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December 18, 1998

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Ms. Magalie R. Salas
Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
TW-A325
Washington, DC 20554

Ex Parte: Universal Service – CC Docket No. 96-45 and Forward-Looking Mechanism for Non-Rural LECs – CC Docket No. 97-160

Dear Ms. Salas,

On December 1, 1998 the Common Carrier Bureau conducted the first of several workshops on input values to be used to estimate forward-looking costs for purposes of determining universal service support. Attached are GTE's comments regarding the topics discussed in the workshop – switching investment, corporate operations expenses and customer operations expenses. Copies of these comments are being provided to the staff of the Common Carrier Bureau.

Pursuant to Section 1.1206(a)(1) of the Commission's rules, and original and one copy of this letter are being submitted to the Office of the Secretary. Please associate this notification with the record in the proceeding indicated above.

If you have any questions regarding this matter, please call me at (202) 463-5293.

Sincerely,

W. Scott Randolph
Director - Regulatory Matters

cc: Craig Brown
Steve Burnett
Paula-Ann Cech
James Eisner
Katie King
Mark Prisbry
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GTE COMMENTS
Universal Service
FCC Cost Model Input Workshop
December 1, 1998

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

The Common Carrier Bureau invited public participation in a Universal Service Cost Model Input Workshop on December 1, 1998. The purpose of the Workshop was to discuss specific FCC cost model inputs: switch investment parameters for fixed costs per switch ("getting started costs"), per line costs and per-line expense factors for customer and corporate overheads. The Commission Staff proposed applying regression analysis to publicly available data as the methodology to be used for developing these FCC cost model inputs.

Rather than adopting one common set of inputs for all local exchange carriers, GTE believes that company and state specific inputs should be used in conjunction with the FCC Cost Model or alternatively, the Commission could adopt several sets of inputs to be used by local exchange carriers with comparable cost attributes. If, however, the Commission adopts a range of inputs to be used in conjunction with the FCC cost model, the methodology proposed by the Commission Staff could produce a reasonable range of input values for an average company only if (1) the regression models are statistically sound and complete and (2) the inputs are developed in a manner consistent with their use in the model. GTE welcomes the opportunity to provide comments on the inputs discussed at the December 1, 1998, Workshop and to offer alternative suggestions for the development of these specific cost model inputs.

SWITCHING INPUTS

The major concerns GTE has with the methodology recommended by the Commission Staff to develop switching inputs are the data source being used to develop the regression equation and the specifications of the regression model. GTE believes that a more comprehensive and representative data set is required if the switching inputs to the FCC cost model are to be representative of the non-rural LECs' networks that are being modeled. Also, the key to more representative costs is a regression equation that includes all significant explanatory variables. GTE's comments address some of the explanatory variables that should be evaluated for use in the development of switching inputs. GTE also discusses the importance of ensuring that the inputs are developed consistent with their use in the model.

Data Sources

Dr. David Gabel presented the results of his and Scott Kennedy's National Regulatory Research Institute (NRRI) study[1] which estimates switching cost curves using publicly available data. Although the Commission Staff is not proposing to directly use the results presented by Dr. Gabel, it is planning to use the methodology (with some modifications) and the data set used by Dr. Gabel and Mr. Kennedy.

The switch data set for the Gable/Kennedy study is derived from Rural Utility Service (RUS) information and FCC depreciation data. GTE is concerned

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1 "Estimating The Cost and Cables Based Upon Publicly Available Data", David Gabel and Scott Kennedy, National Regulatory Research Institute, 1998

that this data set is not randomly selected and is not representative of the non-rural LECs who expect to receive universal service support based on the results of the FCC cost model beginning July 1, 1999. During the Workshop, Commission Staff discussed problems with the responses they received to the switch cost data request released July 9, 1997, in CC Docket 96-45, DA 97-1433 that precluded them from using that information as the data set source. Some members of USTA proposed to revise the data request response in order to provide switching equipment cost information based upon the actual experience of the LECs in the marketplace. GTE would support this effort and encourages the Commission to utilize the LECs' own data to reevaluate switching cost inputs.

