BEFORE THE STATE OF WASHINGTON

ENERGY FACILITY SITE EVALUATION COUNCIL

In the matter of	)	
Application No. 2009-01	)	Hearing Volume III
WHISTLING RIDGE ENERGY, LLC.	)	Pages 378 - 522
WHISTLING RIDGE ENERGY PROJECT	)	
_____	)	

A hearing in the above matter was held on Wednesday, January 5, 2011, at the Skamania Lodge, 1131 S.W. Skamania Lodge Way, in Stevenson, Washington at 8:30 a.m., before the Energy Facility Site Evaluation Council with C. Robert Wallis, Administrative Law Judge, presiding.

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WHISTLING RIDGE ENERGY, LLC, Tim McMahan, Attorney at Law; and Erin Anderson, Attorney at Law; Stoel Rives, LLP, 900 S.W. Fifth Avenue, Suite 2600, Portland, Oregon 97204; and Darrel Peeples, Attorney at Law, 325 Washington Street N.E., No. 440, Olympia, Washington 98506.

COUNSEL FOR THE ENVIRONMENT, H. Bruce Marvin, Assistant Attorney General, Office of the Attorney General, P.O. Box 40100, Olympia, Washington 98504-0100.

REPORTED BY:

SHAUN LINSE, CCR

CCR NO. 2029

1 APPEARANCES (Cont'd):
2 DEPARTMENT OF COMMERCE, Dorothy H. Jaffe,
3 Assistant Attorney General, P.O. Box 40109, Olympia,
4 Washington 98504-0109.
5 FRIENDS OF THE COLUMBIA GORGE, Gary K. Kahn,
6 Attorney at Law, Reeves, Kahn & Hennessy, P.O. Box 86100,
7 Portland, Oregon 97286-0100.
8 SAVE OUR SCENIC AREA (SOSA), J. Richard Aramburu,
9 Attorney at Law, Aramburu & Eustis, LLP, 720 Third Avenue,
10 Suite 2112, Seattle, Washington 98104-1860.
11 * * * * *
12 JUDGE WALLIS: It's the January 5 of the year 2011
13 session in the matter of Council Application 2009-01. As a
14 preliminary matter it was noted a cross-examination exhibit
15 was prepared for the examination of Witness Apostol and was
16 not used in yesterday's session. That document is being
17 withdrawn. It is not an exhibit in this proceeding and will
18 not be in the exhibit list or in the book.
19 Today's schedule was initially identified as
20 hearing witnesses Bauer, Larson, Homann, Storm, Meier, and
21 McDaniel. I understand that McDaniel will not appear
22 because there are no questions for that witness. It's been
23 requested that Witness Storm be taken first. There is no
24 objection to that so I will ask the witness to step forward
25 to the witness stand, please.

MARK STORM,

having been first duly sworn on oath,

testified as follows:

DIRECT EXAMINATION

BY MS. ANDERSON:

Q. Mr. Storm, I'm showing you what's been marked for identification as the Applicant's Exhibit No. 7.00 and 7.01. Is this your prefiled testimony in this matter as well as your resume?

A. Yes, it is.

Q. Mr. Storm, if I were to ask you the same questions live today as they were posed to you in your prefiled testimony would your answers be the same?

A. Yes, they would.

Q. Do you have any changes to your prefiled testimony?

A. No, I do not.

Q. Are you able to answer questions on cross-examination regarding that testimony?

A. Yes, I am.

MS. ANDERSON: Thank you, Your Honor. I move to admit.

(Exhibit Nos. 7.01 and 7.02 offered into evidence.)

JUDGE WALLIS: The witness is available for cross.

DIRECT EXAMINATION

BY MR. ARAMBURU:

Q. Mr. Storm, we've not met. I'm Richard Aramburu. I'm representing one of the intervenors Save our Scenic Area.

A. Good morning.

Q. I understand that your testimony concerns noise; is that correct?

A. That is correct.

Q. And how many wind projects have you conducted noise studies for?

A. To date six or seven.

Q. Six or seven. Your resume only shows two. Are we missing some?

A. That is correct.

Q. You're employed by URS; is that correct?

A. Yes, sir.

Q. Now, as I understand what you did in this proceeding was to do some noise modeling; is that correct?

A. That is correct.

Q. You didn't actually go out and measure noise from wind turbines; is that right?

A. No, I did not.

Q. You used a model that would predict noise from the wind turbines; is that correct?

A. Yes, we used a model based on the Cadna/A program.

Q. What is the Cadna/A program?

A. Cadna/A is a software program belonging to a class of similar software that's industry accepted and used.

JUDGE WALLIS: Could the witness spell for the record, please.

THE WITNESS: Yes, sir. C-a-d-n-a I please there's a forward slash A.

JUDGE WALLIS: Thank you.

BY MR. ARAMBURU:

Q. Is there any particular turbine that is used in your program to predict noise?

A. As shown in the testimony we used and in the ASC we used as the leading turbine a 1.8-megawatt turbine using data from the manufacturer that we already had. At the time we did not know what turbine would be used for this project.

Q. Now have you field tested the actual noise that comes from that turbine or are you relying on the manufacturer's estimates?

A. We are relying on the manufacturer's estimates, those estimates. The manufacturer data we receive is reported based on IEC 61400-011:2002 standard.

Q. Can you tell us some of the characteristics of that 1.8-megawatt, its height, its rotor diameter, some of those specifics, please.

A. As I recall, and if I can refer to the ASC, I

1 believe the hub height is 262 feet.
2 Q. What is the rotor diameter?
3 A. Off the top of my head I don't recall. It's going
4 to be in the neighborhood of I'll just put 60, 70 meters.
5 Something that's typical of what I would consider turbines in
6 this size for power capacity for this.
7 Q. So 60 to 70 meter diameter. Would that be correct?
8 A. I could be mistaken with the exact figure, but
9 that's my recollection.
10 Q. Has the Applicant told you that they have now
11 stipulated to use of a turbine that is not a 1.8-megawatt
12 turbine?
13 A. That is my understanding, yes.
14 Q. Have you modeled the results from a two-megawatt
15 turbine?
16 A. Not on this project. On other projects I believe
17 we have.
18 Q. Now, I understand and I'm attempting to -- I want
19 you to turn -- do you have the application with you there?
20 A. I do not have it in front of me, no.
21 MR. ARAMBURU: Erin, do you have a copy of the
22 application for the witness?
23 MS. ANDERSON: I do. One moment. Do you have a
24 page you're referencing and I will look it up?
25 MR. ARAMBURU: May I have just a moment to adjust

our audiovisual here, if I may?

JUDGE WALLIS: Yes.

THE WITNESS: With counsel's permission I'd like to retrieve my glasses so I can see the audiovisual?

MR. KAHN: No.

BY MR. ARAMBURU:

Q. Let's get you set, Mr. Storm. We put the application in front of you, and I think your section of the application is Section 4.1.

MR. ARAMBURU: And I might ask the Council Members if they have the application in front of them to turn to that section.

MS. ANDERSON: Your Honor, may I also ask that I be able to retrieve a copy? I've given Mr. Storm my copy of the application for site certification, and I want to also be able to verify any quotes are correct. So one moment, please. Is that all right?

MR. ARAMBURU: That's fine, yeah. It will be a couple questions. Let me know. I just want to keep things moving.

MS. ANDERSON: Okay.

BY MR. ARAMBURU:

Q. What kind of a sound does a wind turbine make?

A. A sound wind turbine wind turbine makes what humans perceive and hear is a swishing noise. It's characterized

usually in the range of 500 to 2000 hertz.

Q. So can you recreate what that sound is like here, kind of let us know what it sounds like?

MS. ANDERSON: Your Honor, I'm going to object. He's asking Mr. Storm to generate a wind turbine sound for the record. I don't think that's appropriate here.

JUDGE WALLIS: Apart from the fact that the reporter will have trouble spelling it, I see no problem in the witness doing so, if in fact he's able to do that.

A. I don't know if I can adequately. I listened to rap music when I was younger, but I don't think I have the requisite skills at the moment.

JUDGE WALLIS: Would it be adequate if the witness could describe it in the English language in a way that might be more accurate than sound?

BY MR. ARAMBURU:

Q. My understanding it's kind of a big swoosh.

A. As I said a moment ago, yes, I agree. It's a swoosh type noise. Again, and I try to position it in the audible spectrum 500 to 2000 hertz.

Q. We're not all noise experts here. I just wanted the Council to understand that it's kind of a swoosh sound.

A. Yes, it's largely an aerodynamic. It's noise with aerodynamic charges primary in a range that our ears are accustomed to hearing: speech, music.

Q. The number of swishes that you hear per minute depends on how fast the turbine is going. Right?

A. Well, not necessarily. There are a number of factors at work that can change the character of that swoosh. You're suggesting that there is a cycle or some pattern?

Q. So the faster the turbine is going the more it swooshes. Right?

A. As I'm trying to understand your question, years ago when turbine designs were what we call downwind, meaning the rotors were downstream, were downwind of the mast, and that turbulence of incoming wind over the mast will create a turbulent region through which the rotor blades chop basically, and that will create a pronounced noise. Modern wind turbines today are both upwind, meaning that those turbine blades are ahead of that mast; hence that noise is eliminated. Was that the nature of the question you're asking?

Q. Actually it wasn't. The question I was asking is, and I understand that these are upwind turbines now so the mast is behind the blade and the wind is coming from this direction. Correct? Now, so the number of revolutions determines the number of swishes. Right?

A. That can be. As I said, that is a factor in the noise levels that could be detected at some distance from the turbines, yes.

Q. And the bigger blades create louder swooshes.
A. That can be a factor as well, yes. There are a number of factors that play in terms of what is actually perceived or measured at distance from the turbine.
Q. Well, that is not my question, Mr. Storm. My question I think it's a yes or no. Do bigger blades create more noise under the same wind conditions?
A. Theoretically they can. Okay. But may I add, sir, that by the same token blade design has an influence on blade noise? As I said a moment ago, the primary or dominant noise is aerodynamic turbines. Those blades are better designed or the manufacturers are doing their level best to create more efficient blades. Less turbulence generally means less noise. So it's not necessarily a given that your larger blades or longer blades are going to be noisier.
Q. It depends on the turbine selected.
A. Could you repeat that, please.
Q. It depends on the turbine selected.
A. Turbine select or the manufacturer model that's being considered, yes.
Q. Now, looking in the application at page 4.1-5 which is your drawing of noise level contours.
A. Yes, I have it in front of me.
Q. Now, that drawing is very, very difficult to read, and I've endeavored to put up a bit of a blowup of that

drawing on the screen. Can you see that?

A. I see that, yes.

Q. Tell me what you were doing with this drawing.

A. What my team and I were attempting to display, present in this figure, Figure 4.1-1, is over a large area, not only the project but in the vicinity, to show noise contours, and as you go further away those noise contours are showing what we call ISO dB levels. In a way it's similar, it's analogous to a terrain map where you'll be at topographical contours for the same elevation. Like matter the particular colors are like expected sound levels from the project, the operation of the project. Given it's a rather large area, we try to show with our detail maps 1 and 2 with those blowups, if you will, so that the viewer can see, okay, with respect to Receivers 1, 2, and 3 what are the predicted levels at those locations and give the reader a sense of okay at what noise contours are they falling within.

Q. And the location of the turbines was provided to you by the Applicant; is that correct?

A. That is correct.

Q. You don't know this but the rest of us do; that the foam board map and the drawings show, which is Exhibit 1.11 in these proceeding, show a layout of turbines. Do you see that?

A. I see a layout of turbines on the foam board, yes.

Q. Is that the same layout of turbines that you used in your noise prediction work?

A. I'm trying to do a visual comparison at the moment. It looks similar. It may not be exactly the same. I would have to check that.

Q. You've not been provided with any new turbine locations from the Applicant based upon the change of the 2-megawatt turbines?

A. Not that I'm aware of.

Q. Would the noise -- well, first of all, let me ask you about the isobars on your Figure 1.11. Is that the noise from the turbines that you're providing us?

A. Yes, sir, that's correct.

Q. So the various isobars are noise from the turbines. Is that turbine noise going to be noticeable to the people within the detail maps that you've shown us?

A. It may be noticeable. The aggregate noise from those turbines may be noticeable, but it depends on the nonproject ambient of the existing environment. What was shown here in Figure 4.1-1 is only the project operation. It is not the aggregate but the sum of project and ambient.

Q. I notice that your materials show that there will be -- that this is at page 4-1.13 of the application show the predicted increases in noise at the three receiver IDs; is that correct?

A. Yes, the table displays that.

Q. So it would go from it's Table 4.1-8 and 4.1-9 both show dBA increases at those locations from 4 to 8 dBA. Is that your prediction?

A. Based on the tables you're describing, yes, that will be the range of expected increase over ambient.

Q. Based upon those increases would those be noticeable levels of -- would those be noticeable to the receiver?

A. If at the time painting a scenario where the turbines were built operating normally and the existing ambient measured levels were as we're showing in those tables, those increases at that decibel range 4 to 8 would be noticeable as consistent with industry knowledge or accepted industry practice. In other words, our rule of thumb is a 3 dB difference is detectable by a healthy human ear.

Q. As for those three noise receivers there is a steep elevation difference as I understand it between the receivers and the turbines; is that correct?

A. I would have to check the topographical data. I don't recall off hand what the actual elevations are. I would have to check the model, but that sounds possible.

Q. Have you been in the field to look at where these noise receivers are in comparison to the project location?

A. I personally have not been there. My staff member

in our noise group from San Diego was out there at my direction.

Q. So you've never been on the site?

A. I personally have not been on the site.

Q. You have spotted here for us three noise receivers. Are those homes or are those properties?

A. I would have to confirm or check, but my understanding that those at least represent properties.

Q. You're aware that the Washington Noise Control Regulations require that noise be measured at the property line. Are you aware of that?

A. I'm aware of it, yes.

Q. Are your measurements taken from the property lines of these receiving properties or are they taken from the residences?

A. Could you repeat that question, please.

Q. Your noise predictions that are found on Tables 4.1-8 and 4.1-9 are those taken from the property lines of the properties that are the receivers here or are they taken from the actual residence of the properties? Do you understand my question?

A. I do understand the question, yes. Let me respond by saying that as I recall they were taken, the general location of what we would call the residential uses. I could be mistaken, but my understanding these actually are

agricultural EDNA Type C properties. So while the measurement, the requirement at property lines would be higher, the use at a residential use such as a home or a house on the property, we adopted at what I would say a more stringent EDNA Type A that has lower levels at 60 dBA during the day and 50 dBA at night.

Q. That wasn't quite my question. My question was did you measure these noise levels at the property lines of the property ownership or did you measure them at the residences?

A. Well, we did not measure levels -- let me clarify that. The measurements we've conducted thus far were only existing ambient noise levels at representative locations.

Q. Okay.

A. We modeled levels at residential use receiver locations as indicated by what's shown on the figure.

Q. I understand that there's modeling, and I understand the turbines haven't been put up the last time I was there, but I guess my question is pretty simple. You've got some blue dots on your drawing here. This is for Figure 4.1-1. The Council Members have it and we have them up on the board as well. But are those the residences or are those the property lines of these ownerships of those properties? That's hopefully a simple question.

A. As I understand the question, those locations are what our team in doing this model understood to be

residential uses on those properties.

Q. So these don't show noise levels taken at the property lines.

A. I believe that's correct.

Q. Your testimony talks about noise levels from construction, various kinds of construction equipment. In your experience is one of the -- I'm going to let you answer this anyway you want -- modeling parts of construction these backup beepers that they have on the backs of trucks and other equipment?

A. The backup beepers or alarms as you say, yes, are part of construction noise for safety reasons.

Q. In your experience do nearby residents find those annoying?

A. One could say that, but annoyance is subjective.

Q. I understand. Is there anything that can be done in this project to stop those backup beepers?

A. That would depend on -- again as I mentioned a moment ago, the backup alarms or beepers are for safety primarily. I couldn't say. I think it's a little outside my skill to recommend measures to attenuate or mitigate that noise, again because I think they fall under safety or some other concern.

As I think I've shown in the ASC, I offered some recommendations for noise control, sound attenuation just in

general. But, for example, the construction equipment has adequate mufflers on its exhaust, silence on intakes, things that are industry practice.

Q. I understand that may be true. Let's kind of focus on my question which is backup beepers and not mufflers and other things, if you can, Mr. Storm.

Are there mechanisms by which these backup beepers can be avoided daily from proximity to other things?

A. There may be. Again, I'm not currently at the moment aware of any technology to reduce those, again, because as I said a moment ago and I will say it again, those backup alarms and beepers produce certain noise levels that can be heard. That's the whole point. They're done for safety. There may be alternate technologies that are visual based, but the worker's safety that's my understanding is that's why they're implemented. Might I also add that they are intermittent noise sources. They don't happen all the time comparable. For example, you know a bulldozer engine may be idling or in motion. That's more of a continuous or much longer duration noise source than the intermittent backup alarms.

