BEFORE THE
FLORIDA PUBLIC SERVICE COMMISSION

In Re: Petitions by AT&T Communications of the Southern States, Inc., MCI Telecommunications Corporation and MCI Metro Access Transmission Services, Inc., for arbitration of certain terms and conditions of a proposed agreement with GTE Florida Incorporated concerning interconnection and resale under the Telecommunications Act of 1996.	DOCKET NO. 960847-TP DOCKET NO. 960980-TP

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PROCEEDINGS:	Hearing
BEFORE:	CHAIRMAN SUSAN F. CLARK COMMISSIONER DIANA K. KIESLING COMMISSIONER J. TERRY DEASON COMMISSIONER JULIA L. JOHNSON COMMISSIONER JOE GARCIA
PLACE:	Betty Easley Conference Center Room 148 4075 Esplanade Way Tallahassee, Florida
TIME:	Commenced at 10:00 a.m. Concluded at 12:00 p.m.
DATE:	Wednesday, October 16, 1996
REPORTED BY:	SARAH B. GILROY, CP, RPR
APPEARANCES:	(As heretofore noted.)

WITNESSES - VOLUME 15

P R O C E E D I N G S

(Transcript follows in sequence from Volume 14.)

DON WOOD

having been called as a witness on behalf of MCI and AT&T, and being duly sworn, continues his testimony as follows:

CONTINUED CROSS EXAMINATION

BY MR. FUHR:

Q The image of a model with 1 million cells is sort of a daunting constant when you think of 300 or 400 different input values. But some of these cells are not simply a number, but rather a formula; correct?

A That's right.

Q And would you -- strike that. Is it your understanding that there are more than 5,000 cells in this model that consist of some form of mathematical formula that defines that cell?

A Yeah. I think -- I don't know the exact number. I think it is between five and 6,000. There are a lot of them.

Q And has AT&T -- or Hatfield & Associates disclosed and made publicly available all those 5,000 models or 5,000 formulas?

A To my knowledge they have. Again, if -- you know, those may be situations where there is -- that's -- you may not have the option as a reviewer of the model to change those calculations. You have the option to see them.

In fact I'm quite sure that you can go through for each of those cells and see the underlying calculation, see what got done. And by being able to do that you can then trace through in the process that we were talking about before.

You ought to be able -- to evaluate a model you certainly ought to be able to understand its calculations and its formulas. I'm not sure you ought to be able to change them necessarily. That may not be possible here.

Q Would you agree that to understand a formula it would be useful to have backup documentation on that formula with respect to explanation of what that formula is, what the concept is, what its structure is?

A Certainly, and that's certainly the intention behind I guess what's marked DJW-4, that set of documentation. I can certainly tell you, having tried to review Costmod SCIS in the past, that I've not had that data, and it has been a frustrating process.

In fact I've not had any of the data that we've discussed up to this point.

Q I believe you indicated that the 400 data points that we have described earlier, that we mentioned earlier, approximately 400 are data points that the user of the model can change and adjust; am I right?

A That's right.

Q There are obviously a lot of other data points that

go into this model; correct?

A Yeah. Again, we're talking about the underlying raw data, if you will, the census data, the USGS data.

Q Do you know how many data points of that type there are? And by "that type" I'm talking about a type that are not adjustable by the user.

A Essentially everything else that we're -- we're talking about on a state-specific basis, some of the 400 that we're talking about will change; line counts obviously, traffic statistics, that sort of thing.

Some of those 400 will not necessarily change but are national default figures that can be changed if there is a reason to do so, but won't necessarily change. So as we look at this model as not a single-state model, but a 49-state model, you will certainly see that on a percentage basis most of the cells can't be changed.

And of course the reason they can't be changed is that most of the cells are state-specific data on census and USGS data that are for other states other than the one being studied. Even for this state most of the data points are that type of information.

So certainly on percentage-wise most of them can't be changed, but the reason is that most of what's in the model is underlying a huge database of underlying raw census and USGS data.

Q Are you able to quantify what the rest of the data is, or when you say "most of the data is data that cannot be changed," are you able to put an order of magnitude on that?

A Well it's -- we're talking about 400 user definables, which are the ones that should be user definable. Those are the key assumptions to the model. They determine whether it's right or wrong. Some of those change state by state. Some don't.

To the extent that there are a million more cells out there, five or 6,000 which are calculations, really everything that's left over.

Q It's a mathematical difference of those numbers?

A I'm sorry? It's a very big number. It's hundreds of thousands.

Q Who made the judgment as to which of the inputs were ones that could be adjusted by the user and which ones would be hard wired or in some manner made nonadjustable by the user?

A I don't know what individual would have made that decision. I have talked it over certainly with Dr. Mercer, and it's my understanding the decision was made just on the type of logic that I've described to you.

There is a lot of raw data here that's census data, USGS data that shouldn't be changed by anyone reviewing the model. That's not the data that's at dispute here.

What is potentially at dispute are the key assumptions to the model that fall within the realm of these 400 inputs. And the decision was made certainly between Release 1 and Release 2 to make those as user definable as possible.

Q Is it fair to say that if there is -- or if there are inputs in the model that cannot be adjusted by the user, but which do not come from the census bureau or the U.S. Geographic -- or Geological Survey, you are simply unaware of their existence?

A Again now we're not talking about calculations, we're talking about inputs, input data points.

Q Right.

A This is a pure subject-to-recall answer, and if you remind me of some, I'm sure I will agree with you. But I don't recall any I mean simply because I haven't gone through and tested them all. I've only tested input -- changing inputs that fall within this list of 400. And I've discussed the logic with the developers of why certain sets of data should be closed off.

So I've described the process -- I described this as accurately as I know to describe it to you.

Q Have you had any disagreements in any respect with the judgment that was made by Hatfield & Associates in terms of what values got turned off, meaning that the user could not

change them, and which ones were made changeable?

A No. Again, based on that same conversation with Dr. Mercer, I see no reason that census data ought to be changed or that USGS data ought to be changed.

Q Is there any respect in which, based on your years of experience with cost models, you have a disagreement with what Dr. Mercer has done with respect to this model?

A Actually, no. The only -- I gave him some very specific feedback, and I will be glad to tell you what that was. But they incorporated everything that I expressed concern about.

Q And those were concerns that you expressed with respect to Release 1 and which you believe have now been incorporated in Release 2; is that correct?

A That's right. If that were not true, Mr. Fuhr, I wouldn't be here sponsoring this model today. If they had left out standing concerns I would not be telling this Commission that this was the best and most reliable source of cost data.

Q And is it your opinion that there are no further changes that need to be made to Release 2 for it to be a reliable model for commissions all across the country to rely on in determining the cost of incumbent local exchange carriers in specific states?

A I have not discovered any of that type of error that needs to be corrected. As you're aware, I think we

updated the two pages to my testimony that reported the results and the three output pages, the GJW-3 exhibit, for that very reason, and that is that the model as it was originally distributed had a tax calculation error in it that was discovered very quickly and corrected very quickly.

And the new numbers reflect that change. They're not very different from the others. But in the interest of this process -- and there are a lot of people that feel the same as I do, and that is that this process needs to be absolutely verifiable and absolutely open.

And if we find the mistake, we're going to raise it, and we're going to insist that it get corrected and be corrected immediately. In this case it meant updating results. They weren't very different, but we updated them anyway.

That process is still in place. I'm not the only one that's insisting on that. That's why I'm fairly confident that there haven't been other types of calculation errors like that uncovered, because if they had, I would know about them. We would have them.

Q And the type of updating that you're referring to, you are referring to changes or modifications to the values that are assigned those adjustable inputs as you get better, more accurate information; is that right?

A Well it could be two things. It could be better,

more accurate publicly-available information. We don't want to include any proprietary information here, because then that shuts down this whole public access principle.