Model Specification

Staff proposed modifying the method used to convert historical switch investment to current investment dollars because of a concern with the use of C.A. Turner Indices in the Gabel/Kennedy analysis. In the Gabel/Kennedy paper, C.A. Turner Indices are used to place, in current dollar terms, switch costs over a period of time during which digital switching equipment costs declined significantly. Staff cited the concerns raised in the Commission's Second Report and Order.[2] However, at a more recent December 10, 1998 Input Workshop on Expense to Investment Ratios, Staff's proposed inputs had, to some extent, been developed using C. A. Turner Indices. In addition, the C. A. Turner Indices are well known as demonstrated in the attached memorandum. If C. A. Turner

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2 In the Matter of Local Exchange Carriers' Rates, Terms and Conditions for Expanded Interconnection Through Physical Collocation for Special Access and Switched Transport, Second Report and Order, 12 FCC Rcd at 18812, CC Docket No. 93-162, FCC 97-208.

Indices are acceptable in the development of expense to investment ratios, it follows that they should also be acceptable for use in developing switch inputs.

The modifications made by the Commission Staff account for a decline in switch costs by using "time" as an independent, explanatory variable, rather than using the CA Turner Indices. The proposed cost model input values are based on the values the regression model would predict for 1997. The proposed regression equation produces unexpected results that indicate that there is a problem with the model specifications. For example, by the year 2000, the regression equation produces investments for remote switch "getting started" costs that are negative. It is apparent from these results that the current model specifications overstate the decline in switch costs. GTE proposes that Staff either use C. A. Turner adjusted costs and omit "time" from the set of explanatory variables or use a non-linear regression with an exponential "time" term.

GTE supports a life cycle approach to switching costs inputs. The life cycle approach is consistent with the costs that are experienced in the marketplace. Once a switch is purchased and installed in the network all upgrades and additions to capacity have to come from the same vendor. For this reason vendor's price new switches at a lower price to get as many of their switches in the network as possible. All future growth for that portion of the network is then guaranteed to go to the same vendor. This way the vendor recovers his cost by averaging new switches with the growth of switches over time. The methodology that GTE supports reflects this melding of new and growth switch prices that would be experienced in the real world. GTE's historical

data shows that 70% of lines are purchased at new switch prices and 30% are purchased at growth prices. An investment adjustment factor is developed by weighting the current equipment cost for growth and the cost of new equipment. This factor is then applied to the new switch cost to develop the melded cost. The installed switch cost includes EF&I (engineer, furnish, and install), DC Power, and Test & Common investments. The example attached in Exibit 1 shows the comparison of GTE's costs for selected host and remote switch sizes.

A major omission in the Gabel/Kennedy study that is carried forward to the Commission Staff research is the exclusion of vendor-specific estimation. GTE has analyzed the Gable/Kennedy data set and determined that there are statistically significant differences in switch costs across vendors. Any analysis of switch cost data that does not take vendor cost information into consideration ignores a significant explanatory variable. Omission of explanatory variables from the model specification results in biased coefficient estimates.

Consistency Between Input Definitions and Use in Model

Once the switch investment input issues are resolved and more accurately reflect the LEC total switch investment, several inputs need to be fixed to insure they do not change the switch investment inputs.

If all the switch investment inputs use accounting-based definitions, power investment inputs 1 through 5 should be set to zero. Or if the switch investments do not include power investment, the inputs should be based on empirical data collected from the non-rural companies rather than the non-supported power inputs used to run the HAI model.

The switch room, buildings and land investment inputs should provide enough space to house a wire center to serve the customer base. These inputs should be based on empirical data collected from the non-rural companies and not on the non-supported inputs used to run the HAI model.

The Commission Staff clarified during the Workshop that the switch investment will include the main distribution frame (MDF). Therefore, the MDF input should be set to zero.

The "analog line circuit offset for DLC lines, per line" must also be set to zero to track with the switch investment inputs. Also, if the switch investment inputs are based on investment data versus the material price data HAI used, the "switch installation multiplier" must be set to 1.

