For example, the Commission attempts to justify the adoption of nationwide plant mix values that "may not be exact for every company" on the grounds that they "will be reasonable for all companies."[67] This contention is unsupported by the record and is inconsistent with sound LEC engineering practices which seek to optimize the mix to reflect local geological factors and other requirements.[68] In fact, the Commission, in paragraph 93 of the Order, expressed its belief that varying plant mix by state, study area, or region of the country may more accurately reflect variations in forward-looking costs. Interestingly, the Commission rejected alternatives to nationwide values because the algorithms on the record produced biased results. Yet, in other contexts (*i.e.*, RUS data), it recognized the existence of biases but adopted the data anyway.[69]

The Commission also takes a contradictory approach to the Turner Price Index ("TPI"), using the TPI when suitable to the Commission's purpose, but rejecting it elsewhere. The Commission refused GTE's proposed use of TPI, claiming that it and its underlying data were not public. Yet, the Commission then relied on the TPI to convert 1996 RUS cost data to 1997 levels. These conflicting positions cannot be reconciled, and the Commission's selection of the TPI index for the South Atlantic Region as representative of the entire country is even less supportable.[70]

The Bell Atlantic testimony referenced and used in the NRRI Study also provides another example of the Commission's inconsistent reasoning. The

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[67] Order at ¶ 238.

[68] Murphy Affidavit at ¶¶ 21-22.

[69] Zhang Affidavit at ¶ 13.

Commission accepts the use of the Bell Atlantic analysis for purposes of supporting the "Buying Power" adjustment, but seemingly ignores the citation that points to the RUS fiber splicing costs as being inordinately low.[71]

The Commission rejected the use of company and state-specific input values based on the erroneous and inconsistent application of its own cost model criteria.[72] For example, while the Commission has stated that its intent was not to establish the cost of any specific company, it has recalibrated all RUS data to the costs of one company in one state -- Bell Atlantic Maine. For another example, while the Commission rejected the use of the industry data (which the Commission requested) on structure and cable costs, claiming they were (i) not "verifiable," (ii) the "loading factors appear to be overstated," and (iii) certain observations do not conform to FCC requests,[73] it found the NRRI data and even the PNR's National Access Line Model to be acceptable, even though they suffer the very same infirmities. The NRRI data the Commission has embraced are not supported by contracts that would enable third parties to duplicate the contract price used in the NRRI Study. The NRRI data also contain many observations with zero values for certain costs. Similarly, the PNR National Access Line Model contains proprietary information that cannot be examined by outside parties.[74]

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[70] Murphy Affidavit at ¶¶ 10-11.

[71] Murphy Affidavit at ¶¶ 12, 32.

[72] In the Matter of Federal-State Joint Board on Universal Service, CC Docket No. 96-45, *Report and Order,* FCC 97-157 (rel. May 8, 1997) at ¶ 250 ("Universal Service Order").

[73] Order at ¶¶ 107-110.

[74] Cite to Comments.

Finally, different values are used for the same input in different parts of the Model. The Model uses an installed cost of $3.50 per foot for interoffice fiber cable, but uses a value of $1.79 for the same type of fiber cable in the loop.[75] Similarly, the pole material and labor costs for interoffice facilities are set at the HAI Model default values, and have not been updated to reflect the aerial structure costs in the loop portion of the Model.[76]

D. The Use of Channel Equivalent Line Counts, Instead of Lines or Pairs, is Unsubstantiated.

U S WEST contends that pair counts are a better predictor of costs than channel equivalents.[77] This contention, easily tested and either confirmed or denied with data the Commission has on hand, was rejected arbitrarily, by apparently ignoring evidence on the record.

E. FCC Inputs Systematically Understate Costs.

In addition to the errors explained above that warrant reconsideration, GTE must also note that the Commission's selected inputs systematically understate costs. It is, for instance, less expensive to build distribution plant that serves only current demand. Therefore, the Commission chose to ignore the universally accepted practice, at least in this country, to build distribution plant to meet the ultimate demand, as evidenced by AT&T's own engineering guidelines, as well as RUS engineering guidelines.[78] For apparently the same reason, the Commission chose to ignore the fact that GTE and many other companies are

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[75] Murphy Affidavit at ¶ 23.

