BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

REBUTTAL TESTIMONY OF

ROGER L. RIGGERT

AND

JOHN DONOVAN

ON BEHALF OF

AT&T COMMUNICATIONS OF THE SOUTHERN STATES, INC. and
MCI WORLDCOM, INC.

Docket No. 990649-TP

July 31, 2000

PROPRIETARY VERSION

DECLASSIFIED CONFIDENTIAL

MLL 1-10-07 (entire DN) appeal

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A. INTRODUCTION AND CREDENTIALS

Q. PLEASE STATE YOUR NAMES AND BUSINESS ADDRESSES.

A. My name is Roger L. Riggert. I am self-employed and offer technical and regulatory services in the telecommunications industry through my company, RLR Resources, of which I am owner and principal. My business address is 15719 E. Chicory Drive, Fountain Hills, AZ 85268-4308.

My name is John C. Donovan. I am President of Telecom Visions, Inc., a telecommunications consulting company. My business address is 11 Osborne Road, Garden City, NY 11530.

Q. MR. RIGGERT, PLEASE DESRIBE YOUR BACKGROUND.

A. I have a Bachelors Degree in Electrical Engineering from Kansas State University. I took additional course work in Communications Engineering at Washington University, St. Louis, Missouri. In addition, I completed an eighteen month Operating Engineers Training Program at Bell Laboratories.

I worked for 17 years for Southwestern Bell and 16 years for AT&T before retiring from AT&T in 1994. During my career with Southwestern Bell I held several positions dealing with engineering cost studies, transmission engineering, equipment engineering and special services engineering in the state of Kansas and at Southwestern Bell Headquarters. I also directed the preparation of jurisdictional separations, inter jurisdictional compensation, and plant appraisal and valuation studies in the state of Missouri. During this period with Southwestern Bell, I performed numerous forward looking engineering cost studies in connection with making decisions on how and when to reinforce or install new plant capacity. These studies involved all types of plant, including loop, switching and transmission. While in Missouri, my plant appraisal and valuation responsibilities included the development of outside plant retirement unit costs. The development of these costs required a thorough knowledge of materials, placing and splicing costs and methods and labor rates.

During my career at AT&T, I was involved in the introduction of new digital transmission technology in the Bell System. This included fiber optic, digital cross connect, and digital terminal systems. After divestiture, I was employed in the Law and Government Affairs department, where I directed AT&T's policy and procedures on separations, cost allocation, access cost and other cost matters. This included direct involvement in the early formulation of AT&T's policy regarding the application of Total Service Long Run Incremental Costs to incumbent LEC network plant.

I have been a witness in local competition proceedings in Massachusetts, Vermont, Rhode Island, Pennsylvania, the District of Columbia and Maryland, where I testified regarding unbundling, interconnection and number portability issues. In addition, I have testified on these same subjects in U S WEST and GTE arbitration hearings in North Dakota, South Dakota, Montana, Wyoming, Iowa, Minnesota, Nebraska and Oregon. Earlier in my career I testified in regulatory hearings in Kansas, Missouri and Texas on costing matters. In addition, I have had the opportunity to make several presentations before the Communications Sub-Committee of the National Association of Regulatory Commissioners.

Q. MR. DONOVAN, PLEASE DESRIBE YOUR BACKGROUND.

I received a Bachelor of Science degree in Engineering from the United States Military Academy at West Point, NY, and a MBA degree from Purdue University. I have also completed the Penn State Executive Development Program. I have 30 years of telecommunications experience. My last employment before forming Telecom Visions, Inc. was with the NYNEX Corporation, also recently known as Bell Atlantic-North, and subsequent to the merger with GTE, as Verizon. I retired from NYNEX after 24 years of experience in a variety of line and staff assignments, primarily in outside plant engineering and construction. That experience included everything from personally splicing fiber and copper cables, to heading an organization responsible for the procurement, warehousing, and distribution of approximately $1 million per day in telecommunications equipment. I have had detailed hands-on experience in rural, suburban, and high-density urban environments. I spent several years on the corporate staff of NYNEX responsible for the development of all Methods and Procedures for Engineering and Construction within that company. To summarize, I have planned outside plant, I have designed outside plant, I have purchased telecommunications materials and contract labor, I have personally engineered and constructed outside plant, and I have designed methods for those who do such functions. I have also performed other functions, or have supervised those who do, in installing, connecting, repairing and maintaining the various parts of the telecommunications network.

I have also taught undergraduate students as an Adjunct Professor of Telecommunications at New York City Technical College, and have attended numerous courses in telecommunications technologies, methods and procedures. For the past four years, I have submitted affidavits, written testimony, and appeared as an expert telecommunications witness in proceedings before state regulatory commissions in Alabama, Arizona, Colorado, Georgia, Hawaii, Kansas, Louisiana, Maine, Maryland, Massachusetts, Missouri, Nevada, New Jersey, New York, Oklahoma, Pennsylvania, Texas, Washington, and before the Federal Communications Commission ("FCC").

B. PURPOSE OF TESTIMONY

Q. PLEASE STATE THE PURPOSE OF YOUR TESTIMONY.

A. The purpose of this testimony is to provide analysis and recommendations with respect to the recurring costs of unbundled network elements by GTE. This testimony, in conjunction with that of other AT&T/MCI WorldCom, Inc. witnesses, will address the proper method for conducting forward looking UNE cost studies as well as the determination of a "reasonable allocation" of joint and common costs. This testimony will devote significant attention to the description and support of several essential AT&T/MCI WorldCom, Inc. modifications to GTE's proposed costs. The results of these modifications are contained in Exhibit RLR-1.

C. GENERIC ISSUES

Q. WHAT IS CONSIDERED OF UTMOST IMPORTANCE IN CONNECTION WITH A FORWARD LOOKING COST MODEL?

A. There are two important issues associated with a forward looking UNE cost model. One is the model design, which we will address in the remainder of our testimony regarding the design of GTE's ICM model. Just as important as the design are the inputs to the model. The FCC recognized this when it established a separate phase of its USF proceeding to address model inputs. This Commission has taken a similar approach in Docket 980696-TP (henceforth referred to as the USF docket) where there was extensive testimony and evidence regarding the inputs to a model to determine USF costs. Because of the thoughtful and deliberate process established by this Commission in that docket, we have, to the extent feasible, used the Commission ordered inputs for plant costs, facility sharing, cable distribution percentages and expense ratios. Since the USF docket concerned basic service and basic service is a retail service, a common and shared support ratio was developed that is applied to forward looking costs to arrive at wholesale UNE costs.

Q. WHAT IS ANOTHER IMPORTANT ISSUE THAT YOU ARE CONCERNED ABOUT AS IT APPLIES TO ALL CLASSES OF PLANT?

A. At the base of a considerable amount of argument in this docket and other dockets we have been involved in, is whether it is appropriate to include growth in the investments of GTE to determine the cost of the unbundled network elements. In the normal course of engineering a telecommunications network it is generally not prudent to operate on a "just in time" capacity of the network. Over the course of history in engineering, network tools have been developed that indicate the optimum length of time to provide capacity for a given defined demand. These tools take into account rate of demand growth, the time value of money, cost of equipment or plant and an examination of alternatives on how to provide the capacity. A rational company will only place reserve capacity in advance if, by doing so, it can lower the net present value of its total long-run incremental cost relative to the cost it would incur if it added capacity on a "just-in-time" basis to serve new demand. In other words, placing "spare" capacity is, or should be, the result of an economic analysis that shows reduced costs for serving future customers. If, instead, an incumbent can place plant which is held for future use at the expense of current customers (including competitors purchasing unbundled loops), as GTE has done, it will have no incentive to engage in the kind of economic optimization that it would perform if it bore the risk of recovering the cost of that plant from future customers when the increased demand actually materializes.

GTE, in this case, has included growth, but develops unit cost with a current snapshot of demand. When the additional demand materializes, additional revenues will be generated from these network elements. If these additional units of demand are not included when costs are allocated on a per unit basis, as GTE has done, the result is that every unit of demand will pay more than a pro-rata share of the costs and GTE will recover an amount well above the true economic cost of providing the elements. The principle that demand and costs be determined on the same basis has not been followed by GTE. As a result, any prices for network elements will necessarily inhibit, rather than reinforce competition in GTE's local service market.

