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Before the
FEDERAL COMMUNICATIONS COMMISSION
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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 LECs	)	CC Docket No. 97-160

COMMENTS OF AMERITECH ON
FURTHER NOTICE OF PROPOSED RULEMAKING

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I. INTRODUCTION

The Commission in its Further Notice of Proposed Rulemaking,[1] has provided interested parties the opportunity to comment on the Commission's tentative conclusions regarding forward-looking input values to be used in the "synthesis" model adopted by the Commission. In addition, the Commission has afforded interested parties the opportunity to comment on alternative approaches for determining many input values to be used in the platform model. The complexity of the platform model and the time needed to run it for all non-rural companies makes doing sensitivity analysis impractical at this time. Consequently, Ameritech has limited its comments to many of the most important input values and issues. Ameritech offers these comments presuming that the

[1] In the Matter of Federal-State Joint Board on Universal Service, Forward-Looking Mechanism for High Cost Support for Non-Rural LECs, CC Docket Nos. 96-45, 97-160, FCC 99-120 (released May 28, 1999) ("FNPRM").

Commission still intends to use the synthesis model only in the federal support mechanism.

II. DETERMINING CUSTOMER LOCATIONS

A. Geocode Data

Ameritech agrees with the Commission's tentative conclusion that "interested parties have not had an adequate opportunity to review and comment on the accuracy of the PNR geocode data." PNR has relied on commercial, proprietary databases in order to obtain accurate data for the service territories subject to this proceeding. Ameritech has indicated in previous comments in this proceeding that the use of accurate geocode data is very important in order to develop reasonable and accurate loop costs in the platform model. Ameritech has used geocode data in its own loop model, which was submitted for the Commission's evaluation.[2] However, the address information used in Ameritech's model is proprietary. While other telephone companies undoubtedly keep comparable address information, those companies would probably also view such address information as confidential. Unfortunately, Ameritech is unaware of any data source that provides the detail and accuracy needed to be used by the platform model that does not run into the complications faced by various parties that wished to review the PNR data. While Ameritech would applaud PNR for any improvements in making the PNR data more readily available, the sheer volume of data still makes this a daunting task for any

[2] "Submission of Cost Model," December 12, 1997.

single interested party. Nevertheless, the Commission should encourage interested parties to continue working with suppliers of geocode data such as PNR so that a source of accurate and verifiable geocode data can be selected for use in the federal mechanism in the future.

B. Road Surrogate Customer Locations

The Commission tentatively concluded "that the road surrogating algorithm proposed by PNR should be used to develop road surrogate customer locations for the federal universal service mechanism." Ameritech agrees under the current circumstances that the PNR road surrogate algorithm is a reasonable method for locating customers in the absence of actual geocode data. While the HAI proponents contend that use of a surrogate algorithm may overstate the amount of plant necessary to provide support services,[3] all methods that identify customer locations without using all available location information will necessarily be less accurate than using actual customer locations. For example, the Commission rightly rejected in its Platform Order the alternative algorithm proposed by the HAI proponents, because this alternative is even less accurate than the PNR road surrogate algorithm. Consequently, Ameritech supports using the PNR road surrogate algorithm as the best currently available method for locating customers in the absence of using actual geocode data.

While Ameritech has at this stage of these proceedings acquiesced to the use of the PNR road surrogate data, Ameritech still sees a bias in using the PNR road surrogate

[3] See AT&T's ex parte presentation in this proceeding submitted on May 20, 1999, that shows that PNR's road surrogate data generally produces slightly higher costs than that based on PNR's geocode-based data.

data. The HAI sponsors have estimated a general upward bias by study area of using the PNR road surrogate data rather than using some actual customer location data, but their quantitative analysis does not provide a clear explanation of the source of the bias. For example, the HAI sponsors found that the percentage of customer locations that are geocoded within a study area does not appear to be a significant contributor to the general upward bias in costs. Unfortunately, the cost bias is more likely caused by customer location details at the wire center level or lower rather than the study area. At this time, Ameritech has not undertaken any quantification at the wire center level.

Ameritech offers the following qualitative assessment that should, nevertheless, help explain the bias of using the PNR road surrogate data instead of using road surrogate data as a supplement to geocode locations. Ameritech has compared customer locations for several wire centers based on the PNR road surrogate data and Ameritech's proprietary location data. A pattern appears to emerge for rural areas. Two pictures of customer locations in an actual rural wire center can be used to illustrate the differences in the customer locations from these different data sources. Consequently, these two figures can be used to understand the pattern.

Figure 1 displays customer locations for the Ameritech Michigan Owendale wire center based on PNR's road surrogate data. Figure 2 displays customer locations for the same wire center using Ameritech's geocode locations. Each figure also shows a blowup

of the town from which the wire center derives its name. Several general characteristics of this wire center can be noted. First, this is a sparsely populated wire center having about 10 lines per square mile. Next, over 75% of the locations were geocoded by Ameritech. Finally, this wire center has a relatively simple shape.

Comparing the figures generates several general observations. The PNR road surrogate data has a small, but significant number of locations that do not fall within the wire center. The number of customer locations is very similar in each figure, but the number of lines per location appears to be underestimated for the PNR figure.[4] The dispersion of locations along inhabitable roads, which is how the PNR locations are generally determined, appears only to capture clusters of customers where the roads are more closely spaced. Hence, both figures show a clustering of locations in the town of Owendale, which has a density nearly ten times more dense than the entire wire center. Nevertheless, Figure 2 exhibits a greater concentration of locations in the small town compared to Figure 1. Naturally, this also means customer locations are more sparely located outside the town in Figure 2. Thus, the PNR road surrogate approach tends to spread customer locations across the entire wire center more evenly than the actual locations, although the PNR road surrogate approach does capture some of the clustering of locations that actually exists. The bottom line is that using the PNR road surrogate data will tend to generate longer loops on average for a wire center, and exhibit fewer economies of density compared to actual customer locations for the wire center. Both of these factors will tend to increase loop costs over those based on actual locations.

