ORIGINAL

BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

REBUTTAL TESTIMONY OF

JOHN C. DONOVAN

AND

BRIAN F. PITKIN

ON BEHALF OF

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

MCI WORLDCOM, INC.

Docket No. 990649-TP

July 31, 2000

PUBLIC VERSION

004694

REBUTTAL TESTIMONY OF

JOHN C. DONOVAN

AND

BRIAN F. PITKIN

ON BEHALF OF AT&T COMMUNICATIONS

OF THE SOUTHERN STATES, INC.

and

MCI WORLDCOM, INC.

DOCKET NO. 990649-TP

JULY 31, 2000

I. INTRODUCTION

Q. PLEASE STATE YOUR NAMES AND BUSINESS ADDRESSES.

A. 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.

My name is Brian F. Pitkin. I am a Director of Klick, Kent & Allen, Inc. ("KKA"), an economic and financial consulting firm. KKA, a wholly owned subsidiary of FTI Consulting, Inc., is located at 66 Canal Center Plaza, Suite 670, Alexandria, Virginia 22314.

Q. MR. DONOVAN, PLEASE DESCRIBE YOUR BACKGROUND.

A. 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").

Exhibit JDC/BFP-1 to this testimony provides further detail concerning my qualifications and experience.

Q. MR. PITKIN, PLEASE DESCRIBE YOUR BACKGROUND.

A. I received a Bachelor of Science degree in Commerce, with concentrations in both Finance and Management Information Systems, from the McIntire School of Commerce at the University of Virginia in 1993.

After graduation from the University of Virginia, I joined Peterson Consulting, L.P., where I was involved in developing and analyzing large databases and performing economic analyses. In 1994, I joined KKA. Since joining the firm, I have been involved in cost analyses for the telecommunications, railroad, pipeline and postal industries. Many of the analyses I have worked on have been submitted in regulatory and court proceedings.

During the past four years, I have had extensive experience with the cost models and underlying databases that have been submitted in proceedings arising out of the Telecommunications Act of 1996. I have analyzed cost studies and models sponsored by AT&T and MCI, Bell Atlantic, BellSouth, GTE, Sprint, Southwestern Bell, and US WEST that have been submitted in both unbundled network element ("UNE") proceedings and universal service fund ("USF") proceedings. I have thoroughly reviewed and filed testimony on the Benchmark Cost Proxy Model ("BCPM") and the HAI Model.

More recently, I have critiqued several "business case" models, submitted by various parties to the Federal Communications Commission, that purport to describe the economics of entry into local telephone markets. Also, I have recently evaluated cost studies and models calculating the cost of access and the cost of the FCC's new line sharing UNE. Finally, I have reviewed the FCC's Synthesis Model and presented my recommendations and modifications to the FCC Staff.

Exhibit JDC/BFP-2 to this testimony provides further detail concerning my qualifications and experience.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. We have been asked by AT&T Communications of the Southern States, Inc. (AT&T) and MCI WorldCom, Inc. to review and comment on the

BellSouth Telecommunications Loop Model© ("BSTLM") as it was filed in this proceeding. We will also, out of necessity, comment on certain components of the BellSouth Cost Calculator© ("BSCC") as it relates to the development of outside plant investment.

Q. HOW IS YOUR TESTIMONY ORGANIZED?

A. In Section II, we identify the modeling advantages and disadvantages of the BSTLM and discuss their effects on the estimation of material quantities. In Section III, we discuss the inputs and methodologies that have been used by BellSouth in this filing and explain why they serve to misstate costs significantly. In addition, we explain the modifications we have made in our restatement of BellSouth's models. Finally, in Section IV, we summarize our testimony and explain why the BSTLM and the BSCC, with proper modifications, can be used to generate UNE results for the outside plant portion of the local telephone network.

004699

II. MODELING ADVANTAGES AND DISADVANTAGES OF USING THE BSTLM FOR CALCULATING THE COSTS OF UNBUNDLED NETWORK ELEMENTS

The BSTLM is a significant improvement over previously filed BellSouth cost studies

Q. WHAT ARE THE MAJOR ADVANTAGES AND DISADVANTAGES OF USING THE BSTLM FOR CALCULATING THE COSTS OF UNBUNDLED NETWORK ELEMENTS?

A. The primary advantage of using the BSTLM is that the model attempts to estimate the forward-looking costs of providing unbundled network elements using current technology. In addition, the BSTLM has adopted many of the advanced modeling techniques that recently have been employed in other models. In some cases, the BSTLM relies upon extensive databases, such as road databases and actual BellSouth customer databases, that could result in more realistic estimations of the outside plant required to provide telecommunication services.

The use of these extensive databases comes at a cost, however. First, the BSTLM requires significant processing time. Second, it contains extremely complex programming, containing approximately 30 thousand lines of source code.

Q. HAVE THESE DISADVANTAGES AFFECTED YOUR ABILITY TO ADEQUATELY REVIEW THE BSTLM?

A. Yes. As stated above, the BSTLM is a very large and complex model. By design, this model has the capability to "open up" certain portions of the modeling process that other models perform in "preprocessing" stages that are not easily reviewed. Unfortunately, BellSouth has thwarted this capability of the model by refusing to provide parties the source code in a format that would allow a user to adjust the model's algorithms and perform sensitivity runs. Instead, BellSouth has only provided a password protected ".pdf" (portable document format) version of the source code that is explicitly designed to prevent a user from transferring the text into a compiler (a software package that turns source code into an executable program). This is analogous to providing parties a model in Microsoft Excel while password protecting the formulas so a user cannot test any of the algorithms.

BellSouth has also refused to provide parties with the information necessary to perform similar analyses on the BSTLM that BellSouth's experts have relied on in their affirmative case. For example, Mr. Stegeman's direct testimony includes maps illustrating the network constructed by the BSTLM (Figures 7, 8, 9, 10, 13). During the May 15, 2000 workshop on BellSouth's cost models, Mr. Stegeman confirmed that much of the information needed to create these maps is contained within the ".idb" files produced by the BSTLM. However, BellSouth has refused to provide the information necessary to allow other parties access to this information.

Access to the two pieces of information described above (i.e., source code in a format that can be compiled into an executable program and access to the information that produces the maps) must be provided before the parties and the Commission can fully understand the BSTLM. Because of BellSouth's refusal to provide these key pieces of information, we have not been able to perform any sensitivity runs on the model's algorithms or been able to view the network the BSTLM constructs -- information that Mr. Stegeman used himself in advocating use of the BSTLM in this proceeding. This Commission should require BellSouth to provide the parties with this information and allow parties the opportunity to file supplemental testimony based on the results of additional analyses.

Q. WHAT OTHER DIFFICULTIES HAVE YOU ENCOUNTERED IN EVALUATING THE BSTLM?

A. During the June 2, 2000 workshop, Mr. McKnight, a BellSouth employee, stated that it would take approximately three to four days to run each of the six BellSouth scenarios (three scenarios each broken down into 2 parts). Thus, it takes anywhere from 18 to 24 workdays to replicate BellSouth's initial filing.

This has two important implications. First, given enough time, we may have been able to fully evaluate the source code based on the .pdf text file produced by BellSouth and may also have been able to derive the information from the .idb files to generate maps. However, we have had to focus our attention on replicating BellSouth's initial filing and performing sensitivity runs and have not had time to regenerate the source code or create maps. Second, due to these difficulties, we have had to restrict our sensitivity analyses to a subset of the elements BellSouth proposes.

In addition, we were not able to replicate BellSouth's initial filing for all loop elements. This is because neither the original "Rservice.sys" file (originally provided with the BSTLM), the subsequent "Rservice.sys" file (subsequently provided on May 12, 2000), or the most recent "Rservice.sys" file sent to us (on July 19, 2000) matched the file used to create BellSouth's proposed prices. In our restatement of the BSTLM, we have attempted to use Rservice definitions that match, to the extent possible, BellSouth's initial filing.

Q. WHAT ARE YOUR OPINIONS REGARDING THE QUALITY OF BSTLM?

A. At this point, BSTLM must be considered a prototype cost model until BellSouth provides all of the information necessary to fully review, audit, and perform sensitivity runs on all portions of the BSTLM. As we explain in our testimony below, we have concerns about certain portions of the BSTLM that we have not been able to fully review and test.

The BSTLM material quantities appear reasonable

Q. CAN YOU PLEASE DESCRIBE YOUR REVIEW OF HOW THE BSTLM ESTIMATES REQUIRED ASSET QUANTITIES?'

A. Yes. Because the BSTLM is a bottom-up model, it tries to estimate the equipment quantities necessary to construct the local telephone network based on a series of assumptions and inputs. The reliability of both the underlying assumptions and inputs directly affect the reliability of the BSTLM's outputs. In this proceeding, BellSouth has used its actual customer addresses and the actual road network in BellSouth service territories as inputs to the model. With a few exceptions, we conclude that the underlying way in which the BSTLM constructs the local telephone network is reasonable. Therefore, the BSTLM itself can be used to estimate the quantities of various equipment components required to construct a local telephone network. We will address the unit cost inputs later in our testimony.

Q. HAVE YOU COMPARED THE RESULTS OF THE BSTLM TO THE RESULTS OF THE HAI MODEL AND THE BCPM?

A. Yes we have.

Q. WHAT DO YOUR COMPARISONS SHOW?

A. In evaluating the network constructed by these three different cost proxy models, we focused our efforts on the quantities of various assets produced by each model. By ignoring unit cost inputs in making these comparisons, we have been able to focus on similarities and differences in the underlying network that each model constructs. As a result, the conclusions in this portion of our analysis are unrelated to the unit cost inputs employed by each of the underlying models.

Our analysis shows, as we detail below, that the network constructed by the BSTLM requires much less equipment than the network constructed by the BCPM. In fact, the BSTLM appears to construct a network that is more efficient than the network constructed by the HAI Model. Exhibit JCD/BFP-3 summarizes the amounts of equipment constructed by the BSTLM, the BCPM Release 3.1 and the HAI Model Release 5.0a.

Q. HOW DID YOU DERIVE THE MATERIAL QUANTITIES IN THE TABLE IN EXHIBIT JCD/BFP-3?

A. The material quantities for the BSTLM were generated from the audit reports that a user can output from the model. We had to export both the configuration and investment audit reports for each of the 196 wire centers, requiring 392 individual exports. We then combined all of the individual configuration files into one large database (approximately 800Mb in size) and the individual investment files into one large database (approximately 900Mb in size). Once we prepared these databases, we used the queries that were provided to us by BellSouth to calculate each of the quantities in the above table.

The material quantities for the HAI Model and the BCPM were taken directly from the September 2, 1998 Rebuttal Testimony of Don J. Wood and Brian F. Pitkin in Docket No. 980696-TP before this Commission.

We did not perform any new analyses on either the HAI Model or the BCPM for this proceeding.

Q. WHAT ARE THE IMPLICATIONS OF THE MATERIAL QUANTITIES THAT THE BSTLM GENERATES?

A. The most obvious implication is that the BSTLM should generate investments that are lower than the HAI Model and significantly lower than the BCPM. In fact, BellSouth's new model, which we believe is a significant improvement over the BCPM, actually helps to illustrate that the BCPM constructed an inefficient network and artificially inflated costs. In other words, this Commission should expect to see costs from the BSTLM that are significantly lower than what this Commission adopted in Docket No. 980696-TP.

III. MODIFICATIONS TO BELLSOUTH'S MODELS

<u>BellSouth's three scenarios need to be eliminated</u>

Q. HOW DID BELLSOUTH FILE THE BSTLM IN THIS PROCEEDING?

A. BellSouth filed the BSTLM using three different scenarios. Each different scenario was used to generate the costs associated with different elements. The first scenario, "BST2000," generates estimated investment for unbundled network elements using a mix of fiber and copper facilities assuming universal digital loop carrier equipment ("UDLC"). The second scenario, "Combo," generates estimated investment when the loop element is bundled with the switching element using integrated digital loop carrier equipment ("IDLC"). The third scenario, "Copper Only," generates estimated investment assuming a 100 percent copper network.

Q. ARE ALL THREE OF THESE SCENARIOS APPROPRIATE?

A. No. The BSTLM should construct a single network that estimates the forward-looking costs of providing the underlying services using existing technology. The only scenario that BellSouth filed that is consistent with these principles is the scenario called "Combo."

Q. WHY IS THE FIRST SCENARIO, "BST2000," INAPPROPRIATE IN THIS PROCEEDING?

A. The difference between the scenario called "BST2000" and the scenario called "Combo" is that "BST2000" uses UDLC, while "Combo" uses IDLC technology. While the "BST2000" scenario correctly designs all DLC-served circuits using analog to digital conversion at the field unit's remote terminal ("RT"), it then inappropriately performs an unnecessary digital to analog conversion in the central office, rather than keeping the signal digital.

While analog conversion is obviously not required when the BellSouth loop UNE is connected to the BellSouth switch UNE, it is also not required when loops are purchased on a stand-alone basis. Analog conversion for switched services is an inefficient and obsolete technology because the current digital switching environment is optimized for, and expects to receive digital signals. Requiring new entrants to purchase a configuration with double analog to digital conversions within the

BellSouth network would hinder the new entrant's ability to compete on price offerings or service quality. Allowing BellSouth to charge for conversion to analog in the central office would also require new entrants to pay for their own, unnecessary, additional equipment to convert the signal back to digital, because the new entrant's network will be totally digital. Current networks are not built to perform analog-digital, digital-analog, analog-digital conversions. Instead, one analog-digital conversion should be done at the RT, and the signal should remain digital by using Integrated DLC.

Next Generation Digital Loop Carrier systems, available for several years, currently support multiple switches. This allows new entrants to use integrated loops with either BellSouth's local switch or their own switch, in either case without analog conversion. The number of switches that an IDLC can support with a GR-303 interface varies by vendor. For example, Litespan 2000 can support four and the NORTEL AccessNode supports five, and DISC*S supports three. Furthermore, customers are requesting that their vendors increase this number to as high as eight. Given the very competitive DLC market, and the fact customers are driving this issue, it is apparent that this number will increase in the near future.

BellSouth's proposal of using UDLC is obviously a complicated, costly, and very inefficient loop offering, thereby forcing new entrants -- and their customers -- to accept a network configuration and service quality that is inferior to what BellSouth actually provides to its own customers. This is discriminatory and we do not believe it is consistent with the Commission's intent.

In other words, the "BST2000" scenario is wasteful of equipment and technology because every single line is unnecessarily converted back to a copper pair circuit in the central office. Therefore, the "Combo" scenario should be used instead of the "BST2000" scenario.

Q. WHY IS THE THIRD SCENARIO, "COPPER ONLY," INAPPROPRIATE IN THIS PROCEEDING?

A. The "Copper Only" scenario builds the network using 100 percent copper. This is inappropriate for two reasons. First, this approach is not practical because of engineering restrictions on the length of a copper loop to support full POTS functionality that includes voice and simple analog dial-up modem service. Second, BellSouth's current outside plant guidelines require the use of both fiber and copper facilities. For customers located closest to the serving central office, copper loops are employed for most applications. These copper loops tend to be lower cost than the loops served by fiber feeder that are located farther away from the central office. By developing UNEs for copper loops using a model run that reconstructs the entire network using all copper facilities, BellSouth is attempting to inflate the average cost of a copper loop.

The correct approach is to base the costs of copper-only UNE's on the copper portion of the "Combo" network. In addition, use of a single, appropriate network construct comports with the way ubiquitous outside plant is engineered and built, such that any typical service can be operated over any typical loop. Also, use of a single outside plant design prevents mixing and matching of costs or performing arbitrage on the rates.

Q. CAN YOU PLEASE SUMMARIZE YOUR RECOMMENDATIONS REGARDING THE THREE DIFFERENT SCENARIOS BELLSOUTH PROPOSED IN THIS PROCEEDING?

A. Yes. We have eliminated BellSouth's scenarios called "BST2000" and "Copper Only" based on the discussion above. Therefore, we have used the BSTLM to estimate the UNE costs based on the "Combo" scenario.

BellSouth's inputs in the BSCC should be based on the recommendations of witnesses Hirshleifer, Majoros and Darnell

Q. WHAT BSCC INPUTS HAVE YOU ADJUSTED BASED ON THE RECOMMENDATIONS OF OTHER WITNESSES?

A. We have adjusted BellSouth's cost of capital to reflect the inputs in the testimony of Mr. Hirshleifer and adjusted BellSouth's depreciation lives and salvage values to reflect the inputs in the testimony of Mr. Majoros. We have similarly adjusted BellSouth's plant-specific factors and expense development factors to reflect the inputs in the testimony of Mr. Darnell.

BellSouth's inputs improperly double-count inflation

Q. HOW DO BELLSOUTH'S CALCULATIONS OF LOOP COSTS IMPROPERLY DOUBLE COUNT THE EFFECTS OF INFLATION?

A. The cost of capital employed by BellSouth, this Commission, and Mr. Hirshleifer are "nominal" costs of capital. Nominal costs of capital compensate investors not only for the time value of money and business and financial risk, but also for the effects of inflation. BellSouth's proposed prices double-count inflation by:

- Using a unit-cost inflation factor that is applied to the material investment generated by the BSTLM; and
- Updating the unit costs for material and labor from what was previously determined by this Commission.

Q. WHY DOES USE OF THE INFLATION FACTOR BY BELLSOUTH DOUBLE COUNT THE EFFECTS OF INFLATION?

A. The cost of capital that Mr. Hirshleifer has developed, which we included in our restatement of the BellSouth models, already accounts for the effects of inflation. Specifically, the costs of debt and equity that Mr. Hirshleifer developed from financial market data already include a component that compensates ILEC investors for the loss in purchasing power of their invested capital that would otherwise be caused by the effects of inflation (thus, Mr. Hirshleifer developed a nominal cost of capital as opposed to a "real" cost of capital, which is the nominal cost of capital minus the rate of future inflation anticipated by debt and equity investors). Furthermore, the cost of capital previously adopted by the Florida PSC in its prior proceedings was also a nominal cost of capital, meaning it was high enough to compensate ILECs for the effects of inflation. Any other adjustment for inflation, outside of the cost of capital, includes the effects of inflation *twice* in the capital component of the cost-based prices that BellSouth proposes.

Q. WHY DOES BELLSOUTH'S UPDATING OF THE MATERIAL AND LABOR COSTS, FROM WHAT HAS BEEN PREVIOUSLY DETERMINED BY THIS COMMISSION, DOUBLE COUNT THE EFFECTS OF INFLATION?

A. We understand that the capital cost components of the various annual recurring costs previously adopted by this Commission in the UNE and USF cases were developed by applying a nominal cost of capital to the forward-looking investment. Thus, these costs were high enough to offset the future effects of inflation. Allowing BellSouth to adjust the unit prices and labor rates it uses to develop investments in this proceeding effectively compensates the ILECs *twice* for the effects of inflation, once as part of the nominal cost of capital and again by inflating the investment base to which the nominal cost of capital is applied.

Q. WHY DO THE PARTIES RELY ON NOMINAL COSTS OF CAPITAL (ONES THAT INCLUDE COMPENSATION FOR INFLATION) RATHER THAN REAL COSTS OF CAPITAL (ONES THAT DO NOT INCLUDE COMPENSATION FOR INFLATION)?