It could be calculations. The tax calculation was such an error. It could be the incorporation of new data. The only other type of change that I have seen done at all is a reassignment of census block groups to wire centers or to end offices.

When you're assigning hundreds or thousands of CBGs to a corresponding end office the model does it by the closest office, which is, as it turns out, over 99 percent of the time the right answer, but occasionally is not. I know there have been some corrections made in California. I know there were corrections made in Pennsylvania.

The model developers were happy to do that. They re-ran the model, and the results didn't change significantly in either case. So it's -- that's an ongoing process that's a refinement to this very large base of census data.

But it's not a refinement that to date has resulted in a significant change in the output. So I expect that to be ongoing, but I don't expect it to have major consequences.

Q Let's talk about that, the lives of the CBG data, the assignment of wire centers and the like that you just --

A Yes.

Q -- mentioned. The CBG data that you were referring

to is this data that you have gotten from the federal government that talks about certain census tracts, a certain number of people that reside in those census tracts; correct?

A That's right.

Q And the model attempts to project what the costs are of providing service to those people who reside in each of these tracts; correct?

A That's right. These are very specific and disaggregated geographic units, far more disaggregated than any of the incumbent models that I've seen. In fact I believe there are over 4700 of these in Florida.

Q And the Hatfield Model takes a scorched node approach to providing service -- or calculating the cost of providing service to the people that reside in any particular census tract; is that correct?

A That's right. And by "scorched node" I assume you mean that switching locations are assumed to be the existing locations, that's right.

Q And everything else is assumed variable; correct?

A Well nothing else is considered sunk I think is the most accurate way to characterize it. We're going forward from existing switching node locations to build up the efficient network as it would be built on a forward-looking basis.

Q The model assumes; does it not -- let's take an example. Assume that census data that you collect shows that

in Tract 1, 100 people reside in that district; are you with me so far?

A Yes.

Q Okay. The model assumes -- does it not? -- in making its cost determinations that those 100 people are uniformly disbursed throughout that geographic tract so that the distances between each resident is exactly the same as -- there is no clustering of residents in other words within that tract; correct?

A Well that's nearly true. That was true across all density zones in BCM1. It was recognized by all of the cosponsors of BCM1, including MCI in its development of BCM-PLUS, that when you look at rural areas people really aren't spread out. They really live along the roadways in small towns, at the crossroads.

So there are adjustments in Release 2, just as there are adjustments in BCM2, to reflect the fact that that equal distribution certainly does not occur in low density. To the extent that it's still assumed in the other density zones, it's a cost-maximizing constraint if you will.

The underlying principle of the model is that if there are going to be mistakes, they should err on the high side if you will. There is a principle of conservatism here.

By assuming equal distribution you calculate a maximum cost amount. To the extent that people aren't equally

distributed, if they're clustered, it can cost less than the model predicts, but it can never cost more.

It can never cost more to serve people than it would cost if they are absolutely evenly distributed, because you get no economies of clustering that way.

Q The model further assumes -- does it not? -- in designing a network to service these 100 people in my hypothetical, that that network travels always in the shortest path between any two points in that track; is that correct?

A No, sir, that's not right.

Q How was that factored into the model?

A If you look at -- it comes down to what we used to call route-to-air ratios in the old days. If you look at two locations, and you can get those locations specifically on what are called V&H coordinates, on a grid --

Q Explain what you mean by that. What does it stand for? Just say what it stands for.

A I'm sorry, sure. Vertical and horizontal. It's no sexier than that.

There is a grand map of North America with a full set of V&H coordinates. And you can locate wire centers specifically, and actually beyond the wire center level in some cases, the exact location of any given facility. And you can then go to the LERG, the local exchange routing guide -- L-E-R-G, sorry -- and get the V&H coordinates for given end

locations in given locations.

You can then, using simple geometry, calculate the airline distance between two points, based on their V&H. That's just the hypotenuse of the right triangle.

What the model actually does is not assume airline distances, but actually assumes what's called rectolinear routing, which means that the routes move east-west and north-south, but not southwest, northeast. And that's a very typical process. It's one that's used by incumbent LECs; it's one that's used by GTE.

In a sense you've got facilities that, if you were to draw -- if they're on a diagonal in a relationship, if you were to draw that diagonal on an Etch A Sketch you would get something like -- something like I'm motioning that's going to be impossible for the court reporter to incorporate.

But it's going to be east-west, north-south, which is a longer distance and a higher cost, the model built on that assumption not a shortest-distance assumption.

Q To what extent does the model take into account various zoning regulations, for example, that may affect what path that network and those wires must travel?

A Well it does that in a couple of different ways. It assumes longer routes in higher-density zones, because you would expect that in more populated areas you would be in a town. And towns are much more likely to have zoning

requirements on -- well they're more likely to have two things. They're more likely to have streets laid out in a grid that would require your facilities to actually move in that fashion, and they're more likely to have requirements on where you place the facilities.

So there has been an increase in high-density zones to reflect the likelihood of zoning. Now to do 49 states, the model developers have not gone to each municipality in all 49 states, looked at their zoning requirements and made a specific adjustment. The adjustments have been made in a more general way than that, but it incorporates that.

The other is that there is an adjustment for difficult placement areas if there are -- and this applies in an urban or rural setting -- if there are, based on the geological survey data, difficult areas in which to place facilities, the model adds distance to route around those areas.

So in a couple of different ways it gets at the concern I think you're describing.

Q So, for example, if in a particular tract there is a lake or a swamp, the model for that specific -- in projecting the cost for that specific tract has a factor or formula in there that takes all that into account for that?

A Yeah. And it wouldn't just be a high water table which would be a swamp or a body of water. It would be bedrock

that's just beneath the surface would make it very hard to place a facility, whether it be pole or conduit.

What -- what's been described to me -- and you have to look at the USGS data and then try to fit words to what they're describing. But what's been described to me as bouldery situations, where you have lots of big rocks on the surface, it's hard to place things that way too. Mountains certainly. So you route around those in most cases.

And the model has -- increases the distance correspondingly to that.

Q Does the survey data from the -- the U.S. Geological Survey data contain data with respect to water tables?

A I believe it does.

Q And that's broken down by district, by tract -- by census tract?

A It's broken down at some level. I think everything that's -- I'm absolutely certain that bedrock depth, soil types and surface conditions, if you will, that those factors are at a CBG level. It's my understanding that some of the other data is also at that level.

But those aren't ones that I've gone through in the confirmation process. So they may be a bit more aggregated.

Q Let me go back to the point you talked about before about misassignment to wire centers.

A Yes.

Q That is a phenomenon that has occurred with this model; has it not?

A Well we've at least identified two states in which some have been identified. And we're talking in the order of 1 percent or less. But, yeah, if you assume that all CBGs home on the nearest wire center, it appears that you're correct 99 point something percent of the time.

To the extent that there are exceptions to that rule, those adjustments have been made. It's not a difficult process to go into the model and re-home a given CBG or two.

Q What is the basis for your testimony that it is accurate 99 percent of the time?

A Because we've looked at this in quite a few states, and I'm only aware of two exceptions, and those exceptions were a very manageable number of CBGs as a part of a very, very large number of CBGs. So that's my back of the envelope. But I haven't seen higher numbers than that.

Q Let's take Florida as an example. What study has been done to ensure that wire centers have been properly assigned for the state of Florida?

A Well the developers have gone through and matched them as clearly -- as closely as they could. They go through -- it's a two-step process as I understand it. There is the pure match them to the closest wire center, and then

there is a sanity check on that process. Both of those have been done.

Quite honestly the third level check that's been done in other states is that incumbent companies who have a vested interest in showing us where we're wrong have certainly not been shy about doing that. I suspect, although I don't know, that GTE has performed a similar analysis and has identified any misassignments.

