THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF SOUTH DAKOTA

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IN THE MATTER OF THE APPLICATION OF MONTANA-DAKOTA UTILITIES CO. AND OTTER TAIL POWER COMPANY FOR A PERMIT TO CONSTRUCT THE BIG STONE SOUTH TO ELLENDALE 345 kV TRANSMISSION LINE

EL13-028

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BEFORE THE PUBLIC UTILITIES COMMISSION

GARY HANSON, CHAIRMAN
CHRIS NELSON, VICE CHAIRMAN
KRISTIE FIEGEN, COMMISSIONER

COMMISSION STAFF

John Smith
Karen Cremer
Greg Rislov
Brian Rounds
Katlyn Gustafson

APPEARANCES

Thomas Welk and Jason Sutton, Applicants
Bob Pesall, Intervener
Randall Schuring, Intervener
Bradley Morehouse, Intervener

Reported By Cheri McComsey Wittler, RPR, CRR

Sections 4, 19.1, and 20 of the Application, as well as Responses to Staff's First Data Requests, paragraphs 5 and 8. Section 4 talks about the benefit of the project through property taxes specifically.

Sections 19.1 provides a summary of the socioeconomic conditions of the project and is very typical of what you would see in the Application and is very consistent with applications I've done in the past.

Section 20 is employment estimates for the project. And paragraph 5 in the First Data Request Response has additional property and sales tax information details. And paragraph 8 has additional information on employment estimates and impacts to local economy.

In regard to soilborne pests, after conversations with over 500 landowners who attended our project open houses, many of those which were farmers and the consultation we requested with NRCS and Department of Agriculture, we were not aware of any issues of soilborne pests.

We've addressed the evidence and have responded to the soybean cyst nematode issue as provided by Dr. Tylka's testimony and haven't provided evidence on the soilborne pests as we are not aware of the prevalence of those specific issues raised.

I was hired to work almost exclusively on that, and that was my graduate training as well.

Q. Can you give the Commission a short explanation of what the soybean cyst nematode is?

A. Sure. So generally I start off this explanation by describing nematodes in general. These are microscopic worms that live in water and soil, very common. And most of them are good. They're beneficial.

But there are a subset of them that feed on plants. And many of these plant feeding nematodes or plant parasitic nematodes are native to the United States, and they're commonly found in agricultural soils throughout the United States.

But there also are a few that are introduced pests. And soybean cyst nematode, which I'll probably refer to as SCN from this point on, is one of those introduced pests.

And introduced pests create unique problems in that when they are introduced into a field first off they have no natural enemies because they've never existed there before. So many of the native plant parasitic nematodes are not terribly damaging because there are other things that live in the soil that eat nematodes for lunch, for example.

But when you're a new introduced pest you have the

benefit of many years for not having any natural enemies. And so that's one of the things that makes soybean cyst nematode or SCN so difficult and so dangerous.

It also has aspects of its biology that make it very unique and very damaging. Most nematodes are individual worms that feed from the outside of the root and produce five or 10 offspring. But soybean cyst nematode burrows into the root. It attaches to the vascular tissue, which is in the center of the root, and then the female swells up to form who we refer to as a swollen female. And the reason she swells up is because ovaries develop inside of her that are very large.

Eventually the adult swollen female is about the size of a printed period at the end of a sentence. So in a book page or a newspaper. And that swollen female fills up with eggs, 200 to 300 eggs. So a unique aspect of the nematode's biology is that it has a very high reproductive potential.

Now the whole life cycle of SCN can be completed in four weeks. So when you think about how many weeks a soybean crop is grown in your state or mine that allows for three or four or five turns of the life cycle, generations. And so that adds to the potential for explosive increases in numbers.

And then if mother nature didn't give us enough of a

bad hand, that final aspect that makes it terribly difficult to manage is the eggs inside the females. When she dies those eggs can live 10 or more years without a soybean crop being grown. Those eggs go dormant in the soil.

So it's a very troublesome pest because of being an introduced pest, having a high number of offspring per individual, a short life cycle, and then very long lived in the soil.

Management of soybean cyst nematode consists of checking your fields to know if you have it or not, and then once you've discovered you've got it, you're looking at growing resistant soybean varieties or not growing a host crop like soybeans or using a seed treatment, which is a new management strategy that's just been brought on to the market a couple of years ago.

