

BEFORE THE  
FLORIDA PUBLIC SERVICE COMMISSION

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In the Matter of : DOCKET NO. 980696-TP  
: :  
Determination of the cost of :  
basic local telecommunications :  
service, pursuant to Section :  
Section 364.025, Florida :  
Statutes. :  
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VOLUME 14

Pages 1545 through 1624

PROCEEDINGS:

HEARING

BEFORE:

CHAIRMAN JULIA L. JOHNSON  
COMMISSIONER J. TERRY DEASON  
COMMISSIONER SUSAN F. CLARK  
COMMISSIONER JOE GARCIA  
COMMISSIONER E. LEON JACOBS, JR.

DATE:

Wednesday, October 14, 1998

TIME:

Commenced at 9:00 a.m.

PLACE:

Betty Easley Conference Center  
Room 148  
4075 Esplanade Way  
Tallahassee, Florida

REPORTED BY:

MARY ALLEN NEEL, RPR

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APPEARANCES: (As heretofore noted.)

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Volume 13.)

Q (By Mr. Lamoureux) Let me just follow up  
one question to that. The square that you just  
mentioned, that's this road reduced distribution area;  
right?

A Yes.

Q Okay. Now, am I correct that the algorithm  
for how BCPM lays plant is that it goes horizontal  
first, then vertical?

A Usually, yes. You can work with that.

Q Well, I want to ask you a question about  
something you mentioned, which is unpopulated  
quadrants. I want to assume the wire center is down  
here, and the ultimate grid is up here. Okay?

A Okay.

Q And let's say it has got these four  
quadrants, and the only one that's populated is this  
bottom right quadrant. Okay? So I'll put the road  
reduced distribution area in there.

The way plant would be laid in this example  
is, it would go horizontal from the wire center first;  
right? I mean -- yes, horizontal, then vertical up to  
the quadrant, and then it would have to go horizontal

1 again and then vertical back down to the road reduced  
2 distribution area?

3 A No. I'm afraid you've confused feeder  
4 plant and distribution plant. The first two lines  
5 that you drew would be feeder. Okay?

6 Q Okay.

7 A As I showed in my presentation two days  
8 ago, it may be that the feeder goes straight, or it  
9 may be that the feeder tilts. It depends on what  
10 other ultimate grids are up there north and west of  
11 that grid. It depends on where the feeder is being  
12 steered or not as to whether it goes at an angle or  
13 whether it goes rectilinearly. It also depends --  
14 that might not even be fed by feeder. It might be fed  
15 by subfeeder, and subfeeder can angle off at different  
16 angles, again depending on what's most efficient.

17 Q So if there's another ultimate grid next  
18 door --

19 A And above?

20 Q And above.

21 A Yes.

22 Q Okay. You're saying that the cable could  
23 first be run from the wire center into another  
24 microgrid -- I mean into another ultimate grid, and  
25 then cable be run from that ultimate grid into this

1 built.

2 If it works that most people are up here,  
3 we want to get directly to the most people. We'll go  
4 straight up and then build subfeeder over. It  
5 completely depends on the layout of population in this  
6 wire center, which I may point out, is very different  
7 from your model.

8 Q But in no event, though, will --

9 COMMISSIONER DEASON: Excuse me. Let me  
10 ask one question.

11 MR. LAMOUREUX: Sure.

12 COMMISSIONER DEASON: Does the model do --  
13 the model has within it the functionality to make that  
14 determination, or is there engineering judgment  
15 involved?

16 THE WITNESS: There is engineering judgment  
17 involved, and that has actually been determined,  
18 whether it steers or whether it goes, in the  
19 preprocessing.

20 Now, to the extent that we would want to  
21 change that, it would actually make a lot of sense if  
22 we wanted to change that if Florida-specific  
23 information were known with regard to the population  
24 distribution. And as I showed you in those pictures,  
25 you can see where our feeder is going. If you see it

1 angles, but you say, "Hey, no, we know the people are  
2 over here," we can change that in the preprocessing  
3 and do it, but right now it's already done.

4 MR. LAMOUREUX: The first --

5 COMMISSIONER DEASON: Let me follow up.

6 MR. LAMOUREUX: Sure.

7 COMMISSIONER DEASON: During the  
8 preprocessing, is there an engineer that actually  
9 looks at what is produced to see if it's rational from  
10 an engineering viewpoint?

11 THE WITNESS: Yes, absolutely. We have two  
12 specific engineers, Jim Schaaf, S-c-h-a-a-f, and Jim  
13 Dunbar. Dunbar is a Sprint guy, and Schaaf is a  
14 Pack-Bell guy. They're both outside plant engineer  
15 types. They look at how the feeder is laid out, given  
16 the population distributions in the ultimate grids.  
17 And they have determined that when you've got nobody  
18 in the middle and people over here at a certain angle,  
19 it makes sense to steer it, and at a certain  
20 percentage of the population, it makes sense to steer  
21 it. They put together that algorithm that's used for  
22 the results here in Florida.

23 COMMISSIONER CLARK: I'm sorry. I still  
24 don't understand.

25 THE WITNESS: Okay.

1                   COMMISSIONER CLARK: Commissioner Deason  
2 asked you if it was an engineering judgment or the  
3 model did it. What's your answer to that?

4                   THE WITNESS: The answer -- I apologize if  
5 it wasn't clear. It is engineering judgment that has  
6 already been done. It can be changed, but it has  
7 already been done.

8                   COMMISSIONER CLARK: When you say it has  
9 already been done, do you mean it's in the model?

10                  THE WITNESS: I mean it was done in the  
11 preprocessing and it's in the model.

12                  I don't mean to be confusing. I'm not sure  
13 what you are asking.

14                  COMMISSIONER CLARK: Well, I took it to  
15 mean that when you have the situation described on the  
16 board there, and you indicated that the feeder line or  
17 whatever, the thing coming out of the central office  
18 will angle because of population. Does somebody look  
19 at that in advance, and does some -- it changes the  
20 inputs into the model, or do they simply take what the  
21 population is indicated by the grids, put that in the  
22 model, and the model takes care of it?

23                  THE WITNESS: No. It was looked at in  
24 advance. It was decided ahead of time that this  
25 feeder would go at an angle, because looking at all

1 the grids as they get laid out, we know the population  
2 is up here at an angle. So it was decided ahead of  
3 time. And when you look at the inputs to the model,  
4 that input will reflect in terms of the length of the  
5 feeder that it was tilted and not built rectilinearly.

6 COMMISSIONER CLARK: Let me ask it another  
7 way. Perhaps what you're saying is that -- when you  
8 say it was decided ahead of time, you're saying when  
9 the population from a wire center is up here at an  
10 angle, you will input it in such a way that the model  
11 will take into account the fact that it's up here, but  
12 you have to look at it before you input it.

13 THE WITNESS: Yes, and we did. Yes.

14 COMMISSIONER CLARK: All right.

15 COMMISSIONER DEASON: But when you actually  
16 -- in real life, when you get ready to lay that cable,  
17 assuming you're building a whole new network, it's  
18 going to be -- you obviously have to have a right of  
19 way or easement or something. You've got to follow  
20 roads. So just that straight angle may -- the actual  
21 length to get to that population center is probably  
22 going to be greater than the actual direct angle. How  
23 do you compensation, or do you compensate for that?

24 THE WITNESS: That's certainly possible.  
25 And if I can refer you back to that picture that I had



1 of Pompano Park, Pompano Beach -- I forgot the second  
2 word. Pompano Park, that was part of my presentation,  
3 the layout of the -- I don't know if you have that,  
4 sir.

5 COMMISSIONER GARCIA: Which one is that?

6 THE WITNESS: Which --

7 COMMISSIONER GARCIA: Which page?

8 THE WITNESS: Page 17.

9 COMMISSIONER GARCIA: Seventeen?

10 THE WITNESS: I've got it right up here  
11 too. Actually, even -- okay. We know that that's the  
12 layout of the wire center. Okay? And we know -- I'm  
13 sorry.

14 (Mr. Rehwinkel distributes documents to the  
15 Commissioners.)

16 THE WITNESS: We know that's the shape. We  
17 know that we have to keep the feeder inside the land  
18 area of that wire center. So it makes sense to tilt  
19 it, especially if you look at the next page and you  
20 see where all the roads are in Pompano Park, and  
21 they're all up there in that northwest corner.

22 COMMISSIONER DEASON: I'm sorry. What is  
23 this supposed to show me? That you do follow roads,  
24 or that --

25 THE WITNESS: It's supposed to show that we

1 don't go outside the wire center boundary, and it's  
2 supposed to show that if we were building this feeder  
3 from scratch in the most efficient way, we would steer  
4 it right toward where the most people are. That is  
5 the done in the model. It's a pretty neat device.  
6 This is just an example of doing that.

7 COMMISSIONER CLARK: Well, the question is,  
8 does it or does it not follow roads?

9 THE WITNESS: The feeder? It is not  
10 necessarily supposed to follow roads, given the FCC's  
11 criteria. Feeder is supposed to be laid out in  
12 however you define the most efficient way. That may  
13 or may not follow roads.

14 And I agree, that isn't necessarily  
15 realistic. To the extent that's not realistic, that's  
16 one case where the Florida Commission may have a  
17 different opinion than the FCC, and I understand. And  
18 as I said, we can adjust. The FCC wants it to be laid  
19 out in the most efficient way possible.

20 COMMISSIONER DEASON: But that methodology  
21 then would have a tendency to keep costs lower than  
22 they otherwise would be?

23 THE WITNESS: It would, because what you're  
24 doing is, you're maximizing the shared portion of the  
25 network. Feeder being shared by the majority or the

1 maximum number of people up there in the corner of  
2 Pompano Park, that's what you want to do.