The "Trunk port, per end" input creates a dilemma because it is used 1) to reduce the end office investment and 2) to develop a tandem switch investment. As with the analog line circuit offset for DLC lines this input should be set to zero so as not to distort the switch investment input. However, to have the model calculate investment correctly for the tandem switch investments, this value should be based on empirical data supplied by the non-rural companies, a value closer to $300 per trunk port. Obviously, a single input cannot take on two values so one algorithm must be eliminated. GTE recommends that the switch module worksheet be modified by disabling the computation that reduces the end office investment by the difference in computed interoffice trunks and the 6:1 line to trunk ratio. The worksheet location for this computation is found at R50A_Switching_io, Sheet Name- Wirecenter, Column BX and BU and Sheet

Name – Host/Remote, Columns P and R. GTE did not undertake an extensive search to see if other locations also need to be adjusted.

The user can supposedly change the holding time multiplier input in order to alter the holding times for residence and business calls. This input has never been adequately explained in documentation. The user needs to understand how to use this input in a meaningful way, for example, how the user can add a minute to the holding time of a residence call and the impact such a change has on the model output. GTE requests that Staff release a detailed explanation of how this input affects the holding time and model output.

Switch Algorithm Correction Needed

The FCC Model Platform relies on the HAI Model switching module that is flawed. Either the module platform must be corrected or the inputs must be designed to compensate for this flaw. The HAI switching module fails to accurately estimate a reasonable quantity of interoffice trunks. The HAI model algorithms create an estimation of interoffice trunk traffic demand from a flawed annual dial equipment minutes (DEM) reduction calculation. Additionally, several other assumptions dictate how these reduced DEMs are allocated to certain trunk types and are utilized to estimate the quantity of switched trunks on a wire center by wire center basis.

The generally accepted industry standard Line to Trunk Ratio (LTR) is an average of 6 lines to every trunk (6:1). Since the switch investment is developed from actual empirical data from switch installations, it is clear that the switch investment will incorporate this industry average LTR. However based on typical

default runs produced by the HAI Model, the LTR ratio ranges anywhere from 14:1 to 28:1 as an average for entire state jurisdictions. In fact, the FCC Model produces a LTR of over 24:1 for the C&P Company in Maryland when run in default mode.

Several input values directly affect the trunk output quantity. These inputs include annual to daily business day reductions, call attempts, dial equipment minute counts, call completion quantities, busy hour fractions, and percent of calls assigned to different categories including intraLATA, interLATA, intrastate, etc. While altering any of these values may produce changes to the output of the model, finding the right combination can be frustrating and burdensome and will likely create great difficulty in trying to predict expected results.

To demonstrate, an attempt was made to "drive" the HAI model to produce a LTR close to 6:1. Several model runs were made with various input changes that logically would increase the number of interoffice trunks. GTE found that the "Busy Hour Fraction" input can be adjusted to have the module produce a reasonable number of trunks. The input value for busy hour fraction was sensitized up from the default of 10 percent in 5 percent increments. As expected, the model estimates gradually increased quantities of interoffice trunks as the busy hour fraction was increased. The quantity of switched interoffice trunks reached an industry standard LTR of almost 6:1 when the busy hour fraction was increased to 45 percent for the sample state and company. The table below shows that incremental changes to the "busy hour fraction" input

value produced predictable increases in the quantity of trunks in the model output.

Busy Hour Fraction	Trunks	Lines from HAI data	LTR	% Change in trunk quantity from Last Run
Default (10%)	119,408	336,3270	28.2:1	NA
15%	178,650	336,3270	18.8:1	50%
20%	237,937	336,3270	14.1:1	33%
25%	297,245	336,3270	11.3:1	25%
30%	356,592	336,3270	9.4:1	20%
35%	415,856	336,3270	8.1:1	17%
40%	475,269	336,3270	7.1:1	14%
45%	534,564	336,3270	6.3:1	12%

In order to compare the HAI Model to the FCC Model, data from the HAI Model and sample data from the FCC Model were used for the C&P Company of Maryland. While there are about 14% fewer switched lines in the FCC data than the HAI Model data for the same company, these models produce nearly the same quantity of switched interoffice trunks. But the FCC Model actually approaches a 6:1 LTR at a lower busy hour fraction due to the difference in the quantity of switched lines.