A. Use of the nominal cost of capital is the most straightforward approach, because (as Mr. Hirshleifer discusses in his testimony) nominal costs of capital can be derived directly from data observable in financial markets. But if nominal costs of capital are employed, unit prices for material and labor used to develop the total network investment must be locked in at the levels initially established by the Commission. An alternative is to apply the real cost of capital to investment levels that are allowed to increase with inflation. While conceptually more consistent with the competitive market standard, such an approach is more unwieldy because it would require the Commission to estimate a real cost of capital. In addition, this approach would require that UNE rates increase each year to reflect the effects of inflation on the underlying investments. What clearly is inappropriate is to apply the nominal cost of capital to network investment levels that also are allowed to increase to reflect the effects of inflation because, as we stated above, BellSouth would thereby be compensated *twice* for the effects of inflation.

Q. CAN YOU PROVIDE A SIMPLE EXAMPLE OF THESE TWO ALTERNATIVE METHODS OF CAPITAL RECOVERY?

A. Consider an example with an initial investment of $1,000,000 employing the following assumptions:

- Economic life is 10 years;
- Nominal cost of capital is 10%;
- Inflation rate is 4%;
- Real cost of capital is 5.77% (1.10 / 1.04 - 1).

These assumptions lead to the following two cost recovery patterns that, over the life of an asset, have a present value equal to the initial investment in the asset. Exhibit JCD/BFP-4 illustrates that calculating an annuity based on the nominal cost of capital fully recovers the initial $1,000,000 investment over the 10-year period. The exhibit also illustrates that calculating an annuity based on the real cost of capital, and then inflating the annuity each year at the appropriate inflation rate similarly fully recovers the initial $1,000,000 investment over the 10-year period. Under either approach, the nominal discount rate is appropriate because the cash flows being discounted (shown in the "Inflated Annuity" column) already reflect the effects of inflation. Exhibit JCD/BFP-5 illustrates these two recovery pattern. The above charts help to illustrate the point that both cost recovery patterns result in the same present value at the end of the asset's life. However, it is obvious that using the nominal cost of capital allows BellSouth to recover more of its initial investment earlier in the asset's life than using the real cost of capital. Therefore, if BellSouth is allowed to submit new material and labor prices before year 10, say in year 5, BellSouth will have over-recovered the appropriate amount of investment over this time period.

The inflation double-count in BellSouth's approach is illustrated in the example in Exhibit JCD/BFP-6, which assumes that BellSouth uses a nominal cost of capital and seeks new UNE rates each year to reflect the effects of inflation on asset and labor unit prices.

Exhibit JCD/BFP-6 shows that under BellSouth's approach, it would over-recover its initial investment by more than 21 percent if it were allowed to use the nominal cost of capital and adjust the material and labor prices for the effects of inflation. The charts in Exhibit JCD-BFP-7 also help to illustrate this point.

The solid lines on the charts in Exhibit JCD/BFP-7 are both sufficient to allow BellSouth to recover its investment and earn its cost of capital. Thus, the charts show that BellSouth's proposed approach, represented by the dashed lines, would allow it to recover more than the true economic cost of the asset. The difference between the two sets of lines on each of the above graphs illustrates the amount of BellSouth's over-recovery in each year, under the assumptions we have employed, if BellSouth is allowed both to use a nominal cost of capital and to inflate the underlying unit prices.

Q. WHAT ARE THE IMPLICATIONS OF THIS DISCUSSION FOR THE COST CALCULATIONS THAT THE COMMISSION MUST MAKE IN THIS PROCEEDING?

A. The Commission must calculate the capital component of recurring costs in a manner that avoids compensating BellSouth twice for inflation. As noted above, this can be done either (1) by using the previously-adopted material unit prices and labor rates in establishing the total network investment, and applying the appropriate nominal cost of capital, or (2) by using current material unit prices and labor rates and applying the real cost of capital (which also then requires that UNE rates be adjusted in subsequent years to reflect the effects of inflation on underlying material and labor unit prices). Because real costs of capital are difficult to calculate with precision, and because the UNE prices that have been in effect the past several years were based on a nominal cost of capital, we would recommend that the Commission continue to calculate the capital component of recurring costs by employing a nominal cost of capital and that it "lock in" its previously-adopted material unit prices and labor rates. This Commission's USF decision similarly recognized that "indexing may be appropriate, for example, in a contract arbitration, but not in this proceeding." (Order No. 980696-TP, pg. 157) Indexing is similarly not appropriate in this proceeding.

Q. WHICH MATERIAL AND UNIT PRICES THAT THIS COMMISSION HAS PREVIOUSLY ADOPTED DO YOU RECOMMEND?

A. We recommend that this Commission rely on the material and unit prices it adopted in the USF proceeding, Docket No. 980696-TP.

Q. WHY DO YOU RECOMMEND USING THE COMMISSION'S DECISION IN THE USF PROCEEDING?

A. This USF decision specified the inputs appropriate for BellSouth in the sBCPM. There are three primary reasons why we feel it is appropriate to employ these unit-cost inputs to modify the BSTLM:

- Both the BCPM and the BSTLM purport to estimate the forward-looking cost of providing UNEs using current technologies, so the theoretical frameworks for the two cost proxy models should be similar;
- Many of the inputs in the BSTLM are similar or directly equivalent (except for DLC equipment which we describe below) to the inputs used in the BCPM, so the inputs are easily transferable; and
- BellSouth sponsored the BCPM in the Universal Service docket and the Commission's decisions considered BellSouth's evidence on inputs in that docket.

For these reasons, we believe that these inputs can be used in the BSTLM without the need to re-litigate unit cost inputs that this Commission has already adopted.

Q. WILL YOU PLEASE SUMMARIZE THE ADJUSTMENTS YOU HAVE MADE TO BELLSOUTH'S FILING TO AVOID THIS DOUBLE-COUNT OF INFLATION?

A. Yes. In order to avoid double counting the effects of inflation, we modified the BSCC to remove the inflation factor and have modified the unit cost inputs in the BSTLM to reflect the inputs this Commission previously adopted in Docket No. 980696-TP.

<u>BellSouth's factor approach overstates the costs of engineering and installation</u>

Q. HOW HAS BELLSOUTH DEVELOPED THE ENGINEERING AND INSTALLATION COSTS?

A. BellSouth's filing of the BSTLM and the associated components of the BSCC serve to distort costs. While the BSTLM is designed to calculate the total loop investment required to provide the various loop elements, BellSouth disabled many of these features and instead used the BSTLM to calculate only the <u>material</u> investment associated with the loop elements. BellSouth's filing then applies a series of factors to these material investments, for engineering and installation costs, in order to derive total installed investment.

BellSouth's factor approach to calculating installed investment distorts the actual investment required by assuming that engineering and installation costs are directly proportional to the material costs. Consider the following example:

***** Begin Proprietary*****

- XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
- XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
- XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX XXXXX***End Proprietary*** However, the true cost of placing a 400-pair cable is not significantly higher than the cost of placing a 25-pair cable. As a result, BellSouth's approach is not appropriate and serves to distort costs. It is surprising that BellSouth has resorted to applying such an inexact and inappropriate factor to material investment when it has Standard Time Increment values available. Standard Time Increments represent optimal direct labor times for outside plant functions, such as placing a foot of aerial cable or splicing 100 copper pairs, and provide more appropriate estimates of installation costs than BellSouth's factor approach.

In addition, the BSTLM includes some optimization routines that are based on investment. For example, the inputs filed by BellSouth include a variable named "MinimizeTotDistFDICost." This variable is set to "Yes," which purports to minimize the total cost of the FDIs and distribution cable in a distribution area. However, by excluding the engineering and installation costs from this optimization routine, it appears that the BSTLM will only evaluate material investment, and will not perform its optimization routines based on accurate data (*i.e.*, it is missing a significant portion of the total installed investment). Thus, the BSTLM cannot determine the most optimal network.

For the reasons listed above, BellSouth's attempts to reflect the engineering and installation costs outside of the BSTLM, through the use of "factors," is inappropriate. This Commission previously reached the same conclusion in the USF proceeding by stating:

> We find that BellSouth's use of linear loading factors, while easy for BellSouth to apply, can generate results that seem to beg questions. For example, for 26 gauge buried copper cable, actual material costs as a percent of total cost stays constant at about 23 percent no matter whether the cable is 12 pair or 4200 pair. This means that the total cost of this cable is always about 4.3 times the actual material cost; thus, no economies of scale for exempt material, engineering, or BellSouth labor, ever occur. It seems very unlikely that there are no economies generated as cable sizes grow larger. Sprint apparently agrees, since for the same cable the total cost ranges from 11 times the material cost for 12 pair cable to approximately 1.6 times the cost for 4200 pair cable. (Order No. 980696-TP, pg. 157)

The Commission later reaches the conclusion that:

> While we agree ... that engineering costs may vary somewhat by pair size, we do not accept BellSouth's linear assumption for engineering costs. While BellSouth appears to have the lowest materials costs of all the LECs, they have significantly higher total costs in some cases more than three times as much as the next closest LEC. This is likely due in part to the engineering costs and the application of an inflation factor. (Order No. 980696-TP, pg. 187)

Q. HAVE YOU FIXED THESE PROBLEMS WITH THE BSTLM FACTORS?

A. For the most part, we have. The way in which BellSouth filed the BSTLM in this proceeding allows the user to modify the unit cost inputs. With one exception, we were able to successfully use the Commission's previously adopted unit cost inputs, which reflect installed material costs, and, as a result, were able to eliminate the corresponding in-plant factors. This methodology also corrects the model's optimization routines, which will now evaluate the total installed investment, rather than being driven solely by the material portion of investment.

Q. WHAT IS THE EXCPETION YOU REFER TO IN YOUR PRIOR ANSWER?

A. The DLC inputs in the BSTLM are extremely complex and do not lend themselves easily to employing the DLC inputs previously adopted by this Commission. Therefore, we could not appropriately modify the DLC unit-cost inputs in the BSTLM. Because these unit-cost inputs for DLC equipment reflect only material costs, we were forced to use an in-plant factor to develop the engineering and installation cost for DLC equipment.

Q. WHAT FACTORS DID YOU USE FOR ENGINEERING AND INSTALLATION COSTS OF DLC EQUIPMENT?

A. The in-plant factors for DLC hardwire and plug-in equipment used by BellSouth in the BSTLM are too high. Whereas we estimate that it would require 66½ hours to engineer and install what is essentially a completely pre-fabricated DLC unit, BellSouth's labor factor generates an absurd equivalent of ***Begin Proprietary*** xxxxxx ***End Proprietary*** hours of labor to handle the same pre-fabricated unit. We modified BellSouth's factors to reflect an appropriate amount of engineering and installation costs. Specifically, the engineering and installation cost should reflect the installation of equipment that has been

> ...completely assembled and tested at the factory. Once the equipment is on site and bolted to its mounting pad, the only assembly required consists of connecting local power, connecting drop facilities, connecting optical fiber facilities, installing the back-up batteries, and plugging the circuit packs into their assigned locations in the racks.

[Alcatel Litespan 2000 DLC practice]

We believe the appropriate number of hours required to install pre-assembled DLC equipment are reflected in the HAI Model. Therefore, we have calculated the ratio of installed investment in the HAI Model to material investment in the HAI Model to arrive at an appropriate installation and engineering factor for DLC equipment. Exhibit JCD/BFP-8 details how these factors were derived.

Q. DID YOU MAKE ANY OTHER ADJUSTMENTS TO THE DLC INPUTS IN THE BSTLM?

A. Yes. The BSTLM includes DLC inputs for two different vendors, identified as Vendor 'A' and Vendor 'B'. We calculated the total investment required for different size facilities based on using only Vendor ‘A’ equipment and using only Vendor ‘B’ equipment. The chart in Exhibit JCD/BFP-9 illustrates the results of this analysis.

As the chart in this Exhibit illustrates, Vendor 'A' equipment is much more expensive than Vendor 'B' for larger DLCs (above 672 lines) and less expensive for smaller DLCs. This leads to the conclusion that in the real world, BellSouth most likely uses Vendor 'A' for smaller DLC equipment and Vendor 'B' for larger DLC equipment, thus explaining why BellSouth's model employs a mix of Vendor 'A' and Vendor 'B' equipment. More importantly, in the real world, a telecommunications provider would place the more efficient technology, i.e., use Vendor ‘A’ for smaller DLC equipment and use Vendor ‘B” for larger DLC equipment. However, the BSTLM does not employ Vendor 'A' equipment for smaller DLCs and Vendor 'B' equipment for larger DLCs. Instead, it applies an assumed mix of Vendor ‘A’ and Vendor ‘B’ equipment to <u>both</u> smaller and larger DLCs. As a result, the BSTLM always overstates the required DLC investment.

Based on this analysis, we performed sensitivity analyses by first setting the BSTLM to use 100 percent Vendor 'A' equipment and then using 100 percent Vendor 'B' equipment. The results of these sensitivity analyses show that the Vendor 'B' equipment produces lower investment than the Vendor 'A' equipment.

Thus, we have employed, in our restatement of the BSTLM, an assumption that 100% Vendor ‘B’ DLC should be employed in the model because this is the only alternative available to us. However, this Commission should require BellSouth to fix this error in the BSTLM so that the model assumes the more efficient DLC equipment for each size cabinet.

Q. ARE THERE OTHER INPUT ISSUES THAT THIS COMMISSION NEEDS TO BE AWARE OF?

A. Yes. BellSouth employs factors to calculate structure costs instead of relying on material and labor inputs. While we understand that the BSTLM has the capability to use these more disaggregrate structure inputs, BellSouth has effectively prevented the user from employing these options by locking this portion of the model. In addition, BellSouth has not provided the parties any information or guidance on how to enable this functionality or how the inputs are employed in the model's algorithms. Therefore, we have not been able to utilize this more appropriate methodology and have had to rely on BellSouth's factor approach to estimating structure investment.

BellSouth's unit cost inputs need to be modified

Q. WHY DO BELLSOUTH'S UNIT COST INPUTS NEED TO BE MODIFIED?

A. Based on the discussions above, BellSouth's unit cost inputs need to be modified for two reasons, i.e., (1) to eliminate the double-count of inflation caused by updating the unit cost inputs from what this Commission has already adopted, and (2) to remove BellSouth's factor approach for incorporating engineering and installation costs.

Q. HOW HAVE YOU ADJUSTED BELLSOUTH'S UNIT COST INPUTS TO ACCOMPLISH THESE MODIFICATIONS?

A. We have used the installed material costs from this Commission's order in Docket No. 980696-TP where appropriate unit prices are available. We have included, as Exhibit JCD/BFP-10 (proprietary) to this testimony, a table comparing BellSouth's proposed unit prices for *material only* with the unit prices for *installed* material we have used in our restatement of BellSouth's filing.

Q. WERE YOU ABLE TO DIRECTLY APPLY THE INPUTS FROM THE USF PROCEEDING IN THE BSTLM?

A. In most cases, yes. However, in some cases, the BSTLM inputs are not identical in structure to those used in the BCPM. For example, the BSTLM includes an input for 1500-pair 24-gauge aerial copper cable while the BCPM includes values only for 1200-pair and 1800-pair 24-gauge aerial copper cable. In these situations, we calculated reasonable values based on the Commission's values for the smaller and larger cable sizes (*e.g.*, we averaged the cost per pair of the 1200-pair cable and the cost per pair of the 1800-pair cable and multiplied that resulting cost per pair by the 1500 pairs). Exhibit JCD/BFP-10 (proprietary) also explains the rationale for our modified inputs.

BellSouth's loop length inputs do not reflect efficient network construction

Q. WHAT INPUTS DOES THE BSTLM USE TO DETERMINE THE OUTSIDE PLANT DESIGN OF THE LOOP?

A. The BSTLM attempts to optimize the network by adjusting many parameters, of which we are particularly concerned about five. Specifically, the BSTLM uses the following parameters for both carrier serving area ("CSA") design and allocation area ("AA") design

1. soft copper length limits;
2. hard copper length limits;
3. line limits between the soft and hard limit;
4. 24-to-26 gauge crossover lengths; and,
5. extended range line card limits.

These inputs all have a critical role in determining the network architecture of the local loop that is modeled by the BSTLM.

Q. WHAT ARE THE APPROPRIATE INPUTS FOR THESE ENGINEERING CRITERIA?

A. There are two sets of inputs that could be used in determining the network architecture. The most appropriate architecture should be the solution that results in the lower-cost network design. This is consistent with this Commission's previous determination that

> The choice of maximum allowable copper loop length (12 v. 18 Kft) is likely a cost minimization issue, not an either/or decision. Even assuming that 12 Kft is the rule of thumb, deviations from this standard would be based primarily on what yields the least cost arrangement overall, considering all relevant cost components. Accordingly, we

> will not place a limit on the maximum allowable copper loop length. (Order No. 980696-TP, pg. 49)

Q. WHAT IS THE FIRST POSSIBLE NETWORK ARCHITECTURE?

A. The first option would require limiting the maximum copper loop length to 17,600 feet. In this scenario, the copper distribution plant would use 24-gauge copper cable for loop lengths over 13,000 feet and would never require extended range line cards. The 17,600 foot maximum length comports with Alcatel Litespan 2000 DLC practices.

Q. WHAT IS THE SECOND POSSIBLE NETWORK ARCHITECTURE?

A. The second option would require reducing the maximum copper loop length from 17,600 feet to 16,800 feet. In this scenario, the DLC equipment would use extended range line cards for loop lengths over 13,000 feet and would never require 24-gauge copper cable. Extended range line cards can be powered to overcome the thinner 26-gauge wire for long lengths normally requiring 24-gauge copper.

Q. WHAT OTHER INPUTS DID YOU NEED TO MODIFY IN ORDER TO IMPLEMENT EITHER OF THESE TWO POSSIBLE NETWORK ARCHITECTURES?

A. In addition to adjusting the maximum copper loop length (hard limit), the 24-to-26 gauge crossover, and the extended range line card crossover, we adjusted the soft loop length limit to equal the hard loop length limit and adjusted the number of lines between the soft loop length and the hard loop length to equal the maximum number of lines in an AA or CSA.

There is no engineering rationale for having a soft loop length limit in the model.

Q. CAN YOU PLEASE SUMMARIZE THE MODIFICATIONS YOU HAVE MADE TO THE BSTLM FOR EACH OF THE TWO POSSIBLE NETWORK CONFIGURATIONS DESCRIBED ABOVE?

A. Yes. The table in Exhibit JCD/BFP-11 summarizes BellSouth's inputs and our proposed modifications to these inputs. Thus, the two options for possible engineering criteria are: 1) switching from 26-gauge to 24-gauge cable at 13,000 feet with an absolute restriction of 17,600 feet over 24-gauge copper without the use of extended range line cards; and 2) switching to extended range line cards when the copper loop exceeds 13,000 feet with an absolute restriction of 16,800 feet without the use of 24-gauge copper. Both of these options apply both to AA and CSA design because they are not influenced by the maximum size of a RT cabinet.