3 Q (By Mr. Lamoureux) I just want to be clear  
4 about one thing. When you were talking about -- I'm  
5 sorry.

6 COMMISSIONER CLARK: Keep talking. Turn it  
7 on and keep talking.

8 Q (By Mr. Lamoureux) When you were talking  
9 about the Hatfield Model, you drew a distinction  
10 between what goes on in the preprocessing and what  
11 goes on in the model; right?

12 A Yes, sir.

13 Q So the determination in BCPM of whether  
14 this cable -- whether this path goes straight,  
15 horizontal and vertical, or whether it goes diagonal,  
16 that's done in the preprocessing?

17 A The determination is, yes. Now, whether or  
18 not it's used as opposed to using the locations, this  
19 is certainly used in our model, where the locations  
20 aren't used in yours.

21 Q But the determination is done in the  
22 preprocessing of BCPM?

23 A Yes, it is.

24 Q It's not done in the model?

25 A Right. If we were to do that in the model,

1 it wouldn't fit on any computer that the Staff has.

2 Q Now, in any event, whether it goes  
3 horizontal and vertical or diagonal, the first point  
4 of entry into an ultimate grid is the center of the  
5 ultimate grid; correct?

6 A Okay. The first point of entry -- I don't  
7 think you meant first point of entry. Did you mean  
8 the point at which the feeder connects to the  
9 distribution center?

10 Q Yes, yes.

11 A That is at the road centroid of the  
12 ultimate grid, which may or may not be the  
13 center.

14 Q Okay. And then from that road centroid, it  
15 will go horizontal and then vertical to get to the  
16 centroid of the road reduced distribution area?

17 A That's correct.

18 Q So even if it goes diagonal, there's still  
19 going to have to be some backtracking horizontally and  
20 vertically to get into centroid of this road reduced  
21 distribution area?

22 A Well, the way you've drawn this one, there  
23 is. There doesn't necessarily have to be any  
24 backtracking at all.

25 Q Is it possible that it could go straight

1 from the wire center into the centroid of the road  
2 reduced distribution area?

3 A Are you saying does feeder -- I'm asking to  
4 make sure I understand your question. Does feeder  
5 pass by distribution areas as it goes to other  
6 places? Yes, in the real world it does, and in our  
7 model it does.

8 COMMISSIONER JACOBS: While he's getting  
9 set, could you look at the Pompano Park description  
10 again? Tell me how we get that line coming out about  
11 midway -- the box that's marked 688, I assume that's a  
12 census block marked, but I'm not certain.

13 THE WITNESS: This one?

14 COMMISSIONER JACOBS: Yes.

15 THE WITNESS: Right there?

16 COMMISSIONER JACOBS: What gets that line  
17 out of there going back down towards the other grids?

18 THE WITNESS: Okay. What happens is, in  
19 the picture you've got, the central office is located  
20 at that intersection just to the left of that line.  
21 The feeder will emanate from the central office for a  
22 little ways north, south, east, and west. And because  
23 we have to get feeder to that grid anyway, it just so  
24 happens it goes right to that grid. It's laid out  
25 that way.

1                   So that is just one of the main feeder  
2 cables leaving out of the central office at a north,  
3 south, east, direction and going right to feed that  
4 grid.

5                   COMMISSIONER JACOBS: Okay. And so the one  
6 that goes -- I assume that's east and then south  
7 again, that's going to be -- what kind of line is  
8 that, now?

9                   THE WITNESS: Feeder. That's also feeder.

10                  COMMISSIONER JACOBS: Okay. So you'll have  
11 -- that's what you're saying, is that from the central  
12 office you have feeder going -- okay.

13                  THE WITNESS: I think -- let me rephrase  
14 something and see if I have the point that you're kind  
15 of at. Instead of tilting right away, it goes a  
16 little ways and then tilts.

17                  We built that into the model because we  
18 assume the central office is basically in the center  
19 of town. From our experience, it usually is. It's  
20 efficient where you've got a lot of people to go out  
21 at the compass points. But then where people start to  
22 spread out, it may be more efficient to angle.

23                  So the way the model works, the feeder goes  
24 for 10,000 feet at the compass points, and then it  
25 will either split, not split, or tilt, not tilt,

1 depending on what's most efficient. That's why it  
2 goes out and then tilts.

3 Q (By Mr. Lamoureux) Dr. Staihr, do you know  
4 how prevalent it is in Florida where there's a  
5 situation where, because of unpopulated quadrants,  
6 there has to be some what I call backtracking of the  
7 distribution to get into the road reduced distribution  
8 area from the centroid of the ultimate grid?

9 A No, I don't.

10 Q I want to talk a little bit about your  
11 rebuttal testimony.

12 A Okay.

13 Q On page 3 -- well, starting at page 2, I  
14 guess, you talk about the Kentucky and the Louisiana  
15 proceedings?

16 A Yes, sir.

17 Q On page 3 in particular, you say that the  
18 Kentucky Public Service Commission did not have access  
19 to Sprint's ex parte filings dealing with the minimum  
20 spanning tree analysis.

21 A Yes, sir. During my deposition, you  
22 corrected me on that.

23 Q So you are aware that the Kentucky Public  
24 Service Commission had access to Sprint's ex parte  
25 filing?

1           A     I'm aware that they had access after the  
2 proceedings were concluded and that it was part of a  
3 motion for reconsideration.

4           Q     You're aware that attached to BellSouth's  
5 motion for reconsideration were Sprint's ex parte  
6 filings?

7           A     That's what you told me, yes, sir.

8           Q     Are you aware that the Kentucky Public  
9 Service Commission declined to reconsider its decision  
10 to choose the Hatfield Model?

11          A     That's my understanding, yes.

12          Q     Are you aware also that Sprint in Tennessee  
13 filed a motion to reopen the hearing in Tennessee as a  
14 result of the ex parte filings by Sprint?

15          A     Yes, as a matter of fact I am.

16          Q     And in fact, you filed an affidavit as part  
17 of that motion, didn't you?

18          A     Yes, I did.

19          Q     And are you aware that the Tennessee  
20 Regulatory Authority declined to reopen the hearing?

21          A     Yes. I'm also aware of the reason why.

22          Q     And what was that?

23          A     It was because they said I could have  
24 gotten on a plane and gotten down there in time to  
25 join in the proceeding.



1           Q     In fact, the ex parte filings were filed  
2 before the hearing in Tennessee, weren't they?

3           A     I'll take your word for that. I don't know  
4 for sure, but I believe you.

5           Q     Okay. And Sprint did not present its  
6 minimum spanning tree analysis in the hearing in  
7 Tennessee, did it?

8           A     No, it did not.

9           Q     I want to turn to page 8 of your rebuttal,  
10 if I may. And this is where I think you're talking  
11 about running the BCPM with some geocoded information.

12          A     Yes, we did run the BCPM using geocoded  
13 information.

14          Q     Now, did you actually assign individual  
15 customer locations within each microgrid, or did you  
16 assign counts to each microgrid based on the geocoded  
17 information?

18          A     We assigned individual customer locations  
19 to latitudes and longitudes. Because a microgrid is  
20 determined by latitude and longitude, that determined  
21 which microgrid they went into. From that point, we  
22 proceeded just like the BCPM does. You've got a  
23 certain number of customers in a microgrid, and they  
24 were put there using geocoding.

25          Q     Okay. But BCPM, when it goes through its

1 process of compositing up to ultimate grids from  
2 microgrids, it doesn't use individual latitudes and  
3 longitudes for individual customer locations, does it?

4 A Well, no, sir. It doesn't use geocoded  
5 data normally.

6 Q Okay. And all I'm trying to get at is,  
7 when you did geocoded information in the BCPM, all you  
8 did was, you assigned counts to each microgrid based  
9 on the presence of geocoded information in that  
10 microgrid.

11 A That's correct.

12 Q So all you did was, instead of the counts  
13 that you might have gotten from the road mileage, you  
14 used counts of customers based on geocoded  
15 information?

16 A Yes, that's correct. And it's important to  
17 note that any distortion that might have occurred  
18 after placing those in the microgrids is substantially  
19 less than the corresponding distortion that would  
20 occur in the HAI model.

21 Q Where did you get the geocoded points to be  
22 able to do this?

23 A We got them from our own customer  
24 addresses.

25 Q So Sprint has its own geocoded information?

1           A     It has its own geocoded information for  
2 some areas of Florida. That's one of the reasons we  
3 picked these three wire centers, because they had good  
4 geocoded information.

5           Q     Now, is it your belief that universal  
6 service support is most likely to be necessary in the  
7 lowest density areas?

8           A     I believe your model results with regard to  
9 that and all of your support is in the two lowest  
10 density zones.

11          Q     Is that generally what you believe is true,  
12 that support generally will need to occur in the  
13 lowest density zones?

14          A     I think that's a pretty fair statement,  
15 yes, sir.

16          Q     Okay. These three wire centers that you  
17 picked for this geocoding analysis, those weren't in  
18 the lower density zones, were they?

19          A     That's not absolutely correct, because we  
20 specifically picked these three because at least 25%  
21 of the grids were in the lowest two density zones.  
22 That's why we picked these specific wire centers,  
23 because they had a nice distribution of density.

24          Q     So a quarter of the grids in these wire  
25 centers were in the lowest density zones?

1 A Right.

2 Q So the vast majority of the grids in these  
3 wire centers were not in the lowest density zones?

4 A We wanted a distribution of densities.

5 Q How much geocoded information does Sprint  
6 have?

7 A It varies from state to state, and it  
8 varies from company to company. These three wire  
9 centers had, at best, about 85 to 90%, and these were  
10 three of our very best wire centers.

11 Q Both Hatfield and BCPM first bring  
12 connection -- bring cable to serving areas. Would you  
13 agree with me on that?

14 A First bring --

15 Q Distribution cable to serving areas.

16 A No, they bring feeder cable.

17 Q I always get those two mixed up. They  
18 bring feeder cable to serving areas.

19 A Yes, sir.

20 Q Okay. A serving area in the Hatfield Model  
21 is a cluster, and a serving area in BCPM is the  
22 ultimate grid; is that right?