[76] Murphy Affidavit at ¶ 24.

[77] Order at ¶¶ 393-95.

required in numerous states to maintain warm dial tone in unoccupied housing units. By refusing to allow the Model to consider the costs of serving all housing units, and restricting it to the costs of serving households with telephones, the Commission again understates the costs that a real world company must face.[79]

Even where the Commission acknowledged the existence of inconsistencies resulting in cost understatements such as with the switch and interoffice trunking, it ignored the solutions proffered and ordered only a partial fix, resulting in the continued serious understatement of tandem switching and transport investments and costs.[80]

III. CONCLUSION

In its Order, the Commission adopted a set of input values that were not subject to proper evaluation because they were adopted before GTE and other parties had an opportunity to analyze and comment on the final FCC Model platform, or determine whether the inputs in combination with the platform produce reliable cost estimates. Even in the abstract, many of the inputs are erroneous and lead to understated cost estimates. Accordingly, GTE respectfully requests that the Commission reconsider and set aside its Order, and permit GTE and other parties to evaluate and comment upon the complete and fully operational FCC Model (platform and inputs) and its underlying data.

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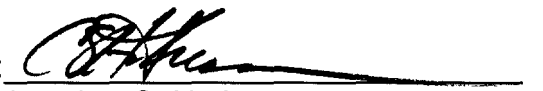
[78] Murphy Affidavit at ¶¶ 13-16, 18-19.

[79] Murphy Affidavit at ¶ 17.

[80] Murphy Affidavit at ¶¶ 30-31.

Respectfully submitted,

GTE SERVICE CORPORATION and its affiliated domestic telephone operating companies

By: 

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January 3, 2000

CERTIFICATE OF SERVICE

I, Christopher S. Huther, do hereby certify that on this 3rd day of January, 2000, I have caused a copy of the foregoing Petition of GTE for Reconsideration of the Commission's Tenth Report and Order to be served, by first class mail, upon the attached service list.

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A

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Federal-State Joint Board on Universal Service	)	CC Docket No. 96-45
	)	
	)	
Forward-Looking Mechanism for High Cost Support for Non-Rural LEC's	)	CC Docket No. 97-160

AFFIDAVIT OF JASON ZHANG
IN SUPPORT OF
GTE'S PETITION FOR RECONSIDERATION
OF THE TENTH REPORT AND ORDER

I, Jason Zhang, being duly sworn, say:

INTRODUCTION & SUMMARY

1. My name is Jason Zhang. I am employed by GTE as a Specialist -- Costing.

2. I received a Master's degree in 1994 and a Ph.D. in 1997 in Economics, both from Boston University. In addition, I have completed three years of graduate studies in Statistics. My areas of specialization are telecommunications economics, applied game theory, and industrial organization. My Ph.D. thesis focused on issues of costing, pricing, competition, and regulation in the cellular telephone industry.

3. Over the last six years, I have worked on the development, analysis, and application of telecommunications cost models. In particular, I have analyzed extensively various versions of the HAI Model (previously called

the Hatfield Model), the Benchmark Cost Proxy Model ("BCPM"), and the Hybrid Cost Proxy Model ("HCPM"). I have attempted to analyze the so-called "synthesis" model ("FCC Model" or "Model") platform adopted by the Federal Communications Commission (the "Commission" or "FCC") on October 28, 1998, in its Fifth Report & Order.[1] I previously filed an affidavit detailing the flaws associated with the FCC Model platform in support of GTE's Petition for Reconsideration of the Fifth Report & Order.

4. The objective of my present analysis was to determine whether the inputs adopted by the FCC in the Tenth Report and Order[2] are based on sound analysis, supported by the evidence in the record, and will produce reasonable, reliable and predictable estimates of the cost of universal service.