As stated above, both configurations are consistent with current outside plant guidelines. Based on sensitivity runs we have conducted, the second option (*i.e.*, using extended range line cards above 13,000 feet with a maximum loop length of 16,800 feet on 26-gauge copper cable, with no 24-gauge copper cable) is the more economical choice. Therefore, we have used these inputs in our restatement of the BSTLM.

__BellSouth's allocation of investment is incorrect__

Q. WHY DOES THE BSTLM NEED TO ALLOCATE INVESTMENTS?

A. As stated above, the BSTLM is an extremely complex model, in part because it assigns particular services to particular customer locations. Specifically, the BSTLM classifies all customers into one of 44 different services. Each of these services requires some unique equipment (such as a particular type of DLC line card), and each also uses some shared equipment (such as the DLC common equipment and fiber feeder cable). Because it is service oriented, rather than element oriented, the BSTLM must allocate the shared equipment investment to the individual services that use this equipment.

Q. WHAT IS THE PROPER WAY TO ALLOCATE SHARED INVESTMENTS?

A. The very reason that allocations are necessary is because some investments are not directly associated with a specific underlying element in the network. Therefore, any such allocation is arbitrary. The important criteria in allocations is that they should be competitively neutral and fair.

Q. HOW DOES BELLSOUTH ALLOCATE THESE SHARED INVESTMENTS?

A. BellSouth allocates this equipment investment based on the DS0 equivalency of each service. Therefore, a HDSL loop will be allocated 24 times the shared equipment investment allocated by the BSTLM to a normal POTS loop. Such an allocation arbitrarily shifts investment away from the POTS loop to the higher-bandwidth services, making advanced services excessively expensive for a CLEC to purchase as a UNE. This approach is particularly arbitrary because the DS0 capacity of a service has little relevance to the costs of DLC shared equipment or fiber feeder associated with a particular service.

Q. WHY IS THE DS0 CAPACITY AN INAPPROPRIATE ALLOCATION OF SHARED FACILITIES?

A. Simply put, we do not see any advantage to allocating investments based on DS0 equivalents, but we do see competitive ramifications. A dedicated DS1 service could be multiplexed down to 24 dedicated DS0s. However, this has nothing to do with the way DLC systems operate using concentration ratios (BellSouth agrees with the use of DLC concentration in this docket). A DLC channel bank slot can accept either a 4-line POTS card or a DS1 card. Capacity for the common cost components in a DLC RT cabinet really depend on the number of card slots in a channel bank, and the number of channel banks that can fit in a maximum size RT cabinet.

For example, a DLC RT cabinet operating at a concentration ratio of 4:1 would have to give up 4 POTS lines of capacity for each DS1 service card. Common equipment bandwidth is seldom an issue, since at a 4:1 concentration ratio, only 21 DS1s worth of bandwidth would be used to serve a maximum of 2016 POTS lines, thereby leaving 63 DS1s unused in a typical OC3 system capable of 84 DS1s. Thus, most of the DLC investment is not driven by the DS0 requirements of the system, but by a fixed cost of the hardware that is unrelated to the bandwidth capacity, or is based on the number of channel banks in the system.

Also consider the cabinet size, which is the largest single fixed cost of DLC equipment. The cabinet size is not determined by the number of DS0s going into the system, but by the number of channel banks required. Again, there is no justification to allocate the DLC investments associated with the cabinet size based on the number of DS0 equivalencies of the DLC system.

Finally, the fiber feeder capacity is virtually limitless. The cost of the fiber feeder is not driven by any one particular item and is a fixed cost of service. Therefore, any allocation of this fiber feeder is completely arbitrary.

Q. WHAT ARE THE COMPETITIVE RAMIFICATIONS OF BELLSOUTH'S ALLOCATION METHOD?

A. We believe that BellSouth's allocation shifts costs from POTS to higher-bandwidth services. This, in turn, significantly increases the costs that competitors must pay to compete for these more advanced services. The way BellSouth has allocated shared investments requires that a competitor pay 24 times the fiber investment for an HDSL loop than for a POTS loop. Allocating investments in this fashion will essentially foreclose competition for these advances services.

As we stated before, the very nature of shared investments requires an arbitrary allocation. However, it is essential that these allocations be competitively neutral and fair.

Q. HOW SHOULD THE SHARED EQUIPMENT BE ALLOCATED TO THE UNDERLYING SERVICES?

A. There is no one correct answer. Further, this question raises other complexities in costing UNEs. For example, both POTS and ADSL services use a single copper pair to provide services. However, these two services have different purposes and different DS0 equivalencies. This does not lead to a conclusion that the HDSL service should be allocated more structure costs than the POTS service. Complex allocations of shared costs only causes administrative burdens and complicates the costing methodology. A methodology of allocating costs based on the equivalent number of copper pairs required to carry the service is intuitively more logical and offers an administratively feasible solution.

Therefore, we believe that BellSouth's allocation technique should use the equivalent number of copper pairs used to provide the service rather than the DS0 equivalency of a service. Using that method, a two-pair copper loop, such as HDSL, would be allocated twice the shared investment of a single copper pair -- regardless of the services being carried over the copper pair. Another way to view this issue is that a "loop is a loop." There is no reason that this treatment should be different for DLC shared equipment and shared fiber facilities than it is for shared structure in the copper portion of the loop. The end result of this "loop is a loop" approach is that the cost of voice grade services will increase slightly while the cost for advanced services will be reduced (compared with BellSouth's proposed rates).

Q. DOES YOUR APPROACH POTENTIALLY UNDERSTATE INVESTMENT?

A. Yes. As we understand the DLC calculations, the DS0 equivalents are not only used to allocate investments but are also used to size the DLC equipment. Therefore, by appropriately adjusting down the DS0 equivalents for the allocation we most likely have also adjusted down the capacity requirements of the DLC optical equipment. Unfortunately, BellSouth did not provide the information necessary for us to correct this problem within the BSTLM algorithms. Therefore, we were forced to make this adjustment by modifying the user-adjustable inputs, which was the only option available to us to correct this allocation problem.

Q. CAN YOU PLEASE SUMMARIZE YOUR RECOMMENDATION?

A. Yes. We recommend that this Commission adopt the "loop is a loop" approach based on the equivalent number of copper pairs required for each service. This approach is conceptually more appealing because it allows the same allocation techniques to be used in all portions of the network. Further, and most importantly, this approach is competitively neutral and is based on the concept of elements rather than services. Therefore, we have used this methodology in restating BellSouth's filing.

The BSTLM does not create the most efficient network routing within a CSA

Q. HOW DOES THE BSTLM POTENTIALLY OVERSTATE THE NETWORK FACILITIES PLACED?

A. The BSTLM methodology originates the minimum spanning road tree "MSRT" from the "root node," which is the road intersection closest to the central office. The MSRT then branches out in multiple directions to create the MSRT for the wire center. The map in Exhibit JCD/BFP-12 (from Mr. Stegeman's May 15, 2000 presentation) illustrates the MSRT from the central office. This map illustrates that the MSRT branches out in three directions from the root node (identified by the square in the center of the map) closest to the central office.

However, the BSTLM fails to employ this same methodology when branching out from DLC locations. Instead, it relies on the same MSRT used in developing the feeder network. In other words, the BSTLM does not reconstruct the MSRT based on DLC locations and may therefore artificially restrict the number of customers that can be served by a single DLC. This may occur because the MSRT will not split a route the same way that the MSRT will split at the central office. The maps in Exhibit JCD/BFP-13 illustrate this point. These two maps (edited from Mr. Stegeman's May 15, 2000 presentation) show the current design of a CSA based on the original MSRT produced by the BSTLM, and also show an alternative routing solution. The map on the left illustrates the circuitous routing (highlighted in a wide, dark line) that the BSTLM generates based on the original MSRT from the central office location. The map on the right illustrates that allowing the MSRT to split after the DLC may allow more direct routing to many of the terminal locations. By not allowing this more direct routing methodology, the BSTLM artificially increases the loop lengths to many of these customers.

This circuitous routing has two practical implications. First, customers served by a given DLC may exceed a copper length threshold thereby triggering either 24-gauge copper or extended range line cards. Because of the cost impacts of these two triggers, the more efficient solution may be to use the more direct routing shown in the map on the right. Second, by precluding the more direct routing design, the BSTLM may fail to include as many customers on a DLC as may otherwise be possible -- thereby creating too many serving areas, too much feeder plant and too many expensive DLC equipment installations, each with its own common equipment costs. It is possible that (in the particular example chosen by the BSTLM developers) the more direct routing may not have created a more efficient network design; however, it is likely that the current methodology does overstate costs in many serving areas. Because BellSouth has not provided us the information necessary to produce network maps, we have been unable to evaluate a sample of maps that would indicate the extent of this overstatement.

Q. HAVE YOU BEEN ABLE TO CORRECT THE BSTLM TO ELIMINATE THIS CIRCUITOUS ROUTING?

A. No. To date, the BSTLM developers have refused to provide the parties with the underlying source code that would allow us to alter the algorithms and to determine the extent of the inefficiencies created by circuitous routing. Thus, the amount of plant the BSTLM creates is likely overstated, but we have been unable to quantify the extent of the overstatement.

<u>The BSTLM places too much drop cable</u>

Q. ARE THE DROP LENGTHS IN THE BSTLM APPROPRIATE?

A. No. The BSTLM drop calculations are based on assuming rectilinear routing from the drop/distribution terminal to the customer's NID. However, drop terminals typically run from the corner of the lot to the NID located on the customer's house. By assuming the drop terminal will extend to the center of the front of the lot and then run perpendicular to the front of the customer's house, the BSTLM consistently overstates this distance. The diagram in Exhibit JCD/BFP-14 illustrates the difference in these distances.

As the above diagrams show, significantly less cable is required when typical, real-world routing is used from the corner of the customer's lot to the NID. The BSTLM should be modified to reduce drop investment by 21.7 percent.

Q. HAVE YOU BEEN ABLE TO CORRECT THIS OVERSTATEMENT IN THE BSTLM?

A. Again, we have been unable to modify the BSTLM algorithms because BellSouth has refused to provide the source code in a format that would allow us to correct this problem. This Commission should require BellSouth to fix this obvious overstatement in the BSTLM.

The BSCC distorts land and building investment

Q. HOW DOES THE BSCC DEVELOP LAND AND BUILDING INVESTMENT?

A. The BSCC develops land and building investment by applying a factor to other investments in the BSCC, specifically DLC investment. This process assumes that required land and building investment is directly proportional to these underlying investments. However, this is not an appropriate way to develop investment because it assumes that two different types of plug-in cards, which are each exactly the same size, would require different amounts of land and building investment. Consider the following example:

*****Begin Proprietary*****

- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxx
- xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxx

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxx ***End Proprietary*** This makes no sense, because both cards are identical in size and therefore require identical land and building investment.

Q. HOW WOULD YOU PROPOSE TO FIX THIS PROBLEM?

A. The current problem is created by the way BSCC calculates land and building investment. Unfortunately, BellSouth has not provided us with a way to correct this error in the BSCC. This Commission should require BellSouth to use a more appropriate methodology for allocating land and building investment. Two possible options would be to calculate land and building investment based on equipment size or to apply a fixed land and building investment per line.

IV. RESULTS AND CONCLUSION

Q. WHAT ARE THE RESULTS OF YOUR ANALYSES?

A. The testimony of Jeffrey A. King discusses the pricing proposals based on our restatements of the BSTLM and the associated components of the BSCC. The table in Exhibit JCD/BFP-15 provides the results of our restatement for a few selected loop-related elements.

Q. WHY DO YOUR RESTATEMENTS SHOW SUCH SIGNIFICANT REDUCTIONS TO BELLSOUTH'S PROPOSED PRICES?

A. Simply put, the BSTLM, with the adjustments we identify above, estimates reasonable investment based on the underlying network. A more appropriate question is "Why does BellSouth's filing of the BSTLM, which produces far less plant than the BCPM, yield costs similar to those from the BCPM." The answer is that BellSouth's filing of the BSTLM and the associated BSCC relies on a series of factors that artificially inflate investments.

As Exhibit JCD/BFP-3 in our testimony illustrates, the BSTLM produces 27% fewer route miles than the BCPM and requires less than half the number of DLCs as the BCPM. Therefore, one would expect that the BSTLM should produce significantly less investment, and costs, than the BCPM. Eliminating these factors and relying on the inputs that this Commission previously adopted in the USF proceeding produces much more reasonable results.

Q. WILL YOU PLEASE SUMMARIZE YOUR TESTIMONY?

A. Our testimony addresses several flaws in the BSTLM and the BSCC that need to be corrected. Specifically, we urge this Commission to:

- Use BellSouth's "Combo" scenario to reflect use of integrated digital loop carrier systems;
- Use the cost of capital recommended by Mr. Hirshleifer;
- Use the depreciation lives recommended by Mr. Majoros;
- Use the plant-specific factors recommended by Mr. Darnell;
- Use the expense development factors recommended by Mr. Darnell;
- Reject BellSouth's attempts to double-count the effects of inflation;
- Reject BellSouth's installation and engineering factors and rely on the Commission's prior unit-cost determinations;

- Reject BellSouth's installation and engineering factors for DLC equipment and rely on the more appropriate factors we have developed;
- Require BellSouth to modify the DLC algorithms to select the more efficient DLC vendor (Vendor 'A' or Vendor 'B') for each individual DLC unit;
- Adjust the loop length criteria to reflect the most efficient network design consistent with the Commission's decision in the USF proceeding;
- Reject BellSouth's misallocation of DLC common equipment investment and fiber facility investment based on DS0 capacity and treat a loop as a loop;
- Require BellSouth to evaluate and correct the routing algorithms to eliminate the circuitous routing that may result from the MSRT approach;
- Require BellSouth to correct the drop calculations and eliminate the perpendicular drop assumption embedded in the BSTLM;
- Require BellSouth to correct the land and building investment calculations.

Until all of the flaws we have identified above have been corrected in the BSTLM and the BSCC (including those within the model's algorithms that we have been unable to modify to date), the costs we develop in our restatement of BellSouth's models should be considered conservative and used as an upper limit for reasonable rates.

We believe that, once these flaws are corrected, the BSTLM can be used to calculate the costs of unbundled network elements for BellSouth-Florida.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

JOHN C. DONOVAN
11 Osborne Road
Garden City, NY 11530
516-739-3565 (Office) 516-739-0022 (Fax)
Internet Address:donovan@telecomexpertwitness.com
Website: http://www.telecomexpertwitness.com

Executive Summary

Expert witness in telecommunications for AT&T, MCI WorldCom, Covad Communications, Rhythms Links, the NYNEX Corporation (now Bell Atlantic), and other clients involving fiber optic damage claims, equipment damage claims, patent infringement law suits, a class action law suit, and cost estimation. Experience in setting major corporate strategy, imaginative and innovative problem solving, in-depth analysis, large scale project management involving engineering, physical construction and Information Services systems development. Expert in fiber optics and electronics. Extensive leadership and technical telecommunications background, especially in outside plant design, construction, maintenance, project implementation, cost estimating, network modeling theory, procurement, and logistics. Experienced lecturer and producer of material for presentations to customers and senior management, and in writing strategic position papers.

Professional Experience

Telecom Visions, Inc. **1996 - Present**
Garden City, New York
President

- *Nationally known expert witness before the FCC and state public utility commissions. Appeared before the FCC and 17 state jurisdictions[1] on behalf of AT&T, MCI WorldCom, Covad Communications, or Rhythms Links as a technical witness for implementation of the Telecommunications Act of 1996. Providing outside plant local loop expert advice and modeling theory for the HAI Model, a key economic model referenced by the FCC and various state jurisdictions to determine compliance with the Telecommunications Act of 1996, to set Unbundled Network Element Prices, and to determine the level of the multi-billion dollar Universal Service Fund.*
- *Expert witness for several U S Patent Infringement law suits, several fiber optic cable damage and telecommunications equipment damage cases, a service related class action law suit against a major regional telephone company, and others.*
- *Currently providing telecommunications consulting services involving various organizations and individuals, including telecommunications and data services management in the northeast for a major financial management firm, strategic advice on the effect of local loop competition to an equipment manufacturer, and valuation studies for due diligence, claims settlements, and other purposes .*
- *Provided Marketing Strategy for a large fiber optic multiplexer manufacturer introducing a new line of SONET based products, and worked with a major management consulting firm to provide advice to the government of Portugal.*
- *Manufacturer's representative for automated electronic cross connection devices.*

---

[1] *Alabama, Arizona, Colorado, Georgia, Hawaii, Kansas, Louisiana, Maine, Maryland, Massachusetts, Missouri, Nevada, New Jersey, New York, Oklahoma, Pennsylvania, Texas, and Washington; advised witnesses and/or prepared testimony for California, Connecticut, Florida, Iowa, Illinois, Kentucky, Minnesota, Mississippi, Montana, North Carolina, North Dakota, New Hampshire, New Mexico, Oregon, Rhode Island, South Carolina, Tennessee, Utah, Vermont, and Wisconsin.*

NYNEX **1994 - 1996**
New York City, New York
General Manager, Plug-In Management.

- *Led a group of 350 people in managing all NYNEX logistics functions for NYNEX's $10 billion investment in electronic printed circuit boards for switching systems and digital carrier systems.*
- *Responsibilities included purchasing, billing verification, warehousing, and repairing all NYNEX printed circuit boards.*
- *Scope of operation included average capital purchases of $1 million in new plug-ins per work day, and managing an expense budget of $30 million per year.*
- *Personally responsible for setting NYNEX's strategic direction in this area through major process re-engineering design. This effort included examining business plans, evaluating goals and objectives, and measuring effectiveness of achieving business plan goals. Efforts determined that major realignment was necessary.*
- *Results included consolidating 3 warehouses into one, 50% expense savings, improving repair intervals from 45 days to 5 days, and developing a multi-million dollar, "state-of-the-art" plug-in tracking system. The plug-in tracking system was a major Information Services development effort requiring large scale project management, definition of requirements, detailed design, and supervision of coding by contract programming companies.*

NYNEX **1991 to 1994**
New York City, New York
Managing Director, Engineering & Construction Methods & Systems.

