

BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

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



VOLUME 13

Pages 1412 through 1544

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 9:10 a.m.

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

REPORTED BY: H. RUTHE POTAMI, CSR, RPR
Official Commission Reporter

APPEARANCES:
(As heretofore noted.)

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P R O C E E D I N G S

(Hearing reconvened at 9:10 a.m.)

(Transcript follows in sequence from
Volume 12.)

CHAIRMAN JOHNSON: We're going to go ahead
and go back on the record this morning. Any
preliminary matters?

MS. CASWELL: I do have one, Madam Chairman.
At the prehearing conference I indicated our witness
Carl Danner would not be available past Wednesday
afternoon.

Given the subject matter of the witnesses
that are to come today, I think it's a very good
possibility that he would not get up today given his
current position, so I would ask that he be moved up
this morning to directly after Mr. Olson. I've spoken
to the parties that I could find this morning, and I
don't think anybody has any objections. But that
would be my request.

CHAIRMAN JOHNSON: Any objections to us
taking Mr. Danner after Mr. Olson? (No response.)

Seeing none, then we'll do that.

MS. CASWELL: Thank you.

CHAIRMAN JOHNSON: Any other preliminary
matters?

1 MR. COX: None that Staff is aware of.

2 CHAIRMAN JOHNSON: I think then we're ready
3 for GTE's next witness, Mr. Olson.

4 MR. POWELL: Thank you, Madam Chair. GTE
5 now calls Steven Olson, please.

6 CHAIRMAN JOHNSON: Of all of the witnesses
7 that are here today, has everyone been sworn in? No?

8 Mr. Olson, were you sworn in?

9 WITNESS OLSON: Yes, I was.

10 CHAIRMAN JOHNSON: Go ahead.

11 - - - - -

12 STEVEN A. OLSON

13 was called as a witness on behalf of GTE Florida
14 Incorporated and, having been duly sworn, testified as
15 follows:

16 DIRECT EXAMINATION

17 BY MR. POWELL:

18 Q Mr. Olson, please state your full name and
19 business address.

20 A Steven A. Olson, 600 Hidden Ridge, Irving
21 Texas.

22 Q Mr. Olson, by whom are you employed and in
23 what capacity?

24 A I'm employed by GTE, manager of regulatory
25 accounting and compliance.

1 Q Did you prepare a piece of prefiled
2 testimony and cause it to be lodged here with the
3 Commission on or about August the 3rd and have
4 attached to that testimony a single-page exhibit
5 marked as SAO-1?

6 A That's correct.

7 Q Was that testimony and was that exhibit
8 either prepared by you or under your direction and
9 control?

10 A That's correct.

11 Q Do you have any corrections that you need to
12 make to the testimony?

13 A No, I don't.

14 Q And it would be true, would it not, that
15 there were some corrections to SAO-1, which you have
16 made recently and which I'll represent and I think the
17 Commission and the parties know was circulated late in
18 the day yesterday?

19 A That's correct.

20 Q If I were to ask you those same questions
21 today as appear in your prefiled testimony, would your
22 answers be the same?

23 A Yes.

24 MR. POWELL: I would move the insertion of
25 Mr. Olson's prefiled testimony into the record as if

1 read here today.

2 MR. BECK: Madam Chairman, for the same
3 reasons yesterday, I -- with respect to Mr. Seaman's
4 testimony, I object to Mr. Olson's testimony. His
5 testimony is not relevant to the issues in this
6 docket.

7 CHAIRMAN JOHNSON: Objection as to
8 relevancy. You can respond, GTE.

9 MR. POWELL: Yes, ma'am. Thank you,
10 Madam Chair.

11 The objection to Mr. Olson's testimony
12 should be overruled, and for two reasons. There are
13 two separate but equally compelling reasons why the
14 Commission should reject the objection and admit the
15 testimony. One is a legal reason. The other is more
16 in the nature of an equitable argument.

17 First the legal argument. The objection is
18 as to relevance. The classic definition of relevance
19 is, is the evidence tendered, might it be helpful to
20 the fact finder or the decision maker on any issue in
21 play in the proceeding.

22 I would submit to the Chair and to the
23 Commission that not only is Mr. Olson's testimony and
24 SAO-1 relevant, indeed, I think it is essential to the
25 task at hand.

1 One of the central issues set forth in the
2 prehearing order and set forth by this Commission asks
3 which model should the Commission recommend to the
4 Legislature for purposes of sizing or estimating the
5 size of the cost of universal service; and we've had
6 ample testimony so far as to the two models that are
7 laid before the Commission.

8 Well, the purpose of these cost models is to
9 show what it would cost an efficient company to
10 provide basic local service. If the Commission wants
11 to weigh the efficacy of these two models in doing
12 what it is they purport to do, there are a number of
13 tests that the models must withstand.

14 We've heard about the test of internal
15 validity; for example, the Minimum Spanning Tree Test.
16 The Commission will inquire also whether the models
17 are open and subject to inspection and how adjustable
18 they are. A third and important and critical test on
19 model selection is one of external validity; how do
20 the model results compare with reality.

21 If the models cannot replicate or at least
22 estimate reality, then the model is useless. I would
23 hope that reality would be of interest to the
24 Commission and the Legislature in this very important
25 inquiry regarding the cost of providing and sustaining

1 and maintaining universal service. Now, there was
2 evidence yesterday and the day before with respect to
3 the HAI model.

4 The sponsors would have you believe that the
5 model before the Commission now, 5.0a, is a new and
6 improved and substantially different model than the
7 Version 2.2.2 that the Commission rejected in the
8 arbitration process.

9 Well, among the reasons the Commission
10 rejected the earlier version of the Hatfield model was
11 because it substantially understated ILEC costs. It
12 has certainly been GTE's position that the model now
13 before the Commission, 5.0a, also substantially
14 understates GTE's actual costs.

15 Well, how do we know this? A very reliable
16 measure of GTE's actual costs are GTE's revenues. GTE
17 believes that the process of regulation has worked in
18 this state. And if that is the case, then the
19 company's current revenues are a terrific surrogate
20 for its current actual costs, and those costs, as
21 reflected by the table on Page 6 of Mr. Seaman's
22 testimony yesterday that stimulated so much discussion
23 in the early evening, demonstrate what the cost today,
24 in fact, is of sustaining universal service.

25 It is surprising in this context that Public

1 Counsel would suggest that this evidence that we offer
2 with respect to our current actual costs is of no
3 probative value on the central question of which cost
4 model should be recommended to the Legislature.

5 Coming back around to the definition of
6 relevance in its classic sense, will this information
7 be helpful to the Commission and helpful to the
8 Legislature as you grapple with these important
9 issues? GTE thinks the answer to that question is
10 quite clear. The evidence is not merely relevant; it
11 is essential.

12 Now, my second point; the equitable
13 argument. There is a significant fairness component
14 at stake here. It's perfect clearly that Public
15 Counsel does not agree with GTE's theory of the case,
16 but GTE should be permitted to try its own case.
17 We've laid out in the testimony and will lay out in
18 our posthearing brief how we think the Commission and
19 the Legislature should resolve these important
20 questions.

21 Simply because Public Counsel has a
22 different view of it does not render the evidence
23 irrelevant. It's important evidence to GTE because it
24 is an important part of GTE's case that it wishes to
25 lay before the Commission and the Legislature.

1 I note parenthetically but not unimportantly
2 that Public Counsel evidently has changed its mind as
3 to the relevance of Mr. Olson's testimony and done so
4 literally at the 11th hour. The testimony was filed
5 nine weeks ago on August the 3rd. I presume Public
6 Counsel did not then think it was irrelevant, because
7 Public Counsel initiated discovery with respect to
8 Mr. Olson's testimony.

9 Indeed, there was a discovery dispute
10 between GTE and Public Counsel, and Public Counsel
11 engaged the valuable resources of this Commission in
12 pursuing a motion to compel responses to this
13 discovery. It's hardly consistent for Public Counsel
14 today to tell the Commission that this evidence is
15 irrelevant when yesterday and the day before that and
16 for eight weeks before that, Public Counsel thought
17 the evidence sufficiently relevant to pursue
18 discovery.

19 Lastly on the fairness point, the record
20 that is being developed in the course of these
21 proceedings and which will go, I presume, in some form
22 or another to the Legislature along with the
23 Commission's recommendation is not going to be a small
24 record by a long shot. There has been voluminous
25 testimony. There's quite a bit yet to come.

1 One might say that the evidence has perhaps
2 strayed a bit from a concise definition of the issues
3 that are on the table. We've heard about the revenue
4 benchmark. We have had some discussion about
5 implementation issues. We've had some discussion
6 about rate rebalancing.

7 The point I think here on the fairness point
8 at the end is there's no conceivable prejudice to
9 Public Counsel or to any of the other parties by
10 introducing this testimony. GTE should be permitted
11 to try its case as it sees fit, particularly when
12 there can be no prejudice.

13 To summarize then, GTE would urge the
14 Commission to acknowledge that this evidence is
15 plainly relevant, clearly important, and necessary for
16 the Commission to discharge the duty that the
17 Legislature has given it.

18 Secondly, as a matter of fairness, GTE
19 should be permitted to continue the discussion that
20 the Commission had with Mr. Seaman yesterday evening,
21 which I thought was clearly of interest to the
22 Commission, certainly of interest to GTE. Mr. Olson's
23 evidence is all of a piece with the discussions with
24 Mr. Seaman yesterday evening.

25 So to summarize then, we think the objection

1 is ill founded, and we would urge the Commission to
2 overrule the objection and permit Mr. Olson's
3 testimony to proceed and be a part of this record.

4 **CHAIRMAN JOHNSON:** Thank you. Mr. Beck?

5 **MR. BECK:** Madam Chairman, Mr. Olson's
6 testimony has nothing to do with either of the models.
7 The issues in this case deal with the cost of basic
8 local telecommunications service. Mr. Olson's
9 testimony does not deal with that.

10 Mr. Olson's testimony purports to give GTE's
11 regulated intrastate earnings after taking out the
12 directory advertising revenues that would otherwise be
13 required by statute. It's not local
14 telecommunications. It's all intrastate services that
15 it purports to give absent the statutory required
16 advertising revenues. It doesn't help tell you
17 whether to pick the HAI or BCPM model in any way,
18 shape or form.

19 If GTE were arguing that the return on
20 equity that they've developed in Mr. Olson's testimony
21 is the return on equity that should be used for their
22 model, it might be relevant; but of course that's not
23 what they're arguing. They want you to ignore the
24 return on equity when picking the inputs to the model
25 because they have other witnesses that talk about

1 return on equity. His return on equity is not the one
2 they want you to use in the model, to be sure, because
3 it would lower their costs if they were to do so.

4 It simply doesn't help -- whatever the
5 results that he would provide you, whether it's a 4%
6 on equity or a 40% or a negative 5 doesn't help you in
7 any manner pick which model you would use, nor does it
8 help you decide any issue that's before you;
9 therefore, it should be stricken.

10 CHAIRMAN JOHNSON: Thank you, Mr. Beck.
11 Staff?

12 MR. COX: I'll address the two reasons that
13 GTE's counsel put forward. The first, the legal
14 reason, the relevancy:

15 Staff has done its best to look over this
16 information, and we've determined that this appears to
17 be embedded type information that's more akin or
18 proper for a rate case type analysis. We fail to see
19 any relevance to what the Commission is doing here in
20 determining a forward-looking cost proxy model to
21 determine the cost of basic local telecommunications
22 services.

23 We just can't make the logical jump from
24 revenues to the costs that we're trying to determine
25 in this proceeding. We just don't see it.

1 With regard to fairness, we agree GTE should
2 be able to put forward its case, but if the
3 information is not relevant, it's simply not relevant;
4 and we believe that the Public Counsel's objection is
5 a valid one.

6 He wasn't required to voice that objection
7 earlier in the proceeding. He could voice it now.
8 That's his prerogative, and he has the right to do
9 that. And we agree there's no prejudice, but the
10 problem is it still has to be relevant information.
11 And we just don't see the relevancy is the bottom
12 line.

13 **CHAIRMAN JOHNSON:** Thank you. I'm going to
14 sustain the objection and strike the testimony --
15 well, not allow the testimony to be inserted into the
16 record as though read of Mr. Olson; and we did not
17 identify the exhibit, but that would include the
18 exhibit.

19 **MR. POWELL:** Madam Chair, I suppose it would
20 be appropriate to go ahead and identify the exhibit.
21 I think next in line it would be No. 56.

22 **CHAIRMAN JOHNSON:** Identify it as Exhibit 56
23 and short title OAS-1.

24 **MR. POWELL:** I would also ask the Commission
25 then to receive Mr. Olson's testimony and Exhibit 56

1 in the form of an offer of proof to be appended to the
2 record in that form, having noted that the Public
3 Counsel's objection has been sustained.

4 **CHAIRMAN JOHNSON:** We'll show it proffered,
5 but not admitted. The exhibit will not be admitted.

6 **MR. POWELL:** I understand that you're not
7 going to admit it, but what I'm making is an offer of
8 proof of Mr. Olson's testimony and the exhibit, and
9 would ask that it be appended not as admitted
10 evidence, but as the proffered evidence by GTE on this
11 subject.

12 **CHAIRMAN JOHNSON:** I think that's what we
13 generally do, so that will be fine.

14 **MR. COX:** Chairman Johnson, I think you said
15 OAS-1. It's SAO-1, just so the record is clear.

16 **CHAIRMAN JOHNSON:** I always transpose. Yes.
17 Show it identified as SAO-1 and not admitted.

18 (Exhibit 56 marked for identification.)

19 **CHAIRMAN JOHNSON:** Thank you, Mr. Olson.
20 Witness excuse. I think we're ready for Mr. Danner.

21 (Witness Olson excused.)

22 - - - - -

23 **MR. CARVER:** Madam Chairman, while he's
24 taking the stand, could I raise another matter
25 briefly?

1 **CHAIRMAN JOHNSON:** Yes.

2 **MR. CARVER:** At the prehearing conference
3 about two weeks ago, Commissioner Jacobs asked the
4 parties who were going to put up a panel to file a
5 notice last Wednesday to provide everyone, in effect,
6 sort of fair notice as to what their panel would be
7 doing; and the specifics were that each party was to
8 identify the areas about which the various panel
9 members could speak and to designate a lead panel
10 member.

11 Mr. Pitkin and Mr. Wood, I believe, will be
12 taking the stand later today on behalf of AT&T and
13 MCI, and I don't believe AT&T has filed anything. I
14 have had some informal discussions with their counsel,
15 but I would like to have their notice before their
16 witnesses take the stand so that we can prepare.

17 **CHAIRMAN JOHNSON:** Mr. Hatch?

18 **MR. HATCH:** Yes, ma'am. I failed to file
19 that document. I had not been able to catch up with
20 Mr. Wood to get that clarified until Sunday night,
21 Monday morning; and I talked to Mr. Carver Monday
22 morning to explain to him my answer from Mr. Wood as
23 to the portions of the testimony.

24 I assumed that took care of the problem, but
25 if you want the formal document, then that's fine;

1 I'll be glad to supply it.

2 **CHAIRMAN JOHNSON:** I'm hearing a need for
3 the formal document.

4 **MR. CARVER:** Yes, ma'am. And, also, one of
5 the things that I believe was to be included was the
6 designation of one or the other of them as a lead
7 member, and I don't think Mr. Hatch even informally
8 has been able to communicate that. So that's
9 something that I hope would be in the notice.

10 **CHAIRMAN JOHNSON:** Mr. Hatch, can you take
11 care of that?

12 **MR. HATCH:** I'd be glad to. I thought we
13 had solved all these questions. Apparently not.

14 **CHAIRMAN JOHNSON:** Thank you. Any other
15 preliminary matters before Mr. Danner? (No response.)

16 Ms. Caswell?

17 **MS. CASWELL:** GTE calls Mr. Carl Danner.

18 Mr. Danner, could you please state your name
19 and business address for the record?

20 **WITNESS DANNER:** I haven't been sworn
21 either.

22 **MS. CASWELL:** Madam Chairman, I think he
23 needs to be sworn as well.

24 **CHAIRMAN JOHNSON:** Anyone who has not been
25 sworn that needs to be sworn?

1 (Witnesses collectively sworn.)

2 - - - - -
3 **CARL DANNER**

4 was called as a witness on behalf of GTE Florida
5 Incorporated and, having been duly sworn, testified as
6 follows:

7 **DIRECT EXAMINATION**

8
9 **BY MS. CASWELL:**

10 **Q** Again, Mr. Danner, would you please state
11 your name and business address?

12 **A** Yes. My name is Carl R. Danner. My address
13 is Suite 1650, 100 Bush Street, San Francisco,
14 California 94104.

15 **Q** By whom are you employed and in what
16 capacity?

17 **A** I'm employed by Wilk & Associates,
18 Incorporated as a consultant.

19 **Q** Did you submit rebuttal testimony in this
20 proceeding.

21 **A** Yes, I did.

22 **Q** Do you have any changes to this testimony?

23 **A** There is a typographical error on Page 3,
24 Line 21. The word "utilize" appears to be misspelled.
25 That should be corrected, and I believe we need a

1 close quote at the end of that line. Aside that from
2 that, I have no other changes.

3 Q So that if I were to ask you the same
4 questions today, would your answers remain the same?

5 A Yes, they would.

6 MS. CASWELL: Madam Chairman, I would ask
7 that Mr. Danner's testimony be inserted into the
8 record as though read.

9 CHAIRMAN JOHNSON: It will be so inserted.

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1 GTE FLORIDA INCORPORATED
2 REBUTTAL TESTIMONY OF CARL R. DANNER
3 DOCKET NO. 980896-TP
4

5 Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

6 A. My name is Carl R. Danner. My business address is Wilk &
7 Associates, Inc., 100 Bush Street, Suite 1650, San Francisco, CA
8 94104.
9

10 Q. PLEASE BRIEFLY SUMMARIZE YOUR RELEVANT EXPERIENCE
11 AND QUALIFICATIONS.

12 A. I was formerly Advisor and Chief of Staff to Commissioner (and
13 Commission President) G. Mitchell Wilk at the California Public
14 Utilities Commission (CPUC), and in that role I designed key
15 components in telephone regulation for California, and helped develop
16 new regulatory policies and programs for the cellular industry, long
17 distance telecommunications, and other communications services.
18 Since leaving the CPUC I have consulted on issues of regulatory
19 politics and policy to a variety of clients, with a primary emphasis on
20 telecommunications. I hold a masters and Ph.D. in Public Policy from
21 Harvard University, where my dissertation addressed the strategic
22 management of telecommunications regulatory reform. At Harvard I
23 served as Head Teaching Assistant for graduate courses in
24 microeconomics, econometrics and managerial economics. I hold an
25 AB degree from Stanford University, where I graduated with distinction

1 in both economics and political science. My experience is broad-
2 based, including research into and teaching about regulation, advising
3 regulators, testifying in regulatory proceedings, and also advising
4 clients as a consultant on regulatory issues.

