BEFORE THE PUBLIC SERVICE COMMISSION

IN THE MATTER OF THE PETITION OF WASATCH WIND, LLC for APPROVAL of a CONTRACT FOR THE SALE OF CAPACITY AND ENERGY FROM THEIR PROPOSED FACILITIES.	)	Case No. 06-035-42 TRANSCRIPT OF PROCEEDINGS
IN THE MATTER OF THE APPLICATION OF PACIFICORP FOR APPROVAL OF POWER PURCHASE AGREEMENT BETWEEN PACIFICORP AND SPANISH FORK WIND PARK 2, LLC.	)	Case No. 06-035-76

February 22, 2007 * 9:00 a.m.

Location: Public Service Commission
160 East 300 South, 4th Floor
Salt Lake City, Utah 84111

Richard M. Campbell, Commissioner
Ted Boyer, Commissioner
Ron Allen, Commissioner

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I N D E X

E X H I B I T S

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P R O C E E D I N G S

COMMISSIONER CAMPBELL: Let's go on the record in Docket Number 06-035-42 In The Matter of the Petition of Wasatch Wind, LLC for Approval of Contract for the Sale of Capacity and Energy from their Proposed QF Facilities, and Docket Number 06-035-76 In The Matter of The Application of PacifiCorp for Approval of Power Purchase Agreement between PacifiCorp and Spanish Fork Wind Park 2, LLC.

Let's take appearances for the record, please.

MR. BROCKBANK: Dean Brockbank for Rocky Mountain Power.

MS. SCHMID: Patricia Schmid, Assistant Attorney General with the Division of Public Utilities.

MR. COLLINS: Rich Collins representing Wasatch Wind.

MR. PROCTOR: Paul Proctor on behalf of the Utah Committee of Consumer Services.

COMMISSIONER CAMPBELL: All right. Thank you.

We are at another hearing where we have both a witness as well as a party that I assume is going to ask questions. We're going to do the best

we can to make sure distinctions are clear as far as when you ask questions that you don't editorialize. But at the same time, that your questions are quite distinct from prefiled testimony. And I think the Commission is going to in the future clarify roles and make sure we understand how this all works.

Let's begin with you, Mr. Brockbank.

MR. BROCKBANK: Thank you, Mr. Chairman.

Rocky Mountain Power has two witnesses today, Mr. Paul Clements and Mr. Mark Adams, both Company employees. And we would like to introduce Mr. Clements at first.

Would the Chairman like to --

COMMISSIONER CAMPBELL: I think -- aren't you already sworn under this docket?

MR. CLEMENTS: Yes.

MR. BROCKBANK: I think Mr. Clements was sworn in but Mr. Adams was not.

COMMISSIONER CAMPBELL: All right. Let's take them one at a time. Mr. Clements, why don't you come up here and take the stand.

PAUL CLEMENTS,

called as a witness, being previously duly sworn, was examined and testified as follows:

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DIRECT 3EXAMINATION

BY MR. BROCKBANK:

Q. Mr. Clements, please state your full name and for whom you work and your business address for the record.

A. My name is Paul Clements. I am a Power Marketer Originator for PacifiCorp Energy. My business address is 201 South Main Street, Suite 2300, Salt Lake City, Utah, 84111.

Q. Are you the same Paul Clements that has prepared Prefiled Testimony in this docket?

A. Yes.

Q. And if you were to state the things today that were stated in your prefiled testimony, would you state the same things?

A. Yes.

Q. Do you have any changes to your testimony?

A. No, I do not.

MR. BROCKBANK: Mr. Chairman, Mr. Clements has a brief summary of his testimony. Could he be allowed to give that?

COMMISSIONER CAMPBELL: Yes. Go ahead.

MR. CLEMENTS: Thank you.

Mr. Chairman and Commissioners. The Company's position in this docket is that no

adjustment should be made to the contract prices in the Spanish Fork Wind Park 2 agreement to account for avoided line losses. In this docket the Company does not attempt to set forth the definitive methodology to be used in all QF contracts, but instead evaluates the circumstances specific and relevant to the Spanish Fork contract alone. After reviewing Commission orders regarding avoided line losses, the Company determined that since the proxy method was used for pricing, adjustments to the contract price to account for line losses should only be made to the extent that the QF project has a meaningful and quantifiable difference in line losses when compared to the proxy contract that is referred to pricing.

The QF contract should not be compared to any other resources since the underlying price is not based on other resources. Therefore, the Company evaluated various options available to compare the line losses associated with the Spanish Fork project to line losses associated with the proxy contract, which in this case is the Wolverine Creek project located southeast of Idaho Falls in Idaho.

The Company determined that the most appropriate method to use to compare the losses of the two projects is to calculate the difference, if

any, between the delivery points of the contracts and the load required to absorb their respective outputs of the contracts.

In performing this analysis the Company chose to use the load as measured at the substation level since the substation's primary purpose is to serve as a transfer station between a source, such as a QF generator or transmission line and load. In an integrated transmission system with built-in loops and redundancies for liability, it is not possible to isolate exactly which generator is the source for a specific load on a lower voltage distribution circuit. For this reason, the substation level was chosen as the most measurable and meaningful level at which evaluations of load and resources and attendant losses therein could be made.

The Division proposes a method similar to the Company's, but takes the analysis one step further to the distribution circuit level. While the Company is not completely opposed to this methodology, it notes that the distribution circuit load used in the calculation is based on a measured peak loading of the circuit and that results may be different during other periods, such as off-peak periods.

Mr. Collins proposes that the contract price for Spanish Fork be increased by 3.37 percent to account for avoided line losses. He uses as a basis for his position the average of a selective group of power flow studies performed by his consultant, Mr. Unger. It is interesting to note he did not average all studies performed by and provided in Wasatch Wind Exhibit 2.1, but instead picked a selective group, providing no explanation as to why some studies were included and others were not. In fact, I calculate the average of the studies that were not included in Mr. Collins' average to be .62 percent versus the 3.37 percent proposed by Mr. Collins.

If you remove the obvious outlier that is found in one study of 21 percent, the average on the excluded studies is .04 percent versus the 3.37 percent proposed by Mr. Collins. Mr. Collins provides no explanation as to why the studies were excluded from the calculation that yielded his 3.37 proposed adjustment. The Company does not agree that the 3.37 increase to the Spanish Fork contract price can be justified by Mr. Collins'analysis for this and for several other reasons which I will touch briefly upon now.

First, the power flow model uses a snapshot in time view of loads and resource assumptions. In reality, the loads and resources will be changing every minute, if not every second, over the 20-year contract period. The assumptions included in that snapshot moment in time may be different or perhaps wrong for the millions of other moments that will occur over this contract life.

Second, Mr. Collins has performed studies in which the Spanish Fork project is compared to resources other than the proxy resource. This is a clear departure from the Commission-approved pricing method for wind QFs.

Third, the power flow studies performed by Mr. Collins show such large variances in results that one must question their accuracy and relevance to be used as evidence for an increase in price that will be paid by Utah ratepayers. For example, Mr. Collins' studies contain results that range from a positive 5.79 percent to a negative 21.05 percent. It's interesting to note in its order dated April 19, 2006 in Docket 03-034-15, the Commission took administration note of the fact that when comparing the 1991 transmission study and a 2001 transmission study, the difference between the transmission energy

loss factor determined by those two studies was only .0006 percent, even though the Cholla, Craig, Haden, Hermiston and Gadsby resource were added in between those two studies. This calls into question Mr. Collins' studies which produced changes of a magnitude in one case of 21 percent after the addition of a single 18.9-megawatt resource.

Finally, to borrow a concept from the real estate industry of using comparable properties, a good way to determine the value of an item is to look at what the value has been placed on or paid for similar items in the area. The Pioneer Ridge project is a 70 megawatt wind project located in Tooele, Utah. It is similar to the Spanish Fork project in terms of proximity to load in the Wasatch Front. After performing their own analysis, Pioneer Ridge determined they would not seek an adjustment to their contract price to account for avoided line losses. As the lead negotiator for the Company on the Pioneer Ridge contract, I represent that no concession was granted to the Pioneer Ridge contract in exchange for the position.

Also, based on the history of those involved with that project, it is evident that the project had the know-how and the experience to

petition the Commission if they felt an adjustment was at all justifiable.

In conclusion, the evidence that's presented in this docket clearly demonstrates that no adjustment to the Spanish Fork Wind Park 2 contract price is justified.

And that concludes my summary.

MR. BROCKBANK: Mr. Clements is now available for cross-examination and questions.

COMMISSIONER CAMPBELL: Why don't we -- why don't you move the admission of this. Do we have this marked, his testimony?

MR. BROCKBANK: We have not marked it. I would like to -- Mr. Clements filed Direct, Rebuttal and Surrebuttal Testimony. Shall we mark them all three separately?

COMMISSIONER CAMPBELL: Yes.

MR. BROCKBANK: Rocky Mountain Power moves for the admission of Mr. Clements' testimony, that his Direct Testimony be labeled Rocky Mountain Power Exhibit 1, that his Rebuttal Testimony be labeled Rocky Mountain Power Exhibit 2, that his Surrebuttal Testimony be labeled Rocky Mountain Power Exhibit 3.

COMMISSIONER CAMPBELL: All right. Any objections?

MS. SCHMID: None.

MR. PROCTOR: No objection.

COMMISSIONER CAMPBELL: All right. It's admitted.

Any questions, Ms. Schmid?

MS. SCHMID: No questions from the Division.

COMMISSIONER CAMPBELL: Mr. Collins, any questions?

MR. COLLINS: Yes.

COMMISSIONER CAMPBELL: Go ahead.

CROSS-EXAMINATION

BY MR. COLLINS:

Q. You are the Company expert witness in proposing this method, correct, for this docket, to determine line losses?

A. Mr. Mark Adams and myself are witnesses in this docket. Depending on the nature of the question, either I will be the witness or he will be the witness.

Q. Okay. So in your Direct Testimony you outline the method to determine avoided line losses. And on page 6, line 91 through 96, you calculate the distance between the delivery point of the proxy contract and the load required to, quote-unquote,

"absorb" the output. And then you compare that to the distance to -- that distance to the distance between the delivery of Spanish Fork and the substation load required to absorb that output; is that correct?

A. Yes, that's correct.

Q. Couldn't the actual end user be quite a distance away from that substation? Couldn't it be 20 miles?

A. That is possible, yes.

Q. Fifty miles?

A. Well, actually my analysis was done at the substation level and the amount of load that is associated with each specific substation is something that we can measure and something that we know with certainty. And that is the level at which my analysis is performed.

Q. But the actual load could be 40 miles, 50 miles, 100 miles away from that substation?

A. Could you explain what you mean by "load"?

COMMISSIONER CAMPBELL: Can you actually rephrase it as a question.

MR. COLLINS: I thought I did.

Q. (BY MR. COLLINS) Couldn't the actual end user be located as much as 100 miles away from the

substation in which you are saying the power is absorbed?

A. It is difficult, if not impossible, to determine which electron flowed to which end user customer.

Q. That wasn't my question. My question was, if you have a substation that is isolated, but the actual end users are some distance away from that substation, would it not be true that there would be line losses associated from the delivery of the substation to the end user?

A. If you could prove with a certainty that the electron flowed from the substation to that specific end user, then, yes, laws of physics would dictate that there would be losses associated with that transfer, yes.

Q. Okay. So you are admitting that the flow of electricity is a lot more complicated than your method has suggested?

A. Yes.

Q. And that the flow of electricity is what results in line losses?

A. That is one way to measure line losses, yes.

COMMISSIONER CAMPBELL: Mr. Collins, for

our record, you need to phrase these as questions. We can hear the intonation in your voice, but you're making statements and we would prefer if you made them as questions.

MR. COLLINS: I will try.

Q. (BY MR. COLLINS) Could you list for the Commission the variables that are important when you study a line loss? What variables make up and determine how much electricity is lost when it travels from the generator to the end user?

A. That is a question that I will defer to Mr. Mark Adams as he is our engineer who is prepared to answer such questions.

MR. BROCKBANK: Mr. Chairman, could I just state that Mr. Clements' testimony focused on the method suggesting that line losses be calculated pursuant to the proxy contract and the proxy project, and whatever questions Mr. Collins has relating to that I think would be appropriately directed to Mr. Clements. To the extent they involve the physics and the lines and whatever variables are on the electric grid would more appropriately be addressed to Mr. Adams.

MR. COLLINS: Okay. I just wanted to ask the question if he was aware of other variables when

he selected this method or the Company selected this method. I will ask those questions of Mr. Adams.

MR. CLEMENTS: I would be happy to respond as well to what led to my decision to choose this method if this pleases the Commission.

COMMISSIONER CAMPBELL: Go ahead.

MR. CLEMENTS: When we evaluated the various methods that were applicable or available to measure line losses or to estimate line losses, and I want to point out that the only way to actually measure line losses is to put a meter at one end of the line and a meter at the other end of the line and then determine what the line losses were.

So we looked at measures that were available to predict or estimate what the expected line losses would be. Now, those methods ranged from something very simple, which has been proposed in other dockets, such as taking the FERC OAK rate and applying it based on distance, to something extremely complex where you would run thousands, if not millions, of power flow analysis where you would capture every second in time over a 20-year contract.

What the Company attempted to do was to pick a method that had sufficient detail to provide certainty that you're addressing the problem

appropriately, while not picking a method that has such a large and far ranging group of assumptions that those assumptions could easily be wrong and lead to an indeterminate or inappropriate answer for the question at hand.

In doing so, the Company arrived on this method where you have a measurable resource, which are the two projects, and you have a measurable and known load which is measured at the substation level. The Company also made note that it was imperative that the comparison be done versus the proxy resource as the proxy resource was referent for pricing.

COMMISSIONER CAMPBELL: But to answer his question, you understand there's other variables that could go into a calculation?

MR. CLEMENTS: Absolutely, yes, and we considered those.

Q. (BY MR. COLLINS) You considered those variables? Did your method take those variables into account?

A. No.

Q. So then it would be fair to say that your method is deficient in that it does not take into account variables that would determine transmission line losses?

A. Are you asking me if it would fair to say that it is deficient or are you asking me if it is deficient?

Q. I'm asking you to say is it deficient.

A. No.

Q. Is it fair to say it's deficient?

A. No as well. For the reasons that I stated before. We felt that the other variables were too difficult to predict with certainty over a 20-year contract life to be considered.

Q. Would it be fair to say that given the fact that Wolverine interconnection is at the Goshen substation and that the Goshen substation has a load, according to you, large enough to absorb the generation, that no QF using this method could qualify for line losses?

A. No.

Q. So no QF could qualify for line losses?

A. No, it's not fair to say that. That was your question.

Q. Okay. Why wouldn't it be fair to say that? Could you explain a situation in which, given your method, a QF could get line losses?

A. I would be happy to. Let's suppose that the Wolverine Creek delivery point was located 50

miles away from the Goshen substation.

Q. But it is not.

COMMISSIONER CAMPBELL: Let him finish his answer, please.

MR. CLEMENTS: Let's suppose that the Wolverine delivery point was located 50 miles from the Goshen substation and that PacifiCorp was required to take delivery at that point and transport the energy 50 miles across the 161-kilovolt line to the Goshen substation. And let's suppose the QF project was interconnected directly to a substation of sufficient size to absorb its load.

Without having specifics and without proposing a definitive methodology, that is not my attempt in responding to this question, I would say there could be an argument that the QF project should be awarded a credit for the losses that would occur from the delivery point across the 50 miles of 161 line to the Goshen substation. However, that is not the case that we are evaluating today.

Q. (BY MR. COLLINS) So I'm confused now. Given the specifics of the interconnection of Wolverine at Goshen, could a QF earn line losses using your method?

