BEFORE THE WASHINGTON UTILITIES AND TRANSPORTATION COMMISSION

In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale	)	**DOCKET NO. UT-960369**
In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale for U S WEST COMMUNICATIONS, INC.	)	**DOCKET NO. UT-960370**
In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale for GTE NORTHWEST INCORPORATED	)	**DOCKET NO. UT-960371**

RESPONSIVE DIRECT TESTIMONY OF

DAVID G. TUCEK

ON BEHALF OF

GTE NORTHWEST INCORPORATED

SUBJECT: AT&T AND STAFF DEAVERAGING PROPOSALS

JANUARY 18, 2000

Q. PLEASE STATE YOUR FULL NAME AND BUSINESS ADDRESS.

A. My name is David G. Tucek. My business address is 1000 GTE Drive, Wentzville, MO 63385.

Q. ARE YOU THE SAME DAVID G. TUCEK WHO PREVIOUSLY FILED DIRECT TESTIMONY IN THIS PROCEEDING?

A. I am.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. On behalf of GTE Northwest Incorporated ("GTE"), my testimony responds to the deaveraging proposals of AT&T witness Douglas Denney and of Staff witness Thomas L. Spinks. My testimony demonstrates that both of these proposals are deficient for a variety of reasons, and provides the Commission with an alternative deaveraging methodology for 2-wire and 4-wire loops that corrects these deficiencies.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. My testimony identifies several errors and deficiencies in both AT&T's and Staff's deaveraging proposals. AT&T has incorrectly identified the wire centers GTE serves in Washington, and has treated certain wire centers on a separate basis

when they should be combined. Additionally, AT&T's proposal simply does not tie back to the statewide average costs the Commission has ordered for GTE and for U S WEST. Using AT&T's own view of lines and wire centers, the proposed rates fall short of GTE's ordered statewide average by $1.38; for U S WEST, they exceed the ordered statewide average by $0.46. In order to correct the failure to tie to the ordered statewide costs, the rates for GTE and U S WEST must be developed separately, rather than on the combined basis that AT&T proposes.

More serious than the above errors and deficiencies is AT&T's reliance on the HM 3.1 estimates of wire center costs. HM 3.1 does not estimate the costs of small, less dense wire centers accurately. The main reason for this is that HM 3.1 relies on Census Block Groups to determine a wire center's serving area. Both a visual and statistical analysis of the HM 3.1 cost estimates for GTE establishes that the amount of variation in the estimates for small and less dense wire centers is excessive, indicating that the model inaccurately estimates the costs in such wire centers, thereby skewing the deaveraging process. A visual and statistical analysis of the HM 3.1 cost estimates also indicates that there is little or no relationship between the HM 3.1 results and such cost drivers as wire center line size, the size of the serving area and the proportion of long loops. Consequently, the

Commission must look elsewhere for wire center cost estimates with which to develop a deaveraging proposal for GTE.

Staff's loop proposal is flawed because it is based on GTE's exchanges rather than wire centers, and because it is at the wire center level that loop costs are determined unless the wire centers are at the same location. Additionally, the methodology chosen to select the proposed density zones is inadequate -- the standard that the zones be characterized by significant differences in average loop costs can only be met after the fact, and cannot be used to determine the "correct" or "best" zone definitions. Staff's proposal to deaverage loops based on length is flawed for several reasons. Chief among these is that the proposed rates bear no relationship to the known cost characteristics for long loops. Additionally, Staff was unable to identify a relationship between loop length and the costs used for GTE's wire centers. Staff ignored this fact and instead used a relationship based only upon U S WEST's data. This is improper because GTE's and U S WEST's serving areas differ in several important respects, and because a statistical analysis of the data relied on by Staff indicates that the relationship is not the same for the two companies. Staff's proposal for switching contains several errors which dramatically affect the proposed rates. More important, the proposal is flawed because it relies on the HAI model. The switching costs in HAI are deficient because they are based

on only four data points, one of which has never been documented, and because the remaining data points do not represent the costs or network configuration of either GTE or U S WEST. Even if this were not the case, HAI models switching costs on the basis of lines only, so that any assignment of costs to minutes must necessarily be arbitrary. These deficiencies are shared by HM 3.1, which is the version of the Hatfield model that AT&T has placed in the record in this proceeding.

In order to correct these deficiencies, I have offered the Commission an alternative deaveraging methodology for loops. This methodology is based on estimates of GTE's wire center costs developed from information contained in the Company's cost-study filing and in the response provided to Staff data requests numbers 6 and 7. Unlike the HM 3.1 wire center costs, these cost estimates do not rely on Census Block Groups to model serving areas; instead, they are based on the observed distribution of loop lengths in GTE's serving territory. Compared to the data relied on by both AT&T and Staff, the GTE wire center costs exhibit a strong relationship with the wire center line size, the size of the serving area, and with the proportion of long loops. The alternative methodology for deaveraging loops that I present is based on obvious jumps in GTE's wire center costs, and is superior to the methodologies used by either AT&T or Staff.