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[4] Part of the difference in the average number of lines per location may be due to differences in the vintages of the location information.

Because of this general bias of higher loop costs for rural wire centers, loop costs for rural areas should be adjusted downward if using road surrogate data rather than actual customer locations. One simple way to make this adjustment is to average costs across wire centers that include non-rural wire centers. Generally, results at a study area level would reflect such an adjustment. Nevertheless, for study areas that are dominated by rural wire centers, study area average costs may still not adequately adjust for the apparent bias in using road surrogate data. In such circumstances the Commission should examine more direct approaches to adjust for the bias.

C. Methodology for Estimating the Number of Customer Locations

The Commission tentatively concluded that "PNR's process for estimating the number of customer locations should be used for developing the customer location data." The Commission also tentatively concluded that " PNR's methodology for estimating the demand for service at each location, and for allocating customer locations to wire centers" should be adopted. Furthermore, the Commission indicated that it was reluctant to develop universal service costs based on a network that would serve all potential customers. More specifically, the Commission indicated that universal service issues regarding unserved areas will be handled in a separate proceeding. Finally, the Commission requested additional comments regarding certain issues such as how to handle vacant locations in areas that are currently served.

The PNR process for estimating the number of customer locations is the most comprehensive approach currently available to the Commission. The PNR process is not as accurate as using proprietary Ameritech data. However, such company-specific data is not currently available for review for all non-rural wire centers. In other words, there are

few, if any, practical alternatives to the PNR process at this time. Assuming that various deficiencies that have been acknowledged by PNR and for which PNR has indicated that it plans to remedy if it is selected,[5] Ameritech views that the PNR process should generate reasonable estimates of the number of customer locations. Similarly, Ameritech views the PNR's methodology for estimating the demand for service at each location, and for allocating customer locations to wire centers are reasonable at this time.

Finally, Ameritech is unaware whether PNR's methodology may already account for at least some portion of housing units that are temporarily vacant. Even so, Ameritech views that reflecting churn in the development of fill factors is a more practical way of dealing with temporarily vacant locations.

III. OUTSIDE PLANT INPUT VALUES

A. National Versus State-Specific Inputs

The Commission has generally proposed using nationwide, rather than company-specific input values in the federal mechanism. For purposes of determining federal universal service support amounts, the Commission stated that nationwide default values generally are more appropriate than company-specific values. However, the Commission acknowledged that there may be some categories of inputs "where company-specific or state specific input values might be appropriate for use in the federal mechanism." Consequently, the Commission seeks comments on alternatives to nationwide values for certain inputs. Finally, the Commission made no claim that the nationwide input values are appropriate for any purposes other than determining federal universal service support.

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[5] See PNR's ex parte letter received on February 10, 1999.

Material and transportation prices for some facilities, such as poles, and concrete that encases conduit, can vary widely across the United States. Labor rates vary widely, and have a large impact on placement costs. Ameritech uses local contractors to construct conduit. In addition, Ameritech uses local contractors to trench, and often place, buried cable. These differences are not due to inefficiencies, but rather reflect underlying market conditions for running a business in Ameritech's service areas. Consequently, there are meaningful differences in the costs of cable and its structure across Ameritech's five states. To the extent that these differences are present, the use of uniform national cable and structure cost inputs introduce unnecessary inaccuracies. Cable and structure cost inputs should reflect the prices that an efficient telephone company could reasonably expect to incur at the locations where universal service is to be provided. If such inputs are not available by study areas, then state-specific average inputs are the next best alternative. If state-specific average inputs are not available for cable and structure costs, then national average values may be the best the can be established at this time. Nevertheless, the use of national uniform inputs for cable and structure costs will specify circumstances that no efficient firm would likely face. If the Commission ultimately decides to use such national uniform inputs, then the Commission should not rely on the artificial argument that the use of nationwide averages rather than actual forward-looking market prices may mitigate the rewards to less efficient companies. Efficient firms will respond to actual forward-looking market prices at specific locations rather than nationwide averages. Consequently, the use of nationwide averages should at this time be accepted for use in the platform only with great reluctance. The Commission should continue to assert that the rationale for whatever

input values are selected for the platform are based on the current record of this proceeding for the limited purpose for which the synthesis model was adopted.

B. Standard for Evaluating Cable and Placement Cost Input Values

In addition to the ten criteria established by the Commission at ¶250 of its Universal Service Order, Ameritech continues to assert that the reasonableness of cable and placement cost input values as well as other inputs used in the synthesis model must significantly rely on the accuracy of these values. In other words, the synthesis model should reflect the facts that an actual provider of universal service could reasonably expect to encounter. Necessarily, the evaluation of the cable and placement cost input values is constrained by the currently available data and the timeframe established for making comments. Within the context of the regression analysis undertaken for cable and placement cost input values, at a minimum that the results reported in Appendix D must be verified and the proposed input values replicated using these regression results. In addition, the regression analysis should rely on sound statistical principles and should not violate causal relationships within and across the specifications used in this analysis. Finally, any large differences from a priori expectations, input value estimates developed by proxy model sponsors, and input value estimates used in state-sponsored universal service cost studies should be explicitly explored, and determined to be either unimportant or incapable of being improved upon within the context of this proceeding.

C. General Methodology for Estimating Outside Plant Costs

The FCC proposes to use regression analysis to develop values for outside plant costs that can then be used as inputs in the synthesis model. Their stated goal is to provide objective estimates, which decreases the reliance on expert opinions and facts

that are difficult to verify. Although this is a worthy goal, deficiencies of the data, large, unexplained differences from input values proposed by the BCPM and HAI sponsors, questionable model specifications, extrapolations far beyond the scope of the data, and the introduction of significant outside information mean that the proposed input values do not satisfy this goal.

