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January 16, 2004

VIA HAND DELIVERY

Hon. Deborah Taylor Tate, Chairman
Tennessee Regulatory Authority
460 James Robertson Parkway
Nashville, TN 37238

Re: *Implementation of the Federal Communications Commission's Triennial Review Order (Nine-month Proceeding)(Switching)*
Docket No. 03-00491

Dear Chairman Tate:

Enclosed are the original and four paper copies and a CD ROM of the Direct Testimony being filed on behalf of BellSouth in the referenced matter. Testimony is being submitted by the following witnesses:

Dr. Debra J. Aron
Dr. Randall S. Billingsley
Kathy K. Blake
Wayne Gray
W. Keith Milner
Dr. Christopher J. Pleatsikas
James W. Stegeman
Pamela A. Tipton
Alphonso J. Varner

The testimony of Mr. Stegeman and Ms. Tipton reference proprietary exhibits which are being filed under separate cover. Also being filed under separate cover is a proprietary version of Dr. Aron's testimony, including proprietary exhibits. Copies of the enclosed are being provided to counsel of record.

Very truly yours,

Guy M. Hicks

GMH:ch

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CERTIFICATE OF SERVICE

I hereby certify that on January 16, 2004, a copy of the foregoing document was served on the parties of record, via the method indicated:

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STATE OF TENNESSEE

BEFORE THE TENNESSEE REGULATORY AUTHORITY

	)	
In re: Implementation of	)	
requirements arising from Federal	)	
Communications Commission	)	Docket No. 03-00491
triennial UNE review: Local Circuit	)	
Switching for Mass Market	)	
Customers.	)	
	)	

DIRECT TESTIMONY OF

DR. DEBRA J. ARON

ON BEHALF OF

BELLSOUTH TELECOMMUNICATIONS, INC.

JANUARY 16, 2004

PUBLIC VERSION

I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME AND POSITION.

A. My name is Debra J. Aron. I am the Director of the Evanston office of LECG, LLC, and Adjunct Associate Professor at Northwestern University. My business address is 1603 Orrington Avenue, Suite 1500, Evanston, IL, 60201.

Q. PLEASE DESCRIBE LECG, LLC.

A. LECG is an economics and finance consulting firm that provides economic expertise for litigation, regulatory proceedings, and business strategy. Our firm comprises more than 550 economists and professional staff members from academe and business, and has 25 offices in six countries. LECG's practice areas include antitrust analysis, intellectual property, and securities litigation, in addition to specialties in the telecommunications, gas, electric, and health care industries.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL QUALIFICATIONS.

A. I received a Ph.D. in economics from the University of Chicago in 1985, where my honors included a Milton Friedman Fund fellowship, a Pew Foundation teaching fellowship, and a Center for the Study of the Economy and the State dissertation fellowship. I was an Assistant Professor of Managerial Economics and Decision Sciences from 1985 to 1992, at the J. L. Kellogg Graduate School of Management, Northwestern University, and a Visiting Assistant Professor of

Managerial Economics and Decision Sciences at the Kellogg School from 1993-1995. I was named a National Fellow of the Hoover Institution, a think tank at Stanford University, for the academic year 1992-1993, where I studied innovation and product proliferation in multi-product firms. Concurrent with my position at Northwestern University, I also held the position of Faculty Research Fellow with the National Bureau of Economic Research from 1987-1990. At the Kellogg School, I have taught M.B.A. and Ph.D. courses in managerial economics, information economics, and the economics and strategy of pricing. I am a member of the American Economic Association and the Econometric Society and an Associate member of the American Bar Association. My research focuses on multi-product firms, innovation, incentives, and pricing, and I have published articles on these subjects in several leading academic journals, including the *American Economic Review*, the *RAND Journal of Economics*, and the *Journal of Law, Economics, and Organization*. I currently teach a graduate course in the economics and strategy of communications industries at Northwestern University.

I have consulted on numerous occasions to the telecommunications industry on competition, costing, pricing, and regulation issues in the U.S. and internationally. I have testified in several states regarding economic and antitrust principles of competition in industries undergoing deregulation; measurement of competition in telecommunications markets; the proper interpretation of Long Run Incremental Cost and its role in pricing; the economic interpretation of pricing and costing standards in the Telecommunications Act of 1996 (i.e., Telecommunications Act of 1996, Pub.L.No. 104-104, 110 Stat. 56. The 1996 Act amended the Communications Act of 1934, 47 U.S.C. § 151 *et seq.* I refer to these Acts collectively as the "Telecommunications Act," the "Act," or as "TA96"); limitations of liability in telecommunications; Universal Service; and proper pricing for mutual compensation for call termination. I have testified in a number of states on issues pertaining to broadband markets, broadband deployment, and incentives for broadband investment. I have also submitted affidavits to the Federal Communications Commission ("FCC") analyzing the merits of SBC Michigan's application for authorization under Section 271 of the Telecommunications Act to serve the in-region interLATA market, CC Docket No. 97-137; explaining proper economic principles for recovering the costs of permanent local number portability, CC Docket No. 95-116; explaining the economic meaning of the "necessary and impair" standards for determining which elements should be required to be unbundled under TA96, CC Docket No. 96-98; and an analysis of market power in support of Ameritech's petition for Section 10 forbearance from regulation of high-capacity services in the Chicago LATA, CC Docket No. 95-65. I have consulted to carriers in Europe, the Pacific, and Latin America on interconnection and competition issues, and have consulted on issues pertaining to local, long distance, broadband, wireless, and equipment markets. I have conducted analyses of mergers in many other industries under the U.S. Department of Justice and FTC Merger Guidelines. In addition, I have consulted in other industries regarding potential anticompetitive effects of bundled pricing and monopoly leveraging, market definition, and entry conditions, among other antitrust issues, as well as matters related to employee compensation and contracts, and demand estimation. In 1979 and 1980, I worked as a Staff Economist at the Civil Aeronautics Board on issues pertaining to price deregulation of the airline industry. In July 1995, I assumed my current position at LECG. My professional qualifications are detailed in my curriculum vitae, which is submitted as Aron Exhibit No. DJA-1.

Q. HAVE YOU PREVIOUSLY TESTIFIED BEFORE THE TENNESSEE REGULATORY AUTHORITY ("TRA")?

A. No.

Q. WHAT IS YOUR UNDERSTANDING OF THIS PROCEEDING?

A. The FCC's Triennial Review Order ("TRO") requires state commissions to determine whether CLECs ("Competitive Local Exchange Carrriers") would be "impaired" in the provisioning of local exchange service to mass-market customers if access to the incumbent local exchange carrier's ("ILEC's") unbundled local switching were not available. The FCC prescribes two ways that state commissions are to conduct this analysis. First, the FCC designed a "bright-line" test consisting of certain "triggers" which, if met in a given geographic market, mandate a finding that CLECs are not impaired (within the TRO's meaning of that term) in that geography. BellSouth has conducted the analysis required by the triggers test, and the results of that analysis are provided in the direct testimony of Pamela A. Tipton.

In those geographic markets where the FCC's switching triggers are *not* met, there is an alternative test that state commissions must apply to determine whether CLECs are impaired without access to unbundled local switching. In promulgating this alternative approach to finding no impairment, the FCC reasoned that "there may well be markets where self-provisioning of switching is economic notwithstanding the fact that no three carriers have *in fact* provisioned their own switches. In such cases, we expect states to find 'no impairment.'" (TRO at ¶ 506, emphasis in original.) This alternative analysis is referred to as the "potential deployment" approach to determining impairment, and it involves considering three factors: evidence of actual deployment, potential operational barriers, and potential economic barriers. (47 C.F. R. 51.319(d)(2)(iii)(B).)

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to address the issue of whether there are economic barriers in those geographic markets in Tennessee where the FCC's switching triggers are not met that would impair a CLEC's ability to provide local exchange service if it lacked access to unbundled switching. My testimony addresses the economic foundation upon which such an examination of potential economic barriers should be based. I discuss the economic model that BellSouth has submitted (the BellSouth Analysis of Competitive Entry or "BACE" model) and how this model accurately captures the analysis required by the potential deployment test. I also discuss a number of key inputs to the model, and the results of the model that I have obtained for the geographical markets covered by this proceeding.

Q. WHAT CONCLUSIONS HAVE YOU REACHED REGARDING WHETHER CLECS ARE IMPAIRED IN TENNESSEE?

A. As the testimony of other BellSouth witnesses indicates, there are 24 relevant geographic markets in Tennessee. I understand that the FCC's switching triggers are met in 4 of those markets. Applying the "potential deployment" methodology to the remaining 20 markets leads to the conclusion that CLECs are not impaired without access to BellSouth's unbundled switching in an additional 3 of those markets. A list of the 3 additional markets is included in Aron Exhibit No. DJA-2.

II. ECONOMIC ANALYSIS REQUIRED BY THE POTENTIAL DEPLOYMENT TEST

Q. CAN YOU EXPLAIN THE FACTORS THAT THE FCC ASKED THE STATE COMMISSIONS TO CONSIDER IN THEIR APPLICATION OF THE POTENTIAL DEPLOYMENT TEST?

A. Yes. The FCC spelled out three factors to consider in applying the potential deployment test. First, state commissions are to consider any use of self-provisioned switches by CLECs, serving either mass market or enterprise customers in the geographic market in question. (TRO at ¶ 507.) Such use may fall short of meeting the triggers test but be indicative of the ability of a geographic market to support "multiple, competitive supply." (TRO at ¶ 506.) The evidence regarding this factor is provided in the testimony of BellSouth witness Tipton. Second, the FCC required the states to consider the impact of potential operational barriers on the ability of a CLEC to enter economically. (TRO at ¶ 507.) The evidence on this point is provided in the testimony of BellSouth witnesses Varner and Blake. Finally, the FCC mandates that state commissions consider the potential economic barriers to a CLEC's self-provisioning of switching in a given market. (TRO at ¶ 507.) The issue of *how* to assess potential economic barriers to self-provisioning switching is the focus of this section of my testimony.

Q. WHAT GUIDANCE DOES THE FCC PROVIDE IN THE TRO CONCERNING HOW ECONOMIC BARRIERS TO ENTRY SHOULD BE ANALYZED?

A. The FCC provides very explicit direction about what the analysis of potential economic barriers should encompass. The FCC has determined that "impairment" exists when "lack of access to an incumbent LEC network element poses a barrier or barriers to entry, including operational and economic barriers, that are likely to make entry into a market uneconomic." (TRO at ¶ 84.) Specifically, the FCC has mandated that the analysis must evaluate whether an efficient CLEC could economically enter a given geographic market. To the extent that such entry is economic, CLECs are not "impaired" in that market, within the TRO's meaning of the term.

Q. CAN YOU ELABORATE ON WHAT THE FCC MEANT WHEN IT REFERRED TO "AN EFFICIENT CLEC"?

A. Yes. The FCC specifically requires that the economic barriers analysis be applied to a CLEC that uses "the most efficient business model for entry rather than to any particular carrier's business model." (TRO at ¶ 517.) The FCC further mandates that the analysis assume that the CLEC in question utilizes "the most efficient network architecture available." (TRO at ¶ 517.) In other words, the TRO requires the state commissions to consider the economics of a CLEC with an optimized business model and network most appropriate to entry without access to unbundled local switching. The CLEC considered in the potential deployment analysis may therefore be materially different from many of today's CLECs, because these companies typically have business models directed toward taking advantage of the availability of unbundled switching (UNE-P) from BellSouth and/or are not currently efficient in their plans and operations.

Q. ARE THERE OTHER IMPLICATIONS OF THE FCC'S DIRECTIVE TO EVALUATE AN "EFFICIENT" CLEC?

A. Yes. There are two implications that flow from the directive to consider the ability of an efficient CLEC to economically enter a given market. First, the operating assumptions that are employed must be consistent with the operations of an efficient firm. This would tend to suggest that key operating metrics like customer acquisition cost, customer churn, and so forth, would tend to be better than the average of actual firms (a number of CLECs have gone bankrupt, suggesting that, on average, CLECs do not have optimally efficient operations). Second, efficient firms would tend to sell a broad array of products to a wide range of customers. This is true because many products and customers can be serviced using the same asset platform without replicating many of the fixed costs. For example, an efficient firm would likely leverage its network assets and sales force to sell products that cost little incrementally to provide and sell, but which could contribute meaningful incremental revenue. The FCC recognized this premise as well:

> The state commission must consider *all* revenues that will derive from service to the mass market…. The state must also consider the revenues a competitor is likely to obtain from using its facilities for providing data and long-distance services and from serving business customers…. Consideration of potential revenues is consistent with our standard…and with the guidance of the *USTA* decision. (TRO at ¶ 519, emphasis in original, footnotes omitted.)

Q. WHAT KIND OF ANALYSIS DEFINES WHETHER AN EFFICIENT CLEC CAN "ECONOMICALLY" ENTER A GIVEN MARKET?

A. It is both standard business practice, and intuitively compelling, that one would begin such an analysis with a business case, which is exactly what the FCC requires. A business case is an analytical approach, with a specific structure, that is used to quantify the expected value of a particular investment opportunity, and thus determine whether the investment opportunity is "economic." When a CLEC considers whether to enter a given market, that option is an example of an "investment opportunity." If the expected payoff from CLEC competitive entry without the local switching UNE is at least as great as the expected payoff from other investments of comparable risk (that is, it covers the market cost of capital), then the business case analysis will indicate that entry is economic, and thus the CLEC is not impaired in that market. Conversely, if the expected payoff from CLEC competitive entry without the local switching UNE does *not* cover the relevant cost of capital, the business case analysis will indicate CLEC impairment. Properly implemented, the business case approach correctly distinguishes between "economic" and "uneconomic" entry, and therefore is particularly (and uniquely) suited to an analysis of CLEC impairment.

Q. DOES THE FCC DISCUSS THE USE OF A BUSINESS CASE ANALYSIS AS PART OF THE "POTENTIAL DEPLOYMENT" ANALYSIS?

A. Yes. In fact, the FCC explicitly directs the state commissions to use the business case approach:

> Consistent with the impairment standard we adopt today, state commissions must determine whether competitors are unable economically to serve the market. State commissions should not

> focus on whether competitors operate under a cost disadvantage. *State commissions should determine if entry is economic by conducting a business case analysis for an efficient entrant*. This involves estimating the likely potential revenues from entry, and subtracting out the likely costs. (TRO at n. 1579, emphasis added.)

Q. WHAT IS THE RELATIONSHIP BETWEEN A BUSINESS CASE AND NET PRESENT VALUE?

A. Net present value ("NPV") is a concept widely used to measure the attractiveness of a business case. A positive NPV means that the present value of the revenues generated by a business opportunity exceeds the present value of the costs (including the cost of capital). Put differently, a positive NPV indicates that a given business decision (e.g., entry into a market) is "economic," within the meaning of that term as contemplated by the FCC and in the economics literature.

Q. DOES THE FCC ENDORSE THE USE OF NPV TO EVALUATE WHETHER CLEC ENTRY IS ECONOMIC?

A. Yes. The FCC explicitly endorses the use of NPV as the proper measure of whether entry is economically possible. (TRO at n. 260.)

Q. PLEASE DISCUSS THE STRUCTURE OF A PROPERLY-SPECIFIED BUSINESS CASE MODEL.

A. A properly structured business case analysis permits the determination of whether entry is economic and thus whether investors would rationally provide the capital needed to fund entry (and other) costs that would be incurred by an efficient CLEC to generate the expected benefits. These costs and benefits can be quantified as cash flows over time. Obviously, if the cash costs, in present value terms, imposed on investors exceed the expected cash benefits, in present value terms, investors will not provide capital and entry will be "uneconomic." Hence, a business case analysis must identify the amount and timing of cash flows, and the method for calculating the present value of those cash flows.

Q. CAN YOU ELABORATE ON THE IMPORTANCE OF THE TIMING AND CERTAINTY OF CASH FLOWS?

A. By timing, I mean that the business case analysis must recognize and properly account for the fact that competitive entry is a long-term proposition. It is common to model the business in question for at least 10 years. One must include all of the cash costs associated with entry, which include any expenditures on capital items that are designed to provide service and generate revenues, over a number of years. It is a fundamental tenet of economics that, all else being equal, a contemporary cash flow is worth more than the same cash flow received in the future. In addition, a cash flow received immediately has no more (and may have less) risk than a longer-term expected cash flow. As a result, a properly specified business case must identify when the cash inflows and outflows occur so that the pattern of cash flows can be compared properly to alternative investments.

Similarly, the future cash flows associated with an investment opportunity (such as competitive entry) cannot be known with certainty. A properly-specified business case must reliably adjust for such uncertainty so as to permit a comparison of the results of this opportunity with alternative investments. As Dr. Billingsley explains in his testimony, this is done by comparing investment opportunities of equal (or reasonably similar) risk in order to determine the cost of capital that is relevant to the business case.

Q. WHAT ADDITIONAL ECONOMIC FACTORS MUST BE CONSIDERED IN A PROPERLY-SPECIFIED BUSINESS CASE?

A. In accounting for the available revenues and associated costs, any business case seeking to represent an accurate picture of whether an efficient CLEC could economically enter any particular local exchange market must consider the cost-reducing effects of scale and scope economies. The FCC has said that state commissions may “not define the market so narrowly that a competitor serving that market alone would not be able to take advantage of available scale and scope economies from serving a wider market.” (TRO at ¶ 495.) Clearly, the FCC contemplates that in considering whether a CLEC can “economically” enter a particular market, the array of opportunities available to a rational CLEC for establishing a profitable business should be considered.

These principles require that an impairment analysis reflect the sources of economic efficiency that are available to an efficient CLEC that is considering competitive entry into the market. It is therefore appropriate to model the *entire* geographic and product scope of operations in which a rational, efficient CLEC would participate. To evaluate the economics of serving a given customer type by geographic market, one must apply this operational model to assess the cash inflows and outflows that occur as a result of a CLEC entering a particular geographic market and serving a particular type of customer (without the local switching UNE) in that market. For example, in assessing whether it is economic for a CLEC to serve mass-market customers in Zone 1 of Memphis, one would first have to model the overall operations of an efficient CLEC. If an efficient CLEC would presumably operate elsewhere in the state and in other states, and would serve enterprise as well as mass-market customers, then those operations must be modeled. In the context of that model, one can assess whether serving mass-market customers in that area would be "economic." That assessment would have to take into account that some costs would be shared with, or borne entirely by, the enterprise part of the business and/or other geographic markets. In this way, any economies of scale or scope would be incorporated into the model when assessing the viability of serving the mass market in any one geographic market.

Q. IS IT NECESSARY TO PERFORM A SEPARATE ANALYSIS, IN ADDITION TO A BUSINESS CASE ANALYSIS, TO ACCURATELY ADDRESS ADDITIONAL CONSIDERATIONS SUCH AS SUNK COSTS AND ECONOMIES OF SCOPE AND SCALE?

A. No. The purpose of a business case is to assess, within the framework of the business case model, the effect of *all* barriers to entry and barriers to capturing profit opportunities that exist in the market at issue. Entry barriers raise the costs or reduce the revenue opportunities associated with competitive entry. A well-specified business case model incorporates as costs (or reductions in revenue opportunities) the effect of all such barriers. Hence, a proper business case will consider and quantify the effects of any economic barrier to entry that is relevant to the market at issue and incorporate it into the model, and similarly will incorporate any benefits from scale or scope economies. The results of the business case will thereby permit a determination of whether entry is economic despite the existence of potential economic entry barriers.

Q. CAN YOU PROVIDE AN EXAMPLE OF HOW ENTRY BARRIERS ARE INCORPORATED INTO A BUSINESS CASE ANALYSIS?

A. Yes. The FCC noted that barriers that may be relevant include (1) scale economies; (2) sunk costs; (3) first-mover advantages; (4) absolute cost advantages; and (5) barriers within the control of the ILEC. (TRO at ¶¶ 87-91.) A business case can be designed to account for any and all of these.

Consider, first, the "scale economies" barrier cited by the FCC. Suppose that a CLEC seeking to enter a market had to invest in an Operational Support System ("OSS") to manage its backend order entry, billing, and other issues. If the system's costs were relatively invariant to scale (i.e., one size fits all), then the OSS system would provide a source of scale economies because they do not increase proportionately with increases in output. The OSS system therefore may deter a CLEC from entering a market if the CLEC does not expect to win enough customers to cover the up-front, scale-invariant costs of the OSS system. This scale economy can be modeled as a one-time, up-front expenditure on the OSS system that does not vary with output volume. By modeling the OSS costs in this way, within the business case analysis, one ensures that the costs, and the effects of scale economies created thereby, are properly considered.

Consider a second example pertaining to "first-mover advantage." The FCC explains that a CLEC may be disadvantaged, relative to the incumbent, by not being able to obtain preferential access to buildings and rights-of-way, or by facing customers that are reluctant to switch carriers. (TRO at ¶ 89.) By properly specifying the costs faced by an efficient CLEC seeking building access or rights-of-way access, the business case would produce an accurate assessment of this particular barrier. In certain cases, the barrier may make entry uneconomic, while in other cases, the attractiveness of a given market may overwhelm this disadvantage.

Barriers that are within the control of the ILEC also can be incorporated into a business case analysis. The FCC's discussion on such barriers focuses on the hot cut process. (TRO at ¶ 91 n. 304, ¶ 459.) The business case can incorporate the effect of ILEC-based barriers, when they exist, by estimating their effects on the CLEC's operating (or acquisition) costs, customer churn, or by estimating their effects on the CLEC's revenue opportunities (e.g., ability to win market share). In sum, the economic effects of the entry barriers described by the FCC (and the countervailing advantages of the CLEC) can, and should, be incorporated into the business case analysis when they exist. By so doing, one may properly determine whether entry genuinely is economic.

III. THE BACE MODEL AND ITS KEY INPUTS

Q. WHAT IS THE PURPOSE OF THIS SECTION OF YOUR TESTIMONY?

A. In this section I do two things: first, I describe why I find the BACE model to be constructed in accordance with both general economic principles and the guidance given in the TRO; second, I supply empirical and economic evidence to support a number of key model inputs for which I am responsible.

Q. CAN YOU PROVIDE AN OVERVIEW OF THE BACE MODEL?

A. Yes. BellSouth's BACE model is a sophisticated, granular, multi-period model of an efficient, generic CLEC's entry into the local telecommunications business. It models in a realistic way the costs and revenues a CLEC would accrue in entering the market, over time and by geographic market. In short, it is the kind of model that a real CLEC could use when constructing a business plan and precisely the kind of business-case model specified by the FCC.

Q. IS THE STRUCTURE OF THE BACE MODEL IN LINE WITH GENERAL ECONOMIC PRINCIPLES?

A. Yes, it is. Over the last few months my staff and I have discussed the structure of the model at length, examined its input tables and outputs, spent significant time working with the model during its development, and met with the model developer (Mr. Stegeman) on numerous occasions. Based on all the work we have done, I believe we have a firm understanding of the economic structure of the model, and I find it to be in line with general economic principles.

Q. DOES THE BACE MODEL PERMIT USERS TO CONDUCT THE ECONOMIC ANALYSIS REQUIRED BY THE POTENTIAL DEPLOYMENT TEST?

A. Yes, it does. As I discussed in the previous section, the TRO establishes a clear approach for conducting the economic analysis required by the potential deployment test. The essence of that test is to model the cash flows of an efficient CLEC to determine whether the NPV of entry in a given market is positive. In my judgment as an economist and based on my extensive work with BACE and Mr. Stegeman, I believe that the BACE model achieves this effectively. It is substantially more detailed in its delineation of revenues and costs than most business case models that I have seen. It is also highly granular in its treatment of geographic and customer variations.

Q. CAN YOU DESCRIBE IN MORE DETAIL THE WAY IN WHICH THE BACE MODEL REPRESENTS A PROPER BUSINESS MODEL, CONSISTENT WITH THE FCC'S DIRECTION IN THE TRO?

A. Yes. First, the model is designed to reflect the costs and revenues of an efficient CLEC that is serving many geographic areas, and is serving both business and residential customers. In doing so, the model captures the benefits in any given geographic market from economies of scale and scope across customer types and across geography. The model also incorporates the ability of a CLEC to target customers and to make economically rational decisions about whether to serve a given geography or type of customer. The BACE model not only includes detailed network costs and wholesale (UNE) costs, it also incorporates realistic costs associated with customer acquisition, churn, taxes, bad debt, and other factors that are relevant to a real firm's profitability. Again, consistent with the direction from the FCC and with sound economic principles, it models a realistic business case in which a CLEC will provide an array of services for which customers will vary in their demands. It also accounts for the fact that some customers will purchase stand-alone basic service, while others will purchase a larger bundle or array of services.

Q. DOES THE BACE MODEL INCORPORATE THE ECONOMIC BARRIERS TO ENTRY THAT MAY BE RELEVANT TO CLEC ENTRY, AS DISCUSSED BY THE FCC?

A. Yes. As Mr. Stegeman testifies, the BACE model considers all relevant costs, whether sunk or recoverable, of entry and operation of a CLEC. In addition to the network costs and operational costs such as collocation, the model incorporates the effects of customer churn, of customer acquisition costs, of OSS costs, and of the fixed costs of providing switching. It also incorporates "first mover advantages" of the incumbent in a number of ways, including the assumption that the entrant will, even after ten years, achieve only a relatively small share of the market.

Q. HOW IS THE BACE MODEL USED TO ASSESS IMPAIRMENT?

A. The criterion for impairment calculated by the model is the NPV standard that was discussed earlier, and the NPV standard is applied separately to the mass-market customers in each geographic market so that each market can be assessed separately. Notably, in the model, it is not sufficient that the total market in a geographic area (enterprise and mass market together) be NPV positive; it must be demonstrated that the mass market itself provides positive NPV in order for the model to deliver the conclusion that the mass market is unimpaired. This is a rigorous test for impairment (indeed, it is overly rigorous from an economic perspective because the model allocates fixed costs to the mass market even in situations in which all the fixed costs might appropriately be allocated to the enterprise market for purposes of an impairment test).

Q. YOU MENTIONED THAT YOU ARE RESPONSIBLE FOR SOME OF THE KEY INPUTS OF THE BACE MODEL. PLEASE EXPLAIN.

A. I provided a number of the inputs into the model, including information regarding segmentation and CLEC revenues, churn, sales expenses, and general and administrative expenses. The development of these inputs required economic analysis and judgment. In the remainder of this section of my testimony, I provide more detail regarding what I recommended for each of these inputs.

Q. PLEASE DISCUSS THE CUSTOMER SEGMENTATION THAT IS USED IN THE BACE MODEL.

A. Certainly. Let me begin by describing why "customer segmentation" as used in the BACE model is required. One of the main themes running through the TRO is the requirement that the impairment analysis be "granular." (E.g., see TRO at ¶ 56.) By this, the FCC has sought to ensure that variations in revenues and costs by geography, customer class, and services offered be taken into consideration. Given this direction, it is clearly inadequate to assume that the CLEC being modeled gains the same revenue per line for every subscriber acquired – obviously some customers spend more than others, and may therefore be more attractive for the CLEC to acquire.

Further, the TRO requires that the CLEC business case model "tak[e] into consideration any countervailing advantages that a new entrant may have." (TRO at ¶ 84.) The ability to target attractive customers selectively is one such advantage that CLECs have exploited in reality and is highlighted in the TRO ("competitors often are able to target particular sets of customers." TRO at n. 1539.) For example, suppose a CLEC determines that it is only profitable to sell to customers who spend at least $60 on local service, features, and long-distance service. The CLEC would then enter the market with a $60 service bundle so that, by self-selection, most of the customers acquired would be profitable. Without a segmentation of customers based on their level of spending, it would be impossible to take into account this kind of "cream skimming" that an efficient CLEC could perform.

As described by Mr. Stegeman, the BACE model reflects both the granular differences in customer spend and the potential for targeting opportunities by dividing the customer base into seventeen segments—one residential segment that is divided into five "quintiles" by customer spend, and four business segments (segmented by numbers of lines at each business customer location), each of which is further subdivided into three "terciles" by spend. Each geographic market (that is, UNE zones subdivided by CEAs, as discussed in Dr. Pleatsikas's testimony) is then allocated the appropriate number of customers from each segment to reflect the actual economic profile of that market. For example, a CLEC may find more high-spend customers in Nashville than in

Fayetteville. I find this segmentation to be an economically reasonable way to take into account the granular variation of customer spending and potential for cream skimming required by the TRO.

Q. HOW IS THE REVENUE OF THE MODELED CLEC DETERMINED?

A. As described by Mr. Stegeman, the revenues of the modeled CLEC are derived from the prices that the CLEC charges, the quantities of different products that each customer takes, and the number of subscribers that it wins in each customer segment – in other words, revenues are derived from prices and quantities, as one would expect.

Q. HOW ARE THE MODELED CLEC'S PRODUCT PRICES AND QUANTITIES DETERMINED?

A. As described in Mr. Stegeman's testimony, the modeled CLEC is able to sell services both *à la carte* and in bundles. The prices and quantities (e.g., the price per long-distance minute and the corresponding minutes of use per customer) by customer segment for *à la carte* services were developed in a pre-processing program using industry standard market sizes and actual billing data for BellSouth's customer locations. Prices for bundled services are direct inputs into the BACE model that I developed after reviewing the prices of actual CLEC bundled service offerings in Tennessee. The bundle prices are generally lower than the price of purchasing the equivalent *à la carte* offerings separately. All prices in the BACE model, whether for *à la carte* or bundled offerings, are, therefore, the “prevailing prices” required by the TRO for this analysis. (TRO at n. 1588.)

Q. HOW IS THE NUMBER OF CLEC CUSTOMERS DETERMINED FOR EACH CUSTOMER SEGMENT?

A. In its most basic terms, for each customer segment, the BACE model computes the total number of customers won by the CLEC in each year by multiplying the CLEC’s forecast market share of local service in that year by the total number of customers in the market. The market share is computed for each of 10 years (*t*), for each market (*i*), and for each customer segment (*j*) and each spend class of each segment, (*k*). Or:

$$CLEC\ Share_{i,j,k,t} = \frac{Number\ of\ CLEC\ Served\ Customers\ Locations_{i,j,k,t}}{Number\ of\ CLEC\ and\ ILEC\ Customers\ Locations_{i,j,k,t}}$$

To describe the CLEC share over time (*t*), I selected a mathematical curve according to which CLEC penetration increases over time at a decreasing rate (that is, more quickly at first, then more slowly over time). This specification requires an estimate of two parameters: the “rate of the climb” (or “*p*-value”) and the ultimate maximum market share (or “asymptote”).

I recommend the use of a rate of climb of 0.50 for residential customers and successively lower *p*-values for the business segments, such that the largest business segment (“SME/C”) has a *p*-value of 0.25. A *p*-value of 0.50 means that the carrier will obtain half the difference between its current market share and its ultimate market share in a given year. The lower *p*-value for business customers means that the CLEC penetration of these customer locations will be slower, in line with the TRO's observation that they might be more willing to sign term contracts. (TRO at ¶¶ 127-128.) Furthermore, I recommend an asymptote of 15 percent for all customer segments in the geographic markets in which the CLEC operates.

Q. WHY ARE THESE RECOMMENDATIONS FOR THE NUMBER OF CUSTOMERS REASONABLE?

A. There are a number of steps that I took to arrive at the rates of climb and ultimate market share that I recommended be included in the model: (1) I reviewed the academic literature on firm growth; (2) I inspected actual CLEC wholesale line gains in the BellSouth region; and (3) I reviewed the success of cable telephony and other providers. Below I will say a few words about each of these sources of information, but in short all of them support the current inputs into the BACE model.

(1) Peer-reviewed empirical studies of firm growth provide support for using a curve of the general shape that I describe that is based on a p-value and an asymptote. Research on firm growth generally has found that the size of a typical, successful entrant (when plotted against time) increases rapidly when the firm is young and small, and tends to level off (i.e., the growth rate decreases) as the firm becomes older and larger (see, e.g., Richard E. Caves, "Industrial

Organization and New Findings on the Turnover and Mobility of Firms," Journal of Economic Literature, Vol. XXXVI, December 1998, pp. 1947-1982).