23 A Yes, sir.

24 Q Okay. But a Hatfield Model cluster and a  
25 BCPM ultimate grid are not comparable to one another.

1 are they?

2 A No, they're not. Often the Hatfield  
3 clusters are significantly larger.

4 Q Are there more Hatfield clusters typically  
5 in a wire center or more BCPM ultimate grids in a wire  
6 center?

7 A Are you including outlier and main  
8 clusters?

9 Q Let's start there, yes.

10 A A rough approximation, there will be more  
11 BCPM ultimate grids than there will be HAI clusters.

12 Q Okay. And all I want to get at is, in  
13 doing a minimum spanning tree analysis, calculating  
14 the percentage of Hatfield Model clusters that might  
15 be under with the percentage of BCPM ultimate grids  
16 that might be under is not an apples to apples  
17 comparison, is it?

18 A I'm afraid I'm back to disagreeing with  
19 you, sir. I think it's a very pertinent comparison  
20 when you're looking at what the model does on a  
21 systematic basis with its serving areas versus what  
22 another model does on a systematic basis with its  
23 serving areas.

24 Q Let's just take a hypothetical numerical  
25 example. If the Hatfield Model has 50 clusters and

1 BCPM has 100 ultimate grids, saying that the Hatfield  
2 Model is under in 25% of its clusters and the BCPM is  
3 under in 50% of its grids, would you say that's an  
4 apples to apples comparison?

5 A When you say apples to apples comparison,  
6 what I'm comparing is the percentages, not the grids  
7 and the clusters. I'm comparing the portions that  
8 each model got right. And I think comparing the  
9 portions, the percentages, the probability that a  
10 model underbuilt I think is a very fair comparison.

11 Q But taking away the percentages, it could  
12 be that there are far more ultimate grids that BCPM is  
13 under than there are clusters that the Hatfield Model  
14 is under, or vice versa?

15 A In terms of numbers, that's where you don't  
16 have an apples to oranges -- an apples to apples  
17 comparison.

18 Q I want to ask a question. Were you here  
19 for Dr. Duffy-Deno's testimony?

20 A Yes, I was.

21 Q Okay. Did you hear me ask him if in doing  
22 the minimum spanning tree analysis he included the DLC  
23 point at the center of the ultimate grid?

24 A Yes, I did.

25 Q And did you hear me ask also if in the

1 results of that that he presented were included the  
2 points inside each road reduced distribution area that  
3 would connect with that DLC?

4 A Yes.

5 Q And do you know what the answer is?

6 A For him or for me?

7 Q For him.

8 A Not for him. I don't know the answer for  
9 him. I know for me.

10 With regard to your first question, the DLC  
11 point was not included. And not including this could  
12 either increase or decrease the length of the minimum  
13 spanning tree, as your witness, Dr. Mercer, the author  
14 of your model, has stated that adding points can  
15 actually decrease the length of the minimum spanning  
16 tree.

17 Q Just so I'm clear on your last answer, in  
18 doing your MST analysis in your testimony, you did not  
19 include this DLC point as a point in the connecting of  
20 the dots on the minimum spanning tree?

21 A That's correct, I didn't.

22 Q And you don't know for Dr. Duffy-Deno when  
23 he presented his results, when he did do that, if he  
24 also included the points in the centroid of these road  
25 reduced distribution areas?

1           A     Well, now, those you wouldn't want to  
2 include if you're doing the minimum spanning tree at  
3 the grid level.

4           Q     At the ultimate grid level?

5           A     Right.

6           Q     Just so I'm clear, the minimum spanning  
7 tree analysis you did at the ultimate grid level;  
8 right?

9           A     Yes, sir.

10          Q     There's no minimum spanning tree analysis  
11 at the quadrant level?

12          A     I didn't do any at the quadrant level.

13          Q     Are you aware that in discovery, AT&T  
14 requested the backup documentation to your Steiner  
15 tree calculations?

16          A     The backup documentation to the Steiner  
17 tree calculations?

18          Q     The analysis that you performed in your  
19 rebuttal, yes.

20          A     Yes, I am. I believe we objected to your  
21 request.

22          Q     Why did Sprint refuse to provide that  
23 information to AT&T?

24          A     If I recall, and you probably have it right  
25 there, I think you asked for every document that had



1 anything to do with the ex partes that were filed,  
2 which includes a lot of your own documents.

3 Q Let me show you the request.

4 A (Examining document.) Right. This says  
5 produce all documents, including work papers,  
6 analyses, notes, correspondence, and memoranda, which  
7 underlie, pertain, refer or relate to the minimum  
8 spanning and Steiner tree analysis described.

9 Q In your rebuttal testimony; right?

10 A Yes.

11 Q The answer to that is simply that Sprint  
12 previously objected to that question; right?

13 A I lost your question when you say the  
14 answer to that. I don't --

15 Q The response to that discovery request is  
16 that Sprint previously has objected to that question?

17 A That's right.

18 Q That question was propounded to Sprint  
19 after your rebuttal testimony was filed; correct?

20 A Right.

21 Q How could Sprint have previously objected  
22 if that question was not asked until after rebuttal  
23 came out?

24 MR. REHWINKEL: I want to object at this  
25 point. I think the question is one not necessarily

1 that is in the realm for the witness to answer.  
2 Rather, this was discovery propounded to Sprint. The  
3 proceeding, the procedural order in this case required  
4 objections to be filed -- five days?

5 MR. HATCH: Five days.

6 MR. REHWINKEL: Five days after the  
7 questions were propounded, and gave a 20-day response  
8 time instead of the 30. Sprint objected within the  
9 five days, and the reference to the previous objection  
10 was to that initial round.

11 MR. LAMOUREUX: Okay. I misinterpreted  
12 what that meant. I apologize.

13 Q (By Mr. Lamoureux) But the basis of the  
14 objection is that we asked for too much? Is that what  
15 it was?

16 A The basis really, sir, was that I didn't  
17 have time to get it all together in the five days that  
18 I knew I had to object.

19 Q Did you have time within the 20 days in  
20 which responses were due?

21 A In reality? No, sir. We can -- I'll tell  
22 you what. We can do what we can to get you as much  
23 information that refers to, relates to, underlies, or  
24 pertains to it as we can. It will include a lot of  
25 your own documents.

1           Q     I think we can perhaps talk about that  
2 off-line, but essentially what I was looking for was  
3 the backup documentation so we can verify the  
4 analysis.

5           A     Okay. There is a fair amount of  
6 documentation in the exhibits to my testimony which  
7 discussed the Steiner tree. It discusses the  
8 methodology, and it discusses the limitations. So  
9 that's in there.

10          Q     Let me ask you, the construction of the  
11 ultimate grid, is that based on any engineering  
12 assumption about what ultimate grids should look like?

13          A     It's my understanding that it's based on  
14 engineering assumptions about what carrier serving  
15 areas should be like.

16          Q     Isn't it just based on the latitude and  
17 longitude for the corners of the ultimate grid?

18          A     No, it's not necessarily. You're saying --  
19 I guess I don't really understand your question. Are  
20 you asking why an ultimate grid is the size it is and  
21 why it holds the number of people it is?

22          Q     Yes.

23          A     Yes. No, that's complete engineering  
24 assumptions. Looking at my picture that was in the  
25 presentation, you've got some little ultimate grids in

1 Tallahassee and some bigger ones, and the difference  
2 in size is completely due to engineering assumptions.

3 Q What engineering assumption drives the  
4 result that ultimate grids in northern Florida are 6%  
5 smaller on average than in southern Florida?

6 A That I don't think there is an engineering  
7 assumption for, but I'm not an engineer.

8 Q That's simply a fact that longitudes and  
9 latitudes change size as you move up the globe, isn't  
10 it?

11 A They sure do, yes.

12 Q Let's talk about the idea of putting  
13 serving areas over water.

14 A Okay.

15 Q Now, the BCPM could place ultimate grids  
16 over water, couldn't it?

17 A Generally we do a pretty good job of not.  
18 Again, if you think back to my presentation where you  
19 saw the wire center boundary at Lake Okeechobee, and  
20 as you see up here, we maintain the actual wire center  
21 boundary. So if you're looking for avoiding bodies of  
22 water, our grids do a pretty good job of avoiding  
23 those bodies.

24 Q But it could, couldn't it?

25 A I believe I can't answer that question,

1       except to say I am pretty sure, sir, that they don't.  
2       The evidence points to the fact that they don't.

3           Q       But BCPM does not explicitly recognize  
4       water boundaries as precluding putting an ultimate  
5       grid over water, does it?

6           A       To the extent that it's a wire center  
7       boundary, it would. To the extent that it's inside  
8       some -- if you have a little lake, it probably  
9       wouldn't keep that out of a ultimate grid.

10          Q       Have you looked at how the BCPM treats the  
11       Keys to determine if there are any ultimate grids over  
12       water?

13          A       No, sir, I haven't.

14          Q       So you looked at that for the Hatfield  
15       Model, but not for BCPM?

16          A       That's correct.

17          Q       Let me change subjects on you for just a  
18       minute and go off the idea of customer location.

19          A       Thank you.

20          Q       In your deposition you talked a fair amount  
21       about Gompertz-Markham curves?

22          A       Gompertz-Makeham curves.

23          Q       Thank you. Now, as I understand it, those  
24       curves represent retirement around an expected asset's  
25       economic life; is that right?

1           A     Yes, sir. They're survival curves.  
2     Basically they measure how much of the asset you  
3     retire in any given period, usually in any given year.

4           Q     Okay. So just to take an example, would a  
5     curve like that represent retirement of poles due to  
6     cars crashing into them?