"Appendix D, Description of the Proposed Methodology for Estimating Outside Plant Costs" contains the mechanics but not the rationale for the proposed methodology. The lack of the fundamental foundation for the regression analysis makes commenting on the results very difficult. In addition, by providing only the proposed specifications interested parties have been deprived of any experiences gained by the investigators that weigh the benefits and costs of alternative specifications that have been explored but discarded. Hence, it is not clear in many cases why a particular specification was proposed for a particular type of cable cost. In addition, it is not clear why specifications differ for different types of cable costs. Why, for example, does the cable cost equation for underground cable cost include a squared term on cable size, when this term is not in the equations for aerial or buried cable? There were no squared terms in the original models specified by Kennedy and Gable. Including variables for "line size" and "line size squared" indicates that a non-linear relationship is hypothesized between line size and cable cost. While it is not unreasonable to expect that the cost tapers with increasing cable size, it is curious to expect to find this relationship only for underground cable costs. The inclusion of this squared term leads to unrealistic results. Hence, Ameritech is troubled by the negative marginal costs for cable sizes greater than 1800 pairs and negative total cable cost estimates for cable sizes larger than 3600 pairs that are produced

by this specification as shown in Table 1. More importantly, Ameritech has been unable to verify the proposed inputs, since they do not match the output from the regression results found by Ameritech.

Table 1

Comparison of the FCC's Underground Copper Cable Cost Input Values and the Results of the FCC Regression ($/foot)

# of Pairs	FCC Values	Values Derived from Regression	Difference
4200	$39.32	($15.28)	($54.60)
3600	$33.70	($2.49)	($36.19)
3000	$28.09	$6.87	($21.22)
2400	$22.47	$12.79	($9.68)
2100	$19.66	$14.46	($5.20)
1800	$19.10	$15.27	($3.83)
1200	$16.02	$14.30	($1.72)
900	$13.51	$12.54	($0.97)
600	$10.35	$9.91	($0.44)
400	$7.88	$7.68	($0.20)
300	$6.53	$6.42	($0.11)
200	$5.11	$5.06	($0.05)
100	$3.63	$3.61	($0.02)
50	$2.86	$2.85	($0.01)
25	$2.46	$2.46	$0.00
18	$2.35	$2.35	$0.00
12	$2.26	$2.26	$0.00
6	$2.16	$2.16	$0.00
1	$2.06	$2.08	$0.02

D. Large Ex-Post Cost Adjustments

The FCC also makes large ex-post cost adjustments to the regression results. Based on external studies, the Commission makes (1) downward adjustments for non-rural LEC bargaining power of 15-33 percent and (2) upward adjustments for LEC

engineering and splicing cost loadings of 9-10 percent. Between 25 and 40 percent of the information used to establish cable costs come from outside adjustments. These adjustments are derived from outside studies. To verify the reasonableness of these adjustments requires that these studies are analyzed. Mixing and matching data in this fashion is precarious, because it relies on the non-overlap of the costs included from different studies performed with different data for different purposes.

E. Potential Double Counting of Placement Sharing

Ameritech understands that there is very little sharing of placement costs in the rural areas represented by the Rural Utilities Service (RUS) data, but that any sharing that occurred is included in these data. To the extent that sharing is included in the RUS data, it is inappropriate to count the sharing again in the SM. Because the Commission proposes to extrapolate the results of its regressions to all density zones, this potential double counting of sharing extends to suburban and urban area cost estimates.

F. Regression Analysis

The Commission's regression analysis of outside plant input values began with the work of Gabel and Kennedy.[6] Gabel and Kennedy provided two key motivations for basing cost estimates on the RUS data set. First, the use of publicly available data would enable regulatory agencies and other interested parties to validate the results.[7] Second, the estimation does not require "engineers making too many judgments, which are

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[6] David Gabel & Scott Kennedy, Estimating the Cost of Switching and Cables Based on Publicly Available Data, (The National Regulatory Research Institute, April 1998) (NRRI Study).

[7] NRRI Study, p. 1.

difficult, if not impossible, to audit."[8] Although the RUS data undoubtedly adds useful information to the mix, it does not appear that the Commission's regression analysis has adequately preserved either of these two potential advantages.

First, although publicly available, the RUS data set contains insufficient information for developing cost inputs for the platform model. Consequently, it was necessary for the Commission to make significant adjustments based on information that is outside of the data used in the regressions analysis. These adjustments are based on outside studies and inputs and results from the BCPM and HAI cost models, some of which stem from proprietary information. Validation of the synthesis model, therefore, entails the validation of proprietary information and the BCPM and HAI models in addition to the RUS data set.

Second, the use of regression analysis to develop cost inputs entails judgment regarding model specification, estimation methodology, forecasts, and treatment of the data. The Commission, however, has not adequately documented and explained these judgment calls. Examples include altering model specifications proposed by Gabel and Kennedy without explanation, implementing ad hoc and potentially inconsistent adjustments (such as bargaining power adjustments), and the questionable use of extrapolations to extend forecasts well outside the range of the sample.

G. Excluding Variables Included in Regression Analysis

The Commission's equation for aerial cable includes a dummy variable for instances when multiple cables are placed at the same location. Because the coefficient on this equation is insignificant, the FCC does not use the variable when it estimates the

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[8] NRRI Study, p. 9.

cable costs. It does not even rerun the equation with the variable omitted; it simply ignores the impact of the variable. This is inappropriate. If a variable is in the estimating equation, then eliminating it from the application of the equation biases the result. When a variable is used to estimate an equation then it belongs in the equation. It is not appropriate to "mine the data" to find the best fit. If, however, the decision is made to remove a variable, at the very least the model should be rerun without the variable prior to using the estimated equation to set input values. Furthermore, as with the decision to include a quadratic term, some theoretical consideration to consistency across models for different cable types should be made in deciding whether to include variables, such as dummy variables for placing multiple cables, in the equation.