(2) My review of wholesale data on CLEC lines in BellSouth wire centers also confirms that this general curve shape is reasonable for CLEC entry and growth. I analyzed data on every wire center in the BellSouth territory, examining several hundred examples of entry by different CLECs over time. While the shape of the penetration curves varied from case to case, my visual inspection confirmed the reasonableness of using a two-parameter (i.e., "rate of climb" and asymptote) curve to represent the general penetration profile of an efficient CLEC over the 10-year time frame that is incorporated into the BACE model. In addition to confirming the basic shape of the penetration curves, I found that the actual BellSouth data of CLEC penetration provided support for the asymptote or maximum assumed market share. I specifically note that in the 9-state BellSouth region, CLECs, in aggregate, had attained market shares of 15 percent or more in 172 of BellSouth's wire centers.

(3) Cable TV providers that have elected to offer voice telephony have already achieved penetration rates far in excess of the 15 percent "maximum" market share assumed for the modeled CLEC in the BellSouth business case. Both Cox Communications and Comcast Corp. have successfully rolled out telephony service to their existing customers in target markets. Both operators have achieved penetration rates of 20-30 percent of their target markets in far less

than ten years. I understand that Cox Communications does not currently offer service in Tennessee, but I believe that the experience of cable telephony providers around the country is informative as to levels of penetration that are achievable in Tennessee. For example, according to one estimate, in the Orange County market, Cox Communications serves 53 percent of existing Cox cable TV customers, and Cox has achieved a 19 percent share of telephone-ready homes in Cox's total geographic footprint nationwide. Furthermore, figures cited in the TRO also confirm that cable television companies are having considerable success in those areas where they choose to compete. According to the FCC's figures, cable television companies throughout the nation have captured approximately 26 percent of the households in areas where they compete with the ILEC for voice telephony. The FCC reports that 2.6 million homes subscribe to cable telephony on a nationwide basis and that about 9.6 percent of the nation's 103.4 million households, or 9.9 million households, have cable telephony available to them. Thus, of the 9.9 million that can obtain cable telephone service, 2.6 million (or 26.2 percent) have selected it. (TRO at ¶ 444.) In addition to the cable-telephony experience, a prominent CLEC has reached a 15 percent market share on a statewide basis in less time than I have assumed in the model parameters. UBS Warburg noted in a December 2002 report on AT&T that, "The company [AT&T] recently announced that it had turned EBITDA positive in New York State, where it has roughly 15% market share after almost three years of entry." Hence, if anything, actual experience therefore indicates that 15 percent is a conservative ultimate penetration for the modeled efficient CLEC to achieve after 10 years.

Q. IN CONSIDERING THE MARKET SHARE PENETRATION THAT THE CLECS MAY ACHIEVE, DO YOU ALSO CONSIDER WHETHER THE CLECS MAY PENETRATE DIFFERENT CUSTOMER GROUPS AT DIFFERENT RATES?

A. Yes. In my opinion, it is clear that CLECs attempt to attract disproportionate numbers of high-spending customers. Because CLECs are not obliged to serve all customers, it would be rational for an efficient CLEC to "cream skim," and the price offerings of actual CLECs suggest that this is their aim, as I discussed in my $60 bundle pricing example above. Anecdotal evidence also supports the CLEC customer-targeting hypothesis – for example according to analysts at Banc of America Securities:

> AT&T's approach to launching local service has been very granular. AT&T's "cherry picking" approach has drawn Bell ire but it has worked. The company targets expansion by state, by neighborhood, and by profit hurdle, experiencing substantial success in the process. (David W. Barden, "AT&T Corporation: A Case for Consumer Services," Banc of America Securities—United States Equity Research, April 30, 2003, p. 6.)

Q. IS THERE ANY FURTHER EVIDENCE OF THE DEGREE TO WHICH CLECS SUCCEED IN THEIR EFFORTS TO TARGET HIGH-SPENDING CUSTOMERS?

A. Yes. BellSouth customer disconnect information indicates that the Company's customers whose monthly spending is substantially below the average are least likely to become "competitive disconnects." If there were no customer targeting, one would expect competitors to win customers about evenly from each customer segment. This is not the case. Instead, BellSouth data indicate that competitive disconnects have been lowest among residential customers with lower-than-average spending on telecommunications services. This is illustrated in Aron Exhibit No. DJA-3. The exhibit shows the proportion of competitive disconnects by spending quintile (arrayed from the highest spenders (quintile 1) to the lowest spenders (quintile 5)). Absent cream skimming, one would expect CLECs to win 20 percent of its customers from each quintile (i.e., the line labeled "expected"). However, the exhibit shows that this is not the case. The lowest-spending quintile customers disconnect from BellSouth to go to a CLEC at about one-half the expected (i.e., non-targeted) rate.

Aron Exhibit No. DJA-4 illustrates that cream skimming also occurs in the SOHO ("Small Office/Home Office") category. Like the residential case, if no cream skimming occurred, one would expect customer location losses to be evenly divided among the three spending categories. This implies that 33 of every 100 customers won by the CLEC would be drawn from each of the three spending level segments. Instead, for SOHO customers, CLECs attract the highest spending customer locations at about twice the rate that would occur without cream skimming *** [redacted] ***

Q. BASED ON THIS INFORMATION, WHAT VARIATION IN PENETRATION RATES DO YOU RECOMMEND ACROSS THE CUSTOMER SPEND GROUPS?

A. The evidence clearly supports the economically rational expectation that CLECs engage in customer targeting. Such targeting is efficient and should be considered as one of the "countervailing advantages" that the FCC requires state commissions to consider in their impairment analyses. I recommend that customer targeting be modeled in the residential and SOHO (1 to 3 line) customer segments consistent with the evidence of BellSouth's experience.

Q. YOU HAVE BEEN DISCUSSING THE PENETRATION RATES FOR CLECS IN THE LOCAL VOICE MARKET. HOW DOES THE BACE MODEL ESTABLISH WHETHER A PARTICULAR TYPE OF CUSTOMER WILL PURCHASE ONE OR MORE SERVICES IN ADDITION TO LOCAL EXCHANGE SERVICE?

A. The model considers the penetration calculation in two conceptual parts. The first part produces the overall CLEC market share for local service that I have been discussing above – in other words, the CLEC's success in attracting customers in the marketplace. The second part quantifies the percentage of the CLEC's customers in each customer segment who also subscribe to the other services the CLEC offers, such as long distance, DSL, or a bundle. These two parts work in tandem to produce the number of customers that the CLEC serves with different products in each spend category.

My recommendations for the second part—that is, the penetrations of *à la carte* non-local products—are summarized in Aron Exhibit No. DJA-5. To arrive at these recommendations, I conducted an extensive review of the public literature to find relevant industry data (primarily industry and investment analyst reports and CLEC presentations to investors) and considered data provided by BellSouth from its own experience in the marketplace.

Q. WHAT DO YOU RECOMMEND FOR THE CHURN RATES USED IN THE MODEL?

A. "Churn" refers to the frequency with which customers disconnect or change providers and is generally expressed as the percentage of subscribers who leave a given provider over a particular time period. I recommend the following rates: 4 percent per month for residential customers, 2 percent per month for the two smaller business segments, and 1.5 percent per month for the two larger business segments.

Q. HOW DID YOU ARRIVE AT YOUR RECOMMENDED CHURN RATES?

A. For residential customers, I reviewed actual CLEC churn rates and also the churn experience of related industries such as wireless, long-distance, and Internet access. For actual CLECs, Z-Tel reported a monthly churn of about 4 percent in 3Q01, and MCI reported in the TRO proceeding that long-term churn for its mass-market *Neighborhood* plan is 4-6 percent per month. (See respectively, James J. Linnehan, "Z-Tel Technologies, Inc.—Still Chugging Along," Thomas Weisel Partners Merchant Banking, November 8, 2001, p. 3; and Gil Strobel (Worldcom) to Marlene H. Dortch, Secretary, FCC, CC Dockets No. 01-338, 96-98, 98-147 (filed November 15, 2002).)

The wireless industry may also provide useful inferences regarding CLEC churn. Banc of America Securities believes this to be the case. In the same report I cited earlier they conclude:

> We believe the wireless churn rate is a relatively close proxy for local churn, although we would expect local churn to be higher than wireless churn. The lack of local number portability is a solid churn defense for the wireless companies (LNP is available for local service) and is only partially offset by service and network issues facing wireless carriers.

I concur with this view. The Banc of America report estimates the average cellular churn rate for what the analyst calls the "big six" wireless carriers to be

2.4 percent per month, and 2.6 percent when the analyst includes “smaller wireless carriers and affiliates.” A study by Morgan Stanley (Simon Flannery, “Trend Tracker: Bottom Line Better, But for How Long?” Morgan Stanley North American Equity Research, May 23, 2003) confirms the reasonableness of this estimate.

I am aware that wireless local number portability is expected to increase wireless churn rates. For example, InStatMDR, a market research firm, estimates that local number portability could increase wireless churn 25-50 percent (i.e., from 2.4 percent to 3.0-3.6 percent). Such an increase, were it to occur, would still place wireless churn well below my recommended CLEC consumer churn rate of 4.0 percent, even though it is not clear whether InStatMDR considered all the ways that wireless companies may respond to local number portability to manage their churn (e.g., by changing the structure of their contracts).

I also examined the residential long-distance and high-speed Internet churn experiences. Because long-distance providers have had a longer opportunity to move toward an equilibrium level of churn, and CLECs may bundle high-speed Internet service with their residential voice offerings, the churn rates for these services may provide useful information.

With regard to long-distance service, an IDC survey of residential customers concludes “26.2% of the total population indicated that they changed their long-distance telephone service (not necessarily service providers) in the past 12 months." (*The Evolving Landscape of Consumer Telecom: IDC's 2002 U.S. Residential Telecommunications Survey*, IDC, Report #27724, August 2002, p. 4.) The 26.2 percent annual churn represents 2.5 percent per month. Also, as IDC notes, the 26.2 percent churn survey result includes respondents who changed plans without necessarily changing their particular service provider. Thus, the churn from one provider to another may be even less.

As for high-speed Internet service, the IDC Report concludes, "According to the 2002 survey results, 25.4% of the high-speed Internet population indicated that they changed service providers in the past 12 months." This likewise indicates a churn rate of about 2.5 percent per month.

In short, there is no reason why an efficient CLEC, providing adequate service and customer support, should not achieve a churn rate of 4 percent or lower, per month, for residential customers.

Q. WHAT EVIDENCE DID YOU CONSIDER IN ARRIVING AT YOUR CONCLUSIONS REGARDING CHURN FOR THE BUSINESS SEGMENTS?

A. I reviewed analyst studies and surveys regarding existing levels of churn. For example, a Goldman Sachs analysis claims "[M]any CLECs have customer attrition rates in excess of 2% per month [for business customers with sub-T1 requirements]." (Lawrence Benn, "Telecom Services: CLECs," Goldman Sachs, January 22, 2001, p. 51.) I infer from this that business customers with T-1 (i.e., DS-1) and above requirements would have lower churn rates (and other evidence that I will discuss supports this) because, as the TRO observes, these larger customers would be more likely to be signed to term contracts. (TRO at ¶¶ 127-128.) A study of US LEC, a business-oriented CLEC, by investment analysts Kaufman Brothers, concluded that after quarterly churn "ticked up" to 3 percent due to a "clean-up of payables" and other reasons, the expectation was that churn would return "to historical industry leading levels of 1% per quarter." A quarterly churn rate of 1 percent represents a monthly churn of about 0.3 percent, just one-fifth of the 1.5 percent monthly rate that I recommend for CLECs that serve the larger business customers. Indeed, the Kaufman US LEC Report concludes:

> In our opinion, [US LEC] is executing well in a difficult environment. US LEC, with several years of history in its targeted markets in the mid-Atlantic and south, is approaching incumbent status while its operations achieve critical mass and start to generate positive [free cash flow]. (Vik Grover, "US LEC Corp.: 1Q03 Earnings Review," Kaufman Brothers, L.P., April 30, 2003, p. 1.)

This suggests that an efficient CLEC can move toward an ILEC-type churn rate.

In another survey, Morgan Stanley analysts conclude that about 64 percent of the business customers in its survey are either indifferent to switching, somewhat unlikely to switch, or very unlikely to switch suppliers. (Simon Flannery, "Annual Telecom Services Survey Part 3: Competition" Morgan Stanley North America Equity Research, June 17, 2003, p. 4.) The survey also concludes that 36 percent are "somewhat" or "very" likely to switch local services providers in the next 12 months. If *all* 36 percent of such business customers do in fact switch providers, this would imply a monthly industry-wide churn rate as a result of seeking a different carrier of 3.7 percent. If only those who indicated that they are "very likely" to switch do, in fact, switch, this would imply a monthly churn rate of 1.4 percent.

In sum, my recommendation of a 2 percent churn rate for the smaller (SOHO and "SME/A") business customers and a 1.5 percent churn rate for the "larger" ("SME/B" and "SME/C") business customers is reasonably close to actual CLEC experience (in some instances it is substantially greater than actual CLEC experience) and so provides a generous point of reference for the efficient CLEC.

Q. PLEASE EXPLAIN WHAT YOU MEAN BY "SALES" AND "GENERAL AND ADMINISTRATIVE" EXPENSES.

A. A firm's expenses generally can be organized as being "cost of goods" (or "operating expenses") or "Sales, General & Administrative" (or "SG&A") expenses. I understand that there are no strict accounting guidelines that distinguish between the cost of goods and SG&A classifications. From an economic perspective, the group of expenses known as "sales" contains types of expenses that are different from, and incurred differently than, expenses associated with G&A. The former expenses relate to customer acquisition, while the latter relate to the overall management of the firm (such as executive, legal, human resources, and the like). I therefore analyzed "S" separately from "G&A." To separate the costs, I consulted a survey on CLEC accounting practices by analysts at Merrill Lynch. The survey provided a description of the types of expenses that CLECs generally book as "SG&A." From this description, I could create a mapping of ILEC SG&A accounts to CLEC SG&A accounts. It was on this basis that I was able to harmonize ILEC data with general CLEC accounting practices. As I describe later, I used ILEC data to provide an estimate of the "G&A" portion of expenses. I separately estimated the "Sales" (customer acquisition) expenses.

Q. PLEASE SUMMARIZE YOUR RECOMMENDATIONS WITH REGARD TO CUSTOMER ACQUISITION (I.E., "SALES") COSTS.

A. I recommend that customer acquisition costs for residence customers be no higher than $95 per subscriber, and that business acquisition costs be based on a multiple of about *******[redacted]******* times the first month's expected average revenue for that particular segment of customer.

Q. PLEASE EXPLAIN HOW YOU DETERMINED THE CUSTOMER ACQUISITION COST RECOMMENDATION FOR RESIDENTIAL SUBSCRIBERS.

A. I relied on reports available from Wall Street investment analysts regarding CLEC customer acquisition costs. I also relied on information provided by CLECs in *ex parte* presentations in other regulatory venues, and I considered the academic literature to determine how to interpret these data. First, regarding the empirical survey, I found a range of estimates and claims for customer acquisition costs, as shown in Aron Exhibit No. DJA-6.

As the exhibit shows, analysts at Thomas Weisel Partners indicate that Z-Tel's actual per customer acquisition costs were in the $60-$70 range. They conclude that Z-Tel's target customer acquisition cost of $50 per account has been established as management seeks to improve efficiency by cutting back on telemarketing and eliminating direct mail, "as these are its most expensive sales channels." Z-Tel seeks to emphasize an incentive program that harnesses customer referrals to entice its existing customers to market to new ones.

Also as noted in the exhibit, customer acquisition costs for Talk America currently are estimated to be $80 per customer. According to its website, Talk America provides residential and small business customers with a variety of local, long-distance, and bundled voice offerings, as does the modeled CLEC. For purposes of valuing AT&T, the investment analysts at Banc of America Securities "deem to be appropriate" the use of $125 per customer for AT&T's UNE-P business case. Thus, publicly available estimates of customer acquisition costs for mass-market customers range from $50 to $125.

Q. ARE CUSTOMER ACQUISITION COSTS OF UNE-P-BASED PROVIDERS LIKELY TO BE REPRESENTATIVE OF CUSTOMER ACQUISITION COSTS OF UNE-L-BASED PROVIDERS?

A. There is reason to believe that customer acquisition costs for UNE-P-based providers are higher than those of UNE-L-based providers (and almost certainly higher than those of *efficient* UNE-L providers).

Economists Thomas Hazlett and Arthur Havenner demonstrate that customer acquisition costs are inefficiently high when UNE-P is available in areas where a CLEC would not otherwise suffer impairment. (Thomas W. Hazlett and Arthur M. Havenner, “The Arbitrage Mirage: Regulated Access Prices with Free Entry in Local Telecommunications Markets,” Review of Network Economics, (undated), pp 4-7.) They argue that the availability of the local switching UNE provides a CLEC with the opportunity to defer investment while it gathers more information regarding the future costs and revenues of serving the market. However, what begins as a benefit to CLECs is dissipated in the form of inefficiently high customer acquisition costs as UNE-P-based CLECs seek to compete for customers. The result is inefficiently low facilities investment and inefficiently high customer acquisition costs. Accordingly, one should not accept at face value the actual customer acquisition costs of CLECs, because theory suggests that these may not be representative of the customer acquisition costs that would be incurred by an efficient CLEC.

Based on the Hazlett and Havenner research, one might reasonably select a value from the lower end of the range of data, such as the $50 target for Z-Tel. However, to be conservative I recommend the use of $95 per residential customer, which is above the midpoint of the range.

Q. PLEASE EXPLAIN HOW YOU DETERMINED THE CUSTOMER ACQUISITION COST RECOMMENDATIONS FOR BUSINESS SUBSCRIBERS.

A. These parameter values are based on independent analysis, which I confirmed with information from BellSouth. My analysis considered acquisition costs from Mpower, Choice One, and Allegiance. Mpower, for example, presents data in its December 2001 10-K report that imply that selling cost per gross line added was on the order of $309 in 2000 and $343 in 2001. In a May 2002 conference call for investors, Mr. Steve Dubnik, Chairman and CEO of Choice One Communications, estimated that his company's selling expenses were approximately $170 per line. I also estimate, based on data from a February 19, 2002 analyst report on Allegiance by Thomas Weisel Partners, that Allegiance's customer acquisition costs were on the order of $188 per line in 2001. According to its website, Allegiance does not market to residential customers, so the estimate applies to the types of business customers that are Allegiance's focus.

According to information from BellSouth, it pays its independent sales agents approximately *****[redacted]***** times the first month's revenue to acquire Small Business Customers. CLECs also utilize sales agents and compensate them in a similar fashion. Based on revenue estimates for the different business segments, I conservatively estimated business customer acquisition costs per line as shown in Exhibit DJA-7.

Q. WHAT DO YOU RECOMMEND FOR G&A EXPENSES?

A. I recommend that G&A expenses be modeled as a percent of revenue. I further recommend that G&A be computed as 15 percent of long-distance revenues and 28.4 percent of all other revenue.

Q. HOW DID YOU DETERMINE THAT IT IS APPROPRIATE TO MODEL G&A EXPENSES AS A PERCENT OF REVENUE?

A. As well as conducting an extensive review of the relevant empirical academic literature, I performed my own empirical analysis of G&A expenses. The analysis confirmed that these expenses are substantially and significantly explained, in a statistical sense, by revenues. My analysis examined total operating revenue and G&A expenses for all of the reporting companies (and over the 1992-2002 period) in ARMIS. I used a statistical technique called "weighted regression" to determine the linear relationship between G&A and revenue. The data representing a number of ILECs of various sizes over a number of years, indicated a very strong relationship, with G&A averaging about 28 percent of revenues.

I assumed a lesser G&A of 15 percent of revenue for long distance, because the model assumes that long distance is operated on a resale basis. I expect that a CLEC operating an efficient resale long-distance business would have a significantly lower G&A cost than would a facilities-based operation.

IV. RESULTS OF THE MODEL RUNS

Q. BASED ON THE RESULTS OF THE BELLSOUTH IMPAIRMENT MODEL YOU HAVE DESCRIBED, WHICH GEOGRAPHIC AREAS IN TENNESSEE ARE UNIMPAIRED?

A. Aron Exhibit No. DJA-2 lists the geographic markets in North Carolina in which the FCC's triggers are not met, but where CLECs are not impaired without access to BellSouth's unbundled switching, according to the BACE model. A map of these areas is provided in Aron Exhibit No. DJA-8.

Q. WHAT ARE YOUR CONCLUSIONS?

A. I believe that BellSouth has provided a highly granular, detailed, sophisticated, and nuanced model of CLEC entry that incorporates the directives of the FCC in its TRO, and the best available research on the parameter inputs that were under my supervision and control. I conclude that CLECs are unimpaired in the areas I have listed in Exhibit DJA-2, and the TRA should declare that BellSouth need not provide access to unbundled local switching in those geographic markets. To arrive at any other conclusion would contravene the intention of the Telecommunications Act to promote competition, would contravene the directives of the FCC in implementing the Act, and would discourage efficient investment in Tennessee.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

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Hoover National Fellowship, Hoover Institution, 1992-1993.

Faculty Research Fellow, National Bureau of Economic Research, 1987-1990.

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IBM Chair, Kellogg Graduate School of Management, Northwestern University, 1986-1987.

RESEARCH INTERESTS

Industrial organization, antitrust economics, business strategy, pricing, information industries, network industries, telecommunications policy, theory of the firm, compensation and incentives.

TEACHING

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Also qualified to teach: graduate Microeconomic Theory; Industrial Organization and Labor Economics; the Economics of Personnel; Public Finance; Applied Game Theory.

PUBLICATIONS AND WORKING PAPERS

"Broadband Adoption in the United States: An Empirical Analysis," with David E. Burnstein, in *Down to the Wire: Studies in the Diffusion and Regulation of Telecommunications Technologies,* Allan Shampine, ed., (Nova Science Publishers, Hauppauge, NY, 2003).

"Developments in the Theory of Vertical Foreclosure as Applied to Regulated Telecommunications Markets" (March, 2002), Prepared for Presentation at The American Bar Association Section of Antitrust Law, 50th Annual Spring Meeting.

"Modifications at HHIs for Vertical Supply Relationships" with Wenqing Li and James Langenfeld, White Paper submitted to European Commission, February 2000.

"Economic Theories of Tying and Foreclosure Applied—And Not Applied—in *Microsoft,*" with Steven S. Wildman, *Antitrust*, vol. 14, no. 1, 1999, pp.48-52.

"Effecting a Price Squeeze Through Bundled Pricing," with Steven S. Wildman, in *Competition, Regulation, and Convergence: Current Trends in Telecommunications Policy Research*, Gillett and Vogelsang, eds. (New Jersey: Lawrence Erlbaum Associates, Inc.) 1999, pp. 1-17.

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"The Pricing of Customer Access in Telecommunications," with Steven S. Wildman, *Industrial and Corporate Change*, vol. 5, no. 4, 1996, pp. 1029-1047.

"Bonus and Penalty Schemes as Equilibrium Incentive Devices, With Application to Manufacturing Systems," with Pau Olivella, *Journal of Law, Economics, and Organization*, 10, Spring 1994, pp. 1-34.

"Diversification as a Strategic Preemptive Weapon," *Journal of Economics and Management Strategy*, 2, Spring 1993, pp. 41-70.

"Using the Capital Market as a Monitor: Corporate Spin-offs in an Agency Framework," *RAND Journal of Economics*, 22, Winter 1991, pp. 505-518.

"Firm Organization and the Economic Approach to Personnel Management, *American Economic Review*, vol. 80, no. 2, May 1990, pp. 23-27.

"The Introduction of New Products," with Edward P. Lazear, *American Economic Review*, vol. 80, no. 2, May 1990, pp. 421-426.

"Ability, Moral Hazard, Firm Size, and Diversification," *RAND Journal of Economics*, 19, Spring 1988, pp. 72-87.

"Worker Reputation and Productivity Incentives," *Journal of Labor Economics*, vol. 5, no. 4, October 1987, part 2, pp. S87-S106.

"The Role of Managerial Ability and Moral Hazard in the Determination of Firm Size, Growth and Diversification," Ph.D. Dissertation, University of Chicago, August 1985.

REPRESENTATIVE PRESENTATIONS

"The High Cost of Proposed New Wireless Regulations," Presentation to the Pacific Research Institute conference "Regulating Wireless in California: Bill of Rights... or Wrongs?," San Francisco, April 2003.

"The TELRIC Showdown," Panelist, NARUC Staff Subcommittee on Telecommunications, 2002 Annual Convention, Chicago, Illinois, November 2002.

"Economic Principles for Efficient Pricing of Municipal Rights-of-Way," National Association of Telecommunications Officers and Advisors (NATOA), Chicago, Illinois, September 2002.

"Trends in Voice and Broadband Competition in Telecommunications Markets: Markets, Strategies, and Regulation," 82nd Annual Convention of the Indiana Telecommunications Association, Lexington, Kentucky, June 2002.

"Broadband Deployment in the United States," Emerging Opportunities in Broadband Symposium, Northwestern University, Evanston, Illinois, December 2001.

"Local Competition in Illinois," Illinois Telecommunications Symposium, Northwestern University, Evanston, Illinois, December 2000.

"Licensing and Access to Innovations in Telecommunications and Information Services," Telecommunications Policy Research Conference, Alexandria, Virginia, September 2000.

"Effecting a Price Squeeze Through Bundled Pricing," Federal Communications Commission, Washington, D.C., May 1999.

"Competitive and Strategic Use of Optional Calling Plans and Volume Pricing Plans," The Institute for International Research Conference for Competitive Pricing of Telecommunications Services, Chicago, Illinois, July 1998.

"Effecting a Price Squeeze Through Bundled Pricing," Consortium for Research in Telecommunications Policy Conference, University of Michigan, Ann Arbor, Michigan, June 1998.

"The Pricing of Customer Access in Telecommunications," Conference on Public Policy and Corporate Strategy for the Information Economy, Evanston, Illinois, May 1996.

"Diversification as a Strategic Preemptive Weapon," University of Iowa, Iowa City, Iowa, February 1994.

"Diversification as a Strategic Preemptive Weapon, "University of Buffalo, Buffalo, New York, February 1994.

"Diversification as a Strategic Preemptive Weapon," University of Southern California, Los Angeles, California, December 1993.

"Strategic Pricing," Winter Meetings of the Econometric Society, Discussant, Anaheim, California, December 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Michigan State University, Lansing, Michigan, November 1993.

"Diversification as a Strategic Preemptive Weapon," Rutgers University, New Brunswick, New Jersey, November 1993.

"Diversification as a Strategic Preemptive Weapon," University of California at Santa Cruz, Santa Cruz, California, November 1993.

"Diversification as a Strategic Preemptive Weapon," Graduate School of Business, Stanford University, Stanford, California, November 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Purdue University, West Lafayette, Indiana, September 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Summer Meetings of the Econometric Society, Boston University, Boston, Massachusetts, June 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," University of California, Department of Economics, Berkeley, California, May 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Stanford University, Graduate School of Business, Stanford, California, May 1993.

"Diversification as a Strategic Preemptive Weapon," Stanford University, Graduate School of Business, Stanford, California, April 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Hoover Institution, Stanford, California, April 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," University of California, Graduate School of Business, Berkeley, California, February 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Stanford University, Department of Economics, Stanford, California, February 1993.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," Hoover Institution, Stanford, California, January 1993.

"Pricing Strategies," Session Discussant, 1992 North American Winter Meeting of The Econometric Society, Anaheim, California, January 1992.

"Diversification as a Strategic Preemptive Weapon," University of Toronto, Toronto, Canada, November 1991.

"Diversification as a Strategic Preemptive Weapon," Queen's University, Kingston, Ontario, Canada, November 1991.

"Bonuses and Penalties as Equilibrium Incentive Devices, with Application to Manufacturing Systems," University of Chicago, Chicago, Illinois, June 1991.

"The Timing of Entry into New Markets," Summer Meetings of the Econometric Society, University of Pennsylvania, Philadelphia, Pennsylvania, June 1991.

"Innovation, Imitation, Productive Differentiation, and the Value of Information in New Markets," University of Chicago, Chicago, Illinois, April 1991.

"Bonuses and Penalties as Equilibrium Incentive Devices, with Application to Manufacturing Systems," Winter Meetings of the Econometric Society, Washington, D.C., December 1990.

"Corporate Spin-offs in an Agency Framework," University of Washington, Seattle, Washington, October 1990.

"The Timing of Entry Into New Markets," University of British Columbia, Vancouver, British Columbia, October 1990.

"Corporate Spin-offs in an Agency Framework," Texas A&M University, College Station, Texas, April 1990.

"Firm Organization and the Economic Approach to Personnel Management," Winter Meetings of the American Economic Association, New York, New York, December 1989.

"Corporate Spin-offs in an Agency Framework," Western Finance Association Meetings, Seattle, Washington, June 1989.

"Corporate Spin-offs in an Agency Framework," University of Rochester, Rochester, New York, May 1989.

"Corporate Spin-offs in an Agency Framework," North American Summer Meetings of the Econometric Society, Minneapolis, Minnesota, June 1988.

"Competition, Relativism, and Market Choice," North American Summer Meetings of the Econometric Society, Berkeley, California, June 1987.

"Competition, Relativism, and Market Choice," University of Chicago, Chicago, Illinois, April 1987.

"Rate Reform and Competition in Electric Power," Discussant, Conference on Competitive Issues in Electric Power, Northwestern University, Evanston, Illinois, March 1987.

"Worker Reputation and Productivity Incentives," New Economics of Personnel Conference, Arizona State University, Tempe, Arizona, April 1986.

"Ability, Moral Hazard, and Firm Diversification," Various Universities, 1985, 1994, including Yale University, University of Rochester, Stanford University, University of Minnesota, California Institute of Technology, Duke University, Northwestern University, Brown University, Harvard University, University of California - Los Angeles, University of Pennsylvania.

ACADEMIC JOURNAL REFEREEING

Dr. Aron has served as a referee for *The Rand Journal of Economics, the Journal of Political Economy, the Journal of Finance, the American Economic Review, the Quarterly Journal of Economics, the Journal of Industrial Economics, the Journal of Economics and Business, the Journal of Economic Theory, the Journal of Labor Economics, the Review of Industrial Organization, the European Economic Review, the Journal of Economics and Management Strategy, the International Review of Economics and Business, the Quarterly Review of Economics and Business, Management Science, the Journal of Public Economics, the Journal of Institutional and Theoretical Economics*, and the National Science Foundation.

SELECTED TESTIMONY AND OTHER ENGAGEMENTS

Expert testimony before the Illinois General Assembly regarding the effects of current regulated UNE pricing of telecommunications elements on competitive telecommunications markets in Illinois, May 2003.

Expert testimony before the Pubic Utilities Commission of Ohio on issues related to rights-of-way fees charged to electric, water, and telecommunications companies in the City of Toledo, Ohio, March 2003.

Report evaluating the cost impacts and public policy implications of the proposed California Consumer Protection rules on wireless carriers and customers, February 2003.

Expert testimony before the state regulatory commissions in Ohio, Illinois, Indiana, and Kansas on the economic principles for evaluating anticompetitive claims regarding “winback” pricing by incumbent telecommunications carriers, 2002 - 2003.

Report pertaining to the economic and antitrust analysis of price squeezes, and the suitability of imputation rules as a protection against an anticompetitive price squeeze, for a carrier in a foreign market, 2002.

Expert testimony before the Michigan Public Service Commission pertaining to allegations of anticompetitive effects of long term contracts, 2002.

For a small manufacturer of telecommunications equipment, consulting support to evaluate the antitrust implications of a proposed acquisition, 2002.

White Paper submitted to the Texas Public Service Commission pertaining to the competitive effects of “winback” and “retention” pricing, 2002.

In Order Instituting Rulemaking on the Commission’s Own Motion to Assess and Revise the new Regulatory Framework for Pacific Bell and Verizon California Incorporated, written declaration submitted to the California Public Utilities Commission pertaining to the economic incentives created by modifications to the State’s alternative regulation plan and competitive reclassification of services, 2002.

Statement to the Federal Communications Commission regarding the potential economic causes of sustained price increases for cable television services, 2002.

Expert testimony before the Kansas Corporation Commission regarding the antitrust principles relevant to establishing rules for competitive reclassification of services under governing state law, 2002.

For a national wireless telecommunications carrier, consulting support pertaining to litigation regarding access charges, 2001.

Expert testimony before the Missouri Public Service Commission pertaining to price squeeze allegations in the long-distance market, 2001.

Expert affidavit submitted to the Circuit Court in the state of Wisconsin, pertaining to irreparable harm caused if court declined to grant a stay of disputed performance remedy plan, 2001.