Changes to the input value for "busy hour fraction of daily use" can produce somewhat predictable results – increasing quantities of switched interoffice trunks as the busy hour fraction increases. While it seems unrealistic to expect an actual busy hour fraction to approach the values used in this

analysis, this option is offered as a means to increase the trunk quantities in the model. GTE does not profess that these results are any more than a display of changes in output based on changes in input values.

It is GTE's opinion that in order to correct the HAI model's constant underestimation of interoffice trunks, changing the model platform is more desirable than adjusting an input value. However, if the FCC Model developers make no change to the FCC model, the input value for "busy hour fraction" can be used to "force" the model to properly estimate the quantity of interoffice trunks required in the forward- looking telecommunications network.

Corporate and Customer Operations Expense

The FCC Staff utilized regression analysis on 1996 ARMIS account data for 91 non-rural LECs to produce per line expense inputs for the following USOA Accounts:

- 6610 Marketing
- 6620 Services
- 6710 Executive & Planning
- 6720 General & Administrative
- 6510 Other Plant, Property & Equipment
- 6530 Network Operations.

While GTE supports the use of ARMIS data as the basis for calculating expense inputs for the FCC cost model, it has some concerns about the data being used and the regression model that was developed by the Commission Staff. The data source should reflect the most currently available ARMIS data, which is 1997 data. Model specification issues include concerns about spurious correlations and explanatory variables that are either omitted from the equation

or specified incorrectly. GTE also offers comments on Staff's question of whether to include Account 6610, Marketing Expense, in universal cost studies.

Data Concerns

The most recent ARMIS data should be used to develop expense inputs for the universal cost model. Since year ending 1997 data is available, it should be used to develop inputs. The Commission staff should not rely on older data i.e., the 1996 data currently being used.

During the December 1, 1998, Workshop, Staff indicated that they may make "possible changes to expense estimation and analysis procedures" involving exclusions of non-forward looking costs. Staff should not attempt to adjust proxy costs for exogenous or extraordinary events. Identification of expense data at this level of detail is not readily available from public information such as ARMIS and unless companies implement specific tracking mechanisms, the data is not generally identifiable after the fact. If Staff pursues the removal of expenses for exogenous or extraordinary events, it must also recognize additional expenses for items such as wage increases and inflation. In the alternative, Staff should attempt to obtain normalized company specific costs or data that could be used to "normalize" company costs prior to conducting its regression analysis.

The Staff also solicited comments on a "Productivity Offset." GTE cautions against using historical ARMIS data and time series regression, the combination of which can result in very distorted results depending on the time period selected. The staff's current regression equation for Corporate and

Customer Operations Expenses were developed using just one year's data, 1996. However, in GTE's case, 1996 was the last year of a major three-year reengineering effort. If the FCC uses the time period between 1994 and 1996 to calculate a future productivity factor, future expense estimates will be too low, probably by a significant amount. Already achieved productivity gains will be improperly projected to future period expense levels which cannot be achieved. Furthermore, if one considers productivity increases, one must also consider inflation increases, but economic theory suggests that wages equal marginal revenue product, so these two would cancel one another.

Model Specification

The regression model developed by Staff expresses the economic theory that cost is a function of output using the equation where

1) $Cost = B_0 * switched\ lines + B_1 * special\ lines + B_2 * toll\ minutes.$

Because multicollinearity exists among the explanatory variables, both sides of the equation were divided by total lines, resulting in:

2) $Cost/line = B_0 * (switched\ lines/total\ lines) + B_1 * (special\ lines/total\ lines) + B_2 * (toll\ minutes/total\ lines).$

In their first model specification, the FCC Staff regressed ARMIS expenses, divided by total lines against the following explanatory variables:

- switched lines divided by total lines,
- special lines divided by total lines, and
- toll minutes divided by total lines.

