC line that was being**
22 **planned in this study?**

23 A. That's correct.

24 **Q. Then finally, if you turn to that**
25 **Canadian Association of Petroleum Producers study,**

1 **Exhibit 631.**

2 A. Okay.

3 **Q. And if you turn to page 1.3 and I**
4 **invite your attention to the bottom of that**
5 **paragraph. What does that say in terms of the**
6 **differences between HVDC fault or AC alternating**
7 **current faults?**

8 A. The last two sentences?

9 **Q. Yes. What does that say?**

10 A. It says, For HVDC faults, both the
11 magnitude and duration of the event tend to be
12 shorter than an AC event. The less severe the
13 safety assessment requires a different
14 interpretation of existing standards.

15 **Q. Now, finally you were asked some**
16 **estimates of costs for burying a line, and I**
17 **believe it was Mr. Jarrett or Mr. Agathan or maybe**
18 **it was Mr. Drag, I've forgotten, but there was a**
19 **5 point million -- or 5.7 million per mile figure**
20 **versus the Grain Belt Express mile. And what's the**
21 **per mile expense for Grain Belt Express at this**
22 **time?**

23 A. We're asking between 1.5 and
24 \$2 million per mile.

25 **Q. If you were to decide to bury this**

1 **entire line, given the issues that you mentioned in**
2 **your initial testimony, what would be multiplier,**
3 **in your opinion?**

4 A. In my opinion, that multiplier would
5 be anywhere from 12 to 15 or 18 times.

6 MR. ZOBRIST: Nothing further, Judge.

7 JUDGE BUSHMANN: Thank you. That
8 completes your testimony. You may step down. And
9 congratulations on your endurance.

10 THE WITNESS: And you as well.

11 JUDGE BUSHMANN: I've been notified
12 by Mr. Zobrist that there's a couple of
13 witnesses --

14 MR. ZOBRIST: And, Judge, if you want
15 to take a short break, that's fine, but we'd like
16 to bring Robert Zavadil to the stand, and we're
17 certainly willing to bring him up right now.

18 JUDGE BUSHMANN: And the plan will be
19 to try and get Mr. Zavadil and Mr. Wesley in
20 tonight.

21 MR. ZOBRIST: Yeah. I mean,
22 Mr. Wesley had relatively short surrebuttal. I
23 can't predict what my colleagues are doing to do.
24 But Mr. Zavadil has testimony regarding reliability
25 and some of the models that he ran. So he might be

1 a little longer. But he was wanting to leave town
2 tomorrow morning, so I would at least like to
3 finish with Mr. Zavadil tonight.

4 JUDGE BUSHMANN: Okay. Would the
5 parties rather take a break -- we're going to have
6 to take about an hour dinner break at some point.
7 Would you rather do that now or wait a little
8 while? Why don't we take about a 10 or 15-minute
9 break?

10 MR. LINTON: I would like to ask
11 permission to be excused from the hearing.

12 JUDGE BUSHMANN: You may be. We'll
13 be in recess until about ten minutes after five.

14 (A BREAK WAS TAKEN.)

15 JUDGE BUSHMANN: Let's go on the
16 record. Could you call your witness, please.

17 MR. ZOBRIST: Yes, Judge. I call
18 Robert M. Zavadil to the stand.

19 (Witness sworn.)

20 ROBERT M. ZAVADIL testified as follows:

21 DIRECT EXAMINATION BY MR. ZOBRIST:

22 Q. Please state your name.

23 A. Robert Zavadil.

24 Q. Where do you work?

25 A. EnerNex, LLC, Knoxville, Tennessee.

1 Q. And what's your position there?

2 A. I'm executive vice president and
3 cofounder.

4 Q. And did you prepare direct test--
5 direct testimony that I've marked as Exhibit 109
6 and surrebuttal testimony which I have marked as
7 110 in this case?

8 A. Yes, I did.

9 Q. If I were to ask you these questions,
10 would your answers be as contained herein?

11 A. Yes, they would.

12 Q. Do you have any corrections to your
13 testimony?

14 A. I do have a minor correction in my
15 direct testimony with regards to my past history.
16 The Dranetz-BMI is not a sister company of my
17 current firm EnerNex. It was a sister company of
18 my previous company Electric Concepts.

19 Q. Okay. And just for the record,
20 Mr. Zavadil, it's page 1, line 23; is that correct?

21 A. Yes, it is.

22 Q. And so what should Dranetz-BMI be
23 substituted with?

24 A. I would suggest that that read, I've
25 held a variety of positions at EnerNex and my

1 previous company.

2 Q. Okay. Any other corrections to your
3 testimony?

4 A. No.

5 MR. ZOBRIST: Judge, I'd offer
6 Exhibits 109 and 110 and tender the witness for
7 cross-examination.

8 JUDGE BUSHMANN: Any objections to
9 those exhibits?

10 MR. AGATHAN: I do, Judge. I know
11 you've already ruled on this, but I think I have to
12 make the objection, just for the record, to
13 preserve it.

14 JUDGE BUSHMANN: What's your
15 objection?

16 MR. AGATHAN: Object to all the
17 testimony and schedules of Mr. Zavadil which were
18 the subject of our November 4th motion of Missouri
19 Landowners Alliance to strike portions of Grain
20 Belt's evidence on the basis of Section
21 536.070(11), Revised Statutes of Missouri, for the
22 reasons set forth in that motion.

23 JUDGE BUSHMANN: You are correct, I
24 have denied that motion. So the objection will be
25 overruled and those will be received into the

1 record.

2 (GRAIN BELT EXPRESS EXHIBIT NOS. 109
3 AND 110 WERE MARKED AND RECEIVED INTO EVIDENCE.)

4 JUDGE BUSHMANN: First party for
5 cross is Wind on the Wires.

6 MR. REED: No, thank you, Judge.

7 JUDGE BUSHMANN: Commission Staff?

8 MR. ANTAL: Thank you, Judge.

9 CROSS-EXAMINATION BY MR. ANTAL:

10 **Q. Just a couple of questions,**
11 **Mr. Zavadil. If you'd turn to your surrebuttal,**
12 **please, page 7.**

13 A. Okay.

14 **Q. You state starting on line 3 that the**
15 **three sigma change increases by nine megawatt --**
16 **nine megawatts for just Ameren Missouri and five**
17 **megawatts for the entire state, correct?**

18 A. Correct.

19 **Q. Okay. And this is an analysis on the**
20 **increased system variability?**

21 A. It is an analysis of the increased
22 changes over a defined time period for the load and
23 then the load net of the probable profile wind
24 generation.

25 **Q. Okay. This would be -- show**

1 **potential change in the ancillary services markets?**

2 A. There's an indirect relationship,
3 yes.

4 Q. Okay. And footnoted to that sentence
5 on the same page it says, A previous version of
6 this analysis was provided in the response of a
7 Grain Belt Express to Staff DR, DR-4, Staff DR-4.

8 MR. ZOBRIST: I'm sorry. What page
9 is it? I don't have a footnote on page 3.

10 MR. ANTAL: I was on page 7.

11 MR. ZOBRIST: I'm sorry.

12 BY MR. ANTAL:

13 Q. And then you go on to say, The
14 analysis presented above has been updated based on
15 a more complete Missouri load forecast.

16 A. I don't have complete recall, but I
17 believe one of the data requests had questioned
18 whether we had included all of the Missouri load as
19 we defined it. We went back and checked, and I
20 believe there was some that was missing in the
21 original analysis that had just a small impact on
22 this outcome.

23 Q. Then with your understanding of what
24 was contained in that DR request response, would
25 you characterize this as a new analysis or a -- an

1 **update to a previous analysis?**

2 A. An update to a previous analysis.

3 MR. ANTAL: Okay. Thank you very
4 much. That's all I have.

5 JUDGE BUSHMANN: Show-Me Concerned
6 Landowners?

7 CROSS-EXAMINATION BY MR. JARRETT:

8 **Q. Good afternoon, Mr. Zavadil.**

9 A. Good afternoon -- evening.

10 **Q. Evening, yes. Terry Jarrett for**
11 **Show-Me Concerned Landowners and Missouri Farm**
12 **Bureau. For system planning time horizons,**
13 **adequacy is defined as loss of firm load during any**
14 **period of the year no more often than one day in**
15 **ten years?**

16 A. The one day in ten years metric is
17 the commonly taken reference.

18 **Q. On page 2 of your Schedule RMZ-2, you**
19 **state that, consequently, this study takes a view**
20 **of Missouri as an electric island and gauges the**
21 **impact of the Grain Belt Express project wind**
22 **injection on the adequacy of the supply portfolio**
23 **for Missouri electric loads; is that correct?**

24 A. Yes, it is.

25 **Q. And, in fact, Missouri is not an**

1 electric island at all, is it?