A. Which QF?

Q. Any QF. Any QF.

A. The issue at hand today is what are the line losses for the Spanish Fork project. And in trying to determine that we evaluated versus the proxy resource, which happens to be the Wolverine Creek project. It is not -- I am not here to testify as to the Company's proposed method for any other QF.

Q. Well, did you -- did he answer my question? Was he responsive?

COMMISSIONER CAMPBELL: Go ahead.

MR. BROCKBANK: Perhaps you could rephrase it, Mr. Collins. I thought he answered it, but if you don't think he did perhaps you could rephrase it.

Q. (BY MR. COLLINS) It's kind of a yes or no answer. Is it possible, using your method, for any other QF to qualify for transmission line loss credit?

A. Yes, it is possible using my method.

Q. Under the specifics of the fact that Wolverine is connected at Goshen, the interconnection point is at Goshen --

A. In this specific case --

Q. And that's the question I'm asking, in this specific case, is it possible for a QF to earn line loss credits?

A. That wasn't the question you were asking. You were asking if under my method, is there a way that a QF could earn line loss credits. The answer is yes. In this specific instance the distance between the output of the project, the delivery point of the project and the absorption of load is zero because PacifiCorp takes delivery of the Wolverine Creek project inside the fence of the Goshen substation.

COMMISSIONER CAMPBELL: Next question, please.

MR. COLLINS: I didn't get a yes or no.

Q. (BY MR. COLLINS) Are you aware that your method contradicts previous Company testimony given by Mr. Griswold?

A. Could you point out an example of that?

Q. Yes. Mr. Griswold, in his Direct Testimony, suggested that wind projects --

MR. BROCKBANK: Mr. Collins, do you have a copy of that for Mr. Clements to see?

MR. COLLINS: I do not. But it is on the record. I will paraphrase from his testimony.

MR. PROCTOR: Excuse me, Mr. Chairman. Could he state the docket number in which that took place?

MR. COLLINS: That is 03-035-14. It is in the second stage of that where we were discussing transmission issues.

MR. PROCTOR: Thank you.

MR. COLLINS: It was in his Direct Testimony.

MR. PROCTOR: I'm uncomfortable --

MR. BROCKBANK: Mr. Chairman, I'm uncomfortable having Mr. Collins characterize a previous PacifiCorp witness's testimony without being able to look at the testimony under other dockets. If he has something for us to look at so I can make sure, I just don't know if he's characterizing it correctly or not. It's not in the record in this docket.

MR. COLLINS: Can I have the Commission take administrative notice of his testimony?

COMMISSIONER CAMPBELL: You can do that. Why don't you go on to your next question then.

Q. (BY MR. COLLINS) On page 4 of your Rebuttal Testimony, line 57 and 61 through 64, you criticize Dr. Collins' use of the power flow models in that they're comparing it to resources other than the proxy resource, and that the results are drawn from conclusions from this comparison between Spanish

Fork's resources and the proxy resource; is that correct? Did I characterize your testimony correctly?

A. Yes, that's correct.

Q. Are you aware of or did you understand what exactly took place in our power flow study? Did you do any analysis of that?

A. Yes, I did.

Q. Okay. Could you explain to me your idea of what was performed?

A. So to rephrase your question --

COMMISSIONER CAMPBELL: Can you be more specific? We're going to be here all day if we can't be real specific as to what you're asking.

MR. BROCKBANK: And, Mr. Chairman, I would object to that question. He's asking the Rocky Mountain Power witness to summarize testimony submitted by another party, i.e., himself and Mr. Unger. Mr. Collins and Mr. Unger will be able to speak to their own testimony.

COMMISSIONER CAMPBELL: Why don't you get to your specific question related to this issue.

Q. (BY MR. COLLINS) Okay. Were you aware that there was a direct comparison made between the line losses resulting from Spanish Fork's being put

onto the PacifiCorp's system with the line losses that results when incremental power is put onto the Wolverine generation?

A. Yes. I'm aware that Spanish Fork ran several power flow studies that attempted to model exactly what you're referring to.

Q. Okay.

A. Although I will not -- by doing so, I'm not agreeing that those models were correct.

Q. Okay. But it is a direct comparison.

COMMISSIONER CAMPBELL: That was a statement. Would you please make it a question?

Q. (BY MR. COLLINS) Would you agree that it is a direct comparison between the proxy model?

A. I would agree that the intent of that model was to try and show a direct comparison, yes, although I do not agree with the methodology or many of the assumptions behind the model.

Q. Now, in your summary you provided some calculations that line losses were as high as 21 percent, that there was huge variations in results that came out of the line loss studies from our power flow models, and you have 21 percent.

How did you calculate that number? Where does that come from?

MR. BROCKBANK: Where are you referring in his testimony?

MR. COLLINS: I'm referring to his summary.

COMMISSIONER CAMPBELL: He actually called it the summary. It shows where in his testimony that summary statement came from.

MR. CLEMENTS: That statement was backing up some points that I had made in my testimony, Mr. Chairman. And I actually pulled the 21 percent number from Wasatch Wind Exhibit 2.1, which was part of Mr. Mike Unger's testimony. The Exhibit does not have page numbers, but it would be the second page, loss analysis, WECC system. Probably if you look at the sixth number down in the far right-hand column you will see a percent change of 21.05 percent.

COMMISSIONER CAMPBELL: All right. You're going to need to identify the exhibit again. I wasn't following you.

MR. COLLINS: Sure, I apologize. It was Wasatch Wind Exhibit 2.1.

MR. BROCKBANK: Mr. Chairman, if I may clarify, this is in Mr. Unger's, Michael Unger's Direct Testimony. It's an exhibit in his Direct Testimony.

MR. CLEMENTS: As I said, there are no page numbers, but it would be, I believe, the second --

MR. COLLINS: It's a one-page document?

MR. CLEMENTS: It was actually a four-page document.

MS. SCHMID: Five, six. Five.

MR. BROCKBANK: Five pages.

MR. COLLINS: That was the electronic submission, I guess.

MS. SCHMID: Do you want to borrow it?

COMMISSIONER CAMPBELL: So you're referring to Mr. Unger's Direct Testimony and at the end of his written testimony you're referring to Exhibit 2.1. It's entitled "Wasatch Wind, Exhibit 2.1, Loss Analysis, Rocky Mountain System." Is that what you're referring to?

MR. COLLINS: I'm actually referring to the second page of that. I believe what is occurring here, Mr. Chairman, is the electronic version from which I am drawing my analysis included more information than what was provided in the written version.

COMMISSIONER CAMPBELL: Because I do not have that on the file, on the record. In the file of

Direct Testimony I do not have a second page.

MR. BROCKBANK: Mr. Chairman, in the electronic filing of Mr. Unger's testimony there was an Excel spreadsheet. By my count, there were five printed pages at least from that spreadsheet, and I only brought one copy for myself and one for the witness. I don't have a copy because it was, I believe, filed with Mr. Unger's Direct Testimony.

COMMISSIONER CAMPBELL: The Commission does not have that.

MR. COLLINS: I submitted the -- I did not submit a hard copy of the backup. I submitted that electronically.

COMMISSIONER CAMPBELL: Is the backup in the form of a data response or was it intended to be on the record?

MR. COLLINS: No, it wasn't. It was just backup calculations. And I believe, and I'll have to ask Mr. Unger, but that was a different scenario that was run that looked at the WECC area and line losses on that. But I'll have to ask my expert witness.

MR. CLEMENTS: Mr. Chairman, the file that was electronically sent to the Company as representative of Wasatch Wind Exhibit 2.1 was an Excel spreadsheet that contained four tabs, the first

of which I believe is the page that you are looking at. There were three -- yes, it is that page exactly. The other --

MR. BROCKBANK: Just for the record, can you identify what the page was?

MR. CLEMENTS: Certainly. It is the page labeled "Wasatch Wind Exhibit 2.1, Loss Analysis, Rocky Mountain System." There were three additional tabs that had other similar looking pages with similar studies from which the Company has performed some analysis and to which I am referring.

COMMISSIONER CAMPBELL: Perhaps the best way to talk about this on the record would be for Mr. Brockbank to ask questions of Mr. Unger when he's our witness.

MR. BROCKBANK: That's fine. I just want to make sure that Mr. Collins asks Mr. Clements where he got that number and that's where he got it from. It's just difficult to show on the record.

Q. (BY MR. COLLINS) So when you re -- I didn't write it down -- but when you recalculated the average percentages changes you included the study from the other tab that included the entire WECC line losses; is that correct?

A. I'm not sure to what you're referring when

you say I calculated.

Q. Well, you presented in your summary recalculations of average line losses.

A. Yes. I'll be happy to respond to that.

COMMISSIONER CAMPBELL: Question, please.

MR. CLEMENTS: I'll interpret the question and respond accordingly. In your Direct Testimony you said that you averaged the 11 studies performed and came up with 3.37 percent. Mr. Collins said in his Direct Testimony that if the averaged 11 studies performed and came up to 3.7 percent. In Mr. Mike Unger's Direct Testimony as electronically filed, he provided a Exhibit 2.1 which contained more studies that were performed by Wasatch Wind, more than 11, in fact more than 40. I took the liberty of calculating the average of the studies that were not included in Mr. Collins' 11 study average to determine what their levels were as well. So yes, I did perform that analysis.

Q. (BY MR. COLLINS) So there were 40 studies; is that correct?

A. As I counted them, there were 40 studies.

Q. And were you aware what the other studies entailed?

A. I was aware to the extent that they were

identified in the spreadsheet. One was identified as Loss Analysis, WECC System. The other two were identified as other studies that were done, one I believe was Malin to Mid-Point and another that I don't recall. They were provided by Mr. Unger and I was curious as to why those studies were not included in the average since they were performed.

MR. COLLINS: Okay. We'll address that when we talk to Mr. Unger.

Q. (BY MR. COLLINS) Now, you criticize the power flow method as only giving a snapshot in time; is that correct?

A. Yes.

Q. Does your method provide a dynamic approach to calculating line losses?

A. No, it does not.

Q. Does your method take into account the impacts on the system?

A. There is no way to take into account the impacts of the system over a 20-year contract period unless you include various assumptions as to the load and resource balance and additions over that 20-year period. For that reason I felt it was more appropriate to take the snapshot look at the substation level where there are less minor

variations in load and resources than a snapshot elsewhere.

Q. So you adopted this because it was a simpler method?

COMMISSIONER CAMPBELL: Is that correct?

Q. (BY MR. COLLINS) Is that correct?

A. It was a more justifiable method, yes.

Q. Justifiable in that it excludes known variables?

COMMISSIONER CAMPBELL: Mr. Collins, we need you to ask questions for our record. It comes across in the record as being argumentative. Your responsibility at this point in the proceeding is to ask questions and then you can make all the statements you want when you do your testimony.

MR. COLLINS: Okay. I'm not trying to testify, I'm trying to ask questions. I'm not trained as a lawyer, so I beg the Commission's patience.

Q. (BY MR. COLLINS) I guess what my question is, when choosing a method should one look for simplicity only or should one try to incorporate all of the variables that might lead to a solution?

A. I believe I answered that in an earlier response. I would be happy to rephrase my response

if it pleases the Commission.

COMMISSIONER CAMPBELL: Go ahead.

MR. CLEMENTS: When we evaluated the various methods, you have to strike a balance between a simple method that will address the problem and a complex method that introduces so many variables and assumptions that there is concern that the variables and assumptions will be incorrect and you will be unsure of the output of the model that uses those variables and assumptions.

So there is a balance between a simple method that addresses the problem and a complex method that also addresses the problem, but then creates multiple other problems in that the inputs and the assumptions and the variables could be incorrect. And we feel we have struck that balance with our method.

MR. COLLINS: I don't think I have any further questions.

COMMISSIONER CAMPBELL: Thank you.

Mr. Proctor, any questions?

MR. PROCTOR: No. Thank you very much.

COMMISSIONER CAMPBELL: Thank you, Mr. Clements.

Oh, wait, wait, wait. Redirect, Mr.

Brockbank?

MR. BROCKBANK: Thank you, Mr. Chairman.

REDIRECT EXAMINATION

BY MR. BROCKBANK:

Q. Mr. Clements, Mr. Collins asked you about your recalculation of some of the averages of the results of Mr. Unger's spreadsheets that were included with his testimony. Could you please explain a little bit of what you did in recalculating those averages and what the results of those were?

A. Sure, I would be happy to.

If the Commission would turn to their Exhibit 2.1 of Mr. Mike Unger's Direct Testimony, that will help to clarify what I did in my analysis. As you will see, second line down is the WECC Heavy Winter 2006 study. That yielded a percent change in losses of minus 4.6 percent. I counted that as one study.

Mr. Collins, in his Direct Testimony, put forth that he averaged the studies that are on this page and that is how he came up with the 3.37 percent proposed loss adjustment. The additional spreadsheets that were provided in the electronically filed Direct Testimony of Mr. Mike Unger as Exhibit 2.1 had similar studies labeled in a similar manner,

WECC Heavy Winter 2006, for example, and they provided a percent change similar to the 4.68 that I just mentioned.

MR. BROCKBANK: For the record, if I may, because the Commission doesn't have those sheets, the top of the other sheets that Mr. Clements is referring to is stated "Loss Analysis, WECC System," and the other four pages do not have headers. So it's difficult to identify them, but they are the four following pages.

MR. CLEMENTS: In that manner I averaged the other studies that were labeled in a similar manner to come up with the averages that I spoke of in my summary testimony, which were well below 1 percent. And I can only assume that those studies were excluded since they were well below and contradictory to the point Mr. Collins was trying to put forth.

MR. BROCKBANK: Thank you.

MR. COLLINS: Can I ask a follow-up question?

COMMISSIONER CAMPBELL: Go ahead.

RECROSS-EXAMINATION

BY MR. COLLINS:

Q. Is it your testimony or the Company's

testimony that it is difficult to estimate what the impacts on the entire western U.S. grid system would be of an 18.9 megawatt addition?

A. I think I referenced that in my summary testimony. I will also defer that question to Mr. Mark Adams.

Q. And that second study, WECC Line Losses, would that not be, in your estimation when you look at that title, the line losses associated with the entire WECC region?

A. It was a study run by Wasatch Wind so I don't want to put forth an opinion on what it was.

COMMISSIONER CAMPBELL: Mr. Collins, later in the proceeding I assume you will be asked why you chose what studies you chose.

MR. COLLINS: Okay. Thank you. That's all.

COMMISSIONER CAMPBELL: Mr. Boyer has a question.

COMMISSIONER BOYER: Yes. Mr. Clements, if you know the answer to this. In the Wolverine contract, the proxy contract, is there either implicitly or explicitly an adder for avoided line losses?

MR. CLEMENTS: To my knowledge, no, there

was no compensation paid to Wolverine Creek for avoided line losses.

COMMISSIONER BOYER: Thank you.

COMMISSIONER CAMPBELL: All right. Thank you, Mr. Clements.

MR. BROCKBANK: Should we call our next witness, Mr. Chairman?

COMMISSIONER CAMPBELL: Please.

MR. BROCKBANK: Our next witness is Mr. Mark Adams.

COMMISSIONER CAMPBELL: If you would stand there and we'll swear you in. Raise your right arm to the square.

Do you swear that the testimony you're about to give in this proceeding is the truth, the whole truth, and nothing but the truth, so help you God?

MR. ADAMS: I do.

MARK ADAMS,

called as a witness, being first duly sworn, was examined and testified as follows:

COMMISSIONER CAMPBELL: Thank you.

Mr. Brockbank.

MR. BROCKBANK: Thank you, Mr. Chairman.

/

DIRECT EXAMINATION

BY MR. BROCKBANK:

Q. Mr. Adams, please state your name, title, and for whom you work for the record.

A. My name is Mark Adams. My title is Manager of Area Planning for Rocky Mountain Power. And my business address is 1407 West North Temple Street, Salt Lake City, Utah.