In alternative specifications, lines are defined in voice grade equivalents and in pair equivalents and toll minutes are broken into interstate and intrastate.

There are two problems with these specifications, both of which are related to explanatory variables being omitted from the equation. First, the specified equation does not contain an intercept, implying that there are no fixed costs in the customer and corporate overhead accounts. And second, the explanatory variables do not represent the full set of outputs that a LEC produces, such as local usage, vertical features, etc. GTE believes that inclusion of local minutes as an explanatory variable is appropriate.

GTE believes that it is inappropriate to use voice grade equivalent (e.g., DS1= 24) line counts in the development of cost proxy model inputs. For example, a DS1 is provisioned over only two twisted pair. To count a DS1 as twenty-four lines grossly overstates its impact on GTE's costs.

GTE is also concerned that the correlation between the explanatory variables and ARMIS expenses may be spurious, and not representative of true causation. Unlike many LECs, GTE is a national company and has many operating centers which support multiple jurisdictions. As a result, many of GTE's expense dollars are allocated, based on factors of which lines and minutes are just a couple of examples of factors used to assign these costs to jurisdictions. That Staff finds a correlation to lines or minutes in its regression analysis does not necessarily indicate a relationship exists.

GTE is further concerned that by excluding an intercept in Equation #1 (described above), the FCC staff is ignoring economies of scale. GTE recommends that the Commission Staff incorporate economies of scale into the

analysis by including the inverse of total lines *(1/lines)* as an independent variable:

$$Cost/line = A_0 * (1/total\ lines) + B_0 * (switched\ lines/total\ lines) + B_1 * (special\ lines/total\ lines) + B_2 * (toll\ minutes/total\ lines).$$

Failure to include a representative set of explanatory variables will result in biased parameter estimates. Also, the regression equations do not include a variable for local DEM which make up more than half of total DEM. This omission may significantly bias the coefficient estimates. The majority of Corporate Operations Expenses (common overhead) does not vary directly with firm output or firm size. Larger firms do have higher overhead costs, in absolute dollars, as compared with smaller firms. However, this fact does not imply that overhead costs have a direct linear relationship with the size of the firm (i.e., access lines and minutes).

Marketing Expense

Staff invited comments on whether it is appropriate to include Account 6610, Marketing Expense, in universal service cost studies. It is GTE's position that an appropriate portion of marketing expenses must be included. GTE is not seeking recovery through universal service studies for marketing activities that are specifically geared towards the sale of nonsupported services (such as dedicated services, switched services, CPE, vertical features, etc.). There are joint marketing expenses, however, that do support the sale of overall GTE products and services which should, in part, be assigned to the cost of universal service. In addition, marketing expenses incurred specifically for the purpose of

promoting basic residential and business services should be included in their entirety.

In a competitive environment, all Fortune 500 companies advertise. It is therefore reasonable to expect that GTE will require at least the same level of advertising expense it incurs today and should be able to recover these costs from the services it provides, including supported services. Furthermore, consistent with the FCC's directive, several states have indicated that they will require LECs receiving universal service support to advertise the availability of supported services.