H. Adjusting for Problem Data

The FCC bases its regression analysis on the analysis of Dr. Gabel and Mr. Kennedy, with several noticeable modifications. One modification is that the FCC adopts what is known as the "robust" regression technique. Robust regressions are a means of excluding or discounting information contained in "outlier" observations. If there are legitimate reasons for instances where cable costs are unusually high or low, eliminating these observations from the analysis will bias the results. There may be legitimate reasons for using the robust regression technique, but these reasons are not discussed in the FNPRM, except to say that outliers were present. However, unless the Commission can support the elimination of information, the ordinary least squares regression technique used in the original Gabel/Kennedy analysis will provide more reasonable and supportable results.

Gabel and Kennedy also removed outliers from their data, and this is the data used in the Commission's regressions. The rationale for removing these data was that "[I]f the data from these two projects had not been excluded, the regression estimates would not have made much sense."[9] Without addressing the merits of this type of data reduction, what is clear is that Gabel/Kennedy eliminated observations from specific contracts because they suspected that the costs were too high. With the application of the so called robust regression technique, the Commission eliminates over 50 observations in one regression that we investigated and gives lower weights to a large number of other observations. There are several concerns with this method of eliminating information. First, the data provided by Gabel/Kennedy already was reduced as described above. Second, all but one of the observations deleted by the Commission and the contracts deleted by Gabel/Kennedy were observations where the costs were higher than average. Finally, the blind application of the Commission's regression technique does not even consider the possible reasons why certain projects have costs that are well above average. In his book, A Guide to Econometrics, Peter Kennedy explains,

> Once influential observations have been identified it is tempting just to throw them away. This would be a major mistake. Often influential observations are the most valuable observations in a data set.... Furthermore, outliers may be reflecting some unusual fact that could lead to an improvement in the model's specification.
>
> The first thing that should be done after influential observations have been identified is to examine these observations very carefully to see if there is some obvious reason why they are outliers.[10]

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[9] NRRI Study, p. 39.

[10] Kennedy, Peter, A Guide to Econometrics, The MIT Press: Cambridge, Massachusetts (1992),.p. 280.

I. Too Little Data Problems

The data used by the Commission to estimate the costs of buried placement contains only 26 observations in density zone one. This small sample size contributes to a low level of statistical confidence for the precision of its buried cost estimate in this density zone. In other words, the cost estimate has a wide confidence interval. Table 2 shows the 95 percent confidence intervals for estimates of buried costs for density zone one using robust and OLS regression. Using OLS regression, the point estimate is $1.39 per foot. But given the nature of the data, one is 95 percent confident that the actual cost of placing buried cable is between $0.18 and $2.60 per foot. By reducing the variability in the underlying data, the robust regression technique has a narrower, but still wide, confidence interval. Note also that in the confidence intervals listed below it is assumed that the ex-post adjustments made by the Commission (LEC engineering costs and the adjustment to the intercept) are known with certainty. To the extent that there is uncertainty about the exact values of these adjustments, the ranges of these confidence intervals are conservative (small).

Table 2

Density Zone 1 Buried Cable Placement Costs And Confidence Intervals ($/foot)

		Confidence Intervals	
Technique	Cost Estimate ($/ft)	Lower 95%	Upper 95%
OLS	$1.39	$0.18	$2.60
Robust	$0.77	$0.12	$1.42

J. Extrapolating Outside of Data Ranges

Regression analysis is a method of "fitting" a prespecified equation to a set of data. The coefficient on each explanatory variable is an estimate of the causal relationship between the explanatory variable and the dependent variable. For example, the estimated coefficient for the variable "number of cable pairs" is the estimated increase in cost for an additional cable pair. If the equation is properly specified and the statistical properties of the estimated coefficient indicate that the relationship is significant, it is reasonable to assume that the relationship will apply under similar conditions. Even for a properly specified equation with coefficients that are deemed significant, however, it is not appropriate to assume that the relationships hold under very dissimilar conditions without further analysis. The following comments by Dr. Gabel and Mr. Kennedy reiterate this point.

> As a matter of sound economics, however, caution must be used to forecast costs for areas that are too dissimilar to those from which the data was obtained.[11]

The Commission's cable and placement cost regressions are based on data from the RUS.[12] As the name indicates, these data reflect rural conditions and are inadequate to provide meaningful information about placement costs in denser areas. First, the placement activities used most widely in rural areas are not representative of the activities that are used to place cables in areas with higher population densities. In rural areas,

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[11] NRRI Study, p. 37.

[12] RUS data are from rural companies. "Rural areas means any area of the United States, its territories and insular possessions (including any area within the Federated States of Micronesia, the Republic of the Marshall Islands, and the Republic of Palau) not included within the boundaries of any incorporated or unincorporated city, village or borough having a population exceeding 5,000 inhabitants." See http://www.usda.gov/rus/telephone/regs/1735.htm.

even in a "scorched node" world, most buried cable would be plowed into the ground.[13] This is much less expensive than other techniques, such as boring and cutting and restoring asphalt and concrete, that are required to place a new network in less rural areas, where it is necessary to account for the presence of houses, driveways, gardens and other obstructions. The Commission recognized that the RUS data only provides estimates that reflect conditions in the lowest two density zones in its model.