Q. Are you the same Mark Adams that filed Rebuttal Testimony and Surrebuttal Testimony in this proceeding?

A. I am.

Q. And if you were going to say -- would you say the same things today verbally that you have stated in writing in your testimony?

A. I would.

Q. Do you have any corrections to your testimony?

A. I do. And maybe I can preface why. I used a computer draft of Mr. Collins' testimony and some of the page numbers in that were a little messed up so I have some page numbers and line number changes in my testimony.

So if you would turn to my Rebuttal Testimony on page 6, line 93, I quote page 6, line 3

of Mr. Collins' testimony. It should be page 6, lines 7 and 8.

COMMISSIONER CAMPBELL: All right. Before you go on, when you say your Rebuttal Testimony, I show that while it's Rebuttal Testimony, it's the testimony that's labeled "Testimony of Mark G. Adams"; is that correct?

MR. BROCKBANK: Yes, that's correct. Dated January 31, 2007.

COMMISSIONER CAMPBELL: All right. Just so we're aware of which we're working on. Please continue.

MR. ADAMS: Okay. On page 8, line 153 of my testimony, I quote page 9, line 16 of Mr. Collins' testimony. It should be page 6, lines 19 through 21.

Then finally, on page 9, line 171 of my testimony, I quote pages 10 through 13 of Mr. Collins' testimony. It should be pages 7 through 10.

Q. (BY MR. BROCKBANK) Is that all the corrections, Mr. Adams?

A. That is.

Q. Mr. Adams, do you have a brief summary of your testimony?

A. I do.

Q. Could you please provide it for the

Commission?

A. Thank you.

Mr. Chairman, Mr. Commissioners. As I see it, the primary purpose of a power flow model is to calculate the robustness of an electrical system by using a computer program to simulate that electrical system. Most electric utilities and support staff, such as Western Electricity Coordinating Council, run these power flow models. There are myriads of models available for review, each one of which makes specific assumptions. It is true that one of the side benefits of a power flow model is it can be used to calculate line and transformer losses.

The danger of gathering these losses is that a computer power flow model will measure a snapshot in time and is not designed to measure losses over a 20-year life of a project. Each time you change a load value, add a new resource, move a capacitor or a transformer setting, it will cause you to run additional power flow cases as you try to calculate those elusive line and transformer losses.

Now, the Wasatch Front is growing at 4.1 percent a year, which means that the 4,100 megawatts we saw this year could be as high as 9,100 megawatts by the year 2026. That means an additional 5,000

megawatts of new resource will be needed to be added to the system in the next 20 years. I do know that neither Rocky Mountain Power, nor Mr. Unger, nor Mr. Collins, made any attempt to predict the effect this level of load growth would have on the Spanish Fork Wind project and the line calculations done.

Second, using the WECC power flow models described in the testimony given by Mr. Unger and Mr. Collins, there was no attempt to represent the subtransmission that is the 46 through 69 kV system to more accurately calculate the effect this project would have on the load buses in the area, even though the system impact study recommended Spanish Fork Wind Plant consider installing the transfer trip scheme to avoid damage in the unit under certain surge outages.

In simple terms, this means modeling the subtransmission rebuild circumstances which showed certain outages would cause high voltage and potential damage to the Spanish Fork Wind project, but their model did not represent that 46 kV system.

Third, the cases that were run included line and transformer losses for the whole western United States, a 100,000-megawatt system, totaling 5,000 megawatts of line losses. In most cases, the change in losses result in a few hundred kilowatts on

a 5,500-megawatt loss which would likely exceed the accuracy of the model in the first place. You almost lose it in the noise, so to speak.

Finally, in both the case of the proxy and the Spanish Fork project, the effects of other utilities in the area were ignored. At Wolverine Creek there would have been significant impacts to Idaho Falls City as well as Bonneville Power Administration.

At Spanish Fork Wind Park the effects to Provo City and Southern Utah Power Producers were ignored. In conclusion, I would submit that power flow models are not the most accurate method to calculate losses for this project.

And that is my summary.

Q. Thank you, Mr. Adams.

MR. BROCKBANK: Mr. Chairman, he's available for cross-examination.

COMMISSIONER CAMPBELL: Why don't we go ahead and mark his testimony.

MR. BROCKBANK: Thank you. My apologies.

Rocky Mountain Power would move the admission of Mr. Mark Adams' testimony dated January 31, 2007 as Rocky Mountain Power Exhibit 4 and Mr. Adams' Surrebuttal Testimony as Rocky Mountain Power

Exhibit 5.

COMMISSIONER CAMPBELL: All right. Are there any objections?

MS. SCHMID: None.

MR. PROCTOR: No objections.

MR. COLLINS: None.

COMMISSIONER CAMPBELL: All right. It's admitted.

MR. BROCKBANK: Now Mr. Adams is available for questions.

COMMISSIONER CAMPBELL: Thank you.

Ms. Schmid?

MS. SCHMID: No questions.

MR. PROCTOR: None.

COMMISSIONER CAMPBELL: Mr. Collins.

CROSS-EXAMINATION

BY MR. COLLINS:

Q. Mr. Adams, as an engineer can you tell us what variables should be included in calculating line losses? What variables are important and will have an impact on how much loss is associated with transmission from generation to load?

A. Okay. The main purpose of trying to calculate what line losses or transformer losses, we maybe need to drop back into Physics 101 for just a

minute. Line losses are as a result of current flow through a conductor or through a transformer. So those transformers or currents have a resistance component and a reactance component. As you get current flow through that resistance and reactance components you generate what we call I squared r (ixixr) losses. So it's a function of the current flow times twice the resistance through a line or through a transformer.

Those two things together gives you a way to calculate those line losses or transformer losses. So it's -- if you know what the current flow is and you know what the resistance of the wire is you can calculate line losses.

Q. So could you put that into layman's terms? What sorts of variables are important? So resistance -- conductor size?

A. Conductor size.

Q. How about distance?

A. Conductor distance.

Q. Okay. Conductor size. How about voltage levels?

A. Voltage levels is less important. Generally you can -- when you calculate a resistance of the wire, the resistance is a function of the

voltage. So in -- I'll just respond. If you had a similar type wire, same conductor size, and you operate it at 46 kV and you pushed the same amount of current through it, a 46 kV wire would have about 12 times the line losses as a 161 kV line with the same wire.

Q. For a certain level of current?

A. For the same level of current, yes.

Q. How about, and you have already mentioned transformers are important in determining line losses.

A. Well, transformers also have losses. A transformer manufacturer, when they make it, will come up and give you the resistance measured through the transformer as well as the reactance measured through the transformer. You have that number and you put a full rate of current through the transformer and you calculate losses.

Q. How about the stepping up and stepping down voltage levels?

A. The voltage doesn't have anything to do with the transformer. The resistance is the same whether you step up or step down. So once you know the impedance of the transformer you can calculate the losses.

Q. Okay.

A. Now, the size of the transformer has much more to do with the number of losses you have than the voltage of the transformer. Big transformers have less losses than smaller transformers.

Q. Okay. So I have distance, voltage levels, conductor size, transformers. How many of those variables did your method include?

MR. BROCKBANK: I object to that question, Mr. Chairman. I don't believe Mr. Adams proposed a method.

MR. COLLINS: Well, I have a problem here then. I was going to ask Mr. Clements these questions, but he deferred to Mr. Adams. And now I ask Mr. Adams and I get, "Well, he didn't propose a method." So --

MR. BROCKBANK: If I remember correctly, Mr. Clements stated that his method did not address any variables, it was based on the proxy contract. Mr. Adams did not propose a method.

COMMISSIONER CAMPBELL: That point is already on the record.

Q. (BY MR. COLLINS) As an engineer, when we place another generator on the system, if you wanted to calculate the impact on system line losses, you

would have to analyze the system, correct?

A. Yes.

Q. Does the method that your colleague proposed analyze the system, the impacts on the system?

MR. BROCKBANK: Again, the question has been asked and answered by Mr. Clements. To the extent Mr. Collins has questions on Mr. Clements' proxy-related losses methodology, I would suggest they should have been asked to Mr. Clements. Mr. Adams did not file Direct Testimony, he only filed Rebuttal Testimony here. He did not have a methodology.

COMMISSIONER CAMPBELL: All right. I agree. Please continue.

Mr. Collins, we just request that your questions relate to the testimony that Mr. Adams has filed.

MR. COLLINS: Okay. I'm just a little discombobulated because I got deferred. I had a whole set of questions on the method and I got deferred because Mr. Clements was not an expert or an engineer and couldn't explain variables that would influence line losses. And then when I asked the engineer -- well, anyway, I'll go on.

Q. (BY MR. COLLINS) You did perform a power flow study and presented those results?

A. A member of my staff did several power flow studies and presented them to the staff in a Technical Conference, yes.

Q. So you understand kind of the workings of the power flow model and what kind of assumptions are made and how it works, et cetera?

A. Yes.

COMMISSIONER CAMPBELL: Those are two statements back to back. Again, please try to keep them as questions.

MR. COLLINS: I keep thinking they are, but I apologize.

COMMISSIONER CAMPBELL: We can hear your intonation, but our transcript will not show that.

Q. (BY MR. COLLINS) Is it true that the power flow model incorporates all of the variables that you listed before; distance, voltage levels, conductor size, transformer changes? Is that correct, that a power flow model incorporates all of those variables in its analysis?

A. A power flow model introduces only those assumptions that the study engineer introduces into the case. For example, the power flow studies my

staff did included the subtransmission system for Rocky Mountain Power, the 46 kV system in Southern Utah, the 46 kV system in Idaho and the 69 kV system in Idaho.

Now, the studies Mr. Unger included, although we started out with the same model, did not include those subtransmission systems. So the answer to the question is yes, they included all the assumptions made, but can a model make assumptions that are not real or make assumptions that are speculation? And the answer to that question is yes too. You can guess what the future will bring and study that future hoping to get it right or you can simplify your study to make it easier and get other results too.

Q. So you are suggesting that one should modify the model in order to get more accurate results, right?

A. Every planning engineer will model by a base case model to get the results he wants, yes.

Q. Now, these WEC models, where do they get their information on transformers and lines and all of the inputs that they would put in to construct those models?

A. I believe in my testimony I mentioned that

WECC, which is Western Electricity Coordinating Council, is a member group of utilities, and each of those member groups, I think there's like 57 utilities that are part of it, each submit the complexity they want included in the model to the WECC staff and they modify that study reflecting the complexity of each of these member utilities. Now, some utilities provide much detail in the model and some utilities don't provide very much detail.

Q. Okay. But the information is provided by the utility itself?

A. That's correct. And then the staff will sometimes remove some of the lower voltage equipment from the model just because it makes the model cumbersome to run. Computer technology is limited and if you try to include every bit of the system you'll never get a model to solve. So they have a tendency to balance between getting results and getting results this month or this year.

Q. Okay. So there is some give and take on how much information you want to put in?

A. There's some art involved, yes.

Q. Okay. Now, in page 5 of your Rebuttal Testimony you were critical of Mr. Unger's use of an unmodified WECC-based case; is that correct?

A. That's correct.

Q. And in particular, your criticism sort of centered on the fact that the subtransmission system had not been included in our model; is that correct?

A. That's correct. As I mentioned earlier, a 161 kV system has -- well, I should say our 46 kV system has 12 times the line losses of a 161 system. So if you ignore all the 46 kV system, all the 69 kV system, you don't pick up all the line losses.

Q. Okay. Now, when you ran your model, you did --

MR. BROCKBANK: Mr. Chairman, I'm going to object to the reference to "your model." Mr. Adams provided some data in a Technical Conference, but none of that data is on the record. He didn't submit it in any testimony. I don't have a problem with him discussing what he did in the Technical Conference, but I just want to make it known it's not on the records here.

MR. COLLINS: He referred to it in his Rebuttal Testimony.

MR. BROCKBANK: Okay.

COMMISSIONER CAMPBELL: Can you point to me what you're referring to?

MR. COLLINS: Okay. On page 4 of his --

it's just marked "Testimony," but I believe it's his Rebuttal Testimony. Page 4, it starts off, "Did you modify the WECC power flow base case?" If so, why." He goes on to say, "Yes, I modified the base case."

COMMISSIONER CAMPBELL: So that's what you're referring to, you're referring to this model right here?

MR. COLLINS: That's correct.

COMMISSIONER CAMPBELL: Thank you. Now please continue with your question.

Q. (BY MR. COLLINS) You ran that model. Could you tell us a little bit about how you ran that model, what assumptions you made? You had estimates of line losses. And could you tell us what that line loss was associated with as far as what area and could you tell us a little bit about what assumptions you made about the generator that was backed down?

A. Okay. First of all, what we did is, in the case of the proxy project, we assumed that that proxy project was located 14 miles east of Goshen on a 161 kV line owned by the proxy project. At that point we used a, I believe it was a summer, heavy summer 2006 loading case with normal line configurations.

In other words, those lines that are

normally in service during the summer peak were in service; those transformers that were normally in since were in service, capacitors, all the other various bits and pieces of equipment that is normally operational during the summer peak we assumed were in there.

We ran the case with I believe it was 18.9 megawatts of wind farm at Wolverine Creek, asked for the loads in that area around Goshen and the losses around Goshen, that's what we called a zone. We break the various system into pockets around a particular area. The area around Goshen was the zone we used. Compared the zone losses with the Wolverine Creek project on and with the Wolverine Creek project off, okay?

We did the same thing around Spanish Fork. Again, we modeled the normal existing system as we would have saw it summer of 2006. And again, those were pretty easy to find because the summer 2006 occurred after -- or before this model. So we knew exactly what the system looked like so we could fine-tune the system to reflect what actually happened during that season. Again, we put the generation on at Spanish Fork, took the generation off at Spanish Fork and compared the line losses in

those two cases.

Q. And so that would be a direct comparison between line losses associated with and without Wolverine and comparing that to line losses with and without generation at Spanish Fork, correct?

A. That's correct.

Q. Now, U.S. made those line losses just for the area around there; is that correct?

A. That is correct.

Q. So your study would not have calculated or even attempted to measure what the system impacts would be; is that correct?

A. Okay. One thing about power flows, is power flows do not measure line losses. They calculate them. The only way you can measure them is to go put a meter out there and measure, okay?

Q. I'm corrected. Okay, so they calculate.

A. That's right. Now, for these two groups of studies, you know, we could have measured the whole western United States grid losses just to see what happened, but in the case of these results we only measured around Spanish Fork for one and around Goshen for the other.

Q. Okay. Now, could you have measured what the impact would have been on PacifiCorp's system?

A. Yes.
Q. And how come you did not measure that?
A. Well, generally when we were doing power flows, we generally don't do power flows to try to predict the effectiveness of a wind project and a 20-year life of the line losses for that system. The only reason we ran studies at all in this case was to help out at the Technical Conference. So we ran a few small power flows to see how close things were.
Q. As an engineer, when you add a generation to a system, is it going to affect the system's line losses?
A. Yes.
Q. So you could assume that when you added power at Spanish Fork that it would have some impact on the system's line losses, correct?
A. Correct. And as you recall from Mr. Clements' testimony, he indicated that the addition of five major coal plants in the Wasatch Front or in Rocky Mountain Power over the last 10 years did very little, if any, to change the line losses of the whole PacifiCorp system.
Q. Okay. So we're comparing apples to oranges in that? The question is --
A. I think what we're saying is in most cases

the line losses on a small plant didn't do anything to the system.

Q. But we're comparing changes, wholesale changes and looking at average line losses from one period to another versus adding one resource to the system and comparing it to a base case; is that correct?