5. I have concluded that many of the adopted inputs are based on faulty and flawed methodologies and data, that many are not based on evidence in record, and many others are the result of inconsistent application of the FCC's own cost model criteria. I have also concluded that use of those inputs will lead to understated costs and distorted relative cost relationships between high and low cost areas. Adopting the recommendations contained in this affidavit will lead to a more reliable set of input values, as well as reasonable, reliable and predictable universal

[1] In the Matter of Federal-State Joint Board on Universal Service, In the Matter of Forward-Looking Mechanism for High Cost Support for Non-Rural LECs, CC Docket Nos. 96-45, 97-160, FCC 98-279, *Fifth Report & Order* (rel. Oct. 28, 1998). This docket -- CC Docket Nos. 96-45 and 97-160 -- is hereafter referred to and cited as the "Universal Service Cost Model Docket."

[2] Universal Service Cost Model Docket, FCC 99-304, *Tenth Report and Order* (rel. Nov. 2, 1999) ("Order").

service cost estimates, as required by the Telecommunications Act of 1996 (the "Act").

THE COMMISSION'S FLAWED USE OF THE NRRI STUDY LEADS TO UNDERSTATED COSTS AND DISTORTED RELATIVE COST RELATIONSHIPS

6. In the sections that follow, I explain that there are many problems associated with the FCC's use of the NRRI Study to extrapolate input values for non-rural LECs. In summary, the NRRI Study, as adopted by the Commission, is flawed. The NRRI Study's incomplete contract costs and arbitrary manipulation of the data causes overall costs to be understated. Inadequate data and flawed methodologies further lead to unreliable estimates for the coefficients in the cable and structure cost equations. Since those coefficients determine the relative costs (high cost areas vs. low cost areas), the unreliable estimates distort this relative cost relationship. This distorted relative cost relationship, in turn, distorts the characterization of high cost and low cost areas and thus leads to a distorted universal service fund. The flawed use of NRRI data affects structure cost inputs more than cable cost inputs because they depend more heavily upon the geological variables. Thus, my discussion relates mainly to structure costs.

Arbitrary Manipulation of Data Leads to Underestimated Costs

7. To begin with, the cost data collected by the NRRI Study are inadequate because the authors do not include all relevant costs. The data is biased downward by the NRRI Study's removal of high cost contracts from the data. The Commission used the Huber adjustments to arbitrarily reduce

further the weight of the high cost contracts that remain. These manipulations reduce the average cost of the sample data, and lead to understated cost estimates, using any econometric analysis. Some of the understated inputs are further reduced by the FCC's improper purchasing power adjustments.

8. The FCC did not dispute that the NRRI Study authors eliminated loading costs from some contracts (some of which were as high as 10.44% of the contract amount[3]) due to uncertainty about how to assign them. The FCC has provided no reason why it is appropriate to exclude those legitimate costs. The FCC also did not dispute that the NRRI Study removed only high cost contracts from its data, but claimed the removal was justified by *a priori* reasoning or record evidence.[4] For example, the FCC pointed out that certain excluded observations reflected higher costs in lower density areas, which, as the FCC noted, contradicted other evidence that structure costs generally increase as population density increases.[5] However, as the FCC acknowledged, the high cost contracts are unlikely to be errors.[6] The reasonable approach would have been to account for the high cost contracts, instead of eliminating them in a seeming effort to make the data

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[3] Universal Service Cost Model Docket, *Comments of GTE Service Corporation and its Affiliated Domestic Telephone Operating Companies in Response to Further Notice of Proposed Rulemaking* (July 23, 1999), at p.18. ("GTE Comments").

[4] Order at ¶ 119.

[5] *Id.*

[6] Order at ¶ 144.

fit the desired results. The removal of high cost contracts seems to serve only the purpose of lowering the cost estimates.

9. The FCC defended the Huber adjustments by claiming they helped attain the goal of "estimat[ing] values that are typical for cable and structure costs for different density and terrain conditions."[7] The FCC further stated that the Huber adjustments treated "symmetrically" observations that have high or low values. Neither defense has merit.

10. First, the FCC's own cost model criteria state that "the cost study or model must estimate the cost of providing service for all businesses and households within a geographic region."[8] The only way to meet this standard is to include the costs of all areas, regardless if they are "typical" or not. Given the nature of the RUS data, the use of the Huber adjustments will bias the "typical" costs to the low side, making the FCC Model incapable of estimating the cost of providing services for all businesses and households within a geographic region.