Although we believe that GTE should use an alternative means to assure that demand and costs are on the same basis, in light of the USF order we have, for instance, used fill factors of .67 for distribution facilities and .735 for feeder facilities. This is consistent with that order. This leaves GTE with a generous amount of spare but far less than it proposes.

Q. ARE THERE ANY OTHER ISSUES OF GENERIC CONCERN?

A. Yes. The question of which depreciation lives and salvage values and which rate of return on capital should be used to determine GTE's costs to provide unbundled elements should be determined. Mr. Majoros and Mr. Hirshleifer address these issues respectively in their testimonies. Their recommendations are made to the inputs to the ICM model.

<u>D. LOOP ISSUES</u>

Q. HAVE YOU IDENTIFIED ANY GENERIC LOOP ISSUES THAT APPLY TO ALL PARTS OF THE LOOP, INCLUDING DISTRIBUTION, FEEDER AND DROPS?

A. Yes. In its Florida ICM filing, GTE assumes that it never shares buried feeder, distribution or drop structures with another utility. Obviously, when multiple utilities share a single structure to house their systems, each utility incurs only a fraction of the structure costs, thereby reducing its total placement investment.

Because it is economically advantageous, it is common for utilities to share trenches that are used to bury cable. If GTE is like other LECs, it is likely that it sometimes relies on the developer of new housing projects to provide the trench in which GTE places its drop wire, thereby avoiding the entire cost associated with drop structure. In some cases, local exchange carriers will do nothing more than drop off cable at the site of a new construction development. Given the cable, the construction contractors will place, bury and stake connecting facilities for multiple utilities. In developing costs for a forward looking loop network, GTE should reflect the economies of sharing the placing costs with other utilities. The only sharing that GTE has recognized in the inputs to ICM is the sharing of poles. In addition, GTE did not design ICM to allow structure sharing for drops. In the adjustments made, sharing factors that the Commission ordered in the USF docket were used.

Q. ARE THERE ANY OTHER GENERIC LOOP ISSUES?

A. Yes. ICM's approach to cable sizing allows for excess spare capacity. ICM sizes all copper cables (feeder and distribution) in the same manner. First, ICM determines the demand that the cable segment will serve. Next, it augments this demand with an administrative fill factor. We assume GTE includes the administrative factor to introduce an adjustment to the cable primarily for the fact that there are certain pairs which cannot be utilized such as bad or defective cable pairs. At best this administrative margin is unnecessary because the breakage in the cable sizes creates more than adequate spare for administrative purposes. At its worst the administrative spare, when it is applied at a cable size break point, could force a larger cable and produce massive spare capacity.

Second, an "engineering factor" that is essentially a growth spare factor is applied. There are several problems with ICM's cable sizing inputs and algorithms. First and foremost is the question of whether it is appropriate to include any growth spare whatsoever in a forward looking cost study. Even if one accepts, arguendo, that a forward looking cost study should include growth spare, it is clear that ICM does so improperly. GTE rationalizes the inclusion of growth spare for distribution on the basis that it builds distribution plant to serve the "ultimate demand" in an area. Yet GTE designs backbone distribution plant beyond the SAI point to interface with the local distribution pairs, which actually builds a measure of ultimate capacity in the backbone distribution plant as well. In reality, the growth spare needed under the "ultimate demand" theory of distribution would likely exceed the growth spare needed for backbone distribution, which GTE could routinely reinforce as demand increases. As previously stated, fill factors were set at .67 and .735 for distribution and feeder respectively.

Distribution Facilities

Q. WHAT ARE THE CHALLENGES IN CONSTRUCTING A MODEL FOR DESIGNING LOOP DISTRIBUTION?

A. Perhaps the biggest challenge for anyone creating a cost model of local exchange networks is the mismatch between the data generally available to populate that model - much of which comes from public data sources that use governmental boundaries such as states, counties and cities or census blocks and census block groups - and the boundaries used in engineering outside plant, which include wire centers and distribution areas. GTE has attempted to bridge this gap using yet another construct, the "demand unit."

Q. IS THERE ANOTHER TERM FOR A "DEMAND UNIT"?

A. Yes. In fact in previous versions of the ICM model, GTE uses the term "grids" rather than "demand units." The demand unit approach to designing distribution plant has come under heavy criticism. It seems that GTE in the 4.1 version of the ICM model is sensitive to that criticism and simply renames the term from grid to demand unit. Regardless what term is used, the approach is the same.

Q. WHAT IS THE CRITICISM REGARDING DEMAND UNITS?

A. Demand units do not solve the engineering problem because they also do not correspond to any geographic unit of significance to outside plant engineering.

Because the population that ICM uses is available for census units, rather than demand units, GTE mapped these data into its artificial demand unit structure. GTE obtained initial demand estimates by census block from PNR & Associates, Inc. Because GTE has no actual data concerning its customer demand at the demand unit level, Stopwatch Maps, Inc. used the PNR estimates to uniformly apportion demand to individual demand units based on the percent of the demand unit area that intersected with a census block. ICM does not assign customers to a distinct point, but rather utilizes fixed areas 1/200th of a degree latitude and longitude. This corresponds to an area approximately 1,500 by 1,800 feet. These estimates are uncertain, and inconsistent because the size of the area to which the ICM assigns customers depends upon where on the earth the customer is located, since 1/200th of a degree longitude differs in length depending how close one is to the equator. Thus, the grid areas will be larger in southern Florida than in northern Florida. ICM assigns customers to the demand units based on the relative road length contained in these grids.

The use of road surrogates tends to disperse customers to a greater degree, particularly in rural areas, than they are dispersed in reality and thus the use of road surrogates tends to overstate cost. It is extremely difficult to project what the results would be if ICM were to use 100 percent actual geocoded data. We believe its cost estimates could significantly fall for distribution plant and could affect feeder plant as well.

Q. HAVE THERE BEEN ANY OTHER CRITICISMS OF THE DEMAND UNIT OR GRID APPROACH?

A. The FCC, in its order on a universal service cost model[1], identified five distinct aspects of the customer location and loop design portions of a cost model that can have a significant bearing on the model's ability to estimate the least-cost, most-efficient technology for serving a particular area.[2] These include: (i) the extent to which the model uses actual customer location data to locate customers, (ii) the method of determining customer locations in the absence of actual data, (iii) the algorithms employed to group customers into serving areas, (iv) the model's ability to design plant directly to the customer locations within the serving area, and (v) adherence to sound engineering and cost minimization principles in both the design of distribution plant within each serving area and the design of feeder plant to connect each serving area to the associated central office.

The FCC concluded a clustering approach is superior to a demand unit-based methodology in modeling customer serving areas accurately and efficiently. It further stated that "to meet the *Universal Service Order's* criteria, a clustering algorithm should group customer locations into serving areas in an efficient manner to minimize costs while maintaining a specified level of network performance quality."[3] This is consistent with actual, efficient network design. In other words, an efficient service provider would design its network using the most efficient method of grouping customers, in order to minimize costs.

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[1] FCC Fifth Report and Order dated October 22, 1998.
[2] *Universal Service Order*, 12 FCC Rcd at 8913, para. 250, criterion 1.
[3] *Universal Service Order*, 12 FCC Rcd at 8913-15, para. 250 (model must assume least-cost, most-efficient, and reasonable technology for providing the supported services; model's loop

The advantage of the clustering approach to creating serving areas is that it can identify natural groupings of customers. That is, because clustering does not impose arbitrary serving area boundaries, customers that are located near each other, or that it makes sense from a technological perspective to serve together, may be served by the same facilities. There are two main engineering constraints that must be accounted for in any clustering approach to grouping customers in service areas. Clustering algorithms attempt to group customers on the basis of both a distance constraint, so that no customer is farther from a DLC than is permitted by the maximum distance over which the supported services can be provided on copper wire, and on the basis of the maximum number of customers in a serving area, which depends on the maximum number of lines that can be connected to a DLC remote terminal.

Q. ARE THERE ANY ADVANTAGES TO THE DEMAND UNIT APPROACH?

A. The only one that comes to mind is that the demand unit approach is simple. Placing a uniform demand unit over a populated area, and concluding that any customers that fall within a given demand unit cell will be served together, is simpler to program than an algorithm that identifies natural groupings of customers.