Q Let me bring you back to Florida if I might. Who has done the study that you have just described in determining whether the wire centers have all been properly assigned for the state of Florida?

A Those are the Hatfield developers. They go through that process before they release the model.

Q You understand that that study has been done for every single state, and the only two errors they found were one in Pennsylvania and one in the state of California?

A No, that's a misstatement. What I said is that there was a two-step process in the model development process. One is to go through and match them to the closest wire center. The second is to go through and do a sanity check.

If you go down and look and see for a fact that there is a river -- intervening river or mountain range, you make manual adjustments. And there have been lots of manual adjustments prior to the release of Release 2.

The third process is the one I described, which is incumbent companies with a vested interest in finding some misassignments. And the only misassignments that I've seen identified were Pennsylvania and California. There may have been others more recently than that. We've all been on the road quite a bit.

Q And probably will be some more.

A I'm afraid so.

Q Let me switch subjects a little bit for you. We discussed earlier the need and the importance of doing rate sensitivity analyses on cost models such as the Hatfield model; do you recall that?

A Yeah. We want to make sure that to the extent the outputs are sensitive to changes and certain inputs, you want to get an idea of what the important inputs are.

Q And have you done or performed any type of rate sensitivity analysis on the inputs for the Hatfield Model Release 2?

A I'm sorry, for these two --?

Q For Release 2.

A Oh, I'm sorry. I want to move away from your phrase of "rate sensitivity analysis." I'm not sure what that means. I have certainly looked at this model very carefully in terms of changing these 400 variables we've been talking about, see what the differences are.

I understand that Dr. Duncan went through that process, but with an earlier version of the model. And fortunately I think the conclusions that he reached at that time were not valid for this version of the model.

Q There is a process by which, using econometrics or some other analysis, you can identify which inputs, if changed a fixed percent, would have the greatest effect on the ultimate output; correct?

A Yes, you can.

Q And what is that analysis called? What term do you use?

A Well I call it actually -- I describe it exactly the way you described it. I call it that process that you use to determine which inputs are important.

Q Let me describe it as "that process."

A That's fine.

Q Have you done that process on Release 2 of this model?

A I've done that process in a decidedly nonacademic and unsexy way, which means I have done it not by creating dazzling mathematics by any stretch of the imagination, but actually by going through and changing input values.

I've done really two things; one is an attempt to determine what's important, and the other is an attempt to establish the condition that I think Dr. Duncan was concerned

about, the linear homogeneity constraint. And I've done that type of analysis, and the model complies with that one as well.

Q When you did that process, would you identify for us the six inputs that you determined were the most sensitive to the value of the output?

A I think you mean that the other way around. I think you mean to which the output was most sensitive to the input. I don't know if I can do six. I will tell you offhand the ones I recall.

Certainly the fill factor assumptions are important. The underlying investment -- the cost of acquiring materials is very important. And the conversion of -- the assumptions underlying the conversion of investments into costs -- what's normally referred to as annual cost factor development or annual charge factor development, the fraction that you use to convert an investment into an annual cost.

The Hatfield Model uses that same fundamental process that GTE uses and the other incumbent LECs use. The assumptions underlying that with regard to expenses also make a difference.

Q Can you identify any other inputs that you can recall as you sit here are particularly important in a sensitivity --

A Well I guess we can do particularly important by the most sensitive working all the way down through the 400. I

think those are probably in a category by themselves. There may be a second category with regard to structure placement, for example, that's pretty important.

Q What type of structure are you referring to?

A I'm talking about poles, poles and conduit and trenches. When I say "structure," outside plant structures. That seems to be fairly important. Surprisingly -- well and depreciation is important, but only in the second tier.

Surprisingly enough, cost of money assumptions don't really have the impact that you would expect them to. It's not that important, partially because there are so much expenses I think that are not capital related.

And depreciation has some impact. It's not a linear relationship. Cutting depreciation lives in half don't double the costs, for example.

Q How sensitive is the inputs for drop wire length, the ratio of buried cable versus aerial cable and the like?

A Well it certainly -- well it matters, but not much overall if you change drop wire assumptions. You know, obviously if you're talking about just the cost of the drop wire, if that's the discrete component you're looking at, then of course it matters a lot if you change that assumption.

If you look at a distribution calculation, that portion of the unbundled loop, it matters very little. If you look at the total loop it matters even less. So it depends on

what discrete component you're actually looking at.

Q Let's go and talk about the first input that I think you mentioned as -- first was fill factors; is that right?

A That's right.

Q What is the fill factor that has been input -- what value has been input into this model?

A Oh, there are quite a few. They are plant utilization assumptions specific to the type of facility and the density of the area. And of course in some cases like loop feeder, the length of the facility, because that's going to determine a copper or fiber placement type decision. So there are quite a few.

Q Do you have in front of you the input summary chart that we talked about in the very beginning of this examination? Attachment RAM-3 is what I've got, but there is probably another reference I probably should have for the record.

A I think I know what document you're talking about. Yes, I have it.

MR. MELSON: Commissioners, if you want to follow along, that's part of Staff's Exhibit DJW-6, beginning at page 75.

MR. FUHR: Thank you.

BY MR. FUHR:

Q If you look at page four of that document, that is a summary of the values that were assigned to the fill factors for this model; is that correct?

A That's right. Let me clarify that in two respects. First of all those are the defaults that can be changed if there is a reason to do that. And second, these are maximums, they're not necessarily the actuals as computed in the model.

Well -- and when I say "actual," let me be careful, because GTE and the other incumbents use actual to mean current traffic divided by total facility capacity. And what I mean here is the actual utilizable capacity on a specific circuit. That won't be higher than this, but it may very well be lower, and the model calculates it that way.

Q On the left-hand side of this page, for example, you've got four -- six rows. That is referring to the density population of different tracts; is that correct?

A That's right. Actually it should be a little more clear. That refers to line density, which certainly for residents is a factor of population density. For business lines it's a factor of total business employees in a given area. But it's a line density number.

Q Okay. And the default values that are assigned for these different line densities is contained in column two of this chart; correct?

A That's right. And, again, those are the maximums.

Q And in column three you explain the source of the data that you put in as the default value; correct?

A That's right. That's really how this document is set up. The last column is intended to be some background information on where the input assumption came from.

Q And the background information that you provide here was that this data is taken from -- these default values were reviewed and accepted by Telecom Visions based on knowledge of a Bell practice that was published in 1951; is that correct?

A Well actually there is a little more here, and I think we need to put it -- state it a little more clearly. There are Bell system practices that have been in place since 1951, and those are published in a number of what we now call TRs since Bellcore was created, but had different nomenclature prior to divestiture. And this one of course predates divestiture. So there is a document reference there.

That data has been looked at carefully and updated where appropriate, based on the outside experts that are identified here. And, again, we're talking about maximums, not actuals.

Q You mentioned that the column on the left refers to line density as opposed to population density; is that right?

A That's right.

Q The data that you get from the census bureau is population data; correct?

A That's right.

Q And you have to -- not you have to, but you did make an effort to convert that into lines; correct?

A Well you have to, because what we are talking about here is engineering a network. And the cost per unit, the cost per line per subelement that we're looking at here is going to be a function of how many total lines are being provided.

So if you don't make an effort to estimate the total lines in a given area, then you're not going to have an accurate assessment of what the cost is on a per-line basis to serve that area. So it's not a did-we-have-to or did-we-want-to, it's a we-had-to.

Q And what assumption does the model make with respect to -- in Florida -- with respect to the number of lines per resident in any given tract?

A Well it actually incorporates two different things. It -- it models residence lines based on total numbers of households. Now two things are true about total number of households.