5

6 **Q. WHAT IS THE PURPOSE OF YOUR REBUTTAL TESTIMONY?**

7 A. My rebuttal testimony addresses direct testimony filed on August 3,
8 1998 by Mr. Richard Guepe, appearing on behalf of AT&T, and Mr.
9 Joseph Gillan, appearing on behalf of The Florida Competitive
10 Carriers Association ("FCCA").

11

12 Each of these witnesses (and Mr. Gillan in particular) offered some
13 incorrect or potentially confusing testimony regarding the proper cost
14 treatment of the local loop when calculating the cost of basic
15 telephone service. Contrary to what their testimony states or may
16 convey, the local loop is a cost of basic local telephone service, and
17 its cost should be included in the calculated cost of basic local
18 telephone service. There is widespread agreement on this point
19 among the economics profession and in the industry, including AT&T,
20 and claims to the contrary contradict the principles of economics, and
21 common sense.

22

23 **Q. IS THE LOCAL LOOP A COST OF BASIC SERVICE**
24 **IRRESPECTIVE OF THE COST TO PROVIDE OTHER**
25 **ASSOCIATED SERVICES?**

1 A. Yes, it is – irrespective of the cost to provide other services, whether
2 “associated” or not. The cost of the loop is caused by a customer’s
3 decision to have basic telephone service whether or not the customer
4 uses the telephone to buy other services as well. Therefore, when the
5 Commission calculates the cost of basic local telephone service by
6 use of a cost proxy model (or by any other means), it must include the
7 full cost of the loop as a cost of basic local service.

8
9 It’s like buying a car – it needs all four tires no matter how much you
10 plan to drive it. I’m not aware of any way to pay for only two tires for
11 a car that will only be driven on Sunday. Likewise, even a customer
12 who won’t use the phone much needs the whole loop to have any
13 service at all, which is why that cost is part of basic phone service.

14
15
16 Q. WHERE IS THIS POINT ADDRESSED IN THE DIRECT TESTIMONY
17 OF MR. GUEPE AND MR. GILLAN?

18 A. At pages 12-16 of his direct testimony, Mr. Guepe presents his point
19 of view on how subsidies should be measured, and states that the
20 “costs of local residential services” should include the “forward looking
21 economic costs associated with all services that ^{utilize} utilize the local loop”
22 (Guepe, page 13); he then goes on to argue that those costs should
23 be compared with a corresponding total revenue figure to measure
24 subsidies. For his part, Mr. Gillan discusses loop cost-related issues
25 at pages 7-17 of his direct testimony, stating that the loop is a

1 common cost of multiple services, and recommending an approach to
2 calculating subsidies that is similar to what Mr. Guepe suggests.

3

4 **Q. MR. GILLAN CLAIMS THAT THE LOCAL LOOP IS NOT JUST A**
5 **COST OF BASIC LOCAL SERVICE, BUT THAT IT ALSO HELPS**
6 **"PROVIDE" OTHER SERVICES AND SO IS MIXED UP WITH THEM**
7 **TO THE POINT WHERE IT CAN'T BE SEPARATED OUT. THUS,**
8 **MR. GILLAN SAYS, CONSIDERING THE WHOLE LOOP AS PART**
9 **OF BASIC SERVICE WILL GIVE THE WRONG ANSWERS WHEN**
10 **TRYING TO TEST WHICH SERVICES ARE SUBSIDIZED. CAN**
11 **YOU COMMENT?**

12

13 **A.** Yes, I can comment. Mr. Gillan is clearly incorrect. The loop is a cost
14 of basic local service and nothing else, a common sense fact on which
15 economists and the industry have agreed.

16

17 First, the common sense. A customer needs a loop – and all of it – to
18 get connected to the network and have any telephone service at all.
19 The phone won't work with only half a loop, or a quarter of a loop, or
20 whatever. Giving a customer basic telephone service at all is what
21 causes the need for, and cost of a loop. In particular, a customer who
22 gets phone service and never uses it much still needs an entire loop.
23 And when a customer uses the phone (to make a long distance call,
24 order a pizza, or talk to an attorney), he or she doesn't cause any
25 more loop cost, so it doesn't make any economic sense to say that

1 loop costs should be allocated to the price of long distance calls,
2 pizzas, or legal bills. It's the same pair of wires (or the electronic
3 equivalent) sitting there whether or not a customer is making a call;
4 the costs don't change, which is why those costs aren't a part of those
5 other services.

6
7 Turning to the views of economists: A recent article in the Journal of
8 Regulatory Economics highlighted their conclusions and agreement
9 that the loop is a cost of basic local service:

10
11 "Because of the focus on the costs and revenues of basic local
12 exchange service in cost proxy models, rate rebalancing
13 proceedings, the FCC access charge reform proceedings, and
14 universal service proceedings, the proper treatment of local
15 loop costs has become critically important. One sometimes
16 hears of unpublished measures of cross-subsidization in which
17 residential basic local exchange service is either not subsidized
18 or is purported to actually provide a subsidy to other services.
19 This result is invariably based on a misunderstanding or
20 misrepresentation of the costs of loop facilities as shared or
21 common costs rather than as a cost that is directly attributable
22 to the provision of access to a modern telecommunications
23 network.

24
25

1 *For a variety of reasons, analyses of loop costs are
2 susceptible to logical error. When considered properly and
3 carefully, it is clear that loop costs are not common production
4 costs to the LEC. Rather, loop costs are directly attributable to
5 the services that cause them (e.g. private line, special access,
6 Centrex, and the subscriber access component of basic local
7 exchange service). Kahn and Shew (1987) first described the
8 fallacy of considering the costs of local access as joint or
9 common costs in the context of a discussion on six pricing
10 fallacies. Parsons (1994) later expands the work of Kahn and
11 Shew and arrives at similar conclusions.

12
13 There appears to be only one article by economists, Gabel and
14 Kennet (1993(a)), disputing the finding that loop costs are not
15 common production costs to the LEC. However, this article
16 induced a record three comments in response to the article in
17 the Review of Industrial Organization. It also appears that
18 Gabel and Kennet are inconsistent in their article, at times
19 arguing that loop costs are incremental to toll calling and at
20 other times arguing that these costs are common costs."
21 Parsons, Steve C. "Cross-Subsidization in
22 Telecommunications," Journal of Regulatory Economics 13:
23 157-182 (1998), pages 169-70. Citations omitted.

24
25

1 As the above indicates, other professional articles have even
2 catalogued loop allocation fallacies, and described how they contradict
3 the correct use of economic principles. See Kahn, Alfred E. and
4 William B. Shew. "Current Issues in Telecommunications Regulation:
5 Pricing," 4 Yale Journal on Regulation 191-256 (1987). See also
6 Parsons, Steve G. "Seven Years after Kahn and Shew: Linger-
7 Myths on Costs and Pricing Telephone Service," Yale Journal on
8 Regulation, Vol. 11, No. 1 (Winter, 1994), pages 149-170.

9
10 With respect to the industry's position on the same issue I would note
11 a recent filing made jointly by AT&T and MCI before the Indiana Utility
12 Regulatory Commission (IURC):

13
14 ...the issue of whether the cost of the loop is a direct cost of
15 providing BLS [basic local service] or is a joint or common cost
16 to be allocated among BLS and other services must be
17 decided first and foremost on the basis of sound economics.

18
19 "As Dr. Harris testified during cross-examination at the hearing,
20 essentially every credible economist agrees on this issue.
21 Under basic economic principles of cost causation, the cost of
22 the loop is a direct cost of providing BLS. Indeed, the entire
23 telecommunications industry – incumbent monopolists, CLECs,
24 and IXCs – all agree that, as a matter of sound economics, the
25 cost of the loop is a direct cost of providing BLS. The entire

1 industry also agrees that competition in the local exchange will
2 not develop effectively if the cost of the loop is improperly
3 allocated as a joint or common cost among BLS and other
4 services." *Joint Submission of Proposed Form of Order (by*
5 *AT&T and MCI), IURC Cause No. 40785, June 8, 1998*
6 *(emphasis in original)*

7
8 I believe the Commission will recognize a statement of such
9 agreement across the industry as truly extraordinary. Indeed, the Dr.
10 Harris to which AT&T and MCI referred is Dr. Robert Harris of the
11 University of California at Berkeley -- who appeared as a witness in
12 that case for Ameritech Indiana, not AT&T or MCI. I can't recall the
13 last time AT&T and MCI cited a witness from an RBOC in this way in
14 an important argument before a regulatory agency.

15
16 Simply put, Mr. Gillan's argument regarding the loop is just incorrect,
17 and should be ignored.

18
19

20 **Q. WHAT BASIC DEFINITION OF ECONOMICS DETERMINES THE**
21 **PROPER WAY TO TREAT A LOOP IN CALCULATING THE COST**
22 **OF BASIC TELEPHONE SERVICE?**

23 **A.** According to the principles of economics, all costs are opportunity
24 costs, that is they measure what must be given up (on the one hand)
25 in order to obtain something or take some action (on the other hand).

1 As Dr. N. Gregory Mankiw explains in his introductory economics
2 textbook:

3

4 "The cost of something is what you give up to get it."

5 *Mankiw, N. Gregory. Principles of Economics (The*
6 *Dryden Press, 1997), page 5.*

7

8 The key to this definition is cost-causation, or identifying what costs
9 are caused by a particular decision someone makes to use or
10 consume something. This is a fundamental principle of economics;
11 in fact, Dr. Mankiw's text identifies this as one of the ten "core ideas"
12 that form "the foundation for most economic analysis." *Mankiw, page*
13 *vii*. Thus, to understand how the cost of the loop fits into telephone
14 service, we need to find the decision that causes the cost of the loop
15 to be incurred. That is what "cost" means.

16

17 **Q. WHAT CAUSES THE COST OF A RESIDENTIAL LOOP TO BE**
18 **INCURRED?**

19 **A.** A customer needs a loop in order to have basic telephone service,
20 and once put in place, that loop is dedicated to the customer it serves
21 Therefore, the decision to have telephone service (or the telephone
22 company's accurate prediction that a customer, say in a new
23 development, will subscribe to telephone service) is what causes the
24 cost of a loop to be incurred. To say it another way, a loop is needed
25 to provide access to the network, regardless of how that access is

1 then used; and customers get access to the network as a part of basic
2 service. Keeping a loop in use for telephone service also causes
3 some other fixed and recurring costs (e.g. for routine billing, customer
4 service and maintenance) that again are caused by the decision to
5 have any telephone service at all.

6
7 Indeed, one could even imagine charging for telephone service in
8 exactly the same way as the costs are incurred – levying a substantial
9 one-time fee to purchase the loop, along with a small ongoing monthly
10 fee for upkeep, perhaps followed by a subsequent one-time fee if the
11 loop needed to be replaced many years later. Of course, it also works
12 for customers to rent the use of such an asset on a monthly basis,
13 including the upkeep, with the company financing the initial cost and
14 future replacements that might be needed. Loop costs are usually
15 converted to their monthly lease equivalent in regulatory cost studies,
16 given the broad acceptance of such an approach.

17
18 **Q. DOES THE COST OF A LOOP VARY WITH HOW IT IS USED?**

19 **A.** As a general matter, loop costs do not vary with whether or how a
20 loop is used, e.g. the costs are the same whether the loop lies idle or
21 is used to place calls 24 hours a day. I am aware of some additional
22 costs that can be related to certain service demands placed on a loop,
23 such as a need for loop conditioning to assure a certain signal-to-
24 noise ratio. Another example would include ISDN service, where
25 multiplexers need to be added to the line.

1 But these examples show only that certain types of service or usage
2 can cause additional costs over and above the fixed cost of the loop
3 that every subscriber needs to have any kind of service. Such
4 additional costs, where they occur, should be recovered by usage-
5 based prices.

6

7 **Q. WHAT DO THESE ECONOMIC PRINCIPLES AND FACTS**
8 **REQUIRE FOR HOW A LOOP SHOULD BE TREATED IN ANY**
9 **COMMISSION STUDY OF THE COSTS OF TELEPHONE**
10 **SERVICE?**

11 **A.** These economic principles and facts require that the cost of the loop
12 be recognized as a cost of basic local telephone service, since the
13 demand for basic telephone service causes the cost of the loop. By
14 contrast, using the loop to buy other goods and services (such as long
15 distance calls, or take-out pizza) does not cause any of the cost of the
16 loop, so the loop is not a part of the cost of such other goods and
17 services.

18

19 **Q. SINCE A LOOP IS USED TO HELP PROVIDE MANY TELEPHONE**
20 **SERVICES (SUCH AS WHEN A CUSTOMER MAKES A LONG**
21 **DISTANCE CALL), WHY ISN'T THE LOOP A COMMON COST TO**
22 **ALL OF THOSE SERVICES?**

23 **A.** It is easy to become confused between the decision that actually
24 causes the cost of a loop to be incurred, versus the additional services
25 a customer can buy *using* a loop once he or she has one to use. But

1 in reality, the decision to have a loop in the first place is different from
2 a decision to use it for a separate purpose, such as making a long
3 distance call or ordering a pizza.

4
5 Analogies are helpful for revealing this critical distinction. Having
6 rented a loop, a customer can use it to purchase many other things –
7 long distance calls, professional services from attorneys or
8 accountants, or anything else that can be bought by calling an 800
9 number or using a credit card. But none of those purchases, long
10 distance included, causes any additional cost related to the loop.
11 Contemplating trying to recover loop costs from an attorney's office or
12 1-800-FLOWERS helps to highlight the nature of this fallacy.

13
14 To use Mr. Gillan's term, a loop can be said to "provide" all kinds of
15 services – not just telecommunications – depending on how a
16 customer decides to use his or her telephone. But that doesn't mean
17 that any of those other services or transactions cause any loop costs,
18 or that the revenues and costs of those other services should be
19 included in deciding where the subsidies are in telephone service.

20
21 **Q. HOW DOES MR. GILLAN'S ARGUMENT HINGE ON HIS**
22 **INCORRECT CLAIM ABOUT THE COSTS OF THE LOOP?**

23 **A.** Because Mr. Gillan thinks (incorrectly) that it is impossible to
24 determine the cost of basic telephone service, Mr. Gillan discovers
25 what he terms a "rather large dilemma" – that if the cost of the loop

1 and the switch is considered as part of basic telephone service, one
2 could calculate that a given customer's basic telephone service is
3 subsidized even though that customer's local telephone company may
4 be making a profit from that customer, due to sales of other services
5 to that customer. This concerns Mr. Gillan. But Mr. Gillan's "dilemma"
6 is not real, and is easily understood using correct economics and
7 common sense.

8
9 Basic local telephone service in Florida is cross-subsidized by
10 revenues from other services whose prices are therefore higher than
11 they otherwise would be. Thus, a customer who buys enough of the
12 other services can provide enough mark-up to the telephone company
13 to offset the subsidy he or she is receiving on the basic monthly rate.
14 Indeed, it's quite common for customers to subsidize themselves
15 under this approach to pricing, where one part of the bill is
16 underpriced and the other part of the same telephone bill is overpriced
17 to help make up the difference. Looking at the average revenue per
18 customer figures Mr. Guepe provides (Guepe, page 18), it's obvious
19 that customers are subsidizing themselves in Florida.

20
21 Therefore, there's no "dilemma"; nor do we learn anything about the
22 cost of local telephone service by lumping all telephone service
23 revenues and costs together in one pot and figuring out whether they
24 offset one another, as Mr. Guepe and Mr. Gillan propose. Today we
25 have a number of services that are paying the subsidies, and another

1 set of services that are receiving the subsidies. If you pool together
2 the services that are paying and those that are receiving, their costs
3 and revenues should more or less net out – but that's no reason to
4 deny that the subsidies exist in the first place.

5

6 **Q. PLEASE SUMMARIZE YOUR TESTIMONY AND CONCLUSIONS.**

7 **A.** The only conclusion that reflects economic principles and the realities
8 of the telephone network is that the loop, and associated fixed costs,
9 are a part of basic local service. Mr. Gillan's claim to the contrary is
10 simply incorrect, and any such implication that might be taken from
11 Mr. Guepe's testimony would also be incorrect.

12

13 When the Commission calculates and/or reports the cost of basic local
14 telephone service in Florida, it must include the full cost of the local
15 loop.

16

17 **Q. DOES THIS CONCLUDE YOUR REBUTTAL TESTIMONY?**

18 **A.** Yes.

19

20

21

22

23

24

25

1 MS. CASWELL: Mr. Danner is available for
2 cross-examination.

3 CHAIRMAN JOHNSON: Okay.

4 MR. HATCH: AT&T has no questions.

5 MS. CASWELL: I'm sorry. I forgot to ask
6 him to do his summary.

7 CHAIRMAN JOHNSON: You can do a summary.

8 WITNESS DANNER: Thank you, Madam Chairman.
9 I'll be brief with the summary.

10 The purpose of this proceeding, as I
11 understand it, is to determine the costs of basic
12 local exchange service. And so in order to accomplish
13 that task, we need to know what to do with the cost of
14 the loop, and my testimony responds to testimony of
15 two other witnesses that suggest that the cost of the
16 loop may not be able to be attributed to basic local
17 service, but perhaps should be treated in some other
18 way, either allocated or treated in some fashion of
19 total revenues and total costs, as is suggested
20 particularly by Mr. Gillan.

21 In response, I would offer that cost means
22 cost causation as a bedrock principle of economics,
23 and, in fact, it's such an important principle of
24 economics, that if you don't consider cost as
25 causation, then the uses to which cost information can

1 be put in economics basically don't work.

2 Costs send signals through prices to tell
3 people and firms the real consequences of their
4 actions, and if costs aren't based on cost causation,
5 in particular, that function of prices and costs will
6 not work.

7 I believe there is no dispute in the
8 economics literature as to the definition of costs
9 from this perspective.

10 As it happens, the cost of a loop is caused
11 by plugging a customer into the network, by giving
12 them access; and in Florida, as in most states, or all
13 states, to my knowledge, most customers obtain their
14 access to the network through basic local service.

15 Furthermore, that loop is dedicated to a
16 particular customer and so, therefore, there's no
17 question from a cost standpoint that the entire cost
18 of the loop is a part of basic local exchange service
19 for customers who purchase their access to the network
20 in that fashion which, as I said, I believe is most
21 customers.

22 Further, other services, such as have been
23 cited by Mr. Gillan, don't cause any loop cost. That
24 includes long distance service, vertical services,
25 access to voice mail, even nontelecommunications uses

1 of the telephone, such as ordering food out or talking
2 to an attorney or other services that are either
3 provided in part through the loop or for which the
4 loop must be used to provide.

5 None of those other uses or services cause
6 any cost of the loop, so therefore you cannot allocate
7 or attribute any cost of the loop to them.