To use its regression results for non-rural areas, the Commission proposes to extrapolate the results of its equations for density zone 2 to density zones 3-9. It "further tentatively conclude[s] that we should perform this extrapolation based on the growth rate in the BCPM and HAI default values for underground and buried structure."[14] There are several conceptual and mechanical flaws with this methodology. This approach is counter to the intent of the Commission to substitute "impartial" data for the judgement of engineers, and it is sure to produce flawed results. Extrapolation from costs based on rural placement activities is inferior to using cost information that is based on the placement activities used in more dense areas.

K. Cable Fill Factors

The Commission tentatively concluded at ¶100 that the fill factors selected for use in the federal mechanism generally should reflect current demand, and not reflect the industry practice of building distribution plant to meet "ultimate" demand. The Commission defined "current demand" to include a reasonable amount of excess capacity

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[13] Recall that the Commission's model is designed to estimate costs in a total service long run incremental cost (TSLRIC) environment. A TSLRIC world includes the current locations of the network nodes and all houses, driveways, buildings, gardens and streets, but no telephone plant.

[14] FNPRM at ¶ 45, p. D-17.

to accommodate short-term growth. The Commission also tentatively concluded that fill factors should be set at less than 100%. The Commission selected the HAI defaults for distribution fill factors and tentatively concluded that they reflect the appropriate fill needed to meet current demand. Finally, the Commission tentatively selected copper feeder fill factors that are the average of the HAI and BCPM default values.

Ameritech agrees with the general characterization made by the Commission at ¶96 that in determining appropriate cable sizes, network engineers include a certain amount of spare capacity to accommodate administrative functions, such as testing and repair, and some expected amount of growth. The cable fill factor is used to adequately size facilities to meet current demand. There are at least four factors that should be reflected in evaluating fill factors to be used in the synthesis model.

First, some outside plant facilities beyond those directly providing service to customers, i.e., working pairs, are needed to maintain and test working pairs. For example, some bandwidth may be needed to monitor and test electronic equipment located outside the central office.

Second, plant goes bad over time. Such problems are not unusual for copper cables. However, it is often only part of a copper cable that is affected. Retiring the plant by removing the entire cable just because a few pairs are no longer usable would generally be inefficient. Of course, once enough pairs go bad, the cable would be retired. Consequently, the initial sizing requirements should reflect sufficient additional pairs to account for pairs going bad over the life of the cable.

Third, at any point in time some existing customer locations had recent telephone service, but do not currently have telephone service. Not surprisingly, when a customer

disconnects service because they are moving from their home, it is very likely that the new owner will request telephone service. Thus, in order to provide timely service in these circumstances additional standby capacity is needed beyond the existing working lines.

Finally, in efficiently sizing any facility recognition must also be made of the normal construction interval. For example, if it normally takes two years to plan, engineer and place new distribution cable, then the sizing of a job must recognize the standby capacity needed during the construction period, if service is to be provided in a timely fashion. A reasonable lower estimate of this efficient standby capacity that reflects the normal construction interval can be measured by the forecasted net gain of working pairs over a standard two-year planning and construction period.

Ameritech has made estimates of fill factors for each of Ameritech's states that reflect these four factors. Because some of these factors are geographic-specific, Ameritech views nationwide fill factors as less accurate than state-specific fill factors. Nevertheless, Ameritech's experience is that while there are differences across Ameritech, judgment cannot be avoided in selecting the forward-looking fill factors. Based on Ameritech's experience and analysis, the Commission's proposed nationwide copper distribution and feeder fill factors are currently reasonable estimates to use in the synthesis model if company-specific or state-specific fill factors are not used.

L. Structure Sharing

The Commission at ¶132 seeks comments on the tentatively adopted structure sharing percentages that represent the percentage of structure costs to be assigned to the LEC and other tentative conclusion set forth in the structure sharing section. In addition,

the Commission seeks comment "on AT&T's contention that the structure sharing percentages should reflect the potential for sharing, rather than the LEC's embedded sharing practice."

The proposed structure sharing percentages are significantly below the opportunities for structure sharing that could reasonably be expected in the near future. AT&T's contention that changes in the regulatory climate have increased the extent to which carriers are required or are willing to share structures is either irrelevant to the determination of structure sharing percentages or inconsistent with the assumptions upon which the platform model is based. AT&T's contention is an ad hoc, specious attempt to justify the unreasonable structure sharing percentages that have been proposed by HAI. Consequently, Ameritech finds no solace in the fact that the Commission's proposed sharing values fall within the range of values proposed by HAI and BCPM.

The original support for the AT&T sharing inputs was based on a mistaken application of cost principles. This support has since been discredited and withdrawn. AT&T originally assumed that all utilities were scorched, not just the local telecommunications provider. In September of 1996, the president of Hatfield Associates, Dr. Mercer, stated the original support for the 33 percent sharing input as follows:

> "That was...a matter of observation that quite typically telephone poles are shared by electric utility, telephone and cable... I've done some work with electric utilities in places and understand from that work that conduit is similarly shared between multiple providers in cities where conduit is installed... I went telephone, cable, electric, and saw that was three, basically... I said it seems reasonable on the average that the number 3 is the right number to use. And .33 is 1 over 3."[15]

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[15] Before the Colorado Public Utilities Commission, "Video Deposition of Robert Mercer," Docket No. 96A-345T, September 19, 1996, pp. 86-7.

In the Washington Costing and Pricing workshop, AT&T witness on outside plant costs, Mr. John Donovan testified as follows:

> "Mr. Potter: So in effect you're assuming that the cities are as they exist today but all of the utilities are building their respective networks anew at the same time.
>
> Mr. Donovan: Yes.
>
> Mr. Carnall: I want to be sure that you are clear that you're assuming that all the utilities are building at the same time?
>
> Mr. Donovan: That's correct.
>
> Mr. Carnall: So this is scorched everybody not just scorched telephone.
>
> Mr. Donovan: Correct."[16]

AT&T made it very clear in a more recent proceeding, however, that it has withdrawn the "scorched everybody" assumption as support for its sharing inputs. In that proceeding, AT&T witness Mr. Klick stated that "[w]e are <u>not</u> arguing that other utilities are scorched."[17] The forward-looking view of the platform model, i.e., the scorched node assumption, only requires that the incumbent local exchange company (ILEC) is scorched. Consequently, the original justification of the HAI sharing percentages is unreasonable and the original sharing factor of 33% cannot be relied upon for determining the reasonableness of any other sharing proposal.