Some households have more than one line. I certainly do. Some households have no lines at all. But if you look at total lines and total households, and you true up the household count to the total line count, which is what's

been done here, you're essentially incorporating both of those factors in at once.

You're getting an assumption that is going to be a line -- residential line count that accounts automatically for the fact that there is less than 100 percent penetration and automatically for the fact that there are multiple line residences. So both of those are considered here.

Q And what assumption or conclusion does the model have then with respect to the number of lines per resident -- or per household?

A Well it doesn't make that calculation directly, just as it doesn't make the penetration calculation directly. What is available is line count data, residence line count data that GTE reports to ARMIS. I believe it's in report 4308.

It's clear that you have that data disaggregated at the wire center level, but you don't provide it that way. So it's necessary then to disaggregate that data. And the most meaningful way that we've identified to disaggregate residence line data that's been built up on some level is to look at total number of households.

And when you weight it essentially by total households you automatically compensate for the fact that there is less than 100 percent penetration, and there are multiple-line households. So there is neither explicit assumption made, but with the true up to the actual residence

lines, you incorporate both of those.

MR. FUHR: Chairman Clark, could I indulge a two-minute rest room break?

CHAIRMAN CLARK: We will take a break until five to 11:00.

(short recess).

CHAIRMAN CLARK: Let's call the hearing back to order. Mr. Fuhr?

MR. FUHR: Thank you.

BY MR. FUHR:

Q Mr. Wood, do you still have before you page four of the input summary exhibit that we've been looking at?

A Yes, sir, I do.

Q All right. That's the -- for the record, that's the page that refers to the fill factors. In your testimony earlier, Mr. Wood, you indicated that you took default values for these fill factors and put them into the model. Did I understand that right?

A Well I didn't personally. What is represented on this page are the default values. In this -- in the case of this page it's for feeder -- metallic feeder cable. They will be different for different facilities, feeder and distribution, and on different types of media.

But the model is based on a set of defaults that can be changed but have not necessarily been changed. In the

case of GTE Florida they were not changed.

Q And you indicated also that when you take those default values and put them into the model, that the model changes those values to come up with the fill factor that it actually applies; is that correct?

A That's right.

Q And would you describe how that process works.

A Sure. And I want to be careful, because I've been calling this average fill, but average -- or actual. And that's kind of been a term that's been commandeered by the incumbents, including GTE. So let me call this realizable fill, because that's different than objective.

There are really three different types. One is the type of fill that is the break point that the company uses, when a facility gets a certain amount full, the point at which they begin to reinforce that facility.

Then there is an objective fill level that is less than that. These are all set at less than the break points where possible. But it's also a fact that as you deploy a network, your realizable fill won't necessarily be this high because of what's called cable breakage. And that's not actual breakage of cable, it's describing a process in which cable only comes in discrete quantities.

Let me give you an example. If you had -- it's easier to do it with distribution. I can come back to feeder

if you like, but let me do this on distribution.

If you look at the line counts that you have to serve a certain area, and you need to put into place the capacity to serve 110 lines, for example, and you look up under the default fill factor, and you see that that's .5, 50 percent for that facility in that density zone.

So you would really then seek to put in 220 pair, not 110 pair, because that would get you 50-percent utilization. Well then when you go out to the reel yard where those big reels of cable are and look, you find you can't really buy a 220-pair cable, the next size up might be a 440-pair.

Then in order to serve 110 lines, you're actually putting in 440 pairs instead of 220 pairs. So your realizable fill, while your objective fill here, the default might be .5, your realizable fill would actually be less than 30 percent I think, if I did the math in my head correctly. It would be smaller than that.

The same type calculation occurs on feeder, because as you move away from the central office there is what's called tapering of feeder facilities. You start out as you leave the office with a very large facility. As you move away from the office and have fewer and fewer people left to serve as you move away, you actually taper that facility down.

And you can't do it in one smooth curve because of,

again, the discrete sizes that the facilities come in. So you've got the same breakage issue with feeder as you do with distribution.

And what you end up with is a look-up in the model of what sizes of cable are actually available for these types of facilities. That gets you your realizable fill, which is always going to be equal to or less than this fill factor that's stated here as the default.

Q Where in the documentation provided and made publicly available with this model is that conversion process laid out and explained?

A It's explained in what we've referred to as DJW-4. And it may take me a minute to find it, but it is in here. Just a second. It's probably in the description of the loop module. It's going to take me a minute.

I will be glad to give you a page reference as I find it. There is a discussion here, I believe a paragraph --

Q We've got a fair amount of ground to cover. So when you find that if you would just provide that, and we can move along.

A I will be glad to. If Mr. Melson will make a note too to remind me, I will do that.

There is a paragraph in this document that has been marked as DJW-4 that describes the fact that -- it describes a series of tables that includes the default values, and then it

describes the fact that the actual values are always going to be equal to or less than that because of this phenomenon.

Q How do the default values for these fill factors in Release 2 of the Hatfield Model compare to those used by BCM2?

A They are -- I believe many of them -- well I think the answer is, it depends. Some are -- in terms of BCM1, some are higher and some are lower. Now BCM2, which is on the U.S. West United tract of development, uses, as I understand it, especially for distribution, some lower fill assumptions.

Q Do you know what those assumptions are?

A Not offhand. I've got that somewhere. I have laid them side by side before, but I don't have that in my notebook with me. It's my understanding that their description of why they chose those factors is that they are calculating what we've been referring to here as actual fill.

It's not an objective. It's not a break point for reinforcement. It's actually a calculation of existing traffic and total capacity.

And of course if you use that type of fill factor, what you're doing is, you're including in the cost of unbundled network elements essentially the costs of the incumbent LEC's future broad band services, for example.

Q What do you understand is GTE's current fill factor in the state of Florida?

A I have not looked at the Georgia -- at the

Florida-specific studies in this docket with regards to fill factors, but it's my understanding that's been treated as proprietary anyway. So I'm not sure I could tell you if I knew. But I readily confess that I have not looked specifically for those factors in what's been provided here.

Q What investigation -- strike that. What assumptions does the model make with respect to the expected growth if demand for the network in the long run is expected?

A It accounts for growth, but it does not do that by making a specific projection of growth. If you want me to explain that, the different facilities that compose the loop, for example, are -- the costs are expressed on a per-unit basis.

And what's described here is a logical means of serving that demand, plus a good buffer, because part of the reason that you have fill numbers less than one is that you want to be able to accommodate some growth. And that expected growth is built in by the use of the fill factors.

You should also keep in mind that to the extent that there is future demand, there is more lines. So if there is more costs in the numerator, there is going to be more lines in the denominator. Since what we're trying to get our hands on here is cost per line, it wouldn't make any sense to use costs associated with the future demand without dividing by the future demand.

And since we're using current lines, we're using current costs. You don't want to mismatch the denominator and numerator of that fraction.

Q Is the data contained in the second column here under default unique to Florida?

A I'm sorry. We're back in --?

Q Back on page four on the fill factors.

A I'm sorry. I will catch up with you. The answer, as I hope I explained before, is no. These are default numbered, which can be changed but were not changed for the GTE Florida run.

Q Is it fair to say then that the model assumes implicitly that the growth in demand in the state of Florida will be the same as that in the state of North Dakota?

A No, sir.

Q How does it account for the -- how and where in the model does it specifically take into account the expected growth in demand for services in the state of Florida, and particularly the GTE service area?

A See, that's what I was trying to describe to you before. Maybe I can do a better job. If you're looking at distribution plant, and let's start from there. We are talking about what's described as -- sometimes described as user-designated equipment.

A lot of distribution plant is actual facilities

that are dedicated to a single user. As the total number of users increases, the denominator, the total cost will increase, that's the numerator. So on a cost-per-line basis, the extent that their economies of scale is actually going to decrease over time, we're being a little conservative here in using current costs and current demand.