8 The term "use" or "helps provide" does not
9 describe cost causation, and so therefore is not an
10 economic cost. Economists generally agree on this.
11 The telephone industry, to my knowledge, generally
12 agrees on this.

13 I would read briefly from my rebuttal
14 testimony from a filing made by AT&T and MCI before
15 the Indiana Utility Regulatory Commission:

16 "Essentially every credible economist agrees
17 on this issue. Under basic economic principles of
18 cost causation, the cost of a loop is a direct cost of
19 providing BLS." Which is basic local service in
20 Indiana.

21 "Indeed, the entire telecommunications
22 industry, incumbent monopolists, CLECs, and IXCs all
23 agree that as a matter of sound economics, the cost of
24 the loop is a direct cost of providing BLS. The
25 entire industry also agrees that competition of the

1 local exchange will not develop effectively if the
2 cost of the loop is improperly allocated as a joint or
3 common cost among BLS and other services."

4 I note, with respect to Mr. Gillan's
5 testimony, that I had the opportunity to review the
6 testimony he gave the other day before the Commission,
7 the cross-examination. I note that Mr. Gillan also
8 agrees that a subscriber causes the cost of a loop
9 when he subscribes to basic local service.

10 So in that sense I don't believe there's any
11 dispute, at least in the record of this proceeding
12 among the witnesses who have filed testimony here,
13 notwithstanding what we heard last week at the
14 workshop.

15 I believe in this record there may no longer
16 be any dispute as to the cost treatment of the loop
17 and basic local service. And when one attributes the
18 cost of the loop to basic local service, one does
19 discover the rather large cross-subsidies in rates
20 that other witnesses have talked about, and which I
21 know have been debated at some length in this
22 proceeding.

23 Finally, I rebut Mr. Gillan's suggestion of
24 kind of a revenue side test for this, that in his mind
25 one should look at whether a customer is subsidized in

1 total rather than whether particular services are
2 subsidized.

3 In essence he's suggesting that if the
4 cross-subsidies add up and somehow cancel each other
5 out, that there's no problem or no issue. I would
6 submit that that argument assumes away the whole
7 purpose of the Telecommunications Act with respect to
8 making subsidies explicit and finding explicit support
9 for them as a means of promoting competition and
10 accommodating to a more competitive environment.

11 That completes my summary.

12 MS. CASWELL: Mr. Danner is now available
13 for cross-examination.

14 CHAIRMAN JOHNSON: AT&T?

15 MR. LAMOUREUX: AT&T has no questions.

16 CHAIRMAN JOHNSON: Mr. Henry?

17 MR. HENRY: Madam Chairman, I just have one
18 or two.

19 CROSS EXAMINATION

20 BY MR. HENRY:

21 Q Mr. Danner, good morning.

22 A Good morning.

23 Q My name is Mickey Henry, and I represent
24 MCI. You were here when Mr. Gillan testified;
25 correct?

1 A I read the transcript of his testimony. I
2 wasn't here.

3 Q And did you see where Mr. Gillan in fact
4 said that there was no economically rational way to
5 allocate the cost of a loop?

6 A I believe I did see that, yes.

7 Q So a lot of your rebuttal would suggest that
8 Mr. Gillan is incorrect in an economic sense because
9 he advocated the allocation of the cost of the loop is
10 not correct.

11 A I don't believe I suggested that he
12 advocated allocation. I said that -- I reported his
13 conclusion that one could not attribute the cost of
14 the loop to basic local service. And then he says
15 don't allocate, but do this other approach of which I
16 spoke just a moment ago.

17 Q Are you familiar with the FCC's decision on
18 the May 7th, '97 order, I believe, on universal
19 service?

20 A In general terms yes.

21 Q And the FCC adopted a revenue benchmark
22 which included a -- which included services that are
23 very similar to what Mr. Gillan is proposing as a
24 family of services in this docket; isn't that correct?

25 A I think that's generally correct, yes.

1 Q And did you note in the FCC's order where
2 they made the statement that, for example, for
3 vertical services, since the cost models include the
4 cost of a port and the port is where the cost of
5 vertical services sit, that you should include the
6 revenues from those services? Are you familiar with
7 that passage in the order?

8 A I don't recall that passage. I just don't
9 remember.

10 Q Do you disagree with that?

11 A What I offered last week in the workshop,
12 and which I don't address directly in this testimony,
13 was the suggestion that when a customer is set up for
14 basic local service, which includes providing a port,
15 as you suggest, that many other capabilities are made
16 available to that customer as a matter of course in a
17 modern telecommunications network; and that perhaps
18 the most sensible way to price telecommunications
19 service would be to charge the customer the entire
20 cost of that, but also give them all those
21 capabilities at the same time.

22 So I think that's at least somewhat
23 consistent with your --

24 Q Okay. But, in fact, we're not giving them
25 the capabilities today. We're requiring them to pay

1 for those capabilities; correct?

2 A Yes.

3 Q One final question: Are you in agreement
4 with your client's proposal that we don't need to look
5 at a cost model to determine the cost of local
6 service; that what we need to do is determine the
7 amount of revenues that they receive that are above
8 cost? Were you here yesterday when Mr. Seaman
9 testified?

10 MS. CASWELL: Mr. Henry, I'm going to have
11 to object to the characterization of GTE's position
12 that we should not look at a cost model in this
13 proceeding.

14 MR. HENRY: Okay. Strike that.

15 Q (By Mr. Henry) You were here yesterday
16 when Mr. Seaman testified?

17 A I'm afraid I wasn't. I heard a little bit
18 of it over the telephone, but I wasn't present.

19 Q Are you familiar with the methodology that
20 he and Commissioner Garcia talked about as far as
21 setting up a universal service fund?

22 A I think so.

23 Q In his testimony Mr. Seaman basically set up
24 a graph or a chart that showed the revenues from
25 several sources, the costs and the contribution; and,

1 it totaled up to \$487 million. And then he suggested
2 that that was the amount that GTE needed to be paid
3 out of the universal service fund.

4 Do you think that is the correct way to set
5 up a universal service fund?

6 A I think to set up a universal service fund,
7 you need to make all subsidies explicit. I think in
8 the process of doing that, since there are joint and
9 common costs in the telecommunications industry,
10 you'll end up with markups on different services that
11 go above what you might call bare incremental costs.

12 I think the universal service funding should
13 be based on those prices, I guess you'd call them, or
14 implicit prices, that would be derived from the bare
15 incremental costs plus a reasonable contribution to
16 cover joint and common costs.

17 I confess I'm not familiar enough with the
18 analysis you're referring to to speak to the numbers.

19 Q Is it important to the analysis, though,
20 that you have -- that you make a determination as to
21 what is the cost to provide basic universal service?

22 A I would think so, yes.

23 MR. HENRY: Okay. I have no further
24 questions. Thank you.

25 CHAIRMAN JOHNSON: Staff?

1 MR. COX: Staff has no questions for
2 Mr. Danner.

3 CHAIRMAN JOHNSON: Commissioners? (No
4 response.) Redirect?

5 MS. CASWELL: No redirect.

6 CHAIRMAN JOHNSON: One question?

7 COMMISSIONER JACOBS: Good morning.

8 WITNESS DANNER: Good morning.

9 COMMISSIONER JACOBS: I understand the
10 economic arguments. But one of the things we heard
11 consistently -- and not in this docket, but we've
12 heard a lot from people -- is -- and particularly
13 customers who don't use the network for all the other
14 ancillary type services.

15 And the argument there is, is that they
16 should only pay some basic, bare bones dial tone fee
17 because they don't use it for any of these other
18 services. The problem is, because of the way we
19 provision this product, they can't do that.

20 And what would be some suggestions about how
21 to address their concern in the context of this
22 argument? Because if we follow your logic, they have
23 to. They don't have any option. They have to rent
24 this loop with all of its bells and whistles
25 regardless of the fact that they don't really need it

1 or want it.

2 WITNESS DANHER: That's a very good
3 question, Commissioner. I guess, first of all, I
4 would agree with you that a customer who has a
5 telephone and never uses it, unfortunately it's the
6 truth that the entire cost of the loop and setting
7 them up for the service is still required, just as,
8 you know, if you -- you can't buy a car with fewer
9 than four tires if you don't want to drive it very
10 much, you need a whole loop to reach the network.

11 I guess there are several options that one
12 could consider that would help that situation. One is
13 that the Commission could define a particular
14 supported universal service for customers in just that
15 situation and say that the company will provide the
16 service; the customer will be charged something less
17 than the full cost; the difference will be supported
18 through universal service, and we'll set that service
19 up in such a fashion through, say, pricing of usage
20 and other features that it really wouldn't be
21 attractive to a customer who won't use the phone very
22 much.

23 That would be one way you could go at it
24 that would preserve kind of a budget service.

25 Another consideration I would suggest is

1 focusing such a service on people who are truly needy;
2 you know, have low incomes. I believe -- I've
3 certainly seen it in other jurisdictions -- that you
4 may have some number of customers who are rather
5 wealthy.

6 A classic profile there is a second home or
7 a vacation home. You could have a telephone that gets
8 very little usage but where the full cost is still
9 incurred, and the person who owns the home is quite
10 capable of paying for it.

11 So I would encourage you to think about
12 affordability concerns as part of that, and perhaps
13 target or limit that service to folks who would have a
14 real need there.

15 COMMISSIONER JACOBS: Thank you.

16 CHAIRMAN JOHNSON: Redirect?

17 MS. CASWELL: No, none. Thank you.

18 CHAIRMAN JOHNSON: Thank you, sir. You're
19 excused.

20 WITNESS DANNER: Thank you.

21 (Witness Danner excused.)

22 - - - - -

23 CHAIRMAN JOHNSON: Sprint?

24 MR. REHWINKEL: Madam Chairman, Charles
25 Rehwinkel with Sprint-Florida. While Dr. Staihr is

1 getting set up, I just wanted to bring up a
2 preliminary matter relating to his testimony, and that
3 would be --

4 CHAIRMAN JOHNSON: Let me go ahead and swear
5 him in before I forgot.

6 (Witness sworn.)

7 MR. REHWINKEL: Dr. Staihr has filed three
8 pieces of testimony, prefiled testimony, in this
9 matter.

10 The last one was supplemental rebuttal, and
11 it has maps and exhibits that contain information that
12 was obtained relatively late in the proceeding from
13 AT&T and MCI's contractor, PNR; and we submitted it
14 under request for confidentiality, the ILECs did.

15 And we had asked that PNR look at the
16 information to determine whether they wanted to
17 maintain confidentiality. And at this point the last
18 word I heard from Mr. Hatch was that they had not
19 heard back.

20 MR. HATCH: That's correct, Madam Chairman.
21 I had asked them to consider its confidential status
22 and to make a determination of what could be publicly
23 released. I have yet to receive a final word from PNR
24 on that issue. So at the moment it is proprietary.

25 CHAIRMAN JOHNSON: Okay.

1 DR. BRIAN K. STAIHR

2 was called as a witness on behalf of Sprint-Florida
3 Incorporated and, having been duly sworn, testified as
4 follows:

5 DIRECT EXAMINATION

6 BY MR. REHWINKEL:

7 Q Dr. Staihr, could you state your full name
8 for the record, please?

9 A Yes. I'm Brian K. Staihr.

10 Q By whom are you employed?

11 A By Sprint.

12 Q Are you the same Brian Staihr that has
13 prefiled direct testimony in this matter?

14 A Yes, I am.

15 Q Consisting of some 19 pages?

16 A Yes.

17 Q Did you also file with that testimony a
18 confidential, Exhibit BKS-1, consisting of a CD ROM
19 containing BCPM 3.1 and the accompanying
20 documentation?

21 A Yes, I did.

22 Q Dr. Staihr, regarding your direct testimony,
23 do you have any corrections or changes to make to that
24 testimony?

25 A No, I don't.

1 Q If I asked you today the questions contained
2 in your prefiled direct testimony, would your answers
3 be the same?

4 A Yes, they would.

5 MR. REHWINKEL: Madam Chairman, at this time
6 I would move Dr. Staihr's direct, prefiled direct
7 testimony, into the record as though read.

8 CHAIRMAN JOHNSON: It will be so inserted.

9 MR. REHWINKEL: And I would ask that
10 Dr. Staihr's Exhibit BKS-1 be given an number for
11 identification.

12 CHAIRMAN JOHNSON: BKS-1 will be identified
13 as Exhibit 57.

14 (Exhibit 57 marked for identification.)

15 Q (By Mr. Rehwinkel) Dr. Staihr, did you
16 also prefile rebuttal testimony of some 25 pages in
17 this matter?

18 A Yes, I did.

19 Q Did your rebuttal testimony have appended to
20 it 10 exhibits labeled BKS-1(a) through BKS-10?

21 A Yes, it did.

22 Q If I asked you the questions contained in
23 your prefiled rebuttal testimony today, would your
24 answers be the same?

25 A Yes, they would.

1 Q Do you have any corrections or changes to
2 make to this testimony?

3 A No, I don't.

4 MR. REHWINKEL: Madam Chairman, at this time
5 I would ask that Dr. Staihr's prefiled direct
6 testimony -- rebuttal testimony be inserted into the
7 record as though read.

8 CHAIRMAN JOHNSON: It will be inserted.

9 MR. REHWINKEL: And that Dr. Staihr's
10 rebuttal exhibits be given -- I guess a composite
11 exhibit would be how you want to do that -- be marked
12 for identification at this time.

13 CHAIRMAN JOHNSON: Okay. What's the short
14 title for those?

15 MR. REHWINKEL: I guess BKS rebuttal
16 exhibits.

17 CHAIRMAN JOHNSON: We'll call it BKS
18 rebuttal exhibit, and it's identified as 58.

19 (Exhibit 58 marked for identification.)

20 MR. REHWINKEL: Thank you.

21 Q (By Mr. Rehwinkel) Dr. Staihr, did you
22 also prefile supplemental rebuttal testimony pursuant
23 to the prehearing officer's order in this matter
24 consisting of some 10 pages?

25 A Yes, I did.

1 Q Were there also appended to that
2 supplemental rebuttal testimony 19 exhibits labeled
3 BKS-1 through 19?

4 A Yes, but there is no Exhibit 9, so --
5 there's a number 19, but there's no 9, so there are
6 actually 18 exhibits.

7 Q Okay. Do you have any corrections or
8 changes to make to that supplemental rebuttal
9 testimony?

10 A I have one very minor change, and it's just
11 one word, and it's on Page 2 and it's on Line 14; and
12 the word "both" should just be crossed out.

13 Q With that change, if I asked you the
14 questions contained in your prefiled supplemental
15 rebuttal testimony, would your answers be the same?

16 A Yes, they would.

17 MR. REHWINKEL: Madam Chairman, I would move
18 that Dr. Staihr's supplemental rebuttal testimony be
19 inserted into the record as though read.

20 CHAIRMAN JOHNSON: It will be inserted.

21 MR. REHWINKEL: And I would ask that the 18
22 exhibits appended to his supplemental rebuttal
23 testimony be given a -- identified as a composite
24 exhibit and marked for identification at this time.

25 CHAIRMAN JOHNSON: Okay. It will be marked

1 as 59 and it's --

2 MR. REHWINKEL: Probably BKS supplemental
3 rebuttal exhibits.

4 CHAIRMAN JOHNSON: BKS supplemental rebuttal
5 exhibit; again, the number is 59.

6 (Exhibit 59 marked for identification.)
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1 A. The purpose of my testimony is to put forth the position of Sprint - Florida, Inc.
2 ("Sprint") regarding the proper costing method and model to be used in
3 calculating basic local service costs necessary to develop universal service support
4 for Tier 1 companies in the state of Florida.

5
6 Q. *For purposes of calculating costs in order to determine explicit universal
7 service support, how does Sprint define basic local telecommunications service?*

8
9 A. For purposes of calculating costs, Sprint defines basic local telecommunications
10 service as it is currently defined in the FCC's May 8th Report and Order on
11 Universal Service ("Order"), paragraph 56. In that Order, the services designated
12 to receive support are (paraphrasing): single party service; voice grade access to
13 the public switched network; Dual Tone Multi-frequency signaling or its
14 functional equivalent; access to emergency services; access to operator services;
15 access to interexchange service; access to directory assistance; and toll limitation
16 services for certain customers.

17
18 Q. *What is the position of Sprint regarding the proper costing methodology that
19 the Florida Public Service Commission should adopt for universal service high-
20 cost purposes?*

21
22 A. Sprint believes this Commission should adopt the Benchmark Cost Proxy Model,
23 Version 3.1 ("BCPM 3.1"), as filed in this proceeding, for use in determining
24 forward-looking costs for Tier 1 LECs in Florida. I am sponsoring BCPM 3.1 on

1 behalf of Sprint. A CD-ROM version of the model and the supporting
2 documentation, including the model methodology, is included as Exhibit BKS-1.
3 A paper copy is available upon request.

4
5 ***Q. Why does Sprint believe the Commission should adopt the BCPM 3.1?***

6
7 **A.** The Florida Legislature has determined that a cost proxy model is the appropriate
8 costing methodology for use in determining forward-looking costs in the state of
9 Florida (House Bill 4785 (Section 1, 364.025 (4) (b)). Sprint believes the BCPM
10 3.1 is the best costing methodology to use for this purpose, since it reflects the
11 forward-looking costs that would *actually be incurred* by an efficient local
12 provider serving the residential and business customers of this state.

13
14 ***Q. Does the BCPM 3.1 calculate the costs that local providers have historically***
15 ***incurred in the provision of basic service to the residents of Florida?***

16
17 **A.** No. The BCPM 3.1 calculates the *forward-looking economic cost* of providing
18 basic service. The economic cost differs from the historical or embedded cost in
19 the following way:

20
21 Costing theory defines the *historical or embedded cost* of a good or service as an
22 actual record of the value of resources that were dedicated to the provision or used
23 in the production of that good or service. In contrast, the *economic cost* of a good
24 or service is a measure of the value of resources that would be used if that good or

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service were produced in the most efficient way possible.

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The BCPM 3.1 does not calculate historical or embedded costs. Historical costs are inappropriate for use in this case because even if historical costs could be accurately developed they would, at best, reflect the firm's accounting practices and investments over time. They would not reflect the costs of providing individual services in today's market, i.e., the costs that a new entrant would face. The BCPM 3.1 calculates forward-looking economic cost.

Q. What, then, is forward-looking economic cost?

A. Forward-looking economic costs are associated with the present and future use of resources. They disregard sunk costs that have already been incurred and cannot be affected in the future. ("A sunk cost is simply an expenditure that has already been made and cannot be recovered. Because it cannot be recovered, it should have no bearing or influence whatsoever on the firm's decision."

Microeconomics, Pindyck & Rubinfeld, 1989.) These forward-looking economic costs are the relevant costs for decision-making on the part of a firm with regard to present and future investment and production, as well as for pricing.