Expert testimony before the public utilities commissions of Illinois, Ohio, California, and Indiana, pertaining to the economic viability of constructing and provisioning ADSL services, including market definition and examination of competitive conditions, 2001.

Expert testimony before the Illinois Commerce Commission pertaining to the proper economic principles governing unbundling obligations, 2001.

In the matter of H & R Mason Contractor's et al. v. Motorola, Inc. et al., before the Circuit Court of Cook County, Illinois, expert affidavit examining the economic impediments to class certification, focusing on the determinants of price in the relevant equipment markets, April 2001.

For a competitive local exchange provider in a foreign market, consulting support regarding the proper determination of avoided costs for resale of incumbent services, April 2001.

For a major Japanese telecommunications equipment manufacturer, evaluated the revenue potential and desirability of entering several advanced services equipment markets worldwide, for the purposes of assisting the client to evaluate a proposed acquisition, February 2001.

Expert testimony in the Illinois Commerce Commission's Investigation Into Certain Payphone Issues, examined the economic and public policy issues pertaining to pricing of access lines for independent pay telephone providers, April 2001.

In the matter of the Illinois Public Utility Commission's Investigation Into Tariff Providing Unbundled Local Switching And Shared Transport, expert testimony regarding economic antitrust perspectives on obligations of firms to affirmatively help their competitors, and related public policy issues, April 2001.

In response to Request for Consultations by the U.S. Trade Representative (USTR) with the Government of Mexico before the World Trade Organization (WTO) regarding barriers to competition in Mexico's telecommunications market, analyzed regulated switched access rates in the U.S. in comparison with those charged by Telmex, November 2000.

Declaration submitted to the Texas Public Utility Commission, analyzed proposed regulation aimed at preventing incumbents from executing a price squeeze; developed a framework for evaluating claims of a price squeeze consistent with antitrust principles of predation, August 2000.

For a taxicab company, analysis of regulatory requirements in the City of Chicago pertaining to valuation of medallions and valuation of capital for purposes of regulatory ratemaking proceeding, 2000.

Written and oral testimony before the public utility commissions of Illinois and Michigan in various arbitration matters pertaining to the proper compensation for the use by competitors of client's facilities for foreign exchange services, 2000.

For a firm in the aluminum fabrication industry, in the matter of a potential merger between vertically integrated competitors, developed a methodology for adjusting the HHI measure of market concentration to account for the vertical control by the merging parties of downstream competitors, 2000.

For a large newspaper publisher, in the possible acquisition of the San Francisco Chronicle, analyzed the potential antitrust impediments to an acquisition by the client of the Chronicle, including issues of geographic and product market definition, the interplay between advertising markets and customer markets, and the relevant implications of the Newspaper Preservation Act, 1999.

Testimony before the Illinois Commerce Commission regarding the proper economic interpretation of the standards for declaring a service competitive under the Illinois Public Utilities Act, and quantification of the extent of competition in relevant Illinois markets, including discussion of market definition; the relevance of entry conditions; the relevance of resale competition and analysis of various resale entry strategies; the interdependence of resale and facilities-based entry strategies; and implementation of a technology-based method of measuring market participation, 1999-2000.

For a firm in the consumer mapmaking business, analyzed market definition, concentration, and efficiencies from a proposed merger, 1999.

Affidavit submitted jointly with Robert G. Harris to the Federal Communications Commission in the matter of "unbundled network elements" and commenting on the proper interpretation of the "Necessary and Impair" standard, including discussion of entry conditions and the business-case approach to valuation of an entry strategy, April 1999; reply affidavit May 1999.

Affidavit, "An Analysis of Market Power in the Provision of High-Capacity Access in the Chicago LATA," submitted to the Federal Communications Commission, including an analysis of the US DOJ merger guidelines and their applicability to regulatory relief in a regulated market, as well as extensive empirical modeling of the costs and business case for network buildout of high capacity facilities, February 1999.

White Paper, "Proper Recovery of Incremental Signaling System 7 (SS7) Costs for Local Number Portability," submitted to the Federal Communications Commission, April 1999.

PROFESSIONAL ORGANIZATIONS

Member, Telecommunications Policy Research Conference Program Committee

Member, American Economic Association

Member, Econometric Society

Associate Member, American Bar Association

PERSONAL INFORMATION

Born: March 15, 1957
Los Angeles, CA

November 2003

ADDITIONAL UNIMPAIRED MARKETS IN TENNESSEE			
UNE Zone	**CEA**	**Net Present Value**	**NPV for Mass Market**
Zone1	Clarksville-Hopkinsville TN-KY	1,410,776	582,168
Zone1	Jackson TN	821,100	256,894
Zone1	Knoxville TN	8,241,181	1,775,008
	TOTAL:	**10,473,057**	**2,614,069**

CROSS-PENETRATION CUSTOMER PROPENSITIES					
	Long-Distance	Voice Mail	DSL	Other Data Services	Inside Wire
Residence	90%	30%	5% in year 1 to 15% in year 3.	0%	0%
SOHO	90%	30%	10% in year 1 to 25% in year 3	0%	0%
SME/A	83%	40%	0%	20%	0%
SME/B	77%	20%	0%	15%	0%
SME/C	70%	0%	0%	15%	0%

CUSTOMER ACQUISITION ("SALES") COSTS OF AT&T AND OF CLECS THAT MARKET TO MASS-MARKET CUSTOMERS		
	Source	
Z-Tel (Management target)	(1)	$50
Z-Tel (Actual)	(1)	$60 - $70
Talk America (Estimate of actual experience)	(2)	$80
AT&T (Estimate of actual experience)	(3)	$125

Sources:
(1) James J. Linnehan, "Z-Tel Technologies, Inc. – Market Perform," Thomas Weisel Partners Merchant Banking, August 13, 2001 p. 3. (May exclude television advertising.)
(2) Vik Grover, "Raising Numbers Again," Kaufman Bros. Equity Research (KBRO Kaufman Bros. L.P.), April 30, 2003, p. 1. See, also, Josephine Shea, "Talk America Holdings, Inc." Morgan Joseph High Yield Research, May 27, 2003, p. 1.
(3) David W. Barden, "AT&T Corporation: A Case for Consumer Services," Banc of America Securities—United States Equity Research, April 30, 2003, p. 20.

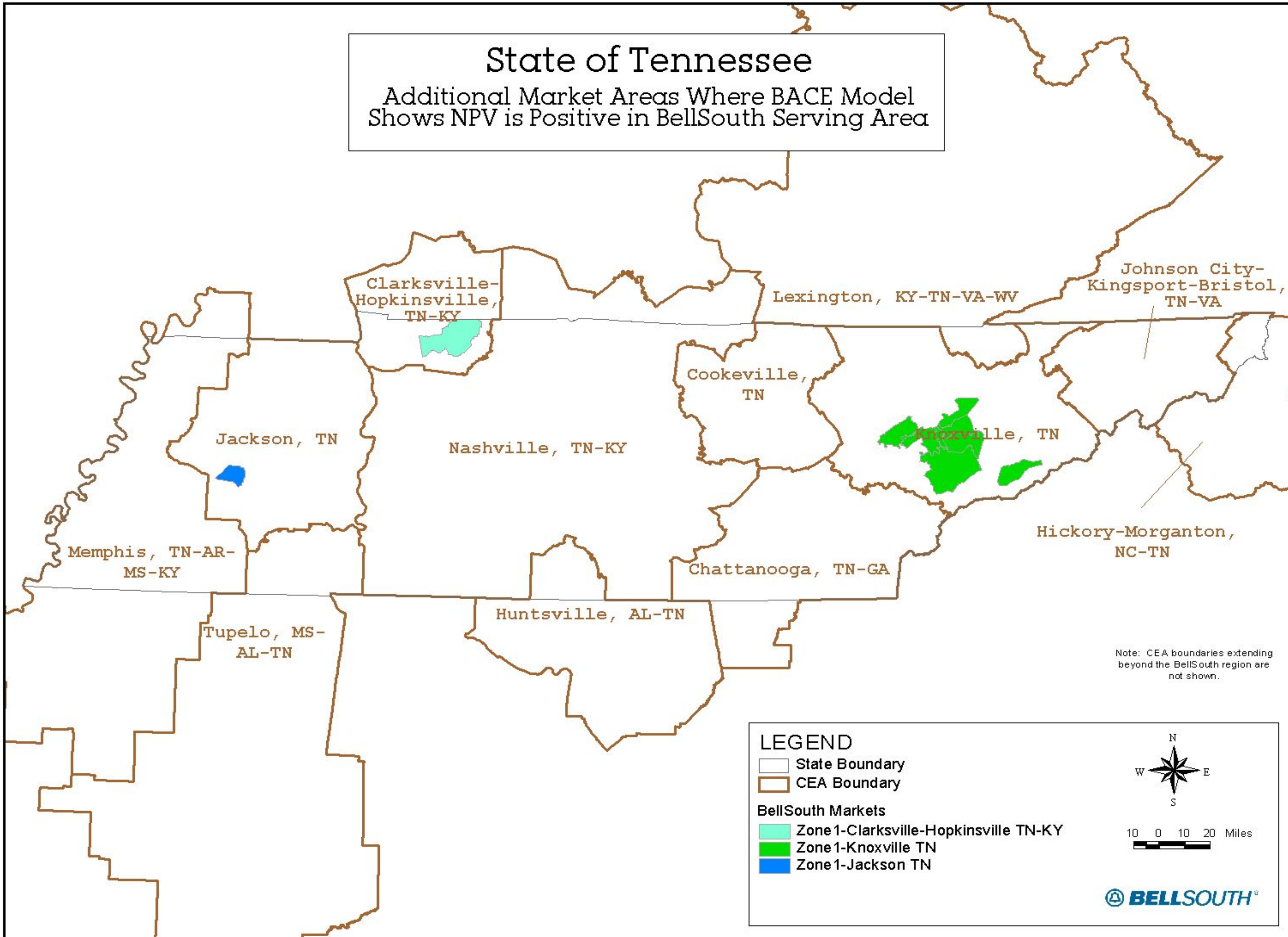
IMPLICATION OF ESTIMATED PER LINE SALES EXPENSES FOR THE BACE MODEL BUSINESS CUSTOMER SEGMENTS				
	BACE Estimate (per Line)	Company and Per Line Sales Expense		
		MPower	ChoiceOne	Allegiance
SOHO	$324	N/A	N/A	N/A
SME/A	$333	N/A	N/A	N/A
SME/B	$387	N/A	N/A	N/A
SME/C	$421	N/A	N/A	N/A
Average	N/A	$309-343	$170	$188

Notes and Sources:

Mpower estimate is based on company's reported customer acquisition costs and LECG estimate of gross line additions (i.e., gross adds = net adds + (avg. lines * 2% monthly churn rate)).

ChoiceOne estimate is Steve Dubnik, Chairman and CEO "Choice One Communications Q1 2002 Earnings Call," Fair Disclosure Financial Network, May 9, 2002, p. 8. (transcript).

Allegiance is estimated as 30% of SG&A expenses / estimated gross line adds (net adds + (avg. lines * 2% monthly churn rate)), where the 30% is estimated based on Peter DiCaprio *et al*., "Allegiance Telecom, Inc. – Q4 Preview - Operating Leverage Cometh" Thomas Weisel Partners Report, February 19, 2002, p. 7.


State of Tennessee
Additional Market Areas Where BACE Model Shows NPV is Positive in BellSouth Serving Area
Clarksville-Hopkinsville, TN-KY
Lexington, KY-TN-VA-WV
Johnson City-Kingsport-Bristol, TN-VA
Cookeville, TN
Jackson, TN
Nashville, TN-KY
Knoxville, TN
Memphis, TN-AR-MS-KY
Chattanooga, TN-GA
Hickory-Morganton, NC-TN
Huntsville, AL-TN
Tupelo, MS-AL-TN
Note: CEA boundaries extending beyond the BellSouth region are not shown.
LEGEND
State Boundary
CEA Boundary
BellSouth Markets
Zone1-Clarksville-Hopkinsville TN-KY
Zone1-Knoxville TN
Zone1-Jackson TN
N
W
E
S
10 0 10 20 Miles
BELLSOUTH

BELLSOUTH TELECOMMUNICATIONS, INC.

BEFORE THE

TENNESSEE REGULATORY AUTHORITY

DOCKET NO. 03-00491

DIRECT TESTIMONY OF

DR. CHRISTOPHER JON PLEATSIKAS

Q. PLEASE STATE YOUR NAME AND POSITION.

A. My name is Christopher Jon Pleatsikas. I am a Principal at LECG, Inc. My business address is 2000 Powell Street, Suite 600, Emeryville, California 94608.

Q. PLEASE DESCRIBE LECG.

A. LECG is an economics and finance consulting firm that provides economic expertise in litigation, regulatory proceedings, and business strategy. Our firm comprises more than 550 economists from academe and business, and has 25 offices in six countries. LECG's practice areas include antitrust analysis, intellectual property, and securities litigation, in addition to specialties in the telecommunications, gas, electric, and health care industries.

Q. PLEASE DESCRIBE YOUR PROFESSIONAL QUALIFICATIONS.

A. I have a B.A. from the University of Pennsylvania, as well as an M.S. in Natural Resources from the University of Vermont and an M.A. and a Ph.D. in Regional

Economic Analysis from the University of Pennsylvania. I have taught economics at both the University of Pennsylvania and the University of Maryland. My particular areas of expertise are industrial organization, competition policy, and microeconomics. I have extensive experience, both in the U.S. and abroad, in damages analysis, antitrust litigation, and in other litigation and strategic consulting assignments concerning a number of industries including telecommunications and a wide variety of other network industries. I have testified and submitted testimony before a number of courts and administrative agencies both in the U.S. and abroad.

Prior to joining LECG I was a Principal at Putnam Hayes & Bartlett. I have also been a Manager in the Economic Analysis Unit at Price Waterhouse. I have authored and co-authored a number of papers. My most recent papers include a book chapter and a journal article on analyzing market definition and market power issues in high technology industries and a journal article comparing the merger guidelines in the United States, Australia and New Zealand. My professional qualifications are detailed in my curriculum vitae, which is submitted as Pleatsikas Exhibit No. CJP-1.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. Section 51.319(d)(2)(i) of the Rules promulgated by the Federal Communications Commission ("FCC") in connection with its Triennial Review Order ("TRO") requires commissions to define the "relevant geographic area" that they will use as their geographic unit of analysis in determining whether competitive local exchange carriers ("CLECs") are impaired without unbundled access to an incumbent local exchange carrier's ("ILEC's") local circuit switching to serve mass-market customers. The purpose of my testimony is to provide the appropriate, economically sound definition of these "geographic areas" for the use by the Tennessee Regulatory Authority ("TRA") in this proceeding.

Q. WHAT IS THE ROLE OF THE GEOGRAPHIC MARKET DEFINITION IN AN IMPAIRMENT ANALYSIS?

A. The FCC requires that, having defined "the markets in which they will evaluate impairment by determining the relevant geographic area to include in each market," a state commission must apply the impairment analysis required for unbundled local switching for mass-market customers "on a granular basis to each identifiable market" (TRO, ¶495).

That is, having decided how to define the geographic markets, the TRA must determine whether CLECs are impaired or not impaired at the level of these geographic markets—no determination of impairment at a different geographic scale should be made. Further, the same geographic area must be used for both the "triggers" analysis and the "potential deployment" analysis that the TRA must perform.

Q. DOES THE FCC PROVIDE GUIDANCE REGARDING THE DEFINITION OF THE APPROPRIATE GEOGRAPHIC AREAS TO BE USED IN A STATE COMMISSION'S IMPAIRMENT ANALYSIS?

A. Yes, it does. Section 51.319(d)(2)(i) provides that direction, stating:

> Market definition. A state commission shall define the markets in which it will evaluate impairment by determining the relevant geographic area to include in each market. In defining markets, a state commission shall take into consideration the locations of mass market customers actually being served (if any) by competitors, the variation in factors affecting competitors' ability to serve each group of customers, and competitors' ability to target and serve specific markets profitably and efficiently using currently available technologies. A state commission shall not define the relevant geographic area as the entire state.

Q. DR. PLEATSIKAS, GIVING APPROPRIATE CONSIDERATION TO THE FCC'S DIRECTION, CAN YOU PROVIDE THE DEFINITION OF THE

GEOGRAPHIC MARKET THAT YOU BELIEVE THE TRA SHOULD APPLY IN THESE PROCEEDINGS?

A. Yes. Based on my considerations of the factors that the FCC has outlined, I recommend that the TRA define as the relevant geographic markets in Tennessee the UNE rate zones ("UNE Zones") that the TRA has defined previously, subdivided into Component Economic Areas ("CEA") as defined by the Bureau of Economic Analysis, a part of the United States Department of Commerce. I have attached as Pleatsikas Exhibit No. CJP-2 a map that displays the 24 markets that exist in Tennessee as a result of using this definition.

Q. WHY ARE THE TRA'S UNE ZONES THE APPROPRIATE STARTING POINT FOR THE DEFINITION OF THE GEOGRAPHIC AREA?

A. The FCC's discussion in its TRO suggested that state commissions might "consider how UNE loop rates vary across the state" in determining the geographic markets, and that UNE zones may therefore be a useful part of the market definition to use in this proceeding (TRO, ¶496).

Moreover, using UNE Zones as the basis for market definition is directly responsive to the TRO's Rule that I cited. UNE Zones reflect the "locations of mass-market customers actually being served by competitors." I understand that CLECs in Tennessee serve the greatest number of customers in the more urban

UNE Zones 1 and 2 than in the more rural UNE Zone 3. UNE Zones also take into account the "variation in factors affecting competitors' ability to target and serve specific markets profitably," because loop rates are determined by UNE Zone, with higher UNE loop rates in areas that are more costly to serve. This variation in costs is an important factor in determining where a CLEC may be able to serve customers profitably because, although each CLEC will have to consider a number of company-specific factors in deciding where to offer services with its own switch, most CLECs will have to consider the cost of the unbundled loops used to connect end users to the CLECs' switches. Use of UNE Zones is therefore directly responsive to the TRO's guidance to "consider how competitors' ability to use self-provisioned switches or switches provided by a third-party wholesaler to serve various groups of customers varies geographically…." (TRO, ¶ 495).

In Tennessee, as in most other states, the TRA has divided the state into three separate zones, with different unbundled loop rates in each zone. The price of a loop is a factor a CLEC considers when determining where it will provide mass-market service using its own switch. This is the behavior we have seen with CLECs using UNE-P, whose rates also vary by UNE Zone. For example, according to one investment analyst, AT&T takes a targeted approach to market entry and enters only those areas where its UNE-P costs are at a 45 percent (or greater) discount to retail prices.

Q. WHY SHOULD UNE ZONES BE FURTHER SUBDIVIDED TO DEFINE THE RELEVANT GEOGRAPHIC MARKETS IN TENNESSEE?

A. The TRO repeatedly indicates the determination of impairment be "granular," i.e., that the geographic areas chosen must be smaller than a state and should "attempt to distinguish among markets where different findings of impairment are likely" (TRO, ¶495). In Tennessee, for example, there are local telephone subscribers located in UNE Zone 1 in Nashville, and there are local telephone subscribers located in UNE Zone 1 in Memphis. Even though all of these customers are in the same UNE Zone, and therefore a competitor would face the same UNE loop prices in both places, the two areas are so geographically distant that the costs of transport could impact the ability to consider these two distant locations to be a single market. That is not to say that UNE Zones 1 in Nashville and Memphis might not be a single market for some CLECs, but to be granular in the assessment of impairment, it is necessary to further divide the UNE zones to account for other types of costs that separate Nashville and Memphis into distinct geographic markets. Having considered several alternatives, I find that superimposing the Component Economic Areas (CEAs) on top of the UNE Zones addresses issues such as this in an economically reasonable manner. I would note that CEA boundaries follow county lines, and zones follow wire center boundaries. As a result, sometimes a CEA boundary will split a wire center service area. In these instances, the entire wire center is associated with the CEA in which the majority of the wire center area falls. You can see an example of this by looking at Pleatsikas Exhibit No. CJP-2 and particularly at the Huntsville, AL-TN CEA. You will see that the Huntsville, AL-TN CEA Zone 3 market area actually extends across the CEA boundary into the Nashville, TN-KY CEA.

Q. WHAT IS A CEA?

A. A CEA is one of 348 geographic areas defined by the U.S. government's Bureau of Economic Analysis ("Bureau"). Each CEA comprises adjacent counties that are economically related, and collectively the 348 CEAs cover the entire United States. The Bureau devised CEAs to define granular, economically meaningful geographic areas that could be used, for example, by "government agencies [that] often use relatively small areas for design of their program regulations or implementation of their licensing programs," or by "businesses [that] need such detail for determining plant locations and for defining sales and marketing territories." CEAs have, for example, been used by the FCC for its geographical licensing schemes and used by the Bureau as the basis for its local economic projections.

Q. HOW ARE CEAS DETERMINED?

A. The Bureau has described the process that it used to determine CEAs in the following manner. The Bureau first identified "economic nodes," which are metropolitan (or similar) areas that serve as "centers of economic activity." The Bureau then assigned to each node those counties that were "[the] most closely related." Thus, each CEA consists of a single economic node and the surrounding counties that are economically related to the node. Of the nodes, nationwide, 90 percent are in metropolitan areas, and 10 percent are in non-metropolitan areas. The resulting CEAs are continuous and cover the entire country.

CEAs were created to be economically meaningful in that they separate various parts of a state into different geographic market areas based on economic factors (such as commuting patterns and newspaper readership). Using the CEA creates a geographic area with a community of interest. For example, because CEAs reflect newspaper circulation and commuting patterns, a CLEC could choose to market in one CEA but not in another, e.g., through print advertising and billboards. In short, my definition of the appropriate "geographic area" takes one concept that is relevant for this proceeding, namely the UNE Zones, and subdivides those zones by another relevant geographic delimiter, the CEA, to produce a set of granular, economically-meaningful markets consistent with the TRO's guidance.

Q. ARE THERE OTHER DEFINITIONS OF THE RELEVANT GEOGRAPHIC MARKET THAT THE TRA COULD CONSIDER?

A. The answer is yes, in part. I believe that any definition that is not based on UNE Zones would be inappropriate. However, once the decision to use UNE Zones is made, there are other ways to subdivide the UNE Zones that the TRA could consider. I have considered those that appear relevant, and have determined that UNE Zones subdivided by CEAs is the most reasonable basis for defining geographic market for the present purposes.

Q. COULDN'T THE TRA SUBDIVIDE THE UNE ZONES BY METROPOLITAN STATISTICAL AREAS ("MSAS")?

A. Yes it could. However, unlike CEAs, MSAs do not cover an entire state. For example, of the 3,151 counties in the U.S., only 836 are part of an MSA. In contrast, all counties are associated with a relevant CEA. Accordingly, if the TRA chose to use MSAs (along with UNE Zones), parts of Tennessee would be excluded from consideration in any impairment test.

Q. YOU HAVE DISCUSSED USING UNE ZONES SUBDIVIDED BY CEAS OR MSAS. WHAT ABOUT USING SMALLER GEOGRAPHIC AREAS SUCH AS WIRE CENTERS?

A. My conclusion is that using wire centers would be inconsistent with economic principles and with the tenets established in the TRO. The FCC in its order said that the states "should not define the market so narrowly that a competitor serving that market alone would not be able to take advantage of available scale and scope economies from serving a wider market" (TRO, ¶495). The FCC also required state commissions to take into consideration the locations of mass-market customers actually being served by competitors. A wire center level definition of the geographic market does not satisfy either of these criteria and is therefore inappropriate.

To elaborate, CLECs today are not limiting the customers they serve from a single switch to those located in a single wire center. Rather, they are casting their nets as wide as is economically feasible to take advantage of economies of scale. This observation is consistent with actions the CLECs have taken to design and implement their networks independent of the existing incumbent local exchange carrier's network and wire centers. To use the language of the TRO, the ability to design a network to take advantages of the relative economics of switching, loops and transport is one of the "countervailing advantages" that a new entrant may have (TRO at ¶84).

Q. WHAT SUPPORT DO YOU HAVE FOR THE PROPOSITION THAT CLECS HAVE NOT BUILT THEIR NETWORKS TO SERVE CUSTOMERS BASED ON WHERE THE CUSTOMERS ARE LOCATED

IN RELATION TO THE INCUMBENT LOCAL EXCHANGE COMPANY'S WIRE CENTERS?

A. I understand that the BellSouth witness discussing the "triggers" test has analyzed the locations of CLEC switches and CLEC customers and has found that the CLECs are serving customers in wire centers other than where their switches are located. In addition, the CLECs have been very clear that they are not designing their networks based on BellSouth's hierarchy of wire centers. For example, in the transcript of an arbitration between AT&T and BellSouth in Florida (Docket No. 000731-TP), the prefiled testimony of David L. Talbott, a witness for AT&T notes that AT&T deploys its switches consistent with the "costs and efficiencies of today's technologies." Mr. Talbott stated in his prefiled testimony that AT&T has deployed fewer switches and more transport on the end user side of the switch (Transcript Vol. 1, page 94). The witness was very clear that AT&T did not intend to replicate BellSouth's wire center-based architecture. AT&T also indicated in that proceeding that, even though it did not have as many switches as BellSouth, its switches were capable of serving every customer in BellSouth's geographic footprint.

Wire centers have been defined in terms of BellSouth's switch locations and the customers served by those switches. AT&T has chosen another approach, which is to serve customers in a wider geographic area with a single switch, as have any number of other CLECs. Therefore, the wire center concept is not relevant to market definition in this context, and specifically not economically relevant in terms of how CLECs provision services to their end users. The geographic scope of the service offered is limited in part by the CLEC's ability to economically serve those customers using the CLECs' network design, not by the location or span of BellSouth's wire centers.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes it does.

CHRISTOPHER J. PLEATSIKAS
c/o LECG
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510-653-9800

PROFESSIONAL EXPERIENCE

Christopher Pleatsikas is a Principal at LECG. He also has been a principal at Putnam, Hayes & Bartlett, Inc. Dr. Pleatsikas has served as a manager of the Economic Analysis Unit, Management Advisory Services, at Price Waterhouse and was a managing associate at Urban Systems Research and Engineering, Inc. He has taught econometrics and quantitative methods at the University of Pennsylvania and the University of Maryland. Dr. Pleatsikas has been engaged in substantial academic research in and has written extensively on antitrust and competition issues. His recent papers include analyses of the interface between antitrust and regulatory policy, evaluation of the implications of standards for determining whether prices are predatory, assessments of the competitive implications of contractual provisions and arrangements and analyses of merger policies and regulations.

His major project experience includes: *antitrust/competition analysis* (mergers and acquisitions, market definition, assessments of market power, evaluation of contractual and other business practices, monopolization and attempted monopolization, monopoly leveraging, price fixing and price discrimination, predatory pricing, and evaluation of competition and efficiency impacts of business practices and public policy); *intellectual property* (patent/copyright/trademark infringement; valuation; patent fraud/misuse; pooling); *damages* (causation, lost sales or profits, reasonable royalty, unjust enrichment, punitive damages; breach of contract, fraud, intellectual property, class action certification and damages, antitrust and "unfair competition"); *regulation* (development of deregulation/re-regulation regimes; prudence inquiries, facility siting and planning, reasonableness of rates and ratebase, and demand forecasting).

Dr. Pleatsikas has been engaged in assignments covering a wide range of industries, although he has particular expertise in the high technology (computers, computer components, software, microprocessors and other semiconductors, semiconductor manufacturing equipment, medical technology, advanced electronic and electrical components, digital signal processing equipment and telecommunications equipment, pharmaceuticals and other specialty chemicals and biotechnology) and energy (oil, gas and coal extraction and processing, electricity and natural gas transmission, distribution and retailing, electricity generation, solar and geothermal energy generation) industries. In addition, he has extensive experience in a variety of other industries, including metals and metals processing, financial services and insurance, building materials, transportation, telecommunications services, food products, furniture and other household products, defense equipment, aircraft and air travel, and a variety of other consumer and intermediate goods and services. He has also been co-director of an economic forecasting service.

Dr. Pleatsikas has testified and/or submitted testimony to courts and administrative bodies in the United States, Australia, New Zealand and the Republic of Singapore.

Dr. Pleatsikas has Ph.D. and M.A. degrees in Regional Economic Analysis from the University of Pennsylvania, an M.S. in Natural Resources from the University of Vermont and a B.A. from the University of Pennsylvania.

EDUCATION
Ph.D., UNIVERSITY OF PENNSYLVANIA, Economics, (Regional Economic Analysis).
M.S., UNIVERSITY OF VERMONT, Natural Resources.
B.A., UNIVERSITY OF PENNSYLVANIA.

TESTIMONY, EXPERT REPORTS AND AFFIDAVITS
Dr. Pleatsikas has testified on numerous occasions in a variety of venues, including:
• United States Federal Court
• United States State Courts (e.g., California, Louisiana)
• State Administrative Agencies (e.g., Public Utilities Commissions)
• United States Federal Administrative Agencies (e.g., International Trade Commission)
• Federal Court of Australia
• High Court of New Zealand
• High Court of the Republic of Singapore

Dr. Pleatsikas has also provided expert reports to foreign administrative agencies and has testified in private arbitrations. In addition, he has been retained as an expert on numerous occasions in other matters that were settled prior to trial or the provision of written or oral testimony. A list of his testimony is available on request.

PUBLICATIONS AND PRESENTATIONS
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Christopher J. Pleatsikas Page 3 3 Philip McLeod and Chris Pleatsikas, “The California Electricity Crisis and Antitrust Analysis,” Trade Practices Law Journal, 2002.

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Stephen King and Chris Pleatsikas, “Exploitation of Market Power,” Economics in Trade Practices Workshop, Federal Court of Australia, April 7-8, 2001.

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Ed Sherry and Chris Pleatsikas, “The Napster Controversy: Intellectual Property Meets Competition Policy,” Trade Practices Law Journal, 2001.

Chris Pleatsikas and David Teece, “The Analysis of Market Definition and Market Power in the Context of Rapid Innovation,” International Journal of Industrial Organization, 2001.

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David Teece and Chris Pleatsikas, “New Indicia for Competition Analysis in High Technology Industries,” presented at the Dynamic Competition and Public Policy Conference (sponsored by the Mercatus Center and the James Buchanan Center at George Mason University), Washington, DC, December 16-17, 1998.

Mary Coleman, Chris Pleatsikas, and David Teece, "The Approach to Merger Analysis by Federal Antitrust Agencies in the United States, Australia, and New Zealand: An Economic View," Trade Practices Law Journal, September, 1998.

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Christopher J. Pleatsikas Page 4 4 Chris Pleatsikas and Bruce Turner, "Electric Competition in New Zealand: Putting Last Things First," Public Utilities Fortnightly, June 15, 1996.

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C. Pleatsikas, Regional and Temporal Variation in Production Cost Relationships for Manufacturing Industries, Univ. of Michigan (Ph.D. Dissertation at the University of Pennsylvania), 1983.

C. Pleatsikas, E. Hudson and R. Goettle, Solar Energy and the U.S. Economy, Westview Press, 1982.

C. Pleatsikas, et al. "Economic Impacts of the Domestic International Sales Corporation (DISC) Tax Provisions," prepared for the American Business Conference and the Business Roundtable, 1982.

C. Pleatsikas and W. Moss, "Federal Tax Credits, Profitability and Market Diffusion of New Thermal Technologies for Industry, " presented to the American Society of Mechanical Engineers Annual Conference, Albuquerque, New Mexico, 1982.

C. Pleatsikas, C. Demeter, "Comparing Lifetime Costs of Meeting Sulfur Dioxide Emissions Standards with and without Flue Gas Desulfurization for Electric Power Plants," presented to the 43rd Annual American Power Conference, Chicago, 1981.