Q. IS SIMPLICITY OUTWEIGHED BY OTHER FACTORS?

A. Yes. The simplicity of the demand unit-based approach can generate significant artificial costs. Because a simple demand unit cannot account for

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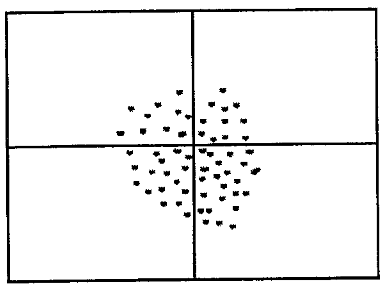
design should not impede the provision of advanced services).

actual groupings of customers, demand unit boundaries may cut across natural population clusters. Serving areas based on demand units may therefore require separate facilities to serve customers that are in close proximity, but that happen to fall in different demand units. The worst-case scenario would involve a natural cluster of customers that, given distance and engineering constraints, could be served as a single serving area but that happened to be centered over the intersection of a set of demand unit lines, as shown below.



This would result in the division of the natural population cluster into four serving areas instead of one. As a result, a demand unit approach cannot reflect the most cost-effective method of distributing customers into serving areas. ICM routinely fragments natural population clusters by treating demand unit lines as boundaries that distribution facilities cannot cross; as a result, ICM unnecessarily duplicates facilities. Moreover, the model employs two different and contradictory assumptions about uniform demand distribution. In calculating the required amount of distribution cable, ICM assumes that demand is uniformly distributed along roads within a demand unit cell, except for demand units with 20 lines or less. In other words, the model makes the unsupported assumption that distribution cable length equals road length.

ICM designs distribution plant separately for each populated demand unit of the 23,669 populated demand units (14,343 of which have 50 or fewer customers) in GTE's Florida service territory using nine "representative" templates (or "stick maps"). ICM identifies each individual demand unit with one of these nine "demand unit style" templates based on the number of road feet in the demand unit. The stick maps create an artificial "segment" structure that, in combination with other rules that ICM employs, causes the model to overestimate distribution costs. For example, ICM applies the algorithm that determines the type of structure (aerial, buried or underground) that ICM deploys for distribution plant to these cable segments in a manner that ignores the economic tradeoffs that its engineering guidelines identify. Percentages of aerial, buried and underground that Commission ordered in the USF docket were input into the ICM model.

Q. HOW DOES THIS APPROACH COMPARE WITH PREVIOUS VERSIONS OF THE ICM MODEL?

A. The demand unit is half the size of the "grids" in previous versions of the model. This tends to mitigate the lack of customer clusters somewhat. However, the current demand unit is still approximately 60 acres in size, an area in which considerable clustering of customers could occur.

Q. WHAT IS A BETTER APPROACH?

A. Treating a natural group of customers as multiple distribution areas (see previous discussion), when they could efficiently be treated as one, raises cost by requiring excess distribution plant, multiple serving area interfaces (and potentially digital loop carriers), and additional feeder plant to reach these distribution areas. A vastly better way to group customers is to apply a clustering algorithm that searches among geocoded data for natural groups of customers.

Q. DO YOU HAVE ANY COMMENTS WITH REGARD TO DROPS?

A. ICM calculates an average lot size in each grid and determines an average drop length unique to each grid with a proprietary maximum and minimum drop distance. It also uses only buried drops and does not account for any sharing of drop costs

ICM suffers a flaw in the drop distance calculation. It assumes that demand is uniformly distributed over the entire area (demand unit) with each location on a single lot of uniform size. This process does not take into account empty space within the area and, thus, overstates lot sizes as well as drop lengths. This error occurs because it does not reduce the demand unit size based on known parameters. Thus lot sizes are determined by the whole area of the demand unit in ICM. The average length of drops that the GTE-ICM produced is about 85 feet. Although a better drop algorithm would probably produce some reduction in that figure, time did not permit adjustment for the algorithm deficiency.

<u>Feeder Facilities</u>

Q. HOW DOES ICM DETERMINE THE DLC SERVING AREAS?

A. ICM groups demand units together using a k-means clustering algorithm that is supposed to group each demand unit with the cluster whose cluster center is closest to that grid. The ICM documentation states, "The K-means methodology starts with a known number of clusters and focuses on determining the members of those clusters. The number of clusters to be used and the initial start points must be determined outside of the K-means algorithm."[4] The ICM documentation contains no information on how the initial number of clusters is determined.

It is unclear whether the ICM is attempting to identify an optimal number of clusters in each wire center. Though the documentation states that the number of clusters is determined outside the model, this is unlikely to be the case. When the user changes the maximum copper loop length from 12,000 feet to 18,000 feet the number of clusters in each wire center declines as is expected.

Further, pictures that the ICM produces of its clusters yield visual results that raise questions whether the K-means clustering algorithm is operating correctly. Exhibit RLR-2 contains two examples. Page one contains three examples of strange clustering in the Auburndale exchange. The map, produced by the ICM, contains unique colors for each cluster in the exchange. This exchange has seven clusters, six of which are served by

[4] ICM Model Methodology, Loop Module, page 16.

DLCs. Three anomalies are designated on the clustering map. The K-means clustering algorithm does not appear to be associating the individual grids with the nearest cluster center in all cases. If distribution plant were built to these grids based on the assignment dictated by this picture, excessive plant would be placed. For example, 2 of the yellow grids would be more efficiently served from the DLC in the green cluster rather than having plant extend from the DLC in the yellow cluster. In this particular example, the K-means algorithm can not be working properly since the green grid is clearly closer to the center of the green grids than it is to the center of the yellow grids. Polk City is another example of an odd cluster that is developed by the K-means algorithm. Situation marked 1 places a grid in the gray cluster even though all of it is closer to the DLC in the blue cluster. The two examples I have shown are repeated in some other wire centers. We are unable to estimate any effect this deficiency produces.

Q. HOW IS THE FEEDER PLANT TO CONNECT THE DLC TO THE CENTRAL OFFICE DESIGNED?

A. ICM uses a constrained minimum spanning tree (CMST) approach. After sufficient plant is estimated to serve customers within distribution areas, sufficient telephone plant must be estimated to connect these distribution areas to the central office. This part of the network is called the feeder plant. The CMST approach seeks to minimize the total feeder distance. Based on my limited review of the ICM feeder methodology and viewing the pictures of feeder routes produced by the ICM it appears that the ICM models a fairly efficient feeder route design. Though the model methodology appears efficient, this only means that feeder distances, not feeder costs in the ICM are appropriate.[5]

Q. DOES GTE UTILIZE THE MOST FORWARD LOOKING TECHNOLOGY IN DESIGNING DIGITAL LOOP CARRIERS (DLC)?

A. No. Forward looking cost standards require GTE to assume the least-cost forward looking technology available in modeling the cost of unbundled loops. GTE has failed to do so, due to the Company's reliance on the Universal Digital Loop Carrier ("UDLC") configuration. UDLC configurations rely on less efficient technologies, which in turn result in overstated costs for fiber optic systems within ICM. ICM should have modeled fiber optic systems in the wholesale option using the Integrated Digital Loop Carrier ("IDLC") configuration, just as it does in the retail option. IDLC utilizes the best, most efficient technologies currently available, and is therefore a more cost-effective arrangement for fiber optic systems.

The Universal DLC configuration consists of a Central Office Terminal ("COT") linked to a Remote Terminal ("RT") via a digital transmission

[5] Though it appears that the ICM methodology for estimating feeder route distances appears reasonable, it should be noted that the ICM likely overstates feeder investment. The ICM allows for very little sharing of facilities and places a substantial amount of equipment in underground facilities, which dramatically increases placement costs. It also appears that the ICM over utilizes

facility. The customer "POTS" service is converted from an analog signal to a digital signal at the remote terminal, interleaved with other digital signals, and transported via digital transmission facilities to the COT. At the central office, a reverse process takes place, converting the digital signal back into its original analog format, and separating individual circuits into discrete pairs of wires that are terminated on the Main Distributing Frame ("MDF"). When introduced, this technological evolution offered efficient transport of signals in the feeder network and interfaced with Analog Switches that pre-dated current digital switches.

The Integrated DLC configuration consists of a remote terminal linked by a digital transmission facility directly to the Local Digital Switch ("LDS"), thereby eliminating the COT and the requirement for an MDF and the switch Analog Ports.