AT&T now offers a contradiction of its own position by basing support for its sharing inputs on the development of a competitive industry.[18] AT&T states that "accelerated facilities-based entry by CLECs into local telecommunications markets will

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[16] Washington Costing/Pricing Workshop, UT-960369, February 14, 1997, p. 188,189.

[17] Presentation of John C. Klick, Before the Public Service Commission of Wyoming, September 30, 1997.

[18] In Appendix B of the Hatfield Model Inputs Portfolio, AT&T try to support their structure sharing assumptions by pointing to sharing opportunities that will develop when competitive phone companies enter the market.

expand further future opportunities for underground structure sharing."[19] This position, however, is inconsistent with the single facility provider assumption. Economies of scale that accompany the single provider assumption produce lower per loop cost estimates in the platform model. It appears that AT&T wants to combine cost reductions from the single facilities provider assumption with cost reductions from having multiple facilities providers. It is simply not possible to have it both ways. AT&T's position is even refuted by its own witness. AT&T witness, Mr. Klick stated in a recent proceeding that "We do not contend that sharing opportunities are induced by competition."[20]

Recent experiences by CLECs are also at odds with the AT&T/MCI sharing percentages. In a deposition in a recent Iowa proceeding, Mr. Kirk Kaalberg, Network Service President of McLeod USA, stated that "we look very aggressively for partners to share our construction costs." Even with an aggressive effort to share, Mr. Kaalberg stated that McLeod bears 60 to 75 percent of buried placement costs.[21]

AT&T may claim that Ameritech has missed the point, because their contention is that incentives or requirements facing ILECs have changed. Certainly, incentives are important. It is also important to distinguish between incentives and opportunities to share placement costs. Both are necessary for sharing to take place. The basic flaw in AT&T's position about sharing is that there would be very few opportunities to share. In

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[19] Hatfield Model Release 5.0a Inputs Portfolio, January 27, 1997, Appendix B, B.1 Overview.

[20] Presentation of John C. Klick, Before the Public Service Commission of Wyoming, September 30, 1997. Ameritech observes that these remarks were made one week after AT&T September 24, 1997 comments at pages 12 and 13 in this proceeding.

[21] Deposition of Kirk E. Kaalberg, Docket No. RPU-96-9, pp. 23, 27-28, 34.

fact, AT&T has described in a presentation before the Wyoming Commission why the opportunities to share are limited by stating that:

> "We are not contending that additional local exchange companies would be available.
>
> We are not arguing that other utilities are scorched.
>
> We do not contend that sharing opportunities are induced by competition."[22]

Basically, no matter what the incentives, if the opportunities are not there it does not matter.

Ameritech agrees that there are some opportunities for structure sharing, but these opportunities are rare and are almost exclusively found when an area is newly developed. This is completely consistent with the observation of the Nebraska Public Service Commission quoted by the FCC that some sharing opportunities exist when new homes and business are constructed. In other words, when no utility has facilities serving an area, then there are real opportunities for structure sharing. When the infrastructure for cable, electricity, gas, and telephony already exists in an area, no company including the ILEC will normally find any opportunity to share the cost of placing new structure.

Ameritech has had unique experiences regarding finding structure sharing opportunities because of the major construction activities of Ameritech New Media Inc., Ameritech's cable TV subsidiary, which has been building new cable networks in Illinois, Ohio and Michigan. Franchise agreements under which New Media operates generally require New Media to use the existing structure of telephone and electric companies

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[22] Presentation of John C. Klick, Before the Public Service Commission of Wyoming, September 30, 1997.

rather than build their own. Where feasible, New Media, like Ameritech's telephone companies, looks for opportunities to save costs by structure sharing in new construction. However, New Media has rarely found opportunities to share in new construction in developed areas even though there are strong business incentives to do so. New Media has found sharing opportunities, and has followed up on these opportunities in new developments. Needless to say, homes in new developments make up a smaller number of the homes passed by New Media.

Ameritech has also had experiences that indicate that the proposed structure sharing percentages are understated. For example, the percentage of Ameritech poles shared with other companies is generally less than presumed by the proposed structure sharing percentages. Also, the structure sharing percentages are understated relative to Ameritech's experiences because neither in this input value nor in any other value used by the model are the substantial rent expenses paid by Ameritech for using other utility poles reflected.[23]

IV. COMMON SUPPORT SERVICE EXPENSES

A. Overview

The FCC proposes to use two regression equations as the basis for identifying portions of five expense accounts that should be attributed to services that are supported by universal service. The FCC proposes averaging the results of the two equations and applying several after model adjustments to reach a final determination for each expense account. Although rigorous statistical analysis has the potential of providing important insights

[23] Also see comments of Ameritech Regarding Outside Plant Aspects of Cost Model pp. 8-10, filed September 24, 1997.

into the cost causative relationships between services and expenses, and although the FCC's proposed methods and results are an important first step in this analysis, the process proposed by the FCC requires considerable additional work. As the proposal stands, it is impossible to have any confidence that the results are accurate or reasonable.