Now if you back up to feeder, which is what you're pointing to on page four, the way you reinforce feeder is actually a much simpler and less costly process. If you've got loop carrier in place, in forward looking, at least anything over nine kilofeet probably is loop carrier, you can actually add capacity simply by adding electronics on each end of that feeder facility. You don't actually have to replace the facility itself.

Once -- on fiber it's very easy. Once the glass is in place, if you will, you can make the effective or virtual size of that facility much larger or much smaller merely by trading out the electronics on each end. So that's not something you actually have to go out to the field and do.

So you can accommodate growth that way on your feeder plant. I can go through the rest of the elements. Switching is also accounted for.

Q Well stick with these -- with these fill factors. The same explanation that you have laid out with respect to cable feeder would apply to those other values that are

outlined in subsequent pages; correct?

A Well I'm not sure what you mean. Certainly what we've described here holds true. These are default values. They are facility-specific values.

And the fact that they're less than one, part of that reasoning, as it is with GTE studies or Bell studies, is to accommodate growth, at least over some intermediate period of time, and also to accommodate any -- peakiness is probably a technical term I shouldn't use -- peakiness in the growth, unexpected short-term levels of growth would be accommodated by the fact these are less than one.

As we go out long-term, then you have to account for growth both in the cost estimate and in the per-unit devisor, if you will, and that takes two pieces of information. Whether you do it now or later, it's still a per-unit cost.

Q Let me go back to my earlier question. To your knowledge has the author or authors of this model made any attempt to investigate and project the likely growth for these services and elements in the Florida market?

A No, because the way the model was constructed, it would be neither necessary nor appropriate to do so.

Q Okay. In the distribution area, is the user able to change the cable sizes within that area?

A I'm sorry. What do you mean by "cable sizes"?

Q Different cable sizes are -- values for different cable sizes are input into this model; are they not?

A Actually let me get on the right page, because it may be helpful if we're looking at actual examples.

Q I had not changed pages actually. I wasn't looking at a particular page. I'm just asking you the general question --

A The answer is yes and no. Certainly the cost per foot is something that's user definable. That's something that you simply go out to a vendor and let them quote you a price. And that's how the model developers used that.

The discrete sizes of cable I suspect may not be user definable, because it wouldn't make any sense to do so. You can't buy a 236-pair cable from any vendor. They're going to make cable in discrete sizes, bundles of certain numbers of copper strands or fiber strands. And you buy one, or you buy the next size up or the next size up after that.

So to the extent that you're asking about bundled cable sizes, they're only offered in certain discrete quantities, and you wouldn't necessarily need to be able to change that, because you couldn't buy it if you changed it.

Q Would you identify which inputs contained in this summary impact the output for loop cost?

A I can go through page by page. I can tell you generally they're going to be -- depreciation lives certainly

is going to matter. Cost of capital is going to matter. The variable overhead factor is going to matter; taxes, let's see, network operations, NID, feeder fill, distribution fill, distribution structure, distribution installation, copper feeder structure, copper feeder installation, fiber feeder structure, fiber feeder installation, drop NID internal investment assumptions, structure factor shares related to telephone, serving area interface investment, digital loop carrier investment, and I believe that's all.

Now I -- what I -- let me be clear. What I'm giving you here are the categories as I've written them down as a guide to the document. There may be within each of those categories I gave you a number of different specific inputs that makes that list much longer. But that's the overview.

Q With respect to those inputs, how many of those values have been drawn specifically from the Florida GTE market?

A I -- well we will have to go back through.

Q Let me approach it this way. Can you identify any of those inputs that contain values that were derived specifically from the GTE Florida market?

A No. As I described to you before, these are -- national defaults were used unless there was a reason to change them. And there weren't any reasons that were identified. Now the loop costs are in fact Florida GTE specific for a number of

reasons.

You can talk about cost per foot for a piece of cable that doesn't change, but the number of feet of cable you need certainly is GTE Florida specific. The size of cable you need is specific.

The terrain -- while the cost of a pole isn't assumed to be different, the cost of placing the pole is certainly going to be different for GTE Florida, and that's based on specific data.

So all of these things impact calculations that are in fact specific to not only GTE Florida generally, but those very specific geographic areas that we were talking about. But not all of the inputs to those calculations will necessarily be GTE Florida specific in order to accomplish that.

Q In the instances there which you said that is specific to Florida, it is that way to the extent that it relies on the census bureau data that we discussed at the outset of your testimony; correct?

A In part, yes, and also on the USGS data, also on the business line data, all of the data that gives you an indication of line density, including the line count information that GTE Florida reports in ARMIS 4308, all of the USGS data that tells you about structure placement. There is quite a bit of state-specific data, yes.

Q But it is not state specific in terms of how the

businesses or the citizens are disbursed within that census tract for the GTE market of Florida; correct?

A Well if we're talking about the equal distribution assumption that we discussed earlier, the answer is, yes, this is a model. When you model reality you necessarily make some abstractions. One of those is the equal distribution in all but the lowest density CBGs.

And, again, in the interest of conservatism, that's a cost-maximizing assumption. It can be less expensive to serve the specific areas given the actual distribution of people --

Q It can be, but it need not be; right?

A Right. But it can't be more. It can't be higher.

Q I didn't mean to cut you off.

A I'm sorry. No, I was finished. It is a -- that assumption causes the model to report results that are the maximum. The costs can be less.

Q And the model makes no effort to in fact attempt to learn how the network has been mapped out within that census tract in terms of trying to project the costs of doing so; correct?

A Well that's right. It doesn't do that, because that would be an embedded cost study. To the extent that it uses existing investment or existing network architecture beyond switching locations it would be -- and I think the FCC's

reasoning was right on this one. It considered that possibility and said, no, that's clearly an embedded cost study. It shouldn't be used.

Q And in terms of how routes -- or how the network gets routed, before you talk about your north, south, east, west paradigm, that, again -- there is no effort made to track what is actually the case in the GTE-specific markets here in Florida, for example; correct?

A No for two reasons; one is, what's assumed here in the model -- and let's be clear. When they start modeling feeder and subfeeder routes, they're not just winging it, they're looking at Bellcore technical references that describe what's been referred to as the fir tree arrangement, which is the arrangement that the incumbent LECs use across the country.

There is nothing -- there is nothing new about that concept. It's a feeder facility that's essentially the trunk of the tree that's being crossed by subfeeder structures that look like the branches. And when you draw them out you tend to see something that looks a bit like a Christmas tree at least. Those have been done.

And the other thing we want to be very careful about here is that, if you go out and map where GTE's facilities currently are, not only are you doing an embedded study, but you're also buying into an assumption that I don't

think is right, and that is that if GTE were to start from scratch today and rebuild its network, that it would necessarily route its facilities in the same way that it did historically.

In fact there is very good evidence around the country that I've seen that suggests if GTE were to start today, they would not route facilities the same. In fact they may not use the same number of switches.

So I think you would be making two errors in one if you tried -- try to proceed to calculate forward-looking costs based on existing facility routes.

Q In the latter point you just raised was implicit I suspect in your earlier testimony that this model assumes a scorched node approach; correct?

A That's right.

Q And in projecting prices and costs from this model, that model assumes that the entire network design is variable in terms of where it is routed and what is the most efficient distribution of the system; correct?

A Well inherent in any scorched node type process is an assumption that certain things are fixed and certain things are variable. In this case, switching locations themselves are fixed. And then how you would go out and serve the area around those switches is variable on a forward-looking basis.

That's inherent in the assumption. It's not only

the right assumption, it's the assumption that underlines the TSLRIC that this Commission has adopted and used previously. So, again, there is nothing new in that assumption.