2 A. Agreed.

3 Q. Missouri does import power from other
4 states, correct?

5 A. Yes.

6 Q. You also say on page 3 of
7 Schedule RMZ-2 --

8 A. One question, please. Which
9 schedule?

10 Q. I'm sorry. RMZ-2, I believe.

11 A. Is that the direct testimony?

12 Q. Direct testimony. I'm sorry.

13 A. Okay.

14 Q. Let me make sure that's right.

15 A. Yeah. So page 3?

16 Q. Page 3, last paragraph there down on
17 the bottom.

18 A. Okay.

19 Q. You state that the quantitative
20 results from the study show that Grain Belt Express
21 project wind energy injection in Missouri would
22 have the capacity benefit of a single medium-sized
23 natural gas power plant, correct?

24 A. Correct.

25 Q. Now, focusing solely on capacity

1 benefit, wouldn't it be cheaper and take less time
2 to build a medium-size gas plant in Missouri to
3 achieve the same capacity benefits as the Grain
4 Belt Express project?

5 A. Most likely it would.

6 Q. You are not testifying that any
7 Missouri load-serving entities cannot meet the one
8 in ten year standard -- one day in ten year
9 standard unless the Grain Belt project is built,
10 are you?

11 A. No, I'm not.

12 Q. And you have no reason to believe
13 that any Missouri load-serving entity will ever
14 violate the one day in ten year standard, do you?

15 A. I do not.

16 MR. JARRETT: I don't have any
17 further questions. Thank you, sir.

18 JUDGE BUSHMANN: Missouri Landowners
19 Alliance.

20 MR. AGATHAN: Thank you, Judge.

21 CROSS-EXAMINATION BY MR. AGATHAN:

22 Q. My name is Paul Agathan, representing
23 Missouri Landowners Alliance.

24 A. Okay.

25 Q. The primary point of your testimony

1 is that the bulk power system in Missouri will be
2 more reliable with the addition of the Grain Belt
3 project than without it, correct?

4 A. Correct.

5 Q. Isn't it true that if you add any
6 amount of additional capacity to any bulk power
7 system, the result will always be an improvement in
8 reliability?

9 A. I believe so, correct.

10 Q. Have you ever seen an analysis or a
11 study of any kind where a utility added capacity
12 and the reliability of the system did not improve?

13 A. Not in terms of a resource adequacy
14 analysis.

15 Q. So no matter what type of capacity is
16 added to Missouri's system or where the geographic
17 source is, it's going to show an improvement in
18 reliability, right?

19 A. Yes, sir.

20 Q. In fact, if you could hook up enough
21 squirrels to little cages to generate it, you could
22 get the same reliability?

23 A. It would be a tough job, but yes.

24 Q. In your analysis you assumed all the
25 energy delivered into Missouri from the Grain Belt

1 line would be from wind generation, right?

2 A. Yes.

3 Q. What happens if the energy delivered
4 in Missouri from the Grain Belt line turns out to
5 be half from wind and say half from gas, will that
6 also show an improvement in reliability in
7 Missouri?

8 A. It would, but we did not consider
9 that in this analysis.

10 Q. But if it -- if that did happen, it
11 would be even more an improvement in reliability
12 than just all wind, correct?

13 A. Yes, it could.

14 Q. The more wind energy we replace with
15 gas, the more and more reliability we get, right?

16 A. Could you restate that question? I
17 think I lost --

18 Q. Sure. If we started out with 50,
19 say, wind and gas, the more that you add gas
20 instead of wind, the more reliable you get?

21 A. Again, you're adding a resource and
22 the presumption that the total capacity of the
23 resources, the total capacity value of the
24 resources just keeps increasing.

25 Q. So yes?

1 A. Yes.

2 Q. Is it fair to say that the value of
3 wind is in displacing higher-priced fossil fuels
4 and reducing carbon emissions as opposed to
5 providing for system reliability requirements?

6 A. It's not my place to make that
7 commentary. That's the way many people view it,
8 attributes of clean energy, and with respect to the
9 reliability attributes, the drivers for wind have
10 been energy environmental attributes and any
11 capacity attributes sort of come along with it.

12 Q. I'm not sure if you're agreeing with
13 my statement or not.

14 A. We can try it again.

15 Q. Is it fair to say that the value of
16 wind is in displacing higher-priced fossil fuels
17 and reducing carbon emissions as opposed to
18 providing for system reliability requirements?

19 A. I can agree with that.

20 Q. In your analysis you injected
21 500 megawatts of wind generation into the Missouri
22 power system, right?

23 A. Correct.

24 Q. And on average, your 500 megawatts of
25 wind generation produce equivalent -- strike that.

1 Mr. Jarrett already covered it.

2 On a different subject, you ran your
3 LOLE analysis only for one year, correct, 2019?

4 A. One year of Missouri load data, yes.

5 Q. And so you calculated the effect of
6 load-carrying capability or ELCC for just that one
7 year?

8 A. Yes.

9 Q. Is it true that previous studies have
10 shown we get significant variations in ELCC results
11 from one year to the next?

12 A. Previous studies have shown that, and
13 I've seen that personally on a number of occasions.

14 Q. Because of this variation from year
15 to year, is it fair to say that ELCC results should
16 be based on the average of multiple years of
17 historical or simulated data instead of just one
18 year?

19 A. Yes, they should.

20 Q. Is it fair to say that a period of
21 10 years can be considered a reasonable historical
22 sample?

23 A. The view in the industry is that
24 10 years or maybe 11 years that correspond with
25 some solar cycles might be a reasonable time

1 period.

2 Q. Is it also true that previous studies
3 have shown that the capacity value of wind
4 generation can decline as the penetration
5 increases?

6 A. Yes, it can, but the same is true for
7 any additional resources.

8 Q. I'm going to distribute what's been
9 mark as Exhibit 319.

10 (GRAIN BELT EXPRESS EXHIBIT NO. 319
11 WAS MARKED FOR IDENTIFICATION BY THE REPORTER.)

12 BY MR. AGATHAN:

13 Q. Do you have a copy of that document?

14 A. I do, sir.

15 Q. Do you recognize the document?

16 A. I do, sir.

17 Q. You are the author of the document,
18 correct?

19 A. Yes, I am, not -- co-author.

20 Q. Co-author?

21 A. Yes.

22 Q. Correct. If you look at page 116,
23 the first three paragraphs there describe the
24 general type of analysis and model that you used in
25 this case; is that correct?

1 A. Correct.

2 Q. And then the last paragraph and over
3 to page 117, you describe some shortcomings of the
4 model, do you not?

5 A. Yes.

6 Q. And looking at the bottom of page 16,
7 you state, Although the computational techniques
8 are rigorous, there are a number of shortcomings
9 with their application to wind generation. The
10 most significant of these is the amount and nature
11 of chronological data required to produce a high
12 confidence result. Inter -- annual variability
13 will affect the ELCC calculations as well.
14 Secondly, both wind and load have a common
15 meteorological driver. Therefore, the hourly
16 profiles of load and wind generation must be drawn
17 from the same historical year to preserve any
18 embedded correlations due to weather, correct?

19 A. Correct.

20 MR. AGATHAN: I'll offer Exhibit 319,
21 your Honor.

22 JUDGE BUSHMANN: Any objections?

23 MR. ZOBRIST: Well, I guess I would
24 object only to the extent it's an incomplete copy
25 of the report. If a complete copy of the report is

1 submitted, I have no objection. So I do object
2 that it's only two pages out of the report. We
3 haven't seen the whole report.

4 JUDGE BUSHMANN: I'll overrule the
5 objection. Exhibit 319 is received in the record.

6 (MISSOURI LANDOWNERS ALLIANCE EXHIBIT
7 NO. 319 WAS RECEIVED INTO EVIDENCE.)

8 BY MR. AGATHAN:

9 Q. Did you read Mr. Berry's testimony?

10 A. No, I did not.

11 Q. Would you accept subject to check
12 that at page 3 of his testimony, line 16 to 20,
13 Mr. Berry says that the line, quote, is necessary
14 to meet the requirements of the Missouri Renewable
15 Energy Standard, RES, and the Renewable Portfolio
16 Standard, RPS, requirements of the other states
17 served by MISO, subject to check?

18 A. I have no reason to disagree with
19 that statement.

20 Q. Do you know how many states ballpark
21 are included in MISO other than Missouri, roughly?

22 A. Seven.

23 Q. In your analysis, did you assume that
24 all of the energy delivered in Ralls County would
25 be used by utilities in Missouri?

1 A. That was the implication, although
2 the LOLE calculation deals only in capacity and
3 demand amounts as opposed to energy and where it
4 goes in any particular hour.

5 **Q. Right. But it all went into**
6 **Missouri?**

7 A. The capacity was all counted against
8 Missouri load on an hourly basis.

9 **Q. Meaning -- I'm not trying to quibble**
10 **here. I'm not understanding this. All the**
11 **capacity from the line ended up, the 50 megawatts,**
12 **being used in Missouri as opposed to other MISO**
13 **states?**

14 A. What's counted in the LOLE
15 calculation are the conventional capacity resources
16 in terms of name plate, along with outage history,
17 outage statistics and then hourly demand net of the
18 wind injection from the -- from the Clean Line GBX
19 terminal.