IDLC has several obvious advantages over UDLC: 1) tremendous cost reductions occur as a result of the elimination of the ancillary central office-based equipment; 2) improved transmission quality results from fewer digital-to-analog and analog-to-digital conversions in the central office; 3) IDLC offers more reliable customer service since less equipment maintenance is necessary and fewer appearances of individual customer circuits is achieved; and, 4) automatic remote provisioning, testing, and performance monitoring can be implemented with associated cost savings and reductions.

DLC equipment and thus fiber feeder cable.

The forward looking IDLC now being deployed throughout the industry (GTE included) is compliant with Telcordia generic requirements "GR303" commonly referred to as Next Generation Digital Loop Carrier ("NGDLC"). One very important feature of GR303-compliant NGDLC is its active bandwidth management, which very efficiently assigns system capacity on a "per call" basis. Operating according to traffic management principles, the NGDLC is able to assign each active call to any free timeslot and re-use that timeslot whenever it is idle. As a result, the same system can serve four to five times the number of remote terminals, significantly reducing investment in equipment (including LDS ports). In contrast, a UDLC system requires a one-to-one relationship between the lines coming from the remote and the lines going out to the MDF.

Q. WHY IS THE ISSUE OF USING IDLC DESIGN SO IMPORTANT?

A. The argument that GTE should be permitted to include the higher costs associated with the use of an arrangement called the universal digital loop carrier in calculating the costs of the loop element, goes to the core of the proper costing methodology and the purpose underlying the use of forward looking costs, rather than embedded costs, for pricing network elements. GTE cannot calculate the forward looking costs of a loop in a manner that imposes additional charges upon a ALEC by simply devising a method of unbundling loops that denies parity to ALECs. Moreover, even if it were proper to consider GTE's embedded network in the analysis, rather than the overall least cost technology to provide the entire output of elements, GTE is converting and has converted a large number of loops that terminate in digital switches from copper to IDLC to take advantage of the synergies that exist in such an arrangement. By doing this, loops can be terminated on the digital switch without having to demultiplex the digital signal to a voice frequency signal. When faced with the prospect of unbundling loops in order that a competitor can gain access to them, GTE reacts with a discriminatory arrangement called universal digital loop carrier (UDLC). With this arrangement, the digital signal is demultiplexed to a voice frequency signal which introduces not only extra investment, but introduces additional recurring charges as well.[6] This immediately causes a disparity between what GTE charges its competitors and what it costs GTE to serve its own customers. That GTE may, in fact, elect to employ such a discriminatory practice in its operations does not mean that the additional costs GTE might incur thereby are properly included in the "forward looking cost" of a loop or that prices should be set based upon such an arrangement. Such an arrangement ignores the requirement that it is not the cost of adding to the existing stock of equipment that is to be used. Instead, the question is what is the overall least cost technology to supply the full range of services and elements that must be provided by GTE. Adopting GTE's position on this issue will certainly impede competition. Material and labor costs have been changed so the wholesale DLCs match the Retail DLCs.[7]

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[6] See supporting material, page 1, "additional Cost of unbundling"
7 In the ICM model, the retail option provides for IDLCs.

Q. ARE THER ANY OTHER ISSUES RELATED TO THE DEPLOYMENT OF IDLC SYSTEMS RATHER THAN UDLC SYSTEMS?

A. Yes. If IDLC systems are deployed, then it is unnecessary to utilize the main distributing frame (MDF) and the MDF protector. Using IDLC deployment rather than UDLC, it is proper to adjust the MDF and MDF protector costs as inputs to the ICM model.

E. SWITCHING ISSUES

Q. HOW ARE THE SWITCHING COSTS DETERMINED IN THE ICM MODEL?

A. The SCIS models are the foundation of GTE's switching cost studies.[8] They were originally developed by Telcordia to identify the investments associated with features and services provided from central office switching machines. The SCIS/MO program determines Telcordia calls switch "primitives". SCIS/MO calculates two levels of investments: (1) Unit Investments that identify the cost of various switching functions, such as the investment per processor millisecond; and (2) Total Investments that identify the total investment in the switch, broken down by the same switching function categories as in the Unit Investment report.

Based on a small number of theoretical 5ESS and DMS switches, GTE uses the investment results generated by SCIS and loads these results into ICM. ICM then obtains the number of lines for a wire center in Florida from the

[8] In the case of the GTD5 switch the costs are determined by a GTE proprietary program called

loop module, looks up the equivalent theoretical switch that is similar in line size, and uses those switch investment results to perform the switching unbundled element calculations. GTE's switching cost studies are seriously flawed. GTE used incorrect switch prices to develop the switching unbundled element investments; these prices were the result of inappropriate modeling methodologies, incorrect inputs and assumption errors.

Q. PLEASE SUMMARIZE YOUR CONCERNS WITH THE MODEL.

A. 1. GTE used an incorrect melding of high switch prices for switch additions and lower switch prices for new switch placements.

2. GTE arbitrarily chose eight theoretical switches, supposedly representing the entire population of GTE's switches in the United States, to determine the price for switches in Florida. In addition, the limited number of switches chosen and the modeling of these switches do not reflect switches in Florida.

3. GTE's switch engineering and installation factors are more than twice the factors used by other large telephone companies, thus inflating all switching unbundled elements.

4. GTE did not include all features and functions of the switch in the switch port.

5. GTE includes the GTD-5 switch, which is not forward looking technology.

Q. DOES GTE ACCURATELY REFLECT ITS CONTRACT SWITCH PRICES?

A. No. GTE began the switch costing process with list prices in SCIS. As list prices are not paid for switches, but are heavily discounted, GTE calculated discount factors based on the difference between the list price and the "quoted" price. GTE claims that these factors adjust the switch prices to reflect the actual prices that GTE expects to pay for switches in Florida. The actual methodology that GTE uses is unduly complicated, as it uses numerous spreadsheet templates, the SCIS model, and the ICM model. And, as discussed below, GTE's methodology is once again badly flawed.

GTE provided documentation from the switch vendors that purportedly represent quotes for switches. It is unrealistic to assume that vendors would provide their best competitive pricing quotes to GTE when it was immediately clear that, for purposes of performing a forward looking cost study, GTE was not requesting to purchase an actual switch.

In order to adjust the SCIS outputs (i.e., inputs to ICM) to reflect a weighted average switching discount between line additions (or growth) and replacements (or modernization), GTE developed yet another method to calculate a so-called investment adjustment factor. SCIS outputs reflect growth-based discounts only (i.e., discounts based on line additions), which tend to be much smaller then those obtained for modernization purposes. The investment adjustment factor is used in ICM to adjust the SCIS outputs to reflect a melded investment of line additions and replacements. Unfortunately, however, GTE's melded investment factor methodology is flawed at a fundamental level, because several of the basic assumptions of the study fail to satisfy forward looking UNE cost requirements. The forward looking cost approach requires costs to be estimated assuming the least-cost, forward looking technology. Therefore, a forward looking cost study demands that, in the long run, all investments are avoidable. Because all of GTE's switches will eventually be replaced, the more appropriate price is the replacement price. The Commission recognized, in the USF docket, that prices for new installations only, should be used in forward looking cost studies.[9]

Q. DOES THE MODELING OF A LIMITED SET OF SWITCHES ACCURATELY REPRESENT THE MOST EFFICIENT DEPLOYMENT OF SWITCHES IN FLORIDA?

A. No. GTE first used Bellcore's SCIS program to model the list price for a group of eight host/standalone switches and five remote switches for each technology. SCIS requires inputs for line and trunk quantities, as well as detailed traffic characteristics of the switches being studied. These inputs determine the amount of equipment SCIS assumes, and therefore are the key determinants of the prices of the switches modeled by SCIS.

GTE's choice of the switches to be modeled was based on an analysis of all switches in GTE's national network. It is not apparent how the number and size of the "representative" switches was chosen.

After determining there would be eight line size categories that are supposed to represent all the host/standalone switches and four remote size categories that are supposed to reflect all the remote switches in Florida, additional

[9] Page 200, Order No.PSC-990068-TP

assumptions were made about traffic characteristics, line sizes, and numbers of trunks. It appears that the traffic characteristics were the same for each type and size of switch (i.e. CCS per line in the busy hour is assumed to be 2.9.[10] It is hard to believe that all the lines in Florida offer a load of 2.9 CCS. The review was performed without benefit of basic statistical data analysis techniques as evidenced by identical usage characteristic inputs for all of the representative switches. This is implausible as the amount of usage (minutes and calls) varies in each switch.