- *Led a group of 115 managers and 45 contractors in maintaining existing computerized design and support systems for Central Office Engineers, Outside Plant Engineers, and Construction Managers that design and construct NYNEX's $2.4 billion annual capital construction program.*
- *Personally devised new, innovative methods for converting paper outside plant records to digital mapping formats, which reduced conversion costs from $150 million to $30 million. This innovative breakthrough has been the cornerstone of records conversion methods by successful companies such a Lucent and IGS (Information Graphics Systems Inc.).*
- *Devised a new Construction Work Management System[2] that mechanized the scheduling and reporting of work (profitability of 41% Rate of Return with a 2 year payback). Project managed a large scale IS development effort involving IS personnel recruited into the organization plus 35 contract IS development personnel from the Oracle Corporation. This multimillion dollar project was successfully completed, and upon completion comprised the second largest distributed platform developed in North America involving mini-computers and PCs.*
- *Supervised the development of all new Methods & Procedures for emerging technologies such as Fiber To The Curb, and for Open Network Architectures such as Signaling System 7 and Co-Location of Competitive Access Providers in telco switching centers.*

---

[2] *ECRIS – Engineering Construction Records information System.*

NYNEX **1989 - 1991**
Albany, New York
Director of Operations, Engineering & Construction, Northeastern Region, New York

- *Directed the overall operations of 600 employees and contract personnel to plan, engineer and construct pole line, conduit, fiber cable, copper cable, fiber optic multiplexers, and pair gain equipment to provide service throughout the Northeast region of New York State ($75 million annual budget supporting 86 central office switching center areas).*
- *Developed the NYNEX strategy of using a "business case" method for substantiating outside plant infrastructure improvements now used throughout the company.*
- *Helped create the "All Fiber Feeder" strategy implemented by NYNEX.*
- *Devised and implemented rapid fiber optic deployment to 225 sites in 16 months.*
- *Served as the Outside Plant Expert Witness for the 1990 Rate Case, providing the successful rebuttal case for the largest New York Public Service Commission Staff recommended disallowance of $110 million.*
- *Headed the Core Support Team handling the Public Service Commission Operational Audit of Outside Plant throughout New York Telephone.*

NYNEX **1989**
Albany, New York
Director, Customer Services Staff, Upstate New York

- *Directed the Upstate Vice President-Customer Services Staff in support of all 3 Upstate New York regions. Disciplines included Personnel & Training, Capital & Expense Budgets, Installation & Repair Operations, Business Offices, Outside Plant Construction & Engineering, and Facilities Assignment Centers.*

NYNEX **1987 - 1989**
New York City, New York
Director of Operations, Engineering & Facilities Assignment Centers, Midtown Manhattan

- *Directed a force of 150 personnel in engineering and assigning the rapid expansion of all local loop facilities in Midtown Manhattan (Approximately $40 Million Annual Budget).*
- *Worked to create NYNEX's strategy for the aggressive deployment of high technology to customer locations to meet competitor initiatives (primarily Teleport).*
- *In an area responsible for 25% of New York Telephone's revenues, rapid deployment of fiber optics to 450 buildings was achieved in less than 2-1/2 years.*
- *Worked with Lucent Technologies to invent the AUA-45 Private Line card used in their SLC-Series 5 Digital Loop Carrier system, saving New York Telephone $10 million.*
- *Made active sales calls to major customers to design private line networks and disaster recovery systems, resulting in $8 - $10 million in new sales revenue.*
- *Number 1 rated district manager in New York City.*

NYNEX Service Company (Corporate Staff) **1986 - 1987**
New York City, New York
Staff Director, Engineering & Construction Methods

- *Formed the first combined New York/New England corporate staff group supporting engineering and construction after divestiture.*
- *Developed strategies and directed the development of Central Office Engineering, Outside Plant Engineering, and Construction for New York and New England Telephone Companies.*
- *Efforts included start-up activities for the new organization, implementation of new Central Office Engineering design systems, trials on Digitized/Mechanized Outside Plant Records in Burlington*

Vermont, initiating a mechanized planning system for New England Telephone, and expanding the introduction of high technology into the local loop.

New York Telephone Company **1982 - 1985**
New York City, New York
Staff Manager, Corporate Staff, Outside Plant Engineering Methods

- *Corporate lightguide expert for Outside Plant.*
- *Authored the Manhattan Overlay Strategy for fiber optic deployment to over 650 commercial buildings.*
- *Conceived, supervised and implemented innovative rapid deployment plan for 13,500 fiber mile interoffice trunk project, completed in 5 months.*
- *Corporate Divestiture expert for Outside Plant.*
- *Wrote the post-divestiture Outside Plant Marketing Business Plan.*
- *Assigned all Outside Plant assets, and negotiated all Outside Plant contracts with AT&T Communications.*
- *Corporate evaluator for employee innovative suggestions.*
- *Corporate evaluator for major projects.*

New York Telephone Company **1980 - 1982**
Garden City, New York
Staff Manager, Long Island Area Staff.

- *Directed a staff group of 17 personnel to track, analyze, evaluate, and make recommendations to upper management concerning operational results for an 800 person Engineering, Construction and Facilities Assignment Center organization.*

New York Telephone Company **1974 - 1980**
Garden City, New York
Engineering Manager, Nassau County

- *Directed an operations center of 55 personnel responsible for cable TV coordination, conduit design, pole engineering, highway improvement coordination, securing Rights of Way, claims adjustments, drafting blue prints, and posting outside plant records.*
- *Supervised a Long Range & Current Planning group of 35 engineering personnel responsible for planning, design, project evaluation, and implementation of major feeder and trunk cable.*
- *Prepared and administered a $20 million per year construction program.*
- *Worked as a Long Range and Current Planner, Feeder Cable Design Engineer, Estimate Case Evaluator and Preparer, and Capital Program Administrator.*
- *Developed new budgeting methods, including writing 30-40 computer programs.*
- *Developed the Cost Estimating Program used by NYNEX and incorporated in the former Bell System JMOS Cost Estimating Model.*

New York Telephone Company **1972 - 1974**
Long Island, New York
Field Manager, Cable Maintenance and Construction, Nassau & Suffolk Counties

- *"Hands-on" craft through second level management experience in constructing and repairing outside plant cable, including analysis, locating, repair, dispatch, and cable trouble trend tracking.*
- *Developed several computer programming systems to track and analyze cable troubles.*

United States Army Signal Corps 1966 – 1970
Germany; Viet Nam; Fayetteville, North Carolina
Captain

- *Airborne, Ranger, Decorated Viet Nam Veteran (Bronze Star Medal + others), Top Secret Clearance.*
- *Germany: Platoon Leader, Company Executive Officer, Battalion Operations Officer, Battalion Executive Officer*
- *Vietnam: Chief of the Communications Branch - Saigon Support Command*
- *Ft. Bragg, North Carolina: Battalion Communications Officer-82nd Airborne Division*

Education

Penn State Graduate School of Business 1988
University Park, Pennsylvania
Executive Development Program

Purdue University Graduate School of Business 1970 - 1971
West Lafayette, Indiana
MBA, Marketing & Finance

United States Military Academy 1962 - 1966
West Point, New York
BS Electrical & Mechanical Engineering

Organizations

New York City Technical College 1987 - 1993
Brooklyn, New York
Adjunct Professor of Telecommunications, Chairman of the Transmission Laboratory, Member of the Telecommunications Executive Committee, Member of the Board

Shenendehowa School Board 1991
Clifton Park, New York
Served on the Technology Planning Committee for the local school board

AM/FM International 1993 - 1994
Boulder, Colorado
Member of Executive Management Board, representing the telecommunications industry for the world's largest organization of digitized mapping and facilities management professionals.

Member of Various Other Organizations:
MENSA High IQ Society, IEEE, Amateur Radio Emergency Services group.

Recent Published Articles

"The Multi-Billion Dollar Outside-Plant Estimate Case", OSP Engineering & Construction Magazine, February 1999 issue, pp. 14-15. See this published article at: http://www.broadband-guide.com/cbl4man/standards/stand0299.html

Recent Testimony

- Before the Kansas Corporation Commission;

Docket No. 00-DCIT-997-ARB: Re: In the Matter of the Petition of Covad Communications Company for Arbitration of Interconnection Rates, Terms, Conditions and Related Arrangements for Line-Sharing with Southwestern Bell Telephone Company; On behalf of Covad Communications Company;

Prefiled Direct Testimony: June 12, 2000	Testimony & Cross Examination: June 15, 2000

- Before the Public Utilities Commission of the State of Hawaii;

Docket No. 7702: In the Matter of the Public Utilities Commission Instituting a Proceedign on Communications, Including an Investigation of the Communications Infrastructure of the State of Hawaii; On behalf of AT&T Communications of Hawaii Inc.;

Prefiled Direct Testimony: June 2, 2000	Testimony & Cross Examination: Pending

- Before the State Office of Administrative Hearings for the Public Utility Commission of Texas, Austin, Texas;

Docket No. 22469: Complaint of Covad Communications Company and Rhythms Links, Inc. Against Southwestern Bell Telephone Company and GTE Southwest Inc. for Post-Interconnection Agreement Dispute Resolution and Arbitration under the Telecommunications Act of 1996 Regarding Rates, Terms, Conditions and Related Arrangements for Line-Sharing; On behalf of Covad Communications Company and Rhythms Links, Inc.;

Prefiled Direct Testimony: May 17, 2000	Testimony & Cross Examination: May 23, 2000

- United States District Court for the District of Minnesota;

Case No. 98-CV-2055 DWF: Re: U.S. Patent No. Re. 34,955; ADC Telecommunications, Inc. Plaintiff, vs. Thomas & Betts Corporation and Augat Communications Products, Inc. Defendants; On behalf of Defendants Thomas & Betts Corporation and Augat Communications Products, Inc.;

Expert Report: March 26, 2000	Case still pending

- United States District Court for the Eastern District of New York;

Case No. 98 Civ. 5020 (DHR)(ETB)[1]: Re: U.S. Patent No. 4,600,814; Davox Corporation, Plaintiff vs. Manufacturing Administration & Management Systems, Inc., Defendants; On behalf of Davox Corporation, which is being accused of infringing U.S. Patent No. 4,600,814 by Manufacturing Administration & Management Systems, Inc.;

Expert Report: March 8, 2000	Deposition: May 30, 2000

[1] Includes also 98 Civ. 6532 (DRH)(ETB) Manufacturing Administration & Management Systems, Inc., Plaintiff vs. ICT Group, Inc., Precision Response Corporation, RMH Teleservices, Inc. & Telespectrum Worldwide, Inc., Defendants; and also includes 98 Civ. 4687 (DHR)(ETB) EIS International, Inc., Plaintiff, vs. Manufacturing Administration & Management Systems, Inc., and William B. Cunniff, Defendants.

- Insurance Claim, State of Texas:

Audubon Insurance Group Claim No. 316-53650-JJG, Charter Communications, Plaintiff vs. P. Penix Company, Defendant; Expert Report on behalf of Defendant's Insurance Carrier, Audubon Insurance Group;

Expert Report:	February 1, 2000	Case still pending

- Before the New York Public Service Commission;

Case No. 98-C-1357: Re: Proceeding on Motion of the Commission to Examine New York Telephone Company's Rates for Unbundled Network Elements; On behalf of AT&T and MCI WorldCom, Inc.;

Prefiled Direct Testimony: January 22, 2000	Prefiled Responsive Testimony: June 26, 2000
Case still pending	

- Before the Kansas Corporation Commission;

Docket No. 00-DCIT-389-ARB: Re: In the Matter of the Petition of DIECA Communications, Inc. d/b/a Covad Communications Company for Arbitration of Interconnection Rates, Terms, Conditions and Related Arrangements with Southwestern Bell Telephone Company; On behalf of Covad Communications Company;

Prefiled Direct Testimony: January 7, 2000	Prefiled Rebuttal Testimony: January 28, 2000
Prefiled Surrebuttal Testimony: February 21, 2000	Oral Deposition: February 8, 2000
Testimony & Cross Examination: February 23, 2000	

- Before the Missouri Public Service Commission;

Docket No. TO-2000-322: Re: In the Matter of the Petition of DIECA Communications, Inc. d/b/a Covad Communications Company for Arbitration of Interconnection Rates, Terms, Conditions and Related Arrangements with Southwestern Bell Telephone Company; On behalf of Covad Communications Company;

Prefiled Direct Testimony: January 7, 2000	Prefiled Rebuttal Testimony: January 28, 2000
Prefiled Surrebuttal Testimony: February 10, 2000	Oral Deposition: February 8, 2000
Testimony & Cross Examination: February 15, 2000	

- Before the Kansas Corporation Commission;

Docket No. 99-GIMT-326-GIT: Re: In the Matter of an Investigation into the Kansas Universal Service Fund (KUSF) Mechanism for the Purpose of Modifying the KUSF and Establishing a Cost-based Fund; On behalf of AT&T Communications of the Southwest, Inc.;

Prefiled Direct Testimony: November 16, 1999	Prefiled Rebuttal Testimony: November 22, 1999
Testimony & Cross Examination: November 30, 1999	

- Before the New York Public Service Commission;

Case No. 98-C-1357 (DSL Track): Re: Proceeding on Motion of the Commission to Examine New York Telephone Company's Rates for Unbundled Network Elements; On behalf of Covad Communications Company, Rhythms Links Inc., and MCI WorldCom, Inc.;

Prefiled Affidavit: September 23, 1999	Prefiled Initial Testimony: October 18, 1999
Prefiled Responsive Testimony: Oct. 22, 1999	Testimony & Cross Examination: November 19, 1999

- Insurance Claim, State of New Jersey:

Wausau Insurance Companies Claim No. 324-016435, Answer Tel, Plaintiff vs. Bell Atlantic-New Jersey, Defendant; Expert Report on behalf of Defendants;

Expert Report: July 29, 1999	Settlement in favor of Defendant based on Expert Report: August 1999

- Before the Georgia Public Service Commission;

Docket No. 10692-U: Re: Generic Proceeding to Establish Long-Term Pricing Policies for Unbundled Network Elements; On behalf of AT&T Communications of the Southern States, Inc.;

Oral Deposition: June 17, 1999	Prefiled Testimony: June 30, 1999
Prefiled Rebuttal Testimony: July 9, 1999	Testimony & Cross Examination: July 13 & 14, 1999

- Before the Massachusetts Department of Telecommunications and Energy;

Docket Nos. 96-73/74, 96-75, 96-80/81, 96-83, and 96-84: Re: Consolidated Petitions for Arbitration of Interconnection Agreements – Dark Fiber; On behalf of AT&T Communications of New England, Inc.;

Prefiled Direct Testimony: September 25, 1998	Testimony & Cross Examination: February 17 & 19, 1999

- Before the Maryland Public Service Commission:

Docket No. 8786: Re: Investigation of Non-Recurring Charges for Telecommunications Interconnection Service; On behalf of AT&T Communications of Maryland, Inc. and MCI Telecommunications, Inc.;

Prefiled Rebuttal Testimony: November 16, 1998	Testimony & Cross Examination: January 15, 1999

- 19th Judicial District Court, East Baton Rouge, LA:

Case No. 436582, Division J, Petition for Damages: TCI Cablevision of Georgia, Inc. DBA TCI of Louisiana, Plaintiff vs. Barber Brothers Contracting, Inc., Defendant; Expert Report on behalf of Defendant's Insurance carrier Audubon Insurance Group;

Expert Report: December 30, 1998	Settlement in favor of Defendant based on Expert Report: February 5, 1999

- Before the Nevada Public Utilities Commission;

Docket No. 98-6005: Re: Filing of Central Telephone Company-Nevada d/b/a Sprint of Nevada's Unbundled Network Element (Unbundled Network Element) Cost Study; On behalf of AT&T Communications of Nevada, Inc.;

Prefiled Direct Testimony: July 1, 1998	Testimony & Cross Examination: August 12-13, 1998
Testimony & Cross Examination: December 7, 1998	

- Before the Nevada Public Utilities Commission;
Docket No. 98-6004: Re: Filing of Nevada Bell Unbundled Network Element (UNE) Cost Study; On behalf of AT&T Communications of Nevada, Inc.;

Prefiled Direct Testimony: July 1, 1998	Prefiled Supplemental Testimony: September 3, 1998
Testimony & Cross Examination: September 19, 1998	Testimony & Cross Examination: December 3, 1998

- United States District Court for the Southern District of New York;
Civil Action No. 95-CV-7052 (BSJ): Re: U.S. Patent No. 4,706,275; Aerotel, Ltd., and Aerotel U.S.A., Inc., Plaintiffs, vs. National Applied Computer Technologies, Hello Card, Inc., GST Telecommunications, Inc., GST USA, Inc., Thomas Sawyer, and Kyle Love, Defendants; On behalf of Plaintiffs;

Expert Report: June 26, 1998	Case settled in favor of plaintiffs in late 1998

- Before the Alabama Public Service Commission;
Docket No. 25980: Re: Implementation of Universal Service Requirements of Section 254 of the Telecommunications Act of 1996; On behalf of AT&T Communications of the South Central States, Inc.;

Prefiled Direct Testimony: February 3, 1998	Prefiled Rebuttal Testimony: February 13, 1998
Testimony & Cross Examination: February 26, 1998	

- Before the Louisiana Public Service Commission;
Docket U-20883, Subdocket A: In re: Submission of the Louisiana Public Service Commission's Forward-Looking Cost Study to the FCC for Purposes of Calculating Federal Universal Service Support Pursuant to LPSC order No. U-20883 (Subdocket A), dated August 12, 1997; On behalf of AT&T Communications of the South Central States, Inc.;

Prefiled Direct Testimony: January 9, 1998	Prefiled Rebuttal Testimony: January 20, 1998
Oral Deposition: January 21, 1998	Testimony & Cross Examination: January 30, 1998

- Before the State of Maine Public Utilities Commission;
Docket No. 97-505: In re: Public Utilities Commission Investigation of Total Element Long-Run Incremental Cost (TELRIC) Studies and Pricing of Unbundled Network Elements; On behalf of AT&T Communications;

Testimony & Cross Examination: December 2, 1997	Written Testimony: December 22, 1997

- Before the State of New Jersey Board of Public Utilities;
Docket No. TX95120631: In the Matter of the Board's Investigation Regarding Local Exchange Competition for Telecommunications Services; On behalf of AT&T Communications of New Jersey, Inc. and MCI Telecommunications Corp.;

Oral Deposition: October 27, 1997	

- Before the Pennsylvania Public Utility Commission;
Docket No. I-00940035: In re: Formal Investigation to Examine and Establish Updated Universal Service Principles and Policies for Telecommunications Services in the Commonwealth; On behalf of AT&T Communications of Pennsylvania, Inc. and MCI Telecommunications Corp.;

Testimony & Cross Examination: October 21 & 23, 1997	

- Before the Georgia Public Service Commission;

Docket No. 10692-U: Re: Generic Proceeding to Establish Long-Term Pricing Policies for Unbundled Network Elements; On behalf of AT&T Communications of the Southern States, Inc.;

Oral Deposition:	August 28, 1997	

- Before the Public Utilities Commission of the State of Colorado

Re: The Investigation and Suspension of Tariff Sheets Filed by U S WEST Communications, Inc. with Advise Letter No. 2617, Regarding Tariffs for Interconnection Local Termination, Unbundling, and Resale of Services; On behalf of AT&T of the Mountain States and MCI Telecommunications Corporation;

Oral Deposition:	April 9, 1997	

- Before the Arizona Corporation Commission;

Docket No. U-2428-96-417: In the Matter of the Petition of AT&T Communications of the Mountain States, Inc. for Arbitration with U S WEST Communications, Inc. of Interconnection Rates, Terms, and Conditions Pursuant to 47 U.S.C. § 252(b) of the Telecommunications Act of 1996; On behalf of AT&T Communications of the Mountain States;
Docket No. U-3175-96-479: In the Matter of the Petition of MCI Metro Access Transmission Services, Inc. for Arbitration of Interconnection Rates, Terms, and Conditions Pursuant to 47 U.S.C. § 252(b) of the Telecommunications Act of 1996; On behalf of MCI Metro Access Transmission Services, Inc.