7           A     Yes, sir, that would be a good explanation.

8           Q     Okay. Isn't that a maintenance account,  
9     though?

10          A     Okay. I think you're confusing two  
11     different things. One, you have to decide how your  
12     plant gets used up when you build it. That's the  
13     depreciation. Another, you have to decide how much on  
14     a daily basis you have to maintain that plant. I'm  
15     not a depreciation expert, and I'm certainly not an  
16     operating expense input expert. We have Mr. Dickerson  
17     for that. But I understand that the cost of basic  
18     service involves both of those.

19          Q     Are you saying that you know for a fact  
20     that all of the expenses associated with replacing  
21     poles are part of depreciation, and none of those  
22     expenses are included in maintenance?

23          A     No, sir. I'm saying that telephone  
24     companies on their books have records of what they  
25     spend maintaining poles. Those are generally referred

1 to as expenses. Telephone companies also retire  
2 plant. That's generally counted in terms of  
3 depreciation. And it's my understanding that those  
4 two things come together in estimating the cost of  
5 providing basic service.

6 Q Okay. Let me try it a different way. Do  
7 you know if the cost of replacing poles, the entire  
8 cost of replacing poles is included in maintenance  
9 accounts?

10 A No, I don't know the answer to that.

11 Q So you don't know if it's possible that  
12 there might be a double accounting by including that  
13 in the curves as well as in the maintenance accounts?

14 A If there is a -- I'm not a -- I'll tell you  
15 right now, I'm not a depreciation guy. I think you  
16 have misinterpreted what depreciation of plant is with  
17 regard to what maintaining plant is as it's standardly  
18 done in the business of offering service.

19 I don't do that, so I can't tell you, but  
20 my understanding of the curves and my understanding of  
21 what you do in your model is that I believe you've got  
22 them both in there too.

23 Q Is it your understanding that the Hatfield  
24 Model uses depreciation curves?

25 A No, the Hatfield does not use depreciation

1 curves. It uses square life depreciation. And I also  
2 know that the FCC just asked you guys to change that.

3 Q To your knowledge, does the BCPM have any  
4 copper loops over 12,000 feet in length in Florida?

5 A Yes. I think we have about one-twentieth  
6 of the number that you do.

7 Q So the suggestion that BCPM has a  
8 12,000-foot cutoff, that's not an absolute criterion  
9 in the model, is it?

10 A Well, no, sir. At a certain point you put  
11 on an extended range line card.

12 Q But the 12,000-foot limit is not an  
13 absolute limit. It's simply a guideline; is that  
14 right?

15 A Absolutely.

16 Q In fact, are you aware that the BCPM in  
17 Florida has loops over 18,000 feet?

18 A I'm aware that in Mr. Pitkin's testimony he  
19 points out one geographic area where he found one.

20 Q Do you have any evidence to the contrary?

21 A Oh, no. I'll bet there may be one out  
22 there.

23 MR. LAMOUREUX: Just one moment. I think  
24 I'm done.

25 That's all the questions I have. Thank you



1 very much.

2 THE WITNESS: Thank you.

3 COMMISSIONER DEASON: Mr. Henry?

4 MR. HENRY: We have no questions.

5 COMMISSIONER DEASON: Staff?

6 MR. COX: Good morning, Dr. Staihr. Will  
7 Cox on --

8 COMMISSIONER DEASON: Excuse me, Staff.  
9 How long do you have for this witness?

10 MR. COX: I'm guessing somewhere between a  
11 half hour and an hour, but I'm not sure.

12 COMMISSIONER DEASON: All right. We'll  
13 take a ten-minute break.

14 (Short recess.)

15 COMMISSIONER DEASON: Call the hearing back  
16 to order. Staff?

17 CROSS EXAMINATION

18 BY MR. COX:

19 Q Good morning, Dr. Staihr. Will Cox on  
20 behalf of the Commission Staff. I just have a few  
21 questions for you this morning.

22 In your presentation on Monday, you stated  
23 that BCPM makes use of the LERG's, the L-E-R-G's  
24 identification of host or remote or stand-alone  
25 switches; is that correct?

1           A     Yes, sir, it does.

2           Q     Now, Mr. Wood stated that in his  
3 presentation that in HAI, the location of each switch  
4 is determined from the Local Exchange Routing Guide,  
5 the LERG, and he also stated that the user may specify  
6 whether the switch is a host, remote, or stand-alone  
7 switch. My question is, does BCPM permit the user to  
8 specify whether the switch is a host, remote, or  
9 stand-alone switch?

10          A     In the standard running of the BCPM, no.  
11 Those specifications can be changed, though.

12          Q     How are they changed?

13          A     You go into the input table, and you  
14 actually change the specification.

15          Q     So it would be considered a user-adjustable  
16 input?

17          A     It's my understanding that you could.  
18 That's what it would be considered, yes.

19          Q     How many user-adjustable inputs are there  
20 in the BCPM?

21          A     A lot. I don't know the actual number.  
22 It's in -- I don't even know if it's in the hundreds  
23 or the thousands, but the model is set up that you  
24 don't have to use all of them if you don't want to.  
25 For instance, with the cable cost, you can put in one

1 cable cost or you can split it out by material and  
2 placement. You could do it either way.

3 Q My next line of questioning refers to your  
4 rebuttal testimony, so if you have a copy of that, if  
5 you could have that handy.

6 A Yes.

7 Q Turn to page 20 of your rebuttal testimony,  
8 where you're discussing the minimum spanning tree  
9 analysis that we've discussed in the last few days in  
10 this proceeding. And this is the minimum spanning  
11 tree analysis discussed on lines 4 through 9 on page  
12 20 that was performed for Sprint. And you acknowledge  
13 that there is evidence that BCPM underbuilds in rural  
14 Florida.

15 Now, given that observation and the similar  
16 analysis conducted on HAI's Florida results is it the  
17 logical conclusion to draw that both models are  
18 deficient in building distribution plant in rural  
19 areas?

20 A No, it's not. And if I can expand on that  
21 just for a second.

22 Q Okay. Under certain conditions, would it  
23 be the logical conclusion to draw?

24 A Yes. Under certain conditions and in  
25 certain areas, yes.

1 Q Okay. What conditions and what areas?

2 A Okay. The first condition is that our  
3 calculation of the minimum spanning tree, if you look  
4 at the attachment to my testimony that discusses that,  
5 it says that when we created the minimum spanning  
6 tree, we made every attempt to err on the job of  
7 making it too long. We did a very good job of that,  
8 and I can go through it if you want.

9 If we were to readdress how we created our  
10 minimum spanning tree not erring on the side of  
11 conservatism, it's probably likely that that number  
12 would go down significantly.

13 Q If you could go ahead and explain your  
14 answer, that would be good.

15 A Is it okay if I use the -- can you see  
16 that?

17 Q That will be fine, as long as you can get a  
18 microphone there. Is there still a microphone for  
19 you?

20 A Yes.

21 COMMISSIONER DEASON: Mr. Rehwinkel, you  
22 may want to give the witness a lesson in the  
23 utilization of that technical piece of equipment.

24 MR. REHWINKEL: Is it working now? There  
25 you go.

1                   COMMISSIONER DEASON: There's a delay on  
2 it. Once you turn it on, you have to wait a second or  
3 two before it actually activates.

4                   THE WITNESS: Thank you.

5                   COMMISSIONER GARCIA: I'm just surprised  
6 Mr. Rehwinkel didn't use his technical expertise with  
7 the attorney from the companies.

8                   MR. REHWINKEL: I just learned on the  
9 break. I didn't know --

10                  COMMISSIONER JACOBS: A likely story.

11                  THE WITNESS: I think this pen works.  
12 Should I turn this, sir?

13                  Q     (By Mr. Cox) That's fine where it is.

14                  A     Okay. Because we had to create our own  
15 version of a minimum spanning tree, if you look at  
16 what's written in the documentation, I'm going to  
17 assume these are microgrids. We calculated a minimum  
18 spanning tree within each microgrid and basically  
19 connected them across microgrids.

20                  Now, if you can see this, the way we  
21 normally place people along roads is uniformly. If  
22 you have a road that goes like that, and say you had  
23 to place three people here, you would have this much  
24 distance; right? But if you have a road that went  
25 like that and you place people uniformly, your minimum

1 spanning tree actually is much less than the distance  
2 of the road. Okay? We didn't use this little  
3 distance. We used the big distance. And we did that  
4 for every single microgrid.

5           Then -- and I'm going to go down here now.  
6 Say we have a minimum spanning tree within a bunch of  
7 microgrids, and it looks something like this, or like  
8 this. Connecting these across microgrids, we took the  
9 points that were closest and connected this way and  
10 this way.

11           In essence, what we ended up doing is going  
12 more rectilinearly than a real minimum spanning tree  
13 would if we used the actual points, if we connected  
14 individual points instead of allocating them within  
15 the microgrid.

16           Q     When you say rectilinearly, you mean more  
17 in a straight line? Is that what you're saying?

18           A     Yes. Clearly, if you were really  
19 connecting someone up here to someone here with a  
20 minimum spanning tree, you would go like this. But we  
21 connected across microgrids. Now, we did a little bit  
22 of -- if there was a tree in here that was closer, we  
23 would connect those, but not always.

24           So my point is, when we created this tool,  
25 we erred on the side of making it too long. If we

1 were to go back, and we can, kind of readdress it and  
2 say let's try and even out the compensating factors, I  
3 believe the 28 $\frac{1}{2}$  there would go down significantly.

4 Q Okay. Did I hear you say that the minimum  
5 spanning tree used in this instance would be less  
6 distance than what Sprint actually used? Is that what  
7 you're saying?

8 A I'm saying that if we changed our  
9 assumptions, the length of the minimum spanning tree  
10 would be shorter. And so if we fell short in a given  
11 grid, we may not fall short compared to this now  
12 shorter minimum spanning tree.