Q. Has the FCC commented on the definition and use of forward-looking economic costs?

A. Yes. In the FCC's August 8, 1996 Order on Interconnection ("First Order",

1 portions of which have been stayed by the 8th Circuit) the concept of forward-
 2 looking economic cost is defined as having both an incremental cost component
 3 and a shared/common cost component (First Order, paragraph 672, also 29). It is
 4 also cited as the proper basis for pricing and is defined as containing a reasonable
 5 profit or return on investment (First Order, paragraph 673.)

6
 7 In addition, in the FCC's May 8, 1997 Order the FCC stated that forward-looking
 8 economic cost was the proper measure to use when calculating federal universal
 9 service support because it was sufficient to ensure provision of the supported
 10 services but not excessive, which might lead to the provision of support for
 11 inefficiencies. (Order, paragraphs 223-230).

12
 13 Because the BCPM 3.1 is a proxy model, it estimates the costs that would be
 14 incurred by any efficient local provider if that provider served the entire market.
 15 A "market" might be defined as the entire state of Florida, or a particular area
 16 currently served by an incumbent local exchange carrier (ILEC), or a portion of
 17 the area currently served by the ILEC. The BCPM 3.1 can and does calculate the
 18 costs for any of these "markets".

19
 20 *Q. Why might the costs produced by the BCPM 3.1 differ from those that were*
 21 *historically incurred by the existing phone companies in the provision of basic*
 22 *service?*

23
 24 *A. The following are three reasons why these costs might differ:*

1 First, the existing telephone network in Florida was constructed over an extensive
2 period of time, and facilities expanded as the population of the state grew.
3 Conversely, the BCPM 3.1 model assumes that the entire network is built at a
4 single point in time. This allows the service provider to realize certain
5 "efficiencies" and "economies of scale" that could not have been realized
6 historically.

7
8 Second, the theoretical network constructed by the BCPM 3.1 uses state-of-the-
9 art, forward-looking technology. In many cases this is not the same technology
10 that is currently being used today. For example, in certain locations the BCPM
11 3.1 might use fiber cable to reach a customer that is actually served by copper
12 cable today. In other cases, the model may install a digital switch in a central
13 office that currently houses an analog switch.

14
15 Third, the geographic layout of the network differs from the actual network that is
16 in service today. The BCPM 3.1 operates under the following assumption: The
17 only part of the existing network that is actually used is the current location of the
18 central offices. (The central office contains the switch (or computer) which is
19 used to connect calls to and from customers in a certain geographic area. The
20 central office is often referred to as a wire center, and all customers with physical
21 connections (cables) from their homes or businesses to that central office are said
22 to be served "out of that wire center.") For example, the cables that currently
23 serve customers in the southern part of the Immokalee area might extend out from
24 the central office along roads, but the BCPM 3.1 might place the cables across

1 fields if that is a more economical layout of the plant. Of course, placing cable
2 across fields might involve incurring some right-of-way costs that placing cable
3 along the road would not require. This difference would have to be included in
4 the model inputs. However, both sets of cables would originate at the same
5 location, the company's existing central office location.

6
7 ***Q. Why does the model do these things in a manner that does not reflect the***
8 ***existing network?***

9
10 ***A. Two reasons. First, quite simply, because the FCC requires it. The Order listed***
11 ***several criteria that proxy models must comply with if they are to be considered as***
12 ***the costing methodology to be used in calculating the federal portion of universal***
13 ***service support. These include all of the three above reasons. A detailed***
14 ***description of how the BCPM 3.1 meets all of the FCC's guidelines and criteria is***
15 ***included in the supporting material filed with the model, the document "Model***
16 ***Methodology", and a summarized version of this information is presented below.***
17 ***In addition to these criteria, the FCC has published additional guidelines for proxy***
18 ***models and requested that the models have certain additional capabilities, such as,***
19 ***optimization features and the ability of the model, if required, to use geocoded***
20 ***data. The sponsors of the BCPM 3.1 have incorporated these guidelines and***
21 ***capabilities as they were made public, and the model is in complete compliance***
22 ***with the FCC's published guidelines for calculating federal universal service***
23 ***support.***

24

1 Q. *Do you believe that the FCC's guidelines and criteria, and the assumptions*
2 *contained therein, are reasonable?*

3

4 A. In general, yes. However, if this Commission disagrees as to the *appropriateness*
5 *of some of the FCC's assumptions, the sponsors of the BCPM 3.1 are ready to*
6 *work with the Commission to incorporate into the model whatever changes the*
7 *Commission concludes are appropriate for Florida.*

8

9 Q. *What is the second reason the BCPM does not reflect the historical or book*
10 *costs of the existing network?*

11

12 A. As stated above, the existing network evolved over a long period of time.
13 Historical or book costs reported over many years do not reflect the efficiencies
14 that can be realized today in the provision of basic service. They also do not
15 reflect the realities of today's market with regard to, for example, labor costs,
16 inflation, environmental constraints or a host of other cost-affecting factors.

17

18 Q. *Why is it important, from the perspective of developing a competitive market*
19 *that economic costs be developed on a forward-looking basis?*

20

21 A. True facilities-based competition can only come to all areas of Florida if explicit
22 universal service support is portable and sufficient to compensate potential new
23 providers offering service over their own facilities. It is important to get the cost
24 right with regard to what costs a new provider would incur on a going-forward

1 basis in order to provide the new carrier with proper incentive to enter the various
2 markets.

3

4 **Q.** *Why is the BCPM 3.1 the proper model to use to estimate the cost of providing*
5 *basic service?*

6

7 **A.** The cost of basic telephone service is primarily, and, in rural areas, almost
8 completely, determined by the cost of the *loop*. (According to both proxy models
9 cited in the FCC's May 8th Order, in many areas the cost of the loop accounts for
10 more than 90% of the cost of basic service.) The loop is the actual physical
11 connection between the telephone company's central office, or switch, and the
12 customer's location. If the cost of the loop is estimated incorrectly, it is likely that
13 the total estimated cost of service will also be wrong.

14

15 The cost of the loop is determined primarily by two factors: *distance and density*.
16 *Distance* affects cost in the sense that the further a customer is situated from the
17 telephone company's central office (or switch), the more cable that is required to
18 reach that customer and the higher the cost of the physical connection. *Density*
19 affects costs in the sense that if a trench must be dug to place the cable required to
20 serve the residents of a new subdivision, that trenching cost is smaller *per*
21 *customer or per line* if the subdivision serves 100 customers in a square mile than
22 if it serves 20 customers in the same square mile.

23

24 Both of these, *distance and density*, in turn depend on where the model assumes

1 customers are located in relation to the central office, and located in relation to
2 each other.

3
4 The BCPM 3.1 has an extensive and detailed algorithm for creating serving areas
5 and locating customers within the serving area (known as the *ultimate grid*) which
6 is described in detail in the Model Methodology (see Exhibit BKS-1). This
7 location methodology, which has been validated statistically, is based on both
8 forward-looking engineering criteria and the strong correlation between road
9 mileage and population distribution. In the process of building its network, the
10 BCPM 3.1 does not make unrealistic assumptions or adjustments that can distort
11 the distance and density of customers. Standard modeling conventions allow for
12 minor adjustments to be made for the sake of simplicity and regularity; however,
13 the effects of these adjustments are quite small.

14
15 In addition, as important as customer location is, equally important is constructing
16 the appropriate network to those locations. The BCPM 3.1 builds an efficient
17 network by maximizing the shared portion of the network route, by ensuring that
18 both rural and urban customers receive the same quality of service through the
19 same technology and by optimizing the layout of the feeder routes to minimize
20 their distance. Feeder cables are a key part of the loop, they are the large cables
21 coming directly out of the central office. Feeder cables eventually branch out into
22 "distribution" cables which in turn branch out to "drops". Drops are those cables
23 that actually connect the distribution cables to houses and businesses.

24

1 By accurately identifying customer location, and building an efficient network to
2 those locations, the BCPM accurately estimates the costs that an efficient provider
3 would incur in the provision of basic service to an entire market.

4
5 **Q.** *Is the BCPM 3.1 a Florida-specific model?*

6
7 **A.** The model platform (algorithms, equations, etc.) is generic in that the structure of
8 the equations will not change from state to state. A very simple example would
9 be, *Cable Length in Feet * Installed Cost of Cable per foot = Cable Investment*
10 which holds no matter what state is being processed. However, because the *Cable*
11 *Length* is Florida-specific, and the *Installed Cost of Cable* is Florida-specific, the
12 resulting *Cable Investment* will be Florida-specific.

13
14 The network that the model builds is Florida-specific for two important reasons.
15 The model uses extensive *Florida-specific geographic data* that reflects the
16 physical conditions in which the network must be constructed: soil type, depth to
17 bedrock, water table depth, slope variables, rock hardness, etc., all at an extreme
18 level of detail. All of these location specific variables impact the cost of
19 providing basic telephone service.

20
21 Second, the model's user-adjustable inputs have been carefully chosen to reflect
22 not only location-specific issues (such as Florida maintenance expenses and
23 placement costs) but to reflect the way that the network is constructed in Florida
24 (for example, percent of distribution cable that is aerial versus underground.)

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Q. Are all of the inputs in the BCPM 3.1 Florida specific?

A. No. Just as the values of certain inputs should and will change from location to location, others will not. Sprint is also sponsoring the testimony of Kent Dickerson in this proceeding, and Mr. Dickerson's testimony deals extensively with BCPM 3.1 input issues.

As with any model, the accuracy of the cost estimates will increase as the inputs themselves are refined. Since some data such as vendor prices and discounts may be of a proprietary nature it may be necessary for the Commission to involve itself in the acquisition of this data *from the companies that actually serve Florida*, to ensure that the cost figures used are Florida-specific, precise, supportable and sufficient.

However, it is important for the Commission to note that accurate cost estimation is not solely (or even primarily) dependent on input values. Accurate cost estimation depends on the validity of the relationships that are built into the platform of any forward-looking cost model.

Q. You mentioned earlier that the BCPM 3.1 estimates the forward-looking economic cost of providing basic service. Does this mean the model ignores all historic or existing cost data?

1 A. No, not at all, nor should it.

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Economic theory does not, *a priori*, preclude the consideration of all historic costs, in particular, recently incurred costs in a forward-looking economic cost study. All that it demands is that the costs used in such a study be representative of future costs. Whether historic or current costs are a good approximation of forward-looking costs is an empirical issue. Indeed, to argue otherwise—i.e., to exclude any consideration of current costs in a forward looking study—leads to the absurd conclusion that none of the available empirical data should be given any weight in a forward looking cost study. This would not only preclude the use of all existing data, but all forecasts based on historic data, in essence reducing forward looking cost studies to pure guesswork.

To accurately estimate future costs it is vital to take into account as much information as possible. In many instances, existing or historic data is a valid indicator of future costs. This, of course, requires a careful analysis of the current or historic data to determine whether it is reasonable to expect those costs to continue to be incurred, and at those levels, in the future period being modeled.

In general, embedded investment levels are not, at least for ILECs, a good indicator of future investment levels. There are several reasons for that. First, embedded investment includes technologies that are obsolete, or, at least, not the technologies used in the forward-looking network. Second, those embedded investments were incurred over a long period of time -- some over 20 to 25 years

1 ago. Even if the technology had not changed, inflation and labor costs (for
2 installation or placement) would render those embedded values a poor indicator of
3 future costs. For that reason, in the BCPM 3.1 we have relied on current
4 equipment prices as the best indicator of forward looking investment costs, and
5 totally disregarded book or embedded investment costs.

6
7 On the other hand, current operating expense data is in most instances the best
8 indicator we have of future expense levels. This is because operating expense
9 data captures current experienced costs in performing a function. For example,
10 we can quantify the expenses we incur in maintaining digital switches and fiber
11 transmission facilities. There is every reason to believe that these expense levels
12 can reasonably be used as an approximation of the expenses we will incur (or
13 anyone serving our market *would* incur) in the near-term for those same activities.

14
15 Using maintenance expenses as an example, the best basis for determining the
16 forward-looking costs of *any* company serving the Sopchoppy area is to look at
17 the maintenance expenses of the company that actually *does* serve Sopchoppy.
18 Contained in that company's costs are the effects of the conditions under which
19 any company would be required to operate if it served Sopchoppy. That is not to
20 imply that adjustments to expense levels might not be necessary. However, it is
21 clearly better to use existing data, adjusted for known changes, rather than rely on
22 pure speculation.

23
24 *Q. What guidelines, criteria, etc. were used in developing the BCPM 3.1?*

1

2

A. The Florida Legislature has not, to date, provided specific guidelines or criteria for the proxy model submitted for use in calculating universal service costs. This is not say that guidelines do not exist. In the FCC's May 8th Order on Universal Service the FCC listed specific criteria for any proxy models put forth as proposed costing methodologies for universal service support. These criteria are listed below (in paraphrased, summary form), each with a short discussion of how the BCPM 3.1 meets the specific criterion:

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1. *Technology in the model must be least-cost, most-efficient, and reasonable for providing supported services. Actual wire center locations must be used. Loop technology must not impede the provision of advanced services. Wire center line counts should equal actual line counts. The model's average loop lengths should reflect actual average loop lengths.*

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2. *All network functions or elements needed to produce the supported services must have an associated cost. The BCPM 3.1 contains a cost for each network element contained in basic service.*

21

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23

3. *Only long-run, forward-looking economic costs may be included.*

24

Embedded costs must be ignored, but the model must be based on actual

- 1 *purchase prices for facilities and equipment.* In the BCPM only forward-
2 looking costs are calculated, embedded costs play no part in the model's
3 algorithms. Actual purchase prices serve as the basis for model inputs, as
4 is consistent with the FCC's May 8th Order definition of forward-looking
5 economic cost (Order, page 124, paragraph 224).
- 6 4. *Rate of return must be 11.25% or a state's prescribed rate of return for*
7 *intrastate services.* Rate of return is a user-adjustable input in the BCPM,
8 the user is able to set the value at any level, including 11.25%.
- 9 5. *Economic lives and future net salvage percentages within the FCC's*
10 *authorized range must be used.* As with rate of return, economic lives and
11 future net salvage percentages are all user-adjustable inputs in the BCPM.
12 A user can set these variables to any desired levels.
- 13 6.. *The model must include all business and residence lines, including multi-*
14 *line business services, special access, private lines, & multiple residence*
15 *lines.* BCPM 3.1 includes all of the above, plus the ability to use actual
16 wire center line counts for single line residence & business, multi-line
17 residence and business, special access, etc. if these counts are available.
- 18 7. *Reasonable allocation of joint and common costs must be included.*
19 BCPM 3.1 allows the user to input either a common cost factor or a per-
20 line expense figure. The model includes a reasonable (and user-
21 adjustable) allocation of joint & common costs.
- 22 8. *The model, all underlying data, formulae, computations, software must be*
23 *available to all interested parties for review/comment. Data must be*
24 *verifiable, engineering assumptions reasonable, outputs plausible.* The

1 BCPM 3.1 is completely open and available to all parties. All
2 preprocessing of data including computer code, algorithms, etc. have been
3 provided to both the Florida Commission staff and the FCC, and are
4 available to anyone through the BCPM website WWW.BCPM2.COM.
5 The model uses public data (Census Bureau data, BLR wire center
6 boundary data) and all data, computations, formulae and algorithms are
7 100% verifiable.

8 9. *Model must contain the ability to examine and modify critical assumptions*
9 *and engineering principles.* The BCPM 3.1 allows a user to modify all of
10 the specific variables listed in the criteria plus hundreds of other user-
11 adjustable inputs through simple drop down menus or through direct
12 access to EXCEL spreadsheets.

13 10. *The model must de-average support calculations to the wire center level at*
14 *least and, if feasible, to even smaller areas such as a Census Block Group*
15 *(CBG), Census Block (CB) or grid cell.* BCPM 3.1 provides estimates of
16 universal service costs for areas as small as variable grids, which are
17 significantly smaller than a CBG or wire center. These individual grid
18 costs can then be aggregated to the census block group or the wire center.

19
20 Q. *At what level of geographic detail can the BCPM 3.1 provide the forward-*
21 *looking cost of basic local telecommunications service?*

22

23 A. Costs in the BCPM 3.1 are calculated at an individual *grid* level and then can be
24 aggregated up to various levels: census block group, wire center, density zone,

1 company, state, etc. This provides the Commission with the largest degree of
2 flexibility when determining the level at which support will be calculated. In
3 addition, it allows for the identification of high-cost "pockets" within more
4 standard areas. For example, within the Tavares wire center there may be specific
5 census block groups that are very high cost, yet the average cost in Tavares might
6 be significantly lower. The level of cost detail developed in the BCPM allows
7 targeting any high cost support to where it would be most appropriate.

8

9 *Q. Does this conclude your testimony?*

10

11 *A. Yes it does.*

1 **BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION**

2 **REBUTTAL TESTIMONY OF BRIAN K. STAIHR**

3 **ON BEHALF OF SPRINT-FLORIDA, INCORPORATED**

4 **DOCKET 980696-TP**

5 **SEPTEMBER 2, 1998**

6

7 **Q. Please state your name, title and business address.**

8

9 **A. My name is Brian K. Staihr. I am employed by Sprint United Management Company**
10 **("Sprint") as Regulatory Economist. My business address is 4220 Shawnee Mission**
11 **Parkway, Suite 303, Fairway, KS, 66205.**

12

13 **Q. Are you the same Brian Staihr who filed direct testimony in this proceeding on**
14 **August 3, 1998?**

15

16 **A. Yes I am.**

17

18 **Q. What is the purpose of your rebuttal testimony?**

19

20 **A. In my rebuttal testimony I address specific points raised by Don Wood with regard to the**
21 **HAI Model Version 5.0a, filed in this proceeding by MCI and AT&T. I also address certain**
22 **comments made by Mr. Wood regarding the Benchmark Cost Proxy Model (BCPM)**
23 **Version 3.1 as filed by Sprint.**

24

1 Q. Please provide a summary statement of your rebuttal testimony.

2

3 A. Contrary to Mr. Wood's statements, the HAI Model is not "the most accurate and reliable
4 means" of developing cost information (Wood Direct p. 3). In the past several months,
5 significant problems have been identified at both the Federal and state levels regarding the
6 accuracy of the HAI Model 5.0a, as filed in this proceeding. These problems have
7 specifically involved the HAI Model's preprocessing, customer location algorithms, network
8 construction algorithms, and various assumptions built into the model and the model
9 sponsors' values for certain user-adjustable inputs. Several of these problems are discussed
10 in the testimony that follows.

11

12 Q. In his testimony Mr. Wood lists two states, Kentucky and Louisiana, where the
13 Commissions chose to rely on the HAI Model for USF purposes. Do these two
14 decisions provide evidence that the problems you mention above were of no concern
15 to these Commissions?