AT&T's Deaveraging Proposal

Q. HAVE YOU BEEN ABLE TO REVIEW AT&T'S DEAVERAGING PROPOSAL AND UNDERLYING WORKPAPERS?

A. I have been able to review the testimony and accompanying exhibit of AT&T witness Douglas Denney. However, because AT&T did not file Mr. Denney's workpapers with his testimony, and because GTE did not physically receive any of his workpapers until January 11th, my review of Mr. Denney's workpapers is incomplete. Nevertheless, I have uncovered several major errors in AT&T's proposal.

Q. WHAT ERRORS IN AT&T'S DEAVERAGING PROPOSAL HAVE YOU DISCOVERED?

A. First, Mr. Denney has proposed to deaverage loop costs in three wire centers that are not part of GTE's serving territory. These are the wire centers corresponding to Cusick (CUSKWAXXDS1), Ione (IONEWAXXCGO), and Metaline Falls (MTFLWAXXRSO). These wire centers were part of GTE's serving territory at one time, but were sold to Pend Oreille Telephone Company in June, 1996.

Second, Mr. Denney has omitted four wire centers that are part of GTE's serving territory. These are Fairfield (FRFDWAXARS0), Loomis (LOMSWAXARS1), Malden (MLDNWAXARS0) and Thorton (THTNWAXARS0).

Third, Mr. Denney has treated certain wire centers separately that should be treated on a combined basis with respect to deaveraging unbundled loop costs. These are:

(1) Burlington (BURLWAXARS0 and BURLWAXXRSO);

(2) Everett Casino (EVRTWAXCCG1) and Everett Primary Center (EVRTWAXADS1);

(3) Mount Vernon (MTVRWAXADS1 and MTVRWAXXDS1);

(4) Sedro-Wooley (SWLYWAXARS1 and SWLYWAXXRSO).

These wire centers should be combined in Mr. Denney's proposal because they constitute a single location as far as deaveraging local loop costs is concerned. For example, the switches in Burlington are all housed in a single building.

Finally, the most serious error in Mr. Denney's proposal is that his proposed rates do not tie back to the Commissioned ordered statewide average of $23.94 for GTE. Using his view of GTE's and U S WEST's wire centers, and the lines he used in developing his proposal, the resulting average revenue under his proposal falls

short of the statewide average for GTE by $1.38 per line. In other words, if one multiplies the lines for each GTE wire center shown in Mr. Denney's exhibit (including the three sold wire centers) by his proposed rates and divides the sum of the resulting products by the total number of GTE lines used by Mr. Denney, the result is only $22.56 per line. If every loop in GTE's network were unbundled at Mr. Denney's proposed rates, GTE would fall short of the Commission ordered statewide average by $1.38 ($22.56 - $23.94 = a $1.38 shortfall). A similar calculation for U S WEST's wire centers shows that the resulting revenue would exceed the Commission ordered statewide average by $0.46 per line.

Because I have been unable to review Mr. Denney's workpapers completely, it is not possible for me to determine if there are any additional errors in his original proposal. I have also been unable to determine why Stevens Pass (STPSWAXARS0) has a loop cost of $3,259 per month according to Mr. Denney -- more than 8 times the HM 3.1 cost for any other GTE wire center. In the rest of my testimony, I have taken Mr. Denney's stated costs at face value. This should not be construed as an endorsement by GTE.

Q. HAVE YOU BEEN ABLE TO ADJUST MR. DENNEY'S COSTS FOR THE FIRST THREE ERRORS IDENTIFIED ABOVE?

A. Yes, I have. I have eliminated the three sold wire centers in the following analysis of Mr. Denney's proposal. For the four missing wire centers, I have substituted the average of the unit costs for Mr. Denney's Zone 3 wire centers, excluding the sold wire centers and Stevens Pass. I also combined the Burlington, Everett, Mount Vernon and Sedro-Wooley wire centers as noted above, using a weighted average of the unit costs reported in Mr. Denney's exhibit. The weights were based on the October, 1999 line counts provided in response to Staff Data Request Number 7. Correcting these errors reduced the number of GTE wire centers to 99, from the 102 wire centers shown in Mr. Denney's exhibit. The rest of my analysis of Mr. Denney's deaveraging proposal is based on these adjusted HM 3.1 costs, rescaled to the ordered statewide average of $23.94 per two-wire loop.