Reasonableness of FCC Methodology

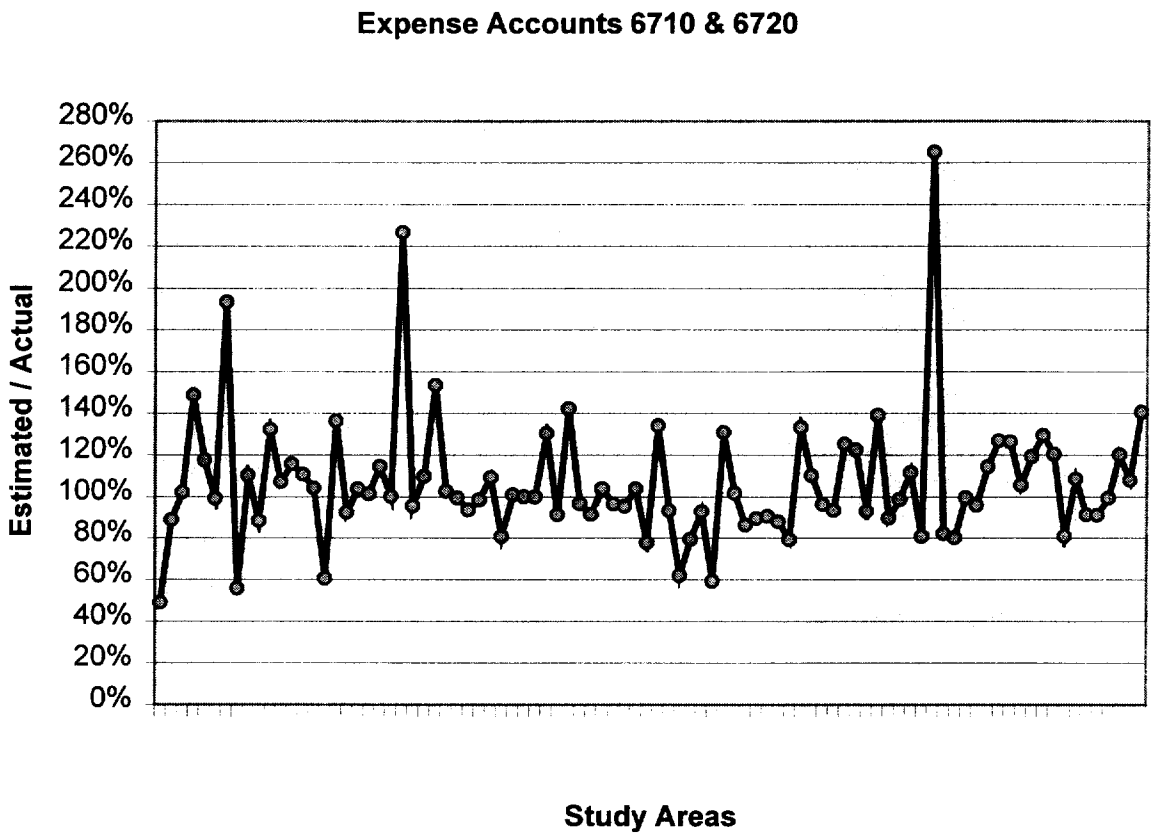
GTE is concerned about the validity of the methodology used by the Commission Staff when their regression results are compared to the actual ARMIS expenses realized in 1996 for the various accounts. The following table shows the ratios of the estimated expenses to the actual amounts for all of the 91 companies represented.

All 91 companies:

	Specification #1			
Account	Amount estimated (in 000s)	Actual ARMIS (in 000s)	Estimated to actual	Estimated Switched to Estimated Total
6610	$ 3,363,928	$ 3,625,031	93%	33%
6620	$ 7,912,352	$ 8,512,865	93%	33%
6710 & 6720	$ 10,460,590	$ 9,885,866	106%	50%
6510	$ 13,227	$ 37,736	35%	971%
6530	$ 6,202,188	$ 6,131,829	101%	46%
Total	$ 27,952,284	$ 8,193,327	99%	43%

The table shows that the estimated total for all 91 companies are quite close to the total actual ARMIS for all accounts other than account 6510. This is to be expected, however, since the regressions would reproduce the results on an average. The problems with the specification are seen only when the data is compared at a disaggregated level. In this case, the variances between the regression results and the actual ARMIS amounts are quite large across companies for the various expense accounts. Using accounts 6710 & 6720 as an example, the graph below depicts the dispersion of the ratios from 100% across companies.

Additional problems are seen when the proposed allocations of expenses to switched lines are compared to total expenses. The shares generally vary from 33% to 50% if the unusual value of 971% for account 6510 that arise from negative regression coefficients is excluded. The average for all the accounts combined is only 43%. These shares are unusually low and are quite suspect. As an example, for all GTE companies, actual TSLRIC studies assign 68% of total costs to switched lines on an average.


