030869-TL

ON BEHALF OF BELLSOUTH TELECOMMUNICATIONS, INC.

DIRECT TESTIMONY OF WILLIAM E. TAYLOR, Ph.D.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

AUGUST 27, 2003

I. INTRODUCTION AND SUMMARY

Q. PLEASE STATE YOUR NAME, BUSINESS ADDRESS, AND CURRENT POSITION.

A. My name is William E. Taylor. I am Senior Vice President of NERA Economic Consulting, ("NERA"), head of its Communications Practice, and head of its Cambridge office located at One Main Street, Cambridge, Massachusetts 02142.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL, PROFESSIONAL, AND BUSINESS EXPERIENCE.

A. I have been an economist for over thirty years. I earned a Bachelor of Arts degree from Harvard College in 1968, a Master of Arts degree in Statistics from the University of California at Berkeley in 1970, and a Ph.D. from Berkeley in 1974, specializing in Industrial Organization and Econometrics. For the past twenty-five years, I have taught and published research in the areas of microeconomics, theoretical and applied econometrics, and telecommunications policy at academic and research institutions. Specifically, I have taught at the Economics Departments of Cornell University, the Catholic University of Louvain in Belgium, and the Massachusetts Institute of Technology. I have also conducted research at Bell Laboratories and Bell Communications Research, Inc.

I have participated in telecommunications regulatory proceedings before many state public service commissions, including the Florida Public Service Commission ("Commission"). Before the Commission, I have testified in Docket Nos. 900633-TL, 920260-TL, 920385-TL, 960786-TP, 980000-SP, 980696-TP, 990750-TP, 000075-TP, 000121-TP, 020119-TP, 020578-TP, and 020507-TP.

In addition, I have filed affidavits before the Federal Communications Commission ("FCC") and the Canadian Radio-television Telecommunications Commission on matters concerning incentive regulation, price cap regulation, productivity, access charges, local competition, interLATA competition, interconnection and pricing for economic efficiency. Recently, I was chosen by the Mexican Federal Telecommunications Commission and Telefonos de Mexico ("Telmex") to arbitrate the renewal of the Telmex price cap plan in Mexico.

I have also testified on market power and antitrust issues in federal court. In recent years, I have studied—and testified on—the competitive effects of mergers among major telecommunications firms and of vertical integration and interconnection of telecommunications networks.

My curriculum vita is attached as Exhibit WET-1.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. I have been asked by BellSouth Telecommunications, Inc. ("BellSouth")—an incumbent local exchange carrier ("ILEC")—to comment on economic issues arising from the recent legislative amendments to Chapter 364 (pertaining to telecommunications regulation) of the Florida Statutes. Specifically, I comment on the provisions of the newly created Section 364.164 on "Competitive Market Enhancement," and reduction of intrastate switched access rates to parity with interstate switched access rates (Section 364.163, as amended).

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. The newly created Section 364.164 aims to encourage greater competitive entry into Florida's local exchange markets by simultaneously removing the current support for residential basic local telecommunications service ("RBLTS") and reducing intrastate switched access rates to parity with interstate switched access rates within 2-4 years.

There is no doubt that competitive local exchange carriers ("CLECs") have made considerable strides in Florida in the past few years. The problem lies, however, with the persistent *unevenness* of CLEC entry in Florida. As of December 2002, 83 percent of ILEC-served access lines went to residential and single-line business customers, while only 48 percent of CLEC-served access lines did. Given the specific market and regulatory circumstances of Florida, this unevenness of competitive entry in the state is attributable in large part to the relationship between end-user rates for basic local telephone service (in particular, for RBLTS) and unbundled network element/unbundled network element-platform ("UNE/UNE-P") rates. Generally, the margins available between the two rates are far more substantial for *business* basic local telephone service than for RBLTS. Unconstrained by public policy or regulation regarding which customers they may or may not serve, CLECs have gravitated naturally toward higher-margin medium and large businesses or customers using four or more lines. It is this unevenness in competitive entry incentives that Section 364.164 is designed to correct.