Q How realistic is the assumption that everything else is variable when we heard testimony at the outset of this hearing from Mr. Gillan that the network and the system that GTE has put into place here is going to be the system for the next 20, 30 years because no one else is going to be able to afford to create another system?

A I wasn't here for Mr. Gillan's testimony, so I don't know what the context of your comment would be. Certainly it's reasonable to expect that it is going to take time for new entrants to build their own facilities.

At the same time what we're trying to capture, and I think appropriately, in a forward-looking economic cost study are the costs going forward given switching nodes where they are.

That's how costs are recovered, if they are, in a competitive marketplace. You can invest today in the greatest technology available, and it can be a good decision. But in a competitive marketplace, if tomorrow a new technology comes along, in order to stay competitive, you have to write it off and go with the new technology. That's what you saw AT&T do with a lot of microwave towers immediately after divestiture.

So if you're going to capture that process that

occurs in competition, then you're going to have to look at forward-looking costs not embedded costs.

Q Looking at a couple of the inputs that you indicated were material through a determination of the loop cost, do you recall that list that you identified a couple minutes ago?

A Yes, I do.

Q You identified installation as part of the equation in determining what the loop cost would be; correct?

A Yes. And particularly, not only facility installation, but structure installation, pole and conduit installation, that's right.

Q And that includes a labor component; correct?

A Yes, it does.

Q In fact the labor component is more -- significantly more material than the material price or cost component; correct?

A In some instances the labor is more material than the material, that's right.

Q To what extent has the model attempted to identify what the labor costs are in the state of Florida for this type of installation?

A Well it's -- it draws data from two sources; one is the MEANS database, M-E-A-N-S, and the other is the National Construction Estimator. And it uses the '96 -- 1996 version of

both of those.

And that gives you construction estimates for some very specific types of activities on a national basis. Now the model does not and should not look at GTE Florida specific labor rates, because those are not the right labor rates to look at going forward.

Q I didn't hear the last word or two you said. Those are not the right rates to look at because --?

A Going forward.

Q Going forward.

A If your labor rates are actually lower than what you could actually go out and hire a subcontractor to do, which is what's reflected in the NCE and the MEANS data, then these costs are overstated, the results of the Hatfield Model.

If your costs are higher, that's a very clear indication that there are some tasks that you shouldn't be doing internally in the future, that you ought to be subcontracting for, because you can do them cheaper that way.

So when we look at capturing on a conservative basis forward-looking costs, these are the correct costs to look at rather than GTE's current internal labor rates.

Q Is it fair to say that labor costs are one of the most important costs in determining the ultimate loop cost?

A I think that's an overstatement. I think when we look at specific things like structure, and we want to look at

the -- how much is material and how much is labor, labor is certainly a significant cost of -- a pole, for example. It costs at least as much to put a pole in place as it costs you to buy the pole in the first place.

But then when we start aggregating these costs together and look at that total loop cost number, labor is a much, much smaller component of that cost.

Q And the model assumes that the labor component cost is the same in every state; correct? It just uses a national number?

A It uses the national numbers which could be varied if there were an instance where there were a reason to show that labor costs in a certain region of the country were higher than the national average.

Q And the same is true with respect to the material or structural component; correct?

A That's right. The materials are -- I think the material assumption is quite defensible, because most companies, including GTE, have national purchasing operations. You're going to buy lots of poles, and you're going to use the fact that you're a national company to give yourself some buying power when you do that.

Q All right. One of the other variables I think you said was an important one was depreciation?

A That's important, yes.

Q Okay. What does the model assume with respect to depreciation lives?

A The model originally had last approved FCC lives. It was updated to some public information from Bell Atlantic Maryland. I was involved in that proceeding earlier this year. And the Maryland commission on a very specific basis gave new authorized depreciation lives.

Those were thought to be the best information to use going forward, because in the context of that case, that commission heard a lot about the development of competition and the status of competition. So they incorporated a lot of that type of consideration in their approved lives.

And since the degree of competition is changing over time, and since these were the most recent data points, those are the ones we used.

Q Since you indicated -- do I gather that the use of that particular data is a recommendation that you actually made to the authors of the Hatfield Model then?

A No. I was involved in the case, so I'm familiar with it. I did testify in the case. So I have a level of familiarity that I wouldn't have otherwise.

But it was not my recommendation, pro or con, that they relied on. In fact I hadn't discussed it with them at all.

Q Okay.

A I think they're right, but they didn't do it because I told them to.

Q What analysis does the model make, or was made in determining how these depreciation lives should be adjusted to reflect the new world of competition that is set to break out in this industry?

A Well we need to be careful when we talk about set to break out, because what we're talking about here are not the costs for GTE's competitive services. What we're talking about here at issue are the costs associated with basic unbundled network elements, what the FCC correctly I think characterized as monopoly bottleneck functions that are likely to stay that way.

If we're talking about monopoly functions, an increase in competition for retail services really isn't going to affect the rate at which you should recover your investment in these assets for monopoly services. And if these weren't -- if unbundled network elements weren't monopoly services, AT&T and MCI wouldn't be here so interested in purchasing them from you.

So I don't think it would be appropriate to make an adjustment to depreciation for these particular cost studies. For your competitive services it may well be appropriate to do so.

Q Just so the record is clear, the depreciation lives

are laid out on page one of this exhibit?

A I believe you're right. Yes, they are.

Q And the Hatfield Model uses these same lives in projecting costs for every LEC in every state; correct?

A Not necessarily. It can use the last approved depreciation lives if there are some that have been recently approved. I can tell you in the BellSouth proceeding that immediately preceded this one -- I've been caught in the same verbal trap you have -- that Staff requested us to run the model using the last approved depreciation lives for BellSouth, and we did that. And they were able to see the results of that analysis.

It was not a huge change. There was some -- it was a very minor change, but there was a change.

Q And has that been done in any other instance?

A Oh, yes, absolutely. A number of states that I'm involved in where --

Q For GTE.

A For GTE?

Q Yes.

A Very possibly in Oregon, although I will have to confirm that. I apologize, I only have knowledge of the cases that I will be testifying in. I don't think there were recently-approved lives in North Carolina that were used.

I will have to verify, but I suspect that at least

in the cases I'm involved in, Oregon may be the only place that those have been changed.

Q Okay. If you look at the next category of inputs, cost of capital, still on page one.

A Yes.

Q The debt percent there, 45 percent, is that your understanding of what the GTE percentage of debt is?

A No, it's not.

Q Is that, again, just a generic national number that has been plugged in?

A Well it's only generic to the extent that the FCC saw fit to approve it at one time. But it is -- we need to look very carefully at the weighted average cost here, which is the 10901, which is my understanding is not significantly different than what GTE is proposing and is much, much higher than the last weighted average cost to capital approved by this Commission for GTE Florida, which I believe was on the order of 8.8 percent or so.

So at least in the context of moving this to a state-specific basis we may have been a little overgenerous in the cost to capital --

Q When was that approved?

A I've got an order number. It was order number PSC-930108, and I apologize, it's probably then followed by a TL, but I don't know for sure what letters follow the order

number. January '93.

Q In the support material column you indicate that it's consistent with the preliminary results of cost of capital studies. Do you see that?

A Yes.

Q Who is performing these studies?

A I don't know the individuals involved. I can describe the studies to you. They look specifically at federally reported numbers for -- consolidated numbers, inter and intrastate -- reported through ARMIS for the period 1990 through 1995, which is the latest that's available.

It's simply a DCF analysis similar to what you do in a standard rate case for that period for the companies on total operations.

Q Let me jump ahead two pages to page three. You have an item there identified as forward-looking network operations factor.

A Yes.

Q I understand that that is a factor that has been applied by the Hatfield Model to take historic costs, apply a factor to them and declare them to be forward-looking costs; is that accurate?