13 Was that clear?

14 COMMISSIONER JACOBS: I thought you said in  
15 the event where the spanning tree is shorter than the  
16 road, you're going to use the length of the road over  
17 the spanning trees.

18 THE WITNESS: Yes. Let me just stick with  
19 these first two microgrid things that I did.

20 Putting people here requires a shorter  
21 minimum spanning tree than putting people here. Even  
22 though each one is the same distance along the road,  
23 we used the total road distance, which is more than  
24 the minimum spanning tree might really be. Minimum  
25 spanning tree is as the crow flies, that. We took

1 that and that. Because of that, in each microgrid, if  
2 the roads curved at all, we, in essence, overestimated  
3 how much you need to connect the customers.

4 As a result of that, in certain grids where  
5 we fell short of how much you need, we maybe really  
6 didn't. But because of these conservative assumptions  
7 built in there, it shows up that we did.

8 Q (By Mr. Cox) Wouldn't the minimum  
9 spanning tree analysis, though, be an underestimate of  
10 the amount of underbuilding?

11 A I -- I'm sorry.

12 Q Meaning that if you connect things in a  
13 straight line, just the pure points, that would not  
14 take into consideration the necessary routing that  
15 would be necessary to accommodate any geographical  
16 constraints?

17 A Yes. Should I sit down?

18 Yes, sir, that's absolutely right. And  
19 that's why, as Dr. Duffy-Deno said yesterday, the fact  
20 that someplace you build more than the minimum  
21 spanning tree doesn't necessarily mean you built  
22 enough. That's why when you attempt to net, as  
23 Mr. Pitkin has done in his testimony, the places where  
24 you built more and the places where you built less,  
25 it's a very misleading and incorrect analysis.



1           Q     Now, you mentioned the 28% that  
2 Dr. Duffy-Deno testified as sort of the result of the  
3 minimum spanning tree analysis, and that would be a  
4 28% shortfall or underbuilding.

5           A     That was in my --

6           Q     That's in your testimony?

7           A     Yes.

8           Q     What adjustments do you think can and  
9 should be made to the BCPM to remedy this shortfall  
10 relative to this result in the MST analysis?

11          A     I can tell you specifically the adjustments  
12 actually in both models, if you like. I'm going to  
13 have to get up again.

14          Q     That will be fine.

15          A     Okay. We have in our model a constraint  
16 built in which constrains the amount of distribution  
17 cable in any quadrant to be no longer than the road  
18 distance. We did that for a reason, because it's the  
19 efficient way to do it.

20                     Say this is a quadrant. Say this is the  
21 digital loop carrier site. Say that in reality, the  
22 road goes up like this, but for whatever reason, the  
23 model built cable here, here, and here. This distance  
24 is clearly more than you need to get to a customer  
25 that's there. So we constrain the amount of cable

1 built to be this length. Okay?

2 Now, that constraint can be adjusted or  
3 turned off. As a result, when you may actually have  
4 needed this much, we only let the model build this  
5 much. If we turn off that constraint, that's one  
6 thing we can do.

7 Q How is that done? How is the constraint  
8 turned off?

9 A I can go -- either I or an INDETEC person  
10 can --

11 COMMISSIONER GARCIA: Should that be  
12 something that we order? Are you doing that  
13 naturally, or --

14 THE WITNESS: We do that because it serves  
15 as a check to make the model efficient. It may have  
16 made it overly efficient in these cases. So we can  
17 check and see. We can run it with it on, or we change  
18 the equation to where it's off. We can see if for  
19 those grids it has made the difference there.

20 The second adjustment is one Dr. Duffy-Deno  
21 mentioned yesterday. Within a distribution area,  
22 we'll have lots like this, and like the HAI model,  
23 like we, we build cable between the lots, but we don't  
24 go to the end. We stop at the perimeter, the reason  
25 being, you can send the drop right from there. We

1 could change that.

2 This is less of an issue in our model than  
3 in the Hatfield Model for two reasons: Our lots are  
4 square, so it makes less of a difference. Second,  
5 their clusters are based on distances that are  
6 determined by the perimeter. Ours are not. In a lot  
7 of cases there's no reason we should go to the  
8 perimeter. In the Hatfield Model, you should always  
9 go to the perimeter.

10 COMMISSIONER JACOBS: That brings up a  
11 point, I'm sorry, I meant to ask earlier. If I  
12 understood it, you said that the build decision under  
13 the Hatfield does not anticipate the shape of the  
14 polygon.

15 THE WITNESS: That's right.

16 COMMISSIONER JACOBS: So --

17 THE WITNESS: Every -- I'm sorry.

18 COMMISSIONER JACOBS: But one of the  
19 criticisms, as I understood it, was the overlapping  
20 polygons.

21 THE WITNESS: Yes. The overlapping -- let  
22 me address it on --

23 COMMISSIONER JACOBS: I'm sorry to  
24 interrupt, but that brought it back to mind.

25 THE WITNESS: On two levels. First, not

1 only do the polygons overlap; the rectangles that get  
2 converted overlap. In certain parts of Florida, the  
3 rectangles actually sit right on top of each other.

4 The problem with overlapping polygons is,  
5 the reason you've got a polygon is, you decide that  
6 these people are going to be served together and these  
7 people are going to be served together. When you  
8 overlap, why is this guy served here and this guy  
9 served here when this guy is closer over here?  
10 Customers that should be served together are split  
11 apart.

12 When the polygon gets converted to a  
13 rectangle, not only is the spatial distance distorted,  
14 but the area that the Hatfield Model actually builds  
15 sometimes will overlap, so you can't tell if  
16 distribution has been built to the right places or  
17 not, distribution being the cable built within the  
18 rectangle. It's a problem of both the polygons  
19 overlapping and the rectangles overlapping.

20 COMMISSIONER JACOBS: Why wouldn't it do  
21 something like what you just said here that you would  
22 do? Wouldn't they just do a drop -- they wouldn't  
23 build different -- I mean, replicating or duplicating  
24 feeder cable, would they?

25 THE WITNESS: Yes, they would. And that's

1 a little bit of a tricky question. If you've got two  
2 rectangles that are placed right over each other, in  
3 the Hatfield Model, each one will have feeder going to  
4 it, and each one will have distribution built within  
5 it.

6 Now, you might think that that overstates  
7 what you really need. Unfortunately, there are some  
8 other things in the Hatfield Model that cause that  
9 investment not to be used in certain cases when the  
10 investment is turned into cost. So although your  
11 initial reaction would be, ah, they've they  
12 double-built, that double-building never gets carried  
13 through to the end in a lot of cases.

14 COMMISSIONER JACOBS: Thank you.

15 Q (By Mr. Cox) Back to the suggestion that  
16 we were talking about. You were saying that you or  
17 INDETEC would have to perform the adjustment, so it's  
18 not something that the user or the Staff in this case  
19 could perform itself?

20 A Yes, absolutely. It's changing the  
21 equations in the spreadsheet. We just would have to  
22 go through and make sure we told you the right ones to  
23 change, but you could do it.

24 Q Okay. Are there other adjustments that  
25 could be made to remedy the shortfall?

1           A     For our model?

2           Q     Yes.

3           A     I think those two would probably do the  
4 majority of the work. I don't know until we try it,  
5 and we haven't tried it, so I don't know. Those two  
6 would be the first two I would try.

7           Q     And you do have some suggestions for making  
8 adjustments on the Hatfield as well?

9           A     Yes, I do.

10          Q     What would those suggestions be?

11          A     I can't use this. I can use this.

12                   Well, wherever the picture went.

13                   These are the original points. This is the  
14 original polygon. The way they get their reduced  
15 rectangle is, they take the point farthest north,  
16 south, east, and west, they make a big rectangle, and  
17 then they convert it to a smaller rectangle that has  
18 the area of this, but the shape of this, which is  
19 where these people get moved inside. Now, if you  
20 start over -- and this would have to be done in their  
21 preprocessing. This would involve PNR.

22                   If you did like the FCC is doing, overlay  
23 this with a grid, maintain the fact that here you have  
24 a person, here you have a person, and here you have a  
25 person, measure the distance here, a minimum spanning

1 tree type of approach, and make sure that the  
2 distribution built is at least as much as that minimum  
3 spanning tree. This is what the FCC is doing with  
4 their clusters to avoid that distortion. That would  
5 have to all be done in the PNR preprocessing, but PNR  
6 would be cable of doing it.

7 Q Are there any other adjustments that you  
8 would suggest to the Hatfield to address this problem?

9 A A couple. The fact that Hatfield's  
10 clusters have rectangular lots, and always the model  
11 builds the distribution up the short side. If these  
12 lots were made square, it would have to build a little  
13 more distribution.

14 Q Dr. Staihr, one of the major differences  
15 between BCPM and the Hatfield in modeling distribution  
16 facilities pertains to the maximum copper lengths  
17 allowed; is that correct?

18 A Yes, sir.

19 Q And while BCPM generally constrains copper  
20 loop lengths from the DLC to the customer to 12,000  
21 feet, HAI deliberately designs copper loops out to  
22 18,000 feet; is that correct?

23 A That's my understanding, yes.

24 Q Now, a copper loop beyond 12,000 feet  
25 requires a larger gauge cable; is that correct?

1           A     Yes, sir.

2           Q     For example, a 24-gauge cable instead of a  
3 26-gauge cable?

4           A     Yes.

5           Q     And a loop extending beyond 12,000 feet  
6 from the DLC requires an extended range line card,  
7 doesn't it?

8           A     Yes. That's my understanding in talking  
9 with engineers, yes.

10          Q     So, so long as a copper loop between 12,000  
11 and 18,000 feet is provisioned on 24-gauge cable with  
12 an extended range line card, shouldn't it work as well  
13 as a copper loop constrained to 12,000 feet?

14          A     That's a question I as a non-engineer can't  
15 answer. I don't know. Work as well in terms of  
16 decibel loss or degradation of the signal, I couldn't  
17 answer that.