The regression-based cost allocation method proposed by the FCC does not provide a reasonable method for allocating expenses to basic local service. There are model specification and statistical problems with the FCC's method. One of the concerns with the FCC's proposed regression analysis is the fact that the underlying data for the explanatory variables are highly correlated. This creates a problem called multicollinearity. The statistical consequences of this condition, and the FCC's own standard for assessing the explanatory power of correlated variables, indicates that their equations do not serve the intended purpose. Finally, Ameritech has been unable to replicate the FCC's results for two of the five accounts (accounts 6510 and 6630).

B. Specification Issues

The first step in regression analysis is to specify an equation in which the *dependent variable* is caused by one or more *explanatory variables*. To the extent that causative relationships are not clearly established, the regression coefficients are not meaningful for developing inputs for a cost model. The FCC's proposed equations begin with the decision that the key drivers of expense categories are the demands for switched local, non-switched special, and toll services.

It is not at all clear that FCC's regressions are based on appropriate cost-causative relationships. Variations in the switched lines, special "lines" and toll minutes do not fully or appropriately reflect the cost causative relationships between expenses and

services supported by universal service. This is one reason for the numerous after model adjustments. To illustrate the problems with the FCC's proposed regression equations, consider the issue of how to count special access lines – as access line equivalents, physical pairs, or some other measure? With electronic equipment, software, and two pairs of copper wires, it is possible to provide a unit of DS1 service that has a capacity to deliver twenty-four narrowband phone lines. The relevant question is, "How does special access service cause expenses?" The FCC counts each DS1 as 24 "lines' and each DS3 as 672 "lines." It is far from clear that this reflects how these services cause expenses. It is clear that DS1s and DS3s are not priced as if they cause 24 and 672 times the amount of expenses as a narrowband line. This specification issue requires additional analysis.

The Commission creates another problem in its proposed equations for attributing expenses when it removes the Local DEM variable from its model. Eliminating an explanatory variable that is deemed important because of correlation with another explanatory variable creates a mongrel model with unknown properties. If a variable is deemed important on theoretical grounds, eliminating the variable leaves a sample specific model that does not provide reliable coefficient estimates. Data obtained from real world observations most often contain some random influences, and, in regression analysis, seldom does the modeler have the luxury of drawing repeated samples to isolate the signal from the noise in the data. The Commission needs to work with real world observations, with all of their peculiarities. When a modeler adds and removes variables to improve the fit to a specific set of data, the peculiarities of the single sample can have an exaggerated impact on the result. The result may be a better "fit" to the specific sample, but there is less confidence that the model provides a good fit outside of the

sample predictions. In regression analysis, the data is meant as a test and quantification of hypothesized relationships, not to fit an equation to a specific sample. It is unclear how and where the variation in the dependent variable caused by a deleted variable is attributed to other coefficients. By eliminating "local DEMs" from the model, the Commission further limits that reliability of its models.

Finally, the Commission proposes averaging the results of two different model specifications for toll DEMs. This is inappropriate and serves to demonstrate that it does not have confidence in either of its model specifications.

C. Other Data Concerns

Another difficulty with the expense data stems from the fact that approximately only twenty local exchange companies account for the 91 observations in the sample. The problem is that the parent companies generally assign a significant portion of non-plant specific and customer operations expenses across their operating companies on the basis of an allocation mechanism. As a result, a simple regression on the 91 observations will produce coefficients that reflect a blend of two relationships: the cost causal relationship, and the allocation-based relationship, of which only the former is appropriate to measure. To net out the latter, it is necessary to either model the allocation method explicitly or, more practically, to aggregate the data to the parent company level. Of course, aggregation of the data would result in a much smaller, albeit truer, data set (20 observations). Ameritech preliminary analysis of using this more appropriate data set has not yielded statistically significant results for the model specification proposed by the Commission.

D. More Ex-Post Cost Adjustments

There are numerous after regression adjustments proposed by the Commission to eliminate costs from the cost allocated to switched lines by the faulty regression analysis. Some of these adjustments are large and at least one adjustment results in a double elimination of costs related to special access and toll services. For marketing, the Commission proposes an after model adjustment that eliminates 95.6 percent of the expense that it associates with switched lines. This reduction is based on a study by ETI, sponsored by the National Cable Television Association, that estimates that residential marketing expenses are only 4.4 percent of all marketing expenses. This adjustment all but overwhelms the regression results, and it is applied incorrectly. With its regression, the Commission eliminates marketing expenses that it estimates are caused by special access and toll services. It appears that the ETI based reduction of 95.6 percent is meant to eliminate some of these same expenses. To the extent that there is overlap between the marketing expense eliminated by the regressions and the marketing expenses eliminated by the ETI study, the Commission proposes to remove these expenses twice. This is what is known as double counting, or in this case double eliminating. Another problem with using the ETI result for isolating marketing expense that is relevant for universal service is that the ETI result does not provide for marketing expense to single-line business customers.

V. CAPITAL COSTS

A. Depreciation

The Commission tentatively concludes that straight-line depreciation should be used in the development of the high cost support mechanism because the Commission's rules require the use of this method (See NPRM at Para. 231). While the use of straight-line depreciation has been the standard method the Commission has been using in its depreciation prescriptions pursuant to Section 32.2000(g), the use of this method is not exclusively mandated by the Commission's rules. Rather, the same rules allow the use of other methods, including accelerated depreciation either through prior approval or prescription (See 32.2000(g)(1)(i) and 32.2000(g)(2)(iv)). As a result, the appropriateness of straight-line depreciation in the universal service fund model cannot be based on the rules to the exclusion of other methods because, simply, the rules allow for other methods. As Ameritech has previously submitted, the method of depreciation for a specific study area needs to be consistent with any study that underlie the development of economic lives or net salvage. Such methods may include methods other than straight-line.[24] The use of such methods would be fully consistent with the Commission's rules.