20 **Q. But you only looked at Missouri?**

21 A. Only looked at Missouri.

22 **Q. If some of the energy from the**
23 **interconnection in Ralls County is sold to**
24 **utilities in states other than Missouri, what**
25 **happens to your reliability figures that you came**

1 up with?

2 A. Again, I believe that's mixing sort
3 of two time frames in two kinds of studies that are
4 routinely performed in the industry. What you're
5 referring to is more of an operational sort of
6 market model, which can be a future year but is
7 generally very detailed hour by hour. The resource
8 adequacy assessment is generally for an out-year,
9 ten-year kind of time frame because of then lead
10 times of the projects, and it really only deals
11 with capacity in a defined area and demand in a
12 defined area.

13 Q. What would have happened, though, if
14 you cut the capacity in half for Missouri and
15 assumed that half would go to other MISO states?

16 A. Then presumably the capacity value
17 would have been cut in half if the injection into
18 Missouri was 250 versus 500 megawatts.

19 Q. Thank you. Are you aware of any
20 studies by Grain Belt or any of its witnesses which
21 estimate the cost of various alternatives for
22 increasing the reliability of the bulk power system
23 in Missouri?

24 A. No, I'm not.

25 Q. On a different aspect of your

1 analysis, you assume the Green Belt line will
2 become operational in the year 2019, correct?

3 A. Yes.

4 Q. And you assume that utilities in
5 Missouri will utilize the full 500 megawatts of
6 capacity available to them beginning in that year,
7 correct?

8 A. That was the assumption, yes.

9 Q. And you also assume that in every
10 year between now and 2019, utilities in Missouri
11 will add just enough capacity to meet the normal
12 capacity planning margin for those years, right?

13 A. That was really not an assumption of
14 the study. We focused on 2019 as a snapshot. We
15 essentially looked at the capacity demand situation
16 in 2019 and specifically made adjustments so that
17 we could benchmark the ELCC of the 500 megawatt
18 injection from a system at the expected reliability
19 level. So we didn't look at a trajectory.

20 Q. Right. But you just assumed that it
21 would hit at that expected reliability by 2019 by
22 adding capacity between now and then?

23 A. Yes.

24 Q. In practice utilities aren't going to
25 exactly hit that one day in ten years, are they?

1 They are -- there's going to be some years where
2 they're a little bit above that, some years they're
3 a little bit below that as a practical matter?

4 A. Most likely for those that actually
5 use that as the resource adequacy standard.

6 Q. Well, whatever standard is used,
7 you're probably not going to hit it 100 percent
8 every year, are you?

9 A. Agreed.

10 Q. If for some reason the Grain Belt
11 line is not built or utilities do not purchase any
12 of the energy from the line, is it fair to assume
13 that utilities in Missouri will add the same number
14 of megawatts of capacity from some other source?

15 A. Given the same assumptions we used in
16 the calculation, presumably, yes.

17 Q. In order to maintain the proper
18 reserves?

19 A. Yes.

20 Q. So that being the case, whether or
21 not the Grain Belt line is built, utilities in
22 Missouri end up with the same level of reliability,
23 do they not?

24 A. Yeah, through the expenditure of
25 capital for that additional resource.

1 Q. Sure.

2 A. Yeah.

3 Q. But they will add that 165 megawatts
4 approximately in order to meet that?

5 A. Yes.

6 Q. Go to a different issue. You and
7 Mr. Moland, who's now I guess his testimony is
8 being adopted by Mr. Loomis, use the same hour
9 profile of the wind injection at the Kansas
10 converter station, did you not?

11 A. Yes.

12 Q. And that's the wind profile that was
13 developed by Mr. Berry in this case?

14 A. Correct.

15 Q. Are you familiar with how the wind
16 profile which you and Mr. Moland used was developed
17 by Mr. Berry?

18 A. Very much so.

19 Q. You are quite the expert in this
20 area?

21 A. Well, in terms of the source data,
22 yes. Yes.

23 Q. Mr. Berry basically chose ten wind
24 tower sites from the Eastern Wind Study database
25 and was then given data for those ten sites by the

1 people who developed and handled that database; is
2 that essentially correct?

3 A. That's my understanding.

4 Q. When I say the Eastern Wind Study, is
5 that a proper term?

6 A. The proper term for the data is the
7 NREL, National Renewable Energy Laboratory
8 Mesoscale database.

9 Q. But it was developed for the Eastern
10 Wind Study, the Eastern --

11 A. That was the initial driver, and it's
12 been used extensively for many other studies since
13 then.

14 Q. Right.

15 A. Yeah.

16 Q. If I said the Eastern Wind Study,
17 though, can we assume I'm talking about that
18 initial driver that it was a study of the whole
19 eastern interconnection?

20 A. Correct. Correct. And there was a
21 parallel study for the Western Interconnection
22 Database developed for that geographic region as
23 well.

24 Q. Fortunately, I haven't had to look at
25 the western part. What is the form and format of

1 the data that would have been provided to Mr. Berry
2 by the Eastern Wind Study Database we're talking
3 about?

4 A. Well, I have people who do that, if
5 you will. But my understanding, there are tens of
6 thousands of two-kilometer grid cells in the
7 database, okay, for which there is a ten-minute
8 value of wind speed, temperature, pressure, solar
9 or radiance data for a record initially of three
10 years in length, which now has been extended to, I
11 think, about ten years.

12 And along with the wind speed there
13 is an initial conversion to wind production from a
14 presumed small segment of a wind plant in that grid
15 cell. So they apply power curves and some
16 statistical variants, because you're talking about
17 multiple turbines at a two-kilometer width. So
18 Mr. Berry selected appropriate cells that they felt
19 were representative of their expectation for
20 development in western Kansas and essentially
21 aggregated them into a first ten-minute and then
22 hourly production time series.

23 Q. Is the company in charge, for lack of
24 a better term, of calculating all that data, is
25 that AWS Truepower.

1 **Q. AWS Truepower for the initial eastern**
2 **database. The augmentation that I just mentioned I**
3 **believe was done by Three Tier, but I'd have to**
4 **check on that.**

5 **Q. What part, if any, does the National**
6 **Weather Service play?**

7 A. The models that are used are derived
8 from forecasting models used by National Weather
9 Service, NOAA and other government agencies
10 involved in weather. The other part the Weather
11 Service plays is provision of historical,
12 observational data, because the data is generated
13 by essentially initializing and running a numerical
14 weather model to simulate a given year. If we let
15 that run on its own for a whole year, it would
16 generate a physically consistent but different
17 version of the weather.

18 So the observational data is used to
19 nudge the model to track as well as possible what
20 actually happened. So there's a -- there's always
21 been an interaction between the weather companies
22 in the renewables field and the Weather Service and
23 NOAA and higher levels.

24 **Q. Do you know why you -- you and**
25 **Mr. Berry I guess used weather from this -- or**

1 **excuse me -- data from this system developed**
2 **originally from that Eastern Wind Study instead of**
3 **using actual data from the wind farm sites?**

4 A. The data from the database is more
5 comprehensive than the geographic scope. Whereas,
6 wind measurements generally are going to be very
7 sparse. So it creates difficulty in terms of
8 understanding what the -- what the spatial and
9 geographic diversity would do to the aggregate
10 profile. And we know from experience that the
11 Mesoscale database is a reasonable facsimile of
12 what we've seen in the field, because we have
13 compared that data to actual operating plants
14 corresponding to those grid cells.

15 Q. **If you had perfect data from the wind**
16 **farms, would that be preferable since they're**
17 **located right at the site of the wind farm?**

18 A. For all of them, yes.

19 Q. **Is the average wind speed at a given**
20 **site in part a function of the geographic location**
21 **of that site?**

22 A. Well, I'm certainly not a
23 meteorologist, but I think you can say yes. We
24 know from the maps produced by NREL and other folks
25 that that's the case.

1 Q. And the projected output of a wind
2 farm would also be partly a function of where it's
3 located, right?

4 A. Yes.

5 Q. Would you agree that to confidently
6 estimate the capacity value of wind farms, you'd
7 need multiple years of wind data, whether pro--
8 whether -- let me strike that.

9 Would you agree that to confidently
10 estimate the capacity value of wind farms, you
11 would need multiple years of wind data, weather
12 production data or simulated through modeling?

13 A. Yes.

14 Q. Would you also agree that when doing
15 an ELCC analysis such as yours, care must be taken
16 to ensure that the hourly profiles of wind, solar
17 and load are taken from the same historical year?

18 A. Yes, if available.

19 Q. Pardon?

20 A. Yes, if available.

21 Q. Is it true that in the absence of
22 actual data from an operating wind plant, PJM
23 assigns it a capacity credit of only 13 percent of
24 its name plate?

25 A. I'm not -- that sounds about right.

1 I can't say for certain.

2 Q. And are these approximate numbers
3 from MISO from 2010, '11 and '12 in the range of
4 8 percent, 13 percent and 15 percent?