Prefiled Direct Testimony:	October 25, 1996	Testimony & Cross Examination: November 20, 1996

- Before the State Office of Administrative Hearings for the Public Utility Commission of Texas, Austin, Texas;

Docket No. 16226: Petition of AT&T Communications of the Southwest, Inc. for Compulsory Arbitration to Establish an Interconnection Agreement Between AT&T and Southwestern Bell Telephone Company; On behalf of AT&T of the Southwest;
Docket No. 16285: Petition of MCI Telecommunications Corporation and Its Affiliate MCIMetro Access Transmission Services, Inc. for Arbitration and Request for Mediation Under the Federal Telecommunications Act of 1996; On behalf of MCI Telecommunications Corporation;

Oral Deposition:	August 30, 1996	Testimony & Cross Examination: October 2-3, 1996

CURRICULUM VITAE

OF

BRIAN F. PITKIN

EDUCATION

University of Virginia, McIntire School of Commerce, Charlottesville, Virginia, 1993
Bachelor of Science in Commerce - Dual Concentrations in Finance and Management Information Systems

EMPLOYMENT HISTORY

Peterson Consulting, LLP, Washington, DC, 1993 - 1994
Consultant

FTI/Klick, Kent & Allen, Alexandria, Virginia, 1994 - Present
Director

TESTIMONY

Federal Communications Commission

May 26, 1999	CC Docket No. 96-98. Implementation of the Local Competition Provisions of the Telecommunications Act of 1996. Affidavit of John C. Klick and Brian F. Pitkin.
May 26, 1999	CC Docket No. 96-98. Implementation of the Local Competition Provisions of the Telecommunications Act of 1996. Affidavit of Michael J. Boyles, John C. Klick and Brian F. Pitkin.
June 10, 1999	CC Docket No. 96-98. Implementation of the Local Competition Provisions of the Telecommunications Act of 1996. Reply Affidavit of Michael R. Baranowski, John C. Klick and Brian F. Pitkin.

Alabama Public Service Commission

February 13, 1998	Docket No. 25980. Implementation of the Universal Support Requirements. Rebuttal Testimony of Brian F. Pitkin.

Florida Public Service Commission

September 2, 1998	Docket No. 980696-TP. Determination of the Cost of Basic Local Telecommunications Service, Pursuant to Section 364.025, Florida Statutes. Rebuttal Testimony of Don J. Wood and Brian F. Pitkin.

State Corporation Commission of the State of Kansas

May 25, 1999	Docket No. 99-GIMT-326-GIT. Investigation into the Kansas Universal Service Fund (KUSF) Mechanism for the Purpose of Modifying the KUSF and Establishing a Cost-based Fund. Direct Testimony of Brian F. Pitkin.

Minnesota Public Utilities Commission

July 14, 1998	Docket No. P-442, 5321, 3167, 466, 421/CI-96-1540. Commission's Generic Investigation of U S West Communications, Inc.'s Cost of Providing Interconnection and Unbundled Network Elements. Supplemental Direct Testimony of John C. Klick and Brian F. Pitkin.

Mississippi Public Service Commission

March 6, 1998	Docket No. 98-AD-035. Mississippi Universal Service Docket. Rebuttal Testimony of Brian F. Pitkin.

Public Service Commission of Missouri

September 25, 1998	Docket No. TO-98-329. Investigation into Various Issues Related to the Missouri Universal Service Fund. Rebuttal Testimony of Brian F. Pitkin, adopted by John C. Klick.

Public Service Commission of the State of Montana

December 31, 1997	Docket No. D97.9.167. Investigation of the Commission Implementation of a Forward Looking Universal Service Cost Model. Direct Testimony of Brian F. Pitkin, adopted by Michael Hydock.
February 13, 1998	Docket No. D97.9.167. Investigation of the Commission Implementation of a Forward Looking Universal Service Cost Model. Supplemental Testimony of Brian F. Pitkin, adopted by Michael Hydock.
February 20, 1998	Docket No. D97.9.167. Investigation of the Commission Implementation of a Forward Looking Universal Service Cost Model. Rebuttal Testimony of Brian F. Pitkin, adopted by Michael Hydock.

South Carolina Public Service Commission

November 10, 1997	Docket No. 97-239-C. Intrastate Universal Service Fund. Adopted the Direct Testimony of John C. Klick.
March 2, 1998	Docket No. 97-239-C. Intrastate Universal Service Fund. Rebuttal Testimony of Brian F. Pitkin.

Tennessee Regulatory Authority

April 9, 1998	Docket No. 97-00888 (USF). Universal Service Generic Contested Case. Rebuttal Testimony of Don J. Wood and Brian F. Pitkin.

Public Utility Commission of Texas

July 16, 1998	Docket No. 18515. Compliance Proceeding for Implementation of the Texas High Cost Universal Service Plan. Live Rebuttal Testimony of Brian F. Pitkin.

Washington Utilities and Transportation Commission

August 3, 1998	Docket No. UT-980311(a). Determining Costs for Universal Service. Testimony of Brian F. Pitkin.
August 24, 1998	Docket No. UT-980311(a). Determining Costs for Universal Service. Rebuttal Testimony of Brian F. Pitkin.

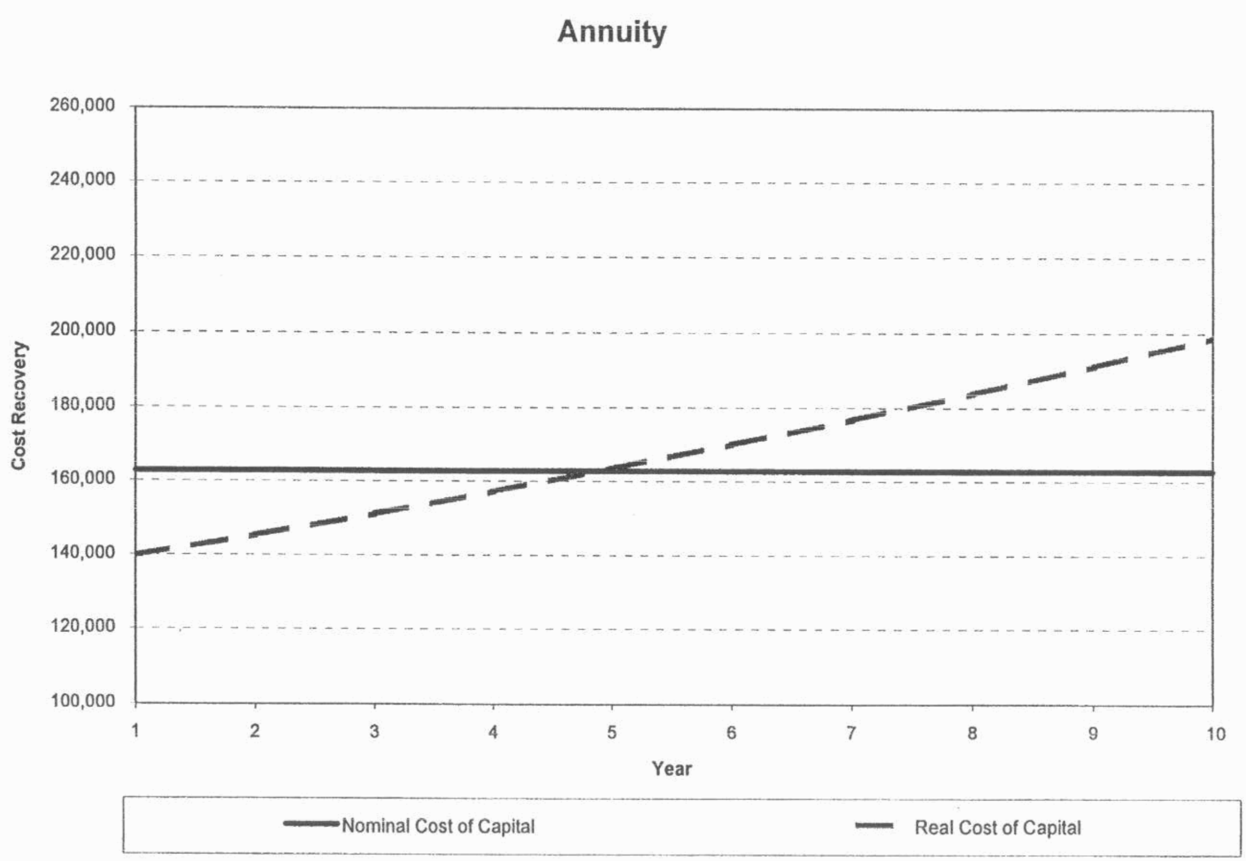
Public Service Commission of the State of Wyoming

January 23, 1998	General Order No. 81. Investigation by the Commission of the Feasibility of Developing Its Own Costing Model for Use in Determining Federal Universal Service Fund Support Obligations in Wyoming. Direct Testimony of Brian F. Pitkin.
February 6, 1998	General Order No. 81. Investigation by the Commission of the Feasibility of Developing Its Own Costing Model for Use in Determining Federal Universal Service Fund Support Obligations in Wyoming. Rebuttal Testimony of Brian F. Pitkin.

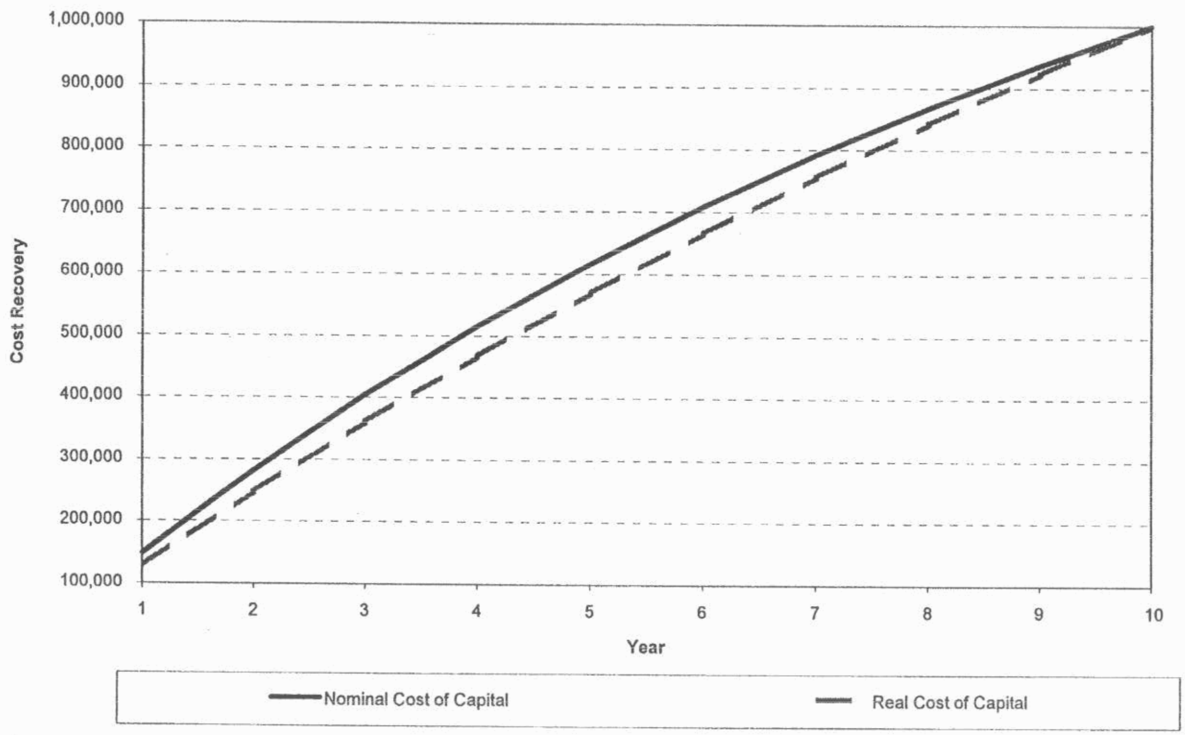
Equipment Type	Quantity of Material			Percent of BCPM	
	BCPM	BSTLM	HAI	BSTLM	HAI
Distribution Route Miles	44,504	37,228	47,751	83.65%	107.30%
Shared Route Miles (Distribution and Feeder)		5,835		N/A	N/A
Feeder Route Miles	17,466	2,018	10,819	11.55%	61.94%
Total Route Miles	61,970	45,081	58,570	72.75%	94.51%
Number of DLCs	9,554	4,531	5,475	47.43%	57.31%

Year	Nominal Cost of Capital					Real Cost of Capital				
	Annuity	Inflation Factor	Inflated Annuity	Present Value Factor	PV of Annuity	Annuity	Inflation Factor	Inflated Annuity	Present Value Factor	PV of Annuity
1	$162,745	N/A	$162,745	0.9091	$147,950	$134,386	1.0400	$139,762	0.9091	$127,056
2	162,745	N/A	162,745	0.8264	134,500	134,386	1.0816	145,352	0.8264	120,126
3	162,745	N/A	162,745	0.7513	122,273	134,386	1.1249	151,166	0.7513	113,574
4	162,745	N/A	162,745	0.6830	111,157	134,386	1.1699	157,213	0.6830	107,379
5	162,745	N/A	162,745	0.6209	101,052	134,386	1.2167	163,502	0.6209	101,522
6	162,745	N/A	162,745	0.5645	91,866	134,386	1.2653	170,042	0.5645	95,984
7	162,745	N/A	162,745	0.5132	83,514	134,386	1.3159	176,843	0.5132	90,749
8	162,745	N/A	162,745	0.4665	75,922	134,386	1.3686	183,917	0.4665	85,799
9	162,745	N/A	162,745	0.4241	69,020	134,386	1.4233	191,274	0.4241	81,119
10	162,745	N/A	162,745	0.3855	62,745	134,386	1.4802	198,925	0.3855	76,694
TOTAL					$1,000,000					$1,000,000

004755

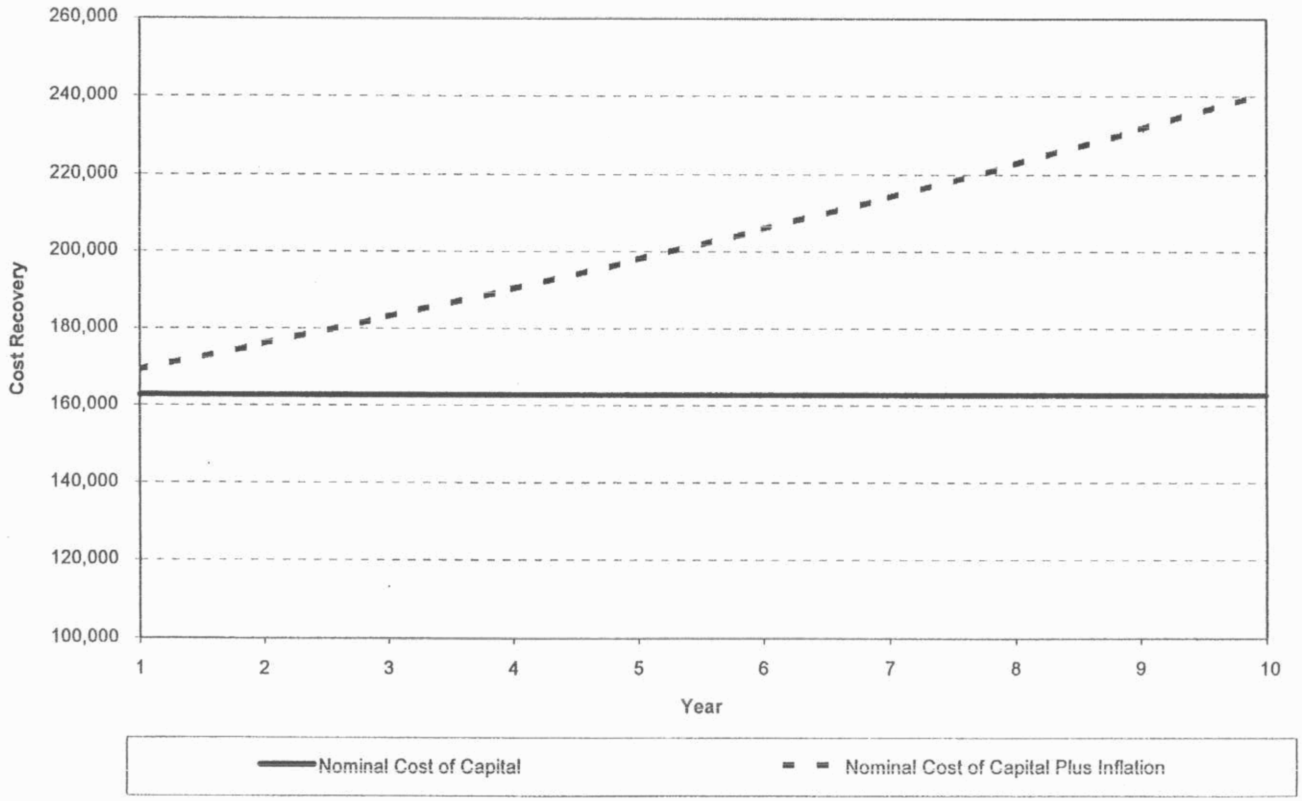

Annuity
260,000
240,000
220,000
200,000
180,000
160,000
140,000
120,000
100,000
Cost Recovery
1
2
3
4
5
6
7
8
9
10
Year
Nominal Cost of Capital
Real Cost of Capital