18          Q     So you have no opinion on that?

19          A     No, sir.

20          Q     Then would any differences in cost between  
21 the two types of installation be the sole basis for  
22 choosing one over the other?

23          A     That would certainly be one basis. I don't  
24 know that that would be all. Depending on how the  
25 loop length was built into the construction of the



1 carrier serving area and how that construction of the  
2 carrier serving area allowed the model to maintain or  
3 not maintain relative distances, all those things  
4 would have to go together. So it would be one  
5 consideration. I don't know if it would be primary.

6 Q And, Dr. Staihr, am I correct that BCPM's  
7 ultimate grids are surrogates for a carrier serving  
8 area, a CSA?

9 A Yes, sir.

10 Q Now, does BCPM restrict the maximum number  
11 of housing units that can be served by a single CSA?

12 A Yes. When the ultimate grids are created,  
13 there is a restriction that starts out with the number  
14 of 999 housing units.

15 Q So 999 housing units is the maximum number  
16 of housing units that BCPM allows to be served per  
17 CSA?

18 A Not exactly, because -- I wish I could give  
19 you a straight answer, but this is the answer. When  
20 an ultimate grid is created, and there's a little bit  
21 of another ultimate grid left over in a wire center  
22 with less than 100 lines, which would be something  
23 less than 100 housing units as well, that will be  
24 added into that ultimate grade, so they're all served  
25 off of the same electronics. It's more efficient to

1 do it that way. So you certainly could end up with  
2 more.

3 Q Okay. You say the same electronics. Is  
4 that the fact that a CSA is served by a digital loop  
5 carrier facility? Is that what you're referring to?

6 A Yes. If fiber is going into it, yes.

7 Q What size DLC system does the BCPM model?

8 A Two sizes, one large and one small, 1,344  
9 maximum on the large and 672 on the small. I can  
10 double check, but I think that's the right number.

11 Q Okay. It's not 2,016 for the large?

12 A No, sir.

13 Q Now, if the number of housing units per CSA  
14 is limited to 999, is it likely that BCPM very often  
15 will build a 1,344-line DLC system, which is a large  
16 system?

17 A Yes, I would say it's likely if that's what  
18 the CSA requires in terms of the number of customers  
19 being served there.

20 Q My question wasn't whether it was likely.  
21 The question was whether it was likely and that would  
22 occur often, frequently.

23 A Frequently, yes.

24 Q And your definition of frequently in this  
25 instance would be?

1           A     That's -- more than 10% of the time?  
2     That's a guess.

3           Q     So something greater than one out of ten?

4           A     Yes.

5           Q     Okay. What is the basis for BCPM's  
6     assumption that a CSA should be limited in this  
7     manner?

8           A     With regard to number of lines?

9           Q     With regard to the 999.

10          A     The 999 households is based on -- if you  
11     take a 1,344 DLC, take it at about 90% of capacity,  
12     you come down to about 1,200 or something. The math  
13     is not right, but it's close. Take 999 households,  
14     add in some second line penetration, whatever it is,  
15     15%, you're up at 1,150. Add in some business  
16     customers, on an average, you'll add some more, and  
17     you'll get up close to that 1,344.

18                     From what I understand -- this is  
19     engineering. This is my understanding of it. You  
20     create an area that can basically hold the number of  
21     lines you're going to be able to serve based on second  
22     lines, businesses, and households.

23          Q     Dr. Staihr, does the combination on the  
24     BCPM of the 12,000-foot maximum copper loop length and  
25     the 999 housing units per CSA limit tend to result in

1 BCPM's CSAs being relatively small?

2 A It results in them being smaller than the  
3 equivalent Hatfield CSAs, yes, sir.

4 Q If the Commission wanted to provide for  
5 larger CSAs, what changes to BCPM would be required?

6 A We would have to rerun the preprocessing  
7 and make 18,000-foot grids, which we have done for the  
8 State of Florida because the FCC asked us to.  
9 Actually, I believe that data is already sitting there  
10 at StopWatch Maps, so it shouldn't take very long.

11 Q Dr. Staihr, do you know if that information  
12 has already been filed in this proceeding?

13 A If the actual data set containing the  
14 18,000-foot grids is? Is that what you're asking?

15 Q The results using the 18,000 feet.

16 A I don't know if they are or not.

17 Q Was that information part of an ex parte  
18 with the FCC?

19 A That information was the result of a  
20 request from the FCC. We made a presentation to them  
21 showing them the results, and there was an ex parte  
22 associated with that. I don't have it. I can get it,  
23 but I don't have it here.

24 MR. COX: We would ask that you could  
25 provide that information as a late-filed exhibit to

1 the hearing. And, Chairman Johnson, if we could have  
2 that marked for identification. It would be BCPM run  
3 using 18,000 --

4 THE WITNESS: Foot grids.

5 MR. COX: Foot grids.

6 CHAIRMAN JOHNSON: Okay. That's Late-filed  
7 61.

8 MR. COX: Thank you.

9 (Late-filed Exhibit 61 identified.)

10 Q (By Mr. Cox) Dr. Staihr, as I understand  
11 the workings of BCPM, with the exception of very dense  
12 areas, the model allocates housing units to microgrids  
13 based on the percentage of the census block's road  
14 network that occurs in a given microgrid?

15 A That's correct.

16 Q Can this technique in some cases result in  
17 allocating fractional housing units to microgrids,  
18 that is, parts of housing units to grids?

19 A Yes, it does. Those fractions, of course,  
20 are reaggregated.

21 Q They're reaggregated? Can you describe how  
22 that works?

23 A When the microgrids are aggregated back up  
24 to form quadrants of ultimate grids, basically you  
25 have a certain number of persons you've placed in

1 there. You have a certain number of persons that  
2 you'll serve in that quadrant of the ultimate grid.  
3 When you add back up what you've got in the  
4 microgrids, if you had some fractions, you might have  
5 a part of a person. Generally a part of a person is  
6 rounded up or down, and that rounding tends to offset  
7 itself.

8 Q So it is rounded?

9 A Yes.

10 Q Dr. Staihr, you're familiar with the joint  
11 rebuttal testimony of Don Wood and Brian Pitkin that  
12 was filed in this proceeding on behalf of AT&T and  
13 MCI?

14 A Yes, I am.

15 Q Do you have a copy of that with you?

16 A Yes, I do. Give me half a second here.  
17 Yes.

18 Q If you could turn to page 20.

19 A Yes.

20 Q Starting at page 20, they contend that  
21 under certain conditions, BCPM will drop housing  
22 units, or equivalently, customers, when it aggregates  
23 microgrids to generate ultimate grids, and thus  
24 constructs no plant to serve these locations.

25 A Right.

1 Q Is this assertion correct?

2 A This assertion is correct in the sense that  
3 we ended up with six one-thousandths of 1% of our  
4 lines left out as a result of rounding.

5 Q How many lines is that precisely?

6 A I just know that -- I filed that.

7 Q Okay.

8 A It was deposition exhibit. I've got it  
9 right here.

10 That was 373 out of 6.6 million lines, of  
11 course, which the Hatfield Model would not have built  
12 to in the first place.

13 Q And why do you say that the Hatfield would  
14 not have built to it in the first place?

15 A Because they don't build to housing units.  
16 They only build to houses that have telephones. And  
17 if you look at a place like Destin where there are a  
18 lot of vacation houses, they build about half the  
19 lines we build in that wire center because they leave  
20 out the housing units.

21 Q If you could turn to page 44 of the  
22 rebuttal.

23 A I'm sorry. Mine or Mr. Pitkin's?

24 Q I'm sorry. We're still on Mr. --

25 COMMISSIONER CLARK: Dr. Staihr, can I ask

1 you a question on that point? I take it then that you  
2 would -- it's your view that in these cost proxy  
3 models, we should build to -- it should include  
4 housing units, not households.

5 THE WITNESS: Yes, it is. And the reason  
6 is very simple. Half the things out there on  
7 St. George Island are housing units, not households,  
8 according to the census, housing units. They all have  
9 phones. A server that was serving that area would  
10 have to build plant to them.

11 COMMISSIONER CLARK: Are you saying since  
12 people weren't there when the census was taken, they  
13 didn't get counted, and that's the basis on which  
14 Hatfield chooses them or doesn't choose them?

15 THE WITNESS: That's the basis on which the  
16 Census Bureau calls it a housing unit or a household.  
17 The Hatfield Model, it's my understanding, builds to  
18 households with phones, not housing units that might  
19 have a phone. According to their documentation, I  
20 believe it says it says households with phones.

21 COMMISSIONER CLARK: If no one was there,  
22 how do they know either way?

23 THE WITNESS: I'm sorry. How do they  
24 know --

25 COMMISSIONER CLARK: First of all, you had



1 to be home, and second of all, you had to say you had  
2 a phone?

3 THE WITNESS: No. I think you would have  
4 to ask the Hatfield people the exact method that they  
5 use for determining a household with a phone. All I  
6 know is that a vacation home, according to the census,  
7 is a housing unit, not a household.

8 COMMISSIONER CLARK: When they take the  
9 census, they know that that's a vacation home? I  
10 mean, how do they get that information?

11 THE WITNESS: I don't know the answer to  
12 that.

13 COMMISSIONER CLARK: And nobody has asked  
14 -- the FCC has not clarified what they meant by  
15 households?

16 THE WITNESS: No. We specifically asked  
17 them. I specifically asked them. We can change our  
18 model, as you know. We said, "Which do you want us to  
19 do?"

20 It's a policy question. It's not a  
21 modeling question. It's a policy question.

22 We did not get an answer.

23 COMMISSIONER CLARK: What have they done in  
24 other states?

25 THE WITNESS: In the states that have

1 picked the BCPM, the BCPM, as I understand it,  
2 continues to build to housing units. There are some  
3 states I think that picked Hatfield. I don't know if  
4 they asked them to change or not.