Q. The swooshes from the wind turbines are going to go on as long as the wind turbines are moving. Right?

A. As a potential noise source, yes, the wind turbines are available -- the wind turbines will produce noise when

the wind resource is available, when the wind turbines are operating.

Q. Does your model take into account the fact that the noise levels at the noise receivers that are shown on your drawings may have different wind conditions than the wind conditions at the level of the turbines?

A. Our model, and I believe this is shown in the ASC, we modeled two different wind speeds which correlated with manufacturer data that was available to us. I think it was six meters per second and nine meters per second at ten meter height. Again it's per IEC 61400-11. What we typically do with these noise studies conservatively is assume that the ground wind speed is going to be calm or nonexistent; however, the wind turbines can still be seen as an available wind resource to turn or rotate and basically operate at maximum power generation capacity. I might add that most turbines in the range of 8 to 9 meters per second in terms of sound level and power generation they've already hit a plateau. They're not going to get noisier as you increase wind speed.

Q. Can you convert 6 and 9 meters per second to miles per hour?

A. That would require a calculator which I don't have at the moment.

Q. If you can't, you can't.

A. Maybe it's early in the morning. Forgive me, Council, for not having that at my fingertips.

Q. If we were to remove turbines in the first A array, A-1 through 7, would that result in the noise from the remaining wind turbines not being noticeable for residents for the three receiving areas, the three receivers on your drawing?

A. I don't -- if I were to paint a scenario where we try to move or locate all of the seven turbines in that figure, in that Section A-1 through A-7?

MR. ARAMBURU: We will need Tammy to help us.

MS. TALBURT: Coming.

A. I don't think I could say with certainty that even if you took those seven turbines away that the remaining aggregate noise, the aggregate noise from the remaining turbines would not be perceived or audible. Understanding that you're taking seven away, you will be taking seven away from a total of 50 in terms of numbers because decibels relate to a logarithmic scale that's, what, you take away 1/7, less than 20 percent.

Yes, those are the closest turbines to those particular residences; however, that doesn't automatically mean that that makes the aggregate noise from the aggregate turbines go away or become inaudible. Again as I said earlier, what someone would perceive or measure also depends

on the ambient noise.

BY MR. ARAMBURU:

Q. I understand, but I'm looking at your drawing and you say that based upon the turbine arrays that you have that the noise will be audible increases for 4 to 8 dBA at these residences. That's the way that I read your material.

A. Yes, with the materials presented, yes.

Q. And that's modeled based upon the seven turbines in the first A-array. Correct?

A. Yes, that is correct.

Q. So if we got rid of those, we just struck those out of this project, then we're left with the remainder of the project, would those numbers, those increases in noise for those residences be eliminated?

MS. ANDERSON: Your Honor, I'm going to object. This has been asked and answered. He already said he cannot answer that it will go away or be audible.

MR. ARAMBURU: I don't think he's answered the question.

JUDGE WALLIS: The witness did respond.

A. I'll repeat.

JUDGE WALLIS: You don't need to repeat if you've already answered it.

THE WITNESS: I believe I've answered the question.

JUDGE WALLIS: Very well.

BY MR. ARAMBURU:

Q. So would it be your testimony that the noise from the A-8 to A-13 array of turbines produced noise for Receptors 1 and 2? Actually 1 and 3, these ones near here, the second A-array up here, does that area there create noise for these properties?

A. My testimony would be that all the turbines on the project are logarithmically added together so that, again, we're looking at the same thing here, Figure 4.1-1. Those noise contours are depicting the aggregate noise from those operating turbines at effectively their maximum operation setting. They're busy collecting wind energy. If you take some away, yes, there may be a slight reduction in noise level. But to say that by taking away those near turbines that the sound totally dramatically drops I would not characterize that as being correct.

Q. So you have not modeled the predictions of noise from the various residences in locations 1 and 3 or other locations by taking away the first A-array.

A. My team and I have not performed that exact scenario.

Q. Would you predict a reduction in noise at Receptors 1 and 3 if that was removed?

A. I would expect a reduction of noise to occur if

1 those turbines were removed, yes.
2 Q. Thank you. I think this may be my last question.
3 Let's suppose that the noise predictions that you're modeling
4 has resulted in you're wrong. The noise is actually more
5 than you predicted, and we discover that when the turbines
6 are up and running. What can we do in the field to reduce
7 the noise to the surrounding residences?
8 A. Let me before I answer that question --
9 Q. Why don't you just answer the question, Mr. Storm.
10 Let's answer that question. If there's some other issues
11 that your counsel wants to bring up in redirect examination,
12 fine, but I prefer that you answer the question, please.
13 A. After turbines are -- because we're relying on
14 manufacturer data given to us, the manufacturers have
15 measured their turbines for this IEC standard I mentioned
16 61400-11. A report in this format what -- in fact, they use
17 the term warranty at overall dBA levels. The level could be
18 160, it could be 104, whatever that number is, and they
19 provide an error range. So we have that confidence and we've
20 got the right that -- let me say it another way.
21 I'd be surprised if the levels were higher. If
22 they were higher as the question I've been asked, one, there
23 may be some theoretical things one could do. I mean
24 obviously one can't put an enclosure around the wind turbine
25 as I might if I were advised on a natural gas project or a

residential noise project.

You go back to theoretical underpinnings. Do I consider reducing the speed of the turbines? Are there some improvements in that respect? But that's -- there are few things that you can do which is why we do our model such as what is contained in the application. We rely on and even insist on getting what would be considered good data from the manufacturer as I said. Manufacturers will use terms like this is the warranty level that they're putting themselves on the line to make sure that we're modeling with good data.

Q. So I understand you're relying on the manufacturer's warranty here, but in the field if we find that we've got a lemon here from one of these manufacturers and this thing is making more noise than their warranty, an experience with all of us in this room, then what can we do in the field? You said we could reduce the speed of the turbine blades. What else can we do?

A. That's theoretical things. Let me provide some background.

Q. I'm simply asking you what can you do in the field to reduce the noise. You've mentioned one thing which is reducing the speed. Is there anything else we can do in the field to reduce noise if we find the noise is higher than what's anticipated by the models? Pretty simple question.

A. I think it's a simple question, but I think the appropriate answer is the predicted levels based on the model conditions, model inputs.

JUDGE WALLIS: Mr. Storm, I think you're repeating yourself here, and I do suggest that you listen to the question and respond to the question if you're able to respond. You've given us some background, and if we need more background I'm sure your counsel will inquire into it.

A. Okay. Thank you. I appreciate that. I did want to quickly point out that what I thought, what I believe the key here is complying with the county's state noise limits.

BY MR. ARAMBURU:

Q. That wasn't the question to you. The question to you was what could we do in the field to reduce noise levels if we find that the manufacturer's data and predictions are wrong and we're getting more noise than we anticipated? And I have your testimony that one of the things we can do is to reduce the speed of the turbines.

So my question to you is there anything else we can do besides that? We've heard a lot of background so if you could answer that question that would move us.

A. If one would call -- there are, again, going to acoustic principles, but I feel I'm going into an area that is out of my scope.

Q. And that's fine. That's a fine answer.

A. Because those are decisions that I feel that I cannot make. I'm a noise expert providing recommendations and testimony.

Q. Okay. Good. Now, have you ever, and you've got all these warranties and these predictions from the manufacturer, but have you ever gone out and field tested to see if those numbers are right?

A. I personally have not done such field measurements.

Q. If the size of the rotor blades on these turbines went from 70 meters to 100 meters would that result in more noise, all other factors being the same, same wind speed, same everything else?

A. By saying everything else as I said earlier in my testimony here, if the blade design was such that you could make that apples-to-apples comparison and theoretically if you were only changing the diameter, that would potentially cause an increase in noise level, yes.

Q. Can you give us any predictions of that noise level?

A. I can't do that because there are a variety of factors in play which I've already described.

Q. Has the Applicant, Mr. Spadaro, indicated to you that his testimony here on Monday was that the new blades may be 100 meters in diameter?

A. So could you repeat the question, please.

Q. Has Mr. Spadaro told you that the new plan with the with the two-megawatt turbines is for 100-meter diameter turbine blades?

A. I have not heard that. I am hearing it now.

Q. If we go from 70-meter turbine blades to 100-meter turbine blades at the same revolutions will the tip speed be going a lot faster?

A. Mathematically I think the rotor speed, the tip speed would basically the equation that would increase.

Q. Your testimony and other materials indicated that the 1.8-megawatt turbine is state of the art in your materials, and those materials I think were done some time ago. Is it still your opinion that the 1.8-megawatt turbine is state of the art, state of the industry?

A. Could you refer is there a page where I made that? I don't recall making that exact statement. I see on page 4.1-12, addressing the Council, what I say there is given that the exact turbine model to be used for the project has yet to be determined at the time of this report, conservative but realistic and representative values for the type of equipment being considered for this project have been used. For example, the model currently uses data from an industry leading 1.8-megawatt, 50/60 hertz wind turbine.

Q. Is the 1.8-megawatt wind turbine you described there still as we sit here in 2011 an industry-leading

turbine?

A. I believe whether it's still industry leading or not I think that's subject to interpretation. I think the more important thing is I still think it's appropriate and a conservative selection that we used in the model.

Q. Aren't most of the projects now going for machines that are greater than 1.8?

A. Again, that depends on the project. If I might add as a scenario, if you have more smaller turbines or less larger turbines I think it's fair to say they tend to -- there would be an offset. Your large turbines may be noisier, but you have fewer of them as the part of the aggregate.

Q. Your resume talks about the project Sacramento Municipal Utility District - Solano Wind Project.

A. Yes, sir, it does mention that.

Q. You did some work for that?

A. Yes.

Q. Is that a recent project?

A. I was involved in that project back in 2007.

Q. They were using 3-megawatt wind turbines not 1.8. Correct? That's what your resume says.

A. If that's what my resume indicates, yes, then I stand by the resume.

MR. ARAMBURU: I don't have anymore questions for

Mr. Storm. Thank you.

JUDGE WALLIS: Very well, Mr. Marvin.

CROSS-EXAMINATION

BY MR. MARVIN:

Q. A couple of questions. The project site is a working industrial forestland. How has your modeling taken that into consideration or is that a consideration when considering that sound?

A. I don't think our model made any special consideration. In fact, due to the characterization certainly for what would be an appropriate noise limit as I mentioned earlier, the EDNA my understanding is the project area is Class C, the receivers are Class A, and that's where the 60 dBA limit during the day and 50 dBA limit at night comes from.

If there's activity on the site, certainly when we did the ambient noise measurements about two years ago, if there was noise occurring at the time it looks like it would have been part of the ambient measurements that were conducted.

Q. I guess what I'm trying to get at is my understanding that this will be a somewhat fluid site in which vegetation and trees are going to be coming and going over long periods or actually in some cases very short periods of time in the harvest. I am just trying to get a

read in terms of, you know, I believe that there has been harvesting done within the last two years on that site, and has any modeling been done to reflect changes in the site conditions?

A. Well, if I were to characterize the -- if I understand what you may be suggesting, that the forest, the vegetative cover let's call it are contributing to the one might call the ground absorptive, acoustical ground absorptive characteristics of the terrain. Yes, we did model that. Cadna/A considers it with coefficients per ISO 9613-2. Having said that, I believe that the prefiled testimony provides a table at which illustrates that because the noise sources of the model turbines are so high that the average height of that sound path goes from let's say a nearest turbine to the receiver. It effectively makes that potential sound attenuation from the ground absorption very small.

Q. So I guess my understanding, and again this could have been subject to change, and I'm glad to be corrected on this. There is a stand of timber between string A-1 through 7 and the residential sites that have been the focus of our discussion today. Is it your testimony that that stand of timber has no impact no impact on the transmission of sound from these potential turbines?

A. I wouldn't say no impact. I would say our model has conservatively considered a small input. In other words,

we're not relying on it to provide a great deal of sound attenuation.

Q. But vegetation of that nature or forested lands can provide some sound attenuation. Correct?

A. Yes, sir, they can, but you need to according to industry references you need a great deal of distance for it to have a substantial number of dBs of attenuation.

Q. What kind of distance are you talking about?

A. Let me put it this way. An analogy would be sometimes I'm asked by a client, "Okay, what happens if I put up a line of poplars maybe 15 feet deep?" I have to tell them unfortunately that's not going to give you anything. There may be visual screen and that may help a neighbor feel like, oh, something has been done, but in terms of acoustics that's a negligible effect. You would need hundreds of feet deep forest and dense covers in order to see that potential sound attenuation value increase.

Q. Are you familiar with the stand of forest that I'm talking about?

A. I'm looking at the foam board and the screen in front of me. Yes, I believe I recall the one you're talking about.

Q. But you've never been to the site?

A. As I said earlier, I personally have not been to the site.

Q. At this point in time you feel comfortable having opinions whether or not that forest stand would provide buffering with regard to sound issues?

A. I'm feeling comfortable with the model we performed which as I said earlier conservatively does not expect that stand or quite frankly other ground absorption to offer much in the way of sound attenuation.

Q. I guess I mean is it simply the model? I don't mean to overwork the issue. I'm just trying to figure out is that a factor that's plugged into the model?

A. Indeed it is. As I mentioned earlier the International Standards Organization 9613-2, which talks about this topic, it's the standard for predicting outdoor sound propagation. It includes a formula I believe, unless I'm mistaken, Equation No. 10 which allows you to input the as I mentioned earlier the average height between the receiver and a sound source. So that's in there. The distance between the source and receiver is also a variable in that equation. So Cadna/A or even if you're using your own Excel spreadsheet combined with the same standard that would calculate for you an estimate of the ground absorption attenuation that you can expect.

Q. One additional question. I believe under Section 4.1.1.5 which is the mitigation measures and on page 4.1-16, it says operation. Do you see where that is? On the page

there's a heading Operation.

A. Yes, I see that.

Q. I'm assuming that this section is mitigation measures, and that is specifically mitigation measures for operations. Quite frankly, I'm not sure that I see any mitigation measures set forth there. Is that accurate? In your opinion this project does not need to be mitigated?

A. That's what the last sentence says taken from the paragraph at the comma, and would result in no need for operation noise mitigation.

Q. I guess then the final question has as to do with the last sentence here. It says with averaged measured existing sound levels reasonably representing ambient noise levels at the nearest noise-sensitive receivers, the cumulative increase over ambient for most operating cases would remain below applicable thresholds and would result in no need for operations for noise mitigation.

I am curious about this cumulative increase over ambient for most operating cases. Would this suggest there are some operating cases where there could be noise in excess of the regulatory threshold?

A. It does say noise in most operating cases. What the comment refers to if I could point --

Q. Obviously my follow up would be can you describe to me what exceptions there would be?

A. Well, in that light, I'd refer the Council to page 4.1-14 where I indicate, and that is after the appearance of Table 4.1-8 to -11. The application indicates, "Under certain conditions there is the potential for one or more of the following phenomena to occur that may temporarily cause a variance in the predicted sound levels," and I list five bullets which I'll summarize. The atmospheric effect, variance to the temperature and humidity, uncertainty range the sound power of each wind turbine.

So there are conditions, and those five bullets do not include what the ambient noise level is at a measured or perception location. You could have very high winds at the ground level; you know, winds going through trees that potentially could create more noise than what the turbines are producing. Again, it depends on position, the proximity of that wind noise through vegetation. There's a lot of factors here at play.

Q. I guess in that section you conclude none of the conditions would result in the project exceeding noise regulations. I guess that is on 4.1-14. And I guess I'm just trying to sort out how that harmonizes with your conclusion on the bottom of page 4.1-16.

A. Okay. I think I understand the question. That last sentence which follows those bullets that I mentioned a moment ago, again, those bullets relate to how the predicted

levels that appear in Tables 4.1-8 to -11 may vary with different conditions that were not precisely modeled. Again, bear in mind that the existing noise levels that appear in those tables are based on the measurements at representative locations that were conducted during our field study. Those existing noise levels may be different at the time the project is completed.

As you'll see in these tables, let's say existing levels that are shown in the tables are still indicative of what one would measure under a like condition at those locations after the project is completed. You'll see from I should say from the estimated project levels and the overall accountable levels, the highest overall anticipated level shown in Table 4.1-11 is 43 which is still 7 dB less than the nighttime level limit of 50 dBA. So that 7 dB discrepancy gives us the confidence to make the statement that follows those five bullets on page 4.1-14.

Q. I guess, Mr. Storm, in your previous cross-examination testimony you indicated that you worked on a total of six or seven wind power projects?

A. Yes, that's what I testified earlier, yes.

Q. Were any of those located in forested landscapes?

A. Not that I can recall, no.

Q. Is there sort of a general descriptor in terms of the types of topography that those projects were located in?

A. I'm currently working on, in addition to this project I'm working on two other wind farms in the western United States. I would characterize those as high desert or desert with varying topography. So they're not both "billiard table". We're not talking about Texas or Wisconsin. So in those projects like we did for this one we did import topographical data to make sure the terrain was adequately represented and modeled.