Q. WHAT ARE YOUR CONCERNS REGARDING ENGINEERING, FURNISH AND INSTALL (EF&I) FACTORS?

A. Examination of the engineering and installation factors that several of the RBOCs provided in the Open Network Architecture filing was made. These numbers were filed in 1992, so they do not reflect any of the efficiencies that telephone companies have been obtaining through re-engineering of processes and systems in preparation for competition in the last eight years. Yet, these factors are all lower than the factors GTE used in this proceeding.

[10] Pages 19-2, Supporting Material

Company	State	TELCO Engineer & Install
SWBT	AK	7.921
	KS	9.82
	MO	8.86
	OK	11.01
	TX	6.41
BA	DC	10.8
	MD	15.6
	VA	10.8
	WV	10.8
	DE	8.6
	PA	8.6
	NJ	10.0
RBOC Average		10.18
GTE	FL	**BEGIN PROPRIETARY** 24.09 **END PROPRIETARY**

GTE's factor that is associated with the engineering that is usually performed by the switch vendor averages ***BEGIN PROPRIETARY*** 24.09% ***END PROPRIETARY*** for the offices in Florida. Adjusting this factor while giving GTE the benefit of the doubt, a factor of 12% is recommended, which is a 1.12 factor when applied to the material investment. Modifications to the input of the ICM model to reflect this adjustment were made.

Q. HOW HAS GTE COSTED VERTICAL FEATURES?

A. GTE has costed vertical features as if they are each a unique separate element. Vertical services and features are an integral part of the switch. The flaw in this concept is readily apparent if one analogizes the GTE switch to a personal computer delivered by the manufacturer with a suite of software applications. Whether the word processor or spreadsheet program is used daily or only once a year, the owner does not incur a cost each time he utilizes the program. Instead, these costs are incurred at the outset as a part of the acquisition of the computer. The same is true of the vertical features of which a switch is capable. The costs are incurred when the switch is purchased. Nevertheless, GTE has chosen to undertake switching studies based on the incorrect assumption that each time a feature is used, there is a corresponding cost in the switch.

GTE's SCIS/IN feature modules require busy hour feature utilization inputs in order to calculate feature investments. These inputs usually have a one-to-one relationship with the output. If the busy hour utilization input is estimated at double the actual usage, the feature investment will also be double. Many of these inputs are difficult to obtain because they must be explicitly measured in a special study; others are simply immeasurable. Marketing/product managers are often asked to provide this data, but it is very difficult to estimate how often subscribers use a particular feature. It is even more difficult to express this estimate in terms of busy hour usage. In addition, these estimates must average subscribers who frequently use features with subscribers who purchase features, but seldom use them. This difficulty is especially acute when features are bundled or packaged, as in Centrex offerings or residential custom calling packages.

It is obvious that the extreme sensitivity of the feature cost studies to inputs whose "plausible" values can vary by orders of magnitude can result in costs and ultimate rates that are orders of magnitude overstated. SCIS was developed at a time when overestimating the costs of features to be sold to subscribers carried no penalty; but that is not the case here. Because of the misallocation of costs on a feature-usage basis coupled with poor estimations by GTE, new entrants are seeing excessive costs for features that are entirely inappropriate in an unbundled switch element environment. This volatile methodology is simply not acceptable for developing switching unbundled elements, nor is it necessary, given the reassignment of the getting started investment to the port element.

The allocated getting started costs are the dominant part of the costs for most features. GTE contracts seem to indicate that the software required to provision many hundreds of features is included in the base price of the switch. A very small number of features use special hardware, but this hardware is normally included in the other switching elements. The bulk of this equipment is conference circuits. The processor utilization factor is very low for most switches. Therefore, there should be no additional investment for features. Yet, it appears that GTE's cost studies included it both in the feature results and in the basic switching investments, thereby double-counting these investments. Any specific feature costs should be included in the switch port cost.

Q. WHY ISN'T THE GTD-5 SWITCH FORWARD LOOKING TECHNOLOGY?

A. The GTD-5 switch is not considered a forward looking technology. In Texas PUC Docket No. 14943 released on July 29, 1996, the following are findings of fact numbers 46-48:

-The manufacturer of the GTD-5 switch is concentrated on providing support functions to maintaining the switches in operation.

-Except for ordering a remote switch to connect to an existing GTD-5 host, GTE would not buy a GTD-5 switch today, but would buy either a Lucent 5ESS or a Nortel DMS series switch.

-The GTD-5 switch is not included in GTE's five year investment planning horizon.

Also, the Indiana Commission in its order in Cause No.40618 dated May 7, 1998 affirmed that costs for the GTD-5 should not be used in a forward looking cost study.

Finally, this Commission in its order in the USF docket, also stated, "Therefore, it is unlikely that an efficient provider in Florida would tend to purchase a GTD-5 switch rather than a 5ESS or a DMS switch". It further ordered that GTE use the values of 5ESS and DMS switches.

Q. WHAT ADJUSTMENTS HAVE YOU MADE IN THE ICM MODEL?

A. Changes were not able to be made in the ICM model without changing hundreds of inputs for 73 different switches. An attempt to change the designation in the flnodes.db file, had no effect on the costs of the switch. The Commission should order GTE to make this calculation.

F. INTEROFFICE TRANSPORT ISSUES

Q. WHAT ARE YOUR COMMENTS WITH REGARD TO THE INTEROFFICE MODULE COSTS?

A. Only a limited amount of time was spent analyzing the interoffice module. The main concern is that GTE used existing host-tandem hierarchies to cost the interoffice network, thus forgoing any efficiencies that might accrue from different homing arrangements. Modifications of the material and labor inputs to the ICM model to agree with the Commission ordered inputs in Docket 980696-TP were made.

G. MARKETING AND BILLING AND COLLECTION EXPENSE

Q. WHAT ARE YOUR COMMENTS REGARDING THE MARKETING AND BILLING AND COLLECTION EXPENSE?

A. GTE includes these expenses in all its unbundled element costs. In the limited time available to review how these costs were calculated, it is unclear, from the supporting material GTE filed, how GTE arrived at these costs. A data request has been submitted to GTE requesting how these costs were calculated. Additional comments may be made after a response to that request is received.

For example, it appears that the ***BEGIN PROPRIETARY*** $7.16 ***END PROPRIETARY*** for billing and collection for a basic two wire loop is 65% of a figure from a B&C study for business end users of

*****BEGIN PROPRIETARY***** $11.01 *****END PROPRIETARY*****.[11] The functions included in dealing with end user customers are bill distribution, bill generation, bill inquiry, cashiering, remittance, toll investigations, treatment and associated data processing. It should be noted that these functions have very little to do with billing a bulk wholesale customer for unbundled elements. In fact, the ALEC customer will encounter these functions when billing its own end user customer.

Without further justification, it is recommended that only 35% of GTE's business billing and collection be allocated to unbundled loops. The other unbundled elements are reduced in the same proportion as the loops.

GTE's marketing expense is likewise unsupportable. It is recommended that marketing expense be no more than 2% of the annual costs excluding billing and collection and marketing costs.

H. SHARED AND COMMON COSTS AND EXPENSE MODULE

Q. WHAT ARE THE PRINCIPLES TO BE FOLLOWED IN DETERMINING SHARED AND COMMON COSTS?

A. In order to comply with economic costing principles, estimates of GTE's "wholesale" costs must be based on valid, forward looking cost methodology. Therefore, a forward looking cost analysis must evaluate costs with the following principles in mind:

Cost-causation. (The only relevant costs are those incurred by the production of the given cost object, e.g., an unbundled loop);

[11] Page 26-42 of GTE's supporting material.

Efficiency. (The study must assume the use of the most optimal, least-cost production process that is currently feasible, e.g., NGDLC for long loops); and

Forward looking practices. (The study must ignore any constraints or costs imposed by the firm's existing operations. For example, if buried placement of loop plant is the least-cost alternative, GTE must ignore the "transition cost" of converting GTE's existing aerial loop plant.)