A. Please restate that again.

Q. I'll try to get it into a question.

A. It's getting complicated for me.

Q. Is it your opinion that the correct way to measure the impact of a generator on the PacifiCorp system would be to study the effects on the entire system as opposed to just the effects at the local area?

A. Well, the correct way to measure line losses is to put meters up.

Q. Okay. And we've established that that is not a cost-effective way?

A. That is correct.

Q. So we're looking for a cost-effective way to estimate, calculate line losses, correct?

A. I believe that is correct.

Q. And we're trying to, just from your opinion, we would try to include as many variables as

possible that would have an impact on line losses, correct?

A. To the point that it's cost effective.

Q. Exactly. To the point that it's cost-effective.

A. Okay. And I would submit running thousands of power flows to try to generate that is not cost-effective.

Q. Okay. But wouldn't some information be better than no information?

A. And that's correct. And we do have some information.

Q. Okay. And the information that we have on this record that you have reviewed and rebutted is that we had studies done that directly compared line losses from Spanish Fork with line losses from Wolverine, and in what was presented in my testimony, that 10 out of 11 cases that Spanish Fork had less line losses than Wolverine; is that correct?

A. That's what your results indicate. But I would submit that because you do not include the subtransmission system in your calculations, the results I got were almost extreme the other way, that the line losses of Spanish Fork were five times the line losses of Wolverine Creek.

Q. Okay. But you have stated that line losses were very miniscule at this level; is that correct?

A. Well, in both cases the line losses were in the hundreds of kilowatts.

Q. Okay. But when you put it into percentage terms it was fairly small, correct?

A. That's right. In both Mr. Unger's cases and in my cases they were all in the hundreds of kilowatt range.

Q. Okay. But in percentage terms it was in the 4 or 5 range? There was a range, correct?

A. There was a range, yes.

Q. Now, when you run different models and different scenarios, wouldn't you expect that there would be different line losses associated with those different years and different scenarios and load conditions, times --

A. Load conditions, assumptions. All those things, absolutely.

Q. So it wouldn't surprise you as an engineer that there would be variations in the estimates of line losses predicted by power flow studies?

A. Absolutely. That's correct.

Q. And so the criticism that because there

were a lot of variations, that it is not a valid method doesn't hold a lot of water?

A. Well, I guess the point we're making is we're talking about line losses that are so small on the scheme of things you're almost down into the noise and you're within the accuracy of the program, we're talking five or six significant figures in the calculations of the model, you know. Now, you can try to do that just based on guessing and get almost that close.

Q. Well, did you do any statistical analysis about what the noise is and versus what these models predicted?

A. No. Just over 30 years of experience we can tell whether it's close or it's way out.

Q. Okay. And it was just that 30 years of experience that said that it doesn't make any sense?

A. Is that a question?

COMMISSIONER CAMPBELL: I don't understand the question, Mr. Collins.

MR. COLLINS: Well, I'll withdraw that.

Q. (BY MR. COLLINS) Now, going back to your running of the model, in order to inject power into either Wolverine or into Spanish Fork, you have to make an assumption of backing down a particular

generator; is that correct?

A. That's correct.

Q. Okay. And what generator did this model back down?

A. Okay. The swing machine that Rocky Mountain Power uses for most of their power flow models is the Bridger Power Plant.

Q. Okay. Now, what made you choose the Bridger Power Plant?

A. It's not probably my choice to use Bridger. That's generally the one that the Rocky Mountain Power uses for their model. In the case of Wolverine Creek, Bridger is a direct source to Goshen. And so if you're going to provide input into the Goshen area it seems reasonable to back down Bridger.

Q. Okay. Now --

A. Because the Goshen system is kind of a little island off by itself and it's tied to that system via Goshen through -- or via Bridger through a 345 kV line.

Q. Now, in your testimony you said that economics should dictate what resource gets backed down; is that correct?

MR. BROCKBANK: Could you please refer to

his testimony?

THE WITNESS: Yeah. Where in my testimony did I say that?

Q. (BY MR. COLLINS) It is on page 11, lines 227 to 230. I think that's --

A. Right. I believe I say on page 11 that in real life the Company adjusts generation output by economics. Now, I'm in the planning group, and I'm not in generation or economics at all, so that's an assumption on my part. I would assume we backed down the unit that cost the most rather than the one that cost the least.

Q. Okay. And are you aware of the GRID model?

A. I'm aware that it exists, but I've never used it.

Q. Do you know that the GRID model is used as the way to calculate avoided cost and that it has been approved by this Commission to determine avoided cost for thermal resources?

A. I'm aware of that, yes.

Q. And would you suggest -- how is the GRID model, how does it determine what to back down?

A. As I mentioned, I've never used the model so I have no clue.

Q. Okay. Would you take it as an assertion, take it to check with your colleagues that it is done on an economic basis?

MR. BROCKBANK: Mr. Chairman, I object to that question. Mr. Adams has stated he's not familiar with the model.

COMMISSIONER CAMPBELL: The objection is sustained. Next question, please.

Q. (BY MR. COLLINS) Now, getting back to your modified model, would we, as a party in this case, have been able to duplicate that model?

A. Absolutely.

Q. So tell me how. What would I need to know to be able to duplicate that model?

A. What you would probably have to do is send your consultant in, we could review all the assumptions made in the model. He could make the same assumptions in his model and get the same answer.

Q. Okay. But would it have been just as easy for us to have gotten that model from you, gotten a copy of it so we could have run that model?

A. If you had chose to.

Q. Okay. When we asked you to run certain scenarios, and in fact we were criticized for asking

because it is expensive and it takes time, we were denied; is that correct?

MR. BROCKBANK: Mr. Chairman, I would object to that question. This is a -- Mr. Collins did not object to the Company's not providing the response to the model runs he asked. This is a legal issue, it's not one for the witness.

COMMISSIONER CAMPBELL: Let's hear your next question.

Q. (BY MR. COLLINS) One final line of questions on this model. So your model ran and estimated the line losses associated with just the area around Goshen and the area around Spanish Fork; that's correct?

A. That's what we limited the model to, yes.

Q. And our model didn't get that kind of granularity. We just estimated what the system's impacts would be.

A. Yes. The western United States, that's correct.

Q. Now, when you say the western United States.

A. Yes.

Q. Now, how do you -- on what basis do you make that assertion?

A. Well, as we look at Mr. Unger's results that we've already discussed, they talk about the WECC model. If you look at the WECC model, they talk about a 5,500-megawatt loss system. To get those kind of line losses you have to include the whole western United States.

Q. Okay. So our runs included the entire western system?

A. United States, yes.

Q. But is it your understanding that the estimates provided on Wasatch Wind 2.1 were of line losses directly associated just with the PacifiCorp eastern system?

A. No, I can't make that statement.

Q. Okay.

A. Again, there was four groups of studies. I believe one of the groups of studies included just the what we call PAC East system. The others included other things that aren't labeled so it's hard to know.

Q. Okay. Would it be appropriate to include the results of your study that looked at the subtransmission level with the results of the model that looks at the entire system, the higher voltage transmission system?

A. I would say no. Only because as you introduce a bigger and bigger system you also introduce the capability of adding additional errors, additional assumptions. Again, we're talking about very small losses. And you include a much bigger system, you get, you know, the ability to skew the results even more than we have today. Again, you'll lose it in the noise if you include a bigger set of pictures.

Q. But again, is it your opinion that some information is better than no information when making a decision?

A. My opinion is faulty information is worse than no information.

Q. And so you're saying that the information that came out of -- are you implying that the information that came out of our power flow studies is faulty?

A. No, I'm not.

Q. Okay. Now let's change subjects here a little bit. We have another model that is out on the kind of table and that was presented by the Division, sort of a modified method to your distance approach, simplistic distance approach. And that tries to measure where the line losses from the point of

interconnection to where the loads are; is that correct?

A. That's correct. It tries to use megawatt of load to line miles of line.

Q. Okay. And in your criticism of that approach and in your criticism of my rebuttal to Dr. Abdulle's approach, you state that Mapleton, which is located I think 4.5 miles from the interconnection point or from the Spanish Fork substation --

A. From the Spanish Fork substation, yes.

Q. Which has a peak load of I believe 10 to 12 megawatts?

A. Ten megawatts, yeah.

Q. Ten megawatts. And that it would not be able to handle the complete load for Wasatch Wind; is that correct?

A. The peak load is 10 megawatts, Wasatch Wind is 18.9. You will never get there.

Q. Okay. So can you tell me how often, in your estimation, Spanish Fork is going to be operating at 18 megawatts?

A. I have no idea.

Q. So --

MR. BROCKBANK: Objection. I think he said 10 megawatts for Spanish Fork.

COMMISSIONER CAMPBELL: No, I heard 18.

MR. BROCKBANK: No, I mean the witness. The witness said 10 megawatts and Mr. Collins said 18 megawatts for Spanish Fork.

COMMISSIONER CAMPBELL: I didn't hear a discrepancy. I hear our witness talking about the load at Mapleton and I hear Mr. Collins talking about the output from Spanish Fork. Please continue, Mr. Collins.

Q. (BY MR. COLLINS) So I know you're not an expert in wind, but wouldn't you assume that there would be a large majority of the time that it would be operating under the 18 megawatts?

A. In a normal power flow case, when we study peak conditions, we would probably study that system as Wasatch Wind being off because we can't depend on it being there during the summer peak.

Q. Okay. But that would be a different type of study. That would be a study to look at the reliability of the system; is that correct?

A. That's what I do, yes.

Q. Okay. But this, we're trying to estimate line losses; is that correct?

A. I assume that's where you're going.

Q. So wouldn't it be fair to say that if

Wasatch Wind's plant at Spanish Fork was operating below capacity that most the power could flow to Mapleton?

A. Not necessarily. I would say Mapleton, the peak load in the middle of the night during summer might be three or four megawatts. You know, it's well under half during the middle of the night and maybe approaching that 10 megawatts only during the hottest day of the year, July 20th or whatever. So most of the time it's well under 10. So to predict whether Wasatch Wind will match up with Mapleton is an exercise in statistics that I don't do.

Q. Okay. So this method really wouldn't take into account the dynamics of the system and fluctuations of load and fluctuations of power, it's just measuring straight distance, correct?

A. I'm assuming.

Q. And so again, it would exclude important variables in determining line loss; is that correct?

A. Again, I would assume that's probably correct.

Q. And so if we were to judge that, it would be a deficient system in that -- method in that it did not incorporate these variables?

A. Once again, it's a case of does it give you a close answer without spending a lot of resource. We've already concluded power flows don't work very well just because it takes thousands of them to try to do it. We've now determined that this isn't a very good method either because it doesn't try to track the dynamic load system.

Q. But it does track the dynamics.

COMMISSIONER CAMPBELL: Mr. Collins, how many more questions? I'm trying to anticipate when we should take a break.

MR. COLLINS: I have probably another 10 minutes or so.

COMMISSIONER CAMPBELL: Let's take a 15-minute recess.

(Recess taken.)

COMMISSIONER CAMPBELL: Let's go back on the record. Mr. Collins.

Q. (BY MR. COLLINS) On page 11, line 211 to 214, you referred to our introduction of line losses associated with the 14-mile stretch between Wolverine and Goshen; is that correct?

A. Yes.

Q. And that we did not take that section of line into account in our line loss power flow study;

is that correct?

A. Excuse me, I'm just reading here. What my statement on page 11 says is we've already discussed the fact that the customer-owned 14-mile Wolverine to Goshen line will incorrectly introduce additional line losses to the power flow case as reported by Mr. Collins. Since those line losses would not be incurred by PacifiCorp, they would need to be discounted from the results.

Now, I have since learned you did not include the 14 miles in your analysis so that -- my statement is probably incorrect.

Q. Okay. And so would it be okay to strike those portions of your testimony referring to your criticisms of 14-mile line not being considered?

MR. BROCKBANK: I object to that question. If Mr. Collins has made his point it's on the record.

MR. COLLINS: Okay. Just so long it's on the point that we did not include that in any of our studies.

MR. ADAMS: Unfortunately, the line miles should have been included in the studies, just not the line loss results. See, you get a better study if you include the actual line miles that are there, which Mr. Unger did not do in his study. You just

would have to discount those line losses as part of the study results. Do you understand where I'm going?

Q. (BY MR. COLLINS) No.

A. The 14 miles of line between Goshen and Wolverine Creek do exist so they should be included in the study.

Q. But wouldn't those 14 miles of line be included in the WECC model?

A. No. It's new enough it's probably not included in the WECC model. Having not seen the model he's using, I could not tell you whether the Wolverine Creek is in the model or not.

Q. Okay.

A. I inferred from talking to Mr. Unger that they were not included, that he lumped the generation right at the Goshen bus.

Q. Now, on page 13, line 264 to approximately 273, you criticize -- you quote my criticism of the power flow model and that a definitive solution would require multiple runs. And then you state that the method that would be best -- get the best results for the effort produced would be your transmission source method, which is just the simplistic distance method.

A. Mr. Clements' method, yes.

Q. Okay. Now, I know you're not an economist, but are you aware of the concept of sum costs?

MR. BROCKBANK: I would object to this question. Mr. Adams is an expert witness. He's an engineer, he's not an economist, as stated by Mr. Collins.

MR. COLLINS: I'm just asking if he understands some costs. I mean, he can say no or he can say yes.

MR. ADAMS: I've heard of the term.

Q. (BY MR. COLLINS) Okay. Do you understand the concept or you just have heard "sum costs"?

A. Well, do I understand it as an engineer or do I understand it as an economist?

Q. Well, as an engineer.

A. I believe I understand it as an engineer.

Q. Okay. Could you give me your understanding of "sum costs" as an engineer?

A. Once you've spent the money it's gone.

Q. Okay. So going forward, would you take that cost into account when you're looking at spending money going forward?

MS. SCHMID: I have a question.

COMMISSIONER CAMPBELL: I don't know how

this relates to his testimony. I gave you a question or two to see how this related to his testimony but I don't --

Q. (BY MR. COLLINS) Okay. Let me ask the question right off. If the money -- you were criticizing the use of this complicated model because it's expensive, the power flow model, correct?

A. Well, it is expensive and it has the great indication of introducing lots of errors.

Q. Okay.

A. Because what you're trying to do with the power flow model is predict these thousands of variables into the future.

Q. But it gives us a snapshot in time, correct?

A. That's right. Each power flow run is a snapshot in time.

Q. Okay. And so it will tell us at that point in time what the line losses are and it includes all the variables that should be required in determining line losses; is that correct?

A. Based on the assumptions you've made. Now, you can make faulty assumptions and you can make incomplete assumptions and get the wrong answer.

Q. Granted, granted. But given that Wasatch

Wind has already expended money to run these, that's sum costs, correct?

A. I'm assuming you paid for your studies, yes.

Q. Yes, we did. And so that argument shouldn't hold sway because we've already expended our money and we're looking at this as only a method for determining line losses in this case; is that correct?

A. Please repeat that.

Q. This docket is not about producing a generic method for determining avoided line losses for all QFs, it's just to determine line losses for this particular project; is that correct?

A. I'm assuming that's correct.

Q. Okay. On page 3 of your Surrebuttal, you are talking about the distance model that was proposed by Dr. Abdulle?

A. Yes.

Q. And I believe it's on that page, you make reference to the fact that we should use not the last incremental power out of Wolverine, but the first incremental power out of Wolverine. Do I have the cite correct and page? I might be off.

A. I don't see it on page 3. Sorry.

Q. Do you recall that testimony?

MR. BROCKBANK: Mr. Collins, Mr. Chairman, it would be helpful if he could show him what testimony he's referring to.

COMMISSIONER CAMPBELL: We would ask you to point to the testimony that you're questioning.

MS. SCHMID: And to help me, can you provide a date as well, please?

COMMISSIONER CAMPBELL: He said Surrebuttal, so I assume that's February 15th.