Finally, Section 364.164 seeks to make the withdrawal of support for RBLTS revenue-neutral from the perspective for the ILEC. For this purpose, Section 364.163 (as amended) requires the ILEC's current intrastate switched access rates in Florida to be dropped to parity with current interstate switched access rates. Historically, intrastate switched access rates have been a source of support for RBLTS. This reduction of intrastate switched access rates will remove an equivalent amount (in dollar terms) of support for RBLTS end-user rates, but whether that would suffice to remove *all* of the support currently available is hard to ascertain. However, any rate rebalancing of the form envisioned by Sections 364.164 and 364.163 (as amended) would improve incentives for competitive entry into Florida's local exchange markets and lead to more efficient prices for RBLTS and switched access services. This would greatly benefit consumers and local exchange competition alike.

II. COMPETITIVE MARKET ENHANCEMENT: SECTION 364.164

Q. WHAT PROVISIONS OF SECTION 364.164 DOES YOUR TESTIMONY

ADDRESS?

A. Section 364.164(1) states as follows:

> (1) Each local exchange telecommunications company may, after July 1, 2003, petition the commission to reduce its intrastate switched network access rate in a revenue-neutral manner. The commission shall issue its final order granting or denying any petition filed pursuant to this section within 90 days. In reaching its decision, the commission shall consider whether granting the petition will:
>
> (a) Remove current support for basic local telecommunications services that prevents the creation of a more attractive competitive local exchange market for the benefit of residential consumers.
>
> (b) Induce enhanced market entry.
>
> (c) Require intrastate switched network access rate reductions to parity over a period of not less than 2 years or more than 4 years.
>
> (d) Be revenue neutral as defined in subsection (7) within the revenue category defined in subsection (2).

Q. IN ECONOMIC TERMS, HOW DO THESE PROVISIONS AMOUNT TO AN ATTEMPT TO "INDUCE ENHANCED MARKET ENTRY"?

A. This section recognizes a fundamental precept of market competition, namely, that competitive market entry by new service providers depends on, among other things, the rates that incumbent service providers can (or are required to) charge for the service or services for which competition is supposed to occur. Given this recognition, this section seeks to promote a form of rate rebalancing which would likely provide the correct price signals to potential competitive entrants. The rate rebalancing consists of, on the one hand, moving ILEC rates for RBLTS up to levels that reflect true ILEC costs by removing currently available subsidy support and, on the other hand, reducing ILEC rates for intrastate switched access.[1] Because this rate rebalancing is required to be revenue-neutral, the amount of support removed from RBLTS rates would be the contribution to that subsidy provided historically by intrastate switched access rates to RBLTS rates.[2]

A rate rebalancing of this form could prove salutary in two respects. First, by lowering *intra*state switched access rates to parity with *inter*state switched access rates, this section would eliminate an artificial discrepancy in rates between two nearly identical services. Lower intrastate switched access rates—which are required by Section 364.163(2) to be flowed through in their entirety into intrastate long distance rates—would make intrastate long distance calling more attractive for both residential and business customers, and for competitive entrants who wish to offer long distance service alongside basic local services.

More importantly, the removal of subsidy support for RBLTS service offered by ILECs would likely move RBLTS rates up to levels that more closely reflect the ILECs' cost to offer RBLTS. Potential competitive entrants base their entry decision on whether or not they can at least match the rates being charged by incumbents. In theory, competitive entrants that are at least equally efficient (i.e., able to offer a competing service at comparable incremental cost) are best positioned to match incumbents' rates. If, however, incumbents' rates are lowered artificially with the help of subsidy support, but their incremental costs do not change, potential competitive entrants that are not entitled to comparable subsidy support are likely to be deterred from entering the market. This, in turn, is likely to limit the amount of competition that develops in the market over time. The

[1] At least, this is what is expected to happen in theory. Whether, in fact, the rate rebalancing envisioned here would make end-user rates for RBLTS truly and completely subsidy-free is another matter entirely and hard to predict *a priori*. I return to this issue later in the testimony.

[2] Again, it is difficult to say whether the amount of subsidy contribution from intrastate switched access rates removed in this manner would constitute *all* of the subsidy contribution that those rates have made historically. That is because intrastate switched access rates are only being required to be reduced to parity with interstate switched access rates. If there is some remaining subsidy contribution built into current interstate rates, then so would some remain in the intrastate rates even after the reduction.

amendments to Chapter 364, and section 364.164 in particular, reflect a recognition of this limitation and provide specific steps for boosting competitive entry.

Q. ISN'T THERE EVIDENCE ALREADY OF SIGNIFICANT COMPETITIVE ENTRY IN LOCAL EXCHANGE MARKETS? IF THERE IS SUCH EVIDENCE, WHY ARE THE PROVISIONS OF SECTION 364.164 NECESSARY?