Q. So my understanding is that some of the impacts of modeling here is affected by the weather; is that correct? Like the development of humidity, the temperature, you know, the temperature inverse, things like that, could have an impact on how sound travels?

A. Yes, that's shown in the ASC. They can have an influence, yes.

Q. In your modeling are there factors that are included with regard to the typical type of -- again, are there weather factors that are included in that model?

A. Council, I'm currently checking ASC for that kind of detail just to make sure that I don't misspeak. I could be mistaken, but I'd like to say based on my recollection that the inputs for this particular model that we performed for the application was using 10 degrees centigrade and 70 percent relative humidity.

Q. And you'll have to forgive me. What is 10 degrees

centigrade?

A. I'm sorry. It's a German program so they like metrics. Ten degrees that would be -- what is it? -- plus 32 times 9 divided by 5, if I'm not mistaken. It works out to be 50, 55. I'm seeing nods from the audience.

MR. MARVIN: I'll take your word on that. I have nothing further. Thank you.

JUDGE WALLIS: Ms. Jaffe, do you have any questions?

MS. JAFFE: No, I do not.

MR. KAHN: Your Honor, I do.

JUDGE WALLIS: Mr. Kahn.

CROSS-EXAMINATION

BY MR. KAHN:

Q. Mr. Storm, good morning. My name is Gary Kahn. I represent one of the intervenors Friends of the Columbia Gorge. I'm going to ask you some questions. I will do my best not to overlap what Mr. Aramburu or Mr. Marvin have asked you. The first area I'd like to go to is covered by the figure that is on the board, Figure 4.1-1. This is in connection with the analysis done to determine the ambient sound levels and increase over the ambient; is that correct?

A. What Figure 4.1-1 is showing are the project operation, the aggregate project operation of noise in contour form as described earlier in my testimony. Again

similar to a terrain map where you're looking at contours of similar elevation height, the noise contours are showing you what are the similar decibel levels 45, 50, 55, etc., not the ambient levels.

Q. Okay. But you've got some indications LT1, ST1, ST2. Those were locations that measurements were taken to determine the ambient sound levels; is that correct?

A. That's correct.

Q. In your testimony this is page 4, lines 24 through 26 and into the top of page 5. You state that with predicted range increase -- well, you concluded that the predicted range increase is going to be less than 10 dBA at all three receivers. Correct?

A. Could you repeat that number.

Q. Page 4, lines 24 through 26 and then onto the top of page 5.

MR. ARAMBURU: He's talking about your testimony.

BY MR. KAHN:

Q. I'm sorry. Your testimony.

A. My testimony says, "Here, the predicted range of 'increase' over ambient being less than 10 dBA for all three nearest representative receivers (see the values in the increase column of the aforesaid Tables), compliance with hypothetical plus 10 dBA over ambient guideline criterion is implied."

Q. Then on page 4.1-16 of the application switching you back there.

A. Yes.

Q. You concluded that with respect to the operational noise level that the increase will also be less than the threshold of 10 dBA. Correct?

A. I don't -- the paragraph does not say that unless I'm missing something.

Q. Well, I'm looking at the last sentence.

A. The cumulative increases ambient for most operating cases will remain below the applicable threshold and would result in no need for operational noise mitigation.

Q. And what is that applicable threshold?

A. The applicable threshold of this project are the county and state noise limits.

Q. If you could look at Table 4.1-9 which is on page 4.1-13. Can tell me the process you went through to come up with the existing dBA level for Receiver 2? Page 4.1-13.

A. Yes, I see the page and I see the table here.

Addressing the Council, I'm turning back to the earlier part of the application where I believe I show some detail that answers the questions so again to make sure I don't misspeak.

As part of the answer I want to go to Table 4.1-2 where I indicate the Short-Term Noise Measurement Data

Summary where I show that ST2, which is the representative measurement location for the west side of the project vicinity, could correspond with R2 or Receiver 2 in the model. It's showing a number of measured values including, Leq dBA physical descriptors, etc. So that is 35.

Unless I'm missing something, the 35 corresponds with the Leq dBA without cars for it looks like measured during the nighttime. That value appears consistent with the 35 Leq dBA for Receiver ID at page 4.1-9.

Q. The purpose of conducting these tests is to determine what the ambient noise level is at the various receivers, is that correct, in layman's term?

A. Our study was performed to characterize ambient noise in the project area and vicinity at representative locations.

Q. Well, on the board there you've got ST2 which is I'm assuming the location where you had the monitoring device for short-term sound levels for the second receiver; is that correct?

A. Right. ST2 was conducted as I recall at the intersection of Jessup and Manzanola roads.

Q. But is ST2 designed to measure the approximate ambient noise level at Receiver 2?

A. It is meant to represent what would be the ambient level at R2 at the bottom, yes.

Q. How far is the ST2 right there? And then I believe R2 is right there; is that correct? Is that R2?

A. I believe that is R2 that you're highlighting at the enclosed red square.

Q. And then ST2 is over here?

A. Yes, ST2 is closer to or within the community of Mill A.

Q. How far is ST2 from R2?

A. The scale is provided on the view screen. I'm looking over at the foam board.

Q. Well, if you look at the exhibit in your book in the application it has a scale and we can give you a ruler if that would help.

A. The distance appears to be over a mile.

Q. Is it typical then to determine the ambient noise level at a location you do monitoring over a mile away?

A. In some cases we do. Again, it's meant to be representative of the area. For example, by way of analogy, if I were to do a transportation noise study along the highway where there may be many residential subdivisions, do I need a measurement at every single house in that subdivision? No, for practical purposes I don't. I take a measurement at one, maybe two locations to represent that residential area. Why? Because the sound sources that make up or comprise the ambient in that area are probably going to

be the same, air conditioning, the mean distance to the highway. The highway is typically going to be the dominant noise source. So that's a similar technique or practice was applied here in this field study.

Q. So I'm confused then. ST2 is designed to measure the ambient noise in that vicinity or is it designed to measure ambient noise at R2?

A. It's meant to represent the ambient noise at R2, yes. That's how we used the model.

Q. And yet it's over a mile away. Correct?

A. That is correct.

Q. In the circle below ST2 all those little dots represent residences; is that correct?

A. That's my understanding, yes.

Q. Can you estimate, again using the scale, about how many residences are within a mile of ST2?

A. From the figure it appears to be more than a few dozen. I would have to check.

Q. How many residences are within a mile of R2?

A. It appears at least two from what I can see.

Q. Is it a fair statement that there's going to be more ambient noise levels if there's 40 or more houses within a mile of the monitoring device as opposed to two houses within a mile of the monitoring device?

A. It depends on the source of the ambient. As I said

in my earlier analogy, the residences despite their number if their in proximity to the dominant noise such as a highway or factory or something else the noise from those individual residences will be effectively negligible.

Q. You haven't been to the ST2 site. Correct?

A. As I said earlier in my testimony, I have not been to the site.

Q. So you can't tell whether there are other noise sources that would mask out the effect of the 40 houses; is that correct?

A. The staff person under my direction that performed the field study conducted the field measurements, and as is contained in the application reported some details of what types sources were produced: bird calls, dog barks, noise due to as I said earlier as the wind blows through vegetation, and things of that sort.

Q. Dog barks and things like that are more likely to occur at 40 houses near the monitoring device as opposed to two houses. Is that a fair statement?

A. It could be a fair statement because there's a number of factors at play. Do they all have dogs?

Q. But we don't know. Again, I'm coming from a layperson's perspective. Tell me whether I'm missing something. Is seems to me that if you're trying to determine ambient noise levels here, why would you pick a spot over a

mile away? Again if you're trying to determine it here why would you pick a spot there?

JUDGE WALLIS: For the record you're contrasting what points?

MR. KAHN: R2 receiver with ST2, the location of the monitoring devices.

A. Again, as I believe I said earlier, the selection of the ST2 was to represent that general area, what one might say that side of the project, the west side of the project vicinity whereas the other measured locations occur with the white square of the figure or correspond with the white square of the figure. That is the southeastern side of the project where based on my staff person's observations at the field as he was conducting the study observing, yes, there are residences down here as well.

BY MR. KAHN:

Q. Mr. Storm, you answered my question that the purpose of ST2 was designed to measure the ambient noise at R2. You said that earlier, and now you said that the purpose of ST2 is to measure the ambient noise at the west side of the project. If that's the point why do we even have an R2 if this is a mile away and designed to measure the ambient noise on the west side of the project as opposed to R2?

A. I believe I said the measurements were done to represent ambient noise levels.

Q. On the west side of the project. Correct?
A. Yes.
Q. If that's the case, if the measuring device is here to measure ambient noise at the west side of the project why do we have any reference whatsoever to R2? Why wasn't R2 designated at the west side of the project other than that specific residence if you put the monitoring device a mile away?
A. The selection of ST2, the actual location of ST2 as we do on other field studies in common industry practice there's a variety of factors. Security being one of them, the availability of good weather conditions, wind conditions to collect data at the time of the study. That will determine that ST2 is at the appropriate location to measure ambient noise to represent that general area, including that residence identified as R2 as indicated in the model and shown on the figure.
Q. Then you use those calculations to subsequently model noise from the wind project and compare it to the ambient noise. Is that again a layperson's way of putting it?
A. Our model predicts the aggregate wind turbine operation noise and then the tables that you alluded to earlier, the 4.1-13, is to compare the representative existing ambient levels with the estimated project noise

levels. We combine those to get an overall what one might call a future ambient; meaning the ambient plus the project, and then how does that overall compare to the existing or pre-project noise levels. The difference of those increase in dBA.

Q. As a general matter is it fair to say that the closer the receiver is to the project the louder the noise will be from that project?

A. I think our figure depicts that, yes, by way of contours.

Q. How far is R2 from the nearest turbine?

A. I believe the application indicates that distance. I'm looking at 4.1-4. It looks like 0.8 miles.

Q. That's the distance from R2 to the nearest turbine?

A. Again, I'll read from the Application Section 4.1.1.3, the second paragraph, "and 0.8 miles (4,265 feet) southwest of Tower B16 (shown on figure as Receiver 2 or R2)."

Q. How far is ST2 from the nearest turbine?

A. On the figure for ST2 would appear to be over a mile from the nearest turbine.

Q. So I think we've actually done the math. About a mile and a half does that sound about right?

A. That sounds reasonable.

Q. So roughly twice the distance from the nearest

turbine at R2. You said it was about 0.8 miles for R2 and about one and a half miles for ST2. So roughly double, a little bit less?

A. I think one could say that, yes.

Q. As the distance from the turbine doubles won't the sound level decrease significantly?

A. A rule of thumb when you have a point source is that as you the double distance you would expect the noise level to theoretically decrease at a rate of 6 dB.

Q. So based on that analysis the noise at ST2 will be 6 dB less, 6 decibels less than it would be at R2 given the approximate doubling of the distance?

A. Well, if you look at the figure again, which is depicting estimated aggregate project wind turbine operation noise, you can see from the contours because the outer most contours are lower noise levels that correspond with the legend at the upright corner of the figure. So that would give you a sense of what the predicted attenuation or drop would be, that best project level.

Q. You stated that at ST2 there were a variety of reasons why you selected ST2 as a measuring location for R.2. Did you consider putting ST2 anywhere along this public right of way, this Willard road that goes right near the house?

A. That may have been a consideration. I would say we also considered putting ST2 where it's currently located.

Q. Well, I understand that. Did you ever consider asking whoever lives in the spot whether you could put the monitoring device there so you can accurately measure the ambient noise at that location?

A. That may have been considered.

Q. But you don't know.

A. I can't comment on that. In our practice we don't always get access permission to properties. In fact, in the other two projects I mentioned and others I've worked on some folks do not and are very adamant about not wanting our well-intended measurements to occur on our property.

Q. But nobody asked that to your knowledge so you don't know what they would have said had they been asked that. Correct?

A. I can't recall. I would have to check.

Q. For R2 you only did short-term measurements, not long-term measurements; is that correct? I don't see any LT2 anywhere in the application or on the figure.

A. It is correct that we are only reporting long-term measurement data from LT1, that's correct.

Q. Let's talk about Receiver 1, which is I believe the southern most of those two residences. Is that your understanding as well? Receiver 1 would be right about there?

JUDGE WALLIS: The center of the white square?

MR. KAHN: Yes.

BY MR. KAHN:

Q. I note that there's little blue dots that identify receivers. I believe the southern one which is close to the center R1 and the other one is R -- other way.

A. Because we are -- not to interrupt but because we're indicating in the application that is a place characterized as a potential future residence shown at this Receiver 3 or R3 is 0.3 miles (2,000 feet) from Tower A-1, yes, I believe that corresponds with the more northwest blue dot within that white square shown on the screen.

Q. You conducted for R1 in the southern most of the two on the white circle you did long-term and short-term measurements. Correct?

A. That is correct.

Q. Why did you do long-term measurements there but not for R2?

A. As I recall, my field staffer did conduct long-term measurements in the vicinity of the ST2 location, but the data was determined to be unusable. I thought that's why we did not report it.

Q. What is the industry standard in trying to determine ambient noise levels? Is it just to do short term, just to do long term, or just to do both?

A. It depends on the -- in my experience it depends on

a variety of factors. Sometimes regulations may require a certain duration of measurements and sometimes they request or require 24, 25 an hour.

Q. What was required here? Was that required here? Are there any standards that apply here that you followed?

A. I don't recall there were requirements. It is in our interest typically to try to get, attempt to get long-term data so that we can again better characterize the ambient sound. Understand that the ambient sound is comprised of a great many sources. Everything from nearby and distant traffic, cars, aircraft overflights, wildlife, again wind through trees, human activity. There is a great many things. So if we can get some long-term data and it's not required, hey, that's great.

As I said, sometimes the data can be used and sometimes it can't.

Q. You said here that you believe, I think was your word, that your staffer did long term measurements, but the data was unusable. Did I capture your answer correctly?

A. Yes, we determined it was not appropriate for use which is why we did not report it.

Q. Why? What made it not appropriate for use?

A. I can't recall the exact factors. A number of things can happen; for example, precipitation. These are outdoor noise monitors. Precipitation would occur or wind

would occur, or sometimes the instruments sometimes in cold weather they can experience short battery life.

Q. The long-term measurements you've done over a 24-hour period; is that correct?

A. Again it depends on the requirement or the guide.

Q. Okay. For LT1 how long were the measurements taken?

A. If I can refer to the -- yes, it looks like from the Table 4.1-3 it was a four-hour period.

Q. Again, going back to what apparently was LT2 that was not disclosed in the application or the EIS you said that there could be precipitation or wind or other reasons. If you're monitoring is done over a 24-hour period and your initial monitoring wasn't valid because of rain or wind why didn't you do it again if it only takes 24 hours to determine the long-term ambient noise at LT2?

A. A number of reasons can apply.

Q. Well, I'm asking what happened here not what could apply generally. Why wasn't there consideration of putting it there for another 24-hour period?

JUDGE WALLIS: If you don't know that answer that's acceptable.

THE WITNESS: Council, I appreciate that.

A. Let me say that forgive me, I have to speak generally. When we conduct the field studies, we are on the

clock. Oftentimes we don't have the luxury of multiple days to conduct repeated measurements or repeat measurements. So there are factors that limit the amount of time we may have on the site or the weather or climate conditions may limit the available window to conduct some measurements to allow us to get what we consider valid data for purposes of this study that's contained in the application.

BY MR. KAHN:

Q. But there's no explanation anywhere in the application or reference to the fact that long-term studies were conducted and disregarded, is that correct, for R2?

A. Well, as I said earlier, the application does not include long-term data at No. 2 because in our estimation the data was not suitable for use.

Q. But you don't know why it wasn't suitable for use. Correct?

A. I can't recall, no, because the studies were performed two years ago.

Q. Do you still have that data from your measurements at LT2?

A. I don't know. I don't know if it's still available. We didn't report it.

Q. Then for Receiver 3 you did both short-term and long-term measurements; is that correct?

A. No, it's not correct. We conducted representative

information at ST1 and LT1.

Q. For both 1 and 3.

A. The ambient measurements collected, the data collected from those locations were meant to represent R1 and R3.

Q. That's what I meant. So we have different methods to determine the ambient noise level for R2 than we do for R1 and R3. Correct?

A. I'm not sure I see a difference because we have short-term data for, representative short-term data for ST1 and ST2 that's shown in Table 4.1-2.

Q. To reach your conclusion of the ambient noise level for R1 and R3, as I read what you did you added the ST1 sound levels and the LT1 sound levels and divided them by two; is that correct?

A. Yes, it looks like that appears in Table 4.1-4, yes.

Q. So there is a completely different methodology for 1 and 3 than two because you didn't add long-term measurements for two and add it to the short term and divide it by two. Correct?