A Well that's a bit of a generalization. The process here is to use the best available data. And if there were forward-looking cost data at a sufficiently disaggregated basis

that's publicly available, that's what we would use.

Unfortunately, in order to meet the publicly-available constraint, the developers of the model have had to utilize ARMIS data quite a bit. Where there is now information that suggests that that ARMIS data ought to be adjusted going forward, those adjustments have been made.

And there are a couple of sources of the adjustments. Network operations expenses have been identified quite generally across the country as an area in which cost savings are possible.

What's cited here is the New Hampshire study that had a 30-percent expect -- figure for expected reduction in those expenses. Pacific Bell recently filed information that indicated that they expect a 56-percent reduction in those expenses.

We didn't go that far certainly. In the context of the Pac Bell testimony, I will say that 30 percent is probably a bit conservative. But it is an attempt to use the data that's available to adjust historic expenses to model forward-looking expenses as closely as possible.

Q Is it fair to say that the model is dependent on historic costs?

A No. I think -- I disagree with that as you've stated. There are specific examples that I just described where ARMIS-reported data, which is historical, is the best

available data. Now that is not to suggest that this is a historic or embedded cost model. It is quite the contrary something else.

If it's going to be made publicly available though you have to go with what's publicly available and adjust it where you have reason to do so. And network operations is an example of that.

You start with ARMIS data. We have two published sources of incumbent-like estimates that they produce themselves that they expect significant cost decreases for this account. And we've reflected the lower end of that range of expected decreases.

Q What is H-A-I?

A Hatfield Associates, Incorporated, I suspect.

Q And so with respect to a number of the inputs -- and I don't want to belabor going through them individually -- where the support material states simply HAI assumption, that is an assumption that some individual or individuals at Hatfield & Associates has made?

A I wish they had explained that a little better. I think that was a shorthand they used to get this document out that I think should have been explained better.

It should read that there is quite a bit of engineering expertise both within and outside of Hatfield that's been relied on, a number of individuals with quite a few

years in the Bell system at Bellcore and other places. And it's the collective experience of those people that leads to those assumptions.

So I think that's a more accurate answer. I wish they had flushed it out a little better in the document. We're working on that.

Q Is it fair to say that if there were a documented source of support for the various values that were chosen or applied, that source is identified, and where none was available, the HAI assumption was used instead?

A No. I think that's a shorthand that gets us beyond the bounds of accuracy a little bit. Again, where it says HAI assumption, we're talking about the collective experience of a number of individuals with Bell system and Bellcore experience, which means that they have throughout their careers relied on quite a few documents, quite a few standard engineering practices that have been put into place.

It's that career's worth of accumulated experience that really goes there. This is not simply a process of, is there a document, is there not a document. Because even where you say HAI assumption, that represents I suspect quite a few documents and quite a few years of experience.

Q And if those documents in fact exist, they are documents I assume that are also publicly available?

A Yes. As I understand it, most of the technical

references can be obtained. And of course then prior to divestiture they were called something else. But we're talking about a lot of data here that's either proprietary, Bellcore proprietary but made available to licensees, or public information.

Q Would it be fair to say then that if a party were to ask for all of this publicly-available documentation and got no documentation with respect to a particular set of default values, then, A, either -- then either, A, that documentation does not exist, or, B, it is proprietary and not publicly available?

A Or C, there are simply potentially hundreds of such documents. I mean there are a lot of Bellcore technical references that are issued essentially every day.

To the extent that a practicing outside plant engineer is going to keep current with his profession, he's going to rely on a continuing stream, if you will, of documents. To the extent we've got a reference here that that experience is being drawn on, it would be impossible for that type of individual to sit down and say, well, I've relied on the following 400 documents, and here they are.

I think that's another viable scenario and probably the most likely explanation.

Q If, for example, on one of these items here that simply states HAI assumption, if GTE wanted to obtain the

documentation that underlay those values, how should it ask for that documentation?

A Well I think you just ask for it directly, and if there are specific documents that are responsive, they would be provided. If it's a case of a career's worth of documents on which a number of engineers and other individuals have been relying on, then I don't know how a response could be made to your request.

I mean it's hard to put onto paper 25 years of outside plant experience, for example.

Q The model assumes -- does it not? -- a fixed allocation of cable, whether it's buried or aerial; is that correct?

A No, sir, that's not quite correct. It actually looks at different parts of the network, different types of facilities and looks at, for different density zones, how that facility would be placed.

In other words, in urban areas with very high density you expect many more of those facilities to be in conduit, for example. In rural areas you expect a lot more poles. The model actually has, for each type of facility and for each density zone, a different mix of aerial buried in underground to reflect those types of realities.

Q And is it fair to say that with respect to the GTE market in Florida there has not been any effort made to assess

the reasonableness of the percentages that were allocated, except to the extent that it relies on this generic CBG data -- maybe I shouldn't call it generic -- but the CBG data for each of the census tracts?

A There has been no specific study. But you have to make your second qualification. There is nothing generic about this CBG data. These are very discrete geographic units.

And the placement characteristics are going to vary quite a bit by how dense an area of population we have. But a rural area in Florida may very well look very similar in terms of that structure next to a rural area in Texas, for example.

So I think the key distinctions here are not whether -- whether we're on one side or the other of the state boundary. The key distinctions are, is this high-density or low-density area. Is it a place where it's easy to place a conduit or hard. Is the bedrock in the way, that sort of thing. Those are the true cost drivers.

Q On page 13 it indicates that the distribution structure inputs pole spacing; the default value is assigned at 150; is that correct?

A 150 feet between poles, that's right.

Q Okay. And on the support material it states there pole spacing is based on field experience of 35 poles per mile?

A That's right.

Q That's field experience here in Florida?

A That's field experience from a number of individuals that have worked all around the country.

Q Have any of them worked in Florida?

A I believe Dr. Mercer, in his experience at Bellcore, will have looked specifically at Florida examples. But other individuals have worked specifically in other areas, but I don't believe Florida is one of them.

Q Is there any other field experience in which you are aware that Hatfield & Associates is relying for this?

A Again, this is a collective group of individuals with 20-plus years' experience in outside plant engineering. And, again, it's not so much the state specificity as it is the other cost drivers; the density, the depth of bedrock, those sorts of things. Those are incorporated.

Q If you look at page 21 of 31.

A Yes.

Q You have there the drop investment per line, default value of $40?

A That's right.

Q How is that derived?

A That comes from the New England Telephone Cost Study, which was the only source of -- only public source of drop investment that could be obtained.

Q What is the year of that study?

A 1993. I believe it's March 3rd, 1993.

Q And this would be an example where the labor component of the cost is substantially larger than material costs; correct?

A That's right. And to the extent that New England labor is more expensive than Florida labor, this probably overstates the costs for Florida a bit.

Q What New England region is it looking at?

A It's New Hampshire I believe.

Q And do you know for a fact that the New Hampshire labor market is more expensive than the GTE market in Florida?

A The statistical data that I've looked at certainly indicates that to be the case. But I haven't looked at it in the context of this proceeding, no.

Q There has been a proceeding though in which you looked at the GTE labor in Florida?

A No. But in previous employment I've had direct responsibility for tracking different types of employment statistics around the country in compiling and publishing that data. And I have looked specifically at regional labor rates in that context fairly extensively.

Q If you drop down four rows to average lines per business location, do you see that?

A Yes.

Q And the default value there is four?

A That's right.

Q And would it be accurate to say that the Hatfield Model assumes that the average -- that there are on average four lines per business location, whether that business location is in Tampa, Florida or Bismarck, North Dakota?

A Well it assumes, based on a review of different sizes of businesses -- and, again, a big business will have more lines; a small business will have fewer lines whether it's in Tampa or Bismarck. This is the aggregation of that data purely for modeling purposes to provide something that is imaginable in terms of data.