5 COMMISSIONER CLARK: Okay.

6 Q (By Mr. Cox) On page 44 of the Wood and  
7 Pitkin rebuttal, Dr. Staihr --

8 A Forty-four?

9 Q Yes. On page 44, they contend that BCPM  
10 constructs 223 DLCs in Florida that each serve only a  
11 single household.

12 A Yes, sir.

13 Q Is this assertion correct?

14 A I filed a deposition exhibit with those  
15 numbers, but only for Sprint. I haven't checked for  
16 the entire State of Florida, and I assume that's what  
17 Mr. Pitkin is referring to here.

18 Q What was the number for Sprint?

19 A It's going to take me a second to find it.

20 Okay. There was a little confusion as to  
21 what was meant with the single household, because  
22 there are grids that have one household plus housing  
23 units, and there are grids that have one household  
24 plus business locations, and there are grids that just  
25 have one household.

1           There are 57 grids that serve a household  
2 and no housing units and no business locations that  
3 have a DLC in them for Sprint's territory, 57.

4           Q     Turning on in their testimony, the Wood and  
5 Pitkin testimony, to page 72.

6           A     Yes, sir.

7           Q     Where they make various criticisms of the  
8 minimum spanning tree analysis performed on the  
9 Hatfield Model.

10          A     Yes, sir.

11          Q     First, at lines 4 through 12, they disagree  
12 that a minimum spanning tree analysis represents the  
13 minimum amount of distribution cable required for a  
14 cluster, asserting that the placement of surrogate  
15 locations, which are most prevalent in low density  
16 areas, tend to overstate customer dispersion and thus  
17 the amount of cable needed.

18                   The question is, does the use of surrogate  
19 geocoded points overstate customer dispersion?

20          A     The evidence that I've presented in this  
21 proceeding shows the exact opposite. When we ran the  
22 BCPM with our standard approach, which one could call  
23 all surrogates -- one could call it that -- we  
24 estimated a certain amount of cable. When we ran it  
25 using geocoded data, it actually increased the amount

1 of cable slightly, by less than 4%.

2 That evidence suggests that using geocoded  
3 data actually increased the dispersion. I don't have  
4 an exact measure of how that took place. I do have  
5 the measures of the actual route miles.

6 Q So the answer to my question, if you could  
7 just give me the simple answer to the question, does  
8 the use of surrogate geocoded points overstate  
9 customer dispersion?

10 A The answer is, not in the experience that  
11 I've presented in this proceeding. It could in one  
12 situation. It may not in another.

13 Q Also in this passage, they state that the  
14 minimum spanning tree analyses that have been  
15 conducted are flawed because they do not include  
16 connections to the DLC and the FDI, the feeder  
17 distribution interface, which would in turn understate  
18 the distance. Are they correct, and if they are  
19 correct, how significant is this claim?

20 A With regard to the DLC, they are correct.  
21 With regard to the FDI, they're not, because the  
22 minimum spanning tree we've done was done at the grid  
23 level. If we were doing it at a quadrant level, then  
24 would you need the connection to the FDI.

25 I haven't done that analysis of rerunning

1 the minimum spanning trees connecting to those  
2 points. I can do it, and I can do it fairly quickly,  
3 and I'll be happy to file that. I know Dr. Duffy-Deno  
4 had it yesterday. I don't have it for our territory  
5 today.

6 Q Now, you said for the DLC, they are  
7 correct. Now, how significant is that claim, given  
8 that it's correct regarding to the DLC?

9 A Not -- I can't say. I can give you an  
10 impression that it's probably not all that correct,  
11 and I can show you -- that big a deal, and I can show  
12 you why if I can draw a picture.

13 Q Sure.

14 A Ultimate grid, quadrants, and for the sake  
15 of argument, road. Okay? We'll call the road  
16 centroid right here. Okay? Microgrids, minimum  
17 spanning tree in each one. This grid is connected to  
18 this grid. If it had to go out of the way to pick up  
19 the DLC, it wouldn't have to go out of the way very  
20 much. This is completely contingent on how I drew the  
21 road. It would be completely contingent on where the  
22 roads are.

23 In this case, it didn't make a bit of  
24 difference. The minimum spanning tree went right  
25 through the DLC.

1           Q     But in some cases it might not go right  
2 through the DLC?

3           A     It might not. That's definitely true.

4           Q     So there could be a significant problem  
5 there in some instances?

6           A     I don't know that I want to use the word --  
7 agree with your "significant," because again, because  
8 the DLC is placed on the roads, because all microgrids  
9 that we have a minimum spanning tree for are where the  
10 roads are, they connect already.

11           COMMISSIONER CLARK: Doctor, I wanted to  
12 ask you a question about -- I'm not sure I saw your --  
13 was it supplemental rebuttal?

14           THE WITNESS: Yes.

15           COMMISSIONER CLARK: I'm not sure I saw  
16 that. But you indicated on page 20 of your testimony  
17 that using 80% of the minimum spanning tree as a  
18 measure of what is sufficient cable, recall that the  
19 Hatfield built underbuilt well over 85% of the main  
20 clusters, and then by comparison, BCPM underbuilds 15%  
21 of the grids. Is there -- do you know by how much?

22           THE WITNESS: Yes. I don't have the actual  
23 numbers, but I can tell you -- if you have my  
24 testimony there, I can refer you to a page here. If  
25 you look at page 13 --

1                   COMMISSIONER CLARK: Of the rebuttal?

2                   THE WITNESS: Of the rebuttal. And then  
3 also look at page 16. Okay? On page 13, I compare  
4 what the Hatfield Model built with the whole minimum  
5 spanning tree, and on page 16 I compare what it built  
6 with 87% of the minimum spanning tree. And the reason  
7 I do that is because that's a different measure that  
8 could be interpreted as enough.

9                   COMMISSIONER CLARK: Let me just ask my  
10 question. If I understood Dr. Duffy-Deno yesterday,  
11 it was that had you to correct that insufficiency in  
12 the model, you couldn't net.

13                   THE WITNESS: (Nodding head affirmatively.)

14                   COMMISSIONER CLARK: I guess my question  
15 is, if you knew by how much you underbuilt and  
16 overbuilt, why couldn't you net, I mean, if you come  
17 out to the same ultimate number?

18                   THE WITNESS: That depends. For instance,  
19 if you're going to do this on a cluster on a grid, all  
20 clusters and grids are associated with wire centers.  
21 There are some weird things going on in the Hatfield  
22 Model where their clusters actually cross wire center  
23 boundaries, so part of the distribution cable is in  
24 one wire center and part of the distribution cable is  
25 in another. So when you've got something like that,

1 if you built enough, if you built too much, is too  
2 much in one, too much in the other? You don't know,  
3 so you don't know that netting really occurs.

4 Also, in a sense, as I put in my testimony,  
5 distribution cable isn't -- the fact that you built  
6 too much -- and we haven't said you built too much.  
7 You built more than the minimum spanning tree. That  
8 may not be too much. It's probably not. That doesn't  
9 offset the fact that you haven't built a functioning  
10 network to connect customers over here.

11 And I'll go on one more, and maybe this  
12 will answer your question. Over here you've got a  
13 type of soil, you've got a depth to bedrock, you've  
14 got things that affect the cost. Over here you've got  
15 different soil, different bedrock, different costs.

16 COMMISSIONER CLARK: So you're saying even  
17 though if you have the correct footage of the cable --

18 THE WITNESS: Right. They'll have  
19 different costs associated with them.

20 COMMISSIONER CLARK: All right. Thanks.

21 MR. COX: Dr. Staihr, could you provide as  
22 a late-filed exhibit the minimum spanning tree  
23 analysis with the DLC information for Sprint?

24 THE WITNESS: Yes, sir, I can.

25 MR. COX: Madam Chairman, Staff would ask



1 that this be marked for identification as a late-filed  
2 exhibit.

3 CHAIRMAN JOHNSON: Okay. It's 62. And a  
4 short --

5 MR. COX: Yes. A short title would be MST  
6 analysis with DLC information for Sprint.

7 CHAIRMAN JOHNSON: Okay.

8 (Late-filed Exhibit 62 identified.)

9 Q (By Mr. Cox) Dr. Staihr, when was the  
10 version 3.1 of BCPM first filed with the FCC?

11 A With the FCC, the version has not  
12 officially been filed. The FCC's version is called  
13 3.0FCC. It's the equivalent of 3.1.

14 Q It has not been filed with the FCC?

15 A No, it has. It's called something  
16 different there. Sorry.

17 Q And when was that filed?

18 A That was in February. I don't know the  
19 exact date. February 6th. I can check, but it was  
20 February.

21 Q Okay. Was there a version that was filed  
22 on December 11, 1997, a version of BCPM?

23 A Yes. That was called 3.0.

24 Q And since the February filing, have there  
25 been other corrections to the model?

1           A     Yes, there have been corrections, and we  
2 provided a list of those to Staff.

3           Q     And that was in a discovery request from  
4 Staff?

5           A     Yes.

6           Q     Did you file Exhibit BSK-1, which is a  
7 CD-ROM containing the BCPM Version 3.1, in this  
8 proceeding?

9           A     Yes, I did.

10          Q     And if we were to assign a date to the  
11 edition of BCPM Version 3.1 that you first filed in  
12 this docket, what date would that be? Would that be  
13 the July 7, '97?

14          A     That I first filed with my direct?

15          Q     Yes.

16          A     The filing date was August 3rd.

17          Q     August 3rd?

18          A     Yes.

19          Q     Okay. And since that time, there have been  
20 some corrections or changes causing you to file a  
21 different version or a revision to the filing?

22          A     Yes, sir, there was a change that we made.

23          Q     And what was that change?

24          A     The change that was made was that when you  
25 calculated costs at a wire center level, the average

1 came out different than when you calculated costs at a  
2 density zone level. They didn't tie. Actually,  
3 neither model ties.