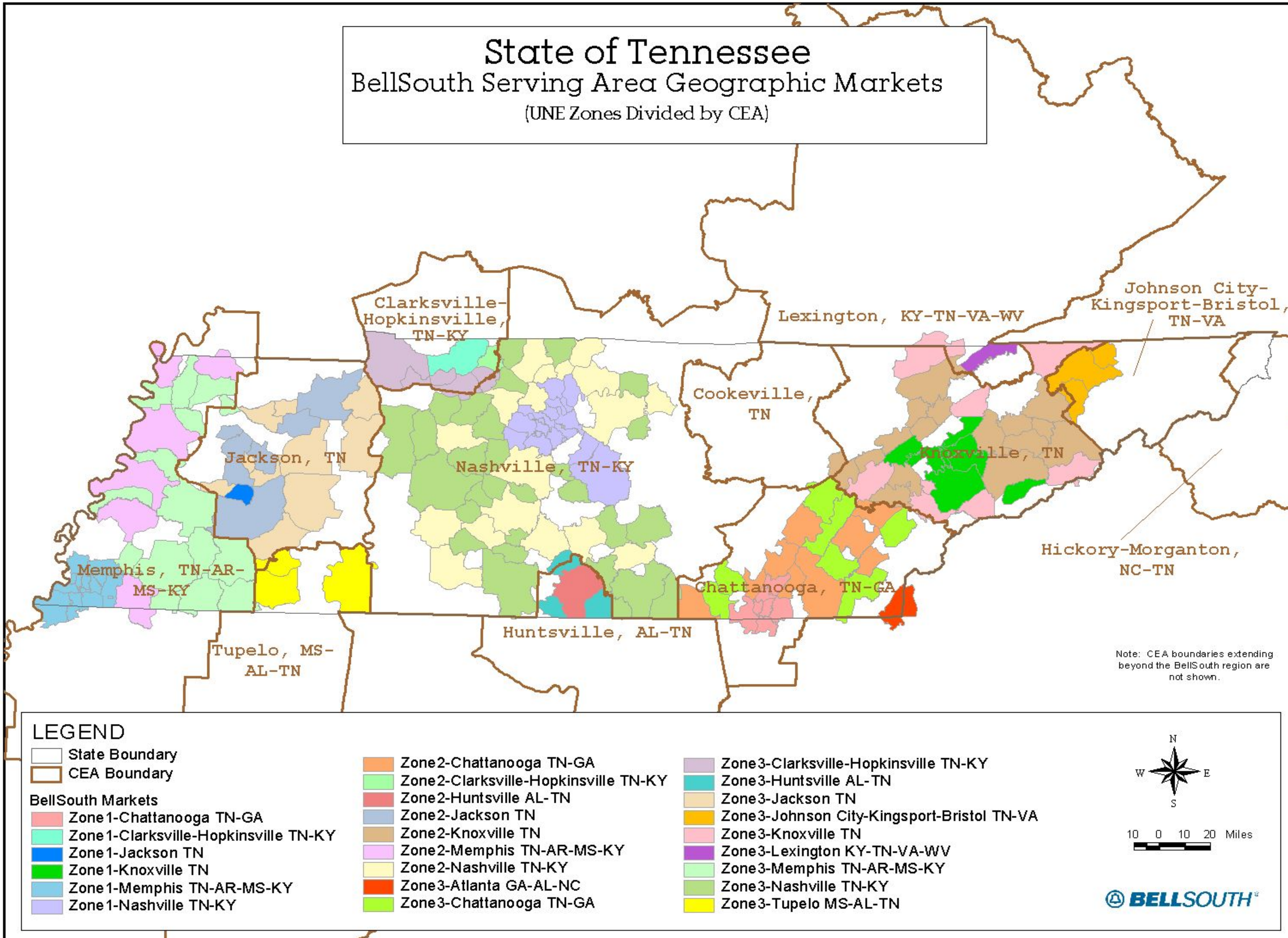
C. Pleatsikas, "An Analysis of the Macroeconomic Effects of Increased Market Penetration of Solar Energy Technologies," presented to the Second Miami Conference on Alternative Energy Sources, 1979.

C. Pleatsikas, "Regional Economic Impacts of Energy-Related Growth," presented to the American Association for the Advancement of Science, Symposium on Management of Energy-Related Growth, Houston, 1979.

C. Pleatsikas, Estimates of Employment Impacts of Product Charges on Product Packaging and Paper-Paperboard Intermediate Product Sectors, paper No.5 of the papers in support of the Resource Conservation Committee, 1978.

C. Pleatsikas, et al., A Study of Measures of Substantial Attachment to the Labor Force, published by the Employment and Training Administration, U.S. Department of Labor, 1978.

Exhibit CJP-2



BELLSOUTH TELECOMMUNICATIONS, INC.
DIRECT TESTIMONY OF W. KEITH MILNER
BEFORE THE TENNESSEE REGULATORY AUTHORITY
DOCKET NO. 03-00491
JANUARY 16, 2004

Q. PLEASE STATE YOUR NAME, YOUR BUSINESS ADDRESS, AND YOUR POSITION WITH BELLSOUTH TELECOMMUNICATIONS, INC. ("BELLSOUTH").

A. My name is W. Keith Milner. My business address is 675 West Peachtree Street, Atlanta, Georgia 30375. I am Assistant Vice President - Interconnection Operations for BellSouth. I have served in my present role since February 1996.

Q. PLEASE SUMMARIZE YOUR BACKGROUND AND EXPERIENCE.

A. My career in the telecommunications industry spans over 33 years and includes responsibilities in the areas of network planning, engineering, training, administration, and operations. I have held positions of responsibility with a local exchange telephone company, a long distance company, and a research and development company. I have extensive experience in all phases of telecommunications network planning, deployment, and operations in both the domestic and international arenas.

I graduated from Fayetteville Technical Institute in Fayetteville, North Carolina, in

1970, with an Associate of Applied Science in Business Administration degree. I graduated from Georgia State University in 1992 with a Master of Business Administration degree.

Q. HAVE YOU TESTIFIED PREVIOUSLY BEFORE ANY STATE PUBLIC SERVICE COMMISSION, AND IF SO, BRIEFLY DESCRIBE THE SUBJECT OF YOUR TESTIMONY?

A. Yes, I have testified before the state Public Service Commissions in Alabama, Florida, Georgia, Kentucky, Louisiana, Mississippi, and South Carolina, the Tennessee Regulatory Authority (TRA"), and the North Carolina Utilities Commission on the technical capabilities of the switching and facilities network, introduction of new service offerings, expanded calling areas, unbundling, and network interconnection.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I describe and support the engineering and network architecture assumptions that form the foundation for BellSouth's Analysis of Competitive Entry ("BACE") Model. I will also discuss how an efficient provider of local telecommunications service entering the market as a facilities-based provider would likely develop and grow its network in order to serve mass-market customers.

Q. GENERALLY, PLEASE DESCRIBE THE BASIS FOR BELLSOUTH'S ENGINEERING AND NETWORK ASSUMPTIONS USED IN THE BACE

MODEL.

A. Typically, a Competitive Local Exchange Carrier ("CLEC") deploys a switch to serve a large area (often an entire state), and provides local service to its customers in that area by interconnecting with the incumbent local exchange carrier's ("ILEC's") network at an ILEC tandem.

There are three (3) basic network constructs from which an efficient provider entering the telecommunications market would likely choose. Each of these three options can be modeled in BellSouth's BACE Model. Exhibit WKM-1, attached to my testimony, illustrates these three (3) network options. Each of these network options assumes that a CLEC places a switch to serve local customers within a Local Access Transport Area ("LATA"), although, as I said earlier, it is not unusual for a CLEC to use one switch to serve an entire state. Because the BACE Model assumes that a CLEC places a switch in each LATA in which it serves local customers, the results are significantly more conservative than if BellSouth had assumed a CLEC would have only one switch per state.

Q. WHAT IS THE RELATIONSHIP BETWEEN CLEC SWITCHING INVESTMENTS AND TRANSPORT/TRUNKING COSTS?

A. There is an economic tradeoff between the quantity of switches serving a given geography versus the length and accompanying costs of loops or interoffice transport. An efficient facilities-based CLEC entering the local telecommunications market often finds that it is less expensive to use one switch to serve a large area, even though this network construct results in the CLEC needing to purchase, lease, construct or otherwise obtain transport facilities to carry traffic from its centralized switch to the various central office locations where the CLEC would be able to connect to loops serving its end user customers. Transport facilities are most often built using fiber optic cables and result in high-capacity transmission systems. Thus, the cost of back-hauling traffic is typically less than the cost of placing an additional switch.

Q. PLEASE DESCRIBE THE NETWORK CONSTRUCT SHOWN ON PAGE 1 OF EXHIBIT WKM-1 (Option 1).

A. Option 1, shown on page 1 of Exhibit WKM-1, reflects a configuration wherein a CLEC serves an entire LATA with one (1) switch. The CLEC uses Enhanced Extended Links ("EELs"), which are combinations of local loops and interoffice transport, and are used by the CLEC to carry all traffic to the CLEC's collocation space, typically located at the BellSouth tandem location. At the central office where the CLEC has obtained collocation, the CLEC acquires EELs (for the end users served in central offices other than the central office housing the collocation arrangement) and unbundled loops (for the end users served from that central office). Once the loops are attached to the CLEC's switch, calls originated by the customers served by those loops are handled by the entirely by the CLEC's switch (for example, calls from one of the CLEC's customers to another of the CLEC's customers) or are handled by the CLEC's switch conveying the call using its interconnection facilities between the CLEC switch and BellSouth's switch (for example, calls from the CLEC's customers to other local service provider's customers).

Q. PLEASE DESCRIBE THE NETWORK CONSTRUCT SHOWN ON PAGE 2 OF EXHIBIT WKM-1 (Option 2).

A. Option 2, shown on page 2 of Exhibit WKM-1, also reflects a configuration wherein a CLEC serves an entire LATA with one switch. In this configuration, however, it is assumed that the CLEC chooses to have collocation space in each BellSouth end office from which the CLEC needs access to its end user's local loop on an unbundled basis. By choosing this configuration, the CLEC also gives itself access to more loops composed entirely of copper facilities, thus enlarging its Digital Subscriber Line ("DSL") footprint without collocating Digital Subscriber Line Access Multiplexers ("DSLAMs") or other equipment at Remote Terminal ("RT") sites. The BACE Model can also be run choosing this network configuration.

Q. PLEASE DESCRIBE THE NETWORK CONSTRUCT SHOWN ON PAGE 3 OF EXHIBIT WKM-1 (Option 3).

A. As with the two (2) configurations I just described, Option 3 shown on page 3 of Exhibit WKM-1 reflects a configuration wherein a CLEC serves an entire LATA with one (1) switch. In this third configuration, however, the assumption is that there will be some situations wherein a CLEC will choose to have collocation arrangements in certain BellSouth end offices, and there will also be some situations wherein the CLEC will choose to use EELs in lieu of collocation. The

BACE Model can be run choosing this option, and the model will calculate and choose the more economical configuration for each portion of the CLEC's network. This network configuration is used in the base case that BellSouth filed with Dr. Aron's testimony. As with Option 2, the more end offices in which a CLEC collocates, the greater the access to so-called "all copper" loops and thus the larger a DSL footprint the CLEC can enjoy without collocation of equipment at RT sites. As I stated earlier, the BACE Model can be run choosing this network configuration.

Q. FOR THOSE SITUATIONS WHERE COLLOCATION IS ASSUMED IN THE BACE MODEL, PLEASE DESCRIBE THE COLLOCATION ARRANGEMENT USED.

A. Exhibit WKM-2 illustrates a collocation arrangement used in the BACE Model wherein the CLEC collocates within a BellSouth central office. The assumption for this Option is that the CLEC will acquire unbundled two-wire loops and unbundled DS-1 loops. The CLEC acquires unbundled loops and other unbundled network elements, which BellSouth delivers to the collocation arrangement. BellSouth connects the requested unbundled network element (an unbundled loop, for example) to the CLEC's Connecting Facility Assignment ("CFA"), which conveys the requested UNE to the collocation arrangement. The CFA is typically a CLEC-provided tie cable that extends from that CLEC's collocation arrangement to the collocation demarcation point (typically a connector block on a distributing frame). At the CLEC end of the CFA, the requested unbundled network element is often terminated to a Point of

Termination bay ("POT bay") within the collocation arrangement. If provided, the CLEC owns the POT bay and the other equipment within the collocation arrangement. The CLEC may choose to install within the collocation arrangement Digital Loop Carrier ("DLC") equipment for aggregating and concentrating the individual unbundled loops as well as DSLAM equipment for the CLEC's broadband services. This equipment is then attached to multiplexing ("mux") equipment for connection to DS-1 or higher transmission systems to the CLEC's switch located in its own central office.

Exhibit WKM-3 reflects a typical collocation arrangement within a BellSouth tandem central office. Different from Option 1 described earlier, if the CLEC collocates within the BellSouth tandem central office, it is assumed that the CLEC will aggregate its EELs and other transport requirements at that location. The CLEC then conveys those EELs and transport facilities to its own central office over DS-1 or higher facilities.

Q. PLEASE DESCRIBE THE CLEC'S SWITCHING ARRANGEMENT ASSUMED IN THE BACE MODEL.

A. Exhibit WKM-4 illustrates the CLEC switching arrangement that is used in the BACE Model. Earlier in my testimony, I have discussed how loop facilities, EELS and transport facilities are aggregated and concentrated and are then conveyed to the CLEC's central office and then to the CLEC's switch. This Exhibit shows the call routing (once the loop has been connected to the CLEC's switch and the end user begins making and receiving calls) assuming the CLEC sends traffic originated by its end users via BellSouth's tandem switch for completion. Likewise, this Exhibit shows how a CLEC receives traffic originated by the end users of other Local Exchange Carriers ("LECs") bound for that CLEC's end users. In other words, by interconnecting its switched network at BellSouth's access tandem switch location, the CLEC can send and receive traffic between that CLEC's end users and the end users of all other LECs including BellSouth plus other carriers such as IXCs and wireless service providers.

Q. WHY DO CLECs ROUTE SOME OR ALL OF THEIR TRAFFIC VIA TANDEM SWITCHES?

A. CLECs route traffic through tandem switches for most of the same reasons as does BellSouth. Tandem switching systems are used to interconnect end office switches when direct trunk groups are *not* economically justified, or when the network configuration indicates alternate routing *is* economically justified. Tandem switches typically provide these functions:

- Interconnect end offices
- Connect to other tandems
- Provide access to Interexchange Carriers
- Provide access to operator positions.

In other words, tandem switching systems perform trunk-to-trunk switching and generally provide two (2) basic network functions — traffic concentration and centralization of services. As traffic concentrators, tandems allow the traffic of groups of end offices to be economically gathered for delivery between the end offices or to distant points. Also, with tandem switches, call recording, LATA-wide access, and operator services functions can be centralized for groups of end offices.

Q.	PLEASE DESCRIBE THE CLEC's FACILITIES LOCATED AT ITS OWN SWITCHING CENTER.

A.	Exhibit WKM-5 shows the types of equipment within the CLEC's own central office. Aggregated, concentrated loops (including EELs) are conveyed to interface equipment (DSX-1 or DSX-3 panels) then on to the DLC Central Office Terminal ("COT"), in the case of incoming loops or EELs, and then to the switch. Equipment for data services such as Asynchronous Transfer Mode ("ATM") packet switches is also housed here. Inbound and outbound calls are received and sent over transport systems at DS-1 or higher to and from BellSouth's tandem switch. Finally, the CLEC either provides for itself or acquires from other providers ancillary functions such as operator services and access to call-related databases.

Q.	DO YOU HAVE OTHER INFORMATION THAT SUPPORTS YOUR OPINION REGARDING THE MANNER IN WHICH CLECs DESIGN AND IMPLEMENT THEIR NETWORKS?

A.	Yes. I have read the sworn testimony of CLECs' witnesses opining on CLEC network architectural considerations. The CLECs have made it clear that their networks are not configured like BellSouth's, and they are relying on fewer switches and more transport to serve their customers. For example, in Tennessee Docket No. 00-00079, AT&T witness, Gregory Follensbee testified that:

> "AT&T offers local exchange service in Tennessee via 4ESS switches, which function primarily as long distance switches, and 5ESS switches, which act as adjuncts to the 4ESS switches. *AT&T has the ability to connect virtually any qualifying local exchange customer in Tennessee to one of these switches through AT&T's dedicated access services*." [*emphasis added*] [Docket Number 00-00079, December 20, 2000, Direct Testimony of Gregory Follensbee, pg. 41.]

WorldCom has likewise filed testimony with the Tennessee TRA regarding its switch coverage in the Knoxville and Memphis areas. Regarding the Knoxville area, WorldCom witness Don Price stated that:

> "The WorldCom network consists of one switch. This switch, combined with the transport network described below, provides local service in two rate centers in the Knoxville area."

With respect to WorldCom's local network in the Memphis area, Mr. Price testified that:

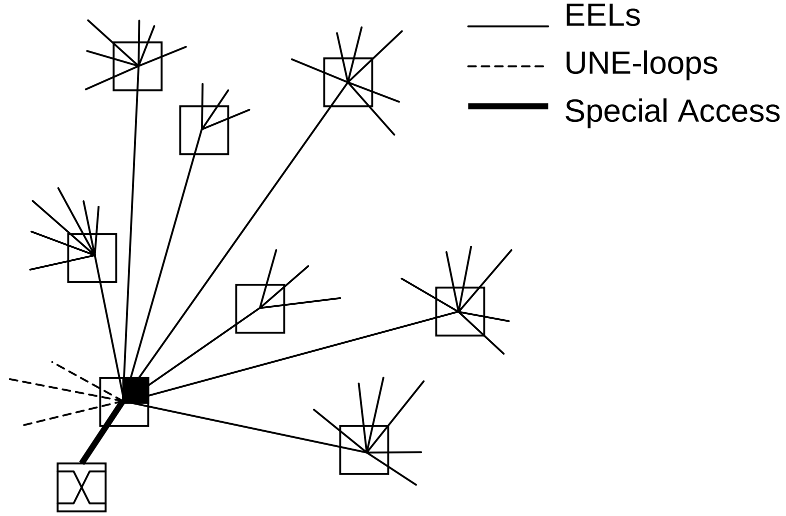
> "The WorldCom Network consists of one switch which is configured and equipped to provide local service in three rate centers." [Docket Number 00-00309-TP, December 13, 2000, Rebuttal testimony of Don Price, pp. 34-35.]

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

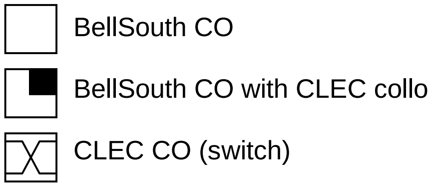
A. Yes.

Option 1

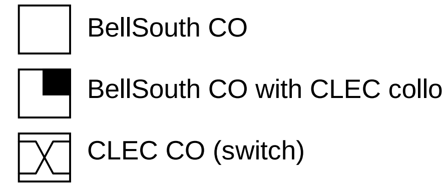
Architecture scenario one – EELs



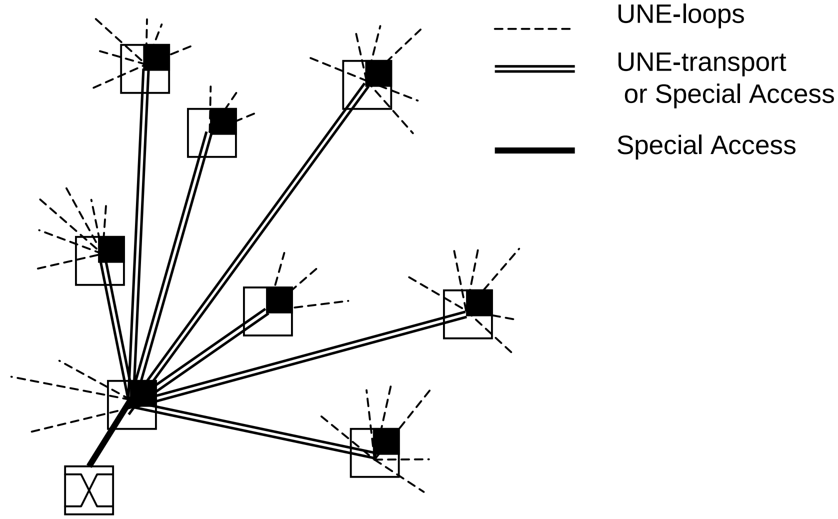
- One CLEC switch per LATA
- EELs to serve most customers
- Collocation in every LATA at an access tandem to serve all lines within the LATA



Option 2



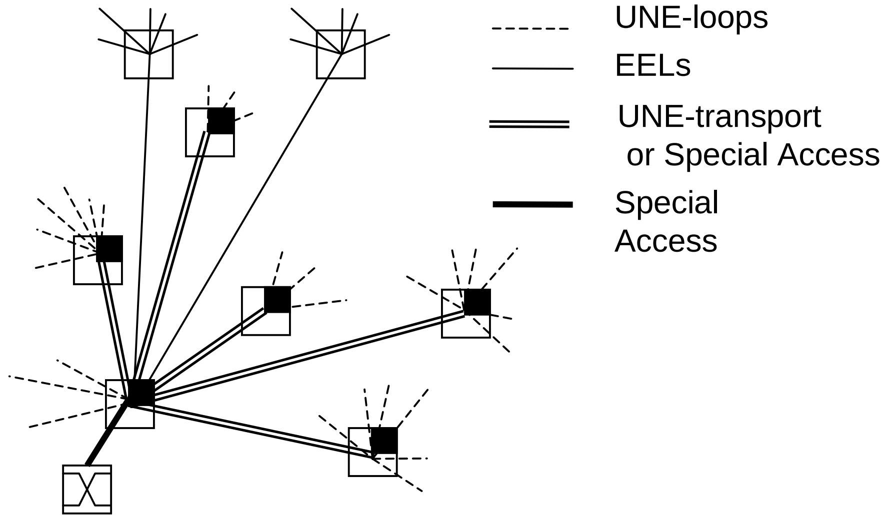
Architecture scenario two – Collocation



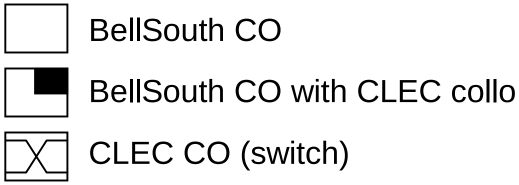
- One CLEC switch per LATA
- UNE-loops to reach customers
- User adjustable choice of transport (UNE-transport or Special Access) as surrogate for CLEC-owned infrastructure
- Larger DSL footprint

Option 3

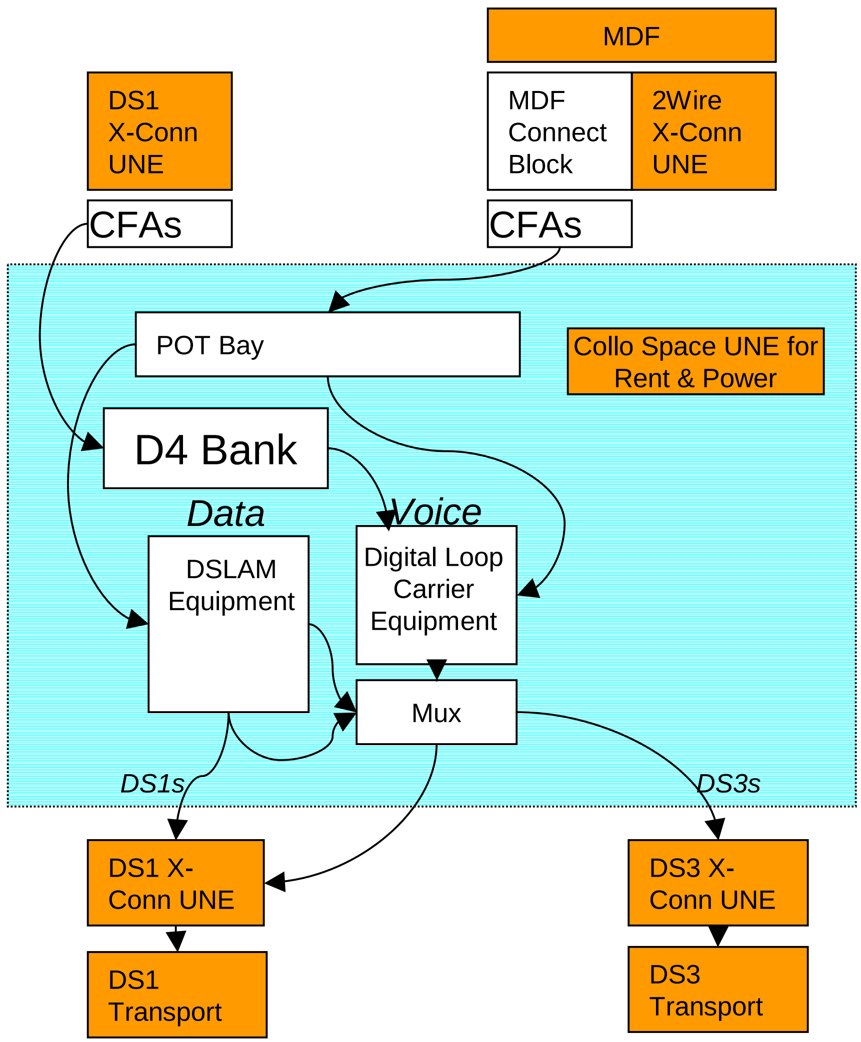
Architecture scenario three – Collocation/EELs Hybrid



- One CLEC switch per LATA
- BACE optimizes collocation and EELs



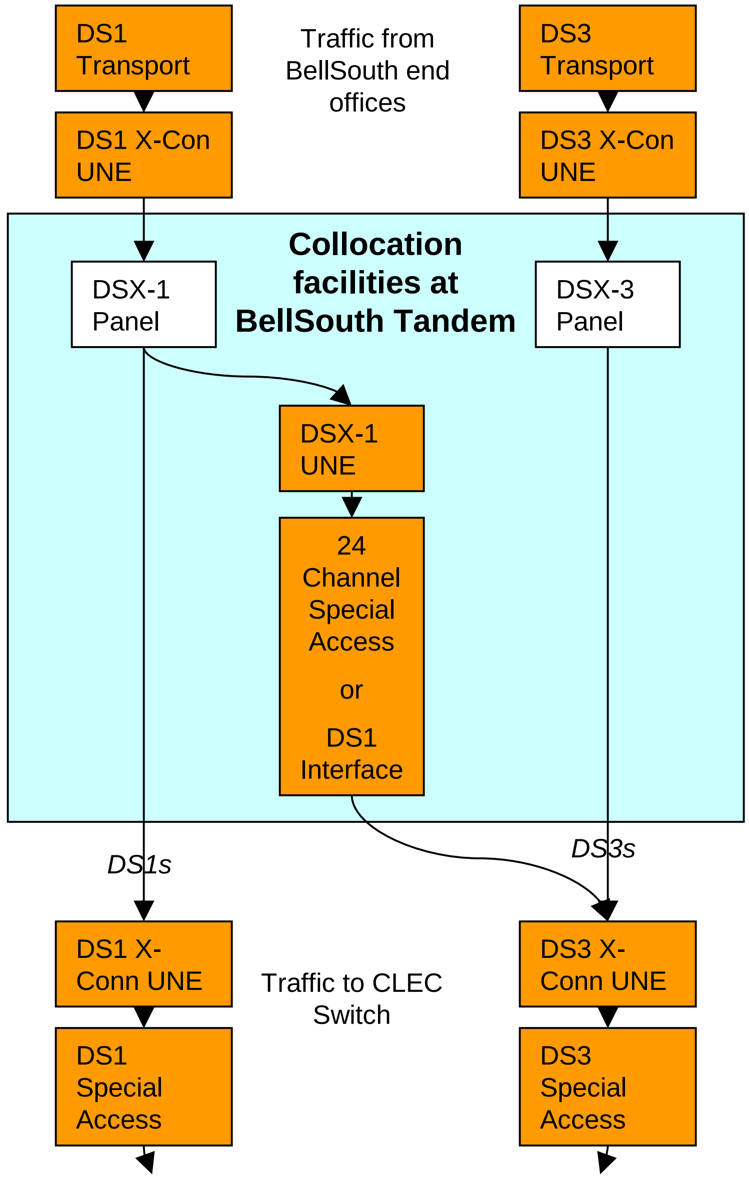
Collocation CLEC Facilities at BellSouth End Office



Dark shading indicates BST provided: White indicates CLEC provided, Light Shading is CLEC space

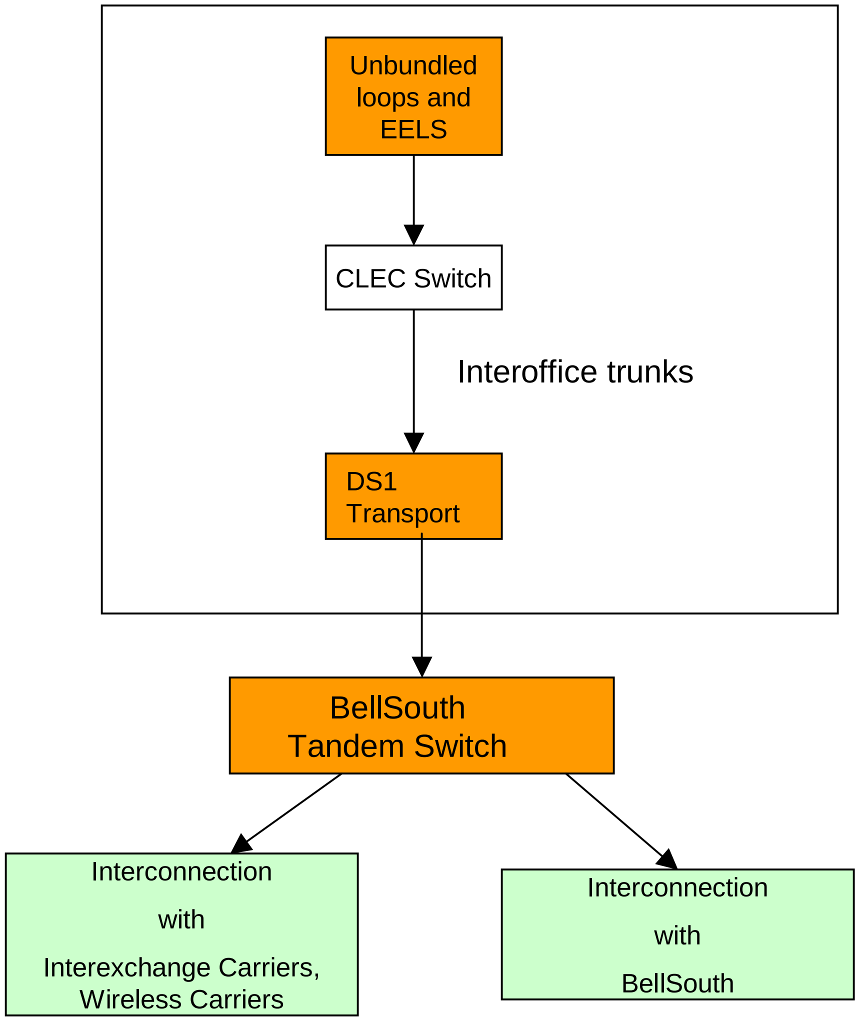
CLEC Facilities Collocated at BellSouth Tandem Switching Central Office

BellSouth Telecommunications, Inc.
Tennessee Regulatory Authority
Docket No. 03-00491
Exhibit WKM-3



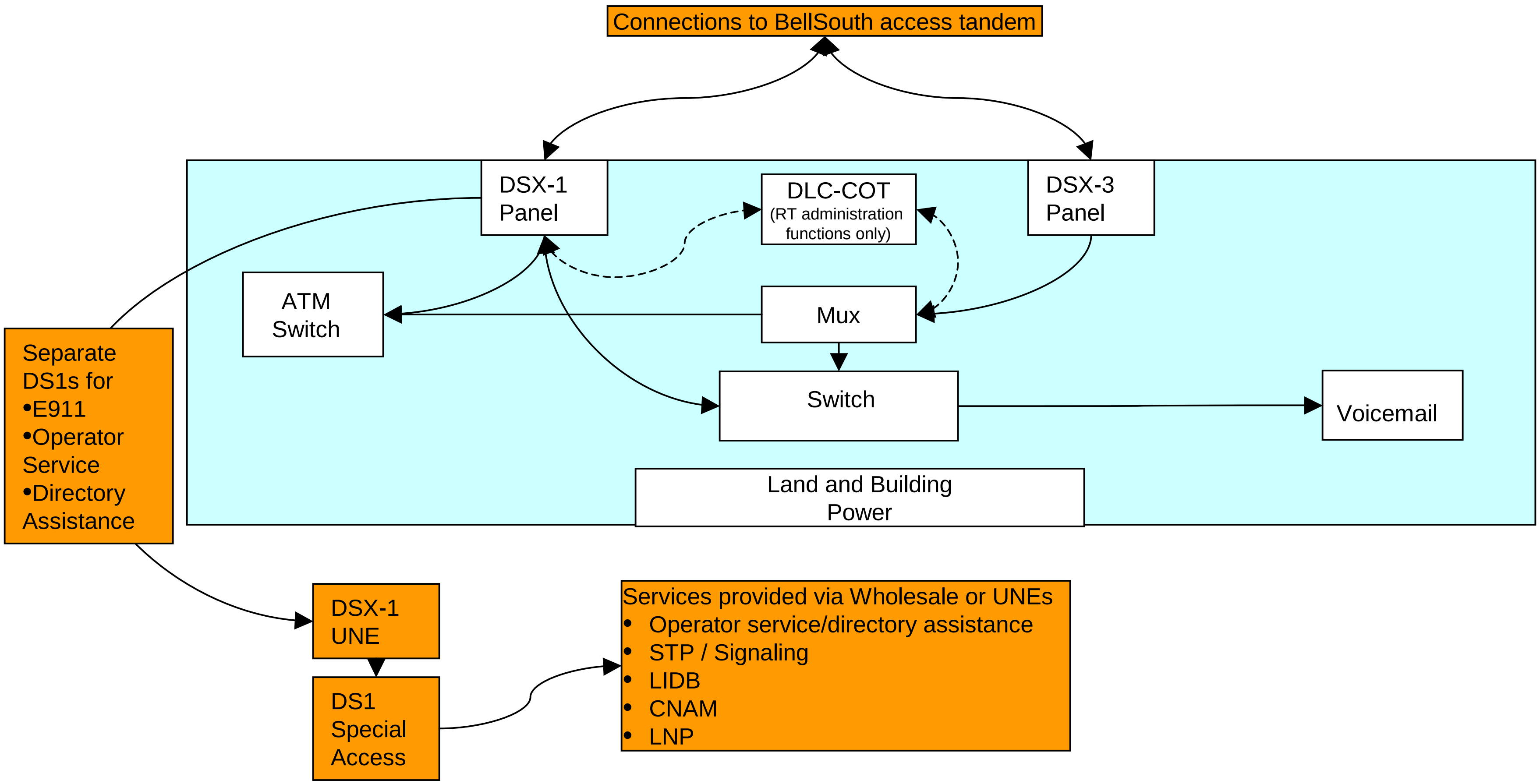
- *Dark Shading indicates BellSouth provided: White indicates CLEC provided , Light Shading is CLEC space*

Interconnection with other service providers



- Dark shading indicates BST provided: White indicates CLEC provided : Medium shading is other entities

NETWORK DESIGN:
DESCRIBING CLEC FACILITIES – CLEC Switching Center



- *Dark shading indicates BST provided (or wholesale purchase): White indicates CLEC provided, Light shading is CLEC space.*

BELLSOUTH TELECOMMUNICATIONS, INC.