5 A. That would sound about correct, yes.

6 Q. And looking at traditional generation
7 sources, do you recall that we asked you for the
8 average 2019 forced outage rates which were used in
9 your database for coal, gas and nuclear plants?

10 A. I do recall, yes.

11 Q. You don't recall the answers. Do you
12 have them?

13 A. I have those here, yes.

14 Q. That would be Data Request Item 51.
15 Looking for the forced outage rates --

16 A. Yeah.

17 Q. -- for coal, gas and nuclear plants.

18 A. Here we go.

19 Q. Could you read those into the record?

20 A. The average forced outage rate
21 assumed for coal was 9.32 percent. Gas was
22 4.72 percent. Nuclear was 4.02 percent.

23 Q. Thank you. Is there a standard
24 definition in the industry for the term busbar
25 price of energy as opposed to busbar cost of

1 **energy?**

2 A. Well, in terms of standard
3 definition, not to my knowledge. No, the prices
4 are potentially the busbar price of energy, but I
5 don't want to speculate.

6 **Q. It's not a term of art that's**
7 **commonly used?**

8 A. No, not to my knowledge.

9 **Q. On a different subject, are you**
10 **generally familiar with the markets for renewable**
11 **energy in the PJM and MISO areas?**

12 A. To some degree. We two years ago
13 completed a fairly massive wind integration study
14 for PJM working with GE. Done some work for MISO
15 market participants in this recent year, and we've
16 done previous work for MISO and familiar with the
17 drivers in terms of the Minnesota RPS.

18 **Q. Is it fair to say in general that PPA**
19 **prices tend to be higher for renewable energy on**
20 **the east coast than in the midwest?**

21 A. Yes.

22 **Q. And why is that?**

23 A. One factor is the quality of the wind
24 resource. A second factor is the cost of
25 development. A third factor might be just the

1 available developable lands. And there are others.

2 I'm not a wind developer, but those come to mind.

3 **Q. Thank you. On a different subject,**
4 **is it fair to say that two of the principal**
5 **disadvantages of wind compared to traditional**
6 **sources are its variability and its uncertainty?**

7 A. Those are certainly attributes of
8 wind. In -- in my work over the last ten years, we
9 haven't characterized them as disadvantages, but
10 they're attributes that need to be dealt with,
11 along with other variability and uncertainty in the
12 power system.

13 **Q. But vis-a-vis a base load coal plant,**
14 **for example, it would be a disadvantage?**

15 A. There are instances where the
16 invariability of base load coal is also an issue.

17 **Q. Right. But in general?**

18 A. In general, yes, I agree with you.

19 **Q. Thank you. Would you agree that**
20 **compared to the fluctuating nature of wind, barring**
21 **rare emergency outages, a conventional power plant**
22 **can produce a near constant output?**

23 A. Some do. Some do better than others.

24 **Q. In general, though?**

25 A. In general, yes.

1 **Q.** Would you agree that the problem of
2 forecasting the output of wind generation is
3 enormously challenging due to the wide variety of
4 factors that play a role in determining the
5 variation of the key parameters within the target
6 forecast volume?

7 A. It certainly is challenging.

8 **Q.** Is it fair to say that the cost of
9 integrating wind generation is obviously nonzero?

10 A. It is obviously nonzero.

11 **Q.** Meaning that the addition of wind
12 generation does produce some amount of wind
13 integration cost?

14 A. Yes.

15 **Q.** And as penetration levels approach
16 20 percent capacity, the costs begin to increase in
17 a nonlinear fashion?

18 A. That was an assumption back ten years
19 ago. I think the experience from studies doesn't
20 bear that out completely. It certainly depends on
21 the system and a lot of other factors. It does
22 increase but nonlinearly is the point.

23 **Q.** But it increases as you approach
24 15 or 20 or 25 percent?

25 A. Agreed.

1 **Q. Excuse me for the pause here. I'm**
2 **trying to strike questions.**

3 A. That's all right.

4 **Q. Another attribute of wind generation,**
5 **in addition to its variability, is that it tends to**
6 **be more plentiful in off-peak hours than on-peak**
7 **hours; is that correct?**

8 A. Again, that depends on the location,
9 geography and other factors. Certainly great
10 plains wind is characterized that way because of
11 the nocturnal jet and some other things, but that's
12 not uniformly true.

13 **Q. But for Kansas wind it would be?**

14 A. I don't know if I would -- since I
15 haven't studied Kansas wind specifically, I don't
16 know if I would make that characterization for all
17 hours all seasons.

18 **Q. But in general, it tends to be more**
19 **plentiful off-peak than on-peak?**

20 A. From what I've seen, yes.

21 **Q. There's been a number of studies**
22 **which have quantified the level of wind integration**
23 **costs, right?**

24 A. Yes, there have.

25 **Q. And the objective is to quantify the**

1 cost which the wind generation imposes on the
2 system where the wind energy is delivered?

3 A. Yes. That has been the case in
4 several of the studies. Not all of them.

5 Q. And normally, or at least often, the
6 output is framed in terms of the extra cost per
7 megawatt hour of the wind generation?

8 A. Yes, it has been.

9 Q. You told us that you were -- that the
10 most recent study that you're familiar with which
11 quantified wind integration costs was the one
12 conducted in 2012 by Pacific Corp; is that correct?

13 A. Yes, sir.

14 Q. And that study quantified the total
15 operating integration costs to be \$2.55 per
16 megawatt hour?

17 A. That sounds correct.

18 Q. Do some systems charge the wind
19 generators directly for at least a part of the wind
20 integration cost?

21 A. Yes.

22 Q. And who absorbs the wind integration
23 costs which are not directly charged to a
24 generator?

25 A. That I can't speak to fully. It's

1 charged back to the wind generator, and whether
2 that's factored in to a PPA or something like that,
3 I can't say.

4 **Q. Right. But not all of it is charged**
5 **back directly to the wind generator, is it?**

6 A. If -- if in their tariff they have a
7 mechanism to charge it back and a fair, approved
8 way to calculate what that charge is, they can
9 charge it back.

10 **Q. But MISO, for example, does not**
11 **charge back wind integration costs to the wind**
12 **generator?**

13 A. Yes, they do.

14 **Q. The entire amount?**

15 A. As determined -- as determined
16 through their various market processes and ex post
17 calculation of increased costs due to uncertainty
18 and those sorts of things, all kind of combined in
19 the revenue sufficiency guarantee concept and may
20 go up with things.

21 **Q. Would you agree that if the wind**
22 **generator is going to recover all its costs,**
23 **eventually all these wind integration costs get**
24 **borne by the retail ratepayer?**

25 A. I can't argue with that without

1 thinking about it much more deeply. The money's
2 got to come from somewhere.

3 **Q. Pardon?**

4 A. The money has to come from somewhere,
5 right?

6 **Q. Retail ratepayers, right? Yes?**

7 A. Yes.

8 **Q. I'm sorry. She can't get it when you**
9 **nod.**

10 A. Thank you very much.

11 **Q. You're familiar with -- I've been**
12 **calling it the wind integration study. It's, I**
13 **guess, properly called the Eastern Wind Integration**
14 **and Transmission Study?**

15 A. Yes, I am. That -- we were the
16 primary contractor for that endeavor.

17 **Q. Do you commonly call that EWITS?**
18 **E-W-I-T-S?**

19 A. People have called it EWITS, as well
20 as other things.

21 **Q. That looked at the entire eastern**
22 **interconnect, did it not?**

23 A. Correct.

24 **Q. It took two and a half years to**
25 **complete?**

1 A. It was somewhat less than that. It
2 was more like 14, 15 months.

3 **Q. Is it fair to say that a number of**
4 **subsequent studies have examined wind integration**
5 **costs, but the breadth and depth of the analysis in**
6 **the EWITS study is unique?**

7 A. I think the scope of the EWITS study
8 was unique. Subsequent integration studies,
9 especially those in which we or GE Energy were
10 involved, utilized a lot of the same, you know,
11 data, methodologies, modeling concepts. They
12 weren't -- certainly weren't departures. It was
13 really the scope of the EWITS study that sets it
14 apart.

15 **Q. I'm not sure you agreed with me there**
16 **or not.**

17 A. Well, try one more time.

18 **Q. Is it fair to say that a number of**
19 **subsequent studies have examined wind integration**
20 **costs, but the breadth and depth of the analysis in**
21 **EWITS is unique?**

22 A. Not necessarily.

23 **Q. Do you have a copy of your**
24 **Schedule RMZ-1, which I guess is basically a very**
25 **lengthy list of your qualifications? My**

1 **congratulations, by the way.**

2 A. Thank you very much. Okay. I have
3 it, yes.

4 Q. I'm looking at the middle page there
5 **under Eastern Wind Integration and Transmission**
6 **Study, five lines down, and this is something that**
7 **you wrote up?**

8 A. Yes. Yes.

9 Q. You say there, a number of other
10 **studies have already examined similar wind**
11 **integration issues, but the breadth and depth of**
12 **the analysis in EWITS is unique?**

13 A. Yes.

14 Q. Could you explain briefly what
15 **transmission overlays are in the context of**
16 **examining wind integration costs?**

17 A. Transmission is one potential
18 solution or mitigation measure for integrating
19 renewable generation. In the case of the Eastern
20 Wind Integration and Transmission Study, it was
21 prescribed by our customer as a solution that we
22 should consider for integrating the 20 percent
23 wind.