Expense Accounts 6710 & 6720
280%
260%
240%
220%
200%
180%
160%
140%
120%
100%
80%
60%
40%
20%
0%
Estimated / Actual
Study Areas

GTE Exhibit 1

Type of Switch	*LineSize*	*NEW GTE/FCC*	*MELDED GTE/FCC*	*NEW GTE/GABEL*	*MELDED GTE/GABEL*
5ESS	700	165%	194%	131%	154%
5ESS	1,700	169%	199%	131%	154%
5ESS	3,400	166%	195%	126%	148%
5ESS	5,000	170%	201%	127%	150%
5ESS	8,300	170%	201%	124%	147%
5ESS	13,300	168%	198%	121%	142%
5ESS	29,200	161%	190%	113%	134%
5ESS	60,000	151%	179%	105%	124%
DMS100	700	153%	205%	121%	163%
DMS100	1,700	144%	194%	112%	151%
DMS100	3,400	138%	187%	105%	142%
DMS100	5,000	133%	180%	99%	134%
DMS100	8,300	130%	175%	95%	128%
DMS100	13,300	130%	175%	93%	126%
DMS100	29,200	123%	167%	87%	117%
DMS100	60,000	119%	161%	82%	112%
GTD5	700	98%	118%	78%	93%
GTD5	1,700	109%	131%	85%	102%
GTD5	3,400	123%	150%	93%	113%
GTD5	5,000	131%	161%	98%	120%
GTD5	8,300	146%	178%	106%	130%
GTD5	13,300	157%	192%	113%	138%
GTD5	29,200	160%	197%	113%	139%
GTD5	60,000	171%	211%	119%	147%
REM 5ESS	1,300	193%	229%	145%	172%
REM 5ESS	2,333	144%	171%	129%	154%
REM 5ESS	2,600	136%	161%	126%	149%
REM 5ESS	3,750	118%	140%	119%	142%
REM DMS100	1,300	105%	143%	79%	107%
REM DMS100	2,333	84%	114%	75%	103%
REM DMS100	2,600	82%	113%	76%	104%
REM DMS100	3,750	72%	98%	72%	99%
REM GTD5	1,300	87%	106%	65%	80%
REM GTD5	2,333	81%	99%	72%	89%
REM GTD5	2,600	79%	97%	73%	90%
REM GTD5	3,750	77%	94%	77%	95%
ALL	10,965	132%	164%	102%	128%
H/E	15,200	145%	181%	107%	134%
RMT	2,496	105%	131%	92%	115%

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December 18, 1998

GTE Telephone Operations
Irving, Texas

The CA Turner Telephone Plant Cost Indexes are published by AUS Consultants on an semi-annual basis (i.e., the indexes are published as of January and July annually). AUS Consultants is an independent consulting firm specializing in utility valuation, cost estimations, depreciation analysis, and regulatory analysis.

The CA Turner Telephone Plant indexes represents the changing cost of telecommunications plant. Indexes are prepared for telephone-type buildings, central office switching and circuit equipment, outside plant property including poles, cable, both metallic and optical, wire, and underground conduit. The indexes for the various types of telecommunication plant are base on a weighted average of material prices, labor costs, and construction overhead costs. Most materials are based on national suppliers and reflect the discounts typically given by manufacturers to their customers. The CA Turner uses labor rates collected from various telephone companies and utility contractors which construct telephone plant. The underlying costs are developed for six separate regions across the United States.

The subscribers to the C.A. Turner Telephone Plant indexes include the US Bureau of the Census, a number of state taxing agencies including the states of California, New York, Idaho, and Washington. Industry subscribers include five (5) of the original seven (7) RBOCs, three (3) of the

major inter-exchange carriers, and four (4) independent telephone system companies. Also related to industry users, three (3) of the major national accounting firms subscribe to the CA Turner Cost Indexes.

Sincerely,

Jerry Weinert

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