Q. MR. DENNEY'S PROPOSAL IS BASED ON A COMBINED VIEW OF GTE'S AND U S WEST'S WIRE CENTERS. DO YOU AGREE WITH THIS APPROACH?

A. As explained in the testimony of GTE witness Terry Dye, GTE agrees that it is not necessary for the Commission to establish three separate zones for GTE, and three separate zones for U S WEST. But, whatever number of zones is ultimately determined, the proposed rates for each company must tie back to the statewide averages that the Commission has ordered for each company. As I explained above, Mr. Denney's proposal does not meet this requirement, even when his own

view of wire centers, lines and costs is used. After correcting for the first three errors in Mr. Denney's proposal that I noted earlier, I have calculated the average revenue per loop for GTE that would result if Mr. Denney's proposed deaveraged rates were adopted -- the average revenue per loop is only $22.97, nearly one dollar short of the Commission ordered statewide average of $23.94 for GTE. In making this calculation, I used the October, 1999 line counts GTE provided in response to Staff Data Request Number 7; these are the same line counts that Mr. Spinks used in developing his deaveraging proposal for GTE and they provide a better, more current view of the distribution of GTE's lines than the line counts used by Mr. Denney. Using the comparable U S WEST line counts from Mr. Spinks' workpapers, I performed the same calculations for U S WEST's wire centers. The resulting average revenue per loop was $19.07, nearly one dollar greater than the Commission ordered statewide cost of $18.16 for U S WEST. Clearly, Mr. Denney's proposal creates an advantage for U S WEST at GTE's expense. Consequently, the Commission should develop separate deaveraged rate proposals for GTE and U S WEST, in order that both companies be afforded equal treatment.

Q. ARE THERE ANY OTHER REASONS WHY SEPARATE RATE PROPOSALS SHOULD BE DEVELOPED FOR EACH COMPANY?

A. There are at least two. First, there are differences in the wire center characteristics that are related to loop costs between U S WEST and GTE. Response Exhibit DGT-1 compares the distribution of GTE's and U S WEST's wire centers by wire center line size and density. The top portion of page one of this exhibit shows the distribution of lines served by office size; the bottom portion shows the distribution of wire centers by office size. Page two of this exhibit shows comparable distributions by wire center density, measured in lines per square mile. It is clear that GTE's network in Washington is characterized by smaller and less dense wire centers than is U S WEST's. By extension, the underlying loop costs are different for both companies, and any deaveraging proposal must be developed separately for each company.

Second, as I explain below, the HM 3.1 estimates are seriously flawed, and their use will skew the resulting deaveraging proposal. Developing a single rate design proposal based on a pooling of GTE's and U S WEST's wire center costs would prevent the Commission from developing deaveraged loop rates for GTE based on loop costs which are free of the deficiencies that characterize the HM 3.1 estimates relied on by Mr. Denney.

Q. DO YOU HAVE ANY OTHER CONCERNS ABOUT MR. DENNEY'S DEAVERAGED RATE PROPOSAL?

A. Yes, I have three. First, it is not clear from Mr. Denney's testimony how the cutoff points between zones were determined. Mr. Denney does not explain how this was done -- he only states that the wire center data should be sorted by cost so that the wire centers can be assigned into their cost-based zones. (Direct Testimony of Douglas Denney at page 9, lines 9-10). An examination of the "$ Difference" and "% Difference" columns in his exhibit reveals nothing remarkable at the points where the zone designation changes. In Response Exhibit DGT-2, I have graphed the HM 3.1 costs per loop by wire center, ordered from low to high. The dashed lines in this exhibit mark the three zones proposed by Mr. Denney. An examination of this graph produces the same conclusion: there is nothing remarkable about the cutoff points Mr. Denney has chosen to define his proposed zones. Indeed, the point labeled "A", where the loop costs cross the $100 level, appears to be a more logical choice for the start of Zone 3. Thus, it appears that Mr. Denney has either made his zone determinations arbitrarily, or in order to meet some objective not addressed in his testimony.

Second, I do not agree with Mr. Denney's choice of HM 3.1 to develop the deaveraged loop costs. This version of the Hatfield model defines exchange

boundaries on the basis of Census Block Groups (CBGs) which can be very large and simply have no correspondence to GTE's serving areas. Consequently, the assignment of households, line counts and costs to individual wire centers is affected by this lack of correspondence.[1] Because CBGs are larger and less densely populated as one moves away from urban population centers, a model that relies on them will exhibit substantially more variability in costs with respect to small wire centers and to wire centers with relatively few lines per square mile. This variability reflects the model's inability to estimate costs accurately because of inaccuracy in modeling the wire centers' serving areas. This is a concern for both U S WEST and GTE, since estimating the costs for such wire centers incorrectly will skew the results of the deaveraging process. Because GTE's wire centers as a whole are smaller and less dense than U S WEST's, this is of particular concern for GTE.