MS. SCHMID: Thank you.

MR. BROCKBANK: Mr. Chairman, while he's looking for that, just a housekeeping matter. I don't know how long the Commission plans on continuing tonight. We do have quite a few questions for Mr. Unger and Mr. Collins. I just want to make the Commission aware of that. We're getting close to four o'clock.

MR. COLLINS: Okay. I'll skip that question.

Q. (BY MR. COLLINS) In your opinion as an engineer, is it important in determining benefits to the system if you locate generation withinside a transmission constrained area?

A. That's a reasonable premise.

Q. So a generator that is located in what we might call a load pocket and the Wasatch Front would be regarded as a transmission constrained area or a load pocket; is that correct?

A. Not necessarily. It depends on the transmission system around it. Transmission constrained means you don't have enough transmission facilities in the area to get generation from the generation point to the load point. If you have lots of transmission system it's not a transmission constrained system.

Q. But you stated in your summary about a statistic, and I will refer back to your testimony, that the Wasatch Front area is growing at a phenomenal rate; is that correct?

A. It's growing at 4.1 percent.

Q. Okay, 4.1 percent. So, you know, if we use the Rule of 72, 72 into -- 4 into 72 will give you us the number of years it will take to double that amount, correct?

A. It will double more than 20 -- or double in less than 20 years.

Q. Okay. So as an expert in transmission, do you foresee that there will be transmission constraints in this area in the next 20 years if we

don't build any new transmission?

A. And if we don't build any power plants in the area, that's probably true.

Q. So a generator located within this area will provide benefits in that it might avoid transmission costs or provide power within this load pocket, correct?

A. Depending on where on the transmission system it is, yes.

Q. But you would -- if you had your choice as a transmission expert, you would rather locate a new generation inside the load pocket as opposed to outside that load pocket?

MS. SCHMID: Excuse me. I have a question. I'm confused. I'm not sure how this relates to calculation of line losses. It may be a personal deficiency.

MR. COLLINS: It has a direct effect in that we should be comparing the two resources together, all right? So we have to look at the benefits of a proxy resource and the benefits of a QF resource.

COMMISSIONER CAMPBELL: Let's not have this discussion back and forth. Are you about done?

MR. COLLINS: I am. This is the last

question.

MR. ADAMS: Was there a question?

COMMISSIONER CAMPBELL: Could you restate it, please?

Q. (BY MR. COLLINS) As a transmission engineer, given the choice, would you, if you could choose where to locate a new generation, would you locate it inside the load pocket or outside the load pocket?

A. If I had my choice, I would locate the generation next to a load pocket. Now, unfortunately, in the case of the Wasatch Wind Park, you've located your project on a small skinny 46 kV line that's quite a ways away from the load pocket. If you were to locate it right at, say, the Spanish Fork 148 kV bus, that would be a much more ideal location to put it.

Q. Are you aware that there are other areas of the country that pay extra for generation that's located withinside a load pocket as opposed to outside a load pocket?

A. No.

Q. Would you be surprised that the New England ISO has locational marginal pricing and, in fact, pays higher amounts to generation inside the

load pocket as opposed --

MR. BROCKBANK: I would object to this question. This has nothing to do with Mr. Adams' Rebuttal or Surrebuttal Testimony.

COMMISSIONER CAMPBELL: The objection is sustained.

MR. COLLINS: All right. I have no other questions.

COMMISSIONER CAMPBELL: Thank you.

Mr. Proctor, any questions?

MR. PROCTOR: No questions. Thank you.

COMMISSIONER CAMPBELL: Any redirect? Go ahead.

MR. BROCKBANK: Thank you, Mr. Chairman.

REDIRECT EXAMINATION

BY MR. BROCKBANK:

Q. Mr. Adams, a few minutes ago before we took the break, Mr. Collins was asking you some questions about the fact that he said -- he asked you whether you meant to imply that their inputs of their transmission model studies were faulty and you responded no. Do you remember that exchange?

A. Yes, I remember that.

Q. Although you said that the inputs are not faulty, do you believe that the inputs were correct

for calculating line losses?

A. I believe their inputs were incomplete. They did not include all of the system that should have been included.

Q. And by failing to include all of that, is that going to have also an incomplete analysis when the model is run?

A. Yes.

Q. Mr. Collins also asked you about the fact that variations in different line loss studies, and he said something to the effect that the fact that we have different outcomes based on different models and different assumptions, that's just a fact of life when you have different models and different assumptions. Do you remember that exchange?

A. I remember that exchange, yes.

Q. Do you believe that that kind of variation in line loss models is going to provide this Commission any meaningful guidance to calculate and predict line losses for a particular project?

A. I do not. As I mentioned before, when you have that kind of variation on this kind of a system, we're down into the noise as far as the calculations are concerned into the fourth and fifth significant figure. And, you know, you get that kind of

fluctuation all the time.

Q. The model that Mr. Collins was asking you about, the model runs that you provided for the Technical Conference, would you consider that model more accurate than that performed by Mr. Unger and Mr. Collins?

A. Yes.

Q. Could you explain why?

A. Only because we included the subtransmission system in both the Goshen model as well as the Spanish Fork model as a result of including those lower voltage systems. As I mentioned earlier, losses are a function of voltage. And as a result, a 46 kV system will have 12 times the losses of a 161 kV system. So if you don't include all the loss pieces, you haven't gathered everything.

Q. Could you please compare the results of your model line to those of Mr. Unger's and Mr. Collins'?

A. Well, Mr. Unger's results indicated that over the 11 runs he did they had an average of 3 percent higher losses for the Wolverine Creek project versus the Spanish Fork Wind project. The results of my studies indicated that Wolverine Creek had about a

fifth of the losses that the Spanish Fork project did. So the Spanish Fork had five times the losses. Now, the numbers are small, but they were five times bigger.

Q. Sure. In your opinion, if you were to use Mr. Collins' and Mr. Unger's method using the power flow study but modeled it with the correct level of detail that you have discussed both in your testimony and in responding to Mr. Collins' testimony here, do you believe that an adjustment would be appropriate or justified for line losses?

A. Yes.

Q. Can you explain how?

A. Well, I believe if you used the same granularity to Mr. Unger's model that I used to mine it would reflect that same five times difference in the Spanish Fork Wind versus the Wolverine Creek. And if we were to adjust -- then you would adjust it such that Spanish Fork would pay more for line losses than Wolverine Creek did.

Q. So in that case are you saying, then, that if all the inputs were correct, those that you have discussed, that the Wolverine Creek proxy project would actually avoid more losses than the Spanish Fork Wind project?

A. That was the results of my study.
Q. Thank you.
MR. BROCKBANK: No further questions.
MR. COLLINS: I do have a follow-up question.
COMMISSIONER CAMPBELL: Go ahead.

RECROSS-EXAMINATION

BY MR. COLLINS:

Q. Your line loss study that you performed, you only reported the line loss associated with the area immediately around where the generation occurred; is that correct?
A. I included the line losses around that pocket of load around where that generation occurred. Now, that pocket of load, in the case of Spanish Fork, included approximately 400 megawatts of load around that system. In the case of Goshen it included about 700 megawatts of load around that Goshen system. So it was just not a small pocket. It was most of southern Idaho and most of Utah Valley.
Q. But you didn't take into account what the impact is on the system as a whole; is that correct?
A. Of the whole western United States?
Q. No, no. Just of the specific PacifiCorp

PAC East system.

A. I did not include all the losses in the PAC East system, that's correct.

Q. Now, you stated that at the local level you had five times the amount of line losses from Spanish Fork versus Wolverine. And then you stated that it was your opinion that the same amount of line losses would occur at the system level; is that correct? Is that your testimony?

A. I didn't mention anything on the system level. I did state that, based on my studies, the line losses at Wolverine Creek were a fifth of the line losses of the Spanish Fork system for the pocket of load we gathered around Spanish Fork and Wolverine Creek.

Q. Okay. So you're not making any assumptions about how it would affect and have an impact on the system?

A. On PAC East or WECC, no.

MR. COLLINS: Okay.

COMMISSIONER CAMPBELL: Thank you. Any other redirect? All right.

Thank you, Mr. Adams.

MR. ADAMS: Thank you.

COMMISSIONER CAMPBELL: I would typically

go to the Division next, but I think what I would like to do is do the cross-examination of Mr. Unger, in the event that we have to come back, then you all can make the decision whether you need him on the phone or not. Since we have him, let's do that. Is that all right?

MR. BROCKBANK: Well, it's a little tricky because Mr. Collins' testimony describes the models run by Mr. Unger. Mr. Unger's testimony basically is the spreadsheet saying "here's the results of my model runs." And so it's difficult to know which questions I should address to Mr. Collins and which ones I should address to Mr. Unger because Mr. Collins described the model runs. And I'm afraid that if I have questions for Mr. Unger, they would be more of a follow-up. That's my concern.

COMMISSIONER CAMPBELL: Well, then I'll stay with my initial inclination. Ms. Schmid, go ahead with your witness.

MS. SCHMID: Hello. The Division would like to call Dr. Abdinasir Abdulle as its witness. Could Dr. Abdulle please be sworn?

COMMISSIONER CAMPBELL: Have you not testified in this docket yet?

MR. ABDULLE: I did not testify in this

docket.

COMMISSIONER CAMPBELL: Okay. Please come up to the witness stand. Do you swear that the testimony you're about to give in this proceeding is the truth, the whole truth and nothing but the truth, so help you God?

DR. ABDULLE: I do.

ABDINASIR ABDULLE,

called as a witness, was examined and testified as follows:

COMMISSIONER CAMPBELL: Thank you.

Ms. Schmid.

MS. SCHMID: Thank you.

DIRECT EXAMINATION

BY MS. SCHMID:

Q. Dr. Abdulle, could you please state your full name and business address for the record.

A. My name is Abdinasir Abdulle and I work for the Division of Public Utilities. And the address is Heber Wells, 160 East 300 South.

Q. Thank you.

Ms. Andrea Coon previously was involved in this docket on behalf of the Division of Public Utilities; is that correct.

A. That's correct.

Q. But since she has left you have become involved and before that you were aware of this docket; is that correct?

A. Yes.

Q. Did you file Direct Testimony which has been premarked as Exhibit DPU Exhibit 1.0 with an Exhibit premarked as DPU 1.1 in this docket?

A. Yes, I did.

Q. Do you have any corrections to that prefiled Direct Testimony?

A. No.

Q. Did you file Surrebuttal Testimony premarked as DPU Exhibit Number 1.0SR with DPU Exhibit Number 1.1SR and DPU Exhibit Number 1.2SR?

A. Yes, I did.

Q. Do you have any corrections to that?

A. Yes, I do.

Q. And for convenience, we'll note that we have passed out substitute sheets, but I believe it would be helpful for Dr. Abdulle to go through the changes.

A. In the testimony, my Direct Testimony at page 3, line 5, in parenthesis I have "DPU Exhibit 1.0, Revised." I will change that to DPU Exhibit 1.1SR.

On same page, line 11, it starts with 2.33 miles. I will change that to 4.79 miles. And at the end of that same line, DPU Exhibit 1.1 should be changed to DPU Exhibit 1.2SR.

On page 4, line 19, question 6, it reads as "On page 6, lines 91 to line 98, Mr. Clements." I would insert right there proposes, the word "proposes."

And the rest of my changes are on the exhibits. Exhibit 1.1SR, at the bottom, counting from the bottom, fourth line from the bottom there is 7.63 in the middle of the line. I would change that for 11.35. And counting from the bottom, line 2, instead of 9.83, I have 13.55.

COMMISSIONER CAMPBELL: And you've made those corrections on your revised exhibit, right?

MS. SCHMID: Those are the two sheets that I have passed out, yes, the revised exhibits. The other corrections in the testimony I did not pass out revised sheets for.

COMMISSIONER CAMPBELL: Okay.

DR. ABDULLE: On DPU Exhibit 1.2SR , in the first column I had 38.9. That's not correct. The correct number is 18.9. And then under the column headed by Megawatt Miles, somewhere down the

line I have 2.33 which should be 4.79. And below that 2.33 should also be 4.79.

Following those two lines I had 5.89 which should be replaced with 4.79. And down from the bottom, fourth line from the bottom, and instead of 7.63 I have 11.35, and 9.83 I have 13.55.

COMMISSIONER CAMPBELL: I would also note that those are also -- those changes are shown on the revised Exhibit, 1.2SR.

DR. ABDULLE: Yes.

MS. SCHMID: The Division would like to --

Q. (BY MS. SCHMID) Do these corrections change your conclusion that there should be no line losses awarded to Spanish Fork?

A. They don't change my conclusions.

Q. If asked the same questions as set forth in your Prefiled Testimony and as corrected today, would your answers be the same as stated and as corrected today?

A. Yes.

MS. SCHMID: The Division would like to request that Exhibit Number 1.0, DPU Exhibit 1.1, DPU Exhibit Number 1.0SR, DPU Exhibit Number 1.1SR, DPU Exhibit Number 1 .2SR, and then I guess that would have to be DPU 1.1SR Revised and DPU 1.2SR

Revised, as distributed here today, be admitted.

COMMISSIONER CAMPBELL: Are there any objections?

DR. PROCTOR: No objections.

MR. COLLINS: No objections.

MR. BROCKBANK: No objections.

COMMISSIONER CAMPBELL: All right. It's admitted.

Q. (BY MS. SCHMID) Dr Abdulle, do you have a brief summary of your testimony that you would like to provide today?

A. Yes, I do.

Q. Please proceed.

A. The Division believes that line losses are physical realities that are there whenever the electricity is flowing through the conductors. There are a number of factors that affect line losses. These factors include, but are not limited to, the distance the power is moved, transformer conversion, the ambient temperature and many others.

However, determining the exact line loss associated with a specific qualifying facility is problematic at best. It requires a determination of which resources or purchase is backed down or which sale is incurred as a result of the QF coming in

online in each and every hour. For this and other reasons, the Commission, in Docket Number 03-035-14, ordered that the price for Utah Wind QFs should be determined using the proxy method adjusted for project-specific differences.

Wasatch Wind, knowing this Commission Order, chose to use the GRID model to determine what resources should be backed down and then perform its analysis accordingly to using the power flow model.

This is contrary to the Commission Order. However, even if we assume that the method used by Wasatch Wind is correct, it suffers a mathematical problem. Wasatch Wind calculated the percent change in line loss using the nameplate for Spanish Fork rather than the megawatt losses of the base case as a denominator. We correct that and use the megawatt loss as a case denominator with the results that Wasatch Wind will change from 3.0 percent loss, 3.3 percent average loss to 0.21 percent. Therefore, Wasatch Wind data shows that there is no significant line loss differences between the plants.

Now, when I'm saying "significant," I'm not saying it in the sense of statistics. I'm saying it's not -- it's much less than what they assumed it to be.

The Division recommended that the price adjustments for the avoided line loss should be based on line loss comparisons between the two plants, Spanish Fork and Wolverine. This is consistent with Commission Order. To perform such line loss comparisons the Division recommended a method that compares the distance between the point of connection and the nearest load centers and transfers the conversions also. Using this methodology the Division found that each megawatt will have to travel to an average of 13.55 miles from Spanish Fork Wind interconnection point to the nearest load center and 5.89 miles from Wolverine connection point to the load center.

What we found regarding the transformer conversion is that Wolverine is associated with more conversions than the Spanish Fork. However, most of the Wolverine transformations are happening on the large transformers rather than small transformers. And the large transformers will have less power loss than the small transformers.

The Division disagrees with the method used by the Company. This method does not consider the line loss that will be realized as electricity flows from substation to the load centers. However,

the method that has been used and the method that the Division uses do have same conclusions, and the conclusion is that line loss should not be considered for Spanish Fork.

And that concludes my statement.