24 And so taking a top-down view of the
25 entire interconnection, a very -- various analyses,

1 production simulations and whatnot were done that
2 led us to essentially an overlay of HVDC across the
3 country that was assumed to just go down all in
4 place in the same year, right, to essentially allow
5 that wind to be integrated. So in terms of the
6 overlay, it's more a concept that we're looking at
7 a year. What would you put on top of it to make
8 this work?

9 **Q. And by what you would put on top of**
10 **it, you're talking about the transmission lines?**

11 A. Transmission, yes. In this case,
12 yeah.

13 **Q. Do you recall the approximate amount**
14 **of the wind integration costs which were quantified**
15 **by the EWITS study? And just for the reporter's**
16 **sake, E-W-I-T-S, correct?**

17 A. Correct. I think we were seeing
18 numbers -- I mean, there were four scenarios in
19 different areas, but it was in the 7, \$8 kind of
20 range per megawatt hour of delivered wind.

21 **Q. Did you try to quantify the amount of**
22 **wind integration costs which we'd be facing in**
23 **Missouri as penetration levels approach 15 or**
24 **20 percent?**

25 A. No, I have not.

1 Q. Is it true that, compared to wind,
2 the uncertainty of traditional synchronous sources
3 of generation is so relatively small that it's
4 often just ignored for planning purposes?

5 A. In the very short term we assign a
6 certain amount of complete availability to
7 conventional resources and carry contingency
8 reserves to cover the eventuality that they're not
9 there. Load is still uncertain in the short-term
10 operational time frames.

11 Q. I'm sorry. I'm still not sure if you
12 agreed or disagreed with my statement.

13 A. I believe if you can restate the
14 question.

15 Q. Sure. Is it true that, compared to
16 wind, the uncertainty of traditional synchronous
17 sources of generation is so relatively small that
18 it's often just ignored for planning purposes?

19 A. Yes, in terms of production at a
20 given hour.

21 Q. And we're talking there about
22 traditional sources being base load, coal plants or
23 nuclear plants --

24 A. Yes.

25 Q. -- correct?

1 A. Correct.

2 Q. Thank you. So the industry doesn't
3 even bother to quantify integration costs for
4 traditional sources of generation such as coal or
5 gas plants, does it?

6 A. We have not historically.

7 Q. If a utility in Missouri purchased
8 renewable energy certificates instead of actually
9 importing wind generation into the system, would it
10 experience any of the wind integration costs we've
11 been discussing, in other words, to meet its
12 renewable energy standards?

13 A. I mean, the mechanism, as you
14 mentioned it before, is very indirect. The money
15 comes from the retail customers across the MISO
16 footprint at some point. However, I'm having
17 difficulty answering that question as you posed it.
18 I really am, because it's -- it's a very general
19 question, and we're talking about the difference of
20 500 megawatts of wind generation in MISO, right?

21 Q. Right.

22 A. So the increment is small,
23 vanishingly small with regard to some identifiable
24 incremental costs.

25 Q. Right. I guess my question is if

1 they bought RECs instead of bringing wind into the
2 system, they don't incur any integration costs at
3 all then, correct?

4 A. Yeah. I'm not familiar with the
5 process for the marketing and purchase of RECs.

6 Q. Do you recall in our Data Request
7 No. 6 to you, we asked you what the capacity factor
8 was for the Kansas wind and you said LOLE analysis?

9 A. I have that number, and that was DR
10 No. 6?

11 Q. Yes. 6F actually. It's
12 unfortunately multiple.

13 A. 6F, 43 percent.

14 Q. Thank you. Just a few questions on
15 the surrebuttal. Pages 19 to 20 -- strike that.

16 Page 9, line 17 to 20, I guess
17 actually beginning up at line 15, you have the
18 following question and answer: Could the Grain
19 Belt Express project actually lead to decreased
20 variability in wind energy generation?

21 Answer: Yes. If you compare adding
22 wind generation from western Kansas to additional
23 wind generation in MISO states that already have
24 substantial wind generation like Iowa, Minnesota
25 and South Dakota, the Kansas wind generation would

1 likely cause variability to decrease. Is that
2 correct?

3 A. Yes.

4 Q. That's what you stated. Just to be
5 clear, you're not implying that the addition of
6 Kansas wind would decrease the total variability of
7 the system, are you?

8 A. It's the per-unit variability of the
9 aggregate amount of wind generation.

10 Q. Right. But you're not decreasing the
11 variability of the entire system, you're just
12 decreasing it compared to other wind sources?

13 A. Right, but that's what that says.

14 Q. Right.

15 A. It's 500 megawatts in Iowa,
16 500 megawatts in Kansas.

17 Q. At page 13, line 6 to 10, you note
18 that in a number of studies wind integration costs
19 were estimated to be around \$5 per megawatt hour
20 delivered wind energy; is that correct?

21 A. Correct.

22 Q. Ballpark how many studies are you
23 talking about?

24 A. I believe there have been over three
25 dozen wind integration studies conducted over the

1 last ten years. Not all of them were focused on
2 identifying wind integration costs per se.

3 **Q. I think I've just got one more**
4 **question.**

5 A. Okay.

6 **Q. In your surrebuttal at page 10,**
7 **lines 14 to 16, you discuss the Xcel study which**
8 **found that the addition of one gigawatt hour of**
9 **wind generation used integration costs in the range**
10 **of 14 to 16 percent, correct?**

11 A. I don't agree with the way you've
12 characterized that statement. There were -- to
13 move from two gigawatts of installed capacity to
14 three gigawatts, two paths were explored. One of
15 those paths was much more geographically diverse
16 than the other. And when you compared the cost
17 associated with that, that's where the 4 to
18 16 percent --

19 **Q. I didn't mean to misstate it, and**
20 **that's really not where I'm going.**

21 A. I'm sorry.

22 MR. ZOBRIST: Well, could the witness
23 at least finish his answer, Judge, and then --

24 MR. AGATHAN: I'm sorry. I thought
25 he had finished.

1 THE WITNESS: I'm done.

2 MR. ZOBRIST: All right. I
3 apologize.

4 BY MR. AGATHAN:

5 Q. What I'm looking at is what the
6 dollar amount per megawatt hour of those wind
7 integration costs were. I think you respond in
8 answer to Data Request 2.3 --

9 A. Yeah. Let's see. Do I have that?

10 Q. Let's see.

11 A. I can -- I can't find the response to
12 the data request, but that study was public, so I
13 can talk about the numbers and the guesstimates.
14 Total integration costs of a few dollars, \$3,
15 megawatt hour kind of thing -- I'm guessing here a
16 little bit. So the 4 to
17 16 percent.

18 Q. I'll hand you a copy.

19 A. You've got my numbers, I guess.

20 Q. If you'd look at the bottom.

21 A. There we go.

22 Q. Do you see those dollar amounts?

23 A. Yes. So we're talking about a
24 difference of 65 cents, 68 cents.

25 Q. And what were the actual dollar

1 **amounts?**

2 A. \$4.02 versus \$3.37.

3 MR. AGATHAN: Thank you very much. I
4 appreciate your patience. That's all I have.

5 JUDGE BUSHMANN: Questions from
6 Commissioners?

7 CHAIRMAN KENNEY: No questions.

8 COMMISSIONER HALL: I have just one
9 issue.

10 QUESTIONS BY COMMISSIONER HALL:

11 **Q. On page 8 of your direct testimony,**
12 **you contend that the LOLE is a 23 percent**
13 **reduction. Now, you said previously, and I assumed**
14 **as well, that whenever you increase the supply, you**
15 **are going to reduce the LOLE to some extent?**

16 A. Correct.

17 **Q. So how -- for our benefit, can you**
18 **put that 23 percent in perspective? Is that a**
19 **significant number?**

20 A. LOLE -- I'm sorry. In terms of the
21 number itself with respect to the effects of a
22 renewable resource like wind is not the issue.
23 It's how much more -- how much more load could you
24 serve at a given reliability level. Okay. So if
25 you think about a graph where LOLE is the vertical

1 axis, when we put the wind in, we sort of reduce --
2 we reduce the loss of load expectation. But what
3 we're really interested in is how much load we
4 serve at the same level of reliability on that --
5 on that vertical axis.

6 **Q. So is that the ELCC?**

7 A. That's the ELCC, effective load
8 carrying capability.

9 **Q. So that is the key finding in your**
10 **testimony?**

11 A. Correct. That's the -- that's the
12 characterization of the capacity value of wind and
13 solar generation that's been used in a great number
14 of the renewable integration studies done over the
15 last decade.