16

17 A. Absolutely not. It is important to understand that a great deal of information and analysis
18 regarding the HAI Model has come to light only in the past few months. This is because a
19 large portion of the information used by the HAI Model in its preprocessing stages was only
20 made available to parties (under order of the Nevada Commission) in April of this year. I
21 specifically refer to the geocoded locations that are placed within main and outlier clusters.
22 These clusters are then used by the HAI Model.

23

24 In April and May of this year Sprint examined this previously unavailable information used

1 by the HAI Model and made several *ex parte* presentations to the FCC. These *ex parte*
2 presentations outlined how this information is used in the HAI Model preprocessing and
3 customer location algorithms (Sprint FCC *ex parte*(s), April 17-30, 1998). These
4 documents demonstrated that in rural areas the HAI Model systematically underestimates
5 the dispersion of customers. As a result of this underestimation, the HAI produces less
6 distribution plant than the amount that would actually be needed to provide service to the
7 customer locations the model purports to use.¹ [Footnotes are included as endnotes in
8 Exhibit BKS-1A] All of these *ex parte* documents are on record at the FCC, and I have
9 included several of the documents here as Exhibit BKS-2.

10

11 Q. Did the Kentucky and Louisiana Commissions have access to these *ex parte*
12 presentation documents?

13

14 A. No. The Louisiana proceeding to which Mr. Wood refers took place in late January (1/28-
15 30). The Kentucky proceeding to which Mr. Wood refers took place at the beginning of
16 March (3/3-6).

17

18 Q. At the time of the Kentucky and Louisiana proceedings, did any party to those
19 proceedings have access to the information that served as the basis for those *ex parte*
20 presentations?

21

22 A. No. The information that served at the basis for those documents is housed at the economic
23 research firm of PNR & Associates in Jenkintown, Pennsylvania. Until April 15-17, 1998,
24 no party other than PNR had been allowed access to that information.

1

2 Q. How did the FCC respond to these *ex parte* presentations?

3

4 A. Following these presentations the FCC produced its own analysis of the HAI customer
5 location algorithm conducted by Jeffrey Prisbrey. This analysis and Sprint's response to it
6 are attached as Exhibit BKS-3. The results of Mr. Prisbrey's analysis support Sprint's
7 findings: That the HAI Model method "underestimates the dispersion" of customer locations
8 (Prisbrey page 3). According to Prisbrey, this underestimation is most extreme when
9 clusters consist of small numbers of customers, as is often the case in rural areas. This
10 underestimation causes the model to build insufficient plant, because it builds to locations
11 that are closer together than the customers' actual locations

12

13 Q. Can you comment on how this information was received, or the impact this
14 information had, in any other state proceedings?

15

16 A. In Nevada, Costing Docket # 96-9035, the Nevada Commission initially chose the HAI
17 Model's immediate predecessor, the Hatfield Model 3.1, to be used for unbundled element
18 (UNE) costing with the intent to also use the model for universal service purposes (USF).
19 [Nevada PUC Opinion and Order, March 5 1998]. When it was pointed out in the
20 proceeding that the FCC had rejected the Hatfield Model 3.0, the Commission moved
21 toward the HAI Model 5.0a, again with the intent of using the model for both UNEs and
22 USF [ibid.]. Sprint then filed a report with the Nevada Commission discussing the HAI
23 Model's customer location algorithm and the FCC analysis discussed above [April 22,
24 1998]. In a subsequent order, the Nevada Commission declined to submit the HAI model to

1 the FCC to be used in calculating universal service support [Docket 97-5018, Nevada PUC
2 Order, May 14, 1998].

3

4 In Minnesota, although the Minnesota Public Utilities Commission appears to have adopted
5 the HAI Model for interconnection and UNE issues, the presiding Administrative Law
6 Judge issued questions about the model on July 16, 1998 directly related to this
7 underbuilding issue. Specifically, the ALJ has asked whether the distribution plant
8 constructed within each cluster should be extended further (increased) in order to come
9 closer to the actual amount needed to provide service to purported customer locations.
10 [State of Minnesota, MPUC Docket No. P-442, 5231, 3157, 466, 421/C1-96-1540].

11

12 More recently, in the state of Washington, the Washington UTC issued a bench request
13 asking both model sponsor^s to make adjustments to their models. Specifically in the case of
14 the HAI Model, the Commission asked the HAI Sponsors to make corrections that would
15 address the issues raised in the aforementioned Prisbrey/FCC analysis regarding customer
16 dispersion. [Washington UTC, Universal Service Docket #UT-98031(a), August 26, 1998].

17

18 Q. How does this information apply to Mr. Wood's testimony, specifically the cites on
19 pages 6 and 7 from the decisions of the Kentucky and Louisiana Commissions?

20

21 A. The cites from both Commission decisions refer to the HAI "locating customers" (Wood
22 Direct page 6). As stated in my direct testimony, there is no question that location is a key
23 driver of cost. However, it is not enough for a model to "locate" customers, because a
24 model must also use that location information when building the network and calculating

1 costs. If a model "locates" customers but then fails to use that information, there is no
2 advantage to locating customers. The *ex parte* presentations attached demonstrate how the
3 HAI Model's preprocessing ignores actual customer locations when it constructs a network
4 in rural areas. The result, particularly in rural areas, is an understating of the cable required
5 to serve customers. Hence, the HAI Model is not the "most accurate and reliable means" of
6 cost estimation for USF purposes.

7

8 **Q. Does the HAI Model use geocoded customer location information when it constructs**
9 **its network?**

10

11 **A.** No, it does not. Geocoded locations are only used in the model's preprocessing to
12 determine *which* customers will be served together. Once that has been determined,
13 geocoded location information is never again used.² That is why the HAI model produces
14 less plant than is actually required to serve customers.

15

16 **Q. Since the HAI Model does not build to actual locations, is there a significant**
17 **advantage to using geocoded information just to determine which customers will be**
18 **served together, as is done in the HAI Model?**

19

20 **A.** Not really. The BCPM considered using geocoded data and rejected the idea for two
21 specific reasons.

22

23 First, it is important to realize that geocoding is far from an exact science. The
24 latitude/longitude coordinates assigned to any given street address can vary significantly

1 from geocoder to geocoder, especially in rural areas. A simple example of this is shown in
2 Exhibit BKS-4. On this sheet we have six actual Florida street addresses that have been
3 geocoded by two separate systems. As you can see, each of the systems has placed the
4 customers in a very different location, despite the fact that each system classifies this point
5 as a "street address", the finest level of geocoding available. According to the HAI Model,
6 each of these addresses is an exact location. The question that remains, however, is, which
7 of these exact locations is right?

8
9 Second, in rural areas (the areas of most concern for universal service purposes) that street-
10 address level data generally does not exist, and the data that does exist is often of
11 questionable quality. Sprint recently filed comments at the FCC that explain how the use of
12 *some* geocoded data in a cost model can often be worse than using none at all. A copy of
13 these comments is attached as Exhibit BKS-5. Nonetheless, the BCPM is *capable* of using
14 geocoded data, as requested by the FCC, to assign customers to areas which would be
15 grouped together to form serving areas, much in the same way the HAI Model groups
16 customers. For this proceeding Sprint undertook an analysis to determine exactly how
17 much difference it would make to use geocoded data. The result of the analysis showed that
18 it makes very little difference.

19
20 **Q. Please describe that analysis.**

21
22 **A.** As I stated earlier, the only way the HAI Model uses actual customer locations is to
23 determine which customers will be served in which cluster. The BCPM builds to areas
24 called *grids*, not clusters, and customers are assigned to grids through a detailed algorithm

1 described in the BCPM Model Methodology. Since all grids are based on latitude and
2 longitude, it is a straightforward process to use latitude/longitude coordinates of geocoded
3 points to assign customers to grids and proceed from there. This of course assumes that
4 good latitude/longitude data exists.

5
6 In this analysis we took 3 specific wire centers from Sprint's operating territory in Florida
7 for which we had reasonably good geocoded data. The 3 wire centers were Inverness,
8 Beverly Hills and Avon Park. The total number of lines served by these 3 wire centers is
9 slightly over 50,000. Using actual customer locations, we assigned residences and
10 businesses to microgrids. From that point, microgrids were aggregated into ultimate grids
11 using the standard approach, and the model was re-run. In some cases the new ultimate
12 grids differed from the original ultimate grids because the new placement of customer
13 locations caused the microgrids to be aggregated differently. In other cases, the grids may
14 have remained the same but the actual customer counts and dispersion of customers within
15 the grid may have changed. Our goal was to determine what *costs and cable distances* the
16 BCPM would produce using the geocoded locations, and how these costs and distances
17 would compare with the standard BCPM results. These results are shown in the table
18 below. I have attached a more detailed explanation of the geocoding and placement process
19 as Exhibit BKS-6.

20
21
22
23



Wire Center	Original Ultimate Grids	Percent Deviation
Inverness	10	100%
Beverly Hills	10	100%
Avon Park	10	100%

1	Inverness	\$39.42	\$39.80	0.9%
2	Beverly Hills	\$37.00	\$37.53	1.4%
3	Avon Park	\$40.92	\$41.51	1.4%

4		Total Route Distance Using Standard BCPM Approach (w/loop)	Total Route Distance Using Geocoded Data (w/loop)	Percent Deviation from Original
5	Inverness	7,261,177	7,391,367	1.8%
6	Beverly Hills	3,009,300	3,088,937	2.6%
7	Avon Park	3,091,569	3,207,724	3.8%

8

9 As the table shows, the average costs per line vary by less than 1.5% in every case.

10

11 More importantly, the amount of network that is built (in terms of route distance) does not
12 vary significantly in the two versions of the model. In every case, the variation was less than
13 4 percent.

14

15 Q. How do you interpret these results?

16

17 A. These results provide strong evidence that the original customer location algorithms used in
18 the BCPM are accurate and reliable in providing a standardized way of modeling customer
19 location. In numerous proceedings (including this proceeding, see Wood Direct p. 8) the
20 HAI Sponsors have made the unsupported claim that the BCPM method of placing
21 customers in microgrids based on road mileage was flawed, and inferior to the use of

1 geocoded data. What Mr. Wood does not mention is that in the universal service areas of
2 Florida, 1) the vast majority of the HAI locations are not geocoded and 2) in cases where
3 there is data, the geocoded locations are never used to construct the network anyway!

4

5 These results, although clearly a sample, demonstrate that the BCPM approach of initially
6 allocating customers along road miles is valid (which the BCPM Sponsors have always
7 known, based on statistical tests of correlation between road miles and population). Most
8 importantly, they support the conclusion that *without using geocoding* the BCPM is
9 superior to the HAI Model in terms of minimizing the distortion that can occur when one
10 models customer location in rural areas incorrectly.

11

12 Q. Specifically, how does this distortion occur in the HAI Model?

13

14 A. Once the HAI Model has determined that a certain number of customers will be served in a
15 specific cluster, there is no attempt to maintain the spatial relationship between the
16 customers. The model will distribute the customers' lots uniformly across the area of the
17 cluster. An example of this is shown in Exhibit BKS-7.

18

19 In this Exhibit, the dots represent actual customer locations that the HAI purports to use.
20 Panels A, B and C are depictions of various dispersions of eight customer locations. These
21 would be considered the "actual" or geocoded locations. Panel D is a depiction of how the
22 HAI Model will place the eight locations in Panels A, B and C before it builds the network.
23 The exhibit shows how the HAI Model will model the customer locations the same way in
24 every case, despite the fact that the customers are actually situated very differently. Existing

1 distances between customers are ignored, distances which can often be several miles. Also,
2 because the BCPM separates its serving areas into quadrants, the distortion that occurs in
3 Panel A cannot occur in the BCPM. In Panel A, the majority of customers are located in the
4 NW quadrant of the area and none are located in the SW quadrant. In the BCPM, this
5 relationship is maintained: the SW quadrant would contain no customers, and the NW
6 quadrant would contain the number you see in Panel B. In the HAI Model, this does not
7 occur.

8
9 **Q. You said that once the geocoded data is discarded and the HAI model builds its**
10 **network, the result of the distortion pictured above is an understatement of cable**
11 **requirements? Is there evidence of such an underbuilding in the results produced by**
12 **the HAI Model in this proceeding?**

13
14 **A. Yes there is. Sprint has conducted an analysis for its Florida territories similar to analyses**
15 **shown in the *ex parte* presentations mentioned above. The results of the Florida analysis are**
16 **completely consistent with our findings in other states. In the rural areas of Florida, the**
17 **network "built" by the HAI Model is a non-functioning network. The HAI Model**
18 **systematically and significantly underbuilds the distribution network.**

19
20 **Q. Please describe how you determined that the HAI underbuilds.**

21
22 **A. The concept is very simple. We examine the amount of network plant that the HAI Model**
23 **builds within its main clusters.³ This includes everything on the customer side of the digital**
24 **loop carrier: the distribution cable, connecting cable⁴, and drop cable. All of these are used**
25 **in the model to do two things: to connect customers to the network (at the DLC) and, by**

1 default, to connect customers to each other.

2

3 We then examine the distance between the original customer locations as they are used in
4 the HAI Model's preprocessing. This equates to the distances between the blue dots in
5 Exhibit BKS-6, Panels A, B and C. The distance measure used is a *minimum spanning tree*
6 (MST). The minimum spanning tree measures the linear distance required to connect any
7 set of points or customer locations in the most direct way. The length of the MST is what
8 we have determined to be "sufficient". (A minimum spanning tree is discussed and pictured
9 in Exhibit BKS-8.)

10

11 In reality, the distance of the MST is usually less than what would be "sufficient" to connect
12 all customers to the network and to each other. The distance of the actual telephone
13 network between a given set of locations (points) is usually longer than the length of the
14 MST for that same set of points. Some reasons for this are: 1) the telephone network
15 usually follows roads (which the MST does not), 2) the telephone network must go up and
16 down hills (the MST assumes the world is flat), and 3) the telephone network must take into
17 account natural barriers such as mountains, lakes, etc. (which the MST ignores.)

18

19 However, for our analysis we have assumed that the length of the MST is sufficient. We
20 then compare the length of what the HAI builds to the length of the MST. If the total
21 distance of connecting, distribution and drop cable in a cluster is at least as long as the MST
22 for the points in that cluster, we determine that the Model has not underbuilt that cluster. If
23 the total distance of connecting, distribution and drop cable is less than the MST for the
24 points in that cluster, we determine that the HAI has underbuilt that cluster. If a cluster is
25 underbuilt, the network the HAI builds to serve that cluster is non-functioning.

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Q. Please describe your findings.

A. In the overwhelming majority of cases the HAI underbuilds the main clusters in rural, low-density areas. As the table below shows, in the lowest density zone the HAI underbuilds over 90% of the main clusters in Sprint's serving territory.

Company	Density Zone	Total Number of HAI Main Clusters	Number of Main Clusters Underbuilt by HAI Model using MST	% of Main Clusters with Insufficient Plant
Sprint-United	0 to 5	186	169	90.8%
Sprint-Centel	0 to 5	87	82	94.2%
Sprint-United	5 to 20	184	126	68.5%
Sprint-Centel	5 to 20	214	174	81.3%
Sprint-United	20 to 100	314	111	35.4%
Sprint-Centel	20 to 100	98	38	38.8%

In the table I have separated the next-lowest density zone (5 to 100 lines per square mile) into two parts: 5 to 20 lines per square mile, and 20 to 100 lines per square mile. This split does not exist in either model, but it is valuable as a tool for viewing that this underbuilding problem occurs most frequently in the very low density areas, the exact areas that are of most concern for universal service purposes.

1 Q. Have other parties used the concept of a minimum spanning tree (MST) as a measure
2 of sufficiency in terms of length?

3

4 A. Yes. In the attached FCC analysis, Jeffrey Prisbrey used the same concept to measure
5 customer dispersion. More recently, the FCC staff has been working on a synthesis of the
6 two models presented in this proceeding. This synthesis, termed the HCPM (Hybrid Cost
7 Proxy Model), uses a minimum spanning tree as a measure of sufficiency for outside plant
8 and the algorithm is built into the loop portion of their model.

9

10 Q. In other proceedings, have the HAI Sponsors commented on the use of the MST as a
11 measure of "sufficient" plant?

12

13 A. Yes they have. Recently in Texas, Dr. Robert Mercer, author of the HAI Model, and Mr.
14 John Klick stated that the MST was an "inappropriate standard" to use in such a
15 comparison. [Supplemental Reply Testimony of Dr. Robert Mercer and Mr. John Klick,
16 Texas PUC Docket #18515, June 10, 1998]. Mercer/Klick went on to state that the
17 "Steiner tree, not the MST, constitutes the minimum true distance required to connect a
18 series of points in a network." [Additional Reply Testimony, Mercer/Klick, Texas PUC
19 Docket #18515, June 30, 1998].

20

21 Q. What is a Steiner tree?

22

23 A. A Steiner tree is another distance construct from mapping theory. Like the MST it
24 measures distance between a set of points, locations or nodes. However, in the Steiner tree
25 it is possible to add points or nodes in the process of connecting the original points. This

1 can result in an overall shorter distance between points, shorter than the MST. Two simple
2 examples are shown in Exhibit BKS-9, and the concept is discussed in Exhibit BKS-8.

3

4 Q. The Mercer/Klick testimony implies that it would be more appropriate to define
5 "sufficient" cable as a distance equal to the Steiner tree, not the minimum spanning
6 tree, in Sprint's analysis. Do you agree?

7

8 A. No, I do not. As stated above, in the overwhelming majority of cases the MST distance
9 would actually represent an *insufficient* amount of cable, since it does not account for
10 barriers and constraints that a real-world network must consider. Obviously something less
11 than the MST distance, such as a Steiner tree distance, would be insufficient as well.

12

13 Just as importantly, the addition of nodes can only decrease the "required" amount of cable
14 for very few, specific configurations of points. Most of these configurations involve less
15 than five (5) points or locations. It is common knowledge that all HAI main clusters must
16 contain at least five customer locations and most contain many more, even in rural areas.

17 Therefore it is simply incorrect to assume that 1) the Steiner Tree distance will be something
18 shorter than the MST distance, and 2) that the Steiner Tree distance is the appropriate
19 measure of what is "sufficient".

20

21 But in the spirit of cooperation Sprint has also conducted an analysis using an equivalent of
22 the Steiner tree. As I state above, it has been shown mathematically [Prim, Exhibit BKS-8]
23 that by adding points or nodes, such as a Steiner tree does, it is sometimes possible in
24 special cases to connect a series of points with less than the MST. But it has been shown
25 that this *reduction* in distance can never be more than 13%. In other words, assume there

1 are 5 households in a HAI main cluster, and the MST tells us it requires 1000 feet of cable
 2 to connect them all to each other and to the network. Adding points of interconnection, as
 3 the Steiner tree does, might reduce that required amount of cable but it will never reduce it
 4 below 870 feet.