A. Because we had available data for LT1, yes, we used that technique to average the ST1 and LT1.

Q. But you didn't do the same technique for Receiver 2 because you didn't have any long-term information for

Receiver 2. Correct?

A. Effectively that is correct.

Q. I'm not sure you'll be able to answer this question. But if the same method of calculation that was used on R2, which is just the short term, were used for R1, what would be the existing ambient nighttime noise level be for R1? In other words, if you ignored long term. You just relied on the short term.

A. Without doing the calculation right now, the number of represent decibels for R1 and R3 would be based on the approach, again in the absence of long-term data.

Q. The short-term measure for R1 is less than the average level; is that correct? I'm just talking for nighttime. The nighttime levels for R1 if you only used short-term information like you did for R2 wouldn't the nighttime ambient noise for R1 be less than what you have concluded it is in the application?

MS. ANDERSON: Counsel, for the record, could you indicate which table you're referencing?

MR. KAHN: I'm not really referencing a table. I'm asking him for his conclusion. He would probably better more suited to figure out which table to use to answer that.

BY MR. KAHN:

Q. Do you understand my question, Mr. Storm? If you used the same measurements for R1 that you did for R2, in

other words, ignore the long-term information, wouldn't the existing ambient nighttime decibel level for R1 be less than what you concluded the ambient noise levels are?

A. Council, I'm taking a moment to check the appropriate tables so I can answer that question. I can answer that question. Give me a moment. I don't mean to keep the Council waiting. I'd have to check to see if whether or not that is -- let me say this: It could be possible that the value could be lower, again based only on the short-term reading.

Q. You're saying it could be possible? You have all the data in front of you. I'd be willing to give you the time to look through the tables and answer my question.

MR. MOSS: Judge Wallis, maybe it will speed things along, I notice that counsel is looking at what appears to be page 4.1-7 which shows the Short-Term Measurement Noise Data Summary ST1 and ST2. Perhaps if the witness will look at that, that will speed things up.

THE WITNESS: I'm looking at it as well, Council. Thank you.

A. When looking at that particular Table 4.1-2, the Short-Term Noise Measurement Data Summary for ST1, there are three time periods corresponding in the morning from 11:52 to 12:12 in the afternoon, then later in the afternoon 18:00 to 18:20, and then 23:00 which would be eleven o'clock at night.

BY MR. KAHN:

Q. My question was just the nighttime ambient, not day or evening.

A. All right. Thank you for the clarification. It looks like the Leq dBA shows that and then it shows Leq dBA without cars is shown as 30. I then go to Table 4.1-4. It would appear the nighttime column, that's the right most column, an expression is shown as (38 + 30)/2=34. So I think to answer your question without that long-term value without cars the value would be 30. So, yes, the answer would be, yes, it's lower.

Q. 30 as compared to 34. Correct?

A. Again, in the absence of that long-term data.

Q. Yes, that's what I mean.

A. Right.

Q. Then you do your modeling to determine the amount of noise that would be generated by the turbines at each of these receiver points. Correct? Using your model and the logarithms and whatever math is done.

A. We modeled levels both at those particular receivers 1, 2, and 3, and because Cadna/A is a three-dimensional sound propagation modeler allows us to produce those contours that are displayed in the figure.

Q. If the ambient noise is 30, nighttime ambient noise at R1 is 30 rather than 34, doesn't that make the increase

from the wind turbine project four decibels more than you indicated, if the ambient noise is four decibels less?

A. Well, it depends on -- are you asking me if the increase would be different by four or if the --

Q. Yes. Wouldn't the increase over ambient noise levels from the wind turbine project be four decibels more if the ambient noise is four decibels less?

A. To help answer your question --

Q. Please.

A. -- Council, if you refer to Table 4.1-8 on page 4.1-13, we're talking about receiver ID. This is the nighttime. Well, let's look at 4.1-9, nighttime at 9 meters per second. If we look at Receiver 1 where existing ambient level is shown to be 34, if that were said to be 30 that would mean that we then add logarithmically 30 to 37 which would result in only a 1 dB increase above 37. In other words, the net result would be 38, and hence the increase over ambient would become eight rather than five as shown, if that scenario were true.

Q. Same set of questions with respect to Receiver 3. You didn't use any long-term measurements for 3; is that correct? Because you used the same measurements for 1 and 3. Right?

A. The measurements at ST1 and LT1 were used to represent those at Receiver 1 and 3, that is correct.

Q. Again, if you follow the same methodology for R2, if you follow the same methodology that you used for R2 and apply the R3, in other words, no long-term measurements, wouldn't the decibel level, the ambient noise level at night for R3 be less than what you disclosed it to be in here as well for the same reasons?

A. If that were true, yes, it would be at a lower level.

Q. If what were true?

A. Again in the absence of using long-term data which we did in our analysis.

Q. Again, the increase, the nighttime, the increase over ambient noise level at night would be more if you didn't use the long-term measurements for R3. The same question I had for R1; isn't that correct?

A. If it would be more, yes.

Q. And how much more would it be?

A. If the scenario was a case where we had let's say a value of 30 instead of 35 that is shown. Again if we take 4.1-9 for Receiver ID 3, if that existing value were 30 and if that indeed represented nighttime ambient noise and to predict that with project levels would be 42, the logarithmic sum of those two values would be 42.

Q. So that would be an increase, a nighttime increase over ambient level of 12 decibels; is that correct?

A. In that scenario that would be a 12 dB increase.

Q. Which exceeds whatever whether you call it hypothetical threshold or whatever, but it exceeds the 10-decibel increase threshold that you mentioned earlier in your testimony; is that correct?

A. It would. 12 is greater than the hypothetical 10 dB shown. 12 is greater than 10, yes.

Q. Is it frequently done in your profession where within a relatively small geographical area in conjunction with the same project that you use different sets of measurements? By different set I mean long term and short term in one average and just short term in the other? Is that common in your industry?

A. Again, I think this is consistent with what I said earlier. Conducting a field survey of this nature or other field surveys unless the regulations specify what has to be done a lot of it is left to rely on our judgment. Again, we are trying to characterize the ambient noise which as I said earlier is comprised of a great many different noise sources.

Having said that, our field study includes not just looking at the sound meter, but, you know, listening to what's in the area, viewing, or attempting to view or observe what are observable producers of noise that again are partial to the project and the project vicinity environment.

Q. But you weren't the one that observed the contours to the sources of noise because you weren't on the site. Correct?

A. As I said earlier, one of my staff members in the our noise group in San Diego was the field investigator who performed measurements and documented those observations.

Q. I've asked this question before, but I want just to clarify it because I'm not sure I understand your question. As a general matter forgetting the specifics of this site or any site, as a general matter won't the ambient noise level be more if you pick a spot as you did for ST2 that has as you said about 40 houses within a mile versus the actual receiver spots which you said has one or two houses? Won't the ambient noise levels be higher just because there's more people, more houses, more stuff?

A. If all else were equal, meaning if there was no dominant noise source such as a highway, aircraft overflights, or something else, yes, all else being equal one could make that -- one could apply that logic.

Q. And are there any of the --

A. Excuse the interruption. And assuming that all things are equal at each of those more numerous receivers that you have exactly or identical sound being generated. I'm sorry. At the Council's forbearance I made a joke about does each residence have a dog barking, but you have to

consider those considerations if you are to apply this logic that I'm being asked to respond to.

Q. Do you know if there's any sources such as a highway or aircraft overflight that would affect where you would place the noise monitoring level meter?

A. As I recall from the project area there is Route 14.

Q. How far is Route 14 from ST2?

A. I don't know. I don't recall the exact distance.

Q. How much higher is ST above State Route 14?

A. Higher being elevation?

Q. Elevation, yes. Does the elevation affect noise?

A. It can be a factor, yes.

Q. So as we sit here today you don't know why, you don't know what factors may have resulted in the selection of ST2 as opposed to something much closer to the receiver; is that correct?

A. That's not right. As I said earlier in my testimony, the selection of ST2 was done for a variety of reasons; again consistent with our field measurement practice, including the window during which measurements can be conducted, does that location generally again based on observations represent the sounds that are common to do in that area, security of equipment, and particularly for a long-term instrument we install. Can we leave it in the

1 location where it won't be disturbed or, you know, corrupted
2 by an uncharacteristic noise source?
3 Q. Did you have any role personally in the selection
4 of ST2 as the site or was that done by the other person in
5 your noise group from San Diego or wherever you are?
6 A. I directed my staff person to locate suitable
7 locations again to represent the ambient acoustical
8 environment.
9 Q. My question specifically is did you have a role in
10 picking that specific spot or did you just give general
11 parameters to your associate who then selected the spot?
12 A. As I recall we were in telephone communication and
13 agreed that those locations were appropriate.
14 MR. KAHN: I would make a request, and this could
15 be sort of a continuing discovery request, that any field
16 notes that disclose why ST2 was located there as opposed to
17 closer than R2 or any of the notes that indicate why the
18 long-term measurements were not deemed reliable, I would ask
19 that those be produced.
20 MS. ANDERSON: Your Honor, I'm going to object to
21 that. Mr. Storm has already testified to the question
22 clearly that Mr. Kahn has asked: Did you participate in
23 that selection? And he said: Yes, I confined the
24 parameters. I consulted with them and I approved them.
25 MR. KAHN: And I've asked for the document that

supports that as well as the underpinning documents for why we had LT2 measured but then disregarded. He hasn't answered that question. It's not a question. I'm asking for documents.

JUDGE WALLIS: I think the request is appropriate.

MR. KAHN: Can we put a time frame on receiving them?

JUDGE WALLIS: Let's be off the record.

(Discussion off the record.)

MR. KAHN: To make it clear, my request is every piece of data you have whether it's field notes or raw data that relate to the long-term measurements that you said for LT2 that were disregarded because they were not usable, as well as any field notes or any other data as to why the monitoring spots for Receiver 2 was located where ST2 is. Actually I'm going to add to that because I was about to go into some questions about the location for ST1 and LT1. I'd like data for that as well, not the underlying data of the measurements, but the notes and any information to why those locations ST1 and LT1 were selected as well.

BY MR. KAHN:

Q. Turning your attention again to 4.1.1, can you tell me approximately how many homes are within one square mile of ST1 and LT1?

A. I'm looking at the screen.

MR. KAHN: Tammy, could you move it up so we get a little bit below that?

There we go.

A. It appears from the figure I'm eyeballing it less than a dozen within that white bounded area that we blow up as detail.

BY MR. KAHN:

Q. I'm talking about areas that would be within a mile of ST1 or LT1. So if you go to the south within a mile aren't there a lot more houses there?

A. The figure displays more locations that are identified as residential, potential residential percent, yes.

Q. The location of LT1 and ST1 those are on the road. In fact, it's on the road; is that correct?

A. It was located along the road.

Q. And about how far is LT1 and ST1 from R1?

A. They were as I recall in close proximity to each other.

Q. What about the distance between ST1 and R3?

A. It appears to be from the figure within a mile.

Q. And R1 and R3 are further away from the road where ST1 and LT1 is. Correct? They're not the road. They're away from the road.

A. As I recall it showed in the application ST1 and

LT1. Okay. On page 4.1-6, ST1's actual location is at the corner of Ausplund Road and Kollock-Knapp Road.

Q. Is it fair to say that the ambient noise is going to be more on an intersection of the road than it might be at the location of the receiver?

A. It's possible. As you will refer to our Table 4.1-2, the measured sound data we showed two columns, and I think I alluded to this earlier here today. There's an Leq dBA and there's an Leq dBA without cars; meaning at a time when cars were passing that the spikes and the sound, the measured sound levels were taken out. In fact, we used that dBA without cars as the ambient levels for comparison in Table 4.1-8 through -11.

Q. Similarly I had a question about ST2 and the proximity of residences. All things being equal isn't it fair to say that the monitoring where you have ST1 and LT1 being closer to these houses would produce a higher ambient noise level than would be heard at R1 or R3 which are further away from the houses as a general statement?

A. As I said in my earlier answer, if all other things were equal, but again in my experience typically a dominant noise source such as a highway, factory, etc., that's dominant and while there may be other sources that contribute that there's typically a dominant one.

Q. Is there a dominant noise source here that you're

referring to? Do you know?

A. As the figure shows there's the presence of the roads.

Q. I'd like to change tacts now. At page 6 of your testimony, lines 18 and 19, I'll give you a chance to get a drink of water there. You state at that reference in that Table 4.1-6 of the application shows predicted construction noise levels at the two existing residences closest to the project. In the application at page 4.1-10 it's stated that for purposes of model conservatism air and ground absorption effects are not included; is that right?

A. That is correct for the construction noise predictions.

Q. So for the noise construction predictions you ignored any aspect of air or ground attenuation.

A. That is correct. By the way, Council, those are conservative measures because we would expect air, acoustical air absorption to have some attenuated effect, particularly in the higher frequencies.

Q. Did you ignore air and ground absorption for determining the noise levels of project operation?

A. No, we did not.

Q. You included air and ground absorption.

A. That's correct.

Q. So for the construction noise you were more

conservative than you were for the project operation?

A. Based on what we analyzed, yes.

Q. So I want to make sure I understand this. That you factored in sound lessening or attenuation from the operation of the project, but you didn't do so for the construction of the project; is that right?

A. It was done. The air and ground absorption are part of the ISO 9613-2 algorithms are standard that the Cadna/A program incorporates. We used the Cadna/A for the project operation. That Cadna/A tool was not used for construction noise.

Q. On page 10 of your testimony I believe you touched on this earlier I think in response to a question from Mr. Aramburu. You indicated that the project elevation hub height relative to the receivers create sound paths to the receivers that typically result in little or no predicted ground absorptive influence. This is page 10 of your testimony. It would be about lines 3 through 6; is that correct?

A. Right. At lines 3 through 6 say, "Consequently, while the terrain around the project site may be porous and offer acoustical absorption under the right conditions, the project elevated wind turbine hub heights relative to the receivers create sound paths to receivers that typically result in little or no predicted ground absorptive

influence."

Q. And this would be from the operation of the project we're talking about here, correct, as opposed to construction because the heights of the hubs wouldn't have anything to do with construction?

A. The context of that discussion was for the operation of the wind turbines.

Q. So here you said that because of the height and the angle there would be little ground absorption from the project. Why then is ground absorption factored in your analysis using the Cadna/A?

A. It's part of the program.

Q. The program factors in ground absorption; yet you said here that there isn't any. Am I missing something?

A. What you may be missing is that the Cadna/A incorporates that algorithm using the inputs when it performs the computations. The resulting effect of the ground absorption may be very little, but it's still calculated and part of the results that are provided by the program and hence are part of the predicted value we reported and as shown for the input scenario in the contours.

Q. Do you know what the result of the analysis would be if the Cadna/A program did not include any ground absorption because as you've indicated shouldn't be much of an issue? Can you determine whether there would be a

1 different result from the analysis?
2 A. As I believe I commented earlier, I think I could
3 say conservatively that, and as in my testimony we've been
4 discussing I don't anticipate for the turbine operation, I
5 don't anticipate the ground absorption to be a significant
6 source of sound attenuation.
7 Q. But you don't know how much sound attenuation the
8 Cadna/A program factored into this, do you?
9 A. Well, I can tell you. In fact, I show it on page
10 9.
11 Q. Of your testimony?
12 A. Of the testimony, yes. I show the table which
13 indicates for a number of average height between the source
14 and the receiver which I indicate in the top row is hm. So,
15 for example, if that average height was 41; meaning if I had
16 hub heights of 80 meters and receiver height of 2 meters, 80
17 plus 2, the average of which is 41. Then you can see based
18 on the distance d between the source and receiver, again the
19 horizontal distance for those values at 41 for the hm. So in
20 other words, you go from 600 to expected ground absorption,
21 ground attenuation to 2.4. Again, this is using the same
22 algorithms as show in ISO 9613-2.
23 Q. So Cadna/A program has a number, and I don't know
24 what that number means, but it has a number reflecting the
25 ground absorption?

A. What the table shows in bold, for example, at 41 hm and for a source receiver of horizontal distance of 600 meters Agr, the attenuation from, the expected attenuation from ground absorption is only 2.4. At 775 it's 2.9. But if that hub height is taller or I should say if that average height is taller, which could occur because your receiver may be at a considerably lower elevation, then you can see from the table that the expected attenuation ground absorption reduces and in many cases here drops to zero.

Again to summarize, and I appreciate the Council's patience in my explanation, because the sources we modeled are very high in the air, our analogy just from studying another type of industrial project with a source that were closer to ground, I would expect more ground absorption effects. In other words, I would expect more sound attenuation from forest ground because both the source of that sound and the receiver are close to the ground. That's not the case we have here because it's operating wind turbines as we've predicted.