Third, Mr. Denney has given no indication that he has examined the relationship between the HM 3.1 costs and the wire center characteristics such as office size and line density. Instead, Mr. Denney has simply asserted that any model can be used to deaverage costs. (Denney Direct Testimony, page 9, lines 3-4). Before the

[1] In the 8th Supplemental Order, at paragraphs 218-222, the Commission acknowledges that the use of CBGs to model customer locations creates an unacceptable variation between observed and modeled loop lengths.

Commission accepts any model as a deaveraging tool, it is important to examine the model results versus exchange characteristics which are known to be related to loop costs.

Q. HAVE YOU MADE SUCH AN EXAMINATION OF THE HM 3.1 COSTS FOR GTE'S WIRE CENTERS?

A. Yes, I have. I compared the HM 3.1 costs, adjusted as I described above, to the following three exchange characteristics:

(1) wire center size, based on the number of lines;

(2) serving area size in square miles;

(3) the proportion of loops greater than 12 kilofeet in length.

Average loop costs are related to all three of these cost drivers. The larger the number of lines served by a wire center, the greater the economies of scale and the lower the average loop costs will be, other things being equal. Similarly, the greater the physical size of the wire center is, the higher the average loop costs will be, other things being equal. The reason for this is that large serving areas are associated with fewer lines per square mile and with longer loops. Finally, the greater the proportion of loops exceeding 12 kilofeet is, the higher will be the average loop cost. The reason for this is that such loops require a pair-gain device and are therefore more costly to provision.

The results of this comparison appear in Response Exhibit DGT-3. The data relating to these three factors used in these graphs are the same as that used by Mr. Spinks and were provided in response to Staff Data Requests Numbers 6 and 7. Note that in order not to distort the visual relationship between the HM 3.1 costs and the cost drivers, I have capped the vertical axis at $250 per loop. As a consequence, some of the HM 3.1 data points are “off the map” and are not displayed. With respect to the number of lines, there appears to be a slight downward relationship in the HM 3.1 data -- that is, as the number of lines increases, the HM 3.1 costs decrease slightly. An analogous relationship appears to exist with respect to serving area size -- that is, as the area increases, the HM 3.1 costs increase slightly. It also appears that there is a marked increase in the variance in the HM 3.1 costs for the small wire centers compared to the large wire centers. Similarly, there appears to be an increase in the variance in the HM 3.1 costs as the size of the serving area increases. As noted above, this increase in variance results from HM 3.1's inability to accurately model the costs of small, less dense, wire centers. With respect to the proportion of lines greater than 12 kilofeet, there does not appear to be any relationship with the HM 3.1 costs, although the amount of variation in the cost estimates seems to be large and to increase as the proportion of long loops increases.

Q. HAVE YOU PERFORMED ANY OTHER ANALYSES OF THE HM 3.1 COST ESTIMATES WITH RESPECT TO THE THREE COST DRIVERS YOU DISCUSSED ABOVE?

A. Yes, I have performed two. First for each cost driver, I divided the wire centers in each graph into two roughly equal sets of 49 and 50 wire centers each. The division in each instance was based on ranking the wire centers from low to high based on the cost driver -- the same ordering that was used to create Response Exhibit DGT-3. I then performed a statistical test, based on the F-distribution, to see if the apparent increase in variance between the two groups was significant for each cost driver. With respect to the number of lines and to the proportion of loops greater than 12 kilofeet, the hypothesis that the two variances are equal was rejected at a 99 percent level of confidence. With respect to the size of the serving area, this hypothesis could not be rejected. However, a similar analysis based on the number of lines per square mile indicates that the variance in the HM 3.1 cost estimates increases significantly as the wire center density decreases. Hence, HM 3.1's ability to model costs deteriorates as the density and the number of lines in a wire center decreases, and as the proportion of long loops increases. This result has a direct bearing on the efficacy of the Hatfield model for use as a deaveraging tool, since it is for wire centers with these characteristics that the CBG problem is exacerbated.

In the second analysis, I estimated a regression of the HM 3.1 costs per loop against the three cost drivers listed above. Using a simple linear functional form for the regression equation produced an R-squared measure of only 0.0189; additionally, the overall F-test indicated that the hypothesis that all of the slope coefficients equal zero could not be rejected at even a 90 percent level of confidence.[2] Using a double-log function improved the results slightly, and the R-squared, measured in the original units of dollars per line, increased to 0.1197. This indicates that the equation explains less than 12 percent of the total variation in the observed data. The results of the overall F-test indicate that the hypothesis that all of the slope coefficients equal zero should be rejected.