Projection lives proposed by BCPM are tentatively rejected by the Commission as inputs to the universal service fund model because such values fall outside the Commission's prescribed ranges and the lack of sufficient evidence supporting such

[24] See Reply Comments of Ameritech of June 12, 1998 in CC Docket No. 96-45, CC Docket No. 97-160.

values. The HAI depreciation values are tentatively adopted as inputs since the HAI values for 76 study areas represent the weighted average of Commission approved projection lives. Contrary to the FNPRM's tentative conclusions, the Commission's prescribed ranges for depreciation lives and HAI's proposed input values are not forward-looking projection lives which are reasonable estimates of economic lives (See NPRM at 232). Such prescribed lives are not appropriate measures of depreciation for inputs to the universal service fund model, nor for any other purpose where forward-looking economic projection lives may be needed, for several reasons. First, while the Commission has adopted some changes in methodology such as Equal Life Group and Remaining Life depreciation and small, incremental changes to projection lives over the past twenty years, there has been no adoption of forward-looking economic lives. A simple comparison between Commission prescribed lives and economic lives used by AT&T and other ILEC competitors shows that the upper range prescribed by the Commission for digital switching investment, for example, is almost double those lives used by AT&T, 18 and 9.7, respectively. If the Commission's lives were forward-looking economic lives, AT&T's lives certainly would not be half those prescribed by the Commission.[25] Ameritech endorses the use of forward-looking economic lives recommended by Technology Futures, Inc., a recognized, independent expert in the field of analyses and forecasting of changing technology and its impact on depreciation.[26]

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[25] See Comments of Ameritech, Biennial Review of Regulations, CC Docket No. 98-137, filed November 23, 1998; also see Comments of SBC, filed November 23, 1998.

[26] See ex parte of SBC of July 1, 1999, "Technology Forecasting Approach to Economic Lives" by Technology Futures Inc. at Page 24.

Second, the Commission last updated its life ranges in 1995, before the passage of the Telecommunications Act of 1996, the emergence of the internet, telecommunications and cable company consolidations, and the growth of wireless communications.[27] With the dramatic and rapid changes in both the technological and competitive landscape, life ranges adopted four years ago, based on mortality data six and eight years ago, cannot be considered current or reasonable estimates of forward-looking economic lives.

Finally, contrary to the FNPRM, the depreciation reserve level is not dispositive of the appropriateness of projection lives used in the determination of depreciation rates for the model. First, the increase in the reserve ratio is the result of the adoption of Equal Life Group and Remaining Life depreciation and the amortization of the reserve deficiencies in the 1980s and not the adoption of forward-looking economic lives. These changes resulted in an increase in depreciation expense and associated reserve amounts than previously allowed. Second, the Commission's ranges for projection lives are outdated as discussed above. What the reserve level and engineered lives are today has little, if anything, to do with what the reserve level or economic lives should be given today's changes in technology and competition. The currently prescribed lives and reserve level provide no buffer against technological change and competitive risk because the Commission's prescribed life ranges are mortality based and not reflective of such risks.

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[27] See The Wall Street Journal, April 26, 1999, "AT&T's Plan to Transform," and The Wall Street Journal, July 16, 1999, "AT&T Tests Its Mettle As a Local Phone Firm On Pacific Bell's Turf." AT&T has invested more than $100 billion dollars in the purchase or alliance with cable firms with access into more than 25 million households and a significant presence in 18 of the top 20 markets.

As further evidence that prescribed lives are woefully inadequate, the ILECs were compelled to make billions of dollars in adjustments of plant assets for external reporting purposes when the application of SFAS No. 71 was discontinued.[28] Adjustments of such magnitudes alone demonstrate that the lives prescribed by the Commission are not forward-looking economic lives. Rather, lives prescribed by the Commission are mortality based.[29] The inadequacy of the Commission's prescribed lives are further evidenced by the current 20 percent difference between the reserve levels of the external financial reporting and the lower amounts on the regulatory books of account.

In conclusion, the Commission should not continue to rely on the mortality based prescribed estimates of projection life ranges as compiled by HAI as inputs to the universal service model, or for any other purposes where economic lives are needed.[30] Rather, the Commission should update the proposed values of BCPM using forward-looking economic lives and adopt the updated values as inputs to the universal service fund model.

B. Cost of Capital

Ameritech agrees with the Commission's tentative conclusion to use 11.25% as the cost of capital. Ameritech also agrees with the tentative conclusion that if the

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[28] See Accounting Simplification in the Telecommunications Industry, prepared by Arthur Andersen LLP, July 15, 1998 at Page 29. Also see Supplement to July 15, 1998 Position Paper, prepared by Arthur Andersen LLP, November 10, 1998 at Page 16, where it is shown that the ILECs have a reserve deficiency of approximately $ 34 billion.

[29] See Comments of Ameritech, Biennial Review of Regulations, CC Docket No. 98-137, filed November 23, 1998. Also see Comments of SBC, filed November 23, 1998; and Comments of USTA, filed November 24, 1998, Affidavit of William E. Taylor and Aniruddha Banerjee.

[30] Ameritech supports the USTA Petition for Forbearance of Depreciation Regulation filed on March 3, 1998 incorporated in the Commission's 1998 Biennial Review of Regulation, CC Docket No. 98-137.

Commission adopts a different rate of return in a rate represcription order, the more recently determined rate of return should be used as an input to the federal mechanism.

VI. CONCLUSION

For the reasons discussed above, proposed input values that rely on regression analyses and are subsequently adjusted in an ad hoc fashion still need significant analysis before the Commission can achieve reasonable input values. Presuming that the Commission still intends to use the synthesis model and that it is only to be used as part of the federal support mechanism, Ameritech recognizes that the model and its inputs need to be selected at particular points in time along the continuing process of improving the synthesis model estimates. If the modeling effort proceeds in the future, Ameritech will continue to help evaluate the reasonableness of the model and its inputs.

Respectively Submitted,

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