Q. At page 10 of your testimony, lines one 12 through 22, I will wait until you get it.

A. Thank you, yes.

Q. You make some general statements discounting the reflection or amplification of sound generated by wind turbines. Is that a fair summary?

A. That may be a general summation. What I'm trying to illustrate as a segue to my earlier comment a moment ago because these wind turbine sources and model's point source and those point sources are high, 262 feet above grade, each of those turbines are emanating sound in all directions. So if there's going to be reflection to occur, a meaningful reflection to occur, the source of that sound has to be close to that source for reflection.

In other words, if I was standing in a corner or along a wall of this room here today, you may hear my voice amplified because the sound of my voice is amplified by the reflection off the wall, a hard surface.

Q. I was only asking whether I sort of summarized it, not the reason behind it. Okay. I'll move on.

Does the Cadna/A model take into account or adjust for potential amplification that may actually occur?

A. The Cadna/A program can do that, yes.

Q. Did it do so here?

A. It didn't do so because the source as I explained are very high with respect to grades. The sources are not backed by the cliff sides of the canyon walls. A reflected sound path has to travel a great distance.

JUDGE WALLIS: I'm going to suggest that the witness listen carefully to the question and answer the question.

BY MR. KAHN:

Q. Is Cadna/A, the model used here, specifically designed for wind projects or is it used for a variety of different industrial sources?

A. It is used commercially worldwide for a variety of industrial type projects.

Q. Are there any kind of commercially available simulated noise prediction programs specifically designed for wind turbines?

A. I am aware of some. I believe one of them is called WindPro.

Q. And another one called NoisePro that you're aware of?

A. I don't recall that particular name. Other names that I'm familiar with are Sound Plan. In my experience Sound Plan and Cadna/A seem to be the two dominant players in that market.

Q. Why did you use one that was designed for general industrial sources and not one specifically designed for wind turbines if you're trying to measure the noise from wind turbines?

A. Cadna/A has been shown to be appropriate for wind turbine noise modeling as proven by industry, and URS used Cadna/A for a variety of different industrial projects, including wind turbines. Wind turbines are makers of noise

so in that respect they share that commonality with other types of industrial noise sources. In fact, I have explained in the past few minutes that the location of those sources as you've describe them in your model is important and can influence results. Cadna/A is still capable of doing that.

Q. Were you the one that selected Cadna/A as opposed to one specifically designed for wind turbine noise?

A. I selected, yes, but Cadna/A is the current one we have in house.

Q. Yes, is all I needed. Are you aware of any published study that calls into question the accuracy of predictions for the four to five models such as Cadna/A when used in mountainous?

A. I'm aware of -- let me.

Q. That's a yes or no question. Are you aware of any study that calls into question the accuracy of predictions put forth by models such as Cadna/A in mountainous terrain? Yes or no.

A. I'm not specifically aware of papers that address whether or not Cadna/A or address the accuracy or suitability of Cadna/A. I am aware of some papers or studies that compare the ISO, that address the underpinning of ISO 9613-2 algorithm which Cadna/A or similar programs in this class are based.

Q. I believe in response to a question from

Mr. Marvin, Counsel for the Environment, you indicated that this was the first project that you've been involved in a wind project in mountainous forested habitat; is that correct?

A. From my personal experience, yes.

Q. So you've never had the ability to field test the results of any predictions you've made as to the noise in such topography; is that correct?

A. In my personal experience, that is correct.

Q. At page 4.1-14 at the very top, you state that under certain conditions there's a potential for one or more of the following phenomena to occur that may temporarily cause a variance in the predicted sounds. Correct?

A. Yes, on that page I show five bullets which characterize some of those, yes.

Q. So if any of those noise, if any of those phenomena are present, either transient or long term, that would mean that the noise experienced would be higher than the amounts that you've shown on Tables 4.1-8 and -9?

A. Depending on which phenomena occur, it could be higher or lower.

Q. The fourth bullet point on page 4.1-14, the uncertainty range for the sound power level of each wind turbine generator, that's going to be something constant I'm assuming; is that correct? That's not a transient. That's

saying on a standard of error, a margin of error.

A. And that would be provided by the manufacturer.

Q. Is that kind of like a margin? They're saying they can't be precise to a T. They could be plus or minus two decibels one way or the other.

A. I would qualify that by going to -- let's see. Okay. If you will look at page 8 of my testimony.

Q. I'm sorry.

A. Page 8 of my testimony. In the last sentence the decibel values shown in Table 4.1-7 of the application for the two wind speeds at each octave band center frequency include a +2 dB margin which produces an A-weighted overall level that represents the top end of a range associated with the manufacturer's warranty values.

I'm trying to answer your question and inform the Council, yes, there's a 2 dB margin. We conservatively apply a 2 dB increase to the input sound levels for each turbine in our model. So as I said a moment ago, while those five bullets shown on page 4.1-14 those are sources of how the level may vary, it could be higher; it could be lower. So in this case because our model includes that +2 dB and hence covers what the manufacturer might call the upper end of this error or tolerance range, the levels could be lower.

Q. Then your fifth bullet point refers to the fact

that during the short-term measurements was low ground wind speed and that with higher wind speeds the noise could be more; is that correct?

A. Yes, that's correct.

Q. This is a wind project. Isn't it likely there's going to be higher winds than very low ground wind speeds when the project is operating?

A. I believe it would a be fair estimation that, yes, you have wind in the area. It's considered a high wind resource. Yes, you could expect high wind speeds at hub height and at ground, but that's not always the case. Our looking at the project noise generation assumed that while the wind turbines are receiving their optimal wind energy extraction that the noise at ground level -- I'm sorry -- row wind speed at ground level may not be as great.

Q. The application sites work of G.P. van den Berg as a reference to rendition which may cause a variance in the predicted sound level; is that correct? Are you familiar with Mr. Or Dr. Van den Berg?

MS. ANDERSON: Can you tell me what page you're on?

MR. KAHN: A footnote on page 4.1-14.

A. Yes, the reference was made.

BY MR. KAHN:

Q. At the same page 4.1-14 the application mentions a

perceptible frequency in relation to the beats of the rotor blades operating at different speeds. How large of a decibel difference can this cause, if you know?

A. I can't say with certainty. It depends. For those beats to occur you have to have very, very exact conditions so I can't comment on the specific number.

Q. Would you agree if I were tell you, assume this is true, that Dr. van den Berg or Mr. van den Berg predicts there would be as much as a 5 to 9 decibel increase? Would you agree with that? Does that make sense to you?

MS. ANDERSON: Your Honor, I'm going to object to Mr. Kahn attempting to introduce evidence from a professional study not in the record and asking the witness to assume that it's true.

MR. KAHN: I'm not introducing anything. I'm giving him a hypothetical question and asking what his opinion is in response to that.

JUDGE WALLIS: The witness may respond.

MR. KAHN: Thank you.

A. Such a decibel level range that you described would depend on the location, location that that measurement was made with respect to measurement location and the distance away from the turbine. The beat that Mr. van den Berg refers to is a result of constructive interference which as I said earlier has to have pretty exact conditions for it to occur,

and those conditions vary.

BY MR. KAHN:

Q. But under certain conditions then you would agree with Mr. Van den Berg's conclusion?

MS. ANDERSON: Again, I'm going to reiterate this is a hypothetical. Mr. Kahn is now suggesting that he's agreeing with Mr. van den Berg's conclusion as to the change in decibel level. We're talking a hypothetical here, and I just want to make that clear.

MR. KAHN: Let me rephrase the question.

BY MR. KAHN:

Q. Under certain conditions is it possible that the beat would cause an increase in decibel level of five to nine, between five and nine?

A. Depending on the location which a measurement is made that's how I qualify an answer to that.

Q. At Table 4.1-7 in the application, this is on page 4.1-12, you state that each turbine is treated as a point source in which the attenuation is treated as 6 decibels per doubling of distance; is that correct?

A. I'm sorry. Page 12 of the --

Q. Page 4.1-12 of the application.

A. Thank you.

Q. Table 4.1-7.

A. I am looking at it. Could you please repeat that

statement.

Q. Yes. Does that table indicate that each turbine is treated as a point source? Is that how you treated the turbine your modeling?

A. Yes, that's correct as a point source.

Q. Does this table indicate that as a point source the attenuation is 6 decibels per doubling the distance away from the source?

A. This particular table does not show or make that assertion. I don't see that being made.

Q. What is the ratio of decibels, the decrease of decibels, the attenuation for doubling the distance?

A. As I've said earlier, theoretically in absence or apart from other ground or air, other absorption or sound attenuation phenomena you have a point source in space. Yes, you would double the distance. The sound will attenuate at a rate of 6 dB per double.

Q. In your modeling here did you have a figure by which the noise would decrease as the distanced doubled? What did you factor in to come up with your conclusion?

A. What you're seeing in Figure 4.1-1 is the Cadna/A presentation of results. It's calculation results from that theoretical 6 dB per doubling the distance from a point source. We're talking about the aggregate of point sources modeled the wind turbines operating. It also includes the

effects of terrain, the effect of air and ground that we've already discussed. So the noise contours are to explain the net effect.

Q. But you sort of start off with the general concept that absent anything else it's 6 decibels for the doubling of the distance, right, absent any other factors?

A. To put it another way I'd say, no. Did I choose the line source monitors? No, I did not. Did I choose an area source? No. I chose a point source for each of those wind turbine locations.

Q. Well, you just mentioned line source. Are you aware of Mr. van den Berg's work which documents atmospheric conditions in which the noise levels emitted by a wind farm attenuate as if in a line as opposed from a point? Are you with that work?

A. I'm familiar that he made a study in that regard.

Q. From a line would the decibel attenuation be less than 6 decibels for doubling the distance if it is a line source as opposed to a point source?

A. What I would for Council education, what I would consider a line source would be with something like a road, a highway, a train where you have --

Q. But that's not my question. My question is if it were a line source is the attenuation less than per doubling the distance than if it's a point source? I'm not asking you

what this is. I'm asking you in that scenario.

A. Per acoustics theory, yes, a line source attenuates at a lower rate than that of a point source.

Q. All right. I'd like to ask you a few questions, and I'm five minutes away from being done. A few questions regarding your low frequency section of the application. Did you offer that as well?

A. Yes.

Q. In your testimony at page 11, line 12, you stated that low frequency sound is that typically ranging from 100 hertz to 20 hertz, page 11, line 12.

A. Yes, the first sentence I believe of the answer to the question I say low frequency sound is that typically from 100 hertz to 20 hertz.

Q. Are you aware of any professional articles or experts which identify the low frequency sound range going to up to 200 hertz?

A. If I could quote Geoff Leventhal, I think here refers to it as being fuzzy, 100 to 200.

Q. So there's no scientific agreement that 100 is the upper end, if Dr. Leventhal says it's fuzzy and goes up to 200?

A. It would depend on what reference.

Q. But there are experts who contend that it doesn't just stop at 100; is that correct?

A. I think contend might be a little strong of a word, but are there different indications? Yes.

Q. Does low frequency noise attenuate at a different rate than higher frequencies?

A. Theoretically from what I was talking earlier about a point source that emanates in all directions. Low frequency noise from a point source attenuates at 6 dB per doubling of distance; however, when you factor in absorption low frequency noise attenuates less rapidly than does higher frequency noise.

Q. Is there any difference in the noise that is produced under normal circumstances as opposed to if the blades become iced over?

A. Blades icing could potentially affect the blade's profiles in terms of aerodynamics by the turbulence that's generated. So, yes, I would agree that there's some potential for that having influence, some influence on the sound level.

Q. And the influence would be to increase the sound I'm assuming; is that correct?

A. I would consult with the manufacturer because they would be more in my estimation better equipped to respond to that in specifics.

Q. So you're saying you don't know whether blade icing over would result in more noise; is that correct?

A. I'm saying there may be a potential.

Q. Are you aware that this area is frequently subject to ice storms, and, in fact, at page 2.1-6 of the application it states, "winter winds occasionally collide with the moist Pacific air masses leading to severe ice storms"?

A. That's --

Q. I'm just asking you --

A. That's not a particular section that I have been asked to testify about.

Q. Are you aware that the area is subject to ice storms?

A. Based on my driving here this morning, yeah, I would say that's a logical assessment.

Q. I think I had the same drive as you did.

Was that factored into your analysis in any way at all?

A. Specifically icing, no, it was not.

MR. KAHN: Thank you. I think that's all I have.

JUDGE WALLIS: Very well. Let's take our morning break now and be back at a quarter after 11:00.

(Recess taken at 11:00 a.m. to 11:15 a.m.)

JUDGE WALLIS: Let's be back on the record following our morning recess.

Ms. Anderson, do you have any redirect for the witness?

MS. ANDERSON: Yes, I do, Your Honor. Thank you.

REDIRECT EXAMINATION

BY MS. ANDERSON:

Q. Mr. Storm, is the ambient noise level at a receiver a part of the noise level generated by a wind project or its constituent turbine?

A. No, it's not.

JUDGE WALLIS: Ms. Anderson, for my benefit I have trouble hearing some of the higher tones. If you could keep that mic very close to your mouth and talk a little bit more slowly than usual that would help me.

MR. SUTHERLAND: You have to get over the ambient noise.

MS. ANDERSON: How about if I try to lower my voice a little? Does that help? I'll try to make an effort.

Would it assist the court reporter if I repeated the question as well?

THE REPORTER: You can or you want me to repeat it?

BY MS. ANDERSON:

Q. My question was to Mr. Storm is the ambient noise level at a receiver a part of the noise level generated by a wind project or its constituent turbines?

A. The answer is no.

Q. Very good. Mr. Storm, can you describe for me the inputs that go into conducting the Cadna/A modeling process?

A. If I could assume you're talking about a wind turbine project such as the one in the application?

Q. Yes, you may assume that.

A. Thank you. As I believe I mentioned earlier in my testimony, we used sound power level data provided from a manufacturer of wind turbines for their specific model. Again that's presented based on measures that the manufacturer has conducted per IEC 61400-11 which I believe was updated in 2002. So we have that warranted overall dBA sound power data. We also had the benefit of octave band data. And when I say octave band, I'm referring to, for example, a level at 63 hertz, 125 hertz, and 250. So that we could input those levels directly into Cadna/A model and as I mentioned earlier and indicated we added a +2 dB margin, safety margin, if you will, to each of those octave band levels. We also the input in Cadna/A an absorption coefficient for ground. We input temperature, relative humidity. I believe those are the key factors that Cadna/A will then use to calculate based on the ISO 9613-2 algorithms.

The aggregate of those multiple point sources which represent the operating wind turbines for the project those levels are presented as shown in Figure 4.1-1 both ISO

level contours at that receiver height above grade and at the specific locations. The Cadna/A is a 3D model program so that we could select other points in a model and assess what the predicted level is, again through project operating wind turbines. Does that answer your question?

Q. I will continue to ask a few follow-up questions. Does the Cadna/A model take into account the potential sources of reflection of noise?

A. Cadna/A has that capability, yes.

Q. In this project was that a factor that was included in the Cadna/A modeling? And, if yes or no, please explain why.

A. It was not considered because as I mentioned earlier the point sources for this project are significantly far away from a potential source of reflection. When you have a noise source at 80 meters, 262 feet above ground, that's different from a case where, for instance, I might have where I analyze a different project. Let's say I have an emergency generator one meter away from the building wall. In that case, yes, I would expect reflection to occur, but that's not the case we have with this wind turbine project.

Q. Mr. Storm, when you make reference to a reflective surface such as a building wall, describe for me what kind of a surface is required in order to generate a noise reflective event?

A. The surface is typically going to be smooth, plainer, or hard, what we call an acoustically hard reflective surface. Like, for example, the wood paneling that I see before me in this room that might be considered hard and reflective, but I believe if I'm not mistaken there's other surfaces that are porous and even though they may be smooth and plainer in appearance, they may actually absorb more.

MS. ANDERSON: May I ask the Council staff person to please put the Figure 4.1-1 back up on the screen?

JUDGE WALLIS: Let's be off the record for a moment while that's being done.

(Off the record to put figure on screen.)

JUDGE WALLIS: Let's be back on the record.

BY MS. ANDERSON:

Q. Mr. Storm, does the Cadna/A process accept as an input mountainous changes in topography or mountainous topography?

A. Yes, it certainly does. We imported topographical data that represents the terrain.

Q. Was the topographical data reflecting the mountainous nature of this project imported to generate Figure 4.1-1?

A. Yes, it does.

Q. How was that demonstrated?

A. A quick visual demonstration. If you look at the noise contours they are irregularly shaped. If this was a "billiard table" model with a flat terrain you would see a much smoother propagation of lower level contours. So you see in some locations you may have a noise level that's at say 45. That may be closer to a turbine than another value, a similar value but at a greater distance. Again, that's an easy visual cue to show that terrain was incorporated in the model.

Q. Mr. Storm, please clarify for me whether or not the vegetative or forested items are input in the Cadna/A program generally?