16 **Q. I thought that the purpose of your**
17 **testimony was to show increased reliability.**

18 A. Well, it is because it means at -- if
19 the state of Missouri in 2019 is at one day in ten
20 years, you know, in terms of the LOLE calculation
21 for the anticipated peak load, with the Missouri
22 converter station you can actually serve
23 165 megawatts additional peak load, okay, at that
24 snapshot in time.

25 So that -- the purpose was to

1 essentially illustrate this kind of difficult
2 concepts with regard to the capacity value of wind
3 generation in the context of Missouri loads,
4 Missouri resources, which are under the purview of
5 this Commission.

6 **Q. So the increase in load served by the**
7 **addition of the new supply, the ELCC, you**
8 **determined that was a 165?**

9 A. Of the -- of the nine cases that were
10 run, that was the average. The actual 2013 profile
11 led to a much larger ELCC, but as we've just heard,
12 the one year sort of number is -- it has to be
13 taken with a grain of salt or taken carefully.
14 That's why we applied that technique to effectively
15 generate additional wind profiles, which was the
16 same approach that was taken in the PJM
17 interconnection study back 18 months ago, I
18 believe.

19 COMMISSIONER HALL: All right. Thank
20 you.

21 JUDGE BUSHMANN: Commissioner Rupp?

22 COMMISSIONER RUPP: Just real quick.

23 QUESTIONS BY COMMISSIONER RUPP:

24 **Q. Just following up what Commissioner**
25 **Hall was saying, I'm trying to test my memory. Has**

1 MISO done a study looking out into 2019 on trying
2 to meet capacity taking into consideration coal
3 plants coming offline? And I thought that they put
4 out a study that said that there would be a need
5 for the increase.

6 A. First part, they do have that process
7 as an RTO and a regional entity. I think it's an
8 annual process. It feeds into the newer long-term
9 resource statement. I'm not familiar with what the
10 most recent study says, although I do know that
11 MISO was looking at or anticipating retirement of
12 substantial coal-fired generation over the coming
13 years. So I'm sorry I can't answer your question.
14 I'm just not familiar enough with their assessment.

15 COMMISSIONER RUPP: I can get that
16 information somewhere else. Thank you.

17 JUDGE BUSHMANN: Recross based on
18 Bench questions, Wind on the Wires?

19 MR. REED: No, thank you.

20 JUDGE BUSHMANN: Commission Staff?

21 MR. ANTAL: Just one question.

22 RE-CROSS-EXAMINATION BY MR. ANTAL:

23 Q. Mr. Zavadil, you were talking with
24 Commissioner Hall about the purpose of your
25 testimony, and I was -- wanted to clarify. Are you

1 **saying that Clean Line expects to deliver energy to**
2 **Missouri coincident with Missouri's peak load in**
3 **2019?**

4 A. Well, there would be some, likely.
5 It's a difficult leap to go from the ELCC to, you
6 know, a specific hour at any specific year. In
7 fact, that's sort of the point of the statistical
8 analysis and all that is to treat it like we treat
9 other resources.

10 **Q. So -- so will Grain Line be able to**
11 **deliver 100 megawatts of peak load to Missouri?**

12 A. 100 megawatts of Missouri peak? I
13 can't say.

14 MR. ANTAL: Okay. Thank you.

15 JUDGE BUSHMANN: Show-Me Concerned
16 Landowners?

17 MR. JARRETT: No questions, Judge.

18 JUDGE BUSHMANN: Missouri Landowners
19 Association?

20 MR. AGATHAN: No questions, Judge.

21 JUDGE BUSHMANN: Redirect by Grain
22 Belt?

23 MR. ZOBRIST: Just a couple.

24 REDIRECT EXAMINATION BY MR. ZOBRIST:

25 **Q. You were asked, I believe by**

1 **Mr. Agathan, about RECs and their effect on the**
2 **MISO market, I think was the question. In order to**
3 **have RECs, does wind generation need to occur**
4 **someplace?**

5 A. Well, I would assume so.

6 Q. **Can you have a REC without wind being**
7 **generated someplace?**

8 A. Not that I'm aware of.

9 Q. **Now, Mr. Agathan asked you some**
10 **questions about RTO's ability to integrate wind.**
11 **What does MISO do in this regard? Does it have a**
12 **tool to manage the integration of wind?**

13 A. MISO has been in many respects the
14 leader in developing tools for managing its
15 portfolio of wind projects as it's grown over the
16 years. They've come to a point where they've been
17 able to reduce certain ancillary services simply
18 because they're operating as a single-market
19 footprint rather than smaller balancing authority
20 areas. They've, through their dispatchable
21 intermittent resource protocol that they rolled out
22 a few years ago, been able to place curtailment of
23 wind generation due to local regional transmission
24 congestion under the market system to make it
25 transparent and as efficient as possible and not a

1 distraction for the operators.

2 Further, through their MTEPP, the
3 MISO transmission expansion planning process,
4 especially MTEPP 11 and the large portfolio of
5 multi-value product that are going in the ground,
6 for the current amount of wind generation that they
7 have 13,000 megawatts, as of the beginning of the
8 year there would likely be no -- very few, if any,
9 congestion issues within the footprint.

10 Obviously by time the MVP projects
11 are on the ground, they'll have more wind to
12 manage. So I can't speak to, you know, what that
13 situation will look like then. But -- so they've
14 been quite progressive in terms of evolving their
15 processes, market structures to handle increasing
16 amounts of wind generation.

17 **Q. Thank you. You were asked about a**
18 **number of wind integration studies that you and**
19 **others conducted. Have the wind integration**
20 **studies that you and your firm have conducted, what**
21 **conclusion have they come to with regard to whether**
22 **variable wind integration can occur at a reasonable**
23 **cost?**

24 **A.** Well, I think what's come out of the
25 studies is that we feel up to the 20 percent of

1 energy is probably doable, not without some cost,
2 but certainly without major threats to system
3 reliability, operational security.

4 Q. Now, as far as costs that could be
5 assessed through ancillary services, does each
6 state pay these costs individually or are they
7 spread across the RTO footprint?

8 A. They're the cost of the market doing
9 business, so they're allocated.

10 Q. Pardon me. And roughly what
11 percentage of the energy costs are ancillary to
12 services today?

13 A. Well, the total market cost, it's a
14 very small amount. I'm trying to think. We're
15 talking about just a handful of dollars relative to
16 the overall market value.

17 Q. Did you have a percentage?

18 A. I know the -- I'm trying to recall
19 the MISO reference. I don't have it right with me.
20 I apologize for that.

21 MR. ZOBRIST: Thank you. Nothing
22 further, Judge.

23 JUDGE BUSHMANN: Thank you,
24 Mr. Zavadil. You've completed your testimony. You
25 may be excused.

1 THE WITNESS: Thank you.

2 JUDGE BUSHMANN: Should we push ahead
3 and try and get Mr. Wesley on?

4 MR. ZOBRIST: That will be great,
5 Judge. Call Tad Wesley to the stand. Pardon me.
6 My colleague, Mr. Steele, is going to handle him.

7 MR. STEELE: Grain Belt calls Tad
8 Wesley as our next witness.

9 (Witness sworn.)

10 TAD WESLEY testifies as follows:

11 DIRECT EXAMINATION BY MR. STEELE:

12 Q. Please state your name.

13 A. Tad Wesley.

14 Q. And where are you employed?

15 A. Key Agricultural Services.

16 Q. And what's your position there?

17 A. I am an agronomist and project
18 manager.

19 Q. And did you prepare surrebuttal
20 testimony in this matter?

21 A. I did.

22 Q. Is Exhibit 106 a copy of your
23 surrebuttal testimony?

24 A. Yes.

25 Q. Do you have any corrections to make?

1 A. I do not.

2 Q. If I were to ask you all of the
3 questions contained in your surrebuttal testimony,
4 would those answers be the same as contained?

5 A. Yes.

6 Q. And you gave those answers under
7 oath?

8 A. I did.

9 MR. STEELE: Judge, I would move to
10 admit Exhibit 106 into evidence.

11 JUDGE BUSHMANN: Any objections?

12 (No response.)

