AFFIDAVIT

STATE OF Illinois

COUNTY OF Cook

BEFORE ME, the undersigned authority, duly commissioned and qualified in and for the State and County aforesaid, personally came and appeared Debra J. Aron, who, being by me first duly sworn deposed and said that:

She is appearing as a witness before the Kentucky Public Service Commission in Case No. 2003-00379, Review of Federal Communications Commission's Triennial Review Order Regarding Unbundling Requirements for Individual Network Elements, and if present before the Commission and duly sworn, her testimony would be set forth in the annexed testimony consisting of 45 pages and 8 exhibits.

Debra J. Aron

SWORN TO AND SUBSCRIBED BEFORE ME
THIS 5th DAY OF FEBRUARY, 2004

Notary Public

Official Seal
Lesley Bates
Notary Public State of Illinois
My Commission Expires 06/25/07

COMMONWEALTH OF KENTUCKY

BEFORE THE PUBLIC SERVICE COMMISSION

In re: Review of Federal Communications Commission's Triennial Review Order Regarding Unbundling Requirements for Individual Network Elements	))))))	**Docket No. 2003-00379**

DIRECT TESTIMONY OF

DR. DEBRA J. ARON

ON BEHALF OF

BELLSOUTH TELECOMMUNICATIONS, INC.

Filed February 11, 2004

EDITED 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, and Adjunct Associate Professor at Northwestern University. My business address is 1603 Orrington Avenue, Suite 1500, Evanston, IL, 60201.

Q. PLEASE DESCRIBE LECG.

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 KENTUCKY PUBLIC SERVICE COMMISSION ("KYPSC" OR "COMMISSION")?

A. No.

Q. WHAT IS YOUR UNDERSTANDING OF THIS PROCEEDING?

A. The FCC's Triennial Review Order ("TRO") requires state commissions to determine whether competitive local exchange carriers ("CLECs") 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 Kentucky 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 KENTUCKY?

A. As the testimony of other BellSouth witnesses indicates, there are 20 relevant geographic markets in Kentucky. I understand that the FCC's switching triggers are met in 2 of those markets. Applying the "potential deployment" methodology to the remaining 18 markets leads to the conclusion that CLECs are not impaired without access to BellSouth's unbundled switching in an additional 6 of those markets. A list of the 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 Louisville, 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 Zone 1 Lexington KY-TN-VA-WV than in Zone 1 Paducah KY-IL. 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 Kentucky. 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 Corporation 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 believe that the experience of cable telephony providers around the country is informative as to levels of penetration that are achievable in Kentucky. 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 ***_____
_____
_____***

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. 3.)

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 ***___ *** 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 ***___*** 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 KENTUCKY ARE UNIMPAIRED?

A. Aron Exhibit No. DJA-2 lists the geographic markets in Kentucky 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 Commission 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 Kentucky.

Q. DOES THIS CONCLUDE YOUR DIRECT TESTIMONY?

A. Yes, it does.

DEBRA J. ARON

LECG, LLC
1603 Orrington Avenue
Suite 1500
Evanston, IL 60201
Tel. (847) 424-4110
Fax (847) 475-1031
E-mail: daron@lecg.com

EDUCATION

Ph.D., Economics, UNIVERSITY OF CHICAGO, Chicago, IL, 1985

A.B. (summa cum laude), Economics, UNIVERSITY OF CALIFORNIA AT LOS ANGELES, Los Angeles, CA, 1979

PRESENT POSITIONS

LECG, LLC Evanston, IL, 1995-present
Director

Office Director, LECG Evanston

NORTHWESTERN UNIVERSITY, Communication Systems Strategy and Management Program, School of Communication, Evanston, IL, 2000 - present
Adjunct Associate Professor of Communication Studies

ACADEMIC AND PROFESSIONAL EXPERIENCE

NORTHWESTERN UNIVERSITY, J. L. Kellogg Graduate School of Management, Evanston, IL, 1985–1995
Visiting Assistant Professor of Managerial Economics, 1993-1995
Assistant Professor of Managerial Economics, 1985-1992

HOOVER INSTITUTION, 1992-1993
National Fellow

UNIVERSITY OF CHICAGO, Department of Economics, Chicago, IL, 1983–1984
Instructor

CIVIL AERONAUTICS BOARD, Office of Economic Analysis, Washington, DC, Summers, 1979 and 1980
Staff Economist

HONORS & AWARDS

Guthman Research Chair, Kellogg Graduate School of Management, Northwestern University, Summer 1994.

Hoover National Fellowship, Hoover Institution, 1992-1993.

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

Pepsico Research Chair, Northwestern University, 1990.

Kellogg Research Professorship, Northwestern University, 1989.

National Science Foundation Research Grant, 1987-1988.

Buchanan Chair, Kellogg Graduate School of Management, Northwestern University, 1987-1988.

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

Courses taught: Pricing Strategy; Information, Communication, and Competition (strategy and competition in communications industries); Intermediate Microeconomic Theory; Managerial Economics (microeconomic theory as applied to business strategy and decision making) at the M.B.A. level, The Economics of Information at the Ph.D. level.

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.

"Worldwide Wait? How the Telecom Act's Unbundling Requirements Slow the Development of the Network Infrastructure," with Ken Dunmore and Frank Pampush, *Industrial and Corporate Change*," vol.7, no. 4, 1998, pp. 615-621.

"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 KENTUCKY			
UNE Zone	**CEA**	**Net Present Value**	**NPV for Mass Market**
Zone1	Lexington KY-TN-VA-WV	361,068	190,904
Zone1	Owensboro KY	1,502,796	700,364
Zone1	Paducah KY-IL	859,958	358,050
Zone2	Bowling Green KY	1,526,460	550,943
Zone2	Evansville-Henderson IN-KY-IL	711,560	246,250
Zone2	Lexington KY-TN-VA-WV	1,778,155	635,640
	TOTAL:	**6,739,997**	**2,682,151**

Actual versus Expected Competitive Losses of Residential Customers to CLECs by Spending Quintile (Customer Targeting Effect)

PROPRIETARY CHART

EDITED VERSION

Actual versus Expected Competitive Losses of SOHO Customers to CLECs by Spending Tercile (SOHO Customer Targeting Effect)

PROPRIETARY CHART

EDITED VERSION

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)(2)	$50
Z-Tel (Actual 2001 Q2)	(2)	$60 - $70
Z-Tel (Actual 2001 Q3)	(1)	$100 - $120
Z-Tel (Actual 2001 Q4)	(3)	$60
Talk America (Estimate of actual experience)	(4)	$80
AT&T (Estimate of actual experience)	(5)	$125

Sources:

(1) James J. Linnehan, "Z-Tel Technologies, Inc. – Market Perform.: Still Chugging Along," Thomas Weisel Partners Merchant Banking, November 8, 2001, p. 3. (This figure excludes television advertising.)

(2) James J. Linnehan, "Z-Tel Technologies, Inc. – Market Perform," Thomas Weisel Partners Merchant Banking, August 13, 2001, p. 3.

(3) Gregory Smith, CEO and Chairman of Z-Tel, Transcript of Z-Tel Fourth Quarter 2001 Earnings Results conference call by Fair Disclosure Financial Network, February 28, 2002.

(4) 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.

(5) 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	$243	N/A	N/A	N/A
SME/A	$266	N/A	N/A	N/A
SME/B	$209	N/A	N/A	N/A
SME/C	$181	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 Kentucky

Additional Market Areas Where BACE Model Shows NPV is Positive in BellSouth Serving Area