DIRECT TESTIMONY OF A. WAYNE GRAY

BEFORE THE TENNESSEE REGULATORY AUTHORITY

DOCKET NO. 03-00491

JANUARY 16, 2004

Q. PLEASE STATE YOUR NAME, YOUR POSITION WITH BELLSOUTH TELECOMMUNICATIONS, INC. (“BELLSOUTH”) AND YOUR BUSINESS ADDRESS.

A. My name is A. Wayne Gray. My business address is 675 West Peachtree Street, Atlanta, Georgia 30375. My title is Director – Regional Planning and Engineering Center in the Network Planning and support organization.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR BACKGROUND AND EXPERIENCE.

A. I graduated from Georgia Tech in 1979, with a Bachelor of Electrical Engineering degree. In 1992, I received a Master of Business Administration degree from Emory University. I began working for Southern Bell in 1979, in the Equipment Engineering organization in Miami, Florida. Over the course of my 24-year career with BellSouth, I have held various line and staff positions in Equipment Engineering, Traffic Engineering (Capacity Management), Infrastructure Planning and Project Management. In November 1999, I became Director-Collocation in the Network Planning and Support organization. In

December 2001, my scope of responsibility was expanded and my title was changed to Director – Regional Planning and Engineering Center. In this position, I am responsible for ensuring that BellSouth provisions collocation arrangements in the timeframes established by contractual agreements and governmental mandates. I am also responsible for managing the planning and engineering of BellSouth's Advanced Intelligent Network, Common Channel Signaling Network, Link Monitoring System, Public Packet Switching Network, MemoryCall® Service platform, Pooled Internet Access Platforms, and corporate transport network. My responsibilities also include the activities performed by BellSouth's Numbering and Technology Forecasting groups. In addition, I direct all switch software upgrades and contract administration for the purchase of network technologies.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. My testimony will address BellSouth's performance in the areas of availability of collocation, provisioning of collocation, and availability of Co-carrier Cross-Connects ("CCXCs"). BellSouth's performance is exemplary, as I will prove by performance measurements and actual usage.

Q. PLEASE DISCUSS THE AVAILABILITY OF COLLOCATION SPACE IN BELLSOUTH'S CENTRAL OFFICES.

A. Space is available for Competitive Local Exchange Carriers ("CLECs") to collocate equipment in all of BellSouth's Tennessee central offices. If space was not available, the CLEC would know by viewing the Space Exhaust List located on the following BellSouth website: http://interconnection.bellsouth.com/notifications/carrier/carrier_pdf/91081451-C.pdf

Q. ARE THERE ALTERNATIVES TO PHYSICAL COLLOCATION IN THE CENTRAL OFFICE, ASSUMING RARE CIRCUMSTANCES WHERE PHYSICAL COLLOCATION MAY NOT BE AVAILABLE IN THE FUTURE?

A. Yes. CLECs may elect virtual collocation, or in the event that there is no virtual collocation available in the central office, then the CLECs may request adjacent collocation.

Q. IS BELLSOUTH PROVIDING PHYSICAL COLLOCATION TO CLECS TODAY?

A. Yes. CLECs currently lease approximately 41,520 square feet of collocation space within sixty (60) of BellSouth's Tennessee central offices.

Q. DOES BELLSOUTH PROVIDE COLLOCATION SPACE TO CLECS IN A TIMELY MANNER FOLLOWING CLECS' REQUESTS FOR SPACE?

A. Yes. As Mr. Varner discusses in his testimony, over the past year, BellSouth has achieved outstanding performance in meeting the collocation provisioning intervals established by this Authority.

Q. ARE THERE MEASURES IN PLACE TO ASSURE THAT BELLSOUTH'S LEVEL OF PERFORMANCE REGARDING COLLOCATION DOES NOT DIMINISH?

A. Yes. This Authority has ordered Performance Measurements that are in place today to monitor BellSouth's collocation performance, as Mr. Varner explains. Should BellSouth fail to meet certain of these metrics, BellSouth would be subject to penalty payments under the Self Effectuating Enforcement Measurement ("SEEMs") Plan.

Q. IS A CLEC'S ABILITY TO OBTAIN COLLOCATION A BARRIER TO CLEC ENTRY IN BELLSOUTH'S MARKETS?

A. Absolutely not.

Q. TURNING TO THE ISSUE OF CROSS-CONNECTS, WHAT IS A "COMPETITIVE LEC-TO-COMPETITIVE LEC CROSS-CONNECT"?

A. A "Competitive LEC-to-Competitive LEC Cross-Connects" is commonly referred to as a Co-Carrier Cross Connect ("CCXCs"). A CCXC is a connection between two CLECs' equipment and/or facilities located within the same BellSouth premises. A CCXC must be provisioned using cabling facilities owned by the ordering carrier that is placed over BellSouth's common cable support structure, unless the CLEC's equipment for facilities are located in contiguous collocation arrangements within the central office. The CLECs must also contract with a BellSouth Certified Supplier to place the cabling facilities for the provision of the CCXC.

Q. WHY WOULD TWO COLLOCATORS USE CO-CARRIER CROSS-CONNECTS?

A. There are a couple of potential uses. A CLEC might use CCXCs to share facilities and/or equipment or exchange interstate or interexchange traffic

Q. DOES BELLSOUTH PERMIT CO-CARRIER CROSS-CONNECTS TODAY?

A. Yes, and BellSouth has done so for several years. Today, a CLEC can connect its collocation arrangement to another CLEC's collocation arrangement by enlisting a certified installation vendor from the list of BellSouth Certified Suppliers to place the cabling necessary to make the connections between the two CLECs' arrangements. Beginning sometime within the first quarter 2004, BellSouth will provide another means for CLECs to obtain CCXCs. BellSouth will make CCXCs available pursuant to its FCC No. 1 Tariff, whereby BellSouth (rather than a third-party vendor) will provide a CCXC for both CLECs at the collocation demarcation point.

Q ARE THERE CLECS WHO HAVE CO-CARRIER CROSS-CONNECTS IN

SERVICE TODAY IN BELLSOUTH'S CENTRAL OFFICES?

A. Yes. In Tennessee, there are approximately 11 CCXC arrangements in BellSouth's central offices.

Q. IS THE ABILITY OF CLECS TO OBTAIN CO-CARRIER CROSS-CONNECTS IN BELLSOUTH CENTRAL OFFICES ON A TIMELY BASIS A BARRIER TO CLEC ENTRY IN BELLSOUTH'S MARKETS?

A. Absolutely not.

Q: PLEASE SUMMARIZE YOUR TESTIMONY.

A. As my testimony demonstrates, CLECs are not impaired since collocation space is available in all BellSouth central offices in Tennessee. Should space become exhausted in a central office, other option are available to CLECs. There are also multiple options available to CLECs to obtain CCXCs for the purposes of connecting to other carriers' collocation spaces. BellSouth's continued high level of performance is assured by the presence of SEEMs penalties should performance slip. For these reasons, a finding of impairment is not warranted.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

BELLSOUTH TELECOMMUNICATIONS, INC.

DIRECT TESTIMONY OF KATHY K. BLAKE

BEFORE THE TENNESSEE REGULATORY AUTHORITY

DOCKET NO. 03-00491

JANUARY 16, 2004

Q. PLEASE STATE YOUR NAME, YOUR POSITION WITH BELLSOUTH TELECOMMUNICATIONS, INC. ("BELLSOUTH") AND YOUR BUSINESS ADDRESS.

A. My name is Kathy K. Blake. I am employed by BellSouth as Director – Policy Implementation for the nine-state BellSouth region. My business address is 675 West Peachtree Street, Atlanta, Georgia 30375.

Q. PLEASE PROVIDE A BRIEF DESCRIPTION OF YOUR BACKGROUND AND EXPERIENCE.

A. I graduated from Florida State University in 1981, with a Bachelor of Science degree in Business Management. After graduation, I began employment with Southern Bell as a Supervisor in the Customer Services Organization in Miami, Florida. In 1982, I moved to Atlanta where I have held various positions involving Staff Support, Product Management, Negotiations, and Market Management within the BellSouth Customer Services and Interconnection Services Organizations. In 1997, I moved into the State Regulatory Organization where my responsibilities included issues management and policy witness support. I assumed my current responsibilities in July 2003.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to provide an overview of BellSouth's position on the issues that the Tennessee Regulatory Authority ("Authority" or "TRA") will address in determining the geographic markets in Tennessee where competitive local exchange carriers ("CLECs") are not "impaired" without unbundled local switching – a finding that I will refer to as "impairment" in this testimony. I begin by outlining the delegation that the FCC has made to the state commissions. After discussing what the FCC has directed the state commissions to do, I introduce BellSouth's witnesses. These witnesses will explain in detail the evidence that addresses the issues that the FCC has asked the state commissions to examine, including demonstrating that CLECs are not impaired within the meaning of the Telecommunications Act of 1996 (the "Act") in specific geographic areas in Tennessee. I provide information regarding certain interpretive decisions that BellSouth has made with respect to the FCC's Triennial Review Order,[1] such as using the FCC's default demarcation point for differentiating between "mass market" customers and "enterprise" customers. Finally, I address the availability of collocation in BellSouth's central offices.

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[1] *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, et al.*, CC Docket No. 01-338, et al., *Report and Order and Order on Remand an Further Notice of Proposed Rulemaking,* FCC 03-36, released August 21, 2003 ("*TRO*").

Q. HAVE YOU FILED TESTIMONY ON BEHALF OF BELLSOUTH IN *TRO* PROCEEDINGS IN OTHER BELLSOUTH STATES?

A. No. In *TRO* proceedings underway in Florida, Georgia and North Carolina, BellSouth filed the policy testimony of Mr. John A. Ruscilli. My testimony in this proceeding presents the same BellSouth policy and positions presented in those other states by Mr. Ruscilli.

Q. WHAT HAS THE FCC CHARGED THE AUTHORITY WITH DOING IN THIS PROCEEDING?

A. On August 21, 2003, the FCC issued its long-awaited written order in its triennial review of unbundled network elements ("UNEs"). In its written order, which I will refer to as the "*TRO*," the FCC determined that "[a]lthough we find competitors to be impaired without access to the incumbent LEC's switch on a national level when serving the mass market, we authorize state commissions to play a fact-finding role – as set forth below – to identify where competing carriers are not impaired without access to unbundled local circuit switching." (*TRO* ¶ 493). As a result of the *TRO*, the Authority established this proceeding to identify the geographic markets in Tennessee where CLECs are not impaired in their ability to serve mass market customers without the availability of circuit switching as an unbundled network element. In defining these markets, state commissions must "evaluate impairment by determining the relevant geographic area to include in each market." (C.F.R. §

51.319(d)(2)(i)). My testimony uses the terms “geographic market area”, “geographic area”, and “geographic market” interchangeably.

In making its determination of whether CLECs are impaired in a given geographic area, the FCC has required state commissions to make several interrelated decisions. A state commission must first define the appropriate geographic market to which it will apply the impairment analysis outlined in the *TRO*. Next, state commissions must determine the definition for the class of customers that the FCC identified as “mass market”. In the *TRO*, the FCC divides customers into two classes, “mass market” customers and “enterprise” customers. (See *TRO* ¶ 419). The FCC created a presumption that CLECs serving “enterprise” customers are not impaired even if the CLECs lack access to unbundled switching. Conversely, CLECs serving “mass market” customers are presumed to be impaired, unless a state commission determines otherwise. However, the FCC did not specify which customers comprise the “mass market” and directed state commissions to make that determination.

Once appropriate definitions of the relevant geographic areas and “mass market” customers are determined, the FCC requires state commissions to apply two “triggers” tests to see whether CLECs are impaired with respect to serving mass market customers in each defined geographic market. Both of the triggers tests are straightforward. If there are three CLECs with self-provisioned switches serving mass market customers in a given geographic market, the state commissions are required to find that CLECs are not impaired in that geographic market. Alternatively, if there are two CLECs providing wholesale switching services to other CLECs who are providing retail service to mass market customers in a geographic market, the state commissions are required to find that CLECs are not impaired in that geographic area. To summarize, if either of these bright line tests is met in a given geographic market, the switching inquiry is complete in that area and a finding of "no impairment" is mandatory.

If neither of these "triggers" is met in a given geographic area, the FCC requires that state commissions determine whether there is sufficient *potential* for competitive deployment in any of these areas to warrant a finding of "no impairment." The "potential deployment" test is independent of the triggers tests and requires the state commissions to consider the economics of an efficient CLEC looking to provide service in a geographic market.

Finally, the FCC delegated to the state commissions the separate task of determining for which geographic markets a "batch hot cut process" is needed and approving such a batch process. The batch hot cut process is being addressed separately in Docket No. 03-00526.

Q. PLEASE PROVIDE AN OVERVIEW OF BELLSOUTH'S TESTIMONY IN THIS PROCEEDING.

A. Consistent with the charge given to the state commissions by the FCC, I divide BellSouth's testimony into five major areas.

First, certain words and phrases used in the *TRO* must be defined, and the geographic market areas for evaluating the FCC's triggers must be established. This portion of the testimony is entitled Market Definition. Second, the geographic areas in which the FCC's "triggers" are met and no impairment is found are identified. This portion of the testimony is entitled Local Switching Triggers. Third, where the FCC's triggers are not met, the issue of "potential deployment" is addressed, and accordingly is entitled Potential for Self-Provisioning of Local Switching. Finally, I end my testimony with a brief discussion of the availability of collocation space in BellSouth's central offices entitled Collocation.

MARKET DEFINITION

Q. TURNING TO THE FIRST TOPIC, WHAT ARE THE CRITICAL DEFINITIONS THAT BELLSOUTH PROVIDES?

A. BellSouth's witnesses provide a logical and economically sound definition of the "geographic markets" in which the "triggers" and other tests for impairment should be applied. As set forth by the FCC in the *TRO*, state commissions were given some parameters that must be used in defining the appropriate geographic market. Specifically, the FCC said: "In defining markets, a state commission shall take into consideration the locations of mass market customers actually being served (if any) by competitors, the variation in factors affecting competitors' ability to serve each group of customers, and competitors' ability to target and serve specific markets profitably and efficiently using currently available technologies. A state commission shall not define the relevant geographic area as the entire state." (47 C.F.R. §51.319(d)(2)(i)). The FCC further notes that the geographic market in which the triggers and potential deployment tests are applied must be large enough to permit CLECs to realize economies of scale and scope, ruling out, as BellSouth witness Dr. Chris Pleatsikas will testify, wire centers as the market definition.

After examining a number of alternatives, BellSouth has concluded that the appropriate "geographic markets" for use in these proceedings are the individual UNE rate zones adopted by the Authority, subdivided into smaller areas using the Component Economic Areas ("CEAs") as developed by the Bureau of Economic Analysis of the United States Department of Commerce. CEAs are defined by natural geographic aggregations of economic activity and cover the entire state of Tennessee. UNE rate zones are an appropriate starting point for the market definition because, by design, they reflect the locations of customers currently being served by CLECs, which are predominantly UNE zones 1 & 2, as well as the costs that affect competitive ability to serve customers profitably. As Dr. Pleatsikas will explain further dividing UNE zones by CEAs allows for an extremely granular assessment of impairment.

In short, BellSouth's proposed geographic market definition is consistent with the existing distribution of customers and the other factors that the FCC indicates should be considered in setting a market definition. By selecting these boundaries for the set of geographic markets to be examined under the state commission's impairment analysis, BellSouth offers a geographic market definition smaller than the entire state, but large enough so that a competitor can realize appropriate economies of scope and scale. This definition of geographic market results in 24 separate geographic markets in BellSouth's service area in Tennessee. Attached hereto as Exhibit KKB-1 is a map of the state of Tennessee showing these 24 geographic market areas. As I noted, Dr. Pleatsikis will provide further detailed information regarding the definition of "geographic market."

In addition to defining the appropriate geographic market, the Authority must also establish an appropriate definition for the "mass market" customer. In this proceeding, BellSouth accepts the FCC's default delineation between "mass market" customers and "enterprise" customers - that is customers with three or fewer CLEC DS0 lines serving them are deemed "mass market" customers. This is a reasonable assumption, and is quite conservative given the FCC's direction to define the cross-over point as "where it makes sense for a multi-line customer to be served via a DS1 loop." (*TRO* ¶ 497).

<u>LOCAL SWITCHING TRIGGERS</u>

Q. WITH THESE DEFINITIONS OF THE RELEVANT GEOGRAPHIC MARKET AND "MASS MARKET", LET US MOVE TO THE SECOND MAJOR AREA OF THE TESTIMONY. IN WHAT GEOGRAPHIC MARKETS ARE CLECS NOT IMPAIRED WITHOUT ACCESS TO

BELLSOUTH'S UNBUNDLED SWITCHING BECAUSE THE TRIGGERS TEST IS MET?

A. BellSouth's witness Pamela A. Tipton provides evidence that the self-provisioning switching trigger established by the FCC in its *TRO* is met in 4 of the 24 geographic markets in Tennessee. That is, Ms. Tipton will demonstrate that CLECs are not impaired in 4 geographic markets, because there are mass market customers in those geographic areas actively being served by at least three (and often more) CLECs using self-provisioned switching. Ms. Tipton has obtained this evidence from the CLECs themselves and from BellSouth's business records. Although there is a second and separate "trigger" involving the situation where a CLEC obtains switching from a wholesale provider, BellSouth has not relied upon that trigger in establishing the geographic areas where CLECs are not impaired. Attached hereto as Exhibit KKB-2 is a map that indicates the geographic areas in Tennessee in which the FCC's self-provisioning switching trigger is met.

<u>POTENTIAL FOR SELF-PROVISIONING OF LOCAL SWITCHING</u>

Q. REGARDING THE THIRD MAJOR AREA OF THE TESTIMONY, WHERE THE FCC'S SWITCHING TRIGGERS ARE NOT MET, WHAT EVIDENCE DOES BELLSOUTH PRESENT WITH REGARD TO "POTENTIAL DEPLOYMENT"?

A. In 3 of the remaining 20 geographic market areas where the triggers tests are not met, BellSouth's witnesses will provide evidence to demonstrate that the FCC's potential deployment test is met and that CLECs are not impaired in those markets without access to BellSouth's unbundled switching. Attached hereto as Exhibit KKB-3 is a map that illustrates the 3 additional geographic market areas in Tennessee where CLECs are not impaired without access to BellSouth's unbundled switching.

Q. PLEASE PROVIDE ADDITIONAL DETAILS REGARDING BELLSOUTH'S "POTENTIAL DEPLOYMENT" CASE, AS IT RELATES TO WHETHER CLECS ARE IMPAIRED WITHOUT ACCESS TO BELLSOUTH'S UNBUNDLED SWITCHING.

A. While the "triggers" test is a "bright line" test, the FCC recognizes that the current availability of unbundled switching may influence the nature and extent of actual competition. In other words, the fact that fewer than three CLECs are self-provisioning switching to mass market customers in a particular geographic market is not necessarily dispositive on the issue of whether impairment exists in that geographic market. To address this, the FCC created a different test that can be used to determine whether CLECs are impaired where the triggers tests are not met. In creating this alternative, the FCC instructed the state commissions to weigh three things which, taken together, constitute the "potential deployment" approach to making a "no impairment" finding where the FCC "triggers" are not met.

First, the FCC told the states to look at actual competition where it did not rise to the level necessary to meet the triggers tests. Ms. Tipton will provide testimony regarding the actual level of competition from CLECs that self-provision switching but where the triggers tests are not met.

Second, the FCC also instructed the state commissions to consider any operational barriers to entry, specifically mentioning non-discriminatory provisioning of loops, access to collocation, and access to co-carrier cross connects. BellSouth witness Mr. Alphonso Varner will present performance data establishing that BellSouth provides CLECs with such non-discriminatory access. BellSouth witness Mr. Wayne Gray discusses the availability of collocation in BellSouth's offices in Tennessee, as well as BellSouth's provisioning of co-carrier cross connects to any carrier who requests such cross connects.

Finally, the FCC directed the states to consider any economic barriers to entry when determining whether CLECs are impaired to serve the mass market customer in a particular geographic market without access to BellSouth's unbundled local switching. To address the economic issues, BellSouth has commissioned the creation of a highly detailed, economic model, a CLEC business case model that, in accordance with the *TRO*'s guidance, can be used to evaluate whether an efficient CLEC could economically enter individual markets without access to BellSouth's unbundled switching.

The model itself will be described and discussed by Mr. Jim Stegeman, whose company led the development of the BellSouth Analysis of Competitive Entry (BACE) Model. Dr. Debra Aron, an economist, will discuss how the model meets the criteria laid out in the *TRO*, the model's economic underpinnings, some of the model's key economic inputs and the results of the potential deployment analysis. Dr. Randall Billingsley will provide information regarding the cost of capital that has been used as an input into the model. Finally, Mr. Keith Milner will discuss the network design that the model emulates.

COLLOCATION

Q. PLEASE DESCRIBE THE FOURTH MAJOR AREA OF BELLSOUTH'S TESTIMONY ADDRESSING COLLOCATION.

A. As BellSouth witness Mr. Wayne Gray explains, physical collocation space is available in all of BellSouth's Tennessee central offices. In rare circumstances where physical collocation may not be available in the future, CLECs may elect either adjacent or virtual collocation. Through the testimony of Mr. Gray and Mr. Varner, BellSouth demonstrates that, over the past year, BellSouth has achieved outstanding performance in meeting the collocation provisioning intervals established by the Authority. A CLEC's ability to obtain collocation space is not a barrier to entry in BellSouth's markets.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. I anticipate that the CLECs will contest the issues in this proceeding in every way possible and throw road block after road block in the path of progress toward real competition in the telecommunications industry in Tennessee. However, the simple truth of the matter is that facilities-based competition has arrived in Tennessee and has been in place for some time. Those CLECs who have chosen to invest in the state of Tennessee have put in switches and are actively serving mass market customers in a number of geographic areas in the state, while other CLECs want to continue to provide services using nothing but BellSouth's network. Requiring BellSouth to unbundle its network, as is presently the case, creates disincentives for CLECs to invest in Tennessee, which no doubt explains why there is not more facilities-based competition than there is now. It is time to take the next step and begin weaning carriers like MCI and AT&T from the cheap switching that BellSouth is currently required to offer, and time to incent these and other companies to make real investments in Tennessee that will be of real benefit over time.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

(#521757)

Exhibit KKB-1

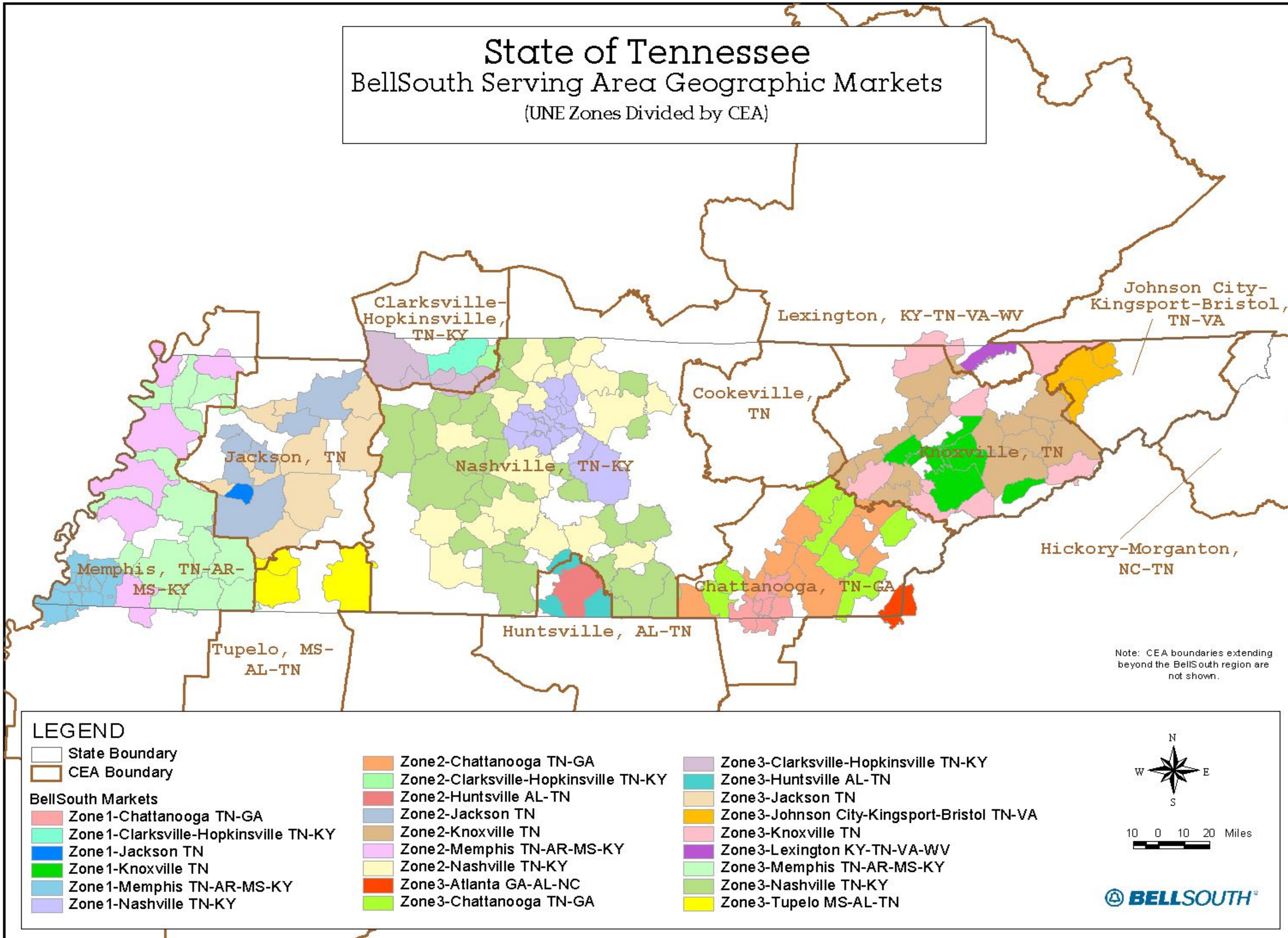


Exhibit KKB-2

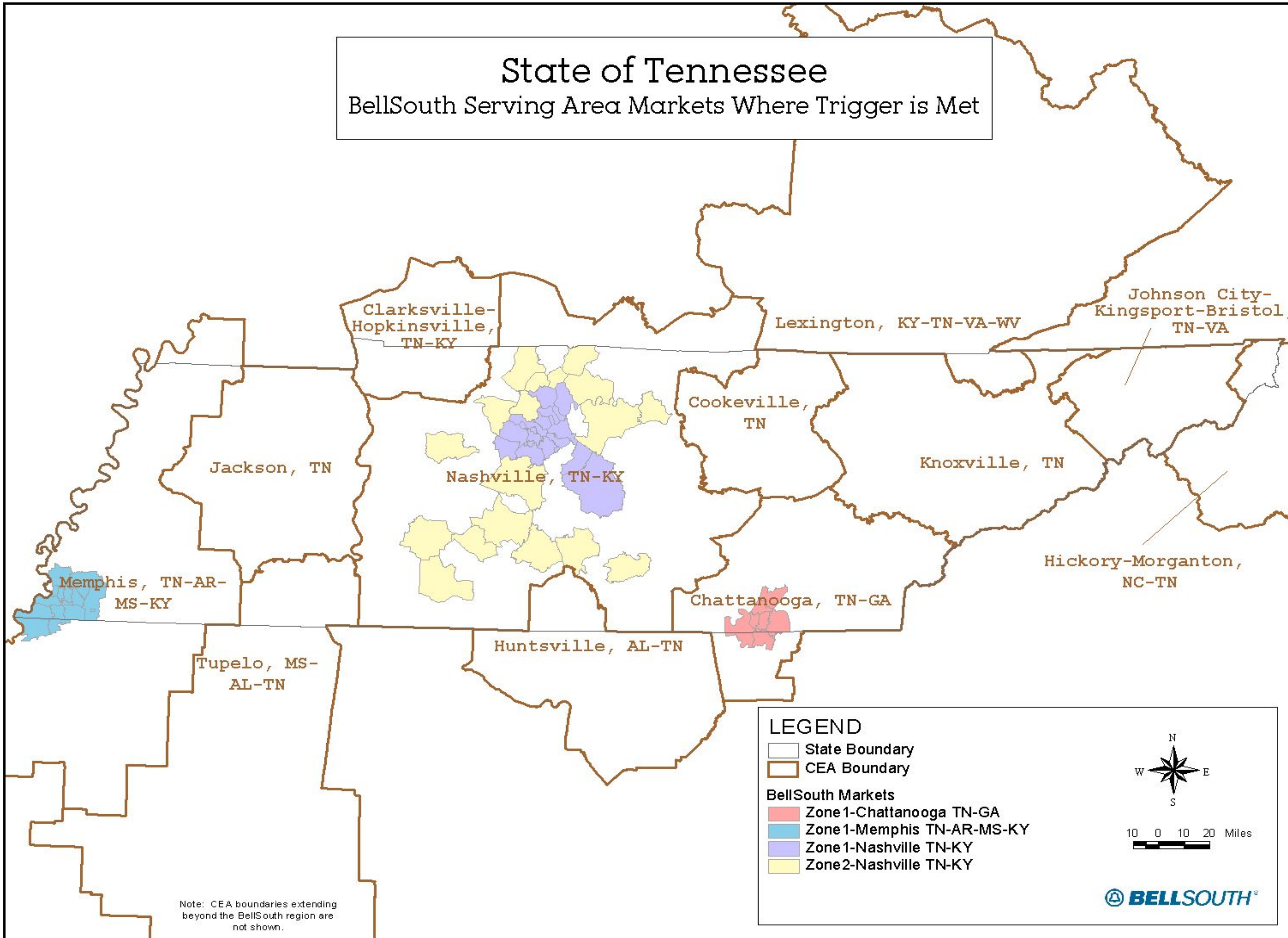
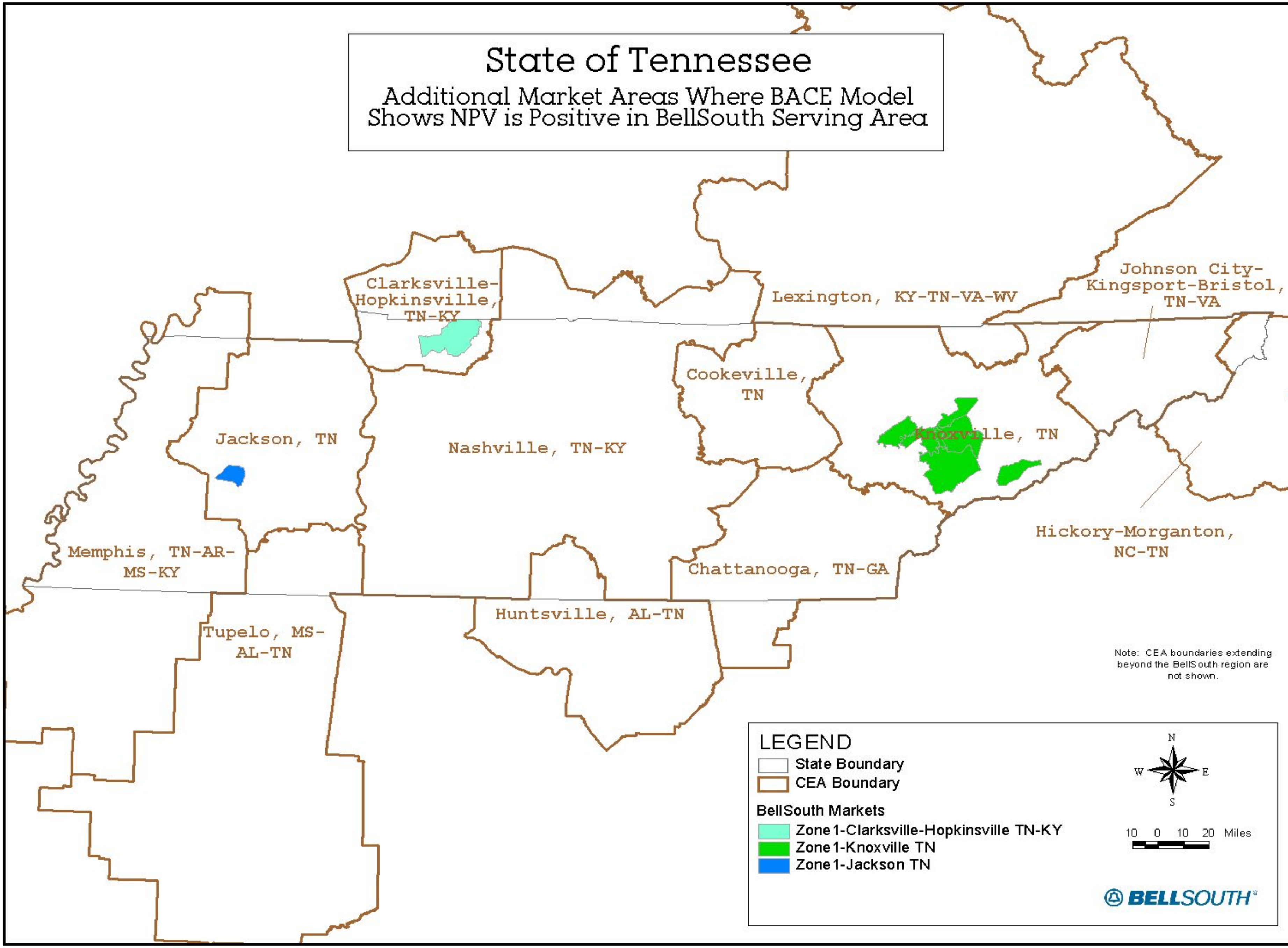


Exhibit KKB-3



BELLSOUTH TELECOMMUNICATIONS, INC.