13 JUDGE BUSHMANN: Hearing none, that
14 will be received into the record.

15 MR. STEELE: Tender Mr. Wesley for
16 cross-examination.

17 JUDGE BUSHMANN: First cross is by
18 Wind on the Wires.

19 MR. REED: No cross, thank you.

20 JUDGE BUSHMANN: Commission Staff?

21 MR. ANTAL: No cross, Judge.

22 JUDGE BUSHMANN: Show-Me Concerned
23 Landowners?

24 CROSS-EXAMINATION BY MR. JARRETT:

25 Q. Yes. Good evening, Mr. Wesley.

1 Terry Jarrett representing the Show-Me Concerned
2 Landowners and Missouri Farm Bureau.

3 A. Good evening.

4 Q. If I could refer to your surrebuttal
5 testimony, page 4 lines 15 through 17.

6 A. Yes.

7 Q. Did you do any independent
8 verification of the 15 percent value you received
9 from Mr. Lawlor?

10 A. I did the calculations and I agree
11 with his calculation.

12 Q. Surrebuttal on page 6, lines 11
13 through 15.

14 A. Yes.

15 Q. How can high-clearance rigs apply
16 chemicals when the ground is wet and aerial
17 application is required?

18 A. Those would be areas where the high
19 clearance could not effectively apply those with
20 the wet ground.

21 Q. And how can chemicals be applied if
22 high-clearance rigs cannot -- strike that.

23 Surrebuttal on page 5, lines 21, 22.

24 Is the use of GPS more accurate than humans when
25 negotiating around objects?

1 A. No. Humans are needed to negotiate
2 around objects.

3 **Q. What is the precision range of GPS in**
4 **terms of feet?**

5 A. It would depend on your GPS unit.
6 The RTK that's used for guidance systems is
7 anywhere from two to three inches up to 12 inches,
8 depending on the level of guidance system used.

9 **Q. Thank you. Surrebuttal page 6,**
10 **lines 11 to 21. From your experience, how close**
11 **will pilots fly to towers?**

12 A. I'm not a pilot, so I can't really
13 state on how close they would get.

14 **Q. What is your definition of a small**
15 **area of the field?**

16 A. A small area of the field would be
17 the effective right of way, so two to three acres,
18 maybe up to four, depending on length of right of
19 way out of a square 16-acre section.

20 **Q. What is the alternative -- when**
21 **you're talking about speed of application, is there**
22 **an -- is there a better alternative than aerial**
23 **application?**

24 A. That's one of the reasons aerial is
25 used for -- able to -- they can cover more ground

1 than the ground rigs can.

2 **Q. How about a cost difference?**

3 A. Aerial application is a higher cost.

4 **Q. What is alternative to aerial**

5 **application when crop height prevents a**

6 **high-clearance rig?**

7 A. The current high-clearance rigs are
8 set up to where crop height usually is not, but if
9 it is an issue, then we have to use an aerial
10 application.

11 **Q. All right. And the cost difference**

12 **there would be more?**

13 A. Yes.

14 **Q. What is --**

15 A. For the aerial applications.

16 **Q. Okay.**

17 A. Correct.

18 **Q. What is an alternative to aerial**

19 **application when field conditions prevent entry?**

20 A. There is none, as I said before. If
21 it's too wet or cannot get in the field, then you
22 are limited too.

23 **Q. You indicate in your testimony that**

24 **you are from Macomb, Illinois; is that correct?**

25 A. Correct.

1 Q. Is that where you live?

2 A. Yes.

3 Q. And since you are in -- from
4 Illinois, you were probably aware of a law that
5 requires a utility to enter into an agricultural
6 impact mitigation agreement with the Illinois
7 Department of Agriculture to meet detailed
8 standards to mitigate impacts of construction
9 activities, correct?

10 A. Correct.

11 Q. And that agreement between the
12 utility and the Illinois Department of Agriculture
13 is incorporated in easement agreements that the
14 utility has -- signs with the landowner?

15 A. Correct.

16 Q. And what are the consequences in
17 Illinois if a utility violates its agreement with
18 the Illinois Department of Agriculture?

19 A. The consequences are stated. The
20 mitigation does not state direct consequences other
21 than repercussions for crop loss or damage.

22 Q. So if a landowner feels like the
23 utility has violated the agreement, there's no
24 mechanism at the Illinois Department of Agriculture
25 for them to review that and do anything?

1 A. The review process would be proof of
2 damage.

3 **Q. But ultimately the Illinois**
4 **Department of Agriculture would be the one to**
5 **determine that?**

6 A. They would be the one to oversee it.
7 It is usually, in past experience with projects,
8 between the landowners and the energy company.

9 **Q. I guess my question goes to whether**
10 **in Illinois they go to the department first or do**
11 **they go directly to courts?**

12 A. 90 percent of the groups I've been
13 involved with, it has been negotiated between the
14 landowners and the energy companies. If that
15 fails, then they go into the court system.

16 **Q. And in your experience, has -- has**
17 **this system in Illinois, the Illinois law, worked**
18 **well for landowners?**

19 A. Yes, it's worked very well.

20 **Q. I'm going to go back to your**
21 **surrebuttal page 6 --**

22 A. Uh-huh.

23 **Q. -- lines 11 to 21. What are the**
24 **consequences if chemicals are applied to the entire**
25 **parcel and leave part of it infested with pests or**

1 **fungus?**

2 A. Could you clarify? I don't quite
3 understand your question.

4 **Q. Yeah. Are yields reduced if**
5 **chemicals are applied to just a part of a parcel**
6 **and part is left untreated and pests are --**

7 A. Depending on the year, the type of
8 pest and the severity of the infestation, there can
9 be a yield loss on the area that's untreated.

10 **Q. In your experience, are**
11 **high-clearance rigs able to address issues of wet**
12 **soil or late season crop issues such as fungicide**
13 **application?**

14 A. We've had very little problems
15 getting high-clearance vehicles across the fields
16 with the exception of very wet years.

17 **Q. What are the disadvantages of using**
18 **high-clearance rigs versus aerial-based**
19 **application?**

20 A. Wet years obviously is a
21 disadvantage. The only other disadvantage would be
22 there is some minor crop damage. It's a miniscule
23 amount, but for turning on end rows.

24 **Q. What is -- what is the height**
25 **restriction of high-clearance rigs?**

1 A. I am not familiar with that number.

2 Q. Do crops ever exceed -- never mind.

3 **Strike that.**

4 **Isn't it true that aerial application**
5 **is the last resort when conditions are wet or crop**
6 **height is too tall?**

7 A. I'm not sure of your -- I wouldn't
8 classify it as -- it is the last resort if
9 conditions are too wet, yes. That is true.

10 Q. **Surrebuttal page 6, lines 13 through**
11 **15.**

12 A. Uh-huh.

13 Q. **How can a farmer plan for wet -- for**
14 **wet field conditions to avoid use of aerial**
15 **spraying?**

16 A. That's a question what is very
17 weather dependant on the year. The only time we
18 have -- we can't plan for wet field conditions.
19 Mother Nature is what controls the wet field
20 conditions. So there is no -- no plan if you're
21 wet through there. The planning is more for you
22 know you have fields that need high-clearance rigs
23 on it, so those are going to be scheduled in a
24 different pattern than what you have ability to do
25 in aerial application.

1 **Q. In your experience, who's liable for**
2 **damages caused by GPS-guided equipment?**

3 A. Can you clarify that?

4 **Q. Well, if there's any damages caused**
5 **by GPS-guided equipment that have been interfered**
6 **with by a line, who would be responsible for that?**

7 A. I've never had experience with any
8 interference on guidance.

9 **Q. Have you ever had any experience with**
10 **drones in farming?**

11 A. I've had some -- this year I've had
12 some experience with test subjects. It is not FAA
13 approved, so we cannot use them in a commercial
14 sense now.

15 **Q. Do you see any negative impacts of**
16 **transmission lines on the use of farm drones?**

17 A. I have not.

18 **Q. Now, on page 3 of your testimony, you**
19 **testified that Grain Belt Express has an**
20 **agriculture impact mitigation policy, correct?**

21 A. Correct.

22 **Q. And sitting here today, you cannot**
23 **tell how well or how poorly Grain Belt Express may**
24 **or may not carry out that policy, can you?**

25 A. That is correct.

1 MR. JARRETT: I don't have any
2 further questions. Thank you, sir.

3 JUDGE BUSHMANN: Missouri Landowners?

4 MR. AGATHAN: No questions.

5 JUDGE BUSHMANN: Questions from the
6 Commissioners?

7 CHAIRMAN KENNEY: Just a couple.

8 QUESTIONS BY CHAIRMAN KENNEY:

9 Q. How are you?

10 A. I'm good. How are you?

11 Q. Doing well, thanks. So you talked
12 about Grain Belt's agricultural impact mitigation
13 policy?

14 A. Yes.

15 Q. And you also discussed Illinois'
16 agricultural impact mitigation agreement?

17 A. Yes.

18 Q. Which do you think has better
19 protection for the landowner?

20 A. The policy that Grain Belt has in
21 place is what I see standard for beginning of
22 projects stating how they would like to handle the
23 very generalized idea of protecting agricultural
24 land. The -- for example, the Illinois mitigation,
25 agricultural mitigation plan goes more into detail

1 on specifics for that state, the soils that you'll
2 run into, different conditions that will happen
3 from cropping and those issues. So the mitigation,
4 the Illinois agriculture mitigation plan has more
5 information in it on how to handle specific
6 situations.