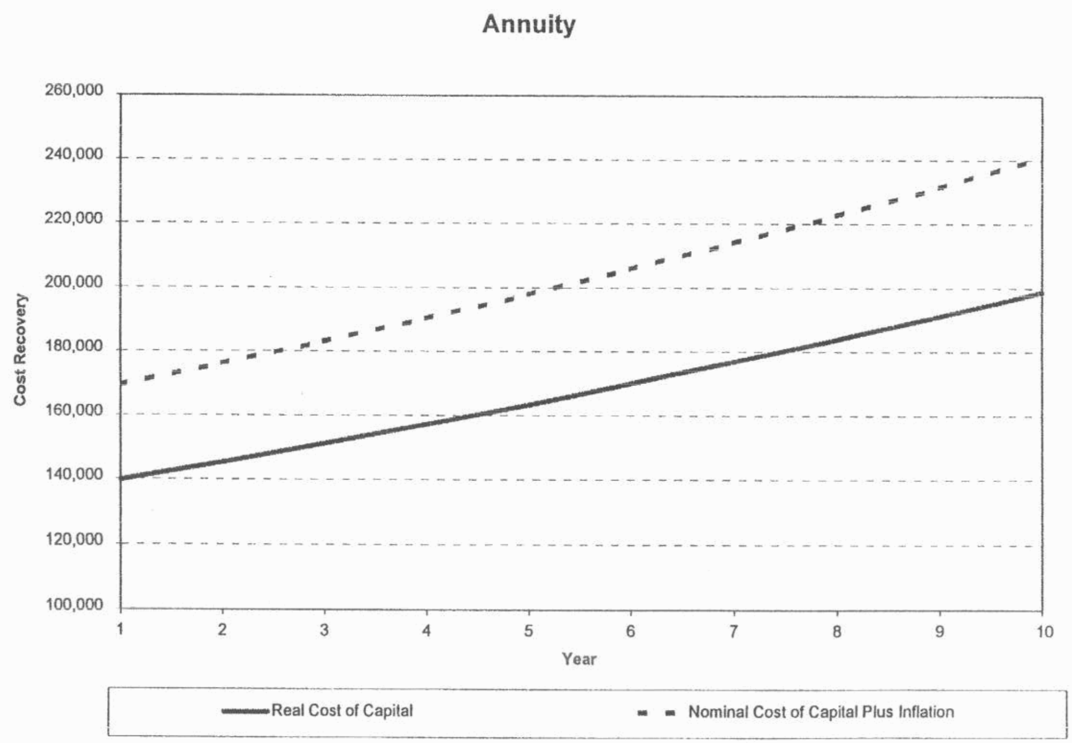
Cumulative Present Value of Annuity



Year	Nominal Cost of Capital (From Table 1)		Real Cost of Capital (From Table 1)		Nominal Cost of Capital Plus Inflation For Material and Labor				
	Annuity	PV of Annuity	Annuity	PV of Annuity	Annuity	Inflation Factor	Inflated Annuity	Present Value Factor	PV of Annuity
1	$162,745	$ 147,950	$134,386	$ 127,056	$162,745	1.0400	$169,255	0.9091	$ 153,868
2	162,745	134,500	134,386	120,126	162,745	1.0816	176,025	0.8264	145,476
3	162,745	122,273	134,386	113,574	162,745	1.1249	183,066	0.7513	137,541
4	162,745	111,157	134,386	107,379	162,745	1.1699	190,389	0.6830	130,038
5	162,745	101,052	134,386	101,522	162,745	1.2167	198,005	0.6209	122,945
6	162,745	91,866	134,386	95,984	162,745	1.2653	205,925	0.5645	116,239
7	162,745	83,514	134,386	90,749	162,745	1.3159	214,162	0.5132	109,899
8	162,745	75,922	134,386	85,799	162,745	1.3686	222,728	0.4665	103,904
9	162,745	69,020	134,386	81,119	162,745	1.4233	231,637	0.4241	98,237
10	162,745	62,745	134,386	76,694	162,745	1.4802	240,903	0.3855	92,879
TOTAL		$ 1,000,000		$ 1,000,000					$ 1,211,026

Annuity


260,000
240,000
220,000
200,000
180,000
160,000
140,000
120,000
100,000
Cost Recovery
1
2
3
4
5
6
7
8
9
10
Year
Nominal Cost of Capital
Nominal Cost of Capital Plus Inflation


Annuity
260,000
240,000
220,000
200,000
180,000
160,000
140,000
120,000
100,000
Cost Recovery
1
2
3
4
5
6
7
8
9
10
Year
Real Cost of Capital
Nominal Cost of Capital Plus Inflation

004760

DLC In-Plant Factor Development

Remote Terminal

Equipment Description	Total Cost	Plug-In or Hardwire
Cabinet	$ 27,500.00	Hardwire
SONET Transceivers	4,500.00	Plug-In
Mulitplexer Commons	2,000.00	Plug-In
Time Slot Interchanger	3,500.00	Plug-In
Channel Bank Assemblies	4,000.00	Hardwire
Channel Bank Assembly Commons	2,500.00	Plug-In
Subtotal Remote Terminal Equipment	$ 31,500.00	Hardwire
	12,500.00	Plug-In

Task Description	Hours	Rate	Total Labor	Plug-In or Hardwire
Engineering	32.00	55.00	$ 1,760.00	Hardwire
Place Cabinet	4.00	55.00	220.00	Hardwire
Copper Splicing	4.00	55.00	220.00	Hardwire
Place Batteries & Turn Up Power	2.00	55.00	110.00	Hardwire
Place Common Plug Ins (21 ea.)	0.50	55.00	27.50	Plug-In
Turn Up & Test System	3.00	55.00	165.00	Hardwire
Site Preparation and AC Power			3,000.00	Hardwire
Subtotal Remote Terminal Labor			$ 5,475.00	Hardwire
			27.50	Plug-In

Central Office Terminal

Equipment Description	Total Cost	Plug-In or Hardwire
SONET Firmware	$ 7,000.00	Hardwire
Sonet Transceivers	4,500.00	Plug-In
Multiplexer Commons	2,000.00	Plug-In
Time Slot Interchanger	3,500.00	Plug-In
DS-1 Shelf Commons	500.00	Plug-In
DSX-1 & Cabling	800.00	Hardwire
Subtotal Central Office Terminal Equipment	$ 7,800.00	Hardwire
	10,500.00	Plug-In

Task Description	Hours	Rate	Total Labor	Plug-In or Hardwire
Engineering	12.00	55.00	$ 660.00	Hardwire
Place Frames & Racks	3.00	55.00	165.00	Hardwire
Splice DSX Metallic Cable	1.00	55.00	55.00	Hardwire
Place DSX Cross Connections	0.50	55.00	27.50	Hardwire
Connect Alarms, CO Timing & Power	1.00	55.00	55.00	Hardwire
Place Common Plug Ins (21 ea.)	0.50	55.00	27.50	Plug-In
Turn Up & Test System	3.00	55.00	165.00	Hardwire
Subtotal Central Office Terminal Labor			$ 1127.50	Hardwire
			27.50	Plug-In

Hardwire Equipment

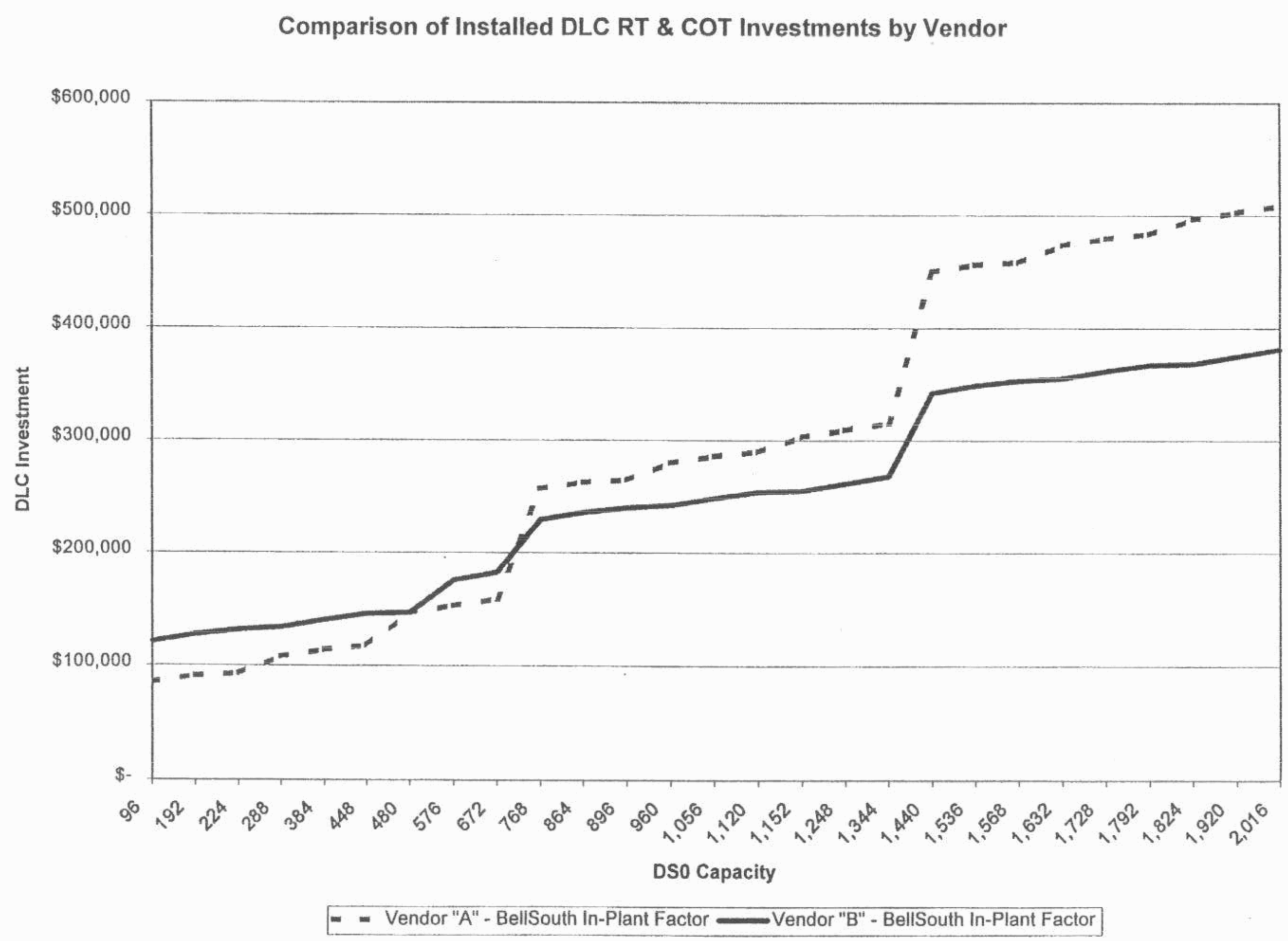
Hardwire Total Installed Cost	$ 45,902.50
Hardwire Material Cost	39,300.00
Hardwire In-Plant Factor	1.16800

Plug-In Equipment

Hardwire Total Installed Cost	$ 23,055.00
Hardwire Material Cost	23,000.00
Plug-In In-Plant Factor	1.00239

004761

Docket 990649-TP
Witness: Donovan/Pitkin
Exhibit No. _____(JCD/BFP-9)
Page: 1 of 1



1 004762

	A	B	C	D	E	F	G
1	**Comparison of Input Values**						
2							
3	**Copper Cable 24 gauge**						
4	Plant Type	Type or Size	BellSouth Value	Restated Value		Rationale	Page
5	Aerial	25	[redacted]	$ 2.28		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
6	Aerial	50	[redacted]	$ 2.51		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
7	Aerial	100	[redacted]	$ 2.97		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
8	Aerial	200	[redacted]	$ 4.23		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
9	Aerial	300	[redacted]	$ 4.80		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
10	Aerial	400	[redacted]	$ 5.78		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
11	Aerial	600	[redacted]	$ 7.63		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
12	Aerial	900	[redacted]	$ 9.79		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
13	Aerial	1,200	[redacted]	$ 10.89		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
14	Aerial	1,500	[redacted]	$ 14.17		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
15	Aerial	1,800	[redacted]	$ 17.68		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
16	Aerial	2,100	[redacted]	$ 20.47		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
17	Aerial	2,400	[redacted]	$ 22.82		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
18	Aerial	2,700	[redacted]	$ 27.25		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
19	Aerial	3,000	[redacted]	$ 32.03		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
20	Aerial	3,600	[redacted]	$ 36.81		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
21	Aerial	4,200	[redacted]	$ 45.14		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	462
22	Buried	25	[redacted]	$ 2.27		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
23	Buried	50	[redacted]	$ 2.55		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
24	Buried	100	[redacted]	$ 3.07		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
25	Buried	200	[redacted]	$ 4.51		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
26	Buried	300	[redacted]	$ 5.27		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
27	Buried	400	[redacted]	$ 6.30		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
28	Buried	600	[redacted]	$ 7.55		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
29	Buried	900	[redacted]	$ 10.24		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
30	Buried	1,200	[redacted]	$ 11.46		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
31	Buried	1,500	[redacted]	$ 15.43		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
32	Buried	1,800	[redacted]	$ 19.83		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
33	Buried	2,100	[redacted]	$ 23.18		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
34	Buried	2,400	[redacted]	$ 26.18		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
35	Buried	2,700	[redacted]	$ 31.58		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
36	Buried	3,000	[redacted]	$ 37.45		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
37	Buried	3,600	[redacted]	$ 43.21		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
38	Buried	4,200	[redacted]	$ 53.39		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
39	Riser/Intrabuilding	25	[redacted]	$ 2.28		Used value for aerial.	
40	Riser/Intrabuilding	50	[redacted]	$ 2.51		Used value for aerial.	
41	Riser/Intrabuilding	100	[redacted]	$ 2.97		Used value for aerial.	
42	Riser/Intrabuilding	200	[redacted]	$ 4.23		Used value for aerial.	
43	Riser/Intrabuilding	300	[redacted]	$ 4.80		Used value for aerial.	
44	Riser/Intrabuilding	400	[redacted]	$ 5.78		Used value for aerial.	
45	Riser/Intrabuilding	600	[redacted]	$ 7.63		Used value for aerial.	
46	Riser/Intrabuilding	900	[redacted]	$ 9.79		Used value for aerial.	
47	Riser/Intrabuilding	1,200	[redacted]	$ 10.89		Used value for aerial.	
48	Riser/Intrabuilding	1,500	[redacted]	$ 14.17		Used value for aerial.	
49	Riser/Intrabuilding	1,800	[redacted]	$ 17.68		Used value for aerial.	
50	Riser/Intrabuilding	2,100	[redacted]	$ 20.47		Used value for aerial.	
51	Riser/Intrabuilding	2,400	[redacted]	$ 22.82		Used value for aerial.	
52	Riser/Intrabuilding	2,700	[redacted]	$ 27.25		Used value for aerial.	
53	Riser/Intrabuilding	3,000	[redacted]	$ 32.03		Used value for aerial.	
54	Riser/Intrabuilding	3,600	[redacted]	$ 36.81		Used value for aerial.	
55	Riser/Intrabuilding	4,200	[redacted]	$ 45.14		Used value for aerial.	
56	Underground	25	[redacted]	$ 3.23		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	461
57	Underground	50	[redacted]	$ 3.51		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
58	Underground	100	[redacted]	$ 4.03		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
59	Underground	200	[redacted]	$ 5.47		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
60	Underground	300	[redacted]	$ 7.10		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
61	Underground	400	[redacted]	$ 8.51		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
62	Underground	600	[redacted]	$ 8.95		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
63	Underground	900	[redacted]	$ 12.39		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
64	Underground	1,200	[redacted]	$ 14.21		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
65	Underground	1,500	[redacted]	$ 18.80		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
66	Underground	1,800	[redacted]	$ 23.80		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
67	Underground	2,100	[redacted]	$ 27.68		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
68	Underground	2,400	[redacted]	$ 31.51		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
69	Underground	2,700	[redacted]	$ 37.37		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
70	Underground	3,000	[redacted]	$ 43.65		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
71	Underground	3,600	[redacted]	$ 50.61		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
72	Underground	4,200	[redacted]	$ 61.69		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
73							

	A	B	C	D	E	F	G
1	**Comparison of Input Values**						
2							
74	**Copper Cable 26 gauge**						
75	Plant Type	Type or Size	BellSouth Value	Restated Value		Rationale	Page
76	Aerial	25	[redacted]	$ 2.23		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
77	Aerial	50	[redacted]	$ 2.42		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
78	Aerial	100	[redacted]	$ 2.79		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
79	Aerial	200	[redacted]	$ 3.87		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
80	Aerial	300	[redacted]	$ 4.27		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
81	Aerial	400	[redacted]	$ 5.07		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
82	Aerial	600	[redacted]	$ 6.55		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
83	Aerial	900	[redacted]	$ 8.18		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
84	Aerial	1,200	[redacted]	$ 8.75		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
85	Aerial	1,500	[redacted]	$ 11.50		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
86	Aerial	1,800	[redacted]	$ 14.47		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
87	Aerial	2,100	[redacted]	$ 16.72		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
88	Aerial	2,400	[redacted]	$ 18.54		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
89	Aerial	2,700	[redacted]	$ 24.84		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
90	Aerial	3,000	[redacted]	$ 32.03		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
91	Aerial	3,600	[redacted]	$ 36.81		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
92	Aerial	4,200	[redacted]	$ 45.14		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
93	Buried	25	[redacted]	$ 2.22		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
94	Buried	50	[redacted]	$ 2.44		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
95	Buried	100	[redacted]	$ 2.85		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
96	Buried	200	[redacted]	$ 4.07		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
97	Buried	300	[redacted]	$ 4.61		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
98	Buried	400	[redacted]	$ 5.42		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
99	Buried	600	[redacted]	$ 6.21		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
100	Buried	900	[redacted]	$ 8.24		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
101	Buried	1,200	[redacted]	$ 8.80		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
102	Buried	1,500	[redacted]	$ 12.10		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
103	Buried	1,800	[redacted]	$ 15.83		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
104	Buried	2,100	[redacted]	$ 18.53		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
105	Buried	2,400	[redacted]	$ 20.86		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
106	Buried	2,700	[redacted]	$ 28.59		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
107	Buried	3,000	[redacted]	$ 37.45		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
108	Buried	3,600	[redacted]	$ 43.21		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
109	Buried	4,200	[redacted]	$ 53.39		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	464
110	Riser/Intrabuilding	25	[redacted]	$ 2.23		Used value for aerial.	
111	Riser/Intrabuilding	50	[redacted]	$ 2.42		Used value for aerial.	
112	Riser/Intrabuilding	100	[redacted]	$ 2.79		Used value for aerial.	
113	Riser/Intrabuilding	200	[redacted]	$ 3.87		Used value for aerial.	
114	Riser/Intrabuilding	300	[redacted]	$ 4.27		Used value for aerial.	
115	Riser/Intrabuilding	400	[redacted]	$ 5.07		Used value for aerial.	
116	Riser/Intrabuilding	600	[redacted]	$ 6.55		Used value for aerial.	
117	Riser/Intrabuilding	900	[redacted]	$ 8.18		Used value for aerial.	
118	Riser/Intrabuilding	1,200	[redacted]	$ 8.75		Used value for aerial.	
119	Riser/Intrabuilding	1,500	[redacted]	$ 11.50		Used value for aerial.	
120	Riser/Intrabuilding	1,800	[redacted]	$ 14.47		Used value for aerial.	
121	Riser/Intrabuilding	2,100	[redacted]	$ 16.72		Used value for aerial.	
122	Riser/Intrabuilding	2,400	[redacted]	$ 18.54		Used value for aerial.	
123	Riser/Intrabuilding	2,700	[redacted]	$ 24.84		Used value for aerial.	
124	Riser/Intrabuilding	3,000	[redacted]	$ 32.03		Used value for aerial.	
125	Riser/Intrabuilding	3,600	[redacted]	$ 36.81		Used value for aerial.	
126	Riser/Intrabuilding	4,200	[redacted]	$ 45.14		Used value for aerial.	
127	Underground	25	[redacted]	$ 3.18		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
128	Underground	50	[redacted]	$ 3.40		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
129	Underground	100	[redacted]	$ 3.82		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
130	Underground	200	[redacted]	$ 5.06		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
131	Underground	300	[redacted]	$ 6.48		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
132	Underground	400	[redacted]	$ 7.69		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
133	Underground	600	[redacted]	$ 7.70		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
134	Underground	900	[redacted]	$ 10.51		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
135	Underground	1,200	[redacted]	$ 11.71		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
136	Underground	1,500	[redacted]	$ 15.67		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
137	Underground	1,800	[redacted]	$ 20.05		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
138	Underground	2,100	[redacted]	$ 23.32		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
139	Underground	2,400	[redacted]	$ 26.53		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
140	Underground	2,700	[redacted]	$ 34.57		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
141	Underground	3,000	[redacted]	$ 43.65		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
142	Underground	3,600	[redacted]	$ 50.61		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
143	Underground	4,200	[redacted]	$ 61.69		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	463
144							