A. Generally actually Cadna/A has an input for absorption coefficient which we utilized.

Q. Referencing some questions, a line of questions from Mr. Marvin earlier today, he was making reference to the lower right-hand string that appears on 4.4-1 and indicating the receptors directly to the south and slightly to the east of that lower right-hand string. I cannot read the string number from here.

A. Is that the string number thing A-1 through A-7?

Q. Yes, it is. Before I say it again, let me grab my glasses and make sure.

Can you tell me -- I want to be clear with your testimony to Mr. Marvin. Was it your testimony that even if

those turbines were removed from this project there would still be cumulative noise likely to be heard from those receptors to the southeast?

A. Yes, that is correct.

Q. Would your opinion change if there was no vegetative buffering between that turbine string and those residences?

A. Between the residences and that string A-1 through A-7?

Q. That's correct.

A. Based on my earlier statements that the ground absorption sound attenuation effect is expected to be minor, I would agree with that statement.

Q. Do you know if Receptors 1, 2, and 3 actually exist?

A. My understanding is that R1 and R2 are existing. R3 unless I'm mistaken was a proposed residential use.

Q. Is R3 the nearest dot on that map in terms of receptors to the project?

A. I believe that is the case, yes.

Q. It's your testimony then that R3 does not exist? To the best your knowledge.

A. To the best of my knowledge my understanding is it does not exist at this time. It certainly did not exist at the time of the field study.

Q. I will also want to be very clear on my understanding of the function of the Cadna/A program. Does the Cadna/A program serve to model ambient noise at a receiver or does it not in this application?

A. No, it does not.

Q. What does it model?

A. It models the aggregate of operating wind turbines, all of the wind turbines shown displayed in that figure. As I said earlier, with each individual turbine having octave band sound power level data from the manufacturer.

MS. ANDERSON: I have no further questions, Your Honor.

JUDGE WALLIS: Is there recross?

MR. KAHN: I have one or two, Your Honor, Gary Kahn.

JUDGE WALLIS: Could you pull that microphone closer, Mr. Kahn.

RECROSS-EXAMINATION

BY MR. KAHN:

Q. Mr. Storm, Ms. Anderson asked you or you responded to a question from Ms. Anderson that as part of the inputs into the Cadna/A modeling you included sound power level data from the manufacturer. Correct?

A. Yes, I did.

Q. That was based on a specific model of turbine?

A. From what we considered a representative 1.8-megawatt model turbine based on the data we had. It is not at the time that analysis was performed it was not the model but may or may not be the model that will be installed.

Q. With a different model you presumably get a different sound power level number from the manufacturer?

A. It could be slightly different, yes.

Q. So the model that you used may not accurately reflect the noise as a result of the specific turbines to be used on the project which we don't know yet; is that correct?

A. I am confident that the manufacturer data that we used was conservative and would represent the class of turbines that would be installed on the site.

Q. But we don't even know what class of turbines are being installed, do we?

A. By class you're referring to?

Q. No, you used the word. I'm just using your word.

A. Class or category. For example, it was mentioned earlier that -- I don't want to misstate that -- a two-megawatt model is under consideration?

Q. Well, according to Mr. Spadaro they've made no determinations at all, although I believe a minimum of two megawatts.

A. The sound power level data in my experience between a 1.8 and 2.0 I would not expect to be variable in rate.

Q. What about 1.8 to 2.5?

A. That level difference I would not expect it to vary a great deal. With respect to -- particularly with respect to levels of meeting the county and state limits.

Q. But the result of the Cadna/A program would be dependent upon the specific term and the sound power level data you received from the manufacturer. Right?

A. As I answered Ms. Anderson's question, we input sound power data from the manufacturers, I should say a representative manufacturer model turbine as indicated in the application for purposes of this analysis.

Q. Then Ms. Anderson asked you whether the Cadna/A includes the input topographical data and you said yes.

A. Yes, sir.

Q. Did you input that or was that somebody else on your team?

A. The topographical information was supplied to us as I recall, and that's a file, if you will, a computer file that Cadna/A uses.

Q. And this is the first time that you had to input mountainous forested habitat into the model like this for determining the impact of wind projects; is that correct? Because this is the first project you have done in a mountainous forested habitat.

A. We commonly in my practice we commonly input

topographical terrain data. Would this be the first forested mountainous of something indicative of this region? Yes, that may be a first, but we routinely include topographical data. It's a common request.

MR. KAHN: That's all I have. Thank you, Mr. Storm.

JUDGE WALLIS: Are there any other questions on recross?

RECROSS-EXAMINATION

BY MR. MARVIN:

Q. Just some clarification.

JUDGE WALLIS: I'm having a hard time hearing you. Sorry.

BY MR. MARVIN:

Q. I'm not sure I'm actually the person questioning originally on the removal of string A, but with regard to your earlier testimony on redirect was it my understanding that you testified that there would no appreciable impact regarding noise to the two southern residential properties if String A was removed, String A-1 through 7?

A. I don't believe those are the words I was using.

Q. If you could just answer.

A. I believe as I said earlier in my comments this morning, if there is a scenario where one were to remove the A-1 through A-7, one should not expect a dramatic reduction

in noise level to the extent to where, oh, a receiver at R1, R3 would no longer hear the turbines. One should not make that conclusion because there are still in the depiction for this scenario there would be 43 remaining turbines or whatever the quantity of turbines remaining are.

Q. I think you previously testified that topography does play a role in how sound carries; is that accurate? Or would you agree with that statement?

A. My response is that terrain by way of topographical data was input in the Cadna/A model so, yes, terrain has been considered in the calculation of the Cadna/A program performed to produce the results that you see in 4.1-1.

Q. You also testified that the, again correct me if I'm wrong, there's a rule of thumb about the amount of distance and the depletion of sound attenuates by half as we double the distance or something like that. Do you know what I'm talking about because I don't?

A. I appreciate the question, and forgive me if I am restating and reiterating. Ideally a point source in space emits sound in all directions, and absent of ground, air, and other external sound attenuating absorption effects that point source sound propagation should attenuate at a rate of 6 dB per doubling the distance. So if there are other additional attenuating effects, one would see aggregate propagation of attenuation to be greater than 6 dB.

Q. So if we were to remove turbine string A-1 through 7, we effectively move the boundary line of the project northward, would you expect that there would be an attenuation of sound in those two receptors of R1 and R2?

MS. ANDERSON: Your Honor, I'm going to suggest just the characterization of the redefinition of the project boundary, a definition of the project boundary is found in the application, and relocation of turbines within the corridors is not correlative of the project boundary so I don't think that it's appropriate to be asking Mr. Storm to address the project boundary.

JUDGE WALLIS: Mr. Marvin.

MR. MARVIN: I think that if you remove turbine string A-1 through 7 that we would effectively be changing the project boundary. With that said, I'll be glad to rephrase the question.

BY MR. MARVIN:

Q. I'll simply say if you remove strings A-1 through 7 then the construction of the project stops substantially farther north than where it had originally been planned. Would you agree with that?

A. Is that a question to me?

Q. Yes.

A. Well, in that scenario if construction occurs at the turbine locations, but there are other factors in

construction with regard to the project that I don't feel qualified to answer.

Q. Okay. Well, let's put it this way: If you remove turbine strings A-1 through 7, then we remove the turbines that are closest to those two residential receptors south of the project. Correct?

A. If you were to again in a hypothetical scenario were you to remove those point sources characterized as A-1 through A-7, those -- let's say if you were to model them. Would those sources, would those sources be present? No. But you still have the presence of the other sources in the model.

Q. And then based on your model would there be an appreciable difference in what people might perceive at those residential locations?

A. In terms of the noise generated from the project. If you have -- and this goes to acoustic fundamentals. If you have fewer sources and those sources are generally identical, yes, I would expect levels to be less. But as I said earlier this morning, the measured levels or what the levels are depend on location and distance.

Q. Okay. Under those circumstances if we hypothetically remove string A-1 through 7 do the absorptive properties of the ground cover become more significant in that point in time in terms of measuring the modeling sound

from locations R1 and R3?

A. As I believe my prefiled direct testimony shows in the table on page 9, the amount of potential ground absorption is relatively small, and I would not expect it to change a great deal.

Q. Would a graveled lot surrounding the wind turbines have any impact on the acoustical evaluation that you performed?

A. I believe our absorption coefficients that we used represented that kind of a treatment in forest areas. But again as I have discussed earlier this morning, the distances and the height of those sources from the ground in my opinion effectively render the ground absorption sound attenuation to be relatively bleak.

Q. If we remove turbine string A-1 through 7 do you have any opinion with regard to how that might impact the perception of sound within the residential area to the west of the project?

A. Let me answer that by saying that again in the scenario where one were to remove those seven turbine point sources from the model, I would expect a consequential reduction in project noise level based only in that reduction. But as I said earlier, whether or not that changes the audibility I don't think one could make a conclusion. In other words, I think I was asked earlier this

morning would those remaining turbines be perceived or audible? I think, yes, they could be. Again, bearing in mind that we are modeling here and showing in Figure 4.1-1 is the project noise which is separate from the ambient background noise of the project vicinity.

MR. MARVIN: I have nothing further.

MR. ARAMBURU: May I have one follow question to Mr. Marvin's question?

JUDGE WALLIS: Mr. Aramburu.

RECROSS-EXAMINATION

BY MR. ARAMBURU:

Q. As I understand there is a visual direct line of site from receptors R1 and R3 to the turbine string that contains turbines A-1 through A-7. Am I right about that?

A. I would have to check the topographical data, but that could be the case.

Q. Are turbine strings that begins with Turbine No. 8 to go to 13 is that visible from receptor R1 and R3?

A. I don't know at this time.

MR. ARAMBURU: Thank you.

JUDGE WALLIS: Ms. Anderson.

RE-REDIRECT EXAMINATION

BY MS. ANDERSON:

Q. Mr. Storm, is visual line of site an input for the Cadna/A program to calculate noise emissions from the wind

turbine?

A. It is in the respect that Cadna/A, the algorithms that Cadna/A uses looks at where there may be intervening or linearly occluding topography which is why as I mentioned earlier we try to get the terrain or the topographical into a model so that we can see those effects.

MS. ANDERSON: Nothing further.

JUDGE WALLIS: So any Council Members have questions?

Let the record show that there's no response. Is there anything further of this witness?

MS. ANDERSON: I have nothing further, Your Honor.

JUDGE WALLIS: Mr. Storm, you are excused from the stand at this time.

I don't recall, Ms. Anderson, that you moved the exhibits.

MS. ANDERSON: I believe I moved it at the end of my questioning, but if the record does not reflect that I did, I'll move to admit them now.

JUDGE WALLIS: Then those exhibits are received in evidence.

(Exhibit Nos. 7.00 and 7.01 admitted into evidence.)

JUDGE WALLIS: Let's be off record while we proceed to our next witness. According to the schedule it's

Mr. Bauer.

(Off the record to let the next witness take the stand.)

JUDGE WALLIS: Let's be back on the record, please. During our recess Mr. Bauer the next witness has stepped forward.

Mr. Jaffe.

MS. JAFFE: Thank you.

LEONARD BAUER,

having been first duly sworn on oath,

testified as follows:

DIRECT EXAMINATION

BY MS. JAFFE:

Q. Mr. Bauer, can you please spell your name for the record.

A. The last name is B-a-u-e-r.

Q. Have you prepared prefiled testimony in this matter?

A. I have.

Q. Do you have it in front of you at this time?

A. Yes, I do.

Q. Is it marked for the record as Exhibit 36.00r and attachments 36.01r and 36.02r?

A. That's correct.

1 Q. If I were to ask these same questions today would
2 your answers still be the same?
3 A. Yes, they would.
4 Q. Are there any substantive changes to your prefiled
5 testimony?
6 A. No, I have none.
7 MS. JAFFE: At this time, Your Honor, I would like
8 to move for admission of Exhibit 36.00r?
9 (Exhibit Nos. 36.00r through 36.02r offered into
10 evidence.)
11 JUDGE WALLIS: Is there objection?
12 MR. KAHN: No objection.
13 MS. ANDERSON: No objection.
14 JUDGE WALLIS: The exhibits are received.
15 (Exhibit Nos. 36.00r through 36.02r admitted into
16 evidence.)
17 MS. JAFFE: No further questions.
18 JUDGE WALLIS: Very well. Cross examination?
19 MR. KAHN: Thank you, Your Honor. Gary Kahn,
20 Friends of the Columbia Gorge.
21 CROSS-EXAMINATION
22 BY MR. KAHN:
23 Q. Mr. Bauer, I note in your testimony that you say
24 you're responsible for providing technical and financial
25 assistance to local governments for all aspects of their

comprehensive land use planning?

A. That's correct.

Q. So I'm going to assume by that that you're fairly familiar with the Washington State Environmental Policy Act?

A. I am.

Q. As part of SEPA it requires disclosure of the affected environment; is that correct?

A. That's the general description, yes.

Q. Are you aware that this project if built as proposed would have turbines immediately adjacent to the Columbia River Gorge National Scenic Area?

A. Looking at the figures before us I can see.

JUDGE WALLIS: Mr. Bauer, excuse the interruption. Could you adjust that microphone so that you're speaking into it directly when you respond to questions. You do that either by looking over toward Council Members or by moving the mic otherwise.

THE WITNESS: I will do that.

JUDGE WALLIS: Thank you.

BY MR. KAHN:

Q. Based on your understanding and familiarity with SEPA is the affected environment limited to the actual project area or does that include other lands beyond that will be affected by the project?

MS. JAFFE: Objection, Your Honor. Mr. Bauer's

prefiled testimony is not related to his experience with SEPA.

MR. KAHN: It relates to his experience in providing technical management assistance to all local governments regarding comprehensive land use planning which includes SEPA, and he just testified he's very familiar with SEPA.

JUDGE WALLIS: The question is allowed.

A. SEPA provides for defining an affected as I guess you'd call on a case-by-case basis depending on the project and its particular dimensions.

BY MR. KAHN:

Q. If a project would have impacts that are visible from other areas such as this, would those other areas be part of the affected environment?

A. Hypothetically if a project does some visual impacts to other areas those areas would be part of the affected environment under the SEPA process.

Q. In page 4 of your testimony it doesn't have lines, but it's right above the last question. You state that development standards in the NSA -- that's National Scenic Area -- Management Plan were adopted to guide development within the NSA. If the same standards that are appropriate for the NSA are used for areas outside the NSA, the same projects will be approved, and none other, regardless of the

policy goals of the county or city elected officials.

Are you contending that the existence of the National Scenic Area immediately adjacent to the project and designated by Congress is to be given no consideration at all in the Council's siting determination?

A. The context of this sentence that you read is in an example that I tried to illustrate on how development standards are applied for the area for which they're intended. They're not typically by the legislative body intended to apply within a specific area. So that, for example, the scenic area development standards are intended to apply in the scenic area boundaries themselves.

Q. By my question is, is it your contention that the existence of the National Scenic Area and whatever impacts there are to the resources of the National Scenic Area is to be given absolutely no consideration in this process?

A. I don't believe that's what I'm stating in my testimony. My testimony is that the development standards adopted to be applied in the scenic area should be applied in the scenic area.

MR. KAHN: Okay. Thank you. That's all I have.

JUDGE WALLIS: Mr. Aramburu.

CROSS-EXAMINATION

BY MR. ARAMBURU:

Q. Mr. Bauer, you're appearing here not as a planner

1 but as a technical person who is responsible for the
2 technical and financial assistance to local governments; is
3 that correct?
4 A. Well, I am a planner, but I am here in that
5 position as the technical and financial assistance to local
6 governments in planning matters in the state of Washington.
7 Q. I gather from the tenor of your testimony today
8 that we've received that your concerned about the extension
9 of the National Scenic Area standards to areas outside of the
10 scenic area; is that right?
11 A. Generally correct. My rebuttal testimony was to a
12 statement by Mr. Apostol that some of those standards can and
13 should be used to assess the appropriateness of projects
14 outside the scenic area.
15 Q. You've supplied us with Exhibit 36.02r. What is
16 the purpose of that exhibit?
17 A. Well, there isn't a reference in my testimony. The
18 exhibit is included as an example or a summary of some of the
19 investments made within the area, within the scenic area to
20 Washington Investment Fund for economic development purposes.
21 Q. These are within the scenic area or outside the
22 scenic area?
23 A. If I'm not mistaken I believe they are all within
24 the scenic area, although I'm not familiar specifically with
25 every project on there.

Q. So have any of these been held up, restricted, mitigated, diminished in any manner by the application of the scenic area?

A. I don't know the answer to that question.

Q. I mean you've got I don't know how many projects here. You can't point us to any one of them that has been impacted by someone saying the scenic area standards have to apply?

A. It's my understanding that the scenic area standards are applied to the urban areas within that scenic area where the development standards are applied in the other management areas of the scenic area are not applied to the urban areas.