MS. SCHMID: Thank you.

Dr. Abdulle is available for questions.

COMMISSIONER CAMPBELL: All right. Let's first go to you, Mr. Brockbank. Do you have questions for Dr. Abdulle?

MR. BROCKBANK: No questions, Mr. Chairman.

COMMISSIONER CAMPBELL: Mr. Collins?

CROSS-EXAMINATION

BY MR. COLLINS:

Q. So you were assigned to this project kind of like at the very end; is that correct?

A. Yes.

Q. And do you feel like you had enough time to become a transmission expert in this -- for this docket?

A. I could use more time, but what I had was enough.

Q. Okay. Now, you state in your Direct Testimony on page 2, line 12 to 14, that there's a

number of different factors that should be included in the line loss study and you included those in your summary. And does the Company's method include all of those variables?

A. To my understanding, the Company's method and my method did not include all possible variables.

Q. Okay. So it would be deficient in the fact that it doesn't include all those variables?

A. No.

Q. It's sufficient?

A. I think what we did is sufficient. We're not trying to pinpoint what the exact line loss is. What we're saying is there are all these factors of determining what the line loss should be and calculating the line loss with precision would be time consuming, resource consuming, and very expensive.

If we could go the easiest route, which is determining whether these factors, whether the two plants differ in these factors, then we will not need to go there. If we find that they differ in these factors, like the distance that the transformation and conversion, then we will have a reason to go ahead and do a full-fledged line loss study. But knowing that those two factors are the biggest

factors and seeing that there is no difference in those two factors between the two plants, the need for going full-fledged is not warranted.

Q. Okay. So you did sort of a, how do I describe this, a test to see whether further studies would be warranted. And your preliminary tests, screening tests, I guess you could call it, led you to the decision that further study was not warranted; is that correct?

A. I wouldn't call it a screening test. It's a real test that we were doing which made us believe that line loss difference are not there because there is no difference in, considerable difference in dissenting our transformers.

Q. All right. But we've already established that there's other important variables to consider in the line loss study, correct?

A. It depends on how we define "important."

Q. Well, impacts on the system, what generators get backed down.

A. We don't think that those factors do significantly contribute to line losses. They contribute some, but it's not a big deal.

Q. But you didn't do any specific studies to substantiate that conclusion?

A. No. But what we see is that you guys did some different study and made some mathematical errors. I follow your method and accept it the way it is. It leads to the same conclusion that we made.

Q. Okay. Let's get to that point. You said we made an error in the way we calculated the percentage change?

A. Uh-huh (affirmative).

Q. Can you tell me what exactly is the nature of the problem? What are we trying to determine in our line loss study or in this docket itself?

A. What we are trying to determine in this docket is whether there's a line loss difference between the two plants.

Q. Okay. And it's going to be associated with the introduction of generation by Spanish Fork's facility into the system and we're going to compare that to the introduction of generation at the Wolverine, the proxy, correct?

A. Uh-huh (affirmative).

Q. All right. So if we're going to look at the change in the system, wouldn't it be more appropriate to use the amount of production, the energy that was injected by this particular project to find out what the entire impact on the system

would be? Because what we're trying to do, and this is a question, do you believe that this is the question, we're trying to figure out how to adjust the contract for this particular QF; is that correct?

A. Yes. We are trying to find out how to adjust it, whether we should or not.

Q. Okay. So I guess my question is, why would you choose to find out what the percentage change in line loss is associated with the QF? Why would you choose to use the system production as the base to determine your percentage change?

A. The way you calculated your methodology, your percent change was you took what you call a base case scenario which includes Wolverine and not Spanish Fork. Then you back down 19 megawatts of Wolverine and inject it into the Spanish Fork line, took the difference between those two scenarios, the before and after, and divided by 19 megawatts which is the nameplate of Spanish Fork.

The way I was taught, and I think most of us were taught, that's not the way you calculate percent change. The percent change is before, the after minus the before, divided by the before. So basically that gives you the percent change of the base case because your difference was based on that.

So the method you are using is not mathematically the proper way to do it. I can't even call it average change. I don't know what to call it.

Q. So you're saying we should calculate the percentage change in line losses for the entire system; is that correct?

A. If you did your differences for the entire system then that's the case.

Q. So we should be -- so should we be compensated for the benefits that we provide to the entire system?

A. I'm --

Q. So we would adjust our contract to reflect the fact that it was, I can't remember, .011 percent of, you know, a huge number?

A. What I'm saying is that there should be no line loss credits for Spanish Fork. My criticism of your methodology is your methodology and I don't think it was properly run.

Q. But you criticize the percentage change and I just -- if you're going to base that percentage change on the entire system then we should be compensated for the benefits, that 1.01 percent, and we'll adjust that based on all of the megawatts that were avoided?

COMMISSIONER CAMPBELL: Are you arguing with the witness or is that a question?

MR. COLLINS: I guess that's a question.

MS. SCHMID: Could you please restate it in a more simple understandable form?

MR. COLLINS: I apologize.

Q. (BY MR. COLLINS) I guess it depends on, is it your opinion that the way you calculate percentage changes depends on the question that you ask?

A. Uh-huh (affirmative).

Q. Okay. And the question that is being asked in this docket is what is the impact on line losses associated with one particular project, Spanish Fork; is that correct?

MS. SCHMID: Objection. I think has already been asked and answered.

MR. COLLINS: All right. Well, I'll move on.

Q. (BY MR. COLLINS) Now, in your calculation, in your revised calculation, DPU Exhibit 1.1SR Revised, you calculate the megawatt miles for the entire output of Wolverine; is that correct?

A. Uh-huh (affirmative).

Q. So what we're doing is finding the average line losses associated with Wolverine; is that correct?

A. Average miles electricity has to travel to get to the use point.

Q. Right. Average megawatt miles?

A. Uh-huh (affirmative).

Q. You are an economist, correct?

A. Uh-huh (affirmative).

Q. Economists, when they make decisions, do they use marginal costs or do they use average costs?

A. Marginal costs most of the time.

Q. Okay. So usually we do a marginal analysis. And so we're looking at the additional, the last production produced to get our marginal cost; is that correct?

A. Uh-huh (affirmative).

Q. Okay. So wouldn't it be more appropriate if we were going to be doing an economic analysis of this to use the last 18.9 megawatts of Wolverine versus an average of the megawatt miles for Wolverine?

A. Can you restate the question?

Q. Wouldn't it be more appropriate to use marginal megawatt miles for Wolverine to do analysis

of line losses versus an average megawatt miles to determine line losses for Wolverine?

A. If you are determining -- I don't understand the question probably, but if I understood it, that you mean marginal, you are expressing marginal as the last megawatt you used?

Q. Well, we'll take the incremental, we'll take the last 18.9 megawatts and see where those last 18.9 megawatts travel to.

A. When I take the 18.9 megawatts from Wolverine, that is my Exhibit 1.2SR.

Q. Do I have that?

MS. SCHMID: I passed that out earlier.

Q. (BY MR. COLLINS) So I'm just getting this. In this, didn't you take the first megawatts coming out of Wolverine? I mean, you have 20 megawatts that has zero miles because it's consumed in Goshen, correct?

A. Go ahead.

Q. Shouldn't you be taking, if we're going to go with marginal, the last produced? We should be taking the megawatts associated with the 16 miles from Goshen to Ammon and the 12 miles from Goshen to Idaho Falls distribution circuit ? That gives us 28 -- well, let's see, the megawatts gives us just a

little over 20.

A. Just a little over 20 is much more than 18.5.

Q. Well, yes.

A. .9.

Q. Well, slightly.

A. Why would I do that?

Q. Because you would be finding marginal analysis taking the last megawatts produced at Wolverine.

A. The way I understand marginal analysis, and the way you're interpreting it is a little different. The way I understand it is the last unit produced, the last megawatt produced.

Q. Okay. I would agree with that. And that's theoretical. But if you're going to put the theory into practice then you would take the last incremental production, which would be the last -- incremental is marginal -- it would be the last --

MS. SCHMID: Objection. Is there a question there? It seems quite argumentative.

Q. (BY MR. COLLINS) Yes. My question is, why didn't he follow economic analysis of a marginal analysis? He's done some sort of an average and I want to know the justification for it.

A. I followed economic analysis here and mathematical analysis, which is I'm trying to compare the distance traveled by the megawatt produced from the two plants. And I am not doing it on the whole and I'm doing it on an average level based on how they are traveling a different -- so it's way average here what I'm trying to do here, and that's the proper way to do it.

Q. So you used an average and you're saying that using an average is the proper way to do an analysis?

A. Because we're not doing --

Q. You just said before that we should be using marginal analysis.

A. Well, we're not doing here the last megawatt produced. So if I'm not doing the last megawatt produced then I should go that way.

Q. Okay. But if you were to -- I don't want to beat a dead horse here, but if you can't take just the last megawatt, you would take the last 18 megawatts, correct, rather than the first 18 megawatts out of Goshen?

A. No.

MS. SCHMID: I would say we've already probably discussed this sufficiently. Asked and

answered.

Q. (BY MR. COLLINS) All right. On page 4 of your Surrebuttal Testimony you criticize Mr. Unger for not comparing the proxy line losses with Spanish Fork line losses. After your review of what has actually occurred, do you still believe that there wasn't a direct comparison of line losses of Spanish Fork with the line losses associated with Wolverine?

A. The line losses that Mr. Unger did was based on an average of some 17 runs, some of which collapsed together, taking the difference to bring it down to 11. And they involve backing down other resource -- resources other than Wolverine, and that's not bad to compare to.

Q. Okay. But we did run a set of studies where we directly backed down Wolverine and increased the power at Spanish Fork; is that correct?

A. Yes. The very first study you did is that, but the number you proposed of 3.3 is not based on that.

Q. Okay. But our first set of data does do a direct comparison according to you, correct?

A. That's what you intended to do, to calculate percent change by doing direct comparisons, but I don't think it was properly done.

Q. Could you elaborate on why it wasn't properly done?

A. Because you are calculating percentage the wrong way, in my mind.

Q. So it gets to this idea of the calculation of percentages?

A. Yes. I don't exactly know what assumptions you guys run, I don't exactly know what has been included or not has been included in your runs. But if I look at what I have in front of me, which is your exhibit that came with Mr. Unger's testimony, I think that you tried to calculate the percent difference between the two in your first set of runs.

I cannot comment on what assumptions you guys put in. And that's okay because I'm not an engineer, but I can comment exactly what out of the results you get, the output you get, how did you run that mathematical to get to the percent change that you are suggesting? That's where I had a problem with.

MR. COLLINS: Okay. I think that's all my questions.

COMMISSIONER CAMPBELL: All right. Thank you.

Mr. Proctor?

MR. PROCTOR: No questions.

COMMISSIONER ALLEN: Mr. Abdulle, I just have one quick question for you because I'm sitting here trying to remember back to my previous life in business school.

COMMISSIONER CAMPBELL: Dr. Abdulle.

COMMISSIONER ALLEN: Dr. Abdulle, I'm sorry. Thank you for that correction.

I'm trying to think back. The type of analysis that we're discussing here to up this point in some detail, does this type of analysis with these type of variables and inputs, does it necessarily allow itself to have -- to statistically calculate confidence levels? Is this the kind of analysis where you can come back and say there's a high level of confidence? What would be your professional assessment of this kind of data analysis?

DR. ABDULLE: Which?

COMMISSIONER ALLEN: In terms of the power flow studies and in terms specifically of your numbers where you're looking at changing 3.3 to .21 percent. When you look at the data input can you calculate statistical reliability or confidence level in this data?

DR. ABDULLE: No. Because it is one point at the time, it's one shot. So that is basically what the power flow model will do, giving you a one-time, one-shot results. And there's no way you can use that statistical analysis on one point.

COMMISSIONER ALLEN: Thank you.

COMMISSIONER CAMPBELL: Any redirect?

MS. SCHMID: Just one.

REDIRECT EXAMINATION

BY MS. SCHMID:

Q. Dr. Abdulle, what is your Doctorate degree in?

A. Economics.

Q. Thank you.

COMMISSIONER CAMPBELL: Thank you.

Thank you, Dr. Abdulle. I think we're done with your testimony.

Dr. Collins, I think we'll put you on the witness stand next; is that correct?

MR. PROCTOR: Do you want me to?

COMMISSIONER CAMPBELL: Would you? I would appreciate that.

We're going to ask Mr. Proctor from the Committee to qualify your testimony once you get up here.

MR. PROCTOR: Did you want Dr. Collins to remain here?

COMMISSIONER CAMPBELL: No. He's going to come up here.

Dr. Collins, if my memory serves me correctly, you've already been sworn in this docket. So please have a seat.

RICHARD S. COLLINS,

called as a witness, being previously duly sworn, was examined and testified as follows:

COMMISSIONER CAMPBELL: Mr. Proctor.

MR. PROCTOR: Thank you, Mr. Chairman.

DIRECT EXAMINATION

BY MR. PROCTOR:

Q. Dr. Collins, would you state your name and a business address for the record, please.

A. Dr. Richard S. Collins. And my business address is 1840 South 1300 East, Salt Lake City.

Q. Are you appearing here today on behalf of Wasatch Wind and also the Spanish Fork Wind Park, which is a Wasatch Wind project?

A. I am.

Q. Prior to today's hearing, my understanding is that you have filed Direct Testimony, filed January the 12th consisting of 11 pages, Rebuttal

Testimony filed January the 31st consisting of five pages, and finally, Surrebuttal Testimony filed February the 15th consisting of 10 pages and also an Exhibit 1.1. Does that accurately state the contents of the testimony you prefiled?

A. It does.

Q. Do you have any corrections or amendments that you wish to make to that testimony?

A. I do not.

Q. If those questions were put to you today, would your answers remain the same?

A. Yes.

MR. PROCTOR: On behalf of Dr. Collins, I would offer those three -- oh, pardon me. One more question.

Q. (BY MR. PROCTOR) Dr. Collins, those items of testimony were not given an exhibit number. May we issue -- may we mark them as Wasatch Direct 1 --

COMMISSIONER CAMPBELL: Let's do this. I was going to point out to the Company in the future, it's helpful if we keep the same first number for a witness. It helps us keep track of it. So if we would mark these Wasatch Wind 1, 1.0, Wasatch Wind 1.R and Wasatch Wind 1.SR is our preferred method so that we can keep the testimony associated with each

witness.

MR. PROCTOR: Thank you. And the Surrebuttal exhibit would be 1.1SR; is that correct?

COMMISSIONER CAMPBELL: Right, that's correct.

MR. PROCTOR: All right. With the addition of those exhibit numbers, on behalf of Wasatch Wind they would be offered into evidence.

MR. BROCKBANK: One question, if I may. Dr. Collins' testimony refers frequently to the model runs run by Mr. Unger and there's pages in the exhibit of Mr. Unger's testimony that the Commission did not have. And I just want to make sure that to the extent that we are referring in questioning Dr. Collins, that we can refer to those exhibits even though they haven't been entered into the record. And I'm not sure about what to do about the fact that the Commission doesn't have those right now. I just want to make sure those are part of the record.

MR. PROCTOR: I don't think there's any barrier to asking him questions about an exhibit that you know will be introduced later. We can do it now if you would like, Mr. Chairman. I can do Mr. Unger as well.

COMMISSIONER CAMPBELL: Well, the problem

is is we do not have those exhibits, they are not part of Mr. Unger's testimony. And I'm stuck with trying to figure out if they are just considered as responses to data requests or if they're formal filings as part of the dockets if we do not have them.

MR. BROCKBANK: From our perspective, they were served on us as part of the testimony filing, not as part of a data request.

MR. PROCTOR: Can I try to clear it up through Dr. Collins?

COMMISSIONER CAMPBELL: Go ahead.