BEFORE THE

TENNESSEE REGULATORY AUTHORITY

DOCKET NO. 03-00491

DIRECT TESTIMONY OF

DR. RANDALL S. BILLINGSLEY, CFA

JANUARY 16, 2004

I. INTRODUCTION

Q. Please state your name, occupation, and business address.

A. My name is Randall S. Billingsley. I am a finance professor at Virginia Polytechnic Institute and State University. I also act as a financial consultant in the areas of cost of capital analysis, financial security analysis, and valuation. More details on my qualifications may be found in Billingsley Exhibit No. RSB-1. My business address is: Department of Finance, Pamplin College of Business, Virginia Polytechnic Institute and State University, Blacksburg, Virginia 24061-0221.

This testimony presents my independent professional opinions and is not presented by me as a representative of Virginia Polytechnic Institute and State University.

II. PURPOSE OF DIRECT TESTIMONY AND SUMMARY OF CONCLUSIONS

A. PURPOSE OF TESTIMONY

Q. What issues in this proceeding are you addressing?

A. My testimony furnishes a part of the information necessary to do the economic analysis to determine whether there are economic barriers to CLEC entry into particular geographic markets without access to unbundled local switching.

Q. Would you elaborate on the purpose of your direct testimony in this proceeding?

A. Yes. My purpose is to provide the Tennessee Regulatory Authority (TRA) with an estimate of the forward-looking costs of capital for the representative competitive local exchange company (CLEC) modeled in the BellSouth Analysis of CLEC Entry (BACE) model. My testimony provides the appropriate costs of capital to be used in the BACE model, which determines whether any lack of access to BellSouth Telecommunications' (BST) switch unbundled network element (switch UNE) makes entry by a CLEC uneconomical. These costs of capital can be used by the TRA in its response to the Federal Communication Commission's (FCC's) Triennial Review Order (In Re Review of the Section 251, Unbundling Obligations of Incumbent Local Exchange Carriers, First Report and Order on Remand and Further Notice of Proposed Rulemaking, FCC 03-36, released August, 21, 2003, hereinafter TRO).

More specifically, the costs of capital presented in my testimony are for use in calculating the net present value (NPV) of the cash flows generated by the products of the representative CLEC entering the Tennessee market, as measured in the BACE model. Accordingly, I provide evidence concerning the representative CLEC's forward-looking cost of equity, cost of debt, and overall cost of capital. It is essential to note that the capital cost estimates I provide are all stated on a before-tax basis. The after-tax cash flows produced by the BACE model must all be discounted at after-tax capital costs.

B. SUMMARY OF THE REPRESENTATIVE CLEC'S COST OF CAPITAL ANALYSIS

Q. Please describe your approaches to determining the representative CLEC's capital costs.

A. Given the data problems explained below for the CLEC industry, I essentially provide "ceiling" and "floor" estimates of the industry's capital costs. Thus, I use two surrogates to measure the representative CLEC's capital costs. As described below, I use the Standard & Poor's Composite 500 Index (S&P 500) as a lower-bound estimate of the representative CLEC's cost of capital and I also use a sample of publicly-traded CLECs that provides an upper-bound estimate of the representative CLEC's cost of capital. I then provide a reasonable estimate of the industry's overall capital costs by averaging the results of my two approaches.

It is important to emphasize that estimating the capital costs of a representative CLEC is challenging. The majority of firms in the CLEC industry are either privately-held or are wholly-owned subsidiaries of much larger, often diversified firms. While there are some publicly-traded CLECs, a number of CLECs have declared bankruptcy over the last two years and a significant number of the others operate under financial distress. The CLEC firms for which data are available therefore do not, by themselves, provide a reliable picture of the industry's sustainable, efficient and forward-looking capital structure and optimal financing costs.

With regard to the S&P 500 surrogate, I apply the discounted cash flow (DCF) model to the firms in the S&P 500 to measure the cost of equity of average-risk firms operating in a competitive environment. As discussed below, reliance on the S&P 500 is based largely on the FCC's recent clarification that the index is a "… useful benchmark for the risk faced on average by established companies in competitive markets" (Verizon Arbitration Order, p. 41, §90, full citation below). Thus, I apply the DCF model to the S&P 500 to provide a conservative, market-determined cost of equity capital estimate for the representative CLEC. This is the derivation of the cost of capital that I believe should form the floor for any analysis of the cost of capital for the representative CLEC.

With regard to the surrogate composed of a group of publicly-traded CLECs, I apply the capital asset pricing model (CAPM) to estimate the cost of equity capital. Because the average cost of equity for this sample reflects the severe financial distress of the industry, it provides an upper-bound estimate of the representative CLEC's sustainable, efficient cost of equity. I cannot use the DCF method on this sample because these CLECs do not pay dividends.

The appropriate cost of debt is determined for each of my two surrogates. First, I determine the cost of debt for the representative CLEC using the current yield on the average bond rating category of firms in the S&P 500. Second, I estimate the cost of debt using the average bond rating for firms operating in the CLEC industry. I rely on the average market value-based capital structure for each of the two surrogates. Averaging the costs of equity, the costs of debt, and the capital structures of the two surrogates provides a reasonable estimate of the overall pre-tax cost of capital for the representative CLEC that should be used in the BACE business case model.

Q. Would you please summarize your findings concerning the representative CLEC's capital costs?

A. Yes. Analysis of the S&P 500 produces an average cost of equity between 14.27% and 14.35% using the DCF model approach, or an average of 14.31%. The CAPM approach applied to a sample of publicly-traded CLECs indicates that the representative CLEC's cost of equity capital is between 20.71% and 20.84%, or an average of 20.78%. The average cost of equity for the two approaches is consequently 17.55%.

Analysis of the firms composing the S&P 500 indicates that the average Standard & Poor's bond rating is BBB (or Baa using the *Mergent Bond Record* equivalent). This indicates a pre-tax cost of debt for the representative CLEC of 6.79%. The average bond rating on a sample of publicly-traded CLECs is CCC+/CCC (or Caa+/Caa using the *Mergent Bond Record* equivalent), which has a current pre-tax yield of 13.04%. Thus, the average cost of debt for the two approaches is 9.92%.

The average market value-based capital structure of firms in the S&P 500 is 29.50% debt and 70.50% equity while the average for the portfolio of publicly-traded CLEC firms is 87.43% debt and 12.57% equity. The average capital structure is thus 58.50% debt and 41.50% equity. Combining this average capital structure with the above average costs of debt and equity produces an average pre-tax overall cost of capital for the representative CLEC of 13.09%. Thus, this overall cost of capital, after being adjusted to be on an after-tax basis, should be used to produce the NPVs in the BACE model.

C. ORGANIZATION OF DIRECT TESTIMONY

Q. How is the rest of your testimony organized?

A. Section III of my testimony overviews the status of competition in the telecommunications industry in the United States and describes the structure of the CLEC industry to provide insight into the context in which capital costs are estimated. Section IV discusses recent FCC clarifications concerning the cost of capital that are relied on in my analyses and relevant to the current proceeding. Sections V-VII describe the methods that I use to estimate the representative CLEC's current capital costs and present my specific findings. Finally, section VIII presents my estimate of the representative CLEC's overall cost of capital and summarizes my recommendations to the TRA.

III. CURRENT STATUS OF COMPETITION IN THE LOCAL TELECOMMUNICATIONS MARKET AND CONDITION OF THE CLEC INDUSTRY

A. CURRENT STATUS OF COMPETITION IN THE LOCAL TELECOMMUNICATIONS MARKET

Q. What are the key points in this section that are relevant to your determination of the representative CLEC's capital costs?

A. In this section I cite evidence that supports the following key points:

- Local telecommunications market competition has increased significantly and the CLEC industry is playing a key role in that increase.
- Incumbent local exchange companies face significant and growing competition from CLECs.
- Recent technological developments like softswitches are making local market entry easier and more profitable for CLECs.
- The current compromised financial condition of the average CLEC does not provide reliable evidence concerning the industry's sustainable, long-run optimal capital structure or associated efficient capital costs, on a stand-alone basis.

Q. What is the current status of competition in local telecommunications markets?

A. Competition in the local telecommunications industry has increased dramatically in recent years. The sources of that increased competition include a greater number of new entrants in the industry, a significant increase in the number of existing competitors, a greater number of substitute telecommunications products and services, more intense competition among existing firms in the industry, and enhanced regulatory risk at both the state and the federal levels. Thus, both actual and potential competition has increased and the risk level of the industry has consequently increased.

Q. Is there any empirical evidence indicating a significant increase in local telecommunications market competition?

A. Yes. A recent study by the FCC documents the significant and growing trend toward greater competition in the local telephone exchange market by observing the following (*Local Competition: Status as of December 31, 2002*, Industry Analysis Division, Wireline Competition Bureau, Federal Communications Commission, June 2003, pp. 1 - 3):

- Competitive local exchange carriers (CLECs) reported 24.8 million (or 13.2%) of the approximately 188 million nationwide end-user switched access lines in service at the end of December 2002, compared to 21.6 million (or 11.4% of nationwide lines) in June 2002. This represents a 14% growth in CLEC market size during the second half of 2002.
- Since December 1999, the percentage of nationwide CLEC switched access lines reported to be provisioned by reselling services has declined steadily, to 19% at the end of December 2002, and the percentage provisioned over UNE loops has grown, to 55%.
- The Commission's [FCC's – *clarification added to quote*] data collection program requires CLECs and ILECs [incumbent local exchange carriers –

> *definition added to quote*] to identify each zip code in which the carrier provides local telephone service to at least one end-user customer. As of December 31, 2002, at least one CLEC was serving customers in 69% of the nation's zip codes. About 94% of United States households resided in these zip codes. Moreover, multiple carriers reported providing local telephone service in the major population centers of the country.

Thus, the FCC documents that competitors are making enormous strides in taking local telecommunications business away from the ILECs.

Similarly, Standard & Poor's (*Industry Surveys*, *Telecommunications: Wireline*, May 31, 2001, p. 19) emphasizes the risks brought by increasing competition:

> For local telephone companies, long-distance carriers, and cable providers alike, the Telecom Act's sweeping deregulation is a double-edged sword. On the one hand, a company can gain new revenue sources by providing extra services and entering markets that previously were out of reach. On the other hand, the added competition in all segments will result in tighter profit margins for all players.

Q. Specifically what effects does the analyst community expect these increasing competitive risks and the growth of the CLEC industry to have on the ILECs in general and BST in particular?

A. The following recent comments by Marc Crossman of J. P. Morgan explain how increasing competition is pressuring ILECs like BST ("Company Report: BellSouth," Telecommunications Wireline Services Equity Research, March 15, 2002, p. 4):

> … The company is facing increasing facilities-based competition from cable operators on the consumer side and the CLECs controlled by WorldCom … and AT&T … on the business side. BellSouth also faces growing competition in both the consumer and business customer segments from non-facilities based wholesale competitors, which lease elements of BellSouth's network to provide service. We estimate that BellSouth will have lost 10% of access lines to wholesale competition by year-end 2002. … Access line loss also places pressure on margins due to the high proportion of fixed versus variable costs associated with providing service.
>
> Technology substitution exacerbates share loss for wireline voice. On the consumer side, wireless is replacing both primary and secondary lines at an accelerating rate, while cable and DSL broadband are eliminating demand for second lines used for dial-up Internet access. On the business side, DSL is replacing ISDN BRI, while ISDN PRI and fiber are replacing copper-based access lines. In many instances, BellSouth becomes the provider of the substitute technology and retains the customer; however, the revenue generated by the replacing technology tends to be lower ...

The point that one can draw from all of this is that the entire telecommunications industry is competitive and risky, and is growing more so with the passage of time.

B. CONDITION OF THE CLEC INDUSTRY

Q. Why would it not be appropriate to determine the representative CLEC's capital costs for application in the BACE model using information solely from currently operating CLECs?

A. That would be an acceptable approach if currently operating CLECs had demonstrated an ability to maintain a sustainable presence in the market and had done so over some time. Unfortunately, the CLECs as a whole continue to demonstrate some degree of financial instability. While that condition should improve in the future, CLEC data are not sufficient today to rely on exclusively in determining the capital costs for a representative CLEC.

Q. What is expected to happen to the CLEC industry over the next few years?

A. Recent research by International Data Corporation (IDC) projects that:

> … the competitive local exchange carriers (CLECs) will continue to win access lines from the incumbent carriers, based on flexible pricing and packaging and personalized customer service. While CLEC access lines will grow at 12.2% compound annual growth (CAGR) through 2007, their revenue growth will be in low single digits because of falling prices for both voice and data services. Other key findings include:
>
> - Regulatory uncertainty is still a problem for the CLEC market, but preservation of the UNE system is good for the CLECs.
> - New technologies, such as softswitches and electronic ordering and

bonding of operational support systems (OSSs), will continue to reduce CLECs' cost of doing business.

- Prior capital expenditures will continue to drive a steady increase in switched lines, though IDC assumes that this growth will decline during 2001-2003 then increase as the economy and capital markets improve. (Adcock, Barbara, Kaplan, Ron, and Stofega, William. "U.S. CLEC Forecast, 2002-2007," IDC, Study #29661, June 2003, p. 1).

Q. What factors explain the financial distress and bankruptcies experienced by the CLEC industry in the last two years?

A. The generally accepted explanation follows:

> Just as the fact that a number of CLECs have filed for Chapter 11 has become common knowledge, the reason for their bankruptcies is well known. In the 1990s, the CLECs acquired billions of dollars in financing to invest in telecommunications infrastructure with the assumption that the demand for their services would continue to experience accelerating growth. When this demand did not materialize, the CLECs were left with billions of dollars in debt and no way to pay it off. Some of these CLECs were forced into Chapter 11 to recapitalize their financial structure. Some of these CLECs finally succumbed to Chapter 7 bankruptcy after exhausting all efforts to reduce their debt loads. (New Paradigm Resources Group, Inc., *CLEC Report 2003: Competitive Last Mile Providers*, 17th edition, volume 1, chapter 2, 2003, p. 3 of 20).

Q. In light of the recent number of bankruptcies and financial distress, is it fair to conclude that the CLEC industry does not currently exhibit a sustainable long-run structure and the implied optimal, efficient capital structure that can be relied upon by itself to estimate capital costs for the representative CLEC?

A. Yes. The following observations reinforce the above-noted cause of the industry's current problems and emphasize the state of flux the industry currently operates within:

> Much has been written in the press about the demise of the CLEC industry. True the past two years have seen several stronger players shut their doors because of high levels of debt. The overall economic slump has further depressed the outlook for CLECs going forward. Despite these facts, New Paradigm Resources Group, Inc. (NPRG) has seen evidence in 2002 that the CLEC industry is nearing its bottom and should stabilize in 2003 and early 2004.
>
> The CLEC industry continued to shrink in 2002 as several competitive providers with weak business plans, excessive amount of debt, and lackluster management have gone bust. At the same time, large portions of their assets have been acquired by other CLECs, serving to strengthen these companies' operations. The CLECs that continue to do business in late 2002 have reduced their capital spending, scaled back expansion plans, and fortified their management teams, all with an eye toward future growth. Indeed, despite the ongoing drought in the capital markets, 2002 has seen a handful of

> competitive providers receive new capital investments …
>
> … The CLEC industry is a relatively young one, and has undergone a variety of growing pains over the last seven years. Considering that total CLEC switched access lines increased by 16% to 27.4 billion during 2001, NPRG continues to assert the difficulty that the industry has faced in the past does not portend the downfall of the entire CLEC market. (New Paradigm Resources Group, Inc. *CLEC Report 2003: Competitive Last Mile Providers*, 17th edition, volume I, chapter 2, 2003, p. 1 of 20).

Q. Have there been any recent specific technological advances that favorably affect forward-looking ability of the CLEC industry to generate profits?

A. Yes. Industry observers note the importance of so-called softswitches in facilitating lower cost entry into the local telecommunications market and increasing the ability of CLECs to compete profitably in it. They observe that one of the trends in 2002 was that:

> … at least 25% of the voice-focused pure-play CLECs – that is, of the CLECs in this Report – had an ongoing softswitch initiative in place. The world continues to move toward a packetized infrastructure.
>
> This is an important trend, carrying significant implications for the future of local competition. To the extent local voice can be readily deployed over softswitches going forward, the expense of deploying a Class 5 switch as an entry barrier will be diminished. This suggest that many more CLEC resellers

and ISPs will ultimately migrate to facilities-based CLEC status, deploying voice as an application. (New Paradigm Resources Group, Inc., *CLEC Report 2002: Competitive Last Mile Providers,* 15th edition, volume I, 2002, chapter 2, p. 3 of 22.)

All of this suggests that while there is useful information in relying in part on information about publicly-traded CLECs, such information cannot reliably reflect, by itself, the capital costs of a representative CLEC.

IV. RECENT FCC CLARIFICATIONS CONCERNING COST OF CAPITAL ESTIMATION

A. TRIENNIAL REVIEW ORDER CLARIFICATIONS

Q. What are the key points in this section that are relevant to your determination of the representative CLEC's capital costs?

A. The recent clarifications made by the FCC in the TRO support the following key points that influence my approaches to estimating the representative CLEC's capital costs:

- The cost of capital should rely on data that reflect competitive markets.
- The cost of capital should reflect the assumption of a forward-looking, technologically efficient network. This implies that the cost of capital should reflect forward-looking, efficient capital structure, equity costs, and debt costs.
- The appropriate capital structure in cost of capital analysis is market value- rather than book value-based.
- The S&P 500 is a useful benchmark for assessing the average risk of firms operating in

competitive markets, which is relevant in the telecommunications market.

Q. What clarifications does the FCC's TRO provide concerning the appropriate method for computing capital costs?

A. The TRO clearly indicates that the cost of capital should reflect the risks of a competitive rather than a regulated market. Indeed, the FCC states:

> To ensure that UNE prices set by the states appropriately reflect the risks associated with new facilities and new services, we think it would be helpful to clarify two types of risks that should be reflected in the cost of capital. First, we clarify that a TELRIC-based cost of capital should reflect the risks of a competitive market. The objective of TELRIC is to establish a price that replicates the price that would exist in a market in which there is facilities-based competition. In this type of competitive market, all facilities-based carriers would face the risk of losing customers to other facilities-based carriers, and that risk should be reflected in TELRIC prices. (TRO, p. 419, §680).

This shows that the FCC believes that the cost of capital should be measured using data from competitive rather than just regulated markets.

Q. What assumptions does the FCC make concerning the underlying telecommunications network for the purpose of computing the cost of equity capital?

A. As noted below, the FCC advocates calculating the cost of capital under the assumption of a forward-looking network using the most efficient technology:

> … To calculate rates based on an assumption of a forward-looking network that uses the most efficient technology (i.e., the network that would be deployed in a competitive market), without also compensating for the risks associated with investment in such a network, would reduce artificially the value of the incumbent LEC network and send improper pricing signals to competitors. Establishing UNE prices based on an unreasonably low cost of capital would discourage competitive LECs from investing in their own facilities and thus slow the development of facilities-based competition. (TRO, pp. 419-420, §682.)

The FCC's assertion that the cost of capital should reflect a forward-looking efficient network presumably implies that the cost of capital should also reflect the assumption of an optimal, sustainable capital structure and its associated forward-looking capital costs. Unfortunately, the current financial problems being experienced by the CLEC industry undermine the validity of such an assumption. It is consequently necessary to find market-based evidence of optimal, sustainable capital structures and capital costs elsewhere.

B. FCC CLARIFICATIONS PROVIDED BY THE VERIZON ARBITRATION ORDER

Q. Does the FCC take a position in its recent Verizon arbitration order concerning the appropriateness of market value- rather than book value-based capital structures in cost of capital analysis?

A. Yes. In reviewing the cost of capital determination process applied to Verizon, the FCC (specifically, the Wireline Competition Bureau) observes that:

> … In calculating TELRIC prices, the theoretically correct capital structure is based on market values of debt and equity, not book values. In section 252(d)(1) of the Act, Congress specifically prohibited the use of traditional rate-base, rate-of-return ratemaking. The Commission has interpreted this section to require prices based on forward-looking costs, because forward-looking costs best replicate the costs a carrier would face in a market with facilities-based competition. Under the Commission's TELRIC rules, we calculate the investment necessary to build a network using the most efficient technology currently available. The TELRIC rules provide for the recovery of the investment in that efficient network through the use of economic depreciation and they provide for a return on that investment through a risk-adjusted cost of capital. The book value of Verizon's existing network is irrelevant for these purposes. Investors would not earn the return that they require if a cost of capital that is based on book value is applied to the economic value of their assets, given that rational investors value these assets at market value. Thus, the use of a capital structure based on market values, rather than book values, represents a departure from traditional ratemaking, but one that is entirely appropriate under the Act. (In the Matter of Petition of WorldCom, Inc. Pursuant to Section 252(e)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia Inc., and for

> Expedited Arbitration, CC Docket No. 00-218, and In the Matter of Petition of AT&T Communications of Virginia Inc., Pursuant to Section 252(e)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia Corporation Commission Regarding Interconnection Disputes With Verizon Virginia Inc., CC Docket No. 00-251, Memorandum Opinion and Order, DA 03-2738, released August 29, 2003, p. 45, §102, hereinafter Verizon Arbitration Order.)

Thus, the FCC quite clearly supports the use of market value-based capital structures in cost of capital estimation.

Q. Has the FCC provided any guidance concerning the usefulness of the S&P 500 in measuring equity capital costs?

A. Yes. In the Verizon Arbitration Order the FCC observes that:

> … the overall beta of 1.0 for the S&P 500 companies for which Verizon placed betas into the record does produce a useful benchmark for the risk faced on average by established companies in competitive markets. (Verizon Arbitration Order, p. 41, §90.)

The FCC consequently indicates that the S&P 500 market return is a reasonable proxy for the average risk faced by firms operating in competitive markets.

Q. By using the firms of the S&P 500 as a surrogate for the representative CLEC, does this mean that the average CLEC has the same risk as any firm in the S&P 500?

A. No. It may be tempting to single out one company in the S&P 500 and incorrectly attempt to compare its various risk measures individually to those of the representative CLEC. However, none of the individual companies in the S&P 500 are precisely like the representative CLEC in every respect. The firms are alternative investment opportunities that, *in the aggregate*, have average risk. This benchmark consequently provides insight into the representative CLEC's long-term, sustainable capital costs in a fully competitive market.

Some may also incorrectly argue that the S&P 500 is of low risk. Yet this is incorrect because the index is, by definition, composed of firms that are, *as a group*, of average risk. The assumption that the S&P 500 captures only lower risk firms is likely based on a historical, rather than a forward-looking perspective. On a forward-looking basis there is plenty of risk associated with S&P 500 companies. For example, Eastman Kodak is an S&P 500 firm, yet it recently lost a significant amount of its value as investors considered a future in which digital photography has in large part replaced traditional chemical-based photography. Thus, Eastman Kodak - and other S&P 500 firms - face considerable forward-looking risks from technological and market changes. In other words, a history of past market success is no guarantee of such a future.

V. COST OF EQUITY ANALYSIS FOR THE S&P 500 SURROGATE

Q. What method do you use to calculate the cost of equity for the S&P 500?

A. I use a standard DCF model.

Q. What form of the DCF model do you use to estimate the representative CLEC's cost of equity capital?

A. I use the constant growth form of the DCF model that assumes an indefinite or infinite holding period. I will first describe the general model that is commonly applied to individual firms and then I will describe how the model is refined for application to the S&P 500.

Since most U.S. firms pay dividends quarterly, I use the quarterly form of the DCF model under the realistic assumption that such dividends are changed by firms once a year, on average in the middle of the year. Specifically, the cost of equity K is calculated as:

$$K = [(D_0^q\ (1 + G)) / P_{mkt}] + G = [D_1^q / P_{mkt}] + G;$$

where G is the most recent average five-year earnings per share growth rate projected by analysts, as reported by either Zacks Investment Research Inc. (Zacks) or by the IBES, and P_{mkt} is the average of the three most recent months (July to September of 2003) of high and low prices for the equity. D_o^q and D_1^q reflect the most recent annual and the anticipated next year amount of quarterly dividends, respectively. D_1^q is calculated as:

$$D_1^q = d_1\ (1 + K)^{.75} + d_2\ (1 + K)^{.5} + d_3\ (1 + K)^{.25} + d_4\ ;$$

where d_1 and d_2 are the quarterly dividends paid prior to the assumed yearly change in dividends and d_3 and d_4 are the two quarterly dividends paid after the given change in the amount paid by a firm. Thus, dividend D_1^q captures the quarterly payment of dividends that grow at rate G. In order to reflect the effect of flotation costs on the cost of equity, I directly reduce the market price P_{mkt} used in my analysis by a conservative 5 percent. Billingsley Exhibit No. RSB-2 elaborates on the nature and applicability of the DCF model in estimating the cost of capital. It also discusses the importance of adjusting for both the payment of quarterly dividends and for flotation costs.

The DCF model for the S&P 500 is estimated using essentially the same approach described above. However, the expected growth rate used in the quarterly version of DCF model is the market value-weighted mean of the five-year earnings per share estimates published by Zacks and IBES for the firms in the S&P 500. Similarly, the average closing values of the index for the three most recent months (July to September of 2003) are used. Dividend yield data are obtained from Standard & Poor's *The Outlook*, restated on a quarterly basis.

Q. What cost of equity capital do you estimate for the representative CLEC applying the DCF model to S&P 500 surrogate?

A. Application of the DCF model to the S&P 500 index produces a cost of equity of 14.27% using IBES growth rate estimates and a cost of equity of 14.35% using Zacks growth rate estimates, or an average of 14.31%.

VI. COST OF EQUITY ANALYSIS USING THE PUBLICLY-TRADED CLEC SURROGATE

Q. For your other surrogate, the limited group of publicly-traded CLECs, did you use the DCF model to estimate that surrogate's cost of equity?

A. No, I did not. Because the CLECs do not generally pay dividends, it is not possible to use the DCF approach. As a result, I have instead used the CAPM approach to estimate the cost of equity for this surrogate.

Q. What form of the CAPM do you use to estimate the representative CLEC's cost of equity capital?

A. I use the common form of the model, which calculates the risk-adjusted rate of return K as:

$$K= R_f + \beta [R_m - R_f];$$

where R_f is the expected return on a risk-free security like a U.S. Treasury bond, β is the expected beta or systematic risk of the equity security, and R_m is the expected return on a broad index of equity market performance, which is the S&P 500 in my analysis.

Q. How and where do you obtain the beta coefficient data needed to estimate the representative CLEC's cost of equity capital using the CAPM?

A. As discussed above, there is limited reliable market data with which to estimate the representative CLEC's beta coefficient, which is required by the CAPM. However, there is sufficient information to evaluate a sample of CLEC firms that do have traded equity and therefore measurable beta coefficients. This sample is identified in Billingsley Exhibit No. RSB-3. Specifically, the average beta of 1.66 for the group of firms is used in the CAPM equation presented above.

The beta coefficients used in my CAPM analysis are the most recent prospective measures supplied by BARRA, a widely recognized provider of financial data and decision support systems for institutional investors. Billingsley Exhibit No. RSB-4 elaborates on the nature and significance of using prospective rather than historical beta estimates.

Q. How do you estimate the risk-free rate of return needed in the CAPM equation?

A. In order to be consistent with the expectational emphasis of the CAPM, I use the 4.51% average expected yield implied by the prices of the Treasury note futures contracts quoted during September of 2003. The prices of these contracts reflect the market's consensus forecast of long-term, low-risk interest rates. Billingsley Exhibit No. RSB-5 describes the futures contracts used in the analysis in more detail and shows the calculations necessary to derive the implied expected future risk-free rate of return.

Q. How do you estimate the expected return on a broad index of equity market performance for use in the CAPM?

A. I use expectational data to estimate the return of the S&P 500 as my proxy for overall equity market performance using the DCF method discussed above. The expected return during the most recent month (September of 2003) for which data are available is used in the CAPM analysis.

Q. What cost of equity capital do you estimate for the representative CLEC under the CAPM approach?

A. Summarizing the results of the above analysis, I use a risk-free rate of return of 4.51%, an average beta of 1.66 for firms comparable in risk to the representative CLEC, and IBES and Zacks growth rate estimates that imply an expected return on the S&P 500 of 14.27% and 14.35%, respectively. These objective, market-determined data indicate that the representative CLEC's cost of equity capital is 20.71% using the IBES growth rate and 20.84% using the Zacks growth rate forecast. Thus, the average cost of equity for the representative CLEC using the CAPM approach is 20.78%.