The National Scenic Area contains several management areas as well as designated urban areas and different development standards apply in each. Some of these projects do occur within the urban areas where many of those development standards are not applied. So I don't know of any impacts, but not all development standards have applied to all of these projects.

Q. Now I want to understand the scope and nature of your testimony here. I understand that you're expressing a concern about the expansion of the National Scenic Area criteria into other areas outside the scenic area. I believe that's a correct summary.

A. That's correct.

Q. Are you here advocating for or against the Whistling Ridge Project as we see it on the drawings here?

A. I am not here advocating for or against the project itself, but to respond to testimony of Mr. Apostol who suggested that these development standards be applied outside the scenic area and the potential affects could be generally on land use and economic development outside the scenic area.

Q. You're not taking a position on the project itself?

A. I am not.

MR. ARAMBURU: Thank you. I have no further questions.

JUDGE WALLIS: Mr. Marvin?

CROSS-EXAMINATION

BY MR. MARVIN:

Q. Mr. Bauer, under SEPA is it appropriate for an agency to consider aesthetic impacts for a proposed project?

A. The aesthetic impacts are one of the considerations under SEPA, yes.

Q. And visual impacts as well?

A. Those are typically included as part of the aesthetic impacts in the assessment.

Q. Would you say the State of Washington with its adoption of SEPA has set forth a policy that requires that those aspects of the project be considered?

A. By including aesthetic impacts as a consideration under the State Environmental Act I'm saying that that's part of the policy of that act.

Q. Would you say that that is a policy of statewide concern?

A. SEPA does apply state wide, correct.

MR. MARVIN: I have nothing further.

JUDGE WALLIS: Any questions from Council Members? Let the record show that there are none.

Ms. Jaffe?

MS. JAFFE: I just have one.

REDIRECT EXAMINATION

BY MS. JAFFE:

Q. Mr. Bauer, what is your concern if the NSA standards are applied outside of boundaries?

A. As I outlined in my prefiled testimony there is really two areas of concern. One is the application of development standards that have been adopted for a specific area within a specific defined boundary outside of that, and then the added to or increase of other development standards that have been applied by the appropriate legislative authority; for example, in this case Skamania County, without the appropriate legislative body the Skamania County Commissioners having considered those or adopted those.

Secondly that then in turn could affect values of

property of certainty for investors who might potentially invest in property outside the scenic area and therefore economic development within the area.

MS. JAFFE: Thank you. I have no further questions.

JUDGE WALLIS: Is there anything further of this witness?

Let the record show that there is no response.

MR. MARVIN: I have a couple follow up.

JUDGE WALLIS: Mr Marvin.

RECROSS-EXAMINATION

BY MR. MARVIN:

Q. Mr. Bauer, are you familiar or are you aware of any other wind power projects proposed within Skamania County?

A. I am not aware of any at this time.

JUDGE WALLIS: Anything further?

MS. JAFFE: No.

JUDGE WALLIS: Very well. Mr. Bauer, you are excused from the stand.

Let's be off the record while the next witness Nate Larson comes forward.

(Off the record to allow witness to take the stand.)

JUDGE WALLIS: Let's be back on the record, please.

1 MR. McMAHAN: Thank you, Your Honor.
2 NATHAN LARSON,
3 having been first duly sworn on oath,
4 testified as follows:
5
6 DIRECT EXAMINATION
7 BY MR. McMAHAN:
8 Q. Good morning, Mr. Larson. Please state your full
9 name for the record.
10 A. Nathan Michael Larson.
11 Q. And your address?
12 A. The business address where I operate 1501 Fourth
13 Avenue, Suite 1400, Seattle, Washington 98101.
14 Q. Thank you. You have in front of you what's been
15 marked as Exhibit No. 1.00; is that correct?
16 A. Indicated as 11.00.
17 Q. Yes, that's right, along with the resume of 11.01;
18 is that correct?
19 A. Yes.
20 Q. Is that Exhibit 11.00 your full written and direct
21 testimony in this matter?
22 A. Yes.
23 Q. And are you prepared to accept cross-examination on
24 that exhibit?
25 A. Yes.

MR. McMAHAN: I would move to admit -- excuse me.

BY MR. McMAHAN:

Q. Are there any substantive changes to that exhibit that you wish to make today?

A. No.

MR. McMAHAN: I move to admit, Your Honor.

(Exhibit Nos. 11.00 and 11.01 offered into evidence.)

JUDGE WALLIS: Is there objection?

MR. KAHN: No objection.

JUDGE WALLIS: Let the record show that there is no objection and the exhibits are received.

(Exhibit Nos. 11.00 and 11.01 admitted into evidence.)

CROSS-EXAMINATION

BY MR. KAHN:

Q. I'm Gary Kahn on behalf of Friends of the Columbia Gorge. Mr. Larson, good morning.

The Applicant proposes to drive oversized trucks through the Underwood community to haul turbine components and construction materials; is that correct?

A. Yes.

Q. Do you have the application in front of you? I thought Ms. Chaney --

A. I have the portion of the application that I'm

sponsoring today.

Q. 4.3-14 that page?

A. Yes.

Q. That indicates that the trucks would require a 135-foot inside turning radius and a 20-foot allowance for tip swing; is that correct? This would be the second full paragraph.

A. Yes.

Q. What is tip swing?

A. Tip swing is an extra allowance in the way for a load that moves laterally as the truck turns.

Q. So would you add that 20-foot tip swing number to the 135-foot number?

A. Yes, when it's turning that's appropriate.

Q. So it would be a 155-foot turning radius?

A. The maximum, yes.

Q. What size turbine blades is that information based on?

A. The maximum turbine blade size that we accounted for -- actually, correction. The turbine blade size is what's specified as a load size was specified as a maximum of -- to answer your question the maximum turbine was not specified.

Q. Maybe I don't understand. To determine what the turning radius would be wouldn't that depend on the size of

what's being hauled?

A. It would be the maximum load size was specified in the testimony, and I will need to locate it to repeat it for you.

Q. If you would, please. Let's see. So truck transporting I'm looking at page 7 of my testimony. Truck transporting wind energy components could be as long as 150 feet, and that's the maximum length of the truck that would be used?

A. The size of the load as specified here was for the purposes of determining whether they exceed load length requirements along the proposed haul route, yes.

Q. If the turbine -- that's irregardless of the size of the turbine blades?

A. I'm not sure I understand the question.

Q. Maybe it's my lack of understanding. I'm assuming that the inside turning radius has something to do with what's in the back of the tractor, what's being hauled; is that correct?

A. The length of it, yes.

Q. As the turbine blade would increase that would require a bigger turning radius?

A. Yes.

Q. So to come up with a 135-foot inside turning radius there must have been some dimension of what's being carried

that was used to come up with that number; is that correct?

A. Presumably, yes.

Q. You say presumably. Do you use this map? Is this your statement?

A. My statement regarding length of load, not the specific contents of the load.

Q. Will, I'm looking at page 4.3-14 of the application. You wrote that part?

A. Supervised its writing.

Q. This refers not to the load but the actual inside turning radius. I guess I'm asking if I've got a 20-foot blade or a 200-foot blade is the turning radius going to be different?

A. Yes.

Q. So for somebody to come up with the specific number of 135 that had to be based on some dimension of what's being carried.

A. Yes.

Q. Okay. What if the components of what's being carried is the rotor, the blades themselves? Do you know whether a 100-meter blade would require more than a 135-foot inside turning radius for the 20-foot allowance for tip swing?

A. Can you rephrase that. I think you just said 100 meter.

Q. Yes. If the diameter of the blades for the wind turbine was to be as much as 100 meters would that change the inside turning radius or the tip swing?

MR. McMAHAN: Excuse you. Are you referring to the diameter 100 meters?

MR. KAHN: Yes, I said diameter.

MR. McMAHAN: To --

A. The radius.

MR. McMAHAN: You mean the radius.

MR. KAHN: Radius, thank you. I meant radius.

MR. McMAHAN: That seemed like an awfully large number.

MR. KAHN: Thank you.

A. Radius would be smaller.

MR. McMAHAN: That's the point I wanted to make.

BY MR. KAHN:

Q. If you have a 100-meter radius turning blade is the 135-foot inside turning radius still a valid number or am I completely missing something here?

A. The length of the load relates to what's being carried. The 135-foot inside turning radius was based on the length of a turbine blade to which our analysis was -- let me rephrase.

Our analysis came after the determination of this load length. Our job was to analyze a load of this length

regardless what of is contained in that load.

Q. When you say a load of this length where does that length measure?

A. 135-foot turning radius.

Q. No, you're talking about a 150-foot load?

A. Right, right.

Q. So that's what I'm asking. What does that measure? What's 150 feet from where to where?

A. Presumably from the front of the truck to the back of the truck. The way I interpreted that was to be the length of the apparatus carrying the load.

Q. Are you familiar with Cook-Underwood Road along which these truck would travel?

A. Yes.

Q. Is it fairly curvy in places?

A. Yes.

Q. Are there places where hauling turbine components would require the use of more than one lane?

A. Yes.

Q. Would flaggers would be required?

A. Yes.

Q. Would those flaggers be blocking traffic on Cook-Underwood Road from both directions to accommodate these trucks?

A. Yes.

Q. Was there any consideration given to an alternative haul route?

A. Yes.

Q. If I read your testimony correctly, there is no longer an issue of the proposed haul route crossing the bridge on the White Salmon River. Is that correct or is that still in the picture?

A. Your first statement was correct. It's no longer anticipated as a haul route.

MR. KAHN: Thank you. I have nothing further.

CROSS-EXAMINATION

BY MR. ARAMBURU:

Q. Been busy working on my computer here, and I'm trying to figure out what the situation is here. The length of the truck that you're talking about is 135 feet, 150 feet; is that right?

A. 150 feet.

Q. How long a load can you put on your 150-foot truck?

A. It depends on the configuration of the truck and the type of load being carried.

Q. Well, let's say it's a turbine blade or two turbine blades. How long of a turbine blade can be carried on the truck as you've got outlined in your testimony?

A. The length of the load 150 feet would be the same as the length, the maximum length of anything that could be

carried on that for the 150-foot feet to still be valid.

Q. So you carry a maximum blade of 150 feet. Would that be -- am I right in that assumption?

A. Yes.

Q. The Applicant just told us on Monday that they are now anticipating two-megawatt turbines to be used on this site and those two-megawatt turbines would have a diameter of the swept area of 100 meters. If I'm doing my math right, that would be a 50 meter blade about? I'm dividing a hundred by two.

A. Well, my understanding is that math makes sense, but I don't know the specific geometry of the turbines are constructed.

Q. A 50-meter blade would be how long?

MR. McMAHAN: Your Honor, if I could just interrupt for a second. Just to inform that there's an assumption made that's not accurate. There's also a nacelle between the blade that that also apparently has a large dimension so it is actually less than 50 on each end.

BY MR. ARAMBURU:

Q. So a 50-meter blade would be how long in terms of 50 meters in feet?

A. How long in feet? Well, the calculator that you're showing me says 165 feet, and that's an estimate based on the conversion to 50 meters.

Q. 50 meters times 3.3 feet gives us the number. Would that be right?

A. Correct.

Q. And the load that would be carried for the turbine bases do you know how long those would be?

A. No.

MR. ARAMBURU: No further questions.

JUDGE WALLIS: Mr. Marvin.

MR. MARVIN: Just one second here.

CROSS-EXAMINATION

BY MR. MARVIN:

Q. Mr. Larson, in your discussion on the mitigation you indicated that there would be a significant number of people during the construction period traveling to the work site. During the course of your review of your project was there any discussion regarding carpooling?

A. No.

Q. Would carpooling, requiring workers to carpool to the construction site relieve potential traffic congestion related to the project?

A. Yes.

Q. Would that be a viable means of mitigating the impact of the traffic in this project?

A. Yes.

MR. MARVIN: I have nothing further.

JUDGE WALLIS: Mr. McMahan.

MR. McMAHAN: Just a quick follow up, Your Honor.

REDIRECT EXAMINATION

BY MR. McMAHAN:

Q. Mr. Larson, just to be clear, I think I heard you say that the inputs -- that you didn't yourself measure this equipment; that you used inputs provided to you from others; is that correct?

A. That's correct, yes.

Q. So you don't personally have knowledge about the dimension of a truck or trailer or any of the turbine blades that have been described hypothetically here. In terms of the actual dimensions of the truck, you reviewed the dimension of the truck used for the analysis; is that correct?

A. As a maximum, yes. I don't have the specific knowledge of what's intended to be used, only that our analysis covers that dimension and anything smaller.

MR. McMAHAN: Thank you. Nothing further.

JUDGE WALLIS: Is there anything further of the witness?

Let the record show that --

MR. KAHN: Actually I do.

///

///

RECROSS-EXAMINATION

BY MR. KAHN:

Q. I apologize if I'm not understanding it, but if it's a 150-foot maximum load that would mean the maximum length something could be hauled would be 150 feet.

A. Yes.

Q. Okay. I'm looking at page 2.3-3 of the application. I know you don't have it in front of you. I am just going to read a statement. Each turbine has three laminated fiberglass blades each approximately 129 to 164 foot long depending on which turbine is selected. If a turbine is selected that has a 164-foot long blade that would require a completely different analysis as to the turning radius of the tip swing? Because you based it on 150 foot and this is as much as 164.

A. Our analysis was designed to estimate whether the load would exceed maximum length requirements on the haul route. 165 feet would also exceed the maximum length requirement of 125 on one of the segments as would 150. So in that respect there would be no difference.

Q. Does maximum length requirements translate to the inside turning radius?

A. Yes, the maximum inside turning radius would be longer with a longer blade than 150 feet.

Q. If the blade were 164 feet, I may be putting you on

1 the spot here, could you tell us about how long the inside
2 turning radius would need to be?
3 A. Again, that relates directly to the configuration
4 of the vehicle used to haul it. But if the same type of
5 configuration were used, I think it would be fair to assume a
6 proportional increase in the inside turning radius. 165 feet
7 is about 10 percent more so the inside turning radius could
8 therefore be reasonably assumed to also be 10 percent more in
9 such a configuration.
10 Q. Would the tip swing also increase by 10 percent?
11 A. That's not as likely. The tip swing is based on
12 the how high the load is and how it's positioned, not as much
13 on length or what's being carried.
14 Q. Have you done any analysis -- let's take your 10
15 percent figure add that up to 135 so we have roughly 148,
16 149. Have you done any analysis as to whether that's
17 feasible on the Cook-Underwood Road or on other aspects of
18 the haul route? I think we're exceeding the scope of
19 redirect, Your Honor. Greatly exceeding the scope of
20 redirect.
21 JUDGE WALLIS: Yes, but it's a matter of potential
22 significance so I will allow it.
23 MR. KAHN: Thank you.
24 A. No, we did not. Our analysis was based on the
25 150-foot load.

MR. KAHN: Okay. Thank you.
JUDGE WALLIS: Is there anything further?
MR. MARVIN: No.
MR. McMAHAN: Not here.
JUDGE WALLIS: Very well. Mr. Larson, you're excused from the stand. Thank you for appearing today.
MR. McMAHAN: Your Honor, we are calling Mr. Timothy Homann.
JUDGE WALLIS: Mr. Homann, please make yourself as comfortable as possible under the circumstances.
MR. McMAHAN: Thank you, Your Honor.

TIMOTHY HOMANN,
having been first duly sworn on oath,
testified as follows:

DIRECT EXAMINATION

BY MR. McMAHAN:
Q. Mr. Homann, I think you have in front of you what's been marked as Exhibit No. 12; is that correct?
A. Yes.
Q. All right. Actually let me back up. Please state and spell your last name for the record.
A. My name is Timothy Homann, H-o-m-a-n-n.
Q. Where are you employed?
A. Employed with Skamania County as the county

1 engineer.
2 Q. So you have in front of you what's been marked as
3 Exhibit No. 12; is that correct?
4 A. Correct.
5 Q. Is that your direct testimony offered in this
6 matter?
7 A. Yes.
8 Q. Is there anything in that testimony of substance
9 that you would change today?
10 A. No, sir.
11 Q. Are you available though reluctantly for
12 cross-examination?
13 A. Yes.
14 MR. McMAHAN: I move to admit, Your Honor.
15 (Exhibit No. 12.00 offered into evidence.)
16 JUDGE WALLIS: Is there objection?
17 MR. KAHN: No objection.
18 JUDGE WALLIS: The exhibit is received in
19 evidence.
20 (Exhibit No. 12.00 admitted into evidence.)
21 CROSS-EXAMINATION
22 BY MR. KAHN:
23 Q. Mr. Homann, my name is Gary Kahn. I represent
24 intervenor Friends of the Columbia Gorge. Do you have your
25 testimony in front of you?

A. I do.

Q. If you could turn to the very top of page 4, and in answer to a question about the size of the vehicles you indicated that they would be as long as 150 feet.