A. There is no doubt that CLECs have made considerable strides in the past few years, both in Florida and elsewhere in the country. For instance, data recently published by the FCC show that, as of the end of 2002, CLECs served about 13 percent of end-user switched access lines in Florida, which was just about the national average market share of CLECs as well.[3] Based on the FCC data, only 15 states are ahead of Florida in terms of access line market shares achieved by CLECs. It is significant that CLEC market share in Florida was only 6 percent—less than half of that presently—in 1999, just three years ago.[4]

The problem lies, however, with the persistent *unevenness* of CLEC entry in Florida and elsewhere. For instance, according to the FCC, while nearly four out of every five end-user switched access lines served by ILECs nationwide go to residential and small business customers, the share of CLEC-served access lines going to such customers has only recently crossed the 50 percent mark.[5] In Florida, the discrepancy is even more acute. As of December 2002, 83 percent of ILEC-served access lines went to residential and small business customers, while only 48

[3] FCC, *Local Telephone Competition: Status as of December 31, 2002* ("*FCC Local Competition Report*"), Industry Analysis and Technology Division, Wireline Competition Bureau, June 2003, especially Table 6.

[4] *Id.*, Table 7.

[5] *Id.*, Table 2. The share of ILEC-served access lines accounted for by residential and small business customers has remained stable over the past three years, at 77.1 percent in December 1999 and 78.0 percent in December 2002. In contrast, the share of CLEC-served access lines accounted for by residential and small business customers was as low as 39.6 percent in June 2000 before rising to 58.0 percent in December 2002.

percent of CLEC-served access lines did.[6] This is the case despite the fact that, as of the same date, 8 ILECs and 24 CLECs were operating in Florida.[7] Only Texas (at 29) had more operational CLECs than Florida, and only Minnesota (at 34) and Texas (at 43) had more operational ILECs and CLECs combined than Florida (at 32).

Slightly older data reported by this Commission corroborate the FCC's statistics on the degree to which competitive entry has occurred in all of Florida's local exchanges (not merely those served by BellSouth). For instance, in mid-2002, 83 percent of Florida's local exchanges had three or more CLECs, while 95 percent of local exchanges had at least one CLEC.[8] At the same time, there is clear evidence of the unevenness of competitive entry. For instance, as of June 30, 2002, CLECs served only 7 percent of residential customers in Florida (up from 4 percent a year earlier).[9] In contrast, they served 26 percent of business customers in Florida (up from 16 percent a year earlier).[10]

Thus, even though Florida is among the national leaders in accomplishing entry *per se* by CLECs, it lags behind most states on the one statistic that the framers of the Telecommunications Act of 1996 ("1996 Act") must have most desired: the availability of basic service choice and variety to *residential* customers.

Q. TO WHAT DO YOU ATTRIBUTE THIS UNEVENNESS IN CLEC ENTRY?

[6] *Id.*, Table 11. The FCC shows only nine states with a lower percentage for CLEC-served access lines.

[7] *Id.*, Table 12. Note that the CLEC count only includes those serving 10,000 access lines or more. Therefore, the actual count of CLECs in any state may actually be higher, perhaps considerably so.

[8] Florida Public Service Commission, *Telecommunications Markets in Florida: Annual Report on Competition as of June 30, 2002 ("Florida Competition Report")*, December 2002, Table 4.

[9] *Florida Competition Report*, at 3.

[10] *Id.* The *Florida Competition Report* appears to agree with the FCC's estimate that 13 percent of access lines in Florida were served by CLECs in 2002. However, note that the FCC's estimate of this share *as of June 2002* (i.e., the date to which the *Florida Competition Report* pertains) was only 9 percent. See *FCC Local Competition Report*, Table 7.

A. In theory, equally-efficient CLECs would expect to be able to charge at least matching (if not lower) rates for RBLTS than the ILEC. Stated another way, CLEC entry would be predicated on CLECs being able to enjoy profit margins that are at least comparable to those of the ILECs against whom they compete.