Staff's Deaveraging Proposal

Q. HAVE YOU BEEN ABLE TO REVIEW STAFF'S DEAVERAGING PROPOSAL AND UNDERLYING WORKPAPERS?

[2]R-squared measures the overall goodness-of-fit of the regression equation. It ranges in value from 0 to 1, with 0 indicating that none of the variation in the dependent variable is accounted for by the model, and with value of 1 indicating that 100 percent of the variation is accounted for by the model -- a perfect fit. The slope coefficients are the coefficients of the independent or explanatory variables (in this case, the three cost drivers). The overall F-test uses the F-distribution to test the null hypothesis that all of these coefficients equal zero, versus the alternative hypothesis that at least one of them is not. One minus the level of confidence represents the probability of making a wrong decision if one rejects the null hypothesis. Significance tests concerning individual coefficients utilize the t-statistic, which is based on Student's t-distribution.

A. I have been able to review the testimony, exhibits and underlying workpapers of Staff witness Thomas L. Spinks. Setting methodological issues aside, I found only four substantive errors in Mr. Spinks' workpapers. In mapping GTE's wire centers to GTE's exchanges, Mr. Spinks incorrectly associated the Juanita wire center with the Everett exchange. Juanita is part of the Kirkland exchange. In developing his proposal for deaveraged switch costs for GTE, Mr. Spinks used the wrong tariffed rates for terminating and originating traffic. In the "Switch" tab of the file GTEEX3.XLS, Mr. Spinks uses an originating rate of $0.002108 per minute and a terminating rate of $0.00151497 per minute. The correct tariff values are $0.0151497 and $0.0021080 for originating and terminating minutes, respectively. Additionally, Mr. Spinks incorrectly placed the Westport wire center in the 5 - 100 lines per square mile zone, when it should correctly be placed in the 100 - 650 lines per square mile zone. Similarly, the combination of Wenatchee and East Wenatchee should be placed in the 5 - 100 lines per square mile zone, instead of the 100 - 650 lines per square mile zone shown in Mr. Spinks' workpapers. The net result of correcting these errors is to increase Mr. Spinks' proposed deaveraged originating rates by 500 to 600 percent, and to increase the proposed terminating rates by 30 to 40 percent.

Q. DID YOUR REVIEW OF MR. SPINKS' WORKPAPERS REVEAL ANYTHING ELSE THAT IS NOTEWORTHY?

A. Yes. First, Mr. Spinks has used the cost estimates produced by HAI 5.0a, rather than HM 3.1, which is the version of the Hatfield model sponsored by AT&T and MCI in this case. HAI is 5.0a is an entirely new version of the Hatfield model -- in particular, the manner in which it models customer locations and local exchange plant has changed substantially. Mr. Spinks' use of HAI 5.0a is contrary to my understanding of the Commission's 19th Supplemental order which reads: "The Commission does not contemplate receiving evidence as to new cost models." Accordingly, I have not commented on the specific cost estimates presented by Mr. Spinks, but have instead focused on methodological issues.

Second, in developing his deaveraging proposal for loops, Mr. Spinks has used the October, 1999 line counts that GTE provided in response to Staff Data Request Number 7. I agree with his use of these line counts since they give an up-to-date and accurate representation of the relative size GTE's serving areas.

Third, Mr. Spinks estimated a regression equation for use in developing his proposal to deaverage costs by loop length using data for GTE's wire centers. The

coefficient of the loop-length variable in this regression was not significant, and Mr. Spinks instead used an equation based on U S WEST data.

Finally, the three duplicate exchanges (Burlington, Granite Falls, and Garfield) appearing in Mr. Spinks' Exhibit TLS-3 appear to be the result of typographical errors only. The duplication of these exchange names in this exhibit has no effect on the calculations undertaken by Mr. Spinks.

Q. DO YOU AGREE WITH MR. SPINKS' DECISION TO DEAVERAGE LOOP COSTS AT THE EXCHANGE LEVEL INSTEAD OF THE WIRE CENTER LEVEL?

A. I do not. There are differences in costs at the wire center level that are lost when aggregated to the exchange level. Just as it was incorrect of Mr. Denney to treat the two Burlington wire centers separately, it is also incorrect for Mr. Spinks to combine wire centers in situations such as the three Kennewick wire centers. In the case of Burlington, the switches are all located in the same building and the geographic areas they serve overlap. In the case of Kennewick, the switches are at different locations and the outside plant going to them exhibits different cost characteristics in terms of line density, loop length and line size.