This approach applies not only to the measurement of wholesale costs directly attributable to particular network elements, it also applies to those costs that are "shared" or "common" in nature. The sole difference in applying the methodology to direct costs versus shared or common costs is that the cost object changes. By definition, direct costs are causally attributable to a single element or UNE; shared costs are attributable to two or more network elements, but not to a particular element within each such grouping; and common costs are not causally attributable to the production of any single UNE or group of UNEs, but are necessarily incurred to provide any UNEs at all (and thus can be avoided only by ceasing production of all UNEs).

Q. WHAT IS YOUR PRIMARY CONCERN REGARDING SHARED AND COMMON COSTS?

A. The Land and Building Study for COE buildings overstates space and therefore the cost needed for central office equipment and the costs that end up in the common category.

The land and building study that GTE puts forth in its supporting material is, at best, puzzling. The study does, indeed, derive a sample out of GTE's national universe, which eventually results in a detailed study of ten central offices. Even though it appears that a lot of work and thought went into the study, most of the results are not used in the allocation of land and building costs to network elements or to the common costs category. For example, the land and building study states that common space amounts to *****BEGIN PROPRIETARY***** 47% *****END PROPRIETARY***** of the central office floor space.[12] Yet in another part of the supporting material, the common space is listed as *****BEGIN PROPRIETARY***** 37.89% *****END PROPRIETARY*****.[13] The amount of building capital costs that is assigned to the category "direct other" indicates that the *****BEGIN PROPRIETARY***** 37.89%*****END PROPRIETARY***** factor was used. This also indicates that the land and building study that was made and is included in the supporting material is a sham and was not used. In any event, the common factor for central office building is not valid to be included in the common and shared costs. The spare space that this factor represents includes growth space that may not be used for a very long time, if ever. It also includes space reserved for collocation, which should be recovered from the collocator. Collocation space and the common space beyond that needed for growth is removed. An adjustment to the input of the ICM model to remove this cost as well as an adjustment to the C.A. Turner

[12] Page 23-596 of GTE's supporting material.
[13] Page 23-597 of GTE's supporting material.

index (discussed below) and a calculation of a unique land and building factor was made.

Q. **ARE THERE ANY OTHER CONCERNS ASSOCIATED WITH BUILDINGS?**

A. Yes. GTE applies a C.A. Turner index to the booked building investment to reflect "forward looking" costs. In theory, there isn't a problem with trying to arrive at forward looking building costs. However, today, with competition emerging, buildings will likely not be built as they were in a monopoly environment. Central office buildings would take into consideration smaller electronics and the fact that personnel would no longer be permanently assigned in many locations, with the advent of centralized work centers. Administrative buildings would be built to hold down costs as much as possible. Because of this applying the C.A. Turner index to existing investments tends to overstate forward looking costs. Without a definitive look at each building, it is recommended that the composite Turner index be reduced 20% in addition to the disallowance of the unused common space in central office buildings.

Q. **WHAT OTHER CONCERN DO YOU HAVE WITH GTE'S COMMON AND SHARED COSTS?**

A. Mr. Trimble calculates the common cost factor incorrectly.[14] He calculates a factor of 18.15 by dividing common costs by direct costs. In other dockets around the country, GTE uses a formula of common costs

[14] Exhibit DBT-3

divided by total regulated revenues, modified to remove the effect of common costs in the denominator.[15] Reflecting changes made to common costs, this formula produces 13.28%, which is used in the proposed costs (see below). In fact, in running the output reports from the ICM model, the formula outlined in the above footnote is used in the model. It appears that Mr. Trimble ignored this methodology.

Q. WHAT ADJUSTMENTS DID YOU MAKE TO THE MAINTENANCE AND SUPPORT RATIOS?

A. The maintenance and general support ratios from the USF docket were used. Instead of using the USF land and building support ratio, calculations of a land and building support ratio, using adjustments as discussed above, produced a slightly higher figure than using the USF land and building support ratio.

I. MODIFICATIONS TO THE ICM MODEL AND RESULTS OF THE ICM MODEL

Q. YOU HAVE OUTLINED ALL YOUR CONCERNS REGARDING GTE'S COSTS. WOULD YOU SUMMARIZE THE MODIFICATIONS YOU HAVE MADE TO THE INPUTS TO THE ICM MODEL OR ADJUSTMENTS THAT WERE MADE OUTSIDE THE ICM MODELTO ADDRESS THOSE CONCERNS?

A. Several inputs were adjusted to agree with the Commission ordered inputs in the USF docket. Those and other changes are summarized below:

[15] (% Common Costs)/(100%-% Common costs)

1. Rate of return on capital to 8.66% as recommended by Mr. Hirshleifer.
2. Plant lives and future net salvage values to those recommended by Mr. Majoros.
3. Material and placement costs for digital loop carrier to reflect an IDLC deployment. GTE uses IDLC in the retail version of the model. The values for the wholesale material and placement costs were changed to match the corresponding retail costs.
4. Use of the 12 Kft. 26Ga. option rather than the 12 Kft. 6MPBS 24Ga. option for loops.
5. Use of .67 and .735 fill factors for distribution and feeder respectively.
6. Sharing percentages for plant facilities from the USF docket.
7. Reduction of distribution engineering factor from 2.2 to 1.5.
8. Reduction of the material price for MDF and MDF protector to reflect the deployment of IDLC where these elements are not needed.
9. Adjustment of the cable percentages (aerial, buried and underground) to agree with the USF ordered percentages.
10. Change of Investment Adjustment Factors for switching to 1.0 to reflect new replacement costs, rather than a blend of replacement and growth costs.

11. Reduction in EF&I factors for switching to reflect an average 1.12 factor.

12. Reduction of building cost to eliminate unused common space (used common such as stairwells and restrooms and growth were left in).

13. Adjusted maintenance and general support factors.

Q. **ARE THERE ANY OTHER MODIFICATIONS?**

A. Yes. GTE calculated costs for high capacity loops outside the model. In examining the costs it was observed that GTE has used unsupportably low fill factors for OC-3 and OC-12 loop systems. The fill factors and the annual charge factors were adjusted, which reduced the costs of terminal and line facilities for DS1 and DS3 by 55% and 49% respectively. The modifications to the fill factors are consistent with fill factors for transmission equipment in the USF order. The annual charge factors adjustments contain the modifications for rate of return, depreciation lives and salvage values and the use of the maintenance and support factors used to adjust all other costs in the ICM model. Adjustments were also made for marketing and billing and collection costs.

B. <u>CONCLUSION</u>

Q. WHAT CONCLUSION HAVE YOU DRAWN FROM YOUR REVIEW OF GTE'S UNBUNDLED ELEMENT COSTS AS PRODUCED BY THE ICM MODEL?

A. GTE's costs are significantly overstated for all the reasons outlined earlier. The model design is deficient, especially in the loop distribution design. There is a disparity in which GTE treats its retail customers versus wholesale customers in use of UDLC versus IDLC design for the loops. The switching offices are designed using office sizes that don't match any one office and installation factors are overstated. A huge amount of growth capacity has been engineered into the plant, but unit costs are developed using current demand.

Resources and time did not permit me to do an in depth review of the interoffice module and the SS7 module. The fiber optic transmission systems also have huge unused capacity, but quantification was not able to be made. Therefore the costs that are proposed are conservative. Exhibit RLR-1 contains proposed costs. Deaveraged costs are not included.