5
 6 In the table below, we present the number of HAI Main clusters in low-density regions that
 7 underbuild the network using the Steiner tree as a measure of "sufficient" cable length. The
 8 length of the Steiner tree is represented as 87% of the length of the MST.

9
 10

	Density Zone	Total Number HAI Main Clusters	Number of Main Clusters Underbuilt by HAI Main Clusters Steiner Tree (w/ MST)	% of Main Clusters with Insufficient Plan	
11	Sprint-United	0 to 5	186	157	84.4%
12	Sprint-Centel	0 to 5	87	80	91.9%
13	Sprint-United	5 to 20	184	109	59.2%
14	Sprint-Centel	5 to 20	214	152	71.0%
15	Sprint-United	20 to 100	314	81	25.9%
16	Sprint-Centel	20 to 100	98	28	28.6%

17 As the table shows, using the Steiner tree as a measure of "sufficient" cable has little impact.
 18 In the overwhelming majority of cases that represent universal service areas, the HAI still
 19 underbuilds the network.

20
 21 Q. The figures above speak to the frequency with which the HAI underbuilds, but what
 22 is the magnitude of this shortage?

1

2 A. The two tables that follow demonstrate that the magnitude of this shortage is significant. In
 3 the first table, I have shown a sample of main clusters from Sprint's serving territory in
 4 Florida. The table lists the wire center associated with the cluster and the cluster name, the
 5 length of the minimum spanning tree, the length of total plant that the HAI builds within the
 6 main cluster, and the difference between the two (the shortage). This is only a sample, for
 7 illustrative purposes.

8

9

	Length of MST (in feet)	Length of Plant Built by HAI (in feet)	Shortage (MST - Plant Built) (in feet)
10 CPCRFLXA008	108,716	60,694	48,022
11 CLTNFLXA002	45,131	181	44,950
12 LBLFLXA003	48,895	6,058	42,837
13 WCHLFLXA005	63,122	23,169	39,953
14 NPLSFLXC004	50,783	13,048	37,735
15 IMKLFLXA003	54,642	18,966	35,676
16 OKCBFLXA018	81,317	46,014	35,303
17 LKPCFLXA009	45,311	10,818	34,493
18 PTCTFLXA033	107,854	73,536	34,318

19

20

21

22

23

24

As you can see, the lengths that the HAI Model underbuilds are not insignificant. In the
 table below, I list the total in miles of this underbuilding, by density zone, for Sprint's
 serving territory. Recall, the shortage listed on each line below does not address outlier
 clusters, nor does it address feeder in any way. The shortages listed are found within main
 clusters.

	Company	Density Zone	Shortage (Amount Underbuilt within Clusters by the HAI in Miles (MST))	Shortage (Amount Underbuilt within Clusters by the HAI in Miles (MST)) 87% of (MST)
2	Sprint-United	0 to 5	637 miles	460 miles
3	Sprint-Centel	0 to 5	333 miles	223 miles
4	Sprint-United	5 to 20	434 miles	288 miles
5	Sprint-Centel	5 to 20	669 miles	381 miles
6	Sprint-United	20 to 100	244 miles	138 miles
7	Sprint-Centel	20 to 100	91 miles	39 miles

8

9 Q. Have results similar to these been found in other states?

10

11 A. Yes. In every state for which Sprint has seen the actual cluster data and been able to
 12 perform such an analysis, the result is always the same: In the low density areas, this
 13 underbuilding is systematic, significant, and occurs in the overwhelming majority of main
 14 clusters.

15

16 Q. How have the HAI Sponsors responded to these statements when presented to them?

17

18 A. In the aforementioned Texas proceeding, the response of the HAI proponents was twofold.
 19 First it was suggested that if this is indeed a problem or shortcoming for the HAI Model, the
 20 BCPM would exhibit the same shortcoming to a much greater degree. Mercer
 21 Supplemental Testimony, June 5, 1998, states "Sprint's claim of a flaw is misleading, greatly
 22 overstated, and is of equal or more applicability to the BCPM as well."

23

24 Second, the HAI proponents claimed that the HAI built substantially more backbone and

1 branch cable inside their clusters than the BCPM built inside its grids, a statement which was
 2 intended to support the first statement above. (Mercer/Klick, June 30, 1998.)

3

4 **Q. Have the BCPM Sponsors conducted a MST analysis on their own model in Florida?**

5

6 **A. Yes we have. It is not possible to replicate the exact MST analysis that was done on the**
 7 **HAI Model because the BCPM in its standard format does not place points, but places**
 8 **counts of customers within microgrids. However, if assumptions are made regarding how**
 9 **these counts are placed in a microgrid, it is possible to conduct a type of MST analysis that**
 10 **measures the dispersion of original customer locations and how that compares with the**
 11 **cable built by the BCPM. A discussion of the BCPM MST approach is attached as Exhibit**
 12 **BKS-10.**

13

14 For the HAI Model, our analysis was done at the main cluster level. The equivalent level in
 15 the BCPM is the ultimate grid level, and this is the level that was used for our MST analysis.
 16 The table below shows the results for the same density zones as shown above for the HAI
 17 Model, for all of Sprint's territory in Florida. (Due to time constraints I was unable to
 18 separate grids by company.)

19

20

21

22

Density	Total Number of Grids	% of Ultimate	Number of	% of
0 to 5	1,164	28.8%	171	14.7%

1	5 to 20	787	89	11.3%	25	3.2%
2	20 to 100	721	4	< 1%	2	< 1%

3

4 As the table shows, there is evidence that sometimes the BCPM underbuilds in rural Florida.
 5 However, the frequency of this occurring is much smaller than with the HAI Model. Using
 6 87% of the Minimum Spanning Tree as the measure of what is "sufficient" cable, recall that
 7 the HAI Model underbuilt well over 85% of main clusters. By comparison, the BCPM
 8 underbuilds less than 15% of grids. The HAI Sponsors' claim, that the BCPM exhibits the
 9 same problem to an equal or greater degree, is without foundation.

10

11 In addition, it can be worthwhile to compare actual plant built by each model within the
 12 basic unit of analysis, either the main cluster (for HAI) or the ultimate grid (for BCPM).
 13 Unfortunately, the two units do not directly equate to each other, so any meaningful
 14 comparisons must be made at the wire center level, and even then the comparison is
 15 imperfect. First, because our analysis focuses only on main clusters, it would be incorrect to
 16 compare a HAI total with a BCPM total for the same wire center. Second, examining data
 17 at the wire center level misses important detail because it allows high-density areas within
 18 the wire center to offset low-density areas. The solution is to look at wire centers that are
 19 low-density overall.

20

21 In the table below we provide the following information:

- 22 What the HAI Model builds within main clusters for an entire wire center;
- 23 What the total MST distance is for the main clusters in that same wire center;
- 24 The degree, if any, to which the HAI Model fell short of "sufficient" cable;
- 25 What the BCPM builds within ultimate grids for an entire wire center;

1 What the total MST distance is for the ultimate grids in that same wire center,
2 The degree, if any, to which the BCPM fell short of "sufficient" cable.

3

4 As stated earlier, our concern is with the lowest density areas of Florida, since these are
5 clearly of highest concern for universal service purposes. The table lists the wire centers, in
6 Sprint's Florida serving territory, where the overall density was less than 20 lines per square
7 mile.

		Total Plant Built by RAI for Name Company Year	Total MSJ Plants Year	RAI Purchase	Total Plant Built by Other for Name Company Year Center	Total MSJ Plants Year Center (In feet)	RAI Storage
4	GNVL	837,911	1,241,375	403,464	1,574,751	1,321,860	0
5	GLDL	547,884	695,539	147,655	886,196	791,228	0
6	PNLN	758,103	995,501	237,398	1,185,130	1,036,367	0
7	LEE	641,367	966,026	324,659	1,304,735	1,173,921	0
8	KNVL	844,510	310,829	0	863,493	605,045	0
9	ZLSP	1,181,784	995,511	0	1,312,056	1,103,090	0
10	SPCP	496,392	694,267	197,875	969,965	781,920	0
11	CHLK	1,008,642	1,313,833	305,191	1,673,651	1,436,335	0
12	RYHL	658,109	896,039	237,930	1,167,481	956,386	0
13	GNWD	875,148	976,640	101,492	1,562,988	1,352,350	0
14	EVRG	744,918	327,307	0	505,130	386,073	0
15	MALN	694,647	806,258	111,611	1,184,506	1,056,533	0
16	BAKR	1,447,839	1,547,207	99,368	2,595,212	2,059,406	0
17	FRPT	1,049,030	1,268,181	219,151	1,984,645	1,389,764	0
18	MNTI	2,507,994	2,941,833	433,839	4,395,127	3,469,573	0
19	CTDL	590,714	580,683	0	948,482	721,563	0
20	WSTV	68,129	85,375	17,246	94,145	76,766	0
21	GDRG	800,128	759,808	0	1,319,982	1,044,484	0
22	STMK	170,084	241,346	71,262	430,952	333,115	0

23

24 As the table shows, in every case where a reasonably direct comparison can be made, the

1 BCPM builds sufficient plant at the wire center level, whereas the HAI falls short in the
2 majority of cases.

3

4 Also, it is important to note that in many of the wire centers shown above, the MST
5 distances are roughly similar between the two models. The fact that MST lengths would be
6 similar, but the HAI builds less than the MST while the BCPM builds more, lends support
7 for the following: *A key difference between the two models is not merely how each model's*
8 *preprocessing initially allocates customer locations. Rather it is in how closely the model*
9 *comes to using those locations when it builds its network.*

10

11 Q. Is the plant listed in this table all categorized as distribution plant, or backbone and
12 branch cable?

13

14 A. No, not for either model. Connecting cable is included in the table above because, in both
15 models, connecting cable is built inside the basic unit (the grid or the cluster) to connect
16 customers in one section of the grid/cluster with customers in another section. In the
17 BCPM it is used more often than in the HAI.

18

19 There has been a great deal of confusion as to what types of plant or cable should be
20 included when calculating "what either model builds". For the HAI Model, in the majority
21 of cases the basic unit of analysis, the cluster, represents one serving area and one
22 distribution area. In the BCPM, most ultimate grids represent one carrier serving area that
23 is separated into (up to) four distribution areas. Sometimes the two models have different
24 terms for the cable that is used at various points in the network. Because of this, it is best to
25 consider all plant built within the basic unit (grid/cluster) since all of it may be used for the

1 purposes of connecting customers to each other and to the network.

2

3 In most cases for the HAI, a customer on the west side of any cluster is connected to a
4 customer on the east side of that cluster using *backbone or branch cable*. The same two
5 customers would be connected in the BCPM using *connecting cable*. Both are copper.

6

7 On the other hand, connecting cable in the BCPM often is found on the customer side of the
8 DLC. Connecting cable in the HAI Model is usually found on the office side of the DLC.

9 In the HAI Model, connecting cable is fiber. In the BCPM it is not.

10

11 Because of this potential for confusion, the comparisons above used everything that exists
12 solely within the cluster or grid: connecting cable plus distribution (backbone and branch)
13 cable. Drop was also included. The results of the table demonstrate the following: A
14 proper comparison of the amount of plant built by the two models, eliminating any
15 confusion over nomenclature or terminology, demonstrates that the shortages discovered in
16 the HAI are significant and systematic in the rural areas of Florida, while the BCPM does
17 not suffer from the same shortcoming.

18

19 **Q.** Please summarize your rebuttal testimony.

20

21 **A.** In his direct testimony Mr. Don Wood states that a model must do two things: It "must
22 accurately determine customer locations" and it must "connect those customers with the
23 serving central office using network facilities that are efficient..." (Wood Direct page 4).

24

25 In my rebuttal testimony I have clarified the first point. Contrary to Mr. Wood's statement,

1 a model must not only "determine" customer location but use the location as well. We have
2 seen that the HAI Model does not do this.

3

4 Second, according to Mr. Wood the model must "connect" the customers to the network.
5 The analysis presented here provides evidence that in the rural areas of Florida the HAI
6 Model fails this test as well.

7

8 I have shown that the HAI Model consistently and significantly underestimates and
9 underbuilds the amount of cable needed to do exactly what Mr. Wood states it must,
10 "connect" customers to the network. I have presented evidence that the FCC conducted its
11 own analysis that supports the findings shown here. In summary, the HAI Model is not the
12 most accurate and reliable costing methodology available to the Commission but a model
13 that is fundamentally and systematically flawed.

14

15 Q. Does this conclude your rebuttal testimony?

16

17 A. Yes.

18

19

20

Supplemental Rebuttal Testimony of
Brian K. Staihr
Docket No. 980696-TP
October 9, 1998

SUPPLEMENTAL REBUTTAL TESTIMONY
OF DR. BRIAN K. STAIHR
ON BEHALF OF SPRINT-FLORIDA, INCORPORATED AND
BELLSOUTH TELECOMMUNICATIONS, INC.
BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION
DOCKET NO. 980696-TP
OCTOBER 9, 1998

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS AFFILIATION.

A. My name is Brian K. Staihr. I am the Regulatory Economist at Sprint United Management Company.

Q. ARE YOU THE SAME BRIAN K. STAIHR WHO FILED DIRECT AND REBUTTAL TESTIMONY IN THIS PROCEEDING?

A. Yes.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to provide the Florida Public Service Commission (Commission) insight into the flaws in the PNR customer location methodology upon which HAT's modeling of distribution plant is based. My supplemental rebuttal testimony, is filed on behalf of both Sprint-Florida, Incorporated and BellSouth Telecommunications Inc. This testimony is based on an expedited review and analysis of the data at the PNR premises. Although the limitations on

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1 the time frame to review the data precluded an extensive analysis, our findings are
2 indicative of pervasive problems in the methodology employed to construct the
3 PNR polygon clusters and to form the HAI rectangles that correspond to each of
4 the PNR polygon clusters.

5
6 Q. PLEASE SUMMARIZE YOUR PRIMARY FINDINGS AND CONCLUSIONS?

7 A. The evidence provided here validates the criticisms of the HAI model described in
8 my rebuttal testimony and contradicts claims made by the HAI proponents in their
9 rebuttal testimony. The findings described and illustrated in the attached exhibits
10 can be summarized as follows:

- 11 1. Examination of PNR polygon clusters and their corresponding HAI rectangles
12 confirms the disparity between the shape and/or orientation of the underlying
13 PNR polygon clusters and the so-called "equivalent" HAI rectangles.
- 14 2. The PNR clustering algorithm ignores basic geographic barriers such as large
15 bodies of water in constructing clusters of customers and modeling the
16 corresponding distribution plant to serve those customers.
- 17 3. Some of the PNR clusters overlap, suggesting the potential to overbuild
18 distribution plant in some areas, despite understating the dispersion of customers
19 in other areas, and underbuilding in other areas. In such clusters, it is unclear
20 which cluster customers have been assigned to in the overlapping area.
- 21 4. Some of the clusters extend beyond the borders of the wire center.
- 22 5. A comparison of the HAI distribution cable and drop lengths to the distribution
23 cable and drop distance required to serve the customers in the locations identified
24 by PNR, taking into account road constraints, indicates that the HAI model
25 grossly underbuilds distribution plant. The extent to which HAI distribution and

1 drop cable distance falls short in this analysis is much greater than that reflected
2 by the Minimum Spanning Tree (MST) analysis which simply connects customers
3 as the crow flies.

4 6. The limitations of address geocoding are illustrated by depicting the
5 substantial disparity between the address geocoded locations identified by PNR
6 and the actual customer locations obtained via satellite imagery for the
7 Yanketown wire center.
8

9 **II. ANALYSIS OF PNR CUSTOMER LOCATION DATA**
10

11 A. Lack of Correspondence Between the PNR polygon clusters and the HAI
12 rectangles

13 Q. MR. DON J. WOOD AND MR. BRIAN F. PITKIN CLAIM IN THEIR
14 REBUTTAL TESTIMONY THAT THE HAI RECTANGLES "PRESERVE
15 THE BASIC AREA, SHAPE AND LOCATION OF THE PHYSICAL
16 CLUSTER OF CUSTOMERS..." (P. 57.) DO YOU AGREE WITH THIS
17 CHARACTERIZATION OF THE RELATIONSHIP BETWEEN THE PNR
18 POLYGON CLUSTERS AND THE HAI RECTANGLES?

19 A. No, I definitely do not agree with this characterization. Based on our preliminary
20 examination of the PNR polygon clusters and the corresponding HAI rectangles
21 during our visit to PNR, this characterization by Mr. Wood and Mr. Pitkin is quite
22 misleading.
23

24 Q. PLEASE ELABORATE ON WHY THEIR CHARACTERIZATION IS
25 MISLEADING.

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1 A. Certainly. The customer location methodology involves the use of an algorithm
2 to cluster customers. According to the HAI model documentation, this process is
3 subject to three constraints. Once customers are clustered into main and outlier
4 clusters, PNR constructs a convex hull around the set of address geocoded and
5 surrogate points associated with that cluster. It is this convex hull that I refer to
6 herein as the PNR polygon cluster. The PNR polygon cluster is transformed into
7 a rectangle that may have little resemblance to the underlying PNR polygon
8 cluster. According to the HAI model documentation, the HAI rectangle has the
9 same geographic center and area as the PNR polygon cluster. Beyond this,
10 however, the cluster and rectangle do not necessarily resemble one another, in
11 shape and orientation (i.e. North, South, East, West). This phenomenon is
12 illustrated in the attached figures. Exhibit BKS-1 depicts a cluster where none of
13 the actual customer points is contained within the so-called "equivalent" HAI
14 rectangle, and only two lie on the border of the rectangle.

15
16 Since the HAI rectangle is used as the basis for modeling distribution plant,
17 distortions between the shape and orientation of the PNR polygon cluster and the
18 HAI rectangle can result in understating the dispersion of customers in the
19 locations identified by HAI via the PNR polygon clusters. This can in turn result
20 in a substantial underestimate by the HAI model of the distribution plant required
21 to serve the customers as located by PNR. These distortions in the PNR polygon
22 cluster's shape and orientation, relative to the HAI rectangle, are illustrated in
23 Exhibits BKS-2 and BKS-3.

24
25 B. Formation of PNR Polygon Clusters Ignores Geography

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1 Q. MR. JAMES W. WELLS, JR. CONTENDS IN HIS REBUTTAL TESTIMONY
2 THAT "HM 5.0a CLUSTERS CUSTOMERS BASED ON THEIR PROXIMITY
3 TO EACH OTHER AND TRANSMISSION DESIGN RULES, WHICH IS
4 WHAT AN OSP ENGINEER WOULD REALISTICALLY DO IN DESIGNING
5 A LEAST-COST LOCAL LOOP NETWORK." (P. 5) DO YOU AGREE WITH
6 HIS CONTENTION?