Q. (BY MR. PROCTOR) Dr. Collins, attached to testimony by Mr. Mike Unger, and my understanding is that Wasatch Wind retained him to provide some testimony in this matter, correct?

A. That is correct.

Q. On the testimony that was sent electronically, and he has filed only Direct January 12th, correct?

A. That is correct.

Q. There was an exhibit that's titled Exhibit 2.1 and it consists of about five to six pages, as I recall. Are you familiar with that particular testimony and the exhibits?

A. I am. But Mr. Unger is more familiar with them.

Q. Do you know whether it was intended that the electronic filing include an exhibit of one page or five?

A. I think our intent was to file the line losses associated with the PAC East system and also the attendant line losses associated with two circuits that run to the west. It wasn't our intent to include the line losses associated with the WECC, although we will address those and answer questions about those.

MR. BROCKBANK: I would object to that. They were served on the parties as part -- in the same spreadsheet as Mr. Unger's Wasatch Wind Exhibit 2.1. In my perspective, they are part of Exhibit 2.1.

MS. SCHMID: That is how the Division received them as well, attached as part of Exhibit 2.1.

MR. COLLINS: That is our intent. And I answered honestly.

Q. (BY MR. PROCTOR) Dr. Collins, are you familiar with all the pages that were included with Mr. Unger's testimony?

A. I am not very aware of what was in the WECC sheet.

Q. As you prepared your testimony, did you refer to his information?

A. I did not.

MR. PROCTOR: All right. It would seem to me, Mr. Chairman, that Dr. Collins' testimony can be admitted. And to the extent that he didn't rely on those documents or those exhibits, the question would not be appropriate.

COMMISSIONER CAMPBELL: And I would agree with that. Are there any objections to the admission of Dr. Collins' testimony?

MR. BROCKBANK: No objection.

MS. SCHMID: No objection.

COMMISSIONER CAMPBELL: All right. It's admitted.

Q. (BY MR. PROCTOR) Dr. Collins, do you have a brief summary, or would you like, in the interests of time, go directly to cross-examination?

A. That's up to the Commission.

COMMISSIONER CAMPBELL: I don't mind a summary if you can keep it within a couple of minutes.

MR. COLLINS: Okay. This docket will

decide whether Wasatch Wind, an 18.9-megawatt wind facility located at the mouth of Spanish Fork Canyon and within a transmission constrained area, which I will call the Wasatch Front load pocket, provides to PacifiCorp's eastern control area higher avoided line losses than the proxy bank of Wolverine that's located in Idaho.

Evidence presented to the Commission in Docket 03-035-14 on method for calculating avoided transmission losses was presented. The Commission rejected the testimony for determining a method for line losses because the methods were not precise enough and it deferred decisions on line losses to a case-by-case basis.

We took the Commission's Order to heart and we pursued a method that would take all of the variables that affect line losses into account. We employed a power flow dynamic model which will look at line losses at a point in time. And what we tried to do was choose different points in time that would be representative of line losses on the system over the 20 years.

We had two sets of estimates of line losses. The first is where we take power out of Wolverine at the Goshen substation and inject it

right directly in at Spanish Fork. And then we run this model and compare it to the base case. These results were done five different times on five different categories of load conditions. Under that, every single one of them showed that Wasatch Wind's facility provided greater line losses -- or avoided greater line losses than the Wolverine.

We also took a second set of estimates where we tried to look at what sorts of generation would be backed down when Spanish Fork came online and we relied on the output of the GRID model to determine what generation would be backed out.

Now, the Commission has already accepted the GRID model as an acceptable model for determining the full avoided costs for thermal resources. So we thought this was going to be an appropriate method to determine which generator should get backed down.

And what we found is that about 80 percent of the time what was backed down was market transactions, and these market transactions occurred at Four Corners, they occurred at COBB, and they occurred at MidC.

And so what we did was we took generation that was located close to there because the operator, we felt, would be buying Wasatch Wind power, or it

would be having power come onto the system and he would have to back down some plant. And so the plant, we assumed, would be close to that market transaction hub.

And again, we ran six different models, six different runs, with and without, and we also ran six different runs, the exact same runs with and without Wolverine. And then we compared the line losses between them to get a direct comparison, all right? And in those six cases, five out of six cases showed that the power losses were less with Spanish Fork than with Wolverine, all right?

So we came to the conclusion that we are benefiting the system and, therefore, should be compensated for that benefit that we're providing to the system.

Now, two other methods have been suggested by the parties and one is just the distance from the interconnect to the substation and the other tries to measure the interconnection to the actual load. Both of these methods are incomplete. Both of them testified to the fact that this -- their methods are incomplete.

To conclude, Wasatch Wind has gone to great lengths and expense to try to develop and

engage the best tools that were available. We really would have preferred to have the Company's model and we asked the Company to run those. And I guess I should have issued a motion to compel. But, you know, we were operating, we were trying to get along, and I didn't. And in hindsight, I should have.

But I believe that the best way to measure this would be to use the Company's model and look not just at the line losses associated with the local area, but look at the line losses associated with the entire PacifiCorp system. And I believe we did that. We didn't have the granularity at the lower levels, but we did run a test case in which we -- and Mike Unger can testify to this -- but he presented -- well, it's in my testimony so I'll talk about it.

But we did do some basic calculations of what the line loss would be from Spanish Fork to one of the furthest load distances, and that was Santaquin. And we calculated, much like Dr. Abdulle calculated it, and we found that it was only 1.1 or 1.4 percent line losses. But that is incomplete in that you're only looking at line losses associated with delivering that power, you're not associating line losses of what got backed down. And so that number would be less.

And so, you know, we calculate like 4.4 percent line loss reductions from Spanish Fork on the higher end transmission level and at the lower end we calculate only 1.4 percent loss. But again, that is an incomplete analysis. When the Company presented their analysis of the lower losses they were miniscule, all right, very small. And so I think that if you take the evidence presented in this case you're going to conclude that based on the preponderance of evidence that Wasatch Wind will provide system benefits to the ratepayers and, therefore, should be compensated for them.

MR. PROCTOR: Thank you, Dr. Collins.

Dr. Collins is available for cross-examination.

COMMISSIONER CAMPBELL: Mr. Brockbank.

MR. BROCKBANK: Thank you.

CROSS-EXAMINATION

BY MR. BROCKBANK:

Q. Dr. Collins, it's been a long afternoon.

A. Yes.

Q. And it's just beginning.

You asked Dr. Abdulle whether as an economist he was a transmission expert. Do you consider yourself an expert on transmission issues?

A. On the engineering part, no. But in my past career as a staff member of the Commission, I went to dozens and dozens of transmission meetings, Indigo, and there were -- on transmission pricing. So I am aware of what the economic issues are regarding transmission.

Q. Okay. I've got here something that I would like to pass out. I am not going to introduce this as an exhibit, it's already on the record. This is a Petition For Delay -- a Petition for Delay and Request for a Technical Conference and Rescheduling of Proceedings. The caption has the date as July 14, 2006, but below it has a date of August 16, 2006. I believe the correct date is August 16, 2006 that it was filed, just for the record. And I'm going to refer to this but, again, it doesn't need to be introduced as an exhibit, if I may approach.

Dr. Collins, are you familiar with this document?

A. Yes.

Q. You filed this before the Commission on August 16, 2006, correct?

A. That is correct.

Q. Can you please look -- the pages are not numbered, so if you'll go into the third page at the

bottom on line 22, I have bracketed some language beginning "We contacted local" and it ends on the next page at line 5 where there's a closed bracket. Would you please read that into the record?

A. "We contacted local consulting and engineering firms about representing us in this proceeding. Our contacts within these organizations were initially very interested in doing the analysis. They appeared to be perfect candidates as they had substantial experience working with PacifiCorp's transmission system, their initial analysis indicated the possibility of substantial line loss savings to the Company from the purchase of energy from our facility."

Q. The portion of this that I want to focus on is where you state to the Commission in this pleading that "their initial analysis indicated the possibility of substantial line loss savings to the Company from the purchase of energy from our facility."

Do you recall having said -- do you recall writing that and submitting that and such?

A. Yes.

Q. Do you recall that Rocky Mountain Power asked you in a Data Request 1.1 to provide the names

of those consultants and whatever initial analyses that had indicated the possibility of substantial line loss savings to the Company?

A. Yes.

Q. And what was your answer?

A. I don't have it here, but I think we refused to provide those names.

Q. I'm going to read your response.

"Answer: Wasatch Wind objects to this request as onerous, unduly burdensome and irrelevant. Wasatch Wind considers the information requested as confidential and privileged. Disclosure of this information is unnecessary to the resolution of the case and not reasonably calculated to lead to the discovery of admissible evidence."

And I'm going to refer again to what you wrote. You wrote that you had contacted possible engineering companies to represent you and "their initial analysis indicated the possibility of substantial line loss savings to the Company."

How is that not relevant?

A. Well, I think the results are relevant. But why is it relevant? I haven't presented their testimony, their evidence on the record. Why is it relevant who did that?

Q. You're not asking the questions. The reason that it's relevant, I'll answer it anyway, is because you stated it in a Commission pleading, that initial analyses from consultants had showed substantial line loss savings, the possibility of substantial line loss savings. That's why it's irrelevant.

Was there ever initial analyses by consultants?

A. Yes.

Q. Who were the consultants that provided the analysis?

A. I would rather not put that on the public record. If we want to go in camera. But I was asked specifically by one individual. He said, "You know, I'll probably get in trouble for this, but I'll run a power flow model." And he came back the next day with the results and said, "You know, it looks like you guys have a case." I said, "Well, great. We would like to hire you."

"Well, let me get back. I have to talk to my boss."

Two days later he talks to his boss and says, "You know, we're not getting involved. And, you know, I would rather you not tell -- you know, I

don't want to get in trouble."

Q. I don't want you to breach confidences, but I also don't want you to act fast and loose with statements in Commission pleadings that there are analyses that have been conducted to support your position when you're not going to provide those analyses.

MR. PROCTOR: Well, Mr. Chairman, I have to object to that on the grounds that it's argumentative. And in addition, one of the things that probably Dr. Collins hasn't explored, because he's not trained to, there's a difference between an expert retained to provide assistance to the client or counsel in preparing a case and one who is designated to testify. And these witnesses may not have been retained to testify. And so the initial contact would be merely to assist Dr. Collins in preparing his case.

His objection probably was not stated as it should have been under the rules, but it may very well have been an appropriate objection. I hate to cut it off. I think there are far more important things to deal with today.

MR. BROCKBANK: I'm just trying to make the point that Dr. Collins says that experts have

indicated that there is a substantial likelihood that line loss savings with their project and he won't tell us anything about it.

COMMISSIONER CAMPBELL: Okay. It's not sworn testimony so --

MR. BROCKBANK: I understand. I just want to get for the record that there is basically no analysis on the record, notwithstanding what his pleading says.

COMMISSIONER CAMPBELL: That this analysis is not on the record?

MR. BROCKBANK: Correct.

COMMISSIONER CAMPBELL: We understand that. Please go to your next question.

Q. (BY MR. BROCKBANK) Dr. Collins, I would like to discuss generally some of these modeling issues. To the extent that I'm asking you a question that is more appropriate for Mr. Unger, please let me know and I'll reserve the question for Mr. Unger because I wasn't quite sure where the separation was. So please just let me know and I can reserve whatever questions you would like for him.

In Docket Number 03-035-14, the Commission issued an order addressing the subject of avoided line loss adjustments for qualifying facilities. The

order is dated April 19, 2006. I would like to just read something, this is a Commission Order. I have copies if anyone would like it, but it's a Commission Order so it doesn't need to be introduced, I believe.

"We take administrative note of the more recent 2001 transmission line loss study that was completed using the Commission-approved method. We note that high voltage transmission line loss factors is nearly unchanged since the 1991 study, despite the addition of the Cholla, Craig, Haden, Hermiston and Gadsby Power Plants. This fact underscores Company testimony in this case stating that one project is not going to make a big difference in system line losses. It also calls into the question the propriety of the plant-by-plant methods proposed in this case."

Do you know, Dr. Collins, how many collective megawatts the Cholla, Craig, Haden, Hermiston and Gadsby power plants added to the GRID?

A. An exact number, no.

Q. Would you accept, subject to check, that it was approximately 2,800 megawatts?

A. I'll accept that.

Q. If the addition of these five new thermal plants resulted in the high voltage transmission line

energy loss factor being, quote, "nearly unchanged," end quote, do you expect that the addition of your 19.8 megawatt intermittent wind project will change the energy loss factor in any meaningful way?

A. I do.

Q. At a minimum, wouldn't you agree that you have a pretty steep burden to justify that Utah ratepayers should pay for this extra line loss savings that you're purporting exists?

A. I think that the Commission should make their decision based on the preponderance of the evidence on the record.

Q. Let's look at your Direct Testimony.

A. If I may just make a comment about the 2001 transmission line loss study. I'm not exactly sure exactly how that was done, but they're measuring, I would imagine, just average line losses. So it doesn't surprise me that with the addition of plants located all over PacifiCorp's system that average line losses wouldn't change very much. I mean, that's quite possible. What we analyzed is the incremental line losses associated with a particular plant.

Now, if the 2001 transmission study had analyzed what the impact of Cholla -- or what were

some of the others -- other plants, they would have, I would imagine, have found substantially different results.

Q. Let's look at your Direct Testimony on page 8 beginning on line 6. You describe a number of model runs using various WECC-based case models.

A. Page --

Q. Page 8, beginning on line 6. Do you see where I'm at?

A. I do.

Q. On line 10 of your testimony you reference various assumptions about loads and load resources. What assumptions did you make to make these model runs?

A. We chose different years, different load conditions and different times of the year to get an idea -- we're getting snapshots, points in time. We tried to get a representative snapshot to give some idea of what the line losses would be associated with Spanish Fork comparing them to line losses associated with Wolverine.

Q. Isn't the essence of your WECC-based power flow studies that they essentially attempt to calculate line losses or line savings associated with the Spanish Fork Wind project for the entire 100

million kilowatt system, western United States system?

A. No, that's an incorrect statement.

Q. Let's look at --

MR. BROCKBANK: Well, Mr. Chairman, this is the difficult part now. Dr. Collins' testimony is referring to Mr. Unger's Exhibit 2.1 and all six pages in it, and I didn't bring copies to introduce this because it was served on us as part of the testimony. In order for me to dig into these exhibits and to what Dr. Collins has just stated, that he doesn't -- that these aren't going into the western United States model, it's going to make it very difficult to look at this.

A. Well, maybe I'll revise my statement. We --

MR. BROCKBANK: Well, excuse me. But it still highlights the issue of these missing documents. I would move their admission as my own exhibit, I just didn't make copies and I didn't think I needed to.

COMMISSIONER CAMPBELL: Early on I thought Dr. Collins testified that he didn't rely on these WECC, the WECC system exhibits, that he focused just on the PacifiCorp East system. So insofar as you

have questions related to the WECC system, maybe those need to be deferred to Mr. Unger. I mean, that's just my recollection, is that you did not rely, at least when Mr. Proctor was asking you questions --

MR. COLLINS: Maybe I can straighten this out a little bit in that the model incorporates the system, all right, but we tried in some ways to isolate it and look, I believe, just at the PAC East, PacifiCorp East system. We did open up two circuits to the west because it is interconnected, all right? But it isn't -- it's going to operate as a system, all right? So it's a system model, but we focused our analysis on the line losses associated with PAC East.

MR. BROCKBANK: Mr. Chairman, I understand that Mr. Collins answered the question that they focused on this particular exhibit. However, it seems very convenient to me that in Mr. Clements' testimony he addressed issues relating to these other pages in the exhibit and their lack of being included in the averages, he mentioned some of the averages associated with those exhibits, and now Dr. Collins is stating those weren't ever intended to be in the analysis after all. That's my concern.