7 **Q. Would you characterize it as more**
8 **protective of the landowner than the policy?**

9 A. Yes.

10 **Q. Do you have any philosophical**
11 **disagreements with the incorporation of the**
12 **agreement into the easements --**

13 A. No.

14 **Q. -- as is done in Illinois?**

15 A. No, I do not.

16 **Q. Do you think that would be a good**
17 **practice here in Missouri?**

18 A. I do.

19 CHAIRMAN KENNEY: No other questions.

20 Thank you.

21 JUDGE BUSHMANN: Commissioner Stoll?

22 QUESTIONS BY COMMISSIONER STOLL:

23 **Q. Good evening. One question. Do you**
24 **know in Illinois, was that done statutorily or how**
25 **did that come about? Maybe you answered that and I**

1 missed it.

2 A. I am honestly not sure how it
3 originally came about. We've had one for quite a
4 few years. I've been involved with the Department
5 of Ag in rewriting it and modifying it through
6 projects.

7 Q. So it's maybe something through the
8 department?

9 A. It is through the Department of Ag --

10 Q. It is? Okay.

11 A. -- is where that was.

12 Q. Do you know, do other states or do
13 many states have a policy like this that you're
14 familiar with?

15 A. Yes. States I work in, Wisconsin,
16 Minnesota, they both implement policies like that.
17 Indiana I believe has a policy. They have
18 implemented into it. I'm not sure about Michigan.
19 The projects I've been on have had them, but I
20 don't know if it was required by the state or a
21 project-specific additive.

22 COMMISSIONER STOLL: Thank you.

23 JUDGE BUSHMANN: Commissioner Hall?

24 QUESTIONS BY COMMISSIONER HALL:

25 Q. Good evening.

1 A. Good evening.

2 Q. On page 5 of your surrebuttal,
3 lines 12 and 13, you say, I know of no instance
4 where a GPS-guided system did not function properly
5 due to the presence of transmission lines. Do you
6 see that?

7 A. Yes.

8 Q. What research did you do, if any, to
9 draw that conclusion?

10 A. For specific research I did searches
11 through literature to find out if there are any
12 reports of that. The rest of it is ten-plus years
13 of experience with guidance systems and out in the
14 field in the tractors riding along with people as
15 we go under power lines. I have a consulting firm.
16 In fact, on Monday I was doing an anhydrous
17 application with guidance systems through --
18 underneath a power line, and we were getting no
19 interference from our unit.

20 Q. Now, at the local public hearings, a
21 number of landowners claimed that there would be --
22 that there would be interference with GPS-guided
23 systems. I don't think they provided reports or
24 documented instances of that, but there certainly
25 is that sense out there that that will be a

1 **problem. You say that in your research you found**
2 **no -- no documented instance of that?**

3 A. Correct, for a GPS guidance system,
4 which is different from a survey grade or
5 higher-end grade GPS that takes stationary
6 positions.

7 **Q. So to the extent that there are**
8 **claims that there would be an interference, you**
9 **found no evidence to support that?**

10 A. Correct.

11 COMMISSIONER HALL: Thank you.

12 JUDGE BUSHMANN: Recross based on
13 questions from the Bench, Wind on the Wires?

14 MR. REED: No, thank you.

15 JUDGE BUSHMANN: Staff?

16 MR. ANTAL: No, Judge.

17 JUDGE BUSHMANN: Show-Me Concerned
18 Landowners?

19 MR. JARRETT: No, thank you, Judge.

20 JUDGE BUSHMANN: Missouri Landowners?

21 MR. AGATHAN: No, thank you, Judge.

22 JUDGE BUSHMANN: Redirect?

23 MR. STEELE: Yes, Judge, just a few
24 questions.

25 REDIRECT EXAMINATION BY MR. STEELE:

1 **Q.** **Mr. Wesley, Mr. Jarrett and**
2 **Chairperson Kenney asked you a little bit about**
3 **potential ways to mitigate the agricultural impact**
4 **of this transmission line. Do you recall that?**

5 A. Yes.

6 **Q.** **Are you aware that Staff has proposed**
7 **some conditions regarding the agricultural impact**
8 **of this transmission line?**

9 A. Yes.

10 **Q.** **In your opinion, is a**
11 **one-size-fits-all policy the most effective way to**
12 **mitigate any agricultural impact?**

13 A. No.

14 **Q.** **Are you aware that Staff has**
15 **recommended that all stumps, for example, be**
16 **treated chemically?**

17 A. Yes, I am.

18 **Q.** **In your opinion, is that a good**
19 **policy?**

20 A. No, I don't believe it's a good
21 policy to have a blanket requirement. It will
22 probably be the common in most areas, but in
23 certain areas you'll be restricted from being able
24 to use chemical means, depending on if you're in
25 wetlands, protected areas, different spots like

1 that.

2 **Q. For example, chemical treatment could**
3 **adversely impact endangered species?**

4 A. Endangered species, native species
5 that are there. Could cause increase in stream
6 bank issues.

7 **Q. Are you also aware that Staff has**
8 **proposed that Grain Belt implement a specific seed**
9 **blend in each right of way along its proposed**
10 **route?**

11 A. Yes.

12 **Q. In your opinion, would this**
13 **one-size-fits-all seed blend be appropriate for the**
14 **entire right of way?**

15 A. No. The seed blends on -- from
16 previous experience on other projects have been
17 either agreed upon by DNR, if they're -- if we are
18 crossing ground that they're in charge of, they'll
19 be dealt with in the landowner agreements for
20 specific uses of that property. And those plans
21 are put together with the restoration plan when the
22 construction plan is done in conjunction with the
23 different departments and parties involved in it.

24 **Q. And in your experience, have**
25 **landowners on occasion requested a specific type of**

1 **seed for their particular piece of property?**

2 A. Yes. They've been very specific on
3 some instances.

4 **Q. Finally, Staff has recommended that**
5 **Grain Belt have an arborist as a foreman on each**
6 **right of way maintenance team. In your experience,**
7 **is that a practical request?**

8 A. I don't believe so. In my
9 experience, the arborists have usually been
10 supervisors over the teams that are out on right of
11 way. So instead of having one on every team,
12 they've had one that does oversight over the
13 project or two, depending on the size of the
14 project.

15 **Q. Going back to the Grain Belt**
16 **agricultural impact mitigation policy that**
17 **Mr. Jarrett and Chairperson Kenney asked you about,**
18 **is that policy consistent with industry standards**
19 **in your experience?**

20 A. Yes, it is consistent with what I've
21 seen in the past for projects of this stage.

22 **Q. And so is it normal that you have a**
23 **more general policy at this stage of development?**

24 A. Yes.

25 **Q. With a more detailed plan that**

1 follows as development progresses?

2 A. As development progresses through
3 states, you'll have the -- as in Illinois, you have
4 the state plan that gets implemented. Landowners
5 will a lot of times have their own specific plans
6 that they'll ask to be put into agreements,
7 depending on the use and the -- and the criteria on
8 that site specific -- or on that specific site.

9 Q. Finally, again, Mr. Jarrett and I
10 think Commissioner Hall asked about GPS guidance.

11 A. Yes.

12 Q. Have GPS guidance designers or
13 manufacturers accounted for potential interference
14 with transmission lines?

15 A. Yes. The units we use have programs
16 built into them to adjust for loss of signal. We
17 have historically had issues with tree lines.
18 That's one of our major obstacles through most farm
19 fields more than any other obstacle we deal with.
20 So they build in what used to be referred to as
21 look ahead. So it predicts the path so that if a
22 signal is lost, it will keep on the line, partially
23 for safety reasons, and then just to keep those
24 straight lines as best we can.

25 Q. In your experience, do tree lines

1 **cause more interference in transmissions lines than**
2 **GPS guidance?**

3 A. Yes. Much more.

4 MR. STEELE: No further questions.

5 JUDGE BUSHMANN: Thank you

6 Mr. Wesley, you may be excused.

7 I believe that completes our
8 testimony for today. We'll begin tomorrow,
9 8:30 a.m. and I assume we start with Mr. Gaul. Do
10 we want to go back in order?

11 MR. ZOBRIST: We've got a couple of
12 folks who wanted to go ahead, so if -- Judge, if
13 it's all right for us to talk among ourselves, I
14 can either e-mail you tonight or let you know.

15 JUDGE BUSHMANN: Why don't you just
16 let me know in the morning.

17 MR. ZOBRIST: All right.

18 JUDGE BUSHMANN: We're off the
19 record.

20 (WHEREUPON, the hearing was recessed
21 at 6:35 p.m.)

22

23

24

25

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C E R T I F I C A T E

STATE OF MISSOURI)

) ss.

COUNTY OF COLE)

I, Kellene K. Feddersen, Certified
Shorthand Reporter with the firm of Midwest
Litigation Services, do hereby certify that I was
personally present at the proceedings had in the
above-entitled cause at the time and place set
forth in the caption sheet thereof; that I then and
there took down in Stenotype the proceedings had;
and that the foregoing is a full, true and correct
transcript of such Stenotype notes so made at such
time and place.

Given at my office in the City of
Jefferson, County of Cole, State of Missouri.

Kellene K. Feddersen, RPR, CSR, CCR

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