7 A. No, I definitely do not agree based on my observations of clusters obtained during
8 the PNR site visit. First, PNR forms polygon clusters that ignore water areas that
9 would never be bridged by a "real" distribution area. This is illustrated in the
10 clusters provided in Exhibits BKS-4, BKS-5, and BKS-6. Exhibits BKS-7 and
11 BKS-8 depict a wire center in the Florida Keys, where the PNR clustering
12 algorithm is oblivious to the fact that it is making one cluster out of parts of two
13 islands, then using another part of that island in a cluster that spans to another
14 island. Clearly this is inconsistent with Mr. Wells' claim that HM 5.0a clusters
15 customers in a manner consistent with a realistic, engineering design of a least
16 cost network.

17
18 Although the Benchmark Cost Proxy Model Release 3.1 (BCPM 3.1) uses a
19 statistical measure that overlays ultimate grids within wire center boundaries that
20 may contain geographic barriers to clustering customers, it is imperative that these
21 issues regarding the formation of HAI clusters are raised here, to dispel the
22 perception created by HAI proponents that HAI's clustering algorithm forms
23 natural clusters of customers consistent with "real" distribution design areas. The
24 evidence provided here refutes their claim that their clustering process is not
25 arbitrary and is superior to BCPM 3.1's clustering process.

1
2 C. Overlapping Clusters and Clusters Extending Outside the Wire Center's
3 Boundaries

4 Q. ARE THEIR OTHER TROUBLING ASPECTS OF PNR'S CLUSTERING
5 PROCESS?

6 A. Yes, there certainly are. First, many of the PNR polygon clusters that we
7 observed during our on site visit at PNR overlap one another. This is depicted in
8 Exhibits BKS-10, BKS-11, BKS-12, BKS-13, and BKS-14. Given that HAI
9 constructs rectangles upon which distribution plant is modeled that have an area
10 equal to the area of the underlying PNR polygon cluster, there are clearly areas
11 where it appears that distribution plant is overbuilt. Since distribution plant is not
12 fungible, overbuilding in some areas does not compensate in any way for
13 inadequate distribution plant in other areas. Appropriate targeting of universal
14 service funding necessitates properly identifying high cost areas in need of
15 support, designing a network that can serve each high cost area without
16 overbuilding or underbuilding.

17
18 Moreover, since clusters overlap, it is not possible to determine the cluster to
19 which customers identified in the overlapping portion belong.

20
21 Second, PNR's clustering algorithm results in clusters that extend outside of the
22 wire center boundaries that contain the underlying address geocoded and
23 surrogate points. This is illustrated in Exhibit BKS-15. Note that in Exhibit
24 BKS-15, much of the PNR polygon cluster is outside the wire center's
25 boundaries. This phenomenon occurs because the PNR clustering algorithm

1 forms a convex hull about the original cluster points.

2
3 **D. HAI Distribution Cable Distance Falls Vastly Short of the Required Distribution**
4 **Cable Distance Based on Real Road Constraints**

5 Q. MR. WOOD AND MR. PITKIN ASSERT IN THEIR REBUTTAL
6 TESTIMONY THAT "ANY MST DISTANCE CALCULATED BY THE
7 BCPM SPONSORS, BASED ON THESE OVERLY-DISPersed
8 SURROGATE LOCATIONS, WILL LIKELY OVERSTATE THE MINIMUM
9 AMOUNT OF CABLE THAT WOULD BE REQUIRED TO SERVE THESE
10 CUSTOMERS WHERE THEY ACTUALLY ARE LOCATED." (P. 72) DO
11 YOU AGREE WITH THEIR ASSERTION?

12 A. No, I do not agree. Mr. Wood's and Mr. Pitkin's contention that the MST
13 presented in my rebuttal testimony is conservative, i.e. is likely to overstate the
14 minimum cable required to serve those customers is refuted by evidence gathered
15 during our on site visit at PNR. Recall that the MST analysis in my rebuttal
16 testimony was based on the minimum distance to connect customers as the crow
17 flies, in locations identified by PNR. As such, that MST distance clearly
18 understates distribution cable distance, which must take into account roads, bodies
19 of water, etc. I present here two analyses of required distribution cable length,
20 based on the road network underlying two HAI clusters whose distribution-plus-
21 drop cable length was already shown to be short of the MST distance for the
22 customer points of the cluster (in one case distribution-plus-drop was only 59% of
23 MST length, in the other case only 65%).

24
25 When we look at the underlying roads, we realize that the required distribution

1 cable -- taking the minimum route possible along these roads-- is clearly
2 LONGER than the MST distance, and that the HAI Model is EVEN SHORTER
3 in its building of distribution cable than was indicated by a comparison to MST
4 length. MST UNDERSTATES the amount of cable required. Where HAI
5 underbuilds relative to the MST, its shortage in a realistic measurement is even
6 greater than when compared to the MST distance. Exhibit BKS-16 illustrates that
7 in the first case examined, the HAI distribution cable and drop distance for this
8 cluster is only 34% of the requisite distribution cable taking into account the road
9 network. Exhibit BKS-17 illustrates that in the second case examined, the HAI
10 (distribution cable and drop distance for this cluster is only 51% of the requisite
11 distribution cable and drop distance taking into account the road network.

12
13 E. Comparison of PNR address Geocoded Locations With Actual Locations Based
14 on Satellite Imagery

15 Q. DID YOUR ANALYSIS OF PNR ADDRESS GEOCODED DATA FOR THE
16 YANKEETOWN WIRE CENTER PROVIDE ADDITIONAL INSIGHT INTO
17 THE SHORTCOMINGS OF ADDRESS GEOCODING?

18 A. Yes, it certainly did. A comparison of the points that PNR address geocoded for
19 the Yankeetown wire center with actual locations based on satellite imagery
20 reveals a gross discrepancy between the address geocoded locations and the actual
21 locations. This is depicted in Exhibits BKS-18 and BKS-19. These observations
22 are a reminder of the limitations of address geocoding and a validation that
23 address geocoding is an estimation process as well.

24
25 **III. LIMITATIONS OF THE PROCESS FOR ANALYZING THE PNR DATA**

1 AT THE PNR SITE

2
3 Q. COULD YOU PLEASE EXPLAIN WHY THE VARIOUS TOOLS OF
4 ANALYSIS PREVIOUSLY DESCRIBED, WERE NOT APPLIED MORE
5 BROADLY, I.E. INCLUDED A MORE EXTENSIVE ANALYSIS OF
6 CLUSTERS AND WIRE CENTERS IN FLORIDA?

7 A. Certainly. In order to use a wide range of tools of analysis, it was imperative that
8 we limit the application of the tools to a small subset of clusters and wire centers.
9 We only had one and a half days to conduct our on site investigation. The
10 computers were not available to us until Wednesday afternoon, October 7, 1998,
11 despite the fact that the Commission's Order required that their facilities be made
12 available as of October 6, 1998.

13
14 Moreover, limitations on the computers provided impeded the speed and progress
15 of our analysis. We provided our required computer needs to AT&T on October
16 6, 1998. Included in that list was two computers with at least 5 Gigabytes on each
17 computer's hard drive. The computers provided to us by PNR had only 3.1
18 Gigabytes on their hard drives. Consequently, we had to work around this by
19 reading the Florida customer location database from PNR's network. This
20 customer database is quite large, 1.6 Gigabytes (7 million records of data). It
21 required substantial time, i.e. approximately 4 hours, simply to read that data from
22 the network to our desktop machines. This slowed processing time down
23 significantly. Furthermore, one of the computers provided had problems with the
24 hard drive, restricting that hard drive to half of what was presumably available.
25 This precluded our working on that machine. Another machine was provided

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1 during the evening of Wednesday, October 7, 1998. In addition, PNR's network
2 went down while we were half way through the process of reading the FL
3 customer database. That process had to be initiated once again. These
4 challenges, in addition to the restrictive time constraints, limited our ability to
5 analyze more comprehensively the data.
6

7 Q. DID THESE LIMITATIONS ON YOUR ABILITY TO ANALYZE THE DATA
8 MORE FULLY, IMPACT THE INTEGRITY OF THE RESULTS PROVIDED
9 HERE?

10 A. No, they did not. The results provided in my testimony here are indicative of
11 problems inherent in the PNR customer location data, the PNR clustering process,
12 and the corresponding HAI rectangles. These findings validate the criticisms that
13 I raised in my rebuttal testimony. Moreover, they confirm the superiority of
14 BCPM 3.1's superior customer location methodology.
15

16 Q. DOES THAT CONCLUDE YOUR TESTIMONY?

17 A. Yes, it does.

1 Q (By Mr. Rehwinkel) Dr. Staihr, do you have
2 a summary to give of your three prefiled testimonies?

3 A Yes, I do. Because I have three sets of
4 testimony, I'm going to kind of do this in three
5 parts, and they're short, and then I'll do a little
6 conclusion.

7 Part one is pretty easy. We're here to pick
8 a model. Sprint believes that the BCPM is the right
9 model to pick. As to why, we'll get into that. We
10 talked a lot about geocoding and about clusters and
11 about acres, but if we take a step back and kind of
12 look at it from a bigger viewpoint, if you will, the
13 reason we're calculating costs is to figure out
14 explicit universal service support here in Florida;
15 and the reason we want to figure that out is because
16 it's the only way competition will show up in Florida,
17 in all areas of Florida.

18 For a new entrant to come in and actually
19 compete, that entrant has to be assured of being able
20 to cover his or her costs, and those are the costs
21 that this entrant will actually incur here in Florida,
22 not in Vermont or Colorado, but here.

23 The BCPM is the best model to calculate the
24 costs of doing business here for two specific reasons.
25 The first one is the platform. When I say platform, I

1 mean the equations and algorithms that make up the
2 model. The platform is based on engineering
3 assumptions that are efficient and they're
4 forward-looking, but they're very well connected to
5 reality, the way people really build networks.

6 The other reason has to do with the inputs.
7 The inputs have been carefully chosen by people who do
8 business in Florida to reflect the cost of doing
9 business here. That combination shows up in the BCPM.
10 It doesn't show up in any other model. That was part
11 one.

12 Part two, my rebuttal testimony:
13 Understandably, the Hatfield sponsors don't agree.
14 They believe that the Hatfield model is the best model
15 to pick, and the reasons that they have put forth are
16 that their engineering is better than ours and they
17 have a superior customer location approach.

18 Now, in my rebuttal testimony I talk about
19 the second one. As we saw yesterday and as I've shown
20 in my testimony, the only thing that the Hatfield
21 model does with regard to customer locations is ignore
22 them. The only thing it does is it does not use them,
23 and in the process of ignoring them, it distorts any
24 pertinent information that may have been included with
25 them.

1 Dr. Duffy-Deno yesterday put a picture up on
2 the overhead that showed a little bit about how these
3 are ignored and somewhat distorted, and I've got a
4 picture that looks like that. It's kind of big.

5 COMMISSIONER GARCIA: You can make that go
6 up.

7 WITNESS STAIER: The picture looked like
8 that, and I just wanted to put it back up there to
9 talk about it.

10 This is what the Hatfield model does with
11 its customer locations. The blue dots are where the
12 people are. The black dots are where it builds the
13 network. Looking at that, BCPM sponsors don't think
14 that that network there is enough. We'll probably
15 talk a lot about what is enough.

16 But in Sprint's territory, as I show in my
17 testimony, in the universal service areas, the low
18 density areas, they don't build enough 90% of the
19 time. Yesterday you heard Dr. Duffy-Deno say 68% in
20 BellSouth. For Sprint it's 90%. This is an example.
21 It's a picture. It's not real.

22 What you have in the supplemental testimony,
23 part three, is real. It's Florida. It's Vernon, it's
24 Trenton, it's Beverly Hills.

25 Now, what it's not, and what I'd like it to

1 be, there are places like Sopchoppy, Sumatra,
2 Immokalee, real rural. We don't have those. We
3 didn't have time. We'd like to go back and get them.

4 But what you have in front of you, if you
5 could pull out No. 1, No. 2 and No. 11 and glance at
6 those. For No. 1, it's a picture of a cluster. The
7 cluster is in blue. I don't think I can put this on
8 the overhead because of the confidentiality. That
9 cluster -- do you have this here? I'm sorry. These
10 pictures. (Pause)

11 The only pictures I'm going to refer to are
12 1, 2, and 11. First, No. 1. It says Beverly Hills at
13 the top. It says "BVHL FLXA". The green dots are the
14 locations, the blue areas the cluster. The red
15 rectangle is what enters the HAI model. And if I can
16 quote the HAI sponsors, they say that they have a
17 dynamic clustering algorithm that determines natural
18 groupings of customers. I will be interested to see
19 the natural grouping on the page.

20 If you'll flip right next to No. 2, what
21 you've got is a Yankeetown cluster. The green dots
22 are the points, the blue is the original polygon, and
23 the red is the rectangle that enters the model.
24 According to the Hatfield sponsors, the rectangles
25 preserve the basic shapes of the cluster.

1 And if you'll flip all the way over to
2 No. 11, toward the back there, what you have is a
3 picture of Vernon.

4 **COMMISSIONER GARCIA:** Why is this
5 confidential?

6 **WITNESS STAIER:** You would have to ask the
7 Hatfield sponsors that.

8 **MR. HATCH:** Commissioner Garcia, I can't
9 answer that. The information belongs PNR. They're
10 the people that can make the determination whether
11 it's proprietary or not. I'm trying to get that
12 answer for you. I don't have it yet.

13 **COMMISSIONER GARCIA:** Okay. I'm sorry.
14 Where did you go?

15 **WITNESS STAIER:** No. 11, which is a picture
16 of Vernon.

17 As Mr. Wood, the Hatfield witness, pointed
18 out earlier in this proceeding, the problem with the
19 BCPM, the problem with our grid approach is that we
20 tend to separate customers who should be served
21 together.

22 What you have in this picture of Vernon is a
23 whole lot of overlapping clusters. You've got a
24 cluster to the west which has points further east than
25 the cluster to the east. You've got a cluster to the

1 north that has points farther south than the cluster
2 to the south.

3 We don't know which points go in which
4 cluster. Maybe PNR will eventually let us know. But
5 in terms of separating customers who should be served
6 together, this is a perfect example of how arbitrary
7 the cluster determination is that the Hatfield model
8 is based on.

9 COMMISSIONER GARCIA: Do me a favor. You're
10 on this now and looking at this map, I guess, broadly.
11 Tell me how your model would capture this.

12 WITNESS STAIHR: Okay. You can't even start
13 until you look at where the roads are here. We don't
14 have the roads --

15 COMMISSIONER GARCIA: The reason I point
16 this out is it almost appears that there are roads. I
17 mean, there's a great similarity, and that's why I
18 asked you, because I doubt that this is a -- just a
19 coincidence that they're all lined up this way.

20 WITNESS STAIHR: No. And if I can point --
21 If you look at the top left corner, you see there's
22 kind of a circle there. Okay. Having looked at this
23 for a long time, what that is is a census block
24 boundary. And for that census block, nobody could be
25 geocoded, so the Hatfield people put everybody on the

1 boundary.

2 COMMISSIONER GARCIA: Okay. Because I was
3 looking at it and saying there must be a road there or
4 something that --

5 WITNESS STAIER: Yeah. That's very clear --
6 I haven't seen the census block boundary, but we could
7 overlay it on this if PNR let us do that.

8 COMMISSIONER DEASON: What was the geocoding
9 success ratio for Vernon?

10 WITNESS STAIER: I don't have Vernon here,
11 but we can get that from the ex parte that -- oh,
12 here. Mr. Rehwinkel has it. According to the
13 Hatfield sponsors' documents, 0.06%.

14 COMMISSIONER DEASON: Say that again,
15 please.

16 WITNESS STAIER: Zero. Less than 1%.

17 COMMISSIONER DEASON: Less than 1%

18 WITNESS STAIER: Yes.

19 COMMISSIONER DEASON: Success?

20 WITNESS STAIER: Yes.

21 COMMISSIONER DEASON: For the entire Vernon
22 area?

23 WITNESS STAIER: Yes, for the Vernon wire
24 center.

25 All I have left is a conclusion, and it's

1 real short. Both the models that you have before you
2 make assumptions. Both of them make adjustments,
3 because when you're modeling something, you have to
4 treat things in a standardized way.

5 It comes down to which assumptions do not
6 introduce a bias to the model. With regard to the
7 models you have, the BCPM is the one that gets closer
8 to being right. That's my conclusion.

9 CHAIRMAN JOHNSON: Thank you.

10 MR. REHWINKEL: Dr. Staihr is tendered for
11 cross-examination.

12 MR. COX: Chairman Johnson, before we begin
13 the cross-examination, Staff thinks it would be
14 appropriate to identify and mark an exhibit, and it
15 may be a conflict on the identification with some of
16 the rebuttal exhibits that Mr. Rehwinkel and
17 Mr. Staihr introduced a moment ago.

18 It's identified as BKS-11, so we may need to
19 come up with a new identifier for it. It is the
20 deposition transcript and late-filed deposition
21 Exhibit Nos. 1 through 15. It's a composite exhibit,
22 and we'd ask that that be marked for identification.
23 As a new identifier --

24 CHAIRMAN JOHNSON: I'm sorry. BKS-11?

25 MR. COX: Yes.

1 **CHAIRMAN JOHNSON:** We don't have anything
2 identified as --

3 **MR. COX:** I thought Mr. Rehwinkel mentioned
4 BKS-1 through something.

5 **CHAIRMAN JOHNSON:** Yes, but we called it
6 something else.

7 **MR. COX:** Okay. So we can go with our
8 identifier?

9 **CHAIRMAN JOHNSON:** Uh-huh. We called one of
10 them BKS rebuttal and one of them supplemental
11 rebuttal.

12 **MR. COX:** That will be fine.

13 **CHAIRMAN JOHNSON:** BKS-11, and that will be
14 identified as 60.

15 **MR. COX:** Thank you.

16 (Exhibit 60 marked for identification.)

17 **CHAIRMAN JOHNSON:** Any questions on this
18 side of the room?

19 **MR. REHWINKEL:** Madam Chairman, before we
20 get started, could I be clear we've got actually
21 two -- we've got another BKS-11 within the composite
22 Exhibit 59, which is a supplemental rebuttal exhibit,
23 the maps that you were just looking at. Is this
24 now 60?

25 **CHAIRMAN JOHNSON:** Uh-huh.

1 MR. REHWINKEL: Okay.

2 MR. LAMOUREUX: Than you, Madam Chairman.

3 The curse of being first in the alphabet.

4 CROSS EXAMINATION

5 BY MR. LAMOUREUX:

6 Q Good morning, Dr. Staihr.

7 A Good morning.

8 Q I'm Jim Lamoureux. I represent AT&T.

9 A Nice to see you.

10 Q Let me begin by asking you a couple of
11 questions about your summary.

12 In endorsing the BCPM in your summary, you
13 mentioned two things. One were engineering
14 assumptions, and one were input.