A. That was the information from the environmental impact statement that I was provided.

Q. Your analysis as to whether there will need to be road improvements factors that length of truck; is that correct?

A. That's correct.

Q. You were in the room for last witness?

A. Yes.

Q. You heard the questions about the statements in the application saying that the blades would be as long as 164 feet. Correct?

MR. McMAHAN: Your Honor, I'm going to just clarify that. It's a hypothetical question. They could be potentially at that length. We saw a lot information that's unanswered in that including the dimension of the nacelles. All right? I want to just make sure the record is clear about the hypothetical nature of that question.

BY MR. KAHN:

Q. Well, let me just read again from page 2.3-3 which has nothing to do with the nacelle. Each turbine has three laminated fiberglass blades each, referring to the blades,

1 approximately 129 to 164 feet long.
2 My question is have you had a chance to analyze
3 whether any road improvements might be necessary if the load
4 is 164 feet as opposed to 150 feet?
5 A. I have not done any analysis on that.
6 MR. KAHN: Thank you. That's all I have.
7 CROSS-EXAMINATION
8 BY MR. ARAMBURU:
9 Q. You indicated the information for the basis of your
10 testimony comes from the environmental impact statement; is
11 that correct?
12 A. Correct.
13 Q. Have you met with the Applicant to discuss any
14 issues concerning transportation?
15 A. We have, yes, we did. We had some general
16 discussion meetings over the course of several months. Maybe
17 one or two meetings myself and the public works director.
18 Q. When was the last of those meetings?
19 A. Oh, gosh. It's probably been six to nine months.
20 I don't recall.
21 Q. Are you aware that the Applicant has decided to
22 change the minimum size of the turbines that would be used on
23 this project?
24 MR. McMAHAN: And I'm objecting to that question.
25 We've been through this before. There's been no change in

the minimum size. It's within the range that's been analyzed by the Applicant. We stipulated to a minimum size, but it's been the dimensions and description of the project that's before the Council.

BY MR. ARAMBURU:

Q. Have you been informed that the Applicant is now deciding to use a minimum wind turbine of two megawatts?

A. That has not been brought to my attention.

Q. Have you had any discussion with the Applicant or with anyone else concerning how that might change the size or length of loads that would be traveled over Skamania County roads?

A. No, sir.

MR. ARAMBURU: Thank you.

JUDGE WALLIS: Mr. Marvin.

MR. MARVIN: I have nothing.

JUDGE WALLIS: Council Members?

MR. MOSS: Judge Wallis, I don't really have a question of this witness, but it would certainly help I think to clarify both the testimony we've heard from this witness and the preceding witness if the Applicant could let us know in light of this stipulation concerning the two-megawatt turbines what the length of those blades is. It would be a fairly simple matter I would think to provide the information for the record, and then we would be clear

as to whether this testimony might require some supplementation or whatever.

MR. McMAHAN: Well, two things. I do have a follow-up question that may have some materiality to this, but if you want clarification from the Applicant on this narrow point.

MR. MOSS: I think that we could do that as a bench request, Judge Wallis.

JUDGE WALLIS: Yes.

MR. MOSS: I would pose that request. Let's just have the information for the record.

MR. McMAHAN: So would you like that now or should we finish up with this witness?

MR. MOSS: Unless the witness knows, yes.

MR. McMAHAN: Right. Very well.

REDIRECT EXAMINATION

BY MR. McMAHAN:

Q. Mr. Homann, are you aware of the potential use of steering wheel rear axles?

A. Generally speaking?

Q. Yes.

A. I'm aware of it, yes.

Q. If used do they affect the turning radius for large vehicles?

A. Yes.

Q. What is the affect?

A. It would reduce the radius by swinging the rear end instead of tracking.

MR. McMAHAN: Okay. I have nothing further.

JUDGE WALLIS: Anything further?

It appears that there is none. Thank you very much for your testimony. Mr. Homann, you are excused from the stand.

THE WITNESS: Thank you.

MR. McMAHAN: So would you like that Applicant to address this question about the dimension of various turbine blade configurations? I think he did it a little bit in his testimony, but clearly if it's not clear enough to you.

MR. MOSS: I would prefer, Judge Wallis, to have that information in the record. I just think it should be made part of the record in light of what we've just heard from the witnesses.

MR. McMAHAN: Yes, I understand.

JUDGE WALLIS: Because this proceeding is continuing for at least the next few days, it's not something that needs to be done right at the moment.

MR. McMAHAN: Let's deal with that. Let's just get a little bit more information to you to have the best answer possible, and we're happy to provide that.

MR. MOSS: Thank you.

1 MR. McMAHAN: We'll take it up. Thank you.
2 JUDGE WALLIS: Is Mr. Meier available?
3 MR. McMAHAN: He is.
4 JUDGE WALLIS: Let's be off the record while
5 Mr. Meier steps forward.
6 (Off the record while witness takes the stand.)
7 JUDGE WALLIS: During our moments off the record
8 we reconfigured some of the audiovisual visual related
9 equipment, and it appears that we are ready to proceed.
10 Mr. Meier has forward to the stand.
11 DAN MEIER,
12 having been first duly sworn on oath,
13 testified as follows:
14
15 DIRECT EXAMINATION
16 BY MR. McMAHAN:
17 Q. Mr. Meier, would you please state your name for the
18 record?
19 A. Dan Meier, M-e-i-e-r.
20 Q. Thank you for doing that. What is your address?
21 A. Business address is 111 Southwest Columbia Street,
22 Portland, Oregon 97201.
23 Q. I believe you have in front of you Exhibit 3.00
24 plus Exhibit 3.01 which is your resume; is that correct?
25 A. Yes, sir.

Q. Is that the direct testimony that you offered in this matter?

A. Yes, it is.

Q. Is that testimony plus the elements of the application for site certificate your complete testimony in this matter today?

A. Yes, it is.

Q. Is there anything of substance you would change today?

A. No.

Q. Are you available for cross-examination on this matter?

A. Yes.

MR. McMAHAN: I move to admit, Your Honor.

(Exhibit Nos. 3.00 and 3.01 offered into evidence.)

JUDGE WALLIS: Is there objection?

MR. ARAMBURU: No.

JUDGE WALLIS: Let the record show that there is no objection to receiving Exhibits 3.00 and 3.01. Those are received in evidence.

(Exhibit Nos. 3.00 and 3.01 admitted into evidence.)

MR. ARAMBURU: I apologize to the Council for the delay in getting things set up. Hopefully this is going to

result in a better ability for the Council to review materials.

CROSS-EXAMINATION

BY MR. ARAMBURU:

Q. Mr. Meier, my name is Richard Aramburu. I'm the attorney representing Save Our Scenic Area which is one of the intervenors in this proceeding. We haven't met before. Good afternoon.

A. Afternoon, morning.

Q. It's afternoon by now. Let me tell you that these microphones are very sensitive so you will want to pull that microphone right up next to you as you give your testimony so it can all be heard by the Council and the people in the audience.

I understand that you performed some geologic investigation of the project site; is that correct?

A. Yes, we did.

Q. Can you tell us when that work was done?

A. The original geotechnical investigation was performed I believe in 2007.

Q. Has there been any subsequent geologic investigation of the site?

A. There was a site walk performed probably later that year toward the end of 2007.

Q. Since then have you been on the site or has anyone

from URS been on the site?

MR. McMAHAN: Excuse me. Do you mean concerning geology or in general? Anybody from URS been on the site is what you said.

MR. ARAMBURU: Okay. Fair question.

BY MR. ARAMBURU:

Q. Anybody from the geology division of URS?

A. Not to my knowledge.

Q. Can you tell us what work you performed on this site by way of investigation?

A. The investigation performed included test pits that were excavated at various locations across the site, some dynamic cone penetration tests to determine characteristics of subgrades on the roads, and some resistivity testing to determine electrical resistivity at several sites, several locations on the site.

Q. What was the purpose of the latter investigation?

A. The resistivity?

Q. Yes.

A. Just to determine or to help determine how much cathodic protection and the ability for grounding of electrical components.

Q. How many times have you been physically on the site?

A. Once.

Q. Do you recall the date?

A. The date it was in October of 2007. The exact date I would have to check.

Q. Did you walk the entirety of the site?

A. I walked several of the slopes. I looked at all the intervening slopes associated with the tower locations, proposed tower locations at that time.

Q. Mr. Meier, I put up on the screen behind us here a diagram that was part of the landslide hazard investigation. Do you recognize this?

A. Yes, I do.

JUDGE WALLIS: Can you identify that with the figure number related to the document which it appears. Is that from the application?

MR. ARAMBURU: It would be Figure C1. It is the very last page of the bound application document.

JUDGE WALLIS: What was that title of that document, the book as it appears?

MR. ARAMBURU: It is the application book.

JUDGE WALLIS: It is the application?

MS. TALBURT: It's Appendix A.

MR. ARAMBURU: Well, it's Appendix A.

JUDGE WALLIS: Appendix A.

MR. ARAMBURU: Well, Appendix A is actually Appendix B to the Application which is the geotechnical

1 materials. So for Members of the Council who want to look
2 at this drawing it would be very last page in this document.
3 Do the Council Members have it available to them?
4 MR. McMAHAN: The appendix volume, not the ASC
5 itself.
6 JUDGE WALLIS: We do have some copies of that in
7 the room, but for present purposes I believe in light of the
8 visibility of the document as shown on the screen is there
9 any concern by the Council Members that that will not be
10 adequate?
11 Let the record show this there is no concern about
12 that. So you may proceed based on display on the screen.
13 BY MR. ARAMBURU:
14 Q. Mr. Meier, do you have the application in front of
15 you, the geotechnical report?
16 A. Yes, I do.
17 Q. In the geotechnical report the very last figure in
18 the last page of that material is Figure C1 which is the
19 landslide hazard classification. Do you see that? Do you
20 have that in front of you?
21 A. Which is the one on the screen, yes.
22 Q. We will notice if we may, Mr. Meier, that
23 potentially the colors have changed from the material in
24 yours and the material that I have which shows certain areas
25 in bright orange and on the screen they're in dark green. Do

you see that?

A. Yes, that is correct.

Q. Now, you indicated that you were given a certain configuration on this project by way of the number of turbines and their location; is that correct?

A. That's correct.

Q. Are those turbines and their location shown on Figure C1 which is on the screen?

A. Yes.

Q. Unlike the rest of our drawing here this drawing is oriented east to west?

A. East is up, yes.

Q. So this direction would be north?

A. North is left.

JUDGE WALLIS: According to the left side of the screen.

BY MR. ARAMBURU:

Q. The locations that are shown for the turbines were those provided by the Applicant?

A. To the best of my knowledge, yes.

Q. There is a string of seven shown in this location on the drawing.

JUDGE WALLIS: Could we be more specific about what that location is so someone reading the record can follow along?

BY MR. ARAMBURU:

Q. There was a location shown with seven turbines designated on your drawing at Turbines A-1 through A-7; is that correct?

A. That's correct.

Q. What other information besides the turbine location is shown on this drawing?

A. I believe there is some access roads and the primary information is soil types and slope angle as indicated by the different colors. I'm sorry. Let me correct that. The colors indicate the landslide hazard classes.

Q. I'm going to ask Tammy to move up so we can see the next item in the scale. So the dark green on that drawing here shows the Class II landslide hazard area; is that correct?

A. That's correct.

Q. Can you tell us what a Class II landslide area is?

A. It's defined as a slope. It's a slope of steepness between I think 30 and 40 degrees, and also the other part of the equation that determines that is soil type based on the National Soil Conservation Services mapping.

Q. So that I understand the soil type, we have locations in black dots on your drawing. We're continuously referring at this point to Figure C1 at the end of the

1 geotechnical report. In this area we show black dots as
2 turbines. They also show numbers in this location, No. 68.
3 What does the 68 refer to?
4 A. 68 refers to the soil classification and indicates
5 that map over gravity loam at 30 to 65 percent slope.
6 Q. Okay. So the area in the vicinity of the A-1 to
7 A-7 turbines is located in Soil Type 68 which is McElroy at
8 gravity loam. Am I reading the correctly?
9 A. That's correct.
10 Q. As I read this drawing you're showing a large
11 quantity of Class II landslide hazard areas generally to the
12 west of the various turbines strings. Am I right about that?
13 A. That's correct.
14 Q. Then a smaller area particularly in the line with
15 Turbines A-1 through A-7 of Class III areas, and I'm showing
16 you that and how to describe that color is a lighter color
17 than the Class II areas. It's kind of a greenish color?
18 A. Correct.
19 Q. So in the vicinity in the A-array as far as I can
20 see from this drawing the A-array is pretty much completely
21 surrounded by a Class II landslide hazard area; is that
22 correct?
23 A. That's correct.
24 Q. On the landslide hazard area also exists to the
25 west of Turbines A-8, 9, 10, 11, 12, and 13; is that correct?

A. Yes.

Q. And the landslide hazard area also exists to the west of the B turbines; is that correct?

A. Yes.

Q. You physically walked the area of the Turbines A-1 to A-7?

A. Yes.

Q. Can you describe for the Council, keeping in mind they're going to take a view as well, of what that land looks like in that area?

A. The slopes are fairly steep, which is the primary. I need to clarify what I said earlier. The colors on there represent actually the slopes, slope angles, and those slope angles just so everybody knows are for the Class II darker green color. They are greater than 30 percent, and for the lighter green color they are between 20 and 30 percent. So those dark green slopes, slopes that are colored dark green are greater than 30 percent as steep as maybe 70 percent. So in some cases they are fairly sleep slopes, and in large areas they've been logged fairly recently so there is not a lot of growth. In some places it is still forested. At least at the time of the site visit there are no visible signs of reasonable recent erosion or landslide activity. I don't know how else to describe that.

Q. That's fine. You said that these slopes by your

1 mapping are from 30 to 65 percent. Have you noted the
2 presence of 65 percent slopes on your drawing?
3 A. The drawing in the -- no, dark green is greater
4 than 30 percent.
5 Q. Now, have you provided in any of your materials a
6 standard topographic map that would assist us in determining
7 the slopes on the site?
8 A. No, I don't believe we provided a topographic map.
9 This is a shaded map based on a ten-meter digital elevation
10 model from USGS.
11 Q. When you say ten-meter model --
12 A. That's just the range of accuracy. It's accurate
13 to ten meters, not vertically but the level of the pixel size
14 basically of the digital model.
15 MR. McMAHAN: Your Honor, if I could just get a
16 little bit of clarification. Mr. Aramburu asked if we
17 provided a topographic map in his materials. Could you
18 please clarify what you're talking about, the appendix
19 document still or things other than the appendix documents?
20 MR. ARAMBURU: I am talking about his report.
21 MR. McMAHAN: So that report itself, not the ASC;
22 is that correct? Is that the question?
23 BY MR. ARAMBURU:
24 Q. Yes, as I understand the configurations, the report
25 that was done by Mr. Meier is Appendix B to the materials,

and the Appendix B was a document that is prepared in 2007. Was that correct?

A. That's correct.

JUDGE WALLIS: While we're a little bit off topic, I want to call attention to the time it is now one o'clock, and I think at most we have perhaps ten minutes remaining to use in this session.

So, Mr. Aramburu, if you have further preliminary questions why don't you go ahead and identify as you proceed what would be an appropriate break.

MR. ARAMBURU: Actually it would be an appropriate break now. I would like to arrange things so I don't have to have Tammy here this entire time, and we will be better organized tomorrow. And I have considerable questions for this witness so I would prefer that we break now and take up as early in the morning as you would like tomorrow.

JUDGE WALLIS: Is there objection to that?

MR. KAHN: Not so much an objection. The only concern I have is tomorrow we've got 1, 2, 3, 4, 5 witnesses scheduled for avian and wildlife. Our witness is coming from out of town. We need to be done with him tomorrow. That would be my only consideration.

JUDGE WALLIS: Let's be off the record for a scheduling discussion.

(Discussion off the record.)

JUDGE WALLIS: Let's be back on the record. During an off record scheduling discussion it's been determined that Mr. Meier will be excused from the stand at this point, and he has agreed to be available on Friday afternoon, the day after tomorrow, for examination. We are making some other relatively minor changes in witness schedule, and the names and order of those witnesses will be available to the parties and to the public no later than tomorrow morning before the start of the morning session.

Is there anything further?

MR. KAHN: Start time for tomorrow?

JUDGE WALLIS: It's been determined we will be starting at eight o'clock tomorrow morning in this room. Thank you very much.

* * * * *

(Whereupon the hearing was adjourned at 1:11 p.m.)

I N D E X

WITNESS	EXAMINATION	PAGE
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In re: Whistling Ridge Energy Project
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A F F I D A V I T

I, Shaun Linse, CCR, do hereby certify that the foregoing transcript prepared under my direction is a full and complete transcript of proceedings held on January 5, 2011, in Stevenson, Washington.

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Shaun Linse, CCR 2029