11. Second, the Huber adjustments could not have treated the high and low cost contracts "symmetrically" because extremely high and low cost contracts could not have presented themselves in the RUS data symmetrically. Most observations in the RUS data are in the lowest density areas, which, with initial removal of high cost contracts, reflect mainly contracts with easy placement conditions. As a result, the average

[7] Order at ¶ 142 (emphasis added).

[8] In the Matter of Federal-State Joint Board on Universal Service, CC Docket No. 96-45, *Report and Order,* FCC 97-157 (rel. May 8, 1997) at ¶ 250 ("Universal Service Order") (criterion 6).

cost of those contracts is very low. Since contract costs can never be negative, the contracts that reflect extreme values, or "outliers," are more likely to be high cost contracts.[9] Those high cost contracts are unlikely to be errors, and must have reflected more difficult placement conditions, such as the need for traffic control and cutting through roads, and should not be discounted. Although such conditions are not typical in rural areas, they are frequently encountered in a non-rural setting. Again, the only apparent purpose of the Huber adjustments is to produce lower cost estimates.[10]

Inadequate Data and Flawed Methodology Distort the Relative Costs

12. In addition to manipulating the RUS raw data to reduce the overall level of cable and structure costs, the FCC approach ignores the fundamental weakness of the data and uses flawed methodology to estimate cable and structure cost equations. The FCC ignores the fact that RUS data do not describe a cost causative relationship between the modeled cost and the explanatory variables. The FCC inappropriately applies to ordinal (ranked) variables statistical techniques that are appropriate only for cardinal (quantitative and continuous) variables. The FCC also uses an unrepresentative data set for its pole cost estimation. Finally, the FCC arbitrarily separates the buried cable and structure cost equation into two.

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[9] Imagine that the cost of contracts follows a normal distribution with contracts with extreme values showing up at the tails of the distribution. The constraint that contract costs have to be positive simply makes the tail of distribution corresponding to lower cost contracts truncated at zero.

As a result of these errors, the estimates for the coefficients in the cost equations are unreliable. Since these coefficients determine the relative costs, the unreliable estimates will lead to distorted relative costs, which will further lead to a distorted universal service fund.

13. GTE previously expressed its concern that a mismatch between dependent and independent variables makes the NRRI Study flawed.[11] The FCC did not dispute this or that it caused a bias. That is, the Commission did not dispute that there may not be a cost causative relationship between the modeled costs and the explanatory variables. This failure to describe a cost causative relationship would lead to unreliable cost estimates. The FCC argued that since GTE had not identified the direction of the bias, and since the coefficients of the variables for geological variables were generally significant, the mismatch was not a problem.[12] This is not true.

14. The results of an econometric analysis are useful only if the econometrics equation is correctly specified and the data reflect the underlying causal relationship in the specification. A mis-specified equation, such as one with omitted variables, will generally lead to biased estimates.[13] The structure cost equations adopted by the FCC are mis-specified because

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[10] Universal Service Cost Model Docket, *Comments of Bell South Incorporated* (July 23, 1999), at Table 1, ("Bell South Comments"). *See also* GTE Comments at Attachment 3.

[11] GTE Comments at p. 22.

[12] Order at ¶ 125.

[13] *See Econometric Models & Economic Forecasts*, Robert S. Pindyck & Daniel L. Rubinfelf. McGraw-Hill, Inc., at pp. 163-164, Section 7.3.1.

they contain only a limited number of variables. They do not include variables such as the need for traffic control, the need to cut through roads, etc., that increase costs. This mis-specification compounds the problems with the NRRI data, making the cost results even more unreliable. While the structure cost data used in the NRRI Study typically come from small contracts that cover small geographical areas (e.g., the specific area needed to place a pole), the explanatory variables (e.g., the geological variables) come from rural companies' entire serving areas, some of which are as large as 9,500 square miles.[14] Granted, the cost of placing structure depends on the geological conditions where placing occurs. But, the cost of placing structure in a particular location is unlikely to have much to do with the general geological conditions of an entire serving area. Therefore, there is unlikely to be a causal relationship between the modeled cost and the explanatory variables used in the NRRI Study. Without a causal relationship, the analysis of the data is meaningless and the cost estimates based on that analysis will be unreliable for any purpose. Since the relative costs depend on the correct estimates of the coefficients of the cost equations, unreliable estimates will lead to distorted relative costs. The direction of bias, even if it is possible to estimate, is irrelevant. What matters is that the relative costs and the universal service fund will be distorted.