So really check your fields, switch to a resistant soybean variety, don't grow something that's a host crop, or a seed treatment.

I want to just touch on the resistant soybean varieties for a second because I don't want to give you the impression that that's a cure. So resistant soybean varieties suppress the reproduction of the nematode, but it doesn't stop reproduction. And also it still suffers some damage.

And then as you use the resistance over time, the nematode can become resistant to resistance. So in Iowa where we grow 11 million acres of soybeans, soybean cyst nematode is in 75 percent of the field. It's not a death sentence, but it's a significant economic hit to the soybean production in any field that has it because of these things.

And the seed treatment, which is the newest management strategy, in my mind at least the verdict is still out on whether or not they provide any additional benefit or not.

Because of everything I've just said, I consider the states of North Dakota, South Dakota, and parts of Minnesota as being in a really unique situation in that there are large tracts of land growing soybeans that don't have soybean cyst nematode yet. And so that's a unique opportunity in terms of management. In many respects the best way to manage soybean cyst nematode is to delay its arrival into a particular field.

So I find myself sitting here listening to proceedings thinking of my career in the early '90s in Iowa when soybean cyst nematode wasn't very widespread, and we really beat the drum and talked about managing the movement of soil to slow the spread of the nematode. Once the nematode is present then we've covered already

what your management options are.

And as far as spread goes, as in my prefiled testimony, anything that moves soil has the ability to move soybean cyst nematode. I just want to bring you back to a mental imagine of a female the size of a period at the end of a sentence. And that little object has 200 to 300 offspring inside of her.

And so the smallest little particle that's able to hold a period at the end of the sentence, that's the amount of soil that could be moved to move the nematode.

Finally, one just short comment. I've heard comments yesterday and today about farmers not mentioning this in discussions and so forth. That doesn't surprise me at all. Soybean cyst nematode has been in Iowa since 1978. And I arrived in 1990 and have devoted my career to research and grower education on soybean cyst nematode, and to this day I run into Iowa farmers who were unaware of soybean cyst nematode.

So just because the farmer -- don't be alarmed or don't let that throw you a curve ball. Soybean cyst nematode is still somewhat unrecognized even in it the State of Iowa among some farmers.

And that concludes the summary of my prefiled testimony.

Q. Mr. Tylka, I have just a couple more questions for

MR. SUTTON: Sure. It's relevant because the basis for his assumptions are that when you dig into the ground and go from field to field it spreads. My point is there are many other mechanisms out there that have been occurring and will occur, and we have not developed the spread that he's indicating. That's the relevance.

MR. SMITH: Do you want to repeat the question and --

MR. SUTTON: Would you like me to reask it? Would that be easier?

MR. SMITH: Sure.

Q. Dr. Tylka, can you tell me how many miles of drain tile have been installed in South Dakota since 1995 when SCN became present?

MR. SMITH: I'm going to overrule the objection. If he knows, he can answer. If he doesn't, he can answer.

A. I do not know.

Q. Now the spread of SCN is caused by the spread of soil particles; is that correct?

A. Beyond an inch, yes. It can only spread on its own power about an inch.

Q. And soil is moved by farm equipment?

A. That is correct.

Q. And it can be moved by wind erosion?
A. Yes.
Q. Also by water erosion?
A. I agree.
Q. Will you look at paragraph -- or your prefiled direct testimony.
MR. SUTTON: Does he have that?
Q. Looking at paragraph 12 of Exhibit 101, that's the direct prefiled testimony that you provided is Exhibit 101, correct, Dr. Tylka?
A. The document I'm looking at has it as Exhibit 102.
Q. Oh, you're right. You're right. Correct. Thank you. Looking at paragraph 12 on page 3, you opine that construction equipment used in the project like the proposed BSSE line can cause SCN to spread farther or more rapidly than ordinary farming practices.
Is that your opinion?
A. Yeah. Opinion, yes.
Q. And then you go on and page 3 and on to page 4 to talk about the basis for that opinion; is that right?
A. Yes.
Q. And when we look at paragraph 12 in the first paragraph underneath the actual number 12, you answer the opinion yes. And then you say "Soil disturbed by construction equipment would likely result in greater

spread of the nematode than soil disturbed by other common occurrences by making the soil more friable, easily crumbled and prone to erosion, compared to soil that is left undisturbed or disturbed just minimally."