	A	B	C	D	E	F	G
1	**Comparison of Input Values**						
2							
145	**Drop**						
146	Plant Type	Type or Size	BellSouth Value	Restated Value		Rationale	Page
147	Aerial	2	[redacted]	$ 0.2900		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
148	Aerial	6	[redacted]	$ 0.2900		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
149	Buried	2	[redacted]	$ 0.6900		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
150	Buried	5	[redacted]	$ 0.6900		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
151							
152	**DTBT Material**						
153	Plant Type	Type or Size	BellSouth Value	Restated Value		Rationale	Page
154	Aerial	25	[redacted]	$ 288.00		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
155	Aerial	50	[redacted]	$ 486.16		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
156	Aerial	100	[redacted]	$ 885.46		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
157	Aerial	200	[redacted]	$ 1,684.04		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
158	Aerial	300	[redacted]	$ 2,482.63		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
159	Aerial	400	[redacted]	$ 3,281.22		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
160	Aerial	600	[redacted]	$ 4,878.39		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
161	Aerial	900	[redacted]	$ 7,274.15		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
162	Buried	25	[redacted]	$ 220.00		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
163	Buried	50	[redacted]	$ 356.01		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
164	Buried	100	[redacted]	$ 629.87		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
165	Buried	200	[redacted]	$ 1,177.57		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
166	Buried	300	[redacted]	$ 1,725.27		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
167	Buried	400	[redacted]	$ 2,272.98		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
168	Buried	600	[redacted]	$ 3,368.38		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
169	Buried	900	[redacted]	$ 5,011.49		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
170							
171	**FDI Terminals**						
172	Plant Type	Type or Size	BellSouth Value	Restated Value		Rationale	Page
173	Aerial	50	[redacted]	$ 949.04		Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
174	Aerial	100	[redacted]	$ 1,197.67		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
175	Aerial	200	[redacted]	$ 1,371.59		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
176	Aerial	300	[redacted]	$ 1,590.54		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
177	Aerial	400	[redacted]	$ 1,794.08		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
178	Aerial	600	[redacted]	$ 2,447.66		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
179	Aerial	900	[redacted]	$ 3,361.55		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
180	Aerial	1,000	[redacted]	$ 3,550.75		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
181	Aerial	1,200	[redacted]	$ 4,039.73		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
182	Aerial	1,400	[redacted]	$ 4,587.48		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
183	Aerial	1,500	[redacted]	$ 4,915.16		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
184	Aerial	1,800	[redacted]	$ 5,736.78		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
185	Aerial	2,100	[redacted]	$ 6,684.45		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
186	Aerial	2,400	[redacted]	$ 7,110.22		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
187	Aerial	2,700	[redacted]	$ 7,880.11		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
188	Aerial	3,000	[redacted]	$ 8,623.59		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
189	Aerial	3,300	[redacted]	$ 9,485.95		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
190	Aerial	3,600	[redacted]	$ 10,348.31		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
191	Aerial	4,200	[redacted]	$ 12,073.03		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
192	Aerial	4,800	[redacted]	#DIV/0!		Calculated based on the average EF&I to material ratio (for both aerial & buried) from the closest size.	
193	Aerial	5,400	[redacted]	#DIV/0!		Calculated based on the average EF&I to material ratio (for both aerial & buried) from the closest size.	
194	Aerial	7,200	[redacted]	#DIV/0!		Calculated based on the average EF&I to material ratio (for both aerial & buried) from the closest size.	

Comparison of Input Values

	A	B	C	D	F	G
195	**FDI Terminals (continued)**					
196	Plant Type	Type or Size	BellSouth Value	Restated Value	Rationale	Page
197	Buried	50	[redacted]	$ 949.04	Based on a regression of equipment sizes in the USF order, applied to this size equipment.	
198	Buried	100	[redacted]	$ 1,197.67	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
199	Buried	200	[redacted]	$ 1,371.59	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
200	Buried	300	[redacted]	$ 1,590.54	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
201	Buried	400	[redacted]	$ 1,794.08	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
202	Buried	600	[redacted]	$ 2,447.66	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
203	Buried	900	[redacted]	$ 3,361.55	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
204	Buried	1,000	[redacted]	$ 3,550.75	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
205	Buried	1,200	[redacted]	$ 4,039.73	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
206	Buried	1,400	[redacted]	$ 4,587.48	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
207	Buried	1,500	[redacted]	$ 4,915.16	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
208	Buried	1,800	[redacted]	$ 5,736.78	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
209	Buried	2,100	[redacted]	$ 6,684.45	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
210	Buried	2,400	[redacted]	$ 7,110.22	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
211	Buried	2,700	[redacted]	$ 7,880.11	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
212	Buried	3,000	[redacted]	$ 8,623.59	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
213	Buried	3,300	[redacted]	$ 9,485.95	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
214	Buried	3,600	[redacted]	$ 10,348.31	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
215	Buried	4,200	[redacted]	$ 12,073.03	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	481
216	Buried	4,800	[redacted]	#DIV/0!	Calculated based on the average EF&I to material ratio (for both aerial & buried) from the closest size.	
217	Buried	5,400	[redacted]	#DIV/0!	Calculated based on the average EF&I to material ratio (for both aerial & buried) from the closest size.	
218	Buried	7,200	[redacted]	#DIV/0!	Calculated based on the average EF&I to material ratio (for both aerial & buried) from the closest size.	
219	Underground	50	[redacted]	$ 949.04	Used values for buried.	
220	Underground	100	[redacted]	$ 1,197.67	Used values for buried.	
221	Underground	200	[redacted]	$ 1,371.59	Used values for buried.	
222	Underground	300	[redacted]	$ 1,590.54	Used values for buried.	
223	Underground	400	[redacted]	$ 1,794.08	Used values for buried.	
224	Underground	600	[redacted]	$ 2,447.66	Used values for buried.	
225	Underground	900	[redacted]	$ 3,361.55	Used values for buried.	
226	Underground	1,000	[redacted]	$ 3,550.75	Used values for buried.	
227	Underground	1,200	[redacted]	$ 4,039.73	Used values for buried.	
228	Underground	1,400	[redacted]	$ 4,587.48	Used values for buried.	
229	Underground	1,500	[redacted]	$ 4,915.16	Used values for buried.	
230	Underground	1,800	[redacted]	$ 5,736.78	Used values for buried.	
231	Underground	2,100	[redacted]	$ 6,684.45	Used values for buried.	
232	Underground	2,400	[redacted]	$ 7,110.22	Used values for buried.	
233	Underground	2,700	[redacted]	$ 7,880.11	Used values for buried.	
234	Underground	3,000	[redacted]	$ 8,623.59	Used values for buried.	
235	Underground	3,300	[redacted]	$ 9,485.95	Used values for buried.	
236	Underground	3,600	[redacted]	$ 10,348.31	Used values for buried.	
237	Underground	4,200	[redacted]	$ 12,073.03	Used values for buried.	
238	Underground	4,800	[redacted]	#DIV/0!	Used values for buried.	
239	Underground	5,400	[redacted]	#DIV/0!	Used values for buried.	
240	Underground	7,200	[redacted]	#DIV/0!	Used values for buried.	
242	**Fiber Cable**					
243	Plant Type	Type or Size	BellSouth Value	Restated Value	Rationale	Page
244	Aerial	6	[redacted]	#DIV/0!	Calculated based on the average EF&I to material ratio from the closest size.	
245	Aerial	12	[redacted]	$ 2.83	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
246	Aerial	18	[redacted]	$ 3.03	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
247	Aerial	24	[redacted]	$ 3.22	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
248	Aerial	30	[redacted]	$ 3.55	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
249	Aerial	32	[redacted]	$ 3.79	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
250	Aerial	36	[redacted]	$ 3.70	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
251	Aerial	44	[redacted]	$ 4.16	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
252	Aerial	48	[redacted]	$ 4.15	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
253	Aerial	60	[redacted]	$ 4.68	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
254	Aerial	72	[redacted]	$ 5.33	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
255	Aerial	84	[redacted]	$ 5.72	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
256	Aerial	96	[redacted]	$ 5.96	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
257	Aerial	108	[redacted]	$ 6.29	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
258	Aerial	120	[redacted]	$ 6.98	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
259	Aerial	132	[redacted]	$ 7.68	Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
260	Aerial	144	[redacted]	$ 7.82	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	460
261	Aerial	156	[redacted]	$ 8.00	Calculated based on the average EF&I to material ratio from the closest size.	
262	Aerial	168	[redacted]	$ 8.62	Calculated based on the average EF&I to material ratio from the closest size.	
263	Aerial	216	[redacted]	$ 11.08	Calculated based on the average EF&I to material ratio from the closest size.	

	A	B	C	D	E	F	G
1	**Comparison of Input Values**						
2							
264	**Fiber Cable (continued)**						
265	Plant Type	Type or Size	BellSouth Value	Restated Value		Rationale	Page
266	Buried	6	[redacted]	#DIV/0!		Calculated based on the average EF&I to material ratio from the closest size.	
267	Buried	12	[redacted]	$ 2.68		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	459
268	Buried	18	[redacted]	$ 2.90		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	459
269	Buried	24	[redacted]	$ 3.06		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	459
270	Buried	30	[redacted]	$ 3.34		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
271	Buried	32	[redacted]	$ 3.56		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
272	Buried	36	[redacted]	$ 3.42		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	459
273	Buried	44	[redacted]	$ 3.96		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
274	Buried	48	[redacted]	$ 4.07		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	459
275	Buried	60	[redacted]	$ 4.64		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	459
276	Buried	72	[redacted]	$ 5.16		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	459
277	Buried	84	[redacted]	$ 5.74		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
278	Buried	96	[redacted]	$ 6.23		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	459
279	Buried	108	[redacted]	$ 6.61		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
280	Buried	120	[redacted]	$ 7.34		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
281	Buried	132	[redacted]	$ 8.08		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
282	Buried	144	[redacted]	$ 8.28		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	459
283	Buried	156	[redacted]	$ 8.35		Calculated based on the average EF&I to material ratio from the closest size.	
284	Buried	168	[redacted]	$ 8.99		Calculated based on the average EF&I to material ratio from the closest size.	
285	Buried	216	[redacted]	$ 11.56		Calculated based on the average EF&I to material ratio from the closest size.	
286	Riser/Intrabuilding	6	[redacted]	#DIV/0!		Used value for aerial.	
287	Riser/Intrabuilding	12	[redacted]	$ 2.83		Used value for aerial.	
288	Riser/Intrabuilding	18	[redacted]	$ 3.03		Used value for aerial.	
289	Riser/Intrabuilding	24	[redacted]	$ 3.22		Used value for aerial.	
290	Riser/Intrabuilding	30	[redacted]	$ 3.55		Used value for aerial.	
291	Riser/Intrabuilding	32	[redacted]	$ 3.79		Used value for aerial.	
292	Riser/Intrabuilding	36	[redacted]	$ 3.70		Used value for aerial.	
293	Riser/Intrabuilding	44	[redacted]	$ 4.16		Used value for aerial.	
294	Riser/Intrabuilding	48	[redacted]	$ 4.15		Used value for aerial.	
295	Riser/Intrabuilding	60	[redacted]	$ 4.68		Used value for aerial.	
296	Riser/Intrabuilding	72	[redacted]	$ 5.33		Used value for aerial.	
297	Riser/Intrabuilding	84	[redacted]	$ 5.72		Used value for aerial.	
298	Riser/Intrabuilding	96	[redacted]	$ 5.96		Used value for aerial.	
299	Riser/Intrabuilding	108	[redacted]	$ 6.29		Used value for aerial.	
300	Riser/Intrabuilding	120	[redacted]	$ 6.98		Used value for aerial.	
301	Riser/Intrabuilding	132	[redacted]	$ 7.68		Used value for aerial.	
302	Riser/Intrabuilding	144	[redacted]	$ 7.82		Used value for aerial.	
303	Riser/Intrabuilding	156	[redacted]	$ 8.00		Used value for aerial.	
304	Riser/Intrabuilding	168	[redacted]	$ 8.62		Used value for aerial.	
305	Riser/Intrabuilding	216	[redacted]	$ 11.08		Used value for aerial.	
306	Underground	6	[redacted]	#DIV/0!		Calculated based on the average EF&I to material ratio from the closest size.	
307	Underground	12	[redacted]	$ 4.23		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	
308	Underground	18	[redacted]	$ 4.43		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	
309	Underground	24	[redacted]	$ 4.58		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	
310	Underground	30	[redacted]	$ 4.91		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
311	Underground	32	[redacted]	$ 5.24		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
312	Underground	36	[redacted]	$ 4.91		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	
313	Underground	44	[redacted]	$ 5.53		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
314	Underground	48	[redacted]	$ 5.51		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	
315	Underground	60	[redacted]	$ 6.07		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	
316	Underground	72	[redacted]	$ 6.55		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	
317	Underground	84	[redacted]	$ 7.11		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
318	Underground	96	[redacted]	$ 7.51		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	
319	Underground	108	[redacted]	$ 7.75		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
320	Underground	120	[redacted]	$ 8.61		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
321	Underground	132	[redacted]	$ 9.48		Average cost per unit of the next smallest size and the cost per unit of the next largest size multiplied by the number of units for this size.	
322	Underground	144	[redacted]	$ 9.41		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	
323	Underground	156	[redacted]	$ 9.16		Calculated based on the average EF&I to material ratio from the closest size.	
324	Underground	168	[redacted]	$ 9.87		Calculated based on the average EF&I to material ratio from the closest size.	
325	Underground	216	[redacted]	$ 12.69		Calculated based on the average EF&I to material ratio from the closest size.	

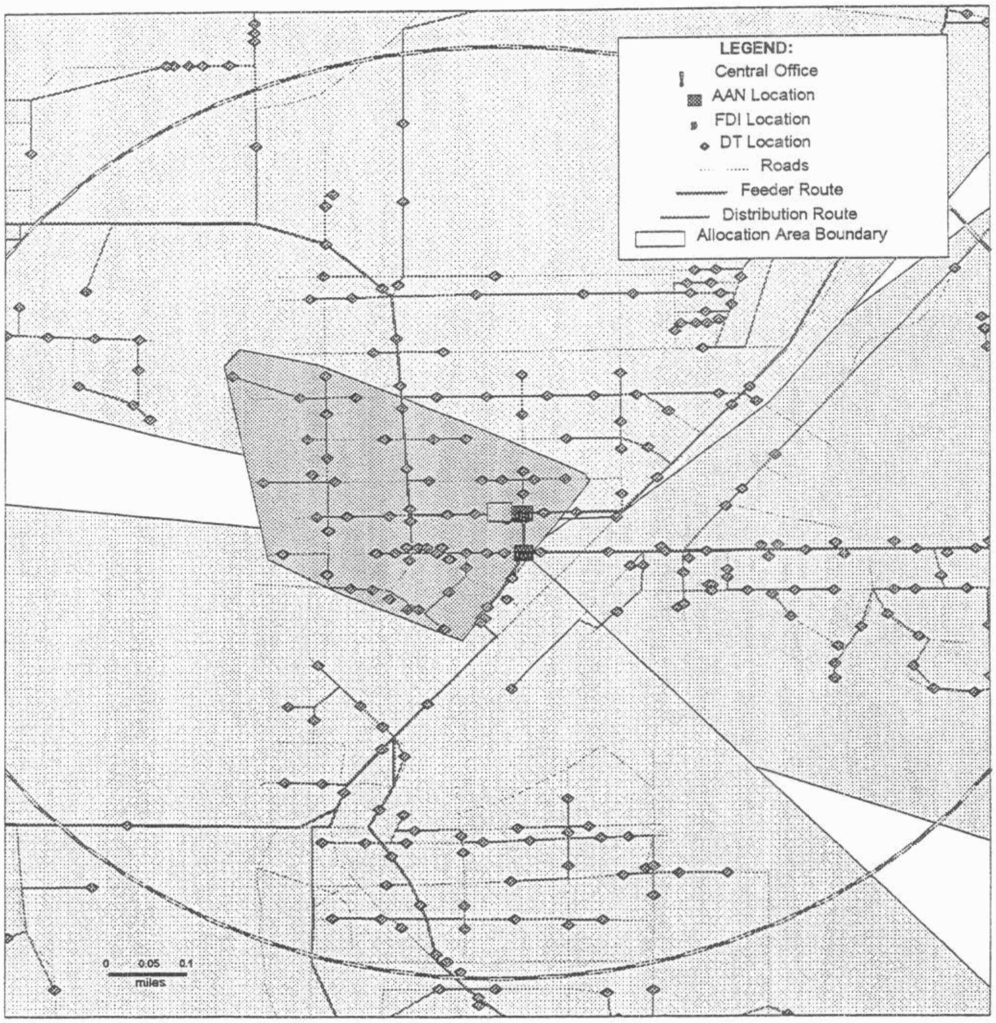
	A	B	C	D	E	F	G
1	**Comparison of Input Values**						
2							
326							
327	**Indoor FDI Terminals Primitives**						
328	Plant Type		BellSouth Value	Restated Value		Rationale	Page
329	66 -type Punch-Down Connector Blocks (50 pair)		[redacted]	$ -		Applied a 1.595 installation factor based on FCC FNPRM 99-120 Appendix D2: ratio of total SAI cost to total cost of material ($21,708.00 / $13,609.33)	
330	Backboard (In) (200 pair)		[redacted]	$ -		Applied a 1.595 installation factor based on FCC FNPRM 99-120 Appendix D2: ratio of total SAI cost to total cost of material ($21,708.00 / $13,609.33)	
331	189 type Protector (100 pair)		[redacted]	$ -		Applied a 1.595 installation factor based on FCC FNPRM 99-120 Appendix D2: ratio of total SAI cost to total cost of material ($21,708.00 / $13,609.33)	
332							
333	**NID/NIU**						
334	Plant Type	Type or Size	BellSouth Value	Restated Value		Rationale	Page
335	HDSLModem	1	[redacted]	$ 17.05		Same labor as the NID. HAI uses $15 for labor and $44 total, adjusted to $50 for commission business NID for $17.04 labor cost.	
336	NID	2	[redacted]	$ 30.00		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
337	NID	6	[redacted]	$ 50.00		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	465
338	NIDIntandProt	1	[redacted]	$ -		Included in installed NID cost.	
339	NIU	1	[redacted]	$ 17.05		Same labor as the NID. HAI uses $15 for labor and $44 total, adjusted to $50 for commission business NID for $17.04 labor cost.	
340							
341	**Service Description (Extended Range Cutover)**						
342	Service Code		BellSouth Value	Restated Value		Rationale	Page
343	A - 2WG UV		14,800	13,000		See testimony.	
344	a - LOCAL POTS/POTS-LIKE		14,800	13,000		See testimony.	
345	b - PBX		14,800	13,000		See testimony.	
346	c - CENTREX		14,800	13,000		See testimony.	
347	d - COIN SMART LINE		14,800	13,000		See testimony.	
348	E - 2WVG USL FEEDER		14,800	13,000		See testimony.	
349	e - COIN REGULAR		14,800	13,000		See testimony.	
350	H - 2WVG U LOCAL CHANNEL(357C)		14,800	13,000		See testimony.	
351	j - SLV ANALOG 2W		14,800	13,000		See testimony.	
352	Q - UCL 2W		14,800	13,000		See testimony.	
353							
354	**Service Description (DS0 Equivalence)**						
355	Service Code		BellSouth Value	Restated Value		Rationale	Page
356	B - 2WVG UDL ADSL		32	1		See testimony.	
357	C - 2WVG UDL HDSL		24	1		See testimony.	
358	D - 2WVG UDL ISDN		3	1		See testimony.	
359	f - ISDN LOC		3	1		See testimony.	
360	g - ISDN PBX		3	1		See testimony.	
361	J - 4WVG UDL (257C) HDSL		24	2		See testimony.	
362	k - DS1 DIGITAL MEGALINK ISDN		24	2		See testimony.	
363	K - 4WVG UDL (257C) DS1		24	2		See testimony.	
364	L - 4WVG USLC DS1		24	2		See testimony.	
365	p - DS1 DIGITAL ACCESS		24	2		See testimony.	
366	P - UCL (357C) LOCAL CHANNEL DS1 DIGITAL		24	2		See testimony.	
367	t - DS1 DIGITAL SWITCHED AREA COMM. PLAN		24	2		See testimony.	
368							
369	**Splicing And Placing Hours**						
370	**Drop Placing Hours (Travel)**						
371	Item		BellSouth Value	Restated Value		Rationale	Page
372	AerialCU		[redacted]	-		Included in installed drop cost.	
373	BuriedCU		[redacted]	-		Included in installed drop cost.	
374	NIDCU		[redacted]	-		Included in installed drop cost.	
375							