15 As to engineering assumptions, you're not an
16 engineer; right?

17 A No, sir, I'm not.

18 Q So in your endorsement of BCPM's engineering
19 assumptions, you're relying on the engineers that
20 participated in putting together BCPM; is that right?

21 A Yes. I talked a lot with the engineers, and
22 I asked them a lot of questions about how we build our
23 network; and I'm talking about Sprint's engineers, not
24 necessarily BCPM engineers.

25 Q So for questions about engineering

1 assumptions within BCPM, really that's for people like
2 Dr. Bowman?

3 A I absolutely agree. He would be a much
4 better person to ask those questions to.

5 Q And in terms of inputs, inputs are not a
6 modeling issue. Would you agree with me on that?

7 A Inputs are a modeling issue in the way that
8 they're used in the model. I'm not the specific input
9 witness. Mr. Dickerson and Mr. Laemli are.

10 My purpose in the proceeding here today is
11 because all those things come together, and you kind
12 of need a person to deal with how they come together,
13 and that's me.

14 Q So, again, in endorsing the inputs to BCPM,
15 you're not -- you're relying on input that you've --
16 advice that you've gotten from other folks on those
17 inputs?

18 A No, not completely; because in endorsing the
19 inputs, I'm also endorsing the way the model uses them
20 and uses them appropriately and accurately. It's a
21 big part of whether or not the input is any good, how
22 the model uses it; and I'm dealing with that.

23 Q Okay. But as to questions about specific
24 inputs, why did you choose this input rather than that
25 input, that's more a question for Mr. Dickerson or --

1 A Or Mr. Laemmler.

2 Q Or Mr. Laemmler?

3 A Yes.

4 Q Okay. And would you agree with me generally
5 that a model itself could be efficient,
6 forward-looking, but if you chose backward looking
7 inputs or historical inputs, you would get an
8 inappropriate result?

9 A You can do a lot of things with a model to
10 get an inappropriate result, and inputs is one way to
11 do that.

12 Q Let's jump right into this idea that you
13 said in your summary that the Hatfield model ignores
14 customer locations. And for convenience, I want to
15 focus on BKS-1 to your supplemental rebuttal.

16 A Yes.

17 Q It will be a little dancing in the dark
18 since we can't put it up, but I hope by asking I can
19 make it clear.

20 A Sure.

21 Q The dots on that page, those represent the
22 customer locations as identified by PNR; is that
23 right.

24 A Yes, they do.

25 Q The irregular shaped polygon that surrounds

1 those dots, that's the polygon that's drawn as a
2 result of those customers locations.

3 A Yes, it is.

4 Q That's the convex hull?

5 A Yes, it is.

6 Q This irregular shaped polygon -- sorry.

7 Strike that.

8 The customer locations are used to construct
9 that irregular shaped polygon.

10 A That is correct.

11 Q So it's not entirely accurate, then, that
12 the model ignores customer locations because those
13 locations are used to construct that polygon; isn't
14 that right?

15 A That's where we're going to have to
16 disagree, because you've got it wrong. The model
17 never sees --

18 COMMISSIONER GARCIA: Sorry. You're going
19 to have to disagree because?

20 WITNESS STAIER: I'm sorry. I said you got
21 it wrong, but that's incorrect.

22 Q (By Mr. Lamoureux) It's incorrect because
23 you're separating out the process of drawing the
24 polygon from the model?

25 A I'm also separating out what goes into the

1 model. The polygon never goes into the model. The
2 model never sees the polygon. The model never sees
3 that the top guy is 5 miles away from the bottom guy.

4 Q Okay. Let me try it this way, then. The
5 preprocessing stage of the Hatfield model does not
6 ignore the customer locations, because those customer
7 locations are used in constructing this irregular
8 shaped polygon; isn't that right?

9 A That's right. The preprocessing done at
10 PNR, again, which never enters the model doesn't
11 ignore those.

12 Q Once that irregular shaped polygon is drawn,
13 that is used to construct the more regular shaped
14 polygon.

15 A Just the measure of the area; not the shape.

16 Q But also the height/width aspect ratio as
17 well --

18 A Yes; and that's where the distortion occurs.

19 Q But the --

20 COMMISSIONER DEASON: Excuse me. Let me ask
21 a question. Looking at the exhibit, do we know those
22 are actual locations? Were those actually geocoded,
23 or was there an assumption made about putting it on
24 the perimeter of the census block?

25 WITNESS STAIER: Having worked with this a

1 while, first we know Beverly Hills had a very good
2 geocode rate; above 60%, maybe as high as 70, but I
3 know for a fact it's above 60.

4 Looking at the way these are laid out here
5 and having looked at a lot of the geocoding lately,
6 you notice that they're very different from the Vernon
7 one that had zero.

8 The way that they're clustered in the bottom
9 right and the way that they're curved in the top left,
10 glancing at this, and having had a reasonable amount
11 of experience, I would bet these are geocoded points.
12 I don't know that, because PNR doesn't let us know
13 that.

14 Q (By Mr. Lamoureux) I just want to step
15 through this one step at a time. In the preprocessing
16 stage of the model the customer locations are
17 identified; combination of geocode plus surrogate.

18 A That's correct.

19 Q Those com -- those locations are then used
20 to construct this irregular shaped polygon?

21 A That's correct, too.

22 Q Information about that irregular shaped
23 polygon is then used to construct the more regular
24 shaped polygon.

25 A Most of it is not; only a very small part,

1 and that's only the area. The pertinent information
2 is not used.

3 Q The area as well as the height/width aspect
4 ratio; is that --

5 A Again the height/width aspect ratio of this
6 polygon is actually not what's used. The height/width
7 aspect ratio of the minimum boundary rectangle is
8 what's used. I can go through that if you'd like.

9 Q No. I'm okay with it.

10 A Okay.

11 Q And then this regular shaped polygon is what
12 comes out of the preprocessing to go into the model?

13 A That's correct.

14 Q Were you here for I think Mr. Wood's
15 presentation at the beginning of the hearing?

16 A Yes, I was.

17 Q Do you agree with him that models generally
18 can't handle irregular shaped polygons?

19 A Definitely I agree with that.

20 Q So there's a rational reason why the
21 irregular shaped polygon is transformed into a more
22 regular shaped polygon so that the model has something
23 it can work with?

24 A I'm not sure I can agree with that.

25 Q Would you agree with me, though, it would be

1 pretty near impossible for a model to use an irregular
2 shaped polygon like this?

3 A No. I would definitely disagree, because
4 that's exactly what the FCC is doing.

5 Q Okay. And that's in their hybrid cost proxy
6 model?

7 A Yes, sir.

8 Q And in that hybrid cost proxy model, the FCC
9 uses a clustering process rather a gridding approach;
10 is that --

11 A Absolutely wrong. They use a grid laid over
12 a cluster; a grid very similar to the BCPM's grid.

13 Q They first construct a cluster, don't they?

14 A Yes. They construct a cluster using the
15 technique that we use to cluster grids.

16 Q In fact, have you seen the public notice
17 issued by the FCC on August 7?

18 A Yes, sir.

19 Q And are you familiar in that it talks about
20 their platform using a clustering approach because it
21 appears to have advantages over gridding approaches?

22 A Yes. They are very into their clustering
23 approach, which is very different than your clustering
24 approach.

25 Q In what way is it different?

1 A Their clustering approach is a divisive
2 approach which is similar to what the BCPM does with
3 grids, which means, you take a big area and you split
4 it. The Hatfield clustering approach is called an
5 agglomerative approach. You take little areas and add
6 them together.

7 Q But it doesn't use the same sort of gridding
8 approach that BCPM begins with of constructing small
9 microgrids and aggregating them up into an ultimate
10 grid without doing any clustering first.

11 A No. What it does is, it takes those small
12 grids and lays them over the cluster to avoid the
13 distortion that occurs in the Hatfield model.

14 Q But the hybrid cost proxy model begins with
15 a cluster, it does not begin with a grid; correct?

16 A That is correct.

17 Q Let's talk about the BCPM. I drew something
18 on the board to save a little time.

19 And we talked a little bit about this with
20 Dr. Duffy-Deno yesterday, so I'm going to try and move
21 through it fairly quickly.

22 The way BCPM works is its finest level of
23 geographic construct is a microgrid; right?

24 A Yes, sir.

25 Q Okay. And it takes a collection of

1 microgrids and composes an ultimate grid, or
2 macrogrid.

3 A Those are two different things, but yes, an
4 ultimate grid.

5 Q Okay. Ultimate grid.

6 COMMISSIONER GARCIA: So that I know, what's
7 the difference?

8 WITNESS STAIER: Were you here for my
9 presentation, sir, at the beginning?

10 COMMISSIONER GARCIA: Yes.

11 WITNESS STAIER: I showed a picture of
12 Tallahassee, and some grids were little and some grids
13 were big, but all of those were ultimate grids. The
14 size that it ends up being depends on how many people
15 are there, how closely they are packed together.
16 You've got a lot of people closely packed together,
17 you'll have a small grid; lot of people spread out,
18 you'll have a bigger ultimate grid. They can be
19 different sizes.

20 Q (By Mr. Lamoureux) But it takes a
21 collection of microgrids, and on top of that
22 collection of microgrids it draws an ultimate grid.

23 A It aggregates or -- yes.

24 Q It collects the microgrids in an ultimate
25 grid.

1 A Yes.

2 Q And there are 64 microgrids in an ultimate
3 grid.

4 A No. There are 64 microgrids in a macrogrid.
5 There may or may not be 64 in an ultimate. I'm just
6 trying to keep it --

7 Q Okay. Well, for simplicity sake, what I've
8 got here is a macrogrid with 64 microgrids in it.

9 A Yes.

10 Q Okay. The way we get to where plant is
11 built -- and that's what I want to get to in BCPM --
12 is it takes that macrogrid and divides it into four
13 quadrants; is that right?

14 A Yes.

15 Q Okay. And then within the quadrants it
16 constructs something called a road reduced
17 distribution area within each quadrant; is that right?

18 A Within each populated quadrant --

19 Q Okay.

20 A Well, actually, yes; it's constructed within
21 each. It may not be used.

22 Q And this road reduced distribution area is
23 centered on the road centroid of the quadrant; is that
24 right?

25 A That's right.

1 Q And then what BCPM does for constructing --
2 for modeling constructing plant is it designs plant
3 from the center of the ultimate grid -- well, it
4 designs table first from the center of the ultimate
5 grid into each road reduced distribution area.

6 A Each populated road --

7 Q Okay. So if in my example, for example, if
8 three of these road reduced -- three of these
9 quadrants are unpopulated, it will create the road
10 distribution area for each, but it will only design
11 plant into the one that's populated?

12 A Yes, sir.

13 Q Okay. What I want to get at is, because
14 this road reduced distribution area -- what I've drawn
15 in the dash lines -- is centered on the road centroid
16 of the quadrant, it may not cover all the microgrids
17 that have population in them; isn't that right?

18 A That is exactly right, yes.

19 Q So, for example, let's saying this quadrant
20 is populated here. This road reduced distribution
21 area could be drawn depending on where the centroid is
22 so that it only covers these upper four microgrids,
23 even though there -- these microgrids down here may be
24 populated?

25 A Okay. You have to be careful, because if

1 these microgrids are populated, it's because there are
2 roads there. If there are roads there, the road
3 centroid won't be put where you just said it would be
4 put.

5 Q Okay. Let me take this. If this quadrant
6 is -- has roads in it in such a way that there are far
7 more roads in the upper left-hand part than in the
8 bottom right-hand part, the road reduced distribution
9 area is going to be pushed up towards the upper
10 left-hand part of the quadrant.

11 A Yes, sir, that's correct.

12 Q So it could very well be possible that there
13 is a microgrid that has some roads in it and,
14 therefore, is assumed to be populated, but the road
15 reduced distribution area does not cover that
16 microgrid.

17 A That's right.

18 Q So in constructing where plant is built,
19 plant may very well be built in the BCPM -- plant may
20 very well be built in BC plant -- PM -- to places --
21 not to all places where BCPM has assumed people live.

22 A Okay. And there's something very important
23 that you can't forget here, and that is -- that this
24 gets technical, and this is an engineer question.

25 Because we do not taper our backbone

1 cable -- if we have to have backbones and we built
2 them here, they could just as easily have been here,
3 reaching an area that isn't really covered by the road
4 reduced area. (Indicating)

5 In your model you taper the backbone cable,
6 so you guys can't do that. It's a modeling convention
7 so that the length of cable is not such that it
8 couldn't actually serve a customer that isn't located
9 in the road reduced area.

10 Q Okay. And when you're talking about --
11 we're talking about connecting cable?

12 A Now I'm talking about backbone or branch
13 cable.

14 Q And that's within the road reduced
15 distribution area?

16 A Yes.

17 Q Okay. So the way the model works is it
18 first constructs the connecting cable into the road
19 reduced distribution area --

20 A Right.

21 Q -- and then it constructs branch and
22 backbone cable within that road reduced distribution
23 area.

24 A That's right.

25 Q But you agree with this road reduced

1 distribution area could very well be in a part of the
2 quadrant that doesn't cover all the microgrids that
3 have roads and, therefore, BCPM initially assumes were
4 populated.

5 A Yes. It could very well be that the plant
6 is placed where we assumed someone was and isn't.

7 COMMISSIONER GARCIA: While you're getting
8 set up again, looking again at this exhibit that we
9 were looking at, tell me what -- assuming that, as you
10 stated, this is a very accurate -- using the HAI
11 model, give me an example what would happen if we use
12 BCPM.

13 WITNESS STAIER: It would be real easy if I
14 could put this on there and draw on it, but I don't --

15 COMMISSIONER GARCIA: Well, I don't think
16 you have to. Just let's assume that this is how we
17 have the people, that they're spread out to two
18 extremes.

19 WITNESS STAIER: Right.

20 COMMISSIONER GARCIA: Tell me how BCPM --
21 first of all, give me an idea of how the ultimate grid
22 would look against the space that I'm looking at. Is
23 that the red triangle? Is that an ultimate grid
24 that --

25 WITNESS STAIER: No, no. That's a Hatfield

1 reduced rectangle --

2 COMMISSIONER GARCIA: Okay. So give me an
3 idea of how --

4 WITNESS STAIER: Okay. First off, because
5 no ultimate grid can be as big as some of the reduced
6 rectangles, this would probably be served in two
7 different ultimate grids. The top people in the left
8 corner would be in one carrier serving area, the other
9 people would be in another.

10 We'd look at where the records are. And
11 here it looks like we've got a road that kind of
12 curves around to the right and zips back up. Okay.
13 If it happened that --

14 COMMISSIONER GARCIA: That's a complete
15 assumption on your part. It's just you're seeing them
16 there and you assume that it's a winding road.

17 WITNESS STAIER: Yeah. I can't tell without
18 being able to actually see whether these are actual or
19 surrogate points, and we don't know that.

20 COMMISSIONER GARCIA: Okay.

21 WITNESS STAIER: Do you want me to assume
22 they're actual and they're on a road?

23 COMMISSIONER GARCIA: Yes. Let's assume, as
24 you stated, that this is very, very accurate.

25 WITNESS STAIER: So the road is going to

1 go -- curve around there and go straight up. We're
2 going to calculate a road reduced area, okay, for
3 that, and that's going become our distribution area;
4 but before we do that, we put an ultimate grid over
5 that bunch of customers.

6 COMMISSIONER GARCIA: You're looking at the
7 top left?

8 WITNESS STAIER: Top left, yes. We find the
9 road centroid, which is probably that one, two, three
10 fourth dot down. See the fourth dot down from the
11 top? We would probably put the digital loop carrier
12 right there at the road centroid. The connecting
13 cable would branch out probably to the right and to
14 the left, head up to serve those people, head down to
15 serve the people on the bottom right, just as was
16 drawn here.

17 COMMISSIONER GARCIA: However, let me
18 just -- looking at this same thing, let's say that
19 this is really a rural area. You've divided it
20 into -- you've got all these customers to the left. I
21 assume that the dots that are right on the edge are
22 the ones that the H&I puts there because it doesn't
23 know where they go.

24 WITNESS STAIER: I don't think your
25 assumption may be right. Those could very well be

1 actual customer locations, and it's just that their
2 clustering methodology decided those could be included
3 but no further ones could.

4 **COMMISSIONER GARCIA:** Well, then it makes my
5 point even better. If, let's say, there was a state
6 road that ran -- or I don't know where Beverly is, so
7 let's -- and that's my own problem -- but let's assume
8 that an interstate went through there, which you do
9 not discount in your model, and these are rural
10 people.

11 What it would do -- let's say, the road ran
12 east to west. What it would do then is take those
13 people, if we knew their address but didn't know about
14 roadways, and then it would cluster them along that
15 roadway.

16 **WITNESS STAIER:** Not if it's an interstate,
17 because we don't put people on the interstate. We'll
18 put them on a state highway, we'll put them on dirt
19 roads, but we won't put them on an interstate.

20 **COMMISSIONER GARCIA:** Okay. But it would
21 cluster them all along a roadway there if that's what
22 you had.

23 **WITNESS STAIER:** It would distribute them
24 along the roadway, and then it would take that area --

25 **COMMISSIONER GARCIA:** But it would also

1 distribute them along dirt roads that happened to be
2 there.

3 WITNESS STAIER: Yes, it would. It doesn't
4 leave out dirt roads.

5 COMMISSIONER GARCIA: So it would take all
6 these people and distribute them evenly along a
7 roadway.

8 WITNESS STAIER: Yes. And if I could --

9 COMMISSIONER GARCIA: Wouldn't that have a
10 tendency in this case to -- if there was a roadway
11 grid that was very spread out, in this case increase
12 the assumptions and costs involved in serving those
13 customers?

14 WITNESS STAIER: It would if we left them
15 spread out. We don't leave them spread out. What we
16 do is, say, they're along a road, we put them along
17 the road. We take the buffer area, 500 feet on either
18 side, convert that to a square, and build the plant
19 within the square.

20 I talked earlier that you have to make
21 standardizing assumptions once you get to a very low
22 level. That's one of them.

23 - - - - -

24 (Transcript continues in sequence .

25 Volume 14.)

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BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In the Matter of : DOCKET NO. 980696-79
Determination of the cost of :
basic local telecommunications :
service, pursuant to :
Section 364.025, :
Florida Statutes. :

VOLUME 13

Pages 1412 through 1544

PROCEEDINGS: HEARING

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

DATE: Monday, October 14, 1998

TIME: Commenced at 9:10 a.m.

PLACE: Betty Easley Conference Center
Room 148
4975 Esplanade Way
Tallahassee, FloridaREPORTED BY: M. KUTHE POTAMI, CSR, RPR
Official Commission Reporter

APPEARANCES:

(As heretofore noted.)

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