COMMISSIONER CAMPBELL: But he also stated that they intended to file these.

MR. BROCKBANK: He did.

COMMISSIONER CAMPBELL: My understanding is that they weren't part of your analysis, but the intent of your party was to file these spreadsheets, at least that's what I thought you said earlier.

MR. COLLINS: I'm not certain we were intending to file the WECC. I mean, it was included with a part of the analysis looking at line losses for the entire system, but at that point we didn't think that it would be as accurate or as relevant. We're concerned about what kind of benefits Wasatch Wind's facility is going to have not on the entire WECC system, but on PacifiCorp's system.

COMMISSIONER CAMPBELL: Mr. Proctor?

MR. PROCTOR: Dr. Collins, just a second. They are on the record, at least filed electronically, which means they are there filed in Dr. Unger, Mr. Unger's testimony. Mr. Brockbank can ask questions about the exhibit and he either says "I don't know" or "I'm not familiar with that." I mean, he can do that. And ultimately the inconsistency between his testimony and his answer here today can certainly be pointed out.

COMMISSIONER CAMPBELL: Okay. We'll allow you to go ahead and ask questions about their WECC exhibits. I think it's clear to the Commission that their focus was on the PAC East system, for the reasons he stated before. So I guess you'll still have to analyze how much time you want to go down this path when they didn't rely on the WECC system analysis.

MR. BROCKBANK: Sure. Understood. And I will do that.

Q. (BY MR. BROCKBANK) Okay. Dr. Collins, in your testimony along those lines, you referenced the GRID model, and this is on page 9 of your Direct Testimony, lines 11 and 12, you referenced the California/Oregon border, the mid Columbia, Four Corners, you represent some of these other delivery points. Do you see where I'm referring to?

A. That's correct.

Q. If you were only using and referring to the PAC East system, how do you use COBB, Cholla, MidC, et cetera?

A. These are where the transactions took place according to the GRID model.

Q. Isn't it --

A. And so we, if the transactions take place

in these hubs, we're going to have to take into account those hubs. And the whole system is interconnected.

Q. Isn't it true, though, that COBB, Cholla and MidC are not in PacifiCorp's PAC East system?

A. That's correct. They're interconnected with our system.

Q. On page 8, we're on page 8 of your testimony, lines 14 and 15, you state that "The models provide a snapshot of the conditions on the system and how changes and resources can affect the system in attendant line losses." Do you see where I'm referring to?

A. That's correct.

Q. In your testimony you acknowledge, then, that these models provide a snapshot of the conditions on the system, how the changes and resources can affect the system and attendant line losses.

Given that the WECC model that is attached to Mr. Unger's Exhibit 2.1, given that that WECC model represents simply a snapshot in time -- well, let me strike that. Let me rephrase the question.

Isn't it true that the WECC models that were employed, the results of which are in Mr.

Unger's Exhibit 2.1, that those models were developed in order to test the limits and the robustness of electric GRID, taking into account the addition of new generation resources and new loads?

A. The models themselves?

Q. The WECC models.

A. Yes.

Q. Given that, given that the WECC models simply represent a snapshot in time, isn't it true that the WECC model without significant changes and assumptions is not a useful tool for predicting line losses?

A. No, I wouldn't agree with that statement.

Q. Why not?

A. It's a useful tool because it provides us some information of what the impacts are on the system and provides estimates of line losses for the PAC East system. Does it capture every single line? No. We didn't have access to that. We don't have access to that information. We had a limited amount of resources, a limited amount of money, and we did the best that we could with that. And we provided the most detailed analysis presented on this case so far, in my opinion.

Q. And based on that limited amount of

information, do you expect the Utah ratepayers to foot the bill for $2 million of line loss reduction payments?

A. I think that we've presented evidence that we are going to provide substantial line loss reductions and that the Commission is going to have to make their decision based on the preponderance of the evidence.

Q. Let's go back to some of the assumptions that you made in reviewing the WECC models. Did you freeze -- and if these are appropriate for Mr. Unger, that's fine, just let me know. Did you freeze the transformers and the capacitors and the reactors from the changing taps?

A. You'll have to ask Mr. Unger that question.

Q. Okay. We'll come to that one with Mr. Unger.

Isn't it true that the model runs that were conducted in Exhibit 2.1 vary from a positive 5.79 line loss to a negative 21.05 line loss adjustment?

A. Could you show me that data? I'm not aware of that.

Q. This is the Exhibit 2.1 that was filed

electronically with Mr. Unger's testimony. I would certainly be happy to give you Mr. Clements' copy of that. And to the extent that we continue tomorrow, Mr. Chairman, we will bring copies of Mr. Unger's exhibit.

COMMISSIONER CAMPBELL: We will not be in tomorrow so we'll have to discuss when we continue this if we don't finish.

MR. BROCKBANK: Okay. May I approach the witness?

COMMISSIONER CAMPBELL: Go ahead.

MR. BROCKBANK: I'm sorry.

COMMISSIONER BOYER: Mr. Brockbank, I don't know if it was clear what I just said, but we do have copies now of those additional pages.

COMMISSIONER CAMPBELL: Although I'm not sure because people are talking about six pages and we only have four. So I'm not sure if we have got exactly what everyone is talking about.

MS. SCHMID: It may depend on, I think, if it was printed landscape or portrait, perhaps.

MR. BROCKBANK: I think that's correct.

Q. (BY MR. BROCKBANK) I will look at the worksheet that is labeled at the top "Loss Analysis, WECC System." And at the bottom it says "Elcon

Associates, Inc., 2/21/2007, 10:13 a.m." I don't know if that's my print date or not. I'm thinking that's the date it was printed.

Do you see what I'm referring to, Dr. Collins?

A. I do see the first page, yeah.

Q. Okay. Let's look down one, two, three, four, five, six lines down on the right-hand column, the Percentage Change column. That represents the WECC, Heavy Summer 2010 model run. Doesn't that say negative 21.05 percent change?

A. It does.

Q. And would that represent the percent change in line losses with the addition of your facility?

A. That's what it would indicate. That looks to be a outlier.

Q. Let's look at -- there's one that isn't. Go down one, two, three more rows on that where it says 5.9, positive 5.9, WECC 5.79. WECC Heavy Winter, 2011, 5.79. Do you see that?

A. I do.

Q. And that would indicate that with the addition of the Spanish Fork project that losses would increase 5.79 percent. Is that correct?

A. That is correct. But that also is a partial analysis. We would have to compare that 5.79 percent with what the line losses associated with Wolverine for the WECC Heavy Winter 2011 condition.

Q. Right here we see that your WECC analysis swings from a negative 21 percent savings to a positive 5.79 percent savings; is that correct?

A. That is estimating it on the entire WECC system. And as you expand your analysis, I would suspect that your degree of certainty declines. So on the WECC basis, you know, I would be more suspect of these numbers than on the PAC East system versus the local system.

Q. Why didn't Spanish Fork Wind include these 21, negative 21 percent and this positive 5.79 percent loss percent change in your recommendation?

A. Because it's not relevant. And the reason it's not relevant is that this Commission is not basing a decision on whether they should increase or decrease our contract price based on how we are going to affect the entire WECC system. We're concerned about Utah Power, PacifiCorp ratepayers.

Q. And so are we. I'm struggling with why these are in your exhibit, however. I don't think they're relevant either.

A. Well, like I said, they were -- I didn't intend to file them.

Q. Don't the results of this model run show precisely the fact that loss results can swing widely depending on what assumptions you make?

A. It shows that when you're estimating for the WECC system, the entire system, that there can be large variations. Well, I wouldn't even say that. You have one outlier, that minus 21, and then you have in between four and five, six percent.

Q. Well, let's look at that. One outlier. Let's take the negative 21 percent outlier away. You've got negative 4 percent, you've got positive 1, I'm just reading down the right-hand column here, negative 2.11, positive 5.79 down at the bottom, three from the bottom, positive 4.21 percent. These are still significant percentage changes, aren't they?

A. You mean differences in the percentage changes?

Q. Yes.

A. You know, they vary.

Q. Dr. Collins, are you aware that the WECC model only represents the bulk backbone transmission system, generally the 138 kV and above?

A. I would refer that question to Mr. Unger.

Q. Okay. I'll just make a note of that so I don't forget to ask Mr. Unger.

Let's look at your Surrebuttal Testimony on page 3, lines 16 through 19. Please let me know when you're there and you've had a chance to review that. I might be wrong on my numbers. 17 is blank. Bear with me one minute. Sorry, I'm looking at the Rebuttal Testimony, I apologize. The citation was correct, so you all were in the right place, I just wasn't.

So page 3, lines 16 through 19. Do you see that, Dr. Collins?

A. I do.

Q. Here you state that in making the comparison of the two projects you inject 19 megawatts of power into the Spanish Fork substation, which is 1.2 miles away from the project. Do you see that?

A. I do.

Q. Okay. Are you aware that in order for those 19 megawatts of load to be consumed, the power may have to flow upwards of 25 miles into four different substations depending on what the current load characteristics are?

A. I'm aware that the power will flow where it's going to flow and it's going to take the path of least resistance.

Q. But my question was, are you aware that in order for -- your power is not 1.2 miles away. The power that is going to be consumed is possibly upwards of 25 miles away, not the 1.2 miles away that you state in your testimony, which is all going to be subject to losses. Do you see what I'm referring to?

A. I see what -- yes, there is the possibility that it's going to have to travel 25 miles, I guess. I'm taking your word for it, not mine. But my question is, how often is that going to happen? That's going to happen when we're producing at full capacity. And we're probably -- that's not going to happen with regularity.

Q. Let's go back to your Direct Testimony. I may skip that point and do everybody a favor.

COMMISSIONER CAMPBELL: Thank you.

Q. (BY MR. BROCKBANK) Let's go back to your Direct Testimony for another point. Page 11 of your Direct Testimony. On page 11, this is where you begin starting at the top for several lines, approximately lines 1 through 10, this is where you recommend a simplified alternative in paying any

qualifying facility located within the transmission bubble to get a line loss credit at the FERC's open access transmission tariff transmission rate; is that correct

A. That is correct.

Q. Yet you criticize Mr. Clements for proposing, quote, "an even more simplistic method than the Division," end quote, in your Rebuttal Testimony on page 3, line 21.

A. That's correct.

Q. How is it, Dr. Collins, that Mr. Clements', quote, "simplistic method" based on a comparison with the proxy resource is not credible, yet your simplified alternative is a fabulous idea even though it is tied to the FERC open access tariff rate that does not address the specific characteristics of your project?

A. Well, let me first state that Mr. Clements' model doesn't take into account -- it takes into account just one variable. And because it only takes into account one variable, I view it as deficient. And given that he chose this method for this particular case, and only this case, perhaps, a method that there would be no possibility for a QF to earn transmission line losses, I view that as

suspect.

Q. Okay. In your proposal --

A. And let me -- I would like to address my proposal, and the reason I suggested this.

Q. Well, I didn't ask you about your proposal.

A. Yes, you did. You mentioned it.

Q. Let me rephrase the question then. Why is your simplified proposal, and perhaps you can elaborate here, merited when Mr. Clements' isn't? So please.

A. Yes, that's what I wanted to address. My simplified method is merited because it takes into account not just line losses, but the benefits associated with being located within the load bubble. And I probably didn't -- this is a line loss study, but really testimony of all the parties have suggested that QFs should get compensated if they provide benefits when compared to the proxy resource.

And there is, in my view, a fundamental benefit that has been ignored in this case that might be brought up in another case, the fact that we are located right inside the load bubble. And we are going to provide -- when we are producing power, we're producing power in that bubble, it's going to

free up transmission that we can import additional power into the region. And so that's a real benefit because we can look for cheaper power if it's outside.

Now, so I thought I had a nice eloquent way of, you know, if you're inside the bubble and the proxy is not inside a constrained bubble then you get line losses. And how do you get line losses? Well, the easiest way to calculate it would at the FERC OAK rate, all right? If you're outside the load bubble you don't get line losses. And it would be a clean and simple way and you guys wouldn't have to sit through a case-by-case analysis for every single QF that wants to increase their rate so they can get their project up and running.

And precisely that is one of the reasons that we have pursued this is that we need the extra money in order to get our project up and running. We expect that we will do it regardless, but this certainly would help.

Q. And is that something that the Commission should take into consideration, whether this will get your project up and running?

A. They should take a view, in my opinion, of will Wasatch Wind as a QF provide benefits to the

ratepayer. Now, I would compare it not to the proxy if I was making the decisions, I would be comparing it to what the alternative is. And so if there's another resource out there, a wind resource that is going to come on line higher and then I deny Wasatch Wind, I would figure I made a bad decision.

Q. That's not what's at issue here today, is it?

A. No. But that was the question you asked me.

Q. Your proposal includes the power flow studies that compare power flow to other of your projects to some other thermal resources, and I think those other thermal resources are the Shasta Plant in California, the Cholla Plant in Arizona, and the Rocky Reach Plant in Washington State; is that correct?

A. That is correct.

Q. You state that those projects, those plants are representative of other units or market purchases that are avoided by using the GRID model; is that correct?

A. We use the GRID model to locate what the GRID model said was going to get backed down when Wasatch Wind was producing power.

Q. Would you be willing to accept a price for the power under your Power Purchase Agreement that is calculated using the GRID model?

A. No, I would not.

Q. If that's the case, shouldn't your price be based on GRID if you're basing your losses on GRID?

A. No. No. We use a proxy method. That's -- that is what the Commission has adopted, a proxy method for wind. I am using a proxy method to determine and compare the characteristics of our facility with the characteristics of Wolverine.

Q. Isn't it true that you're using a proxy method as ordered by the Commission to receive the power purchased, but you're seeking to use the GRID model to get your line losses payment a little higher, aren't you?

A. I used the GRID model for one purpose only. I use that to identify what trans -- what generation I need to back down. In order to run these power flow models, you know, if you're injecting power in at Spanish Fork, you've got to back it off somewhere because otherwise the system won't balance.

So I am using the GRID model to identify

what are the economic generators that get backed down, all right? And I do that for Spanish Fork and I do that for Wolverine and then I compare the two differences. So I am not using the GRID model to determine the line losses. I'm just using it as one component to identify the necessary generation that needs to be backed down.

Q. Okay. I want to go back to Exhibit 2.1 that --

COMMISSIONER CAMPBELL: Can you give me an approximate time so I can make a judgment whether we continue tonight or whether we should just schedule another time to finish this up?

MR. BROCKBANK: I've got some questions -- can I consult with my two witnesses off the record?

COMMISSIONER CAMPBELL: Let's go off the record.

(Recess taken.)

COMMISSIONER CAMPBELL: Let's go back on the record. What does it look like?

MR. BROCKBANK: We're hoping to have another couple of hours.

COMMISSIONER CAMPBELL: We will adjourn and we will ask you to meet with Julie Orchard and schedule another hearing time. Thank you.

(The taking of the deposition was concluded at 5:20 p.m.)

C E R T I F I C A T E

STATE OF UTAH)
: ss.
COUNTY OF SALT LAKE)

I, LANETTE SHINDURLING, a Registered Professional Reporter, Certified Realtime Reporter and Notary Public in and for the State of Utah, residing at Salt Lake City, Utah hereby certify;

That the foregoing proceeding was taken before me at the time and place herein set forth, and was taken down by me in stenotype and thereafter transcribed into typewriting;

That pages 1 through 149, contain a full, true and correct transcription of my stenotype notes so taken.

I further certify that I am not of kin or otherwise associated with any of the parties to said cause of action, and that I am not interested in the event thereof.

WITNESS MY HAND and official seal at Salt Lake City, Utah, this 16th day of March, 2007.

_____

LANETTE SHINDURLING, RPR, CRR
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