Evaluations of riser cable and dark fiber costs were not made because of the lack of supporting detail.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

	A	G	I	J	K	L	M	N	O	P	Q	R	S	T
1							Fixed Allocator	13.28%	Fixed Allocator	18.1%				
2														
3			**AT&T/MCI PROPOSAL**		**GTE PROPOSAL**		**AT&T/MCI PROPOSAL**		**GTE PROPOSAL**		**AT&T/MCI PROPOSA**		**GTE PROPOSAL**	
4			a			b								
5			FLC	FLC	FLC	FLC	Comm. Costs	Comm. Costs	Comm. Costs	Comm. Costs	Cost	Cost	Cost	Cost
6		Unbundled Elements / Services	$ / line / mo	$ / minute	$ / line / mo	$ / minute	$ / line / mo	$ / minute	$ / line / mo	$ / minute	/ line / m	$ / minute	$ / line / mo	$ / minute
7	(1)	**LOCAL LOOPS**												
8		Local Loop												
9		2 Wire Voice Grade Loop	$ 9.42		$ 24.06		$ 1.25		$ 4.35		$ 10.67		$ 28.41	
10		Zone 1	$ -		$ 20.72		$ -		$ 3.75		$ -		$ 24.47	
11		Zone 2	$ -		$ 27.42		$ -		$ 4.96		$ -		$ 32.38	
12		Zone 3	$ -		$ 49.93		$ -		$ 9.04		$ -		$ 58.97	
13		4 Wire Voice Grade Loop	$ 21.93		$ 52.67		$ 2.91		$ 9.53		$ 24.84		$ 62.20	
14		Zone 1	$ -		$ 43.85		$ -		$ 7.94		$ -		$ 51.79	
15		Zone 2	$ -		$ 60.28		$ -		$ 10.91		$ -		$ 71.19	
16		Zone 3	$ -		$ 93.97		$ -		$ 17.01		$ -		$ 110.98	
17														
18		ISDN BRI Loop	$ 10.86		$ 29.66		$ 1.44		$ 5.37		$ 12.30		$ 35.03	
19														
20		High Capacity Loops												
21		DS-1 Loop	$ 84.02		$ 189.02		$ 11.16		$ 34.21		$ 95.17		$ 223.23	
22		Zone 1	$ -		$ 175.04		$ -		$ 31.68		$ -		$ 206.72	
23		Zone 2	$ -		$ 198.77		$ -		$ 35.98		$ -		$ 234.75	
24		Zone 3	$ -		$ 364.95		$ -		$ 66.06		$ -		$ 431.01	
25														
26		DS-3 Loop	$ 523.98		$ 1,022.89		$ 69.58		$ 185.14		$ 593.56		$ 1,208.03	
27		Zone 1	$ -		$ 1,009.60		$ -		$ 182.74		$ -		$ 1,192.34	
28		Zone 2	$ -		$ 1,032.56		$ -		$ 186.89		$ -		$ 1,219.45	
29		Zone 3	$ -		$ 1,092.35		$ -		$ 197.72		$ -		$ 1,290.07	
30														
31														
32	(2)	Network Interface Device*												
33		Basic NID	$ 0.52		$ 1.19		$ 0.07		$ 0.22		$ 0.59		$ 1.41	
34														
35	(3)	**LOCAL SWITCHING (must purchase a port)**												
36		Ports												
37		Basic Analog Line Side Port	$ 1.48		$ 2.73		$ 0.20		$ 0.49		$ 1.68		$ 3.22	
38		ISDN BRI Digital Line Side Port	$ 7.65		$ 11.43		$ 1.02		$ 2.07		$ 8.66		$ 13.50	
39		DS-1 Digital Trunk Side Port	$ 34.52		$ 59.80		$ 4.58		$ 10.82		$ 39.11		$ 70.62	
40		ISDN PRI Port	$ 129.71		$ 189.99		$ 17.22		$ 34.39		$ 146.93		$ 224.38	
41														
42		Local C.O. Switching (Must Purchase Port)												
43		Originating / Termination MOU		$ 0.0009943		$ 0.0022600		$ 0.0001320		$ 0.0004091		$ 0.001126		$ 0.002669
44														
45		Features												
46		Included in Line Port												
47														

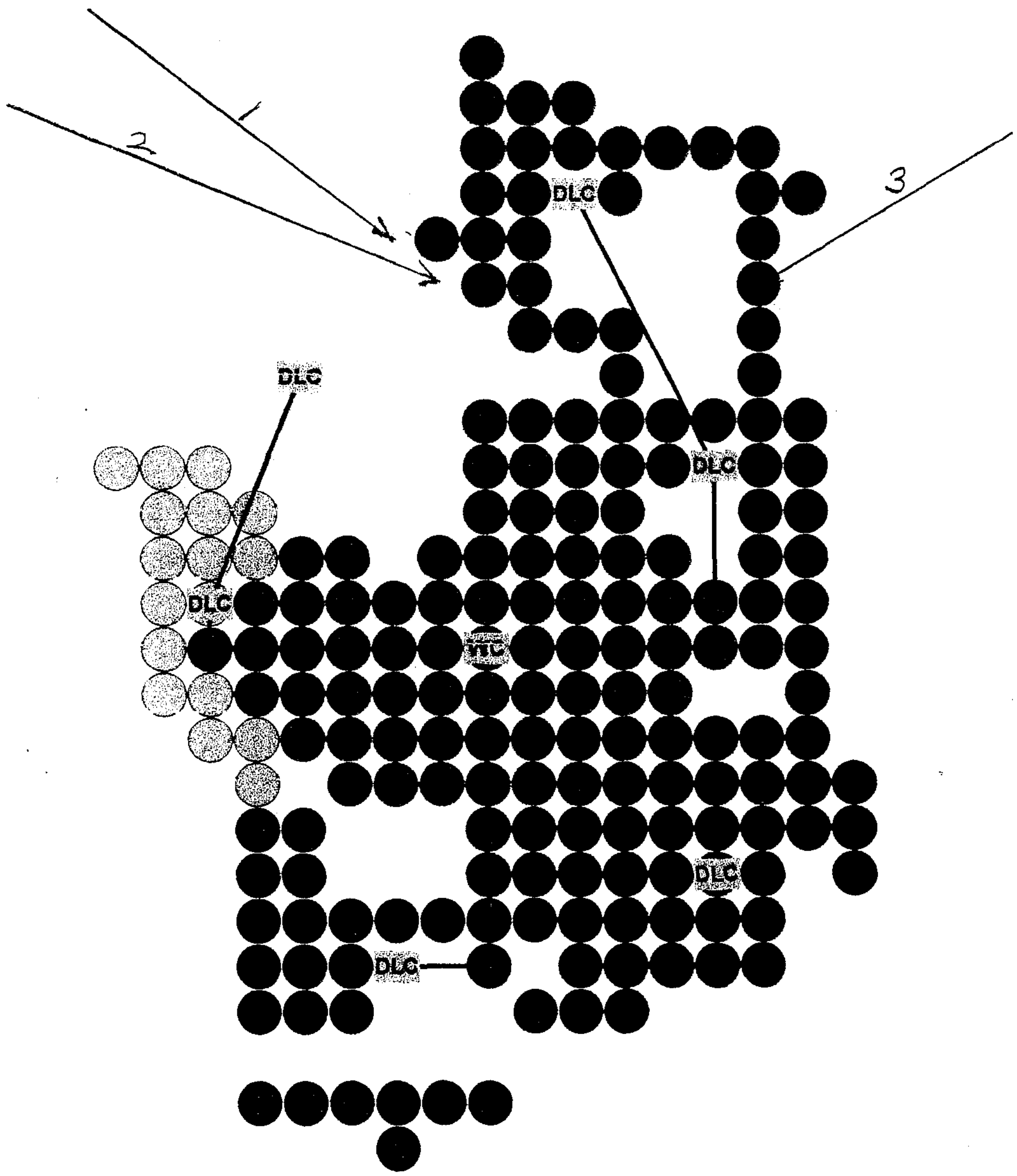
	A	G	I	J	K	L	M	N	O	P	Q	R	S	T
48														
49							Fixed Allocator	13.28%	Fixed Allocator	18.1%				
50														
51			**AT&T/MCI PROPOSAL**		**GTE PROPOSAL**		**AT&T/MCI PROPOSAL**		**GTE PROPOSAL**		**AT&T/MCI PROPOSA**		**GTE PROPOSAL**	
52			a			b								
53			FLC	FLC	FLC	FLC	Comm. Costs	Comm. Costs	Comm. Costs	Comm. Costs	Cost	Cost	Cost	Cost
54		Unbundled Elements / Services	$ / line / mo	$ / minute	$ / line / mo	$ / minute	$ / line / mo	$ / minute	$ / line / mo	$ / minute	/ line / m	$ / minute	$ / line / mo	$ / minute
55	(4)	**DEDICATED TRANSPORT**												
56		Direct Trunked Transport												
57		Voice Facility per ALM	$ 0.02		$ 0.02		$ 0.00		$ 0.00		$ 0.03		$ 0.02	
58		Voice Facility per Termination	$ 5.84		$ 10.58		$ 0.78		$ 1.91		$ 6.61		$ 12.49	
59		DS1 Facility per ALM	$ 0.44		$ 0.33		$ 0.06		$ 0.06		$ 0.50		$ 0.39	
60		DS1 Per Termination	$ 14.69		$ 21.83		$ 1.95		$ 3.95		$ 16.64		$ 25.78	
61		DS3 Facility per ALM	$ 5.19		$ 3.76		$ 0.69		$ 0.68		$ 5.88		$ 4.44	
62		DS3 per Termination	$ 86.34		$ 112.86		$ 11.47		$ 20.43		$ 97.80		$ 133.29	
63		Multiplexing												
64		DS-1 to Voice Multiplexing	$ 125.12		$ 159.07		$ 16.62		$ 28.79		$ 141.74		$ 187.86	
65		DS-3 to DS-1 Multiplexing	$ 343.93		$ 437.00		$ 45.67		$ 79.10		$ 389.61		$ 516.10	
66														
67	(5)	**COMMON TRANSPORT**												
68		Transport Termination												
69		Average MOU / Term		$ 0.0000610		$ 0.0000850		$ 0.0000081		$ 0.0000154		$ 0.000069		$ 0.000100
70		Transport Facility per Mile												
71		Average MOU / Mile		$ 0.0000009		$ 0.0000006		$ 0.0000001		$ 0.0000001		$ 0.000001		$ 0.000001
72														
73	(6)	**TANDEM SWITCHING**												
74		Tandem Switching												
75		Average MOU		$ 0.0006983		$ 0.0014800		$ 0.0000927		$ 0.0002679		$ 0.000791		$ 0.001748
76														
77	(7)	**DATABASES AND SIGNALING SYSTEMS**												
78		SS7Access Systems												
79		Signaling Links												
80		DSAL - 56 Kb	$ 32.07		$ 59.38		$ 4.26		$ 10.75		$ 36.33		$ 70.13	
81		DSAL - DS1	$ 94.86		$ 147.12		$ 12.60		$ 26.63		$ 107.46		$ 173.75	
82		DSAT - 56 Kb Facility per ALM	$ 0.51		$ 2.07		$ 0.07		$ 0.37		$ 0.58		$ 2.44	
83		DSAT - DS1 Facility per ALM	$ 6.07		$ 11.67		$ 0.81		$ 2.11		$ 6.88		$ 13.78	
84														
85		Signal Transfer Point (STP) Port Termination	$ 149.75		$ 395.65		$ 19.89		$ 71.61		$ 169.64		$ 467.26	