It is well known that of the various modes of entry available to them, CLECs have resorted primarily to the use of unbundled loop-switch combinations (called UNE-platforms or "UNE-P") leased from ILECs.[11] For instance, in Florida, 57 percent of CLEC-served access lines at the end of 2002 were provided through UNE or UNE-P arrangements, while nationally that share was 55 percent.[12] More significantly, the share of UNE and UNE-P based lines among those served by CLECs rose nationally from only 24 percent in December 1999 to over 55 percent three years later.[13] Based on these data, it may be surmised that the greatest competitive entry would occur wherever the margin between the entrant's revenue (i.e., the revenue earned from basic local telephone service) and its cost (i.e., what it pays, for example, to lease UNE or UNE-P facilities) is the greatest. This is exactly the conclusion reached by this Commission as well.[14]

Given the specific market and regulatory circumstances of Florida, therefore, the unevenness of competitive entry in the state must be attributed in large part to the relationship between end-user rates for basic local telephone service (in particular, for RBLTS) and UNE/UNE-P rates.[15] It is safe to generalize that the margins available between the two rates are far more substantial for business basic local telephone service (nationwide generally, but in Florida as well)

[11] The other modes of entry include resale of ILEC's basic local telephone service and provision of such service through entirely CLEC-owned facilities.

[12] *FCC Local Competition Report*, Table 10. In the two states most widely regarded as having the greatest local exchange competition, namely, New York and Texas, that share was even higher at 67 percent for both.

[13] *Id.*, Table 3.

[14] *Florida Competition Report*, at 25-37.

[15] The observed unevenness is more acute in suburban or rural areas where the margins may be even

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than for RBLTS. Unconstrained by public policy or regulation regarding which customers they may or may not serve, it is not hard to imagine why CLECs have gravitated naturally toward medium and large businesses or customers using four or more lines.

Q. WHAT ACCOUNTS FOR THE COMPARATIVELY SLIM OR UNATTRACTIVE MARGINS FOR RBLTS IN FLORIDA, AND WHAT SHOULD BE PUBLIC POLICY'S RESPONSE TO THAT PROBLEM?

A. Subsidized end-user rates are a large factor behind narrow or uneconomic margins for RBLTS in Florida. Higher (cost-based) end-user rates for RBLTS or lower UNE/UNE-P rates, or both, can obviously create more attractive margins for potential entrants (particularly those seeking the UNE mode of entry). It is important, however, not to make rate adjustments in a purely reflexive or seat-of-the-pants fashion. Unwilling to tinker with end-user RBLTS rates, many regulators around the country have looked to lowering UNE/UNE-P rates as a way to encourage competitive entry, particularly for RBLTS.

Once UNE/UNE-P rates have been set properly relative to the underlying cost standard (which is total element long run incremental cost or "TELRIC"), there is no *automatic* economic justification for lowering those rates without any definitive evidence that the level of TELRIC itself has fallen. However, given that competitive entry for RBLTS has not been boosted despite setting UNE/UNE-P rates at TELRIC-based levels, it is imperative that the more politically-sensitive RBLTS end-user rates themselves be examined more carefully. It is no secret that, by long-standing tradition, those end-user rates (in Florida and other states) have received subsidy support in order to keep them lower than they would be otherwise. That tradition originated from the idea that telecommunications networks generate

(...continued)

slimmer, a fact noted by the *Florida Competition Report*.

positive network externalities that are benefits to telephone subscribers.[16] Because such externalities, which are not captured through prices or other market processes are considered beneficial, public policy has for a long time used subsidies to RBLTS rates as a means of encouraging greater network participation by customers (in particular, residential customers).

The traditional justification for subsidizing (or artificially lowering) RBLTS end-user rates is now being subjected to considerable rethinking for two reasons. First, thanks to the success of universal service policies, network subscribership by residential customers is now close to the saturation point. FCC statistics show that 93.2 percent of Florida households (and 95.1 percent of households nationwide) received basic local telephone service in July 2001, up from 85.5 percent in Florida (and 91.4 percent nationwide) in November 1983.[17] While this shows some gain, other FCC statistics show the significant slow-down in the *rate* of gain: the percent of households with basic local telephone service went from 78.3 to 90.5 in one decade between 1960 and 1970, but it has grown only to 95.1 in the next 31 years.[18] This slow-down is to be expected as the 100 percent mark is approached, but it also implies that little further gain in network externalities can be expected. The continuing need for subsidies at the current level is, therefore, reduced (if not mitigated).

Second, economic efficiency considerations have risen to the fore in the post-1996 Act telecommunications environment. Now that market competition (in particular, entry and participation by new service providers) is relying increasingly on market signals, continuing subsidies to end-user rates for RBLTS are distorting

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[16] The network externality arises as expansion of the network by even one additional subscriber increases the economic value of the network to all existing subscribers (because of the increased number and variety of calls that can be made).