Q. DO YOU AGREE WITH MR. SPINKS' PROPOSAL TO DEAVERAGE LOOP COSTS BASED ON LENGTH?

A. No. From a costing perspective, the proposal is fundamentally flawed. Additionally, as addressed in the testimony of GTE witness J. Rodney Langley, there are significant administrative and system costs that such a proposal entails. As discussed in the testimony of GTE witness Terry Dye, Mr. Spinks' proposal is at odds with Staff's own policy objectives concerning efficient entry and competitive neutrality.

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Q. HOW IS MR. SPINKS' PROPOSAL TO DEAVERAGE LOOP COSTS BASED ON LENGTH FLAWED FROM A COSTING PERSPECTIVE?

A. First, as noted above, the proposal for GTE is based on cost data and wire center characteristics that relate to U S WEST's serving area and not GTE's. Even if the equation utilized by Mr. Spinks is valid for U S WEST's serving area, there is no reason to believe that it is valid for GTE. Indeed, there is every reason to believe that the relationship between loop costs and the cost drivers chosen by Mr. Spinks is different for GTE than it is for U S WEST -- a Chow test for the hypothesis that the regression parameters are the same for both the GTE and U S WEST data

indicates that this hypothesis must be rejected at more than a 99 percent level of confidence.[3]

Second, the calculations used by Mr. Spinks assume an average loop length of 37,000 feet for loops in excess of 30,000 feet in his two densest zones; an average length of 47,000 feet for such loops in the “100-200" density zone; an average length of 57,000 feet for such loops in the “5-100" density zone; and an average length of 67,000 feet for such loops in the least dense zone. There is no information to validate these assumptions in Mr. Spinks’ workpapers.

Third, the resulting cost estimates are continuous as loop length increases. However, as I explained above, loop costs take a jump at lengths greater than 12 kilofeet because of the need to use a pair-gain device. Mr. Spinks has used his equation to estimate costs of loops in excess of 30,000 feet. Consequently, his methodology is inconsistent with the known cost characteristics of long loops.

[3]The Chow test is based on the F distribution. To conduct the test, one runs three regressions: a constrained equation based on a combination of both data sets, and two unconstrained equations based on each of the individual data sets. The test statistic is based on the ratio of the constrained sum of squared errors and the sum of the unconstrained sum of squared errors, adjusted for the number of data points and the number of parameters being estimated.

Finally, Mr. Spinks is essentially trying to unscramble an omelet. His approach is akin to taking state-level data on education expenditures, school size, student/teacher ratios, etc., and using it to estimate an equation to make predictions about individual school districts or schools. Even if a valid relationship existed between loop costs and his chosen explanatory variables for both companies at the wire center level, there is no reason to believe that the same relationship can be applied to individual loops or classes of loops. Moreover, Mr. Spinks has likely omitted several key variables from his model which would bias the estimated coefficients of the variables he did include. Hence, setting all other objections to his methodology aside, it is likely that it has as its foundation biased parameter estimates for the coefficients of density and loop lengths -- these are precisely the estimates upon which his proposal relies.

Q. IS IT POSSIBLE TO REHABILITATE MR. SPINKS' PROPOSAL BY POOLING GTE'S AND U S WEST'S DATA TO ESTIMATE A SINGLE EQUATION?

A. No, it is not. For one thing, the resulting equation would still be at odds with the known cost characteristics of long loops, and one would still be trying to unscramble an omelet. From an econometric perspective, the fact that the loop-length coefficient in the pooled equation is significantly different from zero does not mean that this variable is explaining any variation in the GTE data. All it means is that it

explains a significant amount of variation in the U S WEST portion of the pooled data. This is to be expected, since the coefficient is significant in the U S WEST equation, and since U S WEST accounts for more than half of the observations in the pooled data set. The conclusion reached by the Chow test still stands: the coefficients of a GTE-only equation are different than one based on the U S WEST data alone, or one based on pooling the data for both companies. Since Mr. Spinks' proposal relies on the estimate of the loop-length coefficient being significantly different than zero, it cannot be applied to GTE.

Q. DO YOU AGREE WITH MR. SPINKS' USE OF THE HAI MODEL TO DEVELOP HIS PROPOSAL TO DEAVERAGE SWITCH COSTS?

A. No. Setting aside the issue of the model version, the HAI estimates of switch costs is fundamentally flawed. Switching costs in the HAI model are based on a regression of costs per line on average switch size. There are two main problems with this regression estimate. First, it is based on only four data points. The source for one of the data points, the one for large switches, has to my knowledge never been documented. All the HAI developers will say is that it is based on a phone conversation between an unidentified HAI employee and an unidentified switch vendor. This is important since the fourth data point has a large impact on the resulting switching costs modeled by HAI -- indeed, without it, the estimated

regression is not statistically significant. Second, the remaining three data points are based on the results of a Northern Business Information (NBI) study conducted in 1995. These three data points reflect a composite of switching costs from LECs across the country. As such, they do not reflect either GTE's costs or the mix of hosts and remotes found in GTE's network in Washington. The same is of course true with respect to U S WEST.