	A	G	I	J	K	L	M	N	O	P	Q	R	S	T
86														
87							Fixed Allocator	13.28%	Fixed Allocator	18.1%				
88														
89			AT&T/MCI PROPOSAL		GTE PROPOSAL		AT&T/MCI PROPOSAL		GTE PROPOSAL		AT&T/MCI PROPOSA		GTE PROPOSAL	
90			a			b								
91			FLC	FLC	FLC	FLC	Comm. Costs	Comm. Costs	Comm. Costs	Comm. Costs	Cost	Cost	Cost	Cost
92		Unbundled Elements / Services	$ / line / mo	$ / minute	$ / line / mo	$ / minute	$ / line / mo	$ / minute	$ / line / mo	$ / minute	/ line / m	$ / minute	$ / line / mo	$ / minute
93	(7)	**DATABASES AND SIGNALING SYSTEMS (Continued)**												
94		Call Related Databases												
95		Queries												
96		Carrier Selection service - DB800		$ 0.0002459		$ 0.0003412		$ 0.0000326		$ 0.0000618		$ 0.000279		$ 0.000403
97		LIDB		$ 0.0002189		$ 0.0003038		$ 0.0000291		$ 0.0000550		$ 0.000248		$ 0.000359
98		LNP		$ 0.0000155		$ 0.0000214		$ 0.0000021		$ 0.0000039		$ 0.000018		$ 0.000025
99		CNAM		$ 0.0001971		$ 0.0019145		$ 0.0000262		$ 0.0003465		$ 0.000223		$ 0.002261
100														
101		Query Transport												
102		SS7 Query Setup												
103		DB800 Query Group		$ 0.0001500		$ 0.0002591		$ 0.0000199		$ 0.0000469		$ 0.000170		$ 0.000306
104		CNAM Query Group		$ 0.0001324		$ 0.0002288		$ 0.0000176		$ 0.0000414		$ 0.000150		$ 0.000270
105														
106		SS7 Query Transport												
107		DB800 Query Transport		$ 0.0000011		$ 0.0003528		$ 0.0000002		$ 0.0000639		$ 0.000001		$ 0.000417
108		CNAM Query Transport		$ 0.0000010		$ 0.0003115		$ 0.0000001		$ 0.0000564		$ 0.000001		$ 0.000368
109														
110	(8)	**INTERCONNECTION**												
111														
112		Expanded Interconn Srv Conn DS0/VG	$ 0.17		$ 0.26		$ 0.02		$ 0.05		$ 0.19		$ 0.31	
113		Expanded Interconn Srv Conn DS1	$ 3.89		$ 5.05		$ 0.52		$ 0.91		$ 4.41		$ 5.96	
114		Expanded Interconn Srv Conn DS3	$ 21.44		$ 27.35		$ 2.85		$ 4.95		$ 24.29		$ 32.30	
115														
116	(9)	**UNE PLATFORM**												
117														
118		Basic Analog	$ 10.90		$ 22.75		$ 1.45		$ 4.12		$ 12.35		$ 26.87	
119		ISDN BRI	$ 18.50		$ 34.55		$ 2.46		$ 6.25		$ 20.96		$ 40.80	
120		ISDN PRI	$ 118.54		$ 378.83		$ 15.74		$ 68.57		$ 134.28		$ 447.40	
121		DS1	$ 119.49		$ 248.64		$ 15.87		$ 45.00		$ 135.35		$ 293.64	
122														
123	(10	**ENHANCED EXTENDED LINK**												
124														
125		2-Wire voice Grade Loop, DS0/1 Mux	$ 134.54		$ 179.89		$ 17.87		$ 32.56		$ 152.40		$ 212.45	
126		DS1 Loop and Jumper	$ 87.91		$ 189.44		$ 11.67		$ 34.29		$ 99.58		$ 223.73	
127		DS1 Loop,DS3/1 Mux, DS3 Interoffice Trans	$ 514.29		$ 626.44		$ 68.30		$ 113.39		$ 582.58		$ 739.83	
128														
129														

	A	B	C D E F G	I	J	K	L	M	N	O	P	Q	R	S	T
130								Fixed Allocator	13.28%	Fixed Allocator	18.1%				
131															
132				**AT&T/MCI PROPOSAL**		**GTE PROPOSAL**		**AT&T/MCI PROPOSAL**		**GTE PROPOSAL**		**AT&T/MCI PROPOSA**		**GTE PROPOSAL**	
133				a			b								
134				FLC	FLC	FLC	FLC	Comm. Costs	Comm. Costs	Comm. Costs	Comm. Costs	Cost	Cost	Cost	Cost
135	Unbundled Elements / Services			$ / line / mo	$ / minute	$ / line / mo	$ / minute	$ / line / mo	$ / minute	$ / line / mo	$ / minute	/ line / m	$ / minute	$ / line / mo	$ / minute
136															
137	(1I	**SUBLOOP**													
138															
139			2-Wire Feeder	$ 3.66		$ 8.39		$ 0.49		$ 1.52		$ 4.14		$ 9.91	
140			4-Wire Feeder	$ 11.51		$ 25.71		$ 1.53		$ 4.65		$ 13.03		$ 30.36	
141			2-Wire Distribution	$ 5.94		$ 14.16		$ 0.79		$ 2.56		$ 6.73		$ 16.72	
142			4-Wire Distribution	$ 10.36		$ 24.58		$ 1.38		$ 4.45		$ 11.73		$ 29.03	
143			2-Wire Drop	$ 1.72		$ 2.56		$ 0.23		$ 0.46		$ 1.95		$ 3.02	
144			4-Wire Drop	$ 1.89		$ 2.93		$ 0.25		$ 0.53		$ 2.14		$ 3.46	
145			Loop 4-Wire w/NID	$ 21.80		$ 48.12		$ 2.89		$ 8.71		$ 24.69		$ 56.83	
146			DSAL - 56KB	$ 31.96		$ 59.65		$ 4.24		$ 10.80		$ 36.20		$ 70.45	
147			DSAL - DS1	$ 95.44		$ 141.63		$ 12.67		$ 25.64		$ 108.11		$ 167.27	

ABDLFLXA96H

Total Lines = 14379



PKCYFLXARSA

Total Lines = 5368