[14] NRRI data indicate that Western New Mexico Telephone Co., Inc., has a serving area of about 9,510 square miles.

15. The FCC's argument that some of the geological variables in part of its analysis are significant does not solve the problem caused by the mismatch. First of all, reliable estimates of the coefficients depend on both the significance and the correct magnitude of the estimates. To see why the significance of an estimate alone does not validate an analysis, one need only look at the FCC's underground structure cost equation. The coefficient for the "Water Indicator" variable is significant, which, using the FCC's flawed logic, would validate its analysis.[15] But, a more careful look proves that the Commission is wrong: the negative sign in the coefficient indicates that encountering water during placement reduces structure costs. That is an absurd result. Additionally, the same FCC study indicates that underground structure costs are not impacted by density, contrary to common experience.[16] Finally, only one-half of the geological variables used in its structure cost equations are significant.

16. GTE also previously expressed the concern that the NRRI Study uses improperly averaged ordinal variables that indicate soil type, rock hardness, and the presence of high water table, again leading to unreliable estimates.[17] The FCC did not seem to dispute that those variables are, in fact, ordinal. But, the FCC argued that the NRRI Study's methods "do not reflect an incorrect averaging of ordinal data" because "they are based on averages of data obtained from the HAI database for

[15] Order at Attachment B-12.

[16] Order at ¶ 119.

the Census Block Groups in which the RUS companies operate," and that "HAI uses as cardinal values, i.e., quantitative values, the soil and rock data from which the averages reflected in the rock and soil variables in the NRRI Study are calculated."[18] As with the use of mismatched data, the FCC supported its approach by citing the statistical significance of those variables, and the lack of the evidence showing the direction and magnitude of the bias.[19] Neither argument has merit.

17. Its first argument, the FCC seems to indicate that if there were improper averaging of ordinal variables, the HAI Model, not the FCC, was to blame. The fact that the selected values come from the HAI Model proves, if anything, their unreliability, since even the developers of that model concede that they fabricated its soil texture data.[20] The use of improperly averaged ordinal variables will lead to unreliable estimates for the coefficients in the cost equations. Regardless of the direction of the bias, the use of these ordinal variables will lead to distorted relative costs.

18. The FCC also mistakenly relied on the statistical significance of the soil type variable to validate the use of observations that were fabricated by HAI Model.[21] As stated previously, the significance of the variables does

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[17] GTE Comments at pp. 19-21

[18] Order at ¶ 124.

[19] *Id.*

[20] GTE Comments at Attachment 2.

[21] GTE Comments at p. 21 and Attachment 2; Order at ¶ 125.

not validate an analysis and certainly does not validate the use of those fabricated observations.

19. In response to evidence that the separation of buried cable and structure cost equation into two are without basis and could lead to questionable results,[22] the FCC first contended that the value of its separated structure cost intercept was within the range of the costs provided by the HAI Model and by AT&T/MCI. But, as the FCC has pointed out on many occasions, the HAI Model inputs tend to be unsubstantiated expert opinions and on the low side.[23] Having found that its structure cost intercept fell within the range of low numbers from AT&T/MCI and the HAI Model, the FCC should have concluded that its structure cost intercept was too low.

20. The FCC further stated that the separation did not really affect any costs except engineering loading. That is wrong. Even without the differences in the engineering costs for cable and structure as recognized by the FCC, the total costs of buried cable and structure costs would still be affected by how the intercept is split. The FCC Model populates the structure costs by density and terrain, while it populates the cable costs by size and placement. As a result, there is no way to ensure that the total cost for given quantity of buried cable and structure from the combined equation is recovered by the separate costs from the structure and cable. For example, suppose the FCC's combined equation says that it costs $15 to

[22] GTE Comments at p. 52.