That's your opinion; correct?

A. Yeah.

Q. What do you mean by undisturbed?

A. Well, undisturbed would be a situation like no-till farming or just not -- nothing dug into the soil.

Q. So, for instance, disturbing the soil through till farming practices would disturb and similarly make the soil friable, would it not?

A. I wouldn't say similarly is correct.

Q. It would make the soil friable; correct?

A. Yes.

Q. And it would disturb the soil?

A. Yes.

Q. You're not aware of any academic studies that have been performed indicating construction practices result in the spread of SCN; correct?

A. No. I believe I stated that in the prefiled testimony.

Q. No is a little ambiguous to the record there. So the answer to my question is correct; correct?

A. Correct.

among the farmers I have had personal experience with. And I guess I can say that relates back to my opening comments about the awareness of the nematode, and that's what I meant by diligent.

Q. Now in your opening comments you also described some mitigation techniques that farmers can employ if they get SCN in their fields; is that right?

A. That's correct.

Q. And one of those is to grow nonhost crops such as corn?

A. That is correct.

Q. And another option would be to include nonhost crops like corn as part of a crop rotation; correct?

A. Yes.

Q. And, in fact, you recommend that to producers who have SCN?

A. That's correct.

Q. That's part of the techniques used to minimize the effect?

A. Correct.

Q. Another option would be to plant SCN resistant variety seed; correct?

A. Correct.

Q. And as part of your work you have completed academic research about the success in using SCN resistant seeds;

absence of the nematode.

That has become less of an issue over the past 20 years, but there still are some SCN resistant soybean varieties that do not have top yield potential. So that's my reason for my answer being it depends on the variety that's chosen.

Q. Because of our growing season, as we move further north into areas that have had less pressure from SCN, would the varieties probably have more research done in that area at this point?

A. The answer is yes. And there are much fewer varieties available with SCN resistance in the maturity groups grown in South Dakota relative to Iowa. Even right now.

MR. SCHURING: Thank you.

MR. SMITH: Mr. Morehouse, any questions?

MR. MOREHOUSE: Nothing. Thank you.

MR. SMITH: Staff, any questions?

MS. CREMER: Thank you.

CROSS-EXAMINATION

BY MS. CREMER:

Q. Is there any way to determine how SCN is introduced into a clean field?

A. I've never been asked that question in 28 years.

Q. Yay for me.

COMMISSIONER FIEGEN: Congratulations.
A. I don't think so. They all look the same and are genetic the same. I don't think so.
Q. And is there any way to determine when SCN was introduced into a clean field?
A. Not specifically. Although you could deduce some timing information based on the numbers that are detected. It doesn't show up in full blown force in terms of numbers. It starts out slowly and builds up.
Q. And then looking at your Exhibit 105, it's a map.
A. Yes.
Q. You have that? So if I understood your testimony correctly, where it shows there is SCN, there definitely is in the dark portions of the map?
A. It should be red if it were printed in color.
Q. Yeah. I printed mine black and white, but okay. If I understood you correctly, those areas that show up white, those may also have SCN and you just haven't found it yet?
A. That's correct.
MS. CREMER: Okay. Thank you.
THE WITNESS: That's a correct statement.
MR. SMITH: Is that all the questions you have?
MS. CREMER: That's all I have. Thank you.
MR. SMITH: We'll turn then to Commissioner

and research in fields, or does everything come in to you?

THE WITNESS: No. Most of my field research is done on farmers' fields.

COMMISSIONER FIEGEN: Okay. So what precautions do you take and your assistants -- I'm sure you have some grad assistants with you.

What type of precautions do you take on vehicles, clothing, work boots, all of that?

THE WITNESS: Just knock off as much dirt as possible, as much soil as possible. Soil probes is probably another thing that would accumulate soil. We just make sure we're not taking large clods of soil. But we don't steam wash or power wash. We just -- we work in fields with SCN. So we -- yeah.