Q. What is your conclusion regarding the representative CLEC's cost of equity capital on the basis of the DCF- and CAPM-based findings for your two surrogates?

A. I believe that the DCF finding of 14.31% for the S&P 500 surrogate and the CAPM result of 20.78% for the publicly-traded CLEC surrogate should be averaged to provide a reasonable cost of equity capital estimate for the representative CLEC. The average cost of equity capital is 17.55%.

VII. COST OF DEBT

Q. How can the representative CLEC's forward-looking cost of debt be empirically estimated?

A. Two approaches are used to estimate the cost of debt. First, the representative CLEC's forward-looking cost of debt is estimated by examining the yields on bonds with the same rating as the average issued by firms in the S&P 500. Using a numerical dummy coding of bond rating categories, the average corporate bond rating for members of the S&P 500 is BBB or Baa. As of September of 2003, the average yield on such bonds is 6.79% (*Mergent Bond Record*, October 2003, p. 63). Second, the representative CLEC's cost of debt is estimated by examining the average bond rating of firms in the industry. As noted above and portrayed in Billingsley Exhibit RSB-6, the average bond rating is CCC+/CCC. That exhibit also shows that the average yield on such bonds in September of 2003 is 13.04%. While this is the rating and associated average yield of a financially troubled industry, I use it to estimate a ceiling debt cost for the industry.

Q. What is your estimate of the representative CLEC's forward-looking cost of debt?

A. Based on my analysis, I believe that a reasonable estimate of the representative CLEC's forward-looking cost of debt is the average of the two estimates of 6.79% and 13.04%, which are the estimates provided by the S&P 500 firms' debt and the sample of publicly-traded CLEC debt. The average cost of debt for the two approaches is 9.92%.

VIII. OVERALL COST OF CAPITAL FOR THE REPRESENTATIVE CLEC AND SUMMARY OF RECOMMENDATIONS

Q. What capital structure, component costs of capital, and overall cost of capital do you use in estimating the representative CLEC's overall cost of capital directly?

A. I use my estimated costs of equity and debt for the representative CLEC along with the average market value-based capital structure for both the S&P 500 and the above-noted sample of publicly-traded CLECs. The average market value-based capital structure of firms in the S&P 500 is 29.50% debt and 70.50% equity while the average for the sample of publicly-traded CLECs is 87.43% debt and 12.57% equity (see Billingsley Exhibit No. RSB-3). Averaging these capital structure weights and combining them with the above average cost of debt and cost of equity estimates produces a pre-tax overall cost of capital for the representative CLEC of 13.09%.

Q. What practical and theoretical arguments support reliance on market value-based rather than on book value capital structures in cost of capital analysis?

A. Book value capital structures do not recognize the reality the representative CLEC obtaining capital in today's financial marketplace. The use of market values is both practically as well and theoretically appropriate and consistent with establishing a prospective cost of capital for use in a proceeding such as this one. Market values should be used exclusively because they are dynamically determined in the marketplace by investors, while book values are the result of historical accounting practices. One-time accounting events that do not change market values can significantly alter book values. Additionally, the point in time at which a company issued stock in the past can influence book values, while prospective market values are not affected. Current market values are determined by investors' most up-to-date expectations for the future. These expectations are based on a variety of factors, many of which are external to a CLEC. Book values look at a firm largely in dated isolation, while market values consider the firm's expected performance in light of its external competitive environment as well.

Over time, market values vary from book values as investors change stock prices in response to new company announcements as well as to announcements concerning their competitors for investors' dollars. If an event or announcement significantly enhances or detracts from shareholder value, that change is immediately translated into a market value change by investors, while there is likely to be no immediate change in book value. It is obvious that relying on book values is unrepresentative of the investor's perspective in today's capital markets from which the representative CLEC must obtain capital. The impact of relying on book values is a downward bias in overall cost of capital estimates.

Q. Would you elaborate on how market value-based capital structures reflect investors' expectations and how capital structures are commonly measured in accepted financial practice and theory?

A. Yes. Market value-based capital structures reflect the most up-to-date expectations of investors in the capital markets. In contrast, book value-based capital structures reflect accounting conventions and historical costs. It is important to stress that capital costs inherently involve market-based expectations no matter what type of cost estimation model is used. Therefore, the capital structure that is matched with expected capital costs must also be measured in market value terms that capture investors' expectations. In order to be consistent with well-established financial practice and theory, market-determined capital costs must be matched with market-determined capital structures. Indeed, the use of market value-based capital structures in cost of capital and capital budgeting analysis is the standard approach taken in modern corporate finance textbooks (e.g., see S. A. Ross, R. W. Westerfield, and B. D. Jordan, *Essentials of Corporate Finance*, Irwin: 1996, pp. 316-317 or R.A. Brealey and S.C. Myers, *Principles of Corporate Finance*, McGraw-Hill: 1996, 5th ed., pp. 214, 517).

Many people mistakenly believe that there are three different costs of capital: historical, current, and expected. Actually there is only one relevant measure, which is the *expected* cost of capital that is based on market values. This is consistently updated every day in the financial markets and exists at any given point in time. Thus, market value-based capital structures are more appropriate than accounting-based capital structures in cost of capital analysis

Q. Is the use of market value-based capital structures in cost of capital analysis consistent with well-accepted legal and regulatory standards?

A. Yes. In addition to being consistent with well-established financial practice and theory, I believe that the use of market value-based capital structures is consistent with the universally-accepted Supreme Court precedents concerning what characterizes a reasonable rate of return for a regulated public utility (see <u>Bluefield Water Works & Improvement Co. v. Public Service Commission of West Virginia</u>, 262, U.S. 679, 692-3, (1923) and <u>Federal Power Commission v. Hope Natural Gas Co.</u> 320, U.S. 591, (1944)).

Market value-based capital structures are also consistent with the FCC's standard of considering the expected cost of capital (see First Report & Order, FCC 96-325, released

August 8, 1996, paragraph 700). Because the expected cost of capital is, by definition, based on investors' expectations, all of its components must be based on expectations. The FCC's standard implies that the CLECs' costs of debt, costs of equity, and capital structures must all rely on the expectations reflected in market values. Thus, well-accepted financial practice and theory as well as the FCC's espoused principle indicate that market value-based capital structures are more appropriate than accounting-based capital structures in cost of capital analysis.

Q. Similarly, is the use of market value-based capital structures in cost of capital analysis consistent with the recent clarifications concerning the estimation of capital costs that you discuss above in your testimony?

A. Yes. As discussed above in Section IV of my testimony, the FCC clearly states that " … the use of a capital structure based on market values, rather than book values, represents a departure from traditional ratemaking, but one that is entirely appropriate under the Act" (Verizon Arbitration Order, p. 45, §102).

Q. Would you please elaborate on why it is necessary to adjust your overall cost of capital estimate for taxes before using it to discount the representative CLEC's cash flows in the BACE model?

A. Yes. The representative CLEC operates in a competitive marketplace that is fully subject to state and federal taxation. Thus, it is important to adjust all estimated capital costs for the effects of such taxation. Interest expenses are typically deducted from taxable income. Thus, each dollar of interest paid reduces the amount of a CLEC's income that is subject to tax. For example, if a CLEC pays a before-tax interest cost of 6.79% and faces a 32% tax rate, it's effective after-tax cost of debt will be 6.79% (1 – 32%) = 4.62%. In contrast, a CLEC must meet equity holders' return requirements as an expense that is not tax-deductible. Thus, for example, the before-tax cost of equity on the S&P 500 of 14.31% is equal to the after-tax cost. In other words, the cost of equity receives no favorable tax treatment.

In evaluating potential investments it is necessary to discount after-tax cash flows at after-tax capital costs. The BACE model generates after-tax cash flows that consequently must be discounted at an after-tax overall cost of capital in order to produce a reliable NPV estimate.

Q. Would you please summarize your recommendations to the TRA concerning the appropriate capital costs that should be used in the BACE business case model to assess whether any lack of access to BST's switch UNE makes entry by a CLEC uneconomical?

A. My analysis indicates that a forward-looking cost of equity estimate for the representative CLEC using the DCF and CAPM approaches is an average of 17.55%. I also find evidence that the cost of debt of the representative CLEC is an average of 9.92%. The average market value-based capital structure of firms is 58.50% debt and 41.50% equity. Combining this average capital structure with the above average costs of debt and equity produces an average pre-tax overall cost of capital for the representative CLEC of 13.09%.

In summary, I recommend that the TRA use a *before-tax* overall cost of capital of 13.09% to discount the cash flows produced by the BACE CLEC business case model. As noted above, the capital cost estimates I provide are all stated on a before-tax basis. The after-tax cash flows produced by the BACE model must be discounted at after-tax capital costs so as to produce a reliable NPV estimate.

Q. Does this conclude your direct testimony?

A. Yes, it does.

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APPOINTMENTS

1994 - Current: Associate Professor of Finance
Virginia Polytechnic Institute & State University

1993: Vice President
Association for Investment Management and Research
Education and Programs Department

Duties: Project director, responsible for the development and design of education technology products. Projects included videos on options and futures analysis, ethical issues in the investment profession, and financial statement analysis for investment valuation and management.

Responsible for the design and offering of continuing education programs to meet the needs of AIMR's members in particular and the investment industry in general.

Associate Professor, On Leave of Absence
Virginia Polytechnic Institute & State University

1987-1992: Associate Professor of Finance
Virginia Polytechnic Institute and State University

1981-1987: Assistant Professor of Finance
Virginia Polytechnic Institute and State University

1978-1981: Lecturer of Finance
Texas A&M University

1977-1978: Lecturer of Economics
Research Assistant in Economics
Texas A&M University

Summers 1978, 1980: Research Associate
Texas Transportation Institute
Texas A&M University

Duties: (1978) Principal researcher and author of a study concerning design of optimal subsidy techniques for public transit projects. (1980) Co-author of research proposal for study of the projected economic impact of user charges on the Texas Gulf Intra-Coastal Waterway (proposal accepted and fully funded). Performed research concerning various policy issues in transportation economics.

PROFESSIONAL DESIGNATIONS

1986: Chartered Financial Analyst (CFA)
The Institute of Chartered Financial Analysts
(Association for Investment Management and Research)

1992: Certified Rate of Return Analyst (CRRA)
National Society of Rate of Return Analysts

EDUCATION

1982: Doctor of Philosophy in Finance, supporting field in Economics
Dissertation Title: "A Multivariate Analysis of Bank Holding Company Capital Note and Debenture Ratings"
Chairman: Dr. Donald R. Fraser
Texas A&M University

1978: Master of Science in Economics, supporting field in Statistics
Texas A&M University

1976: Bachelor of Arts in Economics
Texas Tech University

PRIMARY TEACHING AND RESEARCH INTERESTS

Teaching: Financial Derivatives and Investments.

Research: Interests include investments, valuation methods, cost of capital analysis, primary market pricing of debt instruments, and public utility regulatory issues.

TEACHING HONORS

Teaching Excellence Award, The R. B. Pamplin College of Business, Virginia Polytechnic Institute and State University, 2002-2003.

Teaching Excellence Award, The R. B. Pamplin College of Business, Virginia Polytechnic Institute and State University, 1986-1987.

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Grading Staff, Institute of Chartered Financial Analysts, June 1987.

Candidate Curriculum Committee, Institute of Chartered Financial Analysts, Quantitative Analysis Sub-Committee, 1987-1989.

CFA Examination Analysis Team, Levels I-III, March 1988.

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Consulting Clients

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Bell Atlantic

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Expert Witness Regulatory Testimony
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SELECTED INVITED SPEECHES/WORKSHOPS

LDC / Virginia State Corporation Commission Conference, “LDC Return On Equity: Has The World Changed? Common Myths in Cost of Capital Analysis,” Roanoke, VA, October 2003.

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NATURE AND APPLICABILITY OF THE DISCOUNTED CASH FLOW MODEL IN COST OF EQUITY CAPITAL ANALYSIS

I. Nature of the Discounted Cash Flow (DCF) Model

The DCF model is a formal statement of common sense and basic financial theory. The model asks an investor's most basic question: How much is this stock worth? Common sense dictates that the answer depends on what investors expect to get out of the stock and when they expect to get it. The "what" is the expected cash flow stream generated by the stock and the "when" is the projected timing of those expected cash flows.

Determining how much a stock is worth depends on one more critical consideration: the riskiness or probability that investors associate with their forecast of what they will receive from the stock. In this context, risk is the possibility that investors' expectations will be frustrated. Thus, risk is reflected by the probability that investors' actual returns will differ from their expected returns. The DCF model assumes that the average investor dislikes risk and consequently will accept higher risk only if there is a higher expected return.

The DCF model recognizes two types of expected cash flows: the periodic payment of cash dividends and the (possible) future sale of the stock. If an investor facing an opportunity cost of K percent expects to get dividends D_t annually for the next N years and then sells the stock at the end of year N for a price of P_N, then the appropriate current price P_0 is:

$$P_0 = \frac{D_1}{(1 + K)^1} + \frac{D_2}{(1 + K)^2} + \ldots + \frac{D_N + P_N}{(1 + K)^N}$$

In summary, the appropriate price of a stock is the present value of all of the cash benefits that an investor expects to get from owning it.

II. Applicable Form of the DCF Model

A. Issues

The above form of the DCF model is typically modified in at least two ways. First, a regulatory commission is presumably not concerned with determining how much a stock should sell for. Its goal is to determine what rate of return a firm's equity investors should reasonably expect to receive for bearing the firm's risk. Thus, a regulator is concerned with what the price is rather than with what it should be. The actual price P_{mkt} should consequently be used to infer investors' required rate of return.

Second, the form of the DCF presented above makes no explicit assumption concerning the expected rate of growth in dividends and the stock's price over time, nor any assumption concerning the length of an investor's expected holding period. However, the so-called constant growth form of the DCF model implicitly assumes that dividends and price grow at a constant rate G over time, that the growth rate is less than the required rate of return, and that investors have an infinite or indefinite holding period.

It is important to remember that the fundamental source of a stock's value to investors in the DCF model is its expected dividend stream. Why would investors be willing to trade a stock if the stock was nothing more than a piece of paper that would never pay any money? If the current price of a stock is the present value of all expected future cash flows, then the price at any point in time should be the present value of the expected cash flows beyond that point in time.

While an infinite holding period may not seem to apply to any one investor, this assumption is an accurate way of portraying the behavior of investors collectively. This is because investors must determine all prices, present and future, by projecting a seemingly endless series of future dividends. They must make such dividend projections since any expected future price is dependent on the dividends that are expected to be paid on that stock after it is purchased.

The constant growth form of the DCF model makes these two adjustments and can be expressed as:

$$K = \frac{D_0(1 + G)}{P_{mkt}} + G = \frac{D_1}{P_{mkt}} + G,$$

where D_0 is the most recent dividend paid, G is the expected growth rate, D_1 is the next anticipated dividend, and the rest of the variables are defined as above.

Two additional modifications to the DCF model are necessary. First, it should be recognized that dividends are paid by most companies on a quarterly, not an annual basis. The second adjustment to the general DCF model presented above considers the flotation costs borne by the firm in raising equity funds.

B. Adjustment for Quarterly Dividends

1. Rationale

The annual form of the DCF model assumes that investors receive dividends only once a year and that they have the opportunity to reinvest those cash flows in investments of the same risk. The required rate of return implied by the annual form of the DCF model will be biased downward if investors actually receive their dividend payments in quarterly rather than in annual installments. This bias results because equity investors have the opportunity to start earning a return on their reinvested dividends sooner when these dividends are received quarterly than when the dividends are received only annually.

Investors determine prices that are consistent with the returns that they expect to earn. Thus, investors pay prices that reflect that they expect dividends quarterly rather than annually. Failure to make this adjustment to the DCF model will understate the cost of equity capital. This adjustment should be made in order to determine an economically correct cost of equity for a regulated firm.

2. Specific Adjustment

There are two basic ways in which quarterly dividends can be handled. The first approach makes the simplifying assumption that dividends are paid quarterly and grow quarterly as well. While this approach has the virtue of simplicity, it is not realistic because most firms adjust their dividend payments only once a year, not quarterly.

The second approach assumes that firms pay dividends quarterly but that those dividends are only changed by a firm annually. Thus, quarterly reinvestment opportunities are recognized and the more realistic pattern of annual dividend growth is accounted for as well. This is the approach that I use in my analysis of a regulated firm's cost of equity. Further, I assume that firms on average adjust the level of their dividends in the middle of the year.

The adjusted DCF model calculates a revised dividend, $D_1^{\,q}$:

$$D_1^q = d_1 (1 + K)^{.75} + d_2 (1 + K)^{.5} + d_3 (1 + K)^{.25} + d_4,$$

where d_1 and d_2 are the two quarterly dividends paid prior to the assumed yearly change in dividends and d_3 and d_4 are the two quarterly dividends paid after the given change in the amount paid by a firm. This dividend, D_1^q, revised to recognize the quarterly payment of dividends that grow at rate G once a year (on average for all firms in the middle of the next

12 months), is substituted in the place of D_1 in the basic form of the DCF model as follows:

$$K = \frac{D_1^q}{P_{mkt}} + G.$$

In my analysis, the market price is the average of the monthly high and low stock prices for the most recent three months for which data are available.

C. Adjustment for Flotation Costs

1. Rationale and Specific Adjustment

The cost of equity capital must reflect what a firm needs to earn on its funds in order to meet the return requirements of its investors. Flotation costs reduce the amount of funds that a firm has to invest and thereby increase the return that a firm must earn on those remaining funds if it is to continue attracting investors. If a utility was allowed to recover all of its flotation costs at the time of issuance, there would be no need for this adjustment. Otherwise, it is important to subtract the flotation costs from the price used in the DCF model in order to capture the fact that a utility does not receive the full proceeds of an equity issue.

Two empirical studies indicate that a 5% flotation cost is realistic. Research by C. W. Smith, Jr. (*Journal of Financial Economics*, 1977, pp. 273-307) finds that explicit flotation costs amount to between 4% and 5% of the amount of an equity issue. Focusing on the utility industry, research by R. H. Pettway (*Public Utilities Fortnightly*, May 10, 1984, pp. 35-39) finds that the sale of equity securities generally also involves implicit flotation costs in the form of a 2% to 3% decline in the price of the stock that results from market pressure.

While the above studies deal with both utilities and industrial firms, they are also relevant to the estimation of telecommunications companies' flotation costs. As the telecommunications industry becomes more competitive, such firms are increasingly being viewed more like industrials than as "pure" public utilities. Equity investors taking a long-term view in their valuations recognize this. Thus, the firm's cost of equity should reflect this expected transition. Therefore, given actual costs of approximately 4-5% and market pressure of 2-3%, I include a conservative 5% flotation cost adjustment that is implemented as a 5% reduction to the stock prices used in my DCF analysis.

2. Relevance of Flotation Costs Despite the Absence of Actual Equity Sales

The fact that a regulated firm does not actually sell equity by virtue of an affiliation with a parent company does not invalidate the need to adjust for flotation costs. Taken to its logical extreme, it could be argued that such a regulated subsidiary firm has no cost of equity capital at all since it does not sell shares of stock on the open market. Yet such regulated firms bear such equity costs and should be compensated accordingly.

The omission of a flotation cost adjustment is incorrect and is equivalent to comparing mortgage rates without adjusting for “points.” A regulated firm will not get fair treatment if it is only permitted to earn a return that does not cover all of its reasonable costs, which include flotation costs.

3. Estimation of Growth for Use in the DCF Model

Investors are forward-looking. Investment decisions are made on the basis of how investors expect a stock to perform in the future. While how a stock has performed in the past may well influence an investor’s expectations concerning future performance, there is no guarantee that the future will be a simple extension of the past. Thus, it is important that the estimated growth rate used in the DCF model be a prospective or expected, not a historical, rate.

Financial research indicates that the consensus growth rate forecasts of financial analysts are the most unbiased, objective, and accurate measure of investors’ growth expectations for a stock. Thus, I use the growth rate estimates published by the Institutional Brokers Estimate System (IBES) and Zacks Investment Research, Inc. (Zacks). Both IBES and Zacks are used widely within the investment profession and are revised frequently enough to remain relevant to investors evaluating the growth prospects of stocks. Further, the use of both sources provides broad-based measures of long-term growth rate expectations.

Sample of Publicly-Traded CLECs
March 2003[1]

COMPANY	BARRA BETA	DEBT / TOTAL CAPITAL[2]	EQUITY / TOTAL CAPITAL
DSL.Net, Inc.	2.05	0.5733	0.4267
McLeodUSA Inc.-Cl A	1.61	0.8545	0.1455
Pac-West Telecom, Inc.	1.76	0.8627	0.1373
RCN Corp.	1.86	0.9807	0.0193
Talk America Holdings, Inc.	1.66	0.3167	0.6833
Time Warner Telecom, Inc.	1.71	0.7665	0.2335
US LEC Corp	0.99	0.7851	0.2149
Z Tel Technologies, Inc.	1.62	0.7184	0.2816
Average[3]	**1.66**	**0.8743**	**0.1257**

[1] Based on the closing common stock prices as of March 3, 2003 and year-end 2002 financial statements.
[2] Debt is defined as the book value of total debt plus the book value of preferred equity.
[3] The average debt and equity ratios are market value-weighted.

CAPITAL ASSET PRICING MODEL ANALYSIS OF THE COST OF EQUITY CAPITAL

I. Description of the Approach

The capital asset pricing model (CAPM) is a theory of the relationship between the risk of a security or a portfolio of securities and the expected rate of return that is commensurate with that risk. The theory is based on the assumption that security markets are efficient and dominated by risk averse investors. In other words, the CAPM argues that investors are willing to take on more risk only if they can reasonably expect a higher return.

The CAPM accepts the risk/return trade-off economic principle and quantifies that trade-off. Further, the model assumes that most investors diversify their investment holdings so as to not put "all of their eggs in one basket." Indeed, the tendency for investors to diversify their investment portfolios implies that, in a CAPM context, the only type of risk that is rewarded or relevant in the risk/return trade-off is systematic or market-related risk. Thus, the additional risk created by not diversifying among investments is not rewarded by the securities markets under the CAPM.

The measurable relationship between risk and expected return in the CAPM is summarized by the following expression:

$R_t = R_f + \beta_i [R_m - R_f]$,

where R_i is the expected return on security or portfolio i, R_f is the return on a risk-free security like a U.S. Treasury bond, β_i is the beta of security or portfolio i, and R_m is the expected return on a broad index of equity market performance like the Standard & Poor's Composite 500 Index (S&P 500).

II. Economic Rationale for the Approach

The rationale for the CAPM equation is the common sense observation that investors must be coaxed to move their money from riskless assets like U.S. Treasury bonds into risky assets. Consider an everyday example wherein investors can obtain about a 7% return on a Treasury security. Investors will not invest in a broad market portfolio of risky securities unless they can expect a significant return premium for accepting the risk in excess of the riskless security. In terms of the above example, investors would want an expected return that is greater than 7% if material risk is present. The usefulness of the CAPM is in measuring how much of an expected return premium is appropriate for investments in light of their riskiness relative to the risk of a benchmark broad market index.

The economic interpretation of the CAPM equation is as the base risk-free rate of return (R_f) plus the market-wide risk premium of (R_m - R_f) that is required to coax investors away from exclusive investment in risk-free securities. The beta coefficient measures the riskiness of a given security or portfolio relative to the overall market benchmark. Beta expresses how much the given investment's returns tend to vary as the returns on the benchmark market index vary over the business cycle. Beta therefore may be viewed as the appropriate weight to apply to the market-wide risk premium (R_m - R_f). The beta of the market portfolio must, by definition, be equal to 1.

Consider an example of how the CAPM estimates the appropriate risk-adjusted expected return on an investment. Assume that the risk-free rate of return on a U.S. Treasury bond is 7%, the expected return on the market is 15%, and that an investor wants to determine the appropriate expected rate of return on a stock with a beta of 1.5. The market-wide risk premium is (15% - 7%) or 8%. This implies that investors will not allocate money to investments with market-like riskiness unless they can expect to get at least an 8% premium over the risk-free rate of 7%. However, a 8% premium will be insufficient if an investment is more variable (i.e., riskier) than the overall market. The returns on a stock with a beta of 1.5 tend to vary 1.5 times more than the return on the overall market. The market-wide risk premium of 8% must therefore be increased 1.5 times to 12% in order to attract investors. Thus, a stock with a beta of 1.5 should generate an expected return of 19% in order to adequately compensate investors for the above-market risk of the investment.

III. Consistency of the Approach with Regulatory and Economic Standards

The CAPM is consistent with the appropriate public utility regulatory and economic standards. Specifically, the CAPM is consistent with the regulatory principle set forth in the Hope case that the allowed return of a public utility should be "... commensurate with the returns on investments in other enterprises having corresponding risk." The CAPM is also consistent with the regulatory standard that emerged from the Bluefield decision, which states that the "... return should be reasonably sufficient to assure confidence in the financial soundness of the utility and ... enable it to raise the money necessary for the proper discharge of its public duties."

In terms of the appropriate economic standards, the CAPM produces return estimates that should meet investors' opportunity costs, satisfy the demands of the risk/return trade-off, and is consistent with the empirical evidence that supports a high degree of efficiency in U.S. financial markets.

IV. Usefulness of the CAPM in Estimating the Cost of Equity Capital

The primary usefulness of the CAPM is as a conceptual tool for systematically relating expected returns to risk. The model requires market-based data inputs that are largely objective and relatively easy to obtain. The shortcoming of the CAPM is that available empirical evidence indicates that the beta coefficient may not fully capture all of the sources of market risk. This implies that CAPM-based estimates of the cost of equity should be supplemented with alternative approaches that use other measures of risk. For this reason, my cost of equity analysis does not rely solely on the CAPM but also uses the DCF model and the risk premium approach to corroborate the reasonableness of my cost of equity estimates for the target regulated firm.

V. Data for CAPM Analysis

A. Beta Coefficients

Importantly, the beta coefficients presented in Billingsley Exhibit No. RSB-3 are not historical betas like those commonly quoted by Value Line, Standard & Poor's, or Merrill Lynch. While frequently used, such historical estimates of beta are inconsistent with the CAPM's reliance on prospective beta coefficients. Historical estimates only reflect the past riskiness of an equity security that need not be representative of the future riskiness that is relevant to equity investors. The CAPM is formulated in terms of investor expectations, which clearly transcend exclusive reliance on historical measures of riskiness like betas based solely on the past return performance of stocks. The beta coefficients used in my CAPM analysis are prospective measures supplied by BARRA, a widely recognized provider of data and decision support systems for institutional investors.

BARRA describes its predicted beta as follows:

> In the BARRA E2 multiple-factor model, factors are estimated for 13 risk indices and for 55 industry groups...each risk index is built from a number of underlying fundamental data items that capture elements of risk. By combining them, we produce a multifaceted measure of risk that best characterizes the single concept we are trying to measure. The individual data items are called descriptors. The combined descriptors make up the risk index (*BARRA U.S. Equity Beta Book*, January 1997).

This approach has been extended in BARRA's E3 version of the model (*United States Equity - Risk Model Handbook*, Version 3 (E3), BARRA, Inc., 1998).

B. Risk-Free Rate of Return

In order to be consistent with the expectational emphasis of the CAPM, I use the average expected yield implied by the prices of the U.S. Treasury bond futures contracts quoted during the most recent month for which data are available. These future contracts are obligations to either take or make delivery of 6% coupon 10-year Treasury bonds for a fixed price (yield) at a specified future date. The prices of these contracts reflect the market's objective consensus forecast of long-term, low-risk interest rates. The rate on long-term Treasury securities is chosen to be consistent with the long-time horizon of equities. A more detailed explanation of the data and calculations is provided in Billingsley Exhibit No. RSB-5.

C. Expected Return on the Equity Market

In order to focus on the prospective nature of the CAPM, I use expectational data to estimate the return on the S&P 500 as my proxy for overall equity market performance. The S&P 500 data used in the CAPM analysis reflect expected returns as of the most recent month for which data are available (September of 2003).

CALCULATION OF 10-YEAR U. S. TREASURY NOTE FUTURES' IMPLIED INTEREST RATE

The interest rate implied by the price of a U. S. Treasury note futures contract is calculated as follows:

$$(\textit{Price of Contract}) \ \text{X} \ 1{,}000 = \frac{\$3{,}000}{(1 + i)^1} + \frac{\$3{,}000}{(1 + i)^2} + \ldots + \frac{\$3{,}000}{(1 + i)^{20}} + \frac{\$100{,}000}{(1 + i)^{20}},$$

where i = the semi-annual rate of return and the maturity is assumed to be 10 years.

The implied annual rate of return on a 10-year U. S. Treasury note futures is calculated as:

Annual Rate of Return = $(1 + i)^2 - 1$.

The U. S. Treasury note futures contract prices shown below are averaged, by contract maturity, using the Friday settlement prices for all contracts trading for the entire month of September in 2003 that had significant open interest. Data are obtained from ***The Wall Street Journal***.

U. S. 10-YEAR TREASURY NOTE FUTURES CONTRACT DATA

Contract Maturity	**09/05/03**	**09/12/03**	**09/19/02**	**09/26/03**	**Average Price**	**Implied Yield**
12/03	110.9531	111.9531	112.5469	113.8281	112.3203	**4.51%**

BOND RATINGS FOR VALUE LINE-COVERED CLECs
September 2003[1]

COMPANY	STANDARD & POOR'S BOND RATING[2]
Allegiance Telecom	NR/D
Citizens Communications	NR/BBB
Pac-West Telecom, Inc.	NR/D
RCN Corp.	NR/CCC-
Time Warner Telecom, Inc.	CCC+
AVERAGE[3]	**CCC+/CCC**

[1] CLECs are identified from the Telecommunications Services firms listed in *Value Line Investment Survey for Window –Plus Edition*, Value Line Publishing, Inc., September 2003. Bond ratings are obtained from *Standard & Poor's Bond Guide*, October 2003.
[2] NR= listed as not currently rated in the October 2003 issue of *Standard & Poor's Bond Guide*. However, in such cases the last indicated rating is shown.
[3] The average S&P bond rating is calculated by attaching numerical values to each qualitative category.

YIELDS ON CCC-RATED DEBT
September 2003[4]

DATE	YIELD TO MATURITY (%)
2-Sep-03	13.50
3-Sep-03	13.42
4-Sep-03	13.25
5-Sep-03	13.29
8-Sep-03	13.22
9-Sep-03	13.13
10-Sep-03	13.14
18-Sep-03	12.95
19-Sep-03	12.83
22-Sep-03	12.81
23-Sep-03	12.83
24-Sep-03	12.86
25-Sep-03	12.82
26-Sep-03	12.78
29-Sep-03	12.84
30-Sep-03	12.91
AVERAGE	**13.04**

[4] Data obtained from Goldman Sachs International, High Yield Research.

BELLSOUTH TELECOMMUNICATIONS, INC.

DIRECT TESTIMONY OF PAMELA A. TIPTON

BEFORE THE TENNESSEE REGULATORY AUTHORITY

DOCKET NO. 03-00491

JANUARY 16, 2004

Q. PLEASE STATE YOUR NAME, YOUR POSITION WITH BELLSOUTH TELECOMMUNICATIONS, INC. ("BELLSOUTH"), AND YOUR BUSINESS ADDRESS.

A. My name is Pamela A. Tipton. I am employed by BellSouth Telecommunications, Inc., as a Director in the Interconnection Services Department. My business address is 675 West Peachtree Street, Atlanta, Georgia 30375.

Q. PLEASE DESCRIBE YOUR CURRENT RESPONSIBILITIES.

A. I am responsible for implementation of state and federal regulatory mandates for the Local and Access markets, the development of regulatory strategies and the management of the switched services product portfolio.

Q. PLEASE SUMMARIZE YOUR BACKGROUND AND EXPERIENCE.

A. I received a Bachelor of Arts in Economics from Agnes Scott College in 1986, and a Masters Certification in Project Management from George Washington University in 1996. I have over 15 years experience in telecommunications, with my primary focus in the areas of process development, services implementation, product management, marketing strategy and regulatory policy implementation. I joined Southern Bell in 1987, as a manager in Interconnection Operations, holding several roles over a 5-year period including process development and execution, quality controls and services implementation. In 1994, I became a Sr. Manager with responsibility for End User Access Services and implementation of Virtual and (later) Physical Collocation. In 2000, I became Director, Interconnection Services, responsible for development and implementation of UNE products, and later development of marketing and business strategies. I assumed my current responsibilities in June 2003.