	A	B	C	D	E	F	G
1	**Comparison of Input Values**						
2							
376	**Engineering Rules**						
377	**Building Cable Rules**						
378	Rule		BellSouth Value	Restated Value		Rationale	Page
379	AvgLengthFloortoFloor		25	10		Commercial floors are 10 feet apart. Industry standard calls for vertically aligned telco closets.	
380							
381	**Electronic and Fiber Sizing (Engineering Fill)**						
382	Equipment		BellSouth Value	Restated Value		Rationale	Page
383	DistFOFill		75.0%	100.0%		Distribution fiber optics not used. Also see comments below.	
384	DLCCOTFill		80.0%	90.0%		Universal DLC should not be used in favor of Integrated DLC (see testimony). Also see below.	
385	DLCRTFill		70.0%	90.0%		Standard engineering guideline is to provide for 6 months growth for line card additions.	
386	FdrFOFill		75.0%	100.0%		Standard design of 4 fibers rather than 2 per Remote Terminal provides an effective fill of 50%.	
387							
388	**GIS Rules**						
389	Rule	UOM	BellSouth Value	Restated Value		Rationale	Page
390	AALineMinimumLimit	Lines	10	1,800		See testimony.	
391	CopperLengthDesignLimit	Feet	12,000	15,999		See testimony.	
392	CopperLengthHardLimit	Feet	13,000	16,799		See testimony.	
393	DLCLengthDesignLimit	Feet	12,000	15,999		See testimony.	
394	DLCLengthHardLimit	Feet	18,000	16,799		See testimony.	
395	DLCLineMinimumLimit	Lines	10	1,800		See testimony.	
396	NumberNodesPerRing	Nodes	4	8		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	484
397							
398	**Network Rules**						
399	Rule	Value	BellSouth Value	Restated Value		Rationale	Page
400	AA24/26GaugeXover	Feet	12,000	16,800		See testimony.	
401	CSA24/26GaugeXover	Feet	9,000	16,800		See testimony.	
402	DesignPairsPerHU	Pairs	2.0	1.5		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	458
403	MinimumFOSize	Strands	12	6		Input in the BSTLM.	
404	MinimumPairsPerBusiness	Pairs	6	3		USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.	129
405							
406	**DLC/ONU-Other**						
407	**COT Fiber Termination**						
408	Plant Type	Type or Size	BellSouth Value	Restated Value		Rationale	Page
409	Fiber Terminating Frame	24	[redacted]	$ 266.00		BellSouth's inputs are $133 per 12 strand, applied this cost-per strand	
410	Fiber Terminating Frame	48		$ 532.00		BellSouth's inputs are $133 per 12 strand, applied this cost-per strand	
411	Fiber Terminating Frame	72		$ 798.00		BellSouth's inputs are $133 per 12 strand, applied this cost-per strand	
412	Fiber Terminating Frame	96		$ 1,064.00		BellSouth's inputs are $133 per 12 strand, applied this cost-per strand	
413	Fiber Terminating Frame	144		$ 1,596.00		BellSouth's inputs are $133 per 12 strand, applied this cost-per strand	
414	Fiber Terminating Frame	216		$ 2,394.00		BellSouth's inputs are $133 per 12 strand, applied this cost-per strand	
415							
416	**DLC Vendor Mix**						
417	DLC Type	Vendor	BellSouth Value	Restated Value		Rationale	Page
418	Integrated	Vendor "A"	42.0%	0.0%		See testimony.	
419	Universal	Vendor "A"	42.0%	0.0%		See testimony.	
420	Integrated	Vendor "B"	58.0%	100.0%		See testimony.	
421	Universal	Vendor "B"	58.0%	100.0%		See testimony.	
422							
423	**SONET Terminals-Other**						
424	**Vendor Mix**						
425	Terminal	Vendor	BellSouth Value	Restated Value		Rationale	Page
426	OC-1	Vendor "A"	60.0%	100.0%		See testimony.	
427	OC-3	Vendor "A"	60.0%	100.0%		See testimony.	
428	OC-12	Vendor "A"	60.0%	100.0%		See testimony.	
429	OC-48	Vendor "A"	60.0%	100.0%		See testimony.	
430	OC-1	Vendor "B"	40.0%	0.0%		See testimony.	
431	OC-3	Vendor "B"	40.0%	0.0%		See testimony.	
432	OC-12	Vendor "B"	40.0%	0.0%		See testimony.	
433	OC-48	Vendor "B"	40.0%	0.0%		See testimony.	

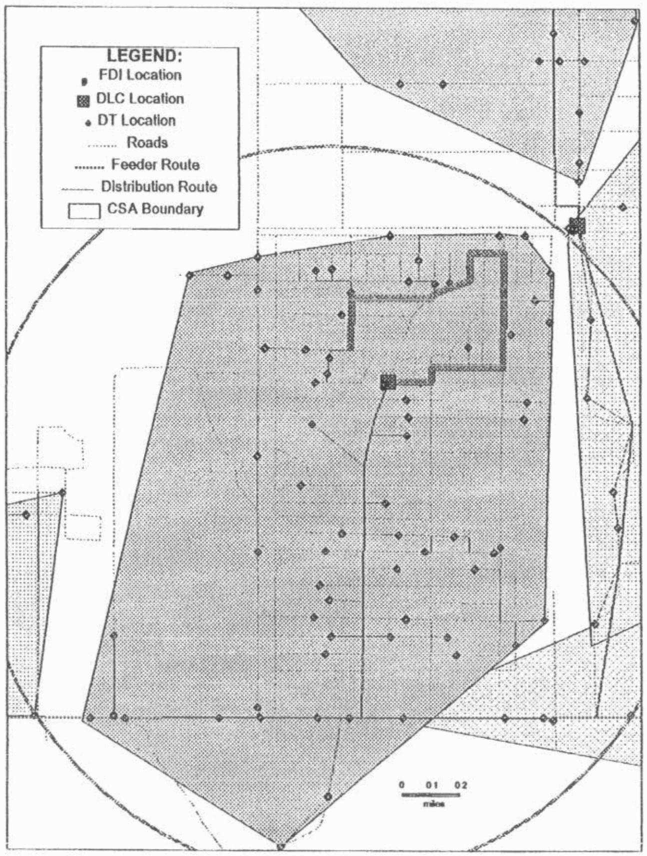
	A	B	C	D	E	F	G	H	I
1	Regression to Determine Aerial DTBT Inputs								
2									
3	Size	Recommended Inputs	Source				Page		
4	6	$ 138.00	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
5	12	$ 178.00	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
6	25	$ 288.00	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
7									
8	SUMMARY OUTPUT								
9									
10	*Regression Statistics*								
11	Multiple R	0.99856							
12	R Square	0.99713							
13	Adjusted R Square	0.99426							
14	Standard Error	5.88464							
15	Observations	3.00000							
16									
17	ANOVA								
18		*df*	*SS*	*MS*	*F*	*Significance F*			
19	Regression	1.00000	12,032.03769	12,032.03769	347.45578	0.03412			
20	Residual	1.00000	34.62898	34.62898					
21	Total	2.00000	12,066.66667						
22									
23		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
24	Intercept	86.86926	7.01794	12.37817	0.05132	(2.30172)	176.04024	(2.30172)	176.04024
25	X Variable 1	7.98587	0.42842	18.64017	0.03412	2.54227	13.42947	2.54227	13.42947
26									
27	Regression to Determine Buried DTBT Inputs								
28									
29	Size	Recommended Inputs	Source				Page		
30	6	$ 117.00	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
31	12	$ 145.00	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
32	25	$ 220.00	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
33									
34	SUMMARY OUTPUT								
35									
36	*Regression Statistics*								
37	Multiple R	0.99885							
38	R Square	0.99770							
39	Adjusted R Square	0.99539							
40	Standard Error	3.61485							
41	Observations	3.00000							
42									
43	ANOVA								
44		*df*	*SS*	*MS*	*F*	*Significance F*			
45	Regression	1.00000	5,659.59953	5,659.59953	433.11700	0.03057			
46	Residual	1.00000	13.06714	13.06714					
47	Total	2.00000	5,672.66667						
48									
49		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
50	Intercept	82.16254	4.31102	19.05873	0.03337	27.38609	136.93900	27.38609	136.93900
51	X Variable 1	5.47703	0.26317	20.81146	0.03057	2.13311	8.82096	2.13311	8.82096
52									

	A	B	C	D	E	F	G	H	I
53	Regression to Determine FDI Terminal Inputs								
54									
55	Size	Recommended Inputs	Source				Page		
56	100	$ 1,197.67	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
57	200	$ 1,371.59	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
58	300	$ 1,590.54	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
59	400	$ 1,794.08	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
60	600	$ 2,447.66	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
61	900	$ 3,361.55	USF Order. Docket No. 980696-TP. Order No. PSC-99-0068-FOF-TP.				481		
62									
63	SUMMARY OUTPUT								
64									
65	*Regression Statistics*								
66	Multiple R	0.99481							
67	R Square	0.98965							
68	Adjusted R Square	0.98706							
69	Standard Error	92.32049							
70	Observations	6.00000							
71									
72	ANOVA								
73		*df*	*SS*	*MS*	*F*	*Significance F*			
74	Regression	1.00000	3,259,464.29021	3,259,464.29021	382.42830	0.00004			
75	Residual	4.00000	34,092.29154	8,523.07289					
76	Total	5.00000	3,293,556.58175						
77									
78		*Coefficients*	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*	*Lower 95.0%*	*Upper 95.0%*
79	Intercept	811.11568	69.82167	11.61696	0.00031	617.25926	1,004.97211	617.25926	1,004.97211
80	X Variable 1	2.75856	0.14106	19.55577	0.00004	2.36691	3.15021	2.36691	3.15021

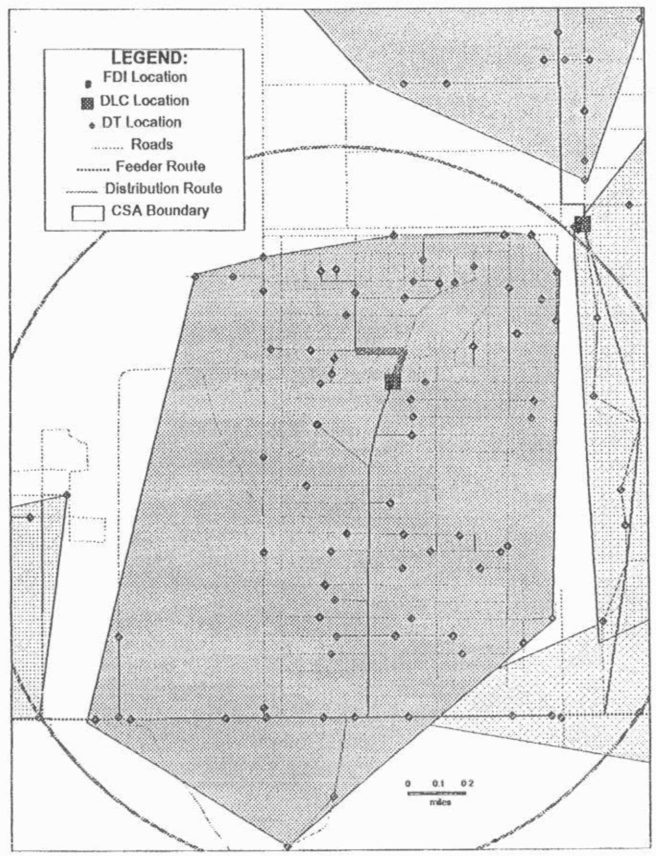
Input Description	BellSouth's Inputs		Modified Inputs	
	AA	CSA	Option 1	Option 2
Maximum Copper Length (Hard Limit)	13,000	18,000	17,599	16,799
Design Copper Length (Soft Limit)	12,000	12,000	16,761	15,999
Maximum Lines Between Soft and Hard Limit	10	10	1,800	1,800
24-to-26 Gauge Crossover	12,000	9,000	13,000	16,800
Entended Range Line Card Crossover	14,800	14,800	17,600	13,000


LEGEND:
Central Office
AAN Location
FDI Location
DT Location
Roads
Feeder Route
Distribution Route
Allocation Area Boundary
0
0.05
0.1
miles

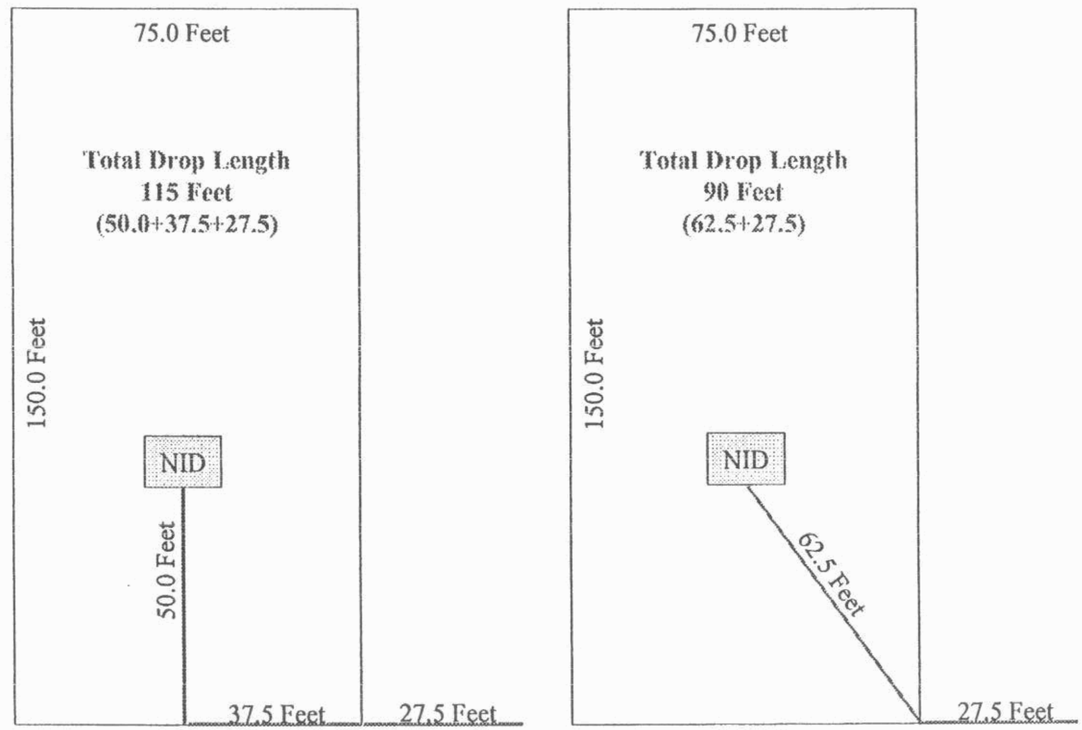
BSTLM Original Routing



Alternative Routing with Splitting



BSTLM Drop Routing | **Correct Drop Routing**



Assumptions: 1) A lot is twice as deep as it is wide
2) The NID is located 1/3rd of the way from the front of the lot

Element	Description	Monthly Cost							
		Results				Difference			
		BellSouth		Restate		Dollar		Percent
A.1.1.	2-Wire Analog Voice Grade Loop - Service Level 1	$	17.87	$	7.42	$	(10.45)	-58.47%
A.1.2.	2-Wire Analog Voice Grade Loop - Service Level 2	$	20.20	$	8.67	$	(11.53)	-57.08%
A.2.1.	Sub-Loop Feeder Per 2-Wire Analog Voice Grade Loop	$	8.57	$	4.61	$	(3.97)	-46.25%
A.2.2.	Sub-Loop Distribution Per 2-Wire Analog Voice Grade Loop	$	10.78	$	4.55	$	(6.23)	-57.81%
A.2.30.	Sub-Loop - Per 2-Wire Copper Loop Short / Feeder Only	$	10.31	$	4.04	$	(6.26)	-60.76%
A.2.32.	Sub-Loop - Per 4-Wire Copper Loop Short / Feeder Only	$	22.40	$	9.57	$	(12.83)	-57.26%
A.2.40.	Sub-Loop - Per 2-Wire Copper Loop Short / Distribution Only	$	9.03	$	3.89	$	(5.13)	-56.88%
A.2.42.	Sub-Loop - Per 4-Wire Copper Loop Short / Distribution Only	$	6.97	$	3.96	$	(3.00)	-43.09%
A.4.1.	4-Wire Analog Voice Grade Loop	$	31.02	$	15.65	$	(15.37)	-49.54%
A.9.1.	4-Wire DS1 Digital Loop	$	96.46	$	35.52	$	(60.94)	-63.18%
A.9.2.	Sub-Loop Feeder Per 4-Wire DS1 Digital Loop	$	59.97	$	28.54	$	(31.43)	-52.41%
D.5.1.	Local Channel - Dedicated - 2-Wire Voice Grade	$	26.31	$	24.37	$	(1.94)	-7.38%
D.5.2.	Local Channel - Dedicated - 4-Wire Voice Grade	$	27.48	$	25.26	$	(2.22)	-8.06%
D.5.24.	Local Channel - Dedicated - DS1	$	42.98	$	32.79	$	(10.19)	-23.71%
P.1.1.	2-Wire Voice Grade Loop	$	16.46	$	7.34	$	(9.11)	-55.38%
P.4.1.	2-Wire ISDN Digital Grade Loop	$	23.75	$	8.62	$	(15.13)	-63.71%