Finally, even if the data and the regression equation used by the HAI developers were valid, in the end the model only estimates the cost of switches based on the number or lines. Any attempt to assign some portion of these per-line costs to minutes is necessarily arbitrary. Mr. Spinks' proposal for switching consequently rests on flawed estimates of total switch costs, compounded by an arbitrary allocation to minutes.

Q. DO THE ABOVE CRITICISMS OF THE HAI MODEL APPLY TO BOTH THE VERSION USED BY MR. SPINKS AND TO THE HM 3.1 SPONSORED BY AT&T IN THIS PROCEEDING?

A. Yes, they do. The switching portions of both versions are fundamentally the same and rely on the 3 data points from the NBI study and the fourth, mystery, data point.

GTE's Alternative Loop Deaveraging Methodology

Q. WHY IS GTE PRESENTING AN ALTERNATIVE DEAVERAGING METHODOLOGY FOR LOOPS AT THIS TIME?

A. Based on my testimony above, it is clear that both AT&T's and Staff's loop deaveraging proposals are seriously flawed. With respect to AT&T, Mr. Denney has omitted wire centers that are part of GTE's serving area and included wire centers that have been sold. Additionally, HM 3.1 is unsuitable for deaveraging loop costs due to the increase in the variance as wire center size and density decrease, and as the proportion of long loops increases. Although I haven't presented a graph portraying this, the same is true of the cost data used by Mr. Spinks -- the requisite data and F-test results are contained in my workpapers. More important, compared to the GTE cost estimates that I describe below, the HM 3.1 costs exhibit an inferior relationship to known cost drivers such as lines, serving area size and the proportion of long loops. Again, the same is true of the cost estimates used by Mr. Spinks. For this reason alone, the Commission must look elsewhere for a viable alternative upon which to base a deaveraging proposal.

GTE's alternative methodology corrects Mr. Denney's errors concerning the wire centers making up GTE's Washington network, but adopts his view that costs should be examined at the wire center level. The methodology also relies on the

October, 1999 line counts used by Mr. Spinks because these line counts give a more accurate depiction of the distribution of lines in GTE's network. Rather relying on either the HM 3.1 or HAI 5.0a wire center cost estimates, the alternative methodology is based on GTE's estimates of costs at the wire center level. As explained below, these estimates compare favorably relative to the known drivers of loop costs, unlike either of the cost estimates used by Mr. Denney or Mr. Spinks. Also, at their core the GTE estimates rely on the observed distribution of loop lengths at the wire center level. Consequently, the GTE estimates are not plagued by the problems of estimating wire center boundaries as are the two sets of Hatfield estimates.

Q. IS THERE ANOTHER REASON WHY THE COMMISSION MUST LOOK FOR AN ALTERNATIVE PROPOSAL FOR DEAVERAGING GTE'S LOOP COSTS?

A. Yes. As I indicated above, Mr. Denney's rationale for selecting his proposed zones is not part of his direct testimony. Moreover, as Response Exhibit DGT-2 shows, he has ignored an obvious break in HM 3.1 costs around the $100 per line level. While Mr. Spinks has explained his rationale for selecting his density zones, he has employed the wrong tool. I agree that however the zones are selected, the resulting groups of wire centers should have significant differences in their average costs. This is true of both Mr. Denney's and Mr. Spinks' proposals, given their view of loop

costs by wire center. However, this is a feature of a deaveraging proposal that must be met after the fact -- it cannot be used to determine the proper definition of deaveraged zones. Mr. Spinks has acknowledged this by ultimately abandoning his search for a unique partitioning of wire centers into zones and using instead the HAI 5.0a's default density zones as a starting point. The fact that he has arrived at zones with significant differences between their average loop costs does not indicate that he has chosen the "correct" set of zone definitions. So long as the wire centers are ordered in terms of cost, and so long as each zone has a sufficient number of wire centers, significant differences will exist.

Q. HOW HAVE YOU USED THE RESULTS OF GTE'S COST MODEL TO DEVELOP COSTS AT THE WIRE CENTER LEVEL?

A. In GTE's cost model, the statewide average costs are based on weighted averages of costs for loops by distance bands for three density zones. The distance bands are defined in increments of 1,000 feet, with the final band corresponding to loops greater than 12,000 feet. In response to Staff Data Request Number 6, GTE provided information on the distribution of loops by these distance bands at the wire center level. I have used this information to generate an estimate of the local loop cost for each of GTE's wire centers.