4 We've corrected that and given you the  
5 correction. I don't know that the Hatfield Model has.

6 Q And was that change filed in September?  
7 Was that the September change?

8 A Yes, sir. I believe in our deposition we  
9 called it the September 24th version.

10 Q How does this change affect the reported  
11 costs at the grid level?

12 A At the grid level, it should have not  
13 changed except maybe by one cent. We report it at the  
14 wire center level. That changed by about a dime.

15 Q Okay. And how would it affect the costs at  
16 the census block group level?

17 A That probably would have changed by about a  
18 dime as well.

19 Q And that's on the monthly per line?

20 A Yes, sir, for Sprint.

21 Q Do you believe that all of the BCPM  
22 sponsors in this proceeding, GTE -- well, I guess GTE  
23 says they're not technically a BCPM sponsor. But  
24 those that are using BCPM, GTE, Sprint and BellSouth,  
25 should use the September version, or correction, or

1 I'm sorry -- investment calculated at the grid level?

2 Q The subsidy.

3 A I don't think I'm surprised. They should  
4 be different. It should impact.

5 Q To your knowledge, have the other parties  
6 submitted a BCPM that incorporates the changes that  
7 you made in September?

8 A I know that they've asked for it, because  
9 they realize we made that change. We've provided it  
10 to them. I don't know if they've submitted it, but I  
11 know they're aware of it and they realize we did that.

12 Q Do you have -- there was a response that  
13 you filed in response to some Staff discovery. It was  
14 Production of Document Request No. 33 in Staff's  
15 Fourth Set of PODs that involved percentages that the  
16 road network predicts customer location for different  
17 density zones.

18 A I think Mr. Rehwinkel is helping me find  
19 that here.

20 Q It's part of Exhibit 39, for the  
21 Commissioners.

22 A Yes, sir.

23 Q Okay. For Sprint-Centel's service  
24 territory, what percentage does the road network  
25 predict customer location for a density zone zero to

1 coefficient.

2 Q Why would it be appropriate to look at the  
3 one that you looked at versus the one that we were  
4 thinking is correct?

5 A First off, because correlation coefficient  
6 also will give you a sign. It will give you the  
7 nature of the relationship, not only the strength of  
8 it. If it's got a negative sign, you've got an  
9 inverse relationship, which this has a positive sign,  
10 so you have a positive relationship between road and  
11 population.

12 Q So we should look the correlation -- what  
13 did you say? The correlation coefficient?

14 A Yes, sir, correlation coefficient.

15 Q To figure out the percentage that the road  
16 network predicts customer location?

17 A Yes That's the same type correlation  
18 coefficient that Dr. Duffy-Deno was looking at  
19 yesterday.

20 Q What percentage does the road network  
21 predict customer location for a density zone five to  
22 20?

23 A Eighty-three.

24 Q Would you say that the efficiency of the  
25 road network presence as a predictor of customer

1 location varies by density zone?

2 A It varies slightly; not dramatically, but  
3 slightly.

4 Q In your presentation, you stated that the  
5 -- on the BCPM model on the first day of this hearing,  
6 you stated that the correlation between the road  
7 network and the customer location was about 90%?

8 A That's right. That would be a rough  
9 average of these.

10 Q Okay. How exactly did you arrive at that  
11 90% figure?

12 A That was a ball park. Five of the seven  
13 here are above 90.

14 MR. COX: That concludes Staff's questions.  
15 Thank you, Dr. Staihr.

16 CHAIRMAN JOHNSON: Commissioners?

17 COMMISSIONER JACOBS: A couple of things.

18 One, it seems to be a common challenge in  
19 rural areas. In the case of the BCPM, there's a  
20 sparsity of roads that you have to overcome, and in  
21 the case of the Hatfield, the absence of geocodeable  
22 addresses. And what I'm hearing you say is that you  
23 overcome that challenge in a more preferable way by --  
24 explain that to me again, how you say the way that --  
25 your way of overcoming that challenge is superior to

1 Hatfield.

2 THE WITNESS: Right. As you said, there is  
3 a serious lack of geocoded data in the rural areas.  
4 Sprint is aware of it. We serve rural areas here.

5 Making the assumption that the Hatfield  
6 Model actually used it is one thing, so let's make  
7 that assumption and say it did. If they don't have  
8 it, they have to use surrogate locations. There are  
9 surrogate locations right now in the model they've  
10 filed here. They put the people on census block  
11 boundaries, sometimes which are roads, sometimes which  
12 are rivers, sometimes which are railroad tracks,  
13 sometimes which are nothing.

14 The correlation shown here. for my money, a  
15 correlation of 80 to 90%, above 90%, is a very strong  
16 indicator that where you have roads, you have people.  
17 If you have to figure out where you put the people,  
18 you put them along the roads, especially since even in  
19 rural areas, especially in rural areas, telephone  
20 plant is built along the roads.

21 So we've got one surrogate method that  
22 takes into account the fact that that's where the  
23 telephone plant is built, and another surrogate method  
24 that might put people on railroad tracks or rivers.  
25 Our surrogate method is better where you don't have

1 any geocoded data, assuming you would use it in the  
2 first place.

3 COMMISSIONER JACOBS: So you're assuming  
4 that you have adequate identification of roads in each  
5 instance, and therefore you would have a preferable  
6 surrogate location method?

7 THE WITNESS: Yes, sir.

8 COMMISSIONER JACOBS: Where we had  
9 instances where you had a very slight instance of  
10 roads in one of your quadrants, that's the situation  
11 that I'm focusing on, how BCPM overcomes that, because  
12 that seems to be the challenge that you have.

13 THE WITNESS: I guess I'm not sure when you  
14 say overcome the challenge --

15 COMMISSIONER JACOBS: Where you have  
16 population in the quadrant, but a scarcity of roads in  
17 the quadrant.

18 THE WITNESS: Right.

19 COMMISSIONER JACOBS: And you need to deal  
20 with the surrogate location, if you will, because  
21 that's what you have to do, the surrogate; is that  
22 true?

23 THE WITNESS: Yes.

24 COMMISSIONER JACOBS: Okay. And your  
25 method of overcoming that is, as I understood it, to



1 trace that plant from the centroid back out.

2 THE WITNESS: Right. The plant is going  
3 to be built from the centroid to where the road is  
4 located in that quadrant.

5 COMMISSIONER JACOBS: Okay. So you're just  
6 going to find the roads.

7 THE WITNESS: Right.

8 COMMISSIONER JACOBS: And you're saying  
9 that that's a superior method.

10 THE WITNESS: Yes.

11 COMMISSIONER JACOBS: Okay. One other  
12 thing. There was a -- and there may be another  
13 witness who will deal with this, but there was an  
14 issue, and I think that was a factor in the Hatfield,  
15 that addresses the idea of looking for the  
16 efficiencies that you gain from technology or just  
17 scope of -- cost scopes.

18 THE WITNESS: Yes.

19 COMMISSIONER JACOBS: Does the BCPM  
20 undertake to do the same thing?

21 THE WITNESS: It does a similar thing in a  
22 different way. I'll try and be real short here.

23 The Hatfield Model does what it calls a  
24 life cycle analysis. In fact, it just looks at four  
25 different inputs that you can change, and they're

1           A     Yes, I recall that.

2           Q     Did you have any opportunity to verify or  
3 check into that on the break?

4           A     Yes, I did. A quick call was made to  
5 INDETEC. INDETEC is one of the developers of the  
6 model.

7                     Mr. Pitkin says there's one location out of  
8 23,000 grids where we build more than an 18,000-foot  
9 loop. We've done an analysis. We can't find that one  
10 location. According to our analysis, we don't have  
11 any loops that are over 18,000 feet.

12                    MR. REHWINKEL: That's all I have.

13                    Madam Chairman, I also wanted to raise as a  
14 matter, Dr. Staihr referred in some of his answers to  
15 the handout that was used on the first morning. I  
16 would suggest it would be appropriate to mark that as  
17 an exhibit, since it was used in his description and  
18 some of his answers to his testimony.

19                    CHAIRMAN JOHNSON: Okay. We'll mark that  
20 as Exhibit 63, with a short title, Staihr's handout.

21                    MR. REHWINKEL: BCPM presentation slides?

22                    CHAIRMAN JOHNSON: Sure.

23                    (Exhibit 63 marked for identification.)

24                    MR. LAMOUREUX: Since we're doing that, to  
25 make the record complete, could we mark the slides

1 that Mr. Wood used in his presentation as the next  
2 exhibit?

3 CHAIRMAN JOHNSON: We'll mark that as --

4 MR. REHWINKEL: Madam Chairman, in  
5 fairness, I have no objection. Mr. Wood is coming on,  
6 and it may be appropriate to do it with his testimony.

7 MR. LAMOUREUX: That's fine. I figured I  
8 could do it now or I could do it later, and before I  
9 forgot, I thought I would do it now.

10 MR. REHWINKEL: I have no objection. I had  
11 a different basis for it, but in fairness,  
12 Mr. Lamoureux has a valid point.

13 CHAIRMAN JOHNSON: Do you want to do it now  
14 or when he comes on -- you want to just mark it so --

15 MR. LAMOUREUX: Yes, please.

16 CHAIRMAN JOHNSON: We'll mark it as 64, and  
17 it will be the HIF presentation slides. Did I say --  
18 HAI.

19 (Exhibit 64 marked for identification)

20 MR. REHWINKEL: At this time I would move  
21 Exhibits 57, 58, 59, and 63.

22 CHAIRMAN JOHNSON: Show 57, 58, 59, 60,  
23 and 63 admitted. And we had two late-filed, 61 and  
24 62, Staff late-fileds. And we have 64, which is the  
25 AT&T slide presentation. Show that admitted without

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