Q What analysis was done in crafting the model to project how that number will increase over time?

A Again, that number -- the increase in that number over time would be reflected in the growth discussion that we had previously. And absent repeating that discussion, I'm not sure what else to tell you.

Q And in the support material it identifies certain statistical abstracts. Do you see that?

A Yes, I do.

Q What are those statistical abstracts?

A I don't know, Mr. Fuhr. I was just looking at that as you were looking at it. I have talked to the Hatfield folks about how they -- their discussion of this particular input.

They did not indicate to me at the time of that discussion that they were relying on statistical abstracts. So

I'm actually seeing it for the first time here as you are. But I would be happy to find out for you.

Q Thank you. If you jump to page 26 --

CHAIRMAN CLARK: Mr. Fuhr, how much more do you have?

MR. FUHR: I'm trying to speed this up.

CHAIRMAN CLARK: That's not an answer. How much more?

MR. FUHR: Thirty minutes.

CHAIRMAN CLARK: Okay.

BY MR. FUHR:

Q Mr. Wood, looking at the page 26 of 31 --

COMMISSIONER DEASON: I'm sorry. I'm sorry. I'm right here. I thought you said two hours last night, or was it an hour and a half?

CHAIRMAN CLARK: No, it was two hours.

MR. GILLMAN: Mr. Fuhr wasn't here. And I gave -- I wasn't sure what it was. I knew it would be substantial.

MR. FUHR: I will see if I can go even faster.

BY MR. FUHR:

Q Mr. Wood, there are a number of inputs identified on page 26 as well as other pages that indicate that they were determined by -- as a result of discussions between Hatfield, AT&T and MCI?

A Yes, I see that.

Q When do those discussions take place?

A Throughout the model development process. What they -- specifically they did -- and, again, this is one that I think they did a quick shorthand on which they described a little better.

They actually got subject matter experts from all three companies together who had detailed knowledge of these issues to come up with their -- their best estimate based on their experience.

Q And did you, I believe, describe in general those discussions in your deposition?

A I don't recall this coming up in my deposition, but I may be wrong.

Q I could be confusing you with other depositions I read.

A I've been deposed a few times lately. I'm sorry.

Q Okay. Are there any inputs into the Hatfield Model or other models such as BCM or BCM-PLUS on which it's relying that are protected by copyright?

A The only example that I'm aware of would be the McGraw-Hill study that is the underlying basis for a couple of the data points on the switching investment curve. And there is a copyright -- you can actually buy the document. Staff had asked for it, and unfortunately my client had not paid the fee, which is several thousand dollars, to McGraw-Hill to have

copying rights.

I would point out that there is a sanity check on that information that makes me less concerned about getting at the document, because the BCM2 developers have similarly adjusted their switching investment curve -- and, again, these are both incumbent LECs that are working on BCM2 -- to a curve that lays down almost exactly on top of the Hatfield curve. So they're very, very close.

Q Would you agree that the fiber-copper cutoff, cable multipliers and the mix of aerial, buried and underground are all fixed in this model?

A I'm sorry. We better do those one at a time. I apologize.

Q The first was the fiber-copper cutoff.

A Oh, no, no, no, that's not fixed. That is an adjustable input that -- the default is set at nine kilofeet. In other words if you were going out a certain feeder distance from a central office, where would it become more economic to go to fiber instead of copper. That's user definable in this model. It was not user definable in BCM1.

That was one of the shortcomings that were identified, and that is what was changed.

Q The second one I mentioned was the cable multipliers.

A I'm -- I'm sorry. What do you mean by "cable

multipliers"?

Q There is a multiplier maybe in one of the -- maybe in one of the modules that is part of the model on the usage of cable; is that not right?

A I confess, Mr. Fuhr, I'm totally at a loss as to what you're referring to. I would volunteer a guess if I had one.

Q We don't need to have -- I don't need a guess.

A Okay. I don't know what you're referring to. There is nothing that's referred to in the documentation with that label that I know of. So I --

Q And the third one was the mix of aerial, buried and underground cable.

A Right. Those are assumptions that are different for different types of facility, different parts of the network and different density zones.

Q And those are all fixed?

A Well they're all set in the model, and they're defaults that are set. That's not to suggest that it's not possible to change them.

Q How does the Hatfield Model account for new technologies?

A It looks at the most efficient forward-looking technology that's available in the marketplace. The effort here is not to -- it's to capture all of the economies that can

be captured by forward-looking investment, but at the same time not to be speculative either.

We don't want to be speculating on the next generation of ATM switches or photonic switches or that sort of thing. So it uses the best of -- the technology that's available in the marketplace today.

Q Mr. Wood, do you have before you your direct testimony of August 26th?

A Yes, I do.

Q There are a couple of different areas I want to ask you about, and some of them we may find that we've already discussed in going through your summary chart.

On page two you indicate that the Hatfield Model is consistent with sound economic principles generally and the FCC's August 8 report and order.

A Yes.

Q At the end of page two, continuing over to page three.

A Yes, sir.

Q Is it your opinion that the first report and order reflects those same sound economic costing principles?

A With regard to costing, yes. I think -- it may not always be true. I think in this case the FCC got it right with regard to certain specific principles. And I actually list those as my testimony goes on.

The reference is to the FCC order and why I think the principles are correct. And those principles are consistent with the TSLRIC principles that this Commission has adopted and used as recently as the interconnection proceeding. So there is -- there is no dispute that I'm aware of.

Q To help out on the record, the testimony you just referred to begins, I believe, at the bottom of page seven.

A I suspect you're right. Yes, you are, and continues on then to page 12 or so I think.

Q Right. In those pages you identify certain criteria that you believe the FCC specified as being required in producing a cost model for these proceedings; correct?

A Well that's right. And whether or not those requirements are still in place or not I guess is a legal matter. But the reason that I pointed those out is that, what those principles in the FCC order represent are not some correction of the FCC in this order, they are in fact well-established, sound economic principles. And the underlying principles remain valid, regardless of the legal issues associated with the FCC order.

Q Do you embrace and endorse each of the criteria that the FCC set out and which you have identified in pages six through 12?

A I think the answer is yes. And the only

qualification I would have to that is that there has been quite a bit of interpretation with the discussion that starts on page 11, line 13 and continues on page 12, and that's the types of costs to be included.

I think it's clear what the FCC meant. I understand that there are different interpretations. I'm not suggesting that I endorse every single interpretation of that language. But I think mine is correct within the context of the order. And with only that qualification, the answer is yes.

Q Do I understand that from the top of page 11 that it is your view -- and you may have indicated it elsewhere -- that the Hatfield Model is the model that you believe nearest approximates the methodology called for by the FCC first report and order?

A I think -- yes. It is not only the one that closely -- most closely approximates, it's the only one that I'm aware of that actually meets those criteria.

Q On page 14 of your testimony you identify three professors whom you've indicated have endorsed the Hatfield Model?

A Yes, sir.

Q Is that an endorsement that they made of the original release, original version of the Hatfield Model?

A That's actually an endorsement that began with

their review of Release 1 and then included there also their subsequent reviews of Release 2. I think the affidavit that's cited here was probably filed when only Release 1 was available. So that was their endorsement of Release 1 specifically, but I understand that Release 2 has been provided to these same gentleman.

Q And is it your understanding that some of these authors whose endorsement is trumpeted here are also retained experts on behalf of AT&T?

A I suspect they are, although they certainly have careers beyond that.

Q I believe you indicated you did not know when Release 3 was going to be released; is that right?

A I don't know if or when there will be a Release 3. I can only tell you what I described to you before, and that is that there have been requests for some additional features that might result in an additional release.

(Transcript continues in sequence in Volume 16.)