Q. ARE THESE ESTIMATES OF GTE'S WIRE CENTER COSTS THE PRODUCT OF A NEW MODEL?

A. No, they are not. They are simply based on information already contained in the Company's cost-study filing and in the responses to the above-mentioned Staff data requests. The calculations involved are nothing more that straightforward arithmetic and take advantage of the greater level of detail contained in the data request response. In short, rather than averaging the costs across the distance bands by density zone, I have averaged them across distance bands at the wire center level. The details of these calculations are contained in the workpapers discussed at the end of my testimony.

Q. DO THESE COST ESTIMATES EXHIBIT THE SAME VARIABILITY IN COSTS AS IS FOUND IN THE HM 3.1 COST ESTIMATES?

A. No, they do not. Response Exhibit DGT-4 makes the same comparisons for the GTE wire center costs as was made for the HM 3.1 costs in Response Exhibit DGT-3. For all three cost drivers, the relationship with the GTE costs conforms with expectations -- costs tend to increase as the physical serving area and proportion of long loops increase, while costs tend to decrease as the number of lines served increases. A regression analysis comparable to that described earlier confirms these conclusions. For the linear model, the resulting R-squared is 0.9149, while

the double-log model produces a value of 0.9391 based on the original units of dollars per line. Both of these equations indicate that more than 90 percent of the variation in the observed data is accounted for by the regression models. Moreover, the overall F-tests indicate that the hypothesis that all slope coefficients equal zero should be rejected, and the individual t-statistics all exceed the critical value at more than a 99 percent confidence level and the estimated coefficients are of the expected sign. Finally, both visual inspection and statistical testing indicate that there is no difference in the variance in the costs for small wire centers versus large wire centers. It is quite clear that the GTE wire center costs are much more closely related to the known cost drivers than are the HM 3.1 estimates. As shown in my workpapers, the same is true of the HAI 5.0a estimates used by staff. In short, the relationship between the GTE wire center cost estimates and the cost drivers is very strong, and substantially superior to the relationships between the cost drivers and either set of Hatfield estimates. As a consequence, the GTE wire center costs are much more suitable for deaveraging loop costs.

Q. HOW DO YOU PROPOSE TO SELECT ZONES FOR GTE'S ALTERNATIVE DEAVERAGING METHODOLOGY?

A. My proposed methodology is very simple and starts with ranking the wire centers from low to high based on the average cost per loop. I have done this in Response

Exhibit DGT-5. These costs were developed as described above and are scaled to the Commission ordered statewide average of $23.94 per loop. It is apparent from an examination of this graph that an obvious break occurs at a cost of about $35 per loop. I propose that this level be chosen as the first cutoff between zones. Moving left past this cutoff, the only other break occurs at just under the $30 level, and that is where I propose to "draw the line" separating Zone 2 from Zone 1. The dashed lines in Response Exhibit DGT-5 correspond to these cutoff points.

Q. WHAT DEAVERAGED RATES FOR EACH ZONE RESULT FROM THIS METHODOLOGY?

A. The resulting rates for the 2-wire and 4-wire loops for each zone are displayed below. The percentages give the proportion of lines that fall into each zone.

	Zone 1	Zone 2	Zone 3
2-Wire Loops:	$21.36	$31.52	$37.89
4-wire Loops:	$32.04	$47.28	$56.84
Proportion of lines:	76.6%	20.3%	3.1%

The above proposed 4-wire rates are 150 percent of the 2-wire rates, in keeping with the 9th Supplemental Order at paragraph 21.

Q. HAVE YOU PROVIDED THE WORKPAPERS UNDERLYING YOUR ABOVE TESTIMONY?

A. Yes. They are contained on a disk labeled Response Exhibit DGT-6 which has been filed along with my testimony and other exhibits. This disk contains a self-extracting zipped file called DGT_EXH.EXE. This file unzips into two files: DGTLOOP.WK4 and DGTSWTCH.XLS. The first of these files is a Lotus spreadsheet which contains all of the data and calculations supporting my testimony concerning Mr. Denney's and Mr. Spinks' loop deaveraging proposals, as well as the testimony dealing with GTE's alternative methodology. Included in this file are the data from the responses to Staff Data Requests Numbers 6 and 7 that I discussed above. The second file is an Excel spreadsheet that contains all of the data and calculations supporting my testimony concerning Mr. Spinks' deaveraging proposal for switching. Both of these files contain confidential data, and should be treated in keeping with the confidentiality agreement of this proceeding.

Q. DOES THIS CONCLUDE YOUR RESPONSIVE DIRECT TESTIMONY?

A. Yes, it does.