Q. WHAT IS THE PURPOSE OF YOUR DIRECT TESTIMONY?

A. The purpose of my testimony is to identify the geographic markets in BellSouth's territory in Tennessee where the local switching self-provisioning trigger established by the FCC in its Triennial Order and new rules has been satisfied and where CLECs, therefore, are not impaired without access to unbundled switching. The switching "triggers" are set forth at 47 C.F.R. § 51.319(d)(2)(iii)(A), which states that "a state commission shall find that a requesting telecommunications carrier is not impaired without access to local circuit switching on an unbundled basis in a particular market where either the self-provisioning trigger … or the wholesale facilities trigger …is satisfied.” My testimony focuses on the self-provisioning trigger. BellSouth is not at this time attempting to make a showing of no impairment based on switching being wholesaled by other providers.

I also provide data identifying the actual competition that exists in some of the geographic markets where the FCC’s triggers are not met. This data supports the conclusion of other BellSouth witnesses that, pursuant to the FCC’s “potential deployment” method of impairment evaluation, CLECs are not impaired without access to BellSouth’s unbundled local switching in certain markets where the self-provisioning trigger is not met.

Q. ARE CLECS USING THEIR OWN SWITCHES TO SERVE CUSTOMERS IN TENNESSEE?

A. Yes. CLECs have deployed more than 60 switches which provide service in Tennessee, at least 15 of which are serving “mass market” customers. The definition of “mass market” customers is discussed further below and in more detail in the testimony of BellSouth witness, Kathy K. Blake.

Exhibit PAT-1 is a list of CLEC switches which provide service in Tennessee. As described in BellSouth witness Keith Milner's testimony, each switch is capable of serving CLEC customers throughout the entire market (or larger) area.

Q. UNDER WHAT CIRCUMSTANCES IS THE LOCAL SWITCHING SELF-PROVISIONING TRIGGER SATISFIED?

A. 47 C.F.R. § 51.319(d)(2)(iii)(A)(1) states that the local switching self-provisioning trigger is satisfied when "three or more competing providers not affiliated with each other or the incumbent LEC, including intermodal providers of service comparable in quality to that of the incumbent LEC, each are serving mass market customers in the particular market with the use of their own local circuit switches."

Q. WHEN APPLYING THE FCC'S SELF-PROVISIONING SWITCHING TRIGGER, IS IT AS SIMPLE AS COUNTING WHETHER THERE ARE THREE OR MORE ENTITIES SELF-PROVISIONING SWITCHING TO MASS MARKET CUSTOMERS?

A. Yes, as a practical matter, it is that simple. The only qualifications under the FCC's rule are that: 1) the entities used to meet the trigger cannot be affiliated with each other, or with the incumbent local exchange carrier; 2) if the self-provisioning entity is an “intermodal” provider, its service must be comparable in quality to that of the incumbent local exchange carrier; and 3) the self provisioning carriers must not have indicated that they intend to terminate service to mass market customers in the relevant geographic area. Satisfaction of the trigger is dependent upon counting the number of entities self-provisioning switching that meet those criteria.

Q. MAY THE AUTHORITY LOOK AT SUBJECTIVE EVIDENCE OF IMPAIRMENT IN APPLYING THE SELF-PROVISIONING TRIGGER?

A. No. The FCC’s rule makes clear that the self-provisioning trigger is purely objective. The Order also explicitly states that other than the objective count of CLECs, “states shall not evaluate <u>any</u> other factors, such as the financial stability or well-being of the competitive switch providers.” Order ¶ 500 (emphasis added).The self-provisioning trigger is straightforward: the Commission <u>must</u> find “no impairment” for unbundled switching when three or more unaffiliated competing carriers are serving mass market customers in a particular market. Order ¶ 501 (emphasis added). This objectivity allows trigger determinations to be made quickly and accurately, and avoids the need for “protracted proceedings.” Order ¶ 498.

Q. ARE THERE ANY EXCEPTIONS TO THE RULE?

A. Yes, there is one, but it is not applicable in Tennessee. In Paragraph 503 of the TRO, the FCC said: "In exceptional circumstances, states may identify specific markets that facially satisfy the self-provisioning trigger, but in which some significant barrier to entry exists such that service to mass market customers is foreclosed even to carriers that self-provision switches." The FCC then gave an example of where this exception would apply, identifying the situation where there was no collocation space available. As Ms. Blake testifies, collocation space is not an issue in Tennessee. Importantly, even in circumstances where the state commission finds what it believes to be an exceptional source of impairment, it must petition the FCC for a waiver of the application of the trigger.

Q. IN DETERMINING WHERE CLECS MIGHT BE IMPAIRED WITHOUT ACCESS TO BELLSOUTH'S UNBUNDLED SWITCHING, WHAT DETERMINATIONS, OTHER THAN THE TRIGGER ANALYSIS, MUST THE AUTHORITY MAKE?

A. The Authority must determine the identity of the appropriate geographic market that will be used to conduct the impairment analysis, and it must determine the appropriate definition of "mass market" customers.

BellSouth witness Dr. Chris Pleatsikis testifies that geographic markets should be defined by the UNE rate zones previously identified by this Authority, subdivided by Component Economic Areas (CEAs) established by the Bureau of Economic Analysis of the Department of Commerce. BellSouth witness Kathy Blake testifies that, for this proceeding, BellSouth adopted the FCC's default demarcation point to divide the market between "mass market" and "enterprise" customers. If a customer location has three or fewer voice grade equivalent lines served by a particular CLEC, the customer is a "mass market" customer. If the customer location has four or more voice grade equivalent lines served by a particular CLEC, the customer is an "enterprise" customer.

Q. APPLYING THE DEFINITION OF THE GEOGRAPHIC MARKET THAT BELLSOUTH ADVOCATES, HOW MANY DIFFERENT MARKETS ARE THERE IN BELLSOUTH'S TENNESSEE SERVICE TERRITORY?

A. There are 24 markets in BellSouth's Tennessee service area. Attached, as Exhibit PAT-2, is a map that shows the 24 separate markets in Tennessee.

Q. IN HOW MANY OF THESE MARKETS IS THE FCC'S SELF-PROVISIONING TRIGGER MET, SUCH THAT THE AUTHORITY MUST

MAKE A FINDING OF "NO IMPAIRMENT?"

A. The FCC's self-provisioning trigger is met in 4 of the 24 market areas.

Q. PLEASE IDENTIFY THE MARKETS WHERE THE FCC'S SELF-PROVISIONING TRIGGER HAS BEEN MET?

Attached as Exhibit PAT-3 is a list of the markets in Tennessee where the self-provisioning trigger is met. Attached as Exhibit PAT-4 is a highlighted map of Tennessee showing the markets where the self-provisioning trigger is met.

Q. CAN YOU IDENTIFY THE CLECS THAT ARE SELF-PROVISIONING SWITCHING TO SERVE MASS MARKET CUSTOMERS IN THE MARKETS THAT YOU HAVE IDENTIFIED AS MEETING THE TRIGGER?

A. Yes. Attached as Exhibit PAT-5 is a list of the CLECs that are using their own switching to serve mass-market customers in the market areas that I have identified as meeting the trigger. We believe there may be additional CLECs that are self-provisioning switching to mass market customers in these and other markets, and we are in the process of reconciling data relating to these CLECs. BellSouth requests that Exhibit PAT-5 be treated as confidential because while the Authority needs to know where CLECs have self-provisioned switching serving mass-market customers, these locations and the identity of the CLECs' customers are proprietary, and it is very important to these CLECs that this information not be made available to their competitors. BellSouth has signed confidentiality agreements with a number of CLECs, promising that this material would not be used by or given to BellSouth's marketing organization, for obvious reasons, or otherwise publicly disclosed.

Q. WHERE DID BELLSOUTH OBTAIN THE INFORMATION UPON WHICH YOU BASE YOUR CONCLUSIONS ABOUT WHETHER THE FCC's SELF-PROVISIONING TRIGGER IS MET IN A PARTICULAR GEOGRAPHIC MARKET?

A. We have relied both upon information obtained from the CLECs and from data that is available from BellSouth's records. We asked CLECs to identify the market areas where they serve mass-market customers using their own switching and to provide detailed information about the number and location of the customers they serve in those markets. Unfortunately, while some CLECs were cooperative and provided the information requested, others did not respond or objected to providing the information requested, claiming that BellSouth had such information in its possession already. BellSouth thus relied on the information it had for these CLECs.

Q. WHAT DID YOU ASK THE CLECS TO PROVIDE TO BELLSOUTH?

A. We asked the CLECs to identify the switches that they owned, and to tell us where they were providing service to customers using those switches, organized by BellSouth wire center serving area. We asked the CLECs to identify customer locations by the number of CLEC lines provided to each location, ranging from 1 line up to more than 10 lines. Some CLECs, including DeltaCom and Network Telephone, provided us with useful information and we have used that information to determine the areas where the self-provisioning trigger is satisfied.

Q. CAN YOU TELL US WHAT YOU DID ABOUT THE CLECS WHO OWN THEIR OWN SWITCHES, BUT WHO DID NOT PROVIDE YOU WITH THE INFORMATION YOU REQUESTED?

A. Yes. For CLECs that objected to providing the information or otherwise did not provide the requested information, BellSouth used the data it had available to determine the total number and the location of the mass market customers. We used one method to identify residential customers and a separate method to identify business customers.

With regard to residential customers, we identified all telephone numbers that had been “ported” from BellSouth to another carrier. The fact that the number was “ported” meant that the customer is being served by another telecommunications provider who had access to a switch that it either self-provided or obtained from another carrier. Our database reflects the carrier to whom the number was ported. We compared these ported numbers against BellSouth’s directory listing database. The purpose of doing this was to confirm that we were including only residential numbers and to obtain an address for the ported number. We identified “residential” customers by looking at their service classifications in the Directory Listings database. We then sorted the ported “residential” numbers by address, so that we could determine how many CLEC lines were provided at that particular address to ensure that we excluded customer locations with more than three lines, such as nursing homes (because BellSouth is using 3 or fewer lines as the demarcation point to designate “mass market” customers). I note that this method has the clear tendency to understate the number of customers served by CLECs because it does not capture the customers to whom BellSouth has never provided local service or those who abandoned their BellSouth number and obtained a new number provided by a CLEC.

Q. WHAT METHOD DID YOU USE TO IDENTIFY THE BUSINESS MASS MARKET CUSTOMERS THAT ARE SERVED BY A SELF-PROVISIONED CLEC SWITCH?

A. Except for those customers served by a carrier using solely its own facilities, like the cable companies, most mass market customers receiving local exchange service from a CLEC that is self-provisioning switching are still served via a UNE loop that the CLEC leases from BellSouth. Our loop inventory database contains a class of service indicator. Therefore, we extracted a list of all business class loops from BellSouth's database. From this database, we learned the identity of the CLECs who lease UNE loops and the service address where each loop terminates. We grouped the business class service addresses, and identified those service addresses where there were three or fewer loops terminated. By matching those locations to the geographic markets we had identified, we could determine how many CLECs were providing local service to mass-market customers in each of the geographic markets.

Q. WOULD THE LOOP RECORDS HAVE ALLOWED YOU TO IDENTIFY BOTH "RESIDENTIAL" AND "BUSINESS" MASS MARKET CUSTOMERS THAT ARE BEING SERVED BY A SELF-PROVISIONED CLEC SWITCH?

A. No. The loop records would not have allowed us to identify carriers who provide service using solely their own facilities, such as cable companies, who generally only provide service to residential subscribers. In cases where facilities-based providers would not provide the information we requested to determine if it is self-provisioning switching, using ported numbers was the only way to identify customers being served by those carriers.

Q. HAVE YOU PROVIDED THE PRECISE CUSTOMER LOCATION FOR EACH OF THE CUSTOMERS OF THE CLECS WHO ARE SELF-PROVISIONING SERVICE?

A. No, because that is not necessary. We have identified the UNE Zones further subdivided by Component Economic Areas in which these customers are located. As BellSouth witness Keith Milner discusses in greater detail in his testimony, the CLECs have made it clear that their networks are not configured like BellSouth's, and that they are relying on fewer switches and more transport to serve their customers. AT&T has stated in a proceeding before the TRA that it "has the ability to connect virtually any qualifying local exchange customer in Tennessee to one of [its] switches through AT&T's dedicated access services". (Docket No. 00-00079, Direct Testimony of Gregory R. Follensbee, December 20, 2000.) Given that, the actual physical location of the individual end users in each market area is not relevant. If the CLECs have chosen to serve customers in BellSouth's serving areas, according to the CLECs, their switch can serve any customers in those areas.

Q. IN DR. ARON'S TESTIMONY, SHE IDENTIFIES AN ADDITIONAL THREE GEOGRAPHIC MARKETS IN TENNESSEE WHERE THE FCC'S TRIGGERS ARE NOT MET, BUT WHERE BELLSOUTH HAS CONCLUDED THAT CLECS ARE NOT IMPAIRED WITHOUT ACCESS TO UNBUNDLED SWITCHING BASED ON THE FCC'S "POTENTIAL DEPLOYMENT" METHODOLOGY. DO YOU HAVE INFORMATION REGARDING ACTUAL CLEC DEPLOYMENT IN THOSE MARKETS?

A. Yes, I do. In addition to the FCC's triggers tests, the FCC provided that there could be other circumstances in which a CLEC would not be impaired without access to an incumbent's unbundled switching. The FCC instructed the state commissions to look at those geographic markets that did not meet either of the triggers tests, and to evaluate those markets based on the actual competition that exists, also considering any operational or economic barriers that might exist.

Specifically, the FCC states that competitive switching serving customers in the *enterprise* market is a "significant indicator of the possibility of serving the mass market because of the demonstrated scale and scope economies of serving numerous customers in a wire center using a single switch." ¶ 508. The FCC further states that "to the extent there is a switch in an area serving the local exchange mass market, this fact must be given particularly substantial weight." ¶ 510.

With respect to the three geographic markets where the trigger is not met, but where BellSouth has concluded that CLECs are not impaired without access to BellSouth's unbundled switching, CLECs are serving mass-market customers using their own switches in two of those markets. These two markets are listed in Exhibit PAT-6. In Exhibit PAT-7, I identify, for these two areas, the CLECs that are providing service using their own switches. Exhibit PAT-7 contains proprietary confidential business information (just as did my earlier exhibit that identified CLECs serving specific geographic areas).

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. The FCC has created a "bright line" test for impairment with regard to unbundled switching. Where there are three or more unaffiliated CLECs providing switching in the relevant geographic areas using their own switch, the Commission must conclude that CLECs are not impaired without access to the incumbent local exchange carrier's switch, end of inquiry. In Tennessee, a number of CLECs are providing service to mass market customers using their own switches. Indeed, for all of the market areas I identified where the trigger is met, there are three such CLECs. There are as many as five different providers in a single market. CLECs are not impaired in those market areas without access to BellSouth's unbundled switching. Moreover, with respect to the three geographic markets where the "potential deployment" test is satisfied, CLECs are providing service to mass market customers using their own switches in two of these markets, even though the FCC's switching triggers have not been met. The fact of actual deployment in these markets must be given substantial weight in determining lack of impairment. Finally, it is likely that with cooperation from a greater number of CLECs in providing data, the facts will show that CLECs are serving a greater number of customers, in more markets, than those set forth in my testimony.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

DEPLOYED CLEC SWITCHES	SWITCH CLLI	SWITCH NODE CLLI SERVING TN	CLEC
1	ANTCTNBJDS0	ANTCTNBJDS0	SBC TELECOM, INC. - TN
2	ASCYTNMARS2	ASCYTNMARS2	ITC DELTA COM - TN
3	ATLNGAHPDS5	CHTGTNNSX0X	LEVEL 3 COMMUNICATIONS, LLC - GA
		KNVLTNMAX1Z	LEVEL 3 COMMUNICATIONS, LLC - GA
		MMPKTNVZ2MD	LEVEL 3 COMMUNICATIONS, LLC - GA
		NSVMTN172MD	LEVEL 3 COMMUNICATIONS, LLC - GA
4	ATLNGAMADS9	KNVLTNWHY4X	KMC TELECOM III, INC. - TN
5	ATLNGAPKDS6	CHTHTNDNDS0	ITC DELTA COM - TN
6	BRWDTNDDDS0	BRWDTNDDDS0	US LEC OF TENNESSEE, INC
7	CHTGTN48DS0	CHTGTN48DS0	ELECTRIC POWER BOARD OF CHATTANOOGA
8	CHTGTN7800W	CHTGTN7800W	KMC TELECOM III, INC. - TN
9	CHTGTN78DS0	CHTGTN78DS0	KMC TELECOM III, INC. - TN
10	CHTGTNKFDS0	CHTGTNKFDS0	US LEC OF TENNESSEE, INC
11	CHTGTNKVDS0	CHTGTNKVDS0	TCG AMERICA, INC. - TN
12	CLTNTNMARS1	CLTNTNMARS1	ITC DELTA COM - TN
13	CRVLTNMARS3	CRVLTNMARS3	INTERMEDIA COMMUNICATIONS INC. - TN
14	FKLNTNMARS3	FKLNTNMARS3	INTERMEDIA COMMUNICATIONS INC. - TN
15	GDVLTNMARS2	GDVLTNMARS2	ITC DELTA COM - TN
16	GNVLSCDBDS1	KNVLTNMABB4	NUVOX COMMUNICATIONS, INC. - TN
17	HDVLTNMARS0	HDVLTNMARS0	ITC DELTA COM - TN
18	IPLUIN19DS1	NSVMTNNN0MD	GLOBAL CROSSING LOCAL SERVICES, INC.- TN
19	JCSNMSPSDS1	MMPHTNMAXTX	AT&T LOCAL
20	JCSNMSPSDS4	MMPHTNMAX6Z	AT&T LOCAL
21	JCSNTN09007	JCSNTN09007	AENEAS COMMUNICATIONS, LLC - TN
22	KNVLTN02DS1	KNVLTN02DS1	US LEC OF TENNESSEE, INC
23	KNVLTNBHDS0	KNVLTNBHDS0	TCG AMERICA, INC. - TN
24	KNVLTNIIDS0	KNVLTNIIDS0	BROOKS FIBER COMMUNICATIONS - TENNESSEE
25	KNVLTNMADS2	KNVLTNMADS2	AT&T LOCAL
26	KNVLTNMADS4	CHTGTNNSW94	NETWORK TELEPHONE CORPORATION - TN
		KNVLTNMADS4	NETWORK TELEPHONE CORPORATION - TN
27	KNVLTNSGDS0	KNVLTNSGDS0	BUSINESS TELECOM INC. - BTI - TN
28	KNVMTN50RS0	KNVMTN50RS0	KNOLOGY OF TENNESSEE, INC. - TN
29	LXTNKY01BB0	KNVLTNMAX8Z	ALEC, INC. - TN
30	LXTNKY01BB0	NSVLTNMT20Z	ALEC, INC. - TN
31	MAVLTNMARS0	MAVLTNMARS0	ITC DELTA COM - TN

Source: Local Exchange Routing Guide

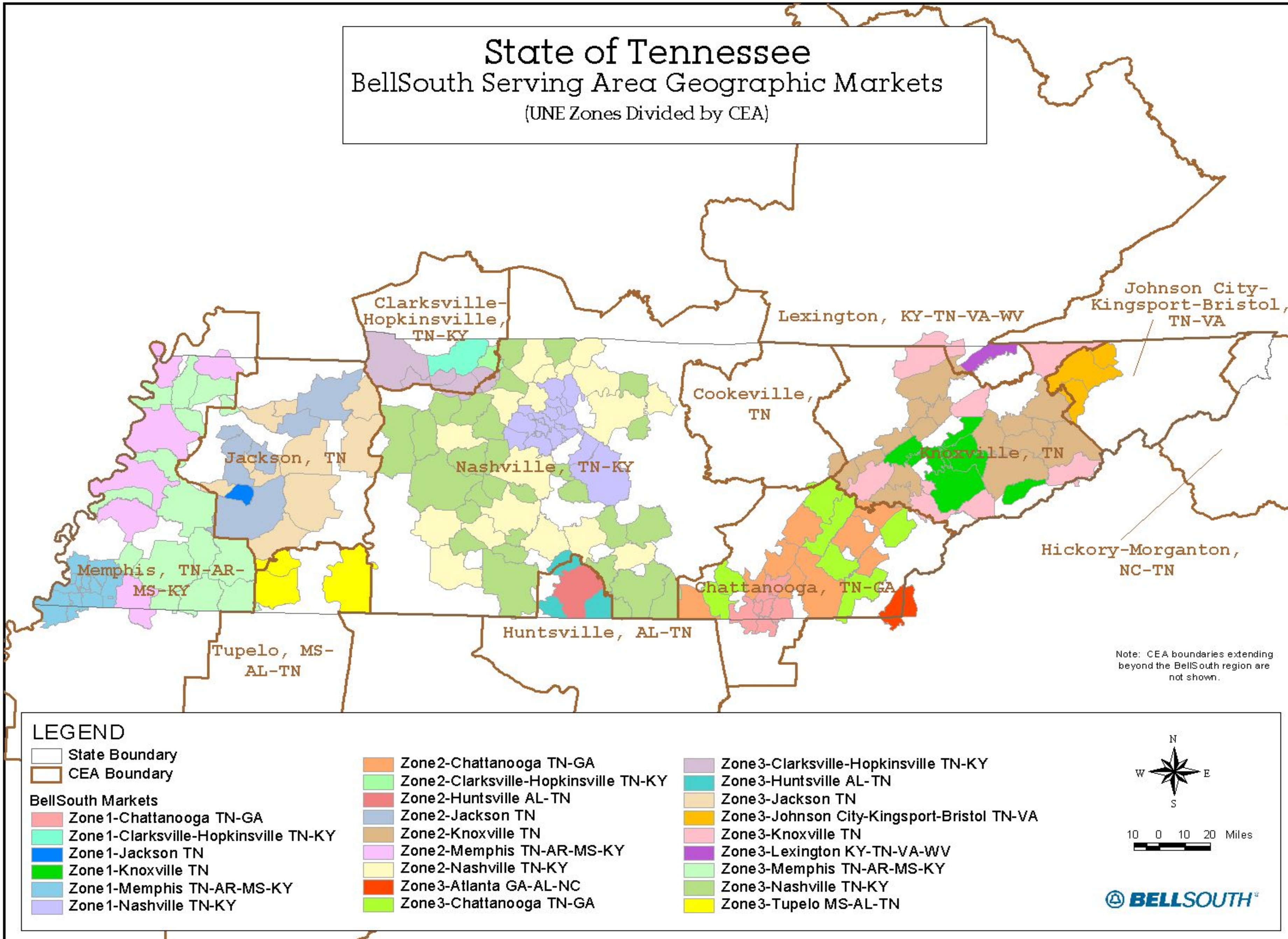
32	MMPHTN32DS0	MMPHTN32DS0	MCIMETRO, ATS, INC.
33	MMPHTNMADS2	MMPHTNMADS2	AT&T LOCAL
		MMPHTNMAX4Y	AT&T LOCAL
34	MMPHTNMADS5	MMPHTNMADS5	NETWORK TELEPHONE CORPORATION - TN
35	MMPHTNSZDS0	MMPHTNSZDS0	TIME WARNER COMMUNICATIONS AXS OF MEMPHIS, TN
36	MMPHTNWBDS0	MMPHTNWBDS0	SBC TELECOM, INC. - TN
37	MMPJTN44DS0	MMPJTN44DS0	INTERMEDIA COMMUNICATIONS INC. - TN
38	MMPJTNAGDS0	MMPJTNAGDS0	XO TENNESSEE, INC.
39	MMPJTNAGDS1	MMPJTNAGDS1	XO TENNESSEE, INC.
40	MMPJTNJUDS0	JCSNTNMABMD	US LEC OF TENNESSEE, INC
		MMPJTNJUDS0	US LEC OF TENNESSEE, INC
41	MMPKTNLMDS0	MMPKTNLMDS0	XSPEDIUS, LLC - TN
42	MMPKTNVZDS0	MMPKTNVZDS0	LEVEL 3 COMMUNICATIONS, LLC - TN
43	MSCTTNMTRS0	MSCTTNMTRS0	ITC DELTA COM - TN
44	NSVLTN02DS0	CHTGTNNSDS2	NEWSOUTH COMMUNICATIONS CORP
		KNVLTNMADS3	NEWSOUTH COMMUNICATIONS CORP
		MMPHTNMADS4	NEWSOUTH COMMUNICATIONS CORP
		NSVLTN02DS0	NEWSOUTH COMMUNICATIONS CORP
45	NSVLTN17CA1	CHTGTNNSXSX	SPRINT COMMUNICATIONS COMPANY, L.P. - TN
		KNVLTNMAXSZ	SPRINT COMMUNICATIONS COMPANY, L.P. - TN
		KNVLTNWHXMD	SPRINT COMMUNICATIONS COMPANY, L.P. - TN
		MMPHTNMAXSZ	SPRINT COMMUNICATIONS COMPANY, L.P. - TN
		NSVLTN17CA1	SPRINT COMMUNICATIONS COMPANY, L.P. - TN
46	NSVLTN19DS1	NSVLTN19DS1	LOADPOINT TELECOMMUNICATIONS, LLC - TN
47	NSVLTN48DS0	MMPHTNMADS3	TCG AMERICA, INC. - TN (AT&T - LOCAL TN)
		NSVLTN48DS0	TCG AMERICA, INC. - TN
48	NSVLTN90DS1	NSVLTN90DS1	XO TENNESSEE, INC.
49	NSVLTN90DS2	NSVLTN90DS2	XO TENNESSEE, INC.
50	NSVLTNDBDS0	NSVLTNDBDS0	BUSINESS TELECOM INC. - BTI - TN
51	NSVLTNMTDS4	CHTGTNMATMD	AT&T LOCAL
		NSVLTNMT08Z	AT&T LOCAL
		NSVLTNMTDS4	AT&T LOCAL
52	NSVLTNMTDS5	NSVLTNMTDS5	NETWORK TELEPHONE CORPORATION - TN
53	NSVLTNMTH37	NSVLTNMTH37	BROADRIVER COMMUNICATION CORPORATION-TN
54	NSVLTNMWDS0	NSVLTNMWDS0	ICG TELECOM GROUP - TN
55	NSVMTN03DS0	NSVMTN03DS0	INTERMEDIA COMMUNICATIONS INC. - TN
56	NSVMTN17DS0	NSVMTN17DS0	LEVEL 3 COMMUNICATIONS, LLC - TN

Source: Local Exchange Routing Guide

57	NSVMTNFSDS0	NSVMTNFSDS0	ADELPHIA BUSINESS SOLUTIONS OF NASHVILLE, LP
58	NSVNTN08DS0	NSVNTN08DS0	NUVOX COMMUNICATIONS, INC. - TN
59	NSVNTN09DS0	NSVNTN09DS0	XSPEDIUS, LLC - TN
60	NSVNTNBWDS0	NSVNTNBWDS0	ITC DELTA COM - TN
61	NSVNTNBWDS3	KNVMTNVODS0	ITC DELTA COM - TN
62	NSVNTNBWDS4	MMPHTNMADS6	ITC DELTA COM - TN
63	OKRGTNMTRS0	OKRGTNMTRS0	ITC DELTA COM - TN
64	OLHCTNMARS7	OLHCTNMARS7	ITC DELTA COM - TN
65	SVVLTNMTRS0	SVVLTNMTRS0	ITC DELTA COM - TN

Source: Local Exchange Routing Guide

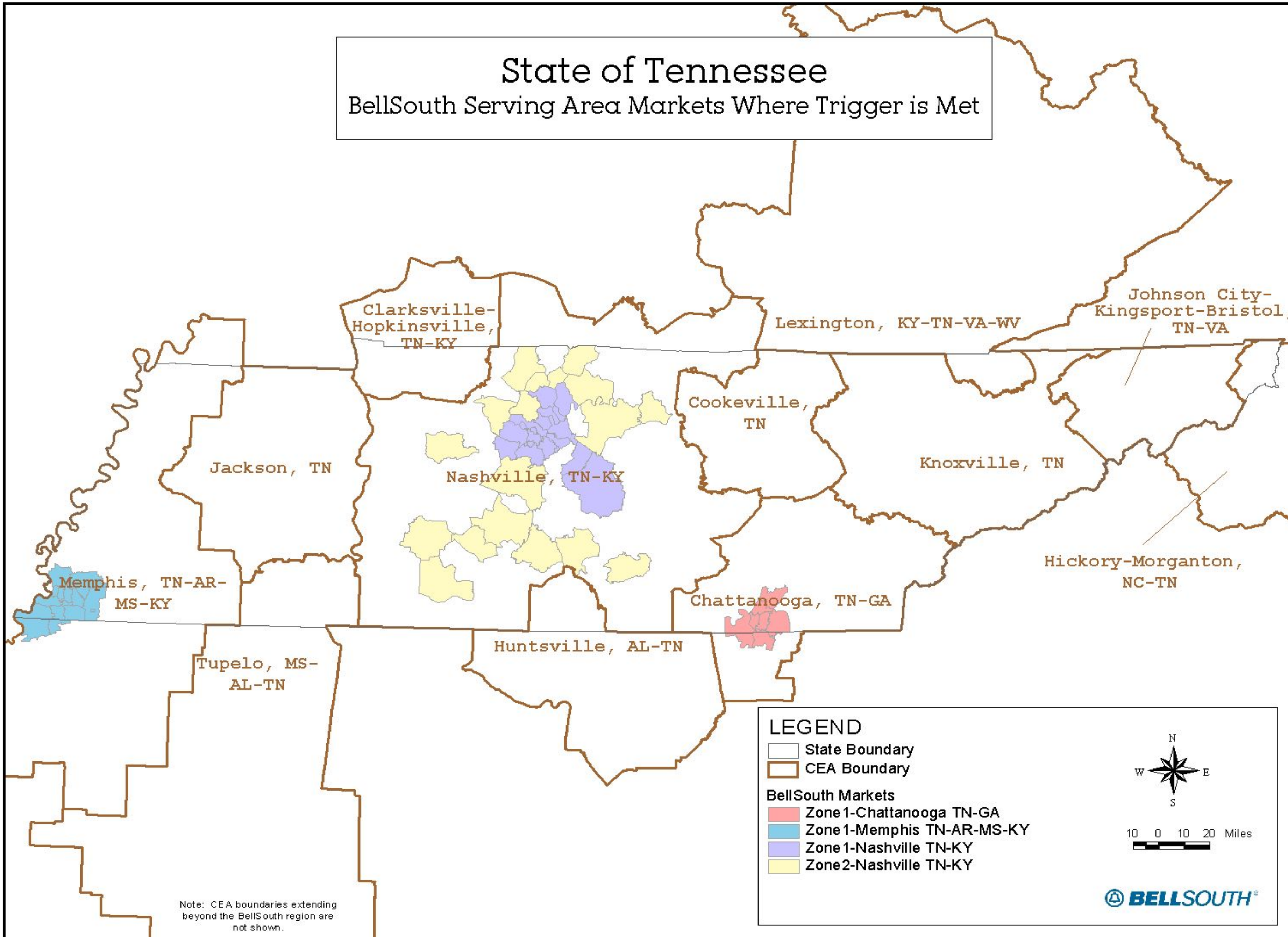
Exhibit PAT-2



Tennessee Markets Where Self-Provisioning Trigger is Met

UNE Zone	CEA
Zone 1	Chattanooga, TN-GA
Zone 1	Memphis, TN-AR-MS-KY
Zone 1	Nashville, TN-KY
Zone 2	Nashville, TN-KY

Exhibit PAT-4



CLECs Self-Providing Switching in Markets Where Trigger is Met*

Chattanooga, TN-GA Zone 1	1
	2
	3
	4
Memphis, TN-AR-MS-KY Zone 1	1
	2
	3
Nashville, TN-KY Zone 1	1
	2
	3
	4
	5
Nashville, TN-KY Zone 2	1
	2
	3

*Based on available data

Markets With Actual CLEC Deployment Where Triggers Not Met

Zone	CEA
Zone 1	Knoxville, TN
Zone 1	Jackson, TN

CLECs With Actual Deployment In Markets Where Triggers Not Met

1.
2.