[23] Order at ¶ 165.

place one foot of buried, 24-gauge, 400-pair cable and structure in normal terrain in a density zone of 100 lines per square mile. In this case, the FCC Model determines the cable costs by using the size and type of placement (buried). If the cable cost is $7 per foot, that would leave $8 per foot ($15-$7) for the structure cost for the buried cable. But, the Model does not use only the particular type of placement for the cable (buried) to figure out the structure cost of the cable. Instead, it also uses the density of the area (100 lines per square mile) to determine the percentages of aerial, buried and underground placements for the density, and then calculates the structure cost as the weighted average of the structure costs from the three placement methods. There is no way to be sure that the weighted average will equal the necessary $8. Therefore, how the intercept term in the combined buried cable and structure cost equation is split can affect the total costs of buried cable and structure produced by the Model. This is another reason why the FCC's adopted buried cable and structure costs for density zones 1 and 2 are unreliable.

21. GTE expressed concern that the FCC's regression for pole costs was unreliable because the pole cost equation was estimated using only 19 observations covering only 6 states, and differences in freight costs and terrain conditions in different areas, which the Commission ignored, could cause significant structures cost differences.[24] Additionally, GTE expressed concern that the rural, suburban and urban probabilities the

[24] GTE Comments at p. 15.

NRRI Study used to calculated pole accessory costs were unsupported and appeared to be solely a construct of the NRRI Study authors.[25]

22. The FCC conceded that the number of observations used in the estimate was far less than the minimum of 10 times the number of parameters that the FCC previously stated was necessary to arrive at reliable estimates.[26] The FCC abandoned this requirement for two reasons, neither of which withstands scrutiny from an econometric perspective. First, the FCC noted that the pole material cost it estimated from the sparse data was close to the average from the data and to the average of some incumbent local exchange carrier ("ILEC") responses to a FCC data request.[27] The FCC does not seem to understand that a linear regression will always produce a predicted mean value that is identical to the mean of the data sample on which the regression is based. The FCC's result is doubtful because the explanatory variables in the Commission's equation accounted for less than 30% of the variation in the cost of poles for the rural companies in the sample. In addition, since freight and terrain conditions can significantly affect a pole's cost, the similarity in material costs for poles alone does not establish that the FCC estimates are sufficient for total pole costs. Second, the FCC claimed that "GTE does not provide any evidence that suggests that a sample size of 19 poles for developing structure costs produces biased estimates...." Again, the

[25] GTE Comments at p. 52, fn. 81.

[26] Order at ¶ 123.

FCC forgets that in order for the cost estimates to provide valid relative costs, the estimates for the coefficients must be reliable. As I have explained above, unreliable estimates lead to distorted relative costs, regardless the direction of the bias.

23. Finally, GTE was concerned that the rural, suburban, and urban probabilities used by the NRRI Study to calculate the costs of pole accessories were unsupported and appeared to be solely a construct of the NRRI Study authors.[28] The FCC did not address this issue. As a result, the total pole cost estimated from the NRRI Study is not reliable and should not be used as basis to estimate the aerial structure costs for non-rural LECs.

NRRI Study-Based Inputs Lead To Understated Costs And Distorted Relative Costs, And Therefore Should Be Discarded

24. Faced with the numerous concerns expressed by the industry on the use of the NRRI Study, the FCC recognized that the cost data from state studies in North Carolina, South Carolina, Indiana, Nebraska, New Mexico, Montana, Minnesota, and Kentucky filings "are more reliable than the extrapolated data" from the NRRI Study, and accordingly adopted the state data as the inputs for the structure costs for underground and buried for density zones 3-9.[29] GTE has long maintained that only the use of the company-specific inputs can estimate the cost that a company in the

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[27] *Id.*

[28] GTE Comments at p. 52, fn. 81.