COMMISSIONER FIEGEN: It is really tricky because when an egg of 200 eggs -- that swollen female.

THE WITNESS: Female.

COMMISSIONER FIEGEN: And it's a point of a period, it is in your boots. Because when I wear work boots they have groves.

THE WITNESS: Absolutely.

COMMISSIONER FIEGEN: I can knock off as much soil as I can, but it's still there.

THE WITNESS: Yes.

COMMISSIONER FIEGEN: So the precautions of the research people are pretty much not going through the washing but mostly knocking off the excess.

THE WITNESS: Yeah. And let's be specific. You asked about my particular research group. There may be other research groups in other states where they do use plastic booties on their feet and they do more thorough precautions than I do.

COMMISSIONER FIEGEN: Sure. Thank you.

THE WITNESS: Yes.

COMMISSIONER FIEGEN: Are you aware -- especially when I see commercial sprayers out there across the State of South Dakota, but I'm sure across Iowa you have those big commercial sprayers. Are you aware of any mechanisms they take to prevent the spread of diseases?

Because, of course, they travel on roads. Roads have mud. So they're picking up things while they're traveling to the farmers, let alone from farm to farm to elevator, all of that.

THE WITNESS: Yeah. The answer is no. And forgive me if I'm over answering, but since you're curious about that, the way I pitch managing the movement of soil in Iowa is first in the context that three-fourths of the fields have it. And that percentage

maybe some of those nematodes could get baked near the soil surface, and maybe the numbers would be lower than if you had collected to a depth of 8 inches.

CHAIRMAN HANSON: Okay. Because there was some discussion it sounded like there needed to be some excavation of some sort in order for it to be transported. But it sounds like -- that seemed to conflict a little bit with one of your other answers when you said -- I believe it might have been Mr. Sutton's question, could it be transported by the wind, and you answered yes.

THE WITNESS: Yep.

CHAIRMAN HANSON: It could.

THE WITNESS: So my answer to your question, to double back on your question, is it's present there at the surface.

From a research standpoint where I'm measuring numbers I would worry about only including that upper inch because the numbers might be a little lower. But it's present, and it's available to be wind blown, water washed, all the things that we covered that move soil.

CHAIRMAN HANSON: So hunters going from one field to the next, deer running from one field to the next, any animals, badgers, skunks, whatever, rabbits -- what about water fowl and birds? They could transport it

as well?

THE WITNESS: There's actually a paper where somebody has picked through bird droppings and found dead SCN females with live eggs.

CHAIRMAN HANSON: It sounds like it's impossible to stop this. This is terrible.

THE WITNESS: I mean, it is, but there are certain parts of the country that are in a unique situation. I would never say you can stop it or prevent it, but there's things that could be done to slow it.

CHAIRMAN HANSON: And it develops immunity to herbicides and --

THE WITNESS: Well, to resistant -- I was using the herbicides as an analogy. But it can develop resistance to the resistant varieties.

CHAIRMAN HANSON: What are some other host crops besides soybeans that are grown in South Dakota?

THE WITNESS: What are the crops that are grown in South Dakota?

CHAIRMAN HANSON: Sorghum, corn.

THE WITNESS: Wheat are not hosts.

CHAIRMAN HANSON: Wheat. What other --

THE WITNESS: So hosts are more into play when you get into North Dakota and Minnesota and you talk about edible beans. There's all kinds of different types

Q. What do you mean "not as much"?
A. Well, I made the comment here a little bit at the end here I said this project will take more from agriculture and the state of South Dakota than it will return.
Q. Well, as I understand it -- and we will get the exhibits in front of you that are your land. They're Exhibits 21A and 21B and 21C.
Do you have those exhibits before you?
A. Yes, I do. B.
Q. 21A, 21B, and 21C.
A. Yes. I have A in front of me.
Q. Is 21A a true and accurate representation of the land in which the project seeks to put its structures?
A. I believe so.
Q. The project proposes to put two structures on your property, and those numbers are 457 and 458. Is that your understanding?
A. According to this map, yes.
Q. And is that your field that's depicted in Exhibit 21A?
A. Yes, it is.
Q. Do you do till or no-till in that?
A. Depends on the year and the conditions of the soil.
Q. Do you do both then?