[29] Order at ¶¶ 220 - 222.

real world can be expected to incur on the forward-looking basis. In absence of that, GTE welcomes the FCC's efforts to make cost estimates more reliable by basing the inputs on actual state data from non-rural company serving areas instead of extrapolating them from NRRI data that contain no such information. The FCC's adopted structure costs based on the state data are more reasonable and logical than those based on the flawed use of the NRRI Study.

25. However, aerial structure and the underground and buried structure costs for density zones 1 and 2 are still based on the flawed use of the NRRI Study. In fact, since the inputs based on NRRI Study are so understated, they cause an illogical disconnect between density zones 2 and 3. For example, the underground normal structure costs for an area with a density of 100 lines per square mile is more than four times that of an area with a density of 99 lines per square mile.[30] Even worse, the FCC's underground structure equation shows counterintuitive results -- the underground structure costs have nothing to do with an area's density, and even decline when water is encountered in the placement,[31] leading to a distortion of relative costs.

26. In absence of company-specific inputs, the FCC should use the same state data for the aerial structure costs for all density zones and the underground and buried structure costs for density zones 1 and 2. This

[30] Per hcpm_inputs_October1999.xls, the Normal underground structure for an area with density of 99 lines per square mile is only $1.68 per foot, but the same structure cost for an area with a density of 100 lines per square mile is $7.63 per foot.

will make the cost inputs more reliable and will resolve the apparent disconnect in the current input values between density zones 2 and 3.

THE FCC SHOULD ADJUST ITS POLE COST INPUTS

27. Although the FCC has continuously made platform-related changes in the input phase of this proceeding, e.g., changing switching formulae to correct the trunk investment calculation,[32] it refused to make a necessary correction to its per foot pole investment calculation,[33] arguing that it would represent a platform change.[34] The FCC's refusal to make the correction is without basis because the errors can be corrected through simple changes in the input values in the aerial structure cost tables.

28. Here is an example of how to make the correction: (1) select the state for which the cost study is needed. Run the clustering algorithm and use the resulted clusters to figure out the average size of clusters.[35] For example, if GTE-Oregon is chosen and 18 kft. is chosen as maximum size of cluster, the average cluster size is about 3.76 square miles. (2) Use the FCC default value of two SAIs per cluster and assume each SAI serving area is square and identical with the SAI located in the center. Use the average cluster size to calculate the typical distribution length for the SAI

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[31] Order at Attachment B-12.

[32] *See* RFCC_switching_io_October1999.xls, wire center investment!BU2 for an example.

[33] GTE Comments at p. 51.

[34] Order at fn. 465.

[35] If national average inputs are desired, then a sample of states can be run and resulted clusters pooled to generate the average cluster size.

serving areas for the clusters. For the example, it is about 3,620 feet.[36] (3) Based on the typical distribution length, calculate the adjustment factors for density zones 1-2, density zones 3-4, density zones 5-6 and density zones 7-9, respectively as follows. For each group of zones, the adjustment factor is equal to ratio of number of poles required based on GTE's correct formula and based on the FCC's current calculation (which is 1 less than output from GTE's correct formula) and the pole spacing for the group of density zones. For the example, the adjustment factors are 1.07, 1.06, 1.05 and 1.04 for the four zones used in the FCC pole calculation.[37] (4) apply those adjustment factors, by density and terrain, to the current FCC pole cost per foot inputs or the inputs based on state data that the FCC should adopt in absence of company-specific inputs. The adjustment factors described above are conservative because they are based upon an 18 kft. maximum cluster size. Use of a 12 kft. maximum cluster size should produce substantially higher factors.

29. GTE also pointed out that telephone companies used a variety of pole sizes, and that the taller the poles, the more likely they are to be shared. Since the FCC Model uses only the 40-foot poles and assumes all poles are shared, the amount of investments assigned to the ILEC will always be underestimated.[38] The FCC did not refute GTE's contention, but

[36] Sqrt[3.76/2]*5280/2=3620.

[37] For the example, the number of poles required for each SAI area per GTE (FCC) based on FCC pole spacing for the group zones are as follows: Zones 1-2: 15 (14), Zones 3-4: 19 (18), Zones 5-6: 22 (21) and Zones 7-9: 25 (24).

[38] GTE Comments at p. 50.