[17] FCC, *Trends in Telephone Service*, Industry Analysis and Technology Division, Wireline Competition Bureau, May 2002, Table 17.2.

[18] *Id.*, Table 17.3. While there can be several reasons for this slow-down, the advent of mobile telecommunications (and, in particular, the increasing substitution of mobile for wireline telephone service) may be an important one.

those signals.[19] It is now imperative that public policy re-examine the wisdom in subsidizing RBLTS end-user rates with the decline in the importance of network externalities and a rising need to ensure efficient competition. The provisions of Section 364.164 take a major step in precisely this direction. Rather than look reflexively to lowering UNE/UNE-P rates further, the new policy direction favors encouraging greater competitive entry for RBLTS by allowing end-user rates to rise to unsubsidized levels.

Q. PLEASE COMMENT ON SECTION 364.164'S PROVISION FOR THE REDUCTION OF INTRASTATE SWITCHED ACCESS RATES.

A. The reduction of intrastate switched access rates charged by ILECs is the second part of a coherent strategy to realign service rates to make them more cost-based and, more importantly, encourage greater CLEC activity in Florida's local exchanges. As referred to earlier, the complete flowthrough of the intrastate access rate reductions into intrastate long distance rates (as required by Section 364.163(2)) is expected to stimulate intrastate long distance calling and make it more attractive for CLECs to offer bundles of local and long distance services. Also, the requirement of revenue-neutral rate reductions would ensure that intrastate access charges are lowered by only as much as is necessary to reduce—if not completely eliminate—intrastate switched access service's share of support for (or "contribution" to) the subsidy presently available to RBLTS end-user rates. Such revenue-neutral rate reductions would, in principle, enhance economic efficiency by eliminating the distorted price signals that occur from artificially maintaining rates either below cost (as for RBLTS end-user rates) or above cost (as for intrastate switched access rates).

[19] From an economic efficiency perspective, it would be far better to employ *targeted* subsidies (to either attract the small percent of households currently not subscribing to basic local telephone service or maintain *marginal* households as subscribers) than to continue with the long-standing system of *generalized* subsidies to RBLTS rates.

Q. HOW WOULD REDUCING INTRASTATE SWITCHED ACCESS RATES TO PARITY WITH INTERSTATE SWITCHED ACCESS RATES HELP TO ACCOMPLISH SUBSIDY ELIMINATION AND ENHANCE ECONOMIC EFFICIENCY?

A. It is true that Section 364.164 only seeks to reduce intrastate switched access rates to parity with their interstate counterparts. However, that reduction may be expected legitimately to move *all* service rates closer to true underlying costs and, in the process, enhance economic efficiency. Even if the gain in economic efficiency were not maximized in the process, some gain would be better than no gain at all.

First, for a number of years now, interstate switched access rates have been moving toward incremental cost-based levels, i.e., freed of the sizable contribution support elements that were hallmarks of those access rates in the past. Significant action in this regard was initiated by the FCC and a consortium of ILECs and other carriers.[20] Intrastate/interstate distinctions for switched access rates are based primarily on jurisdictional differences; the incremental costs to provide the two forms of switched access tend to be quite close. Thus, equalizing switched access rates in Florida, regardless of jurisdictional distinctions, would base those rates more closely on cost than ever before and, in the process improve economic efficiency.

Second, end-user rates for RBLTS have historically received subsidy support from several ILEC-supplied services, among which intrastate switched access was only one. Moreover, as noted earlier, there can be no guarantee that simply moving intrastate switched access rates to parity with their interstate counterparts would end all subsidy support from the intrastate rates. It is, therefore,

[20] FCC, *In the Matter of Access Charge Reform, Price Cap Performance Review for Local Exchange Carriers, Low-Volume Long-Distance Users, and Federal-State Joint Board On Universal Service,* CC Docket Nos. 96-262, 94-1, 99-249, and 96-45, Sixth Report and Order in CC Docket Nos. 96-262 and 94-1, Report and Order in CC Docket No. 99-249, and Eleventh Report and Order in CC Docket No. 96-45 ("*CALLS Order*"), May 31, 2000.

debatable how completely reducing intrastate switched access rates in the manner proposed by Section 364.164 would purge *all* subsidy support from end-user rates for RBLTS. However, *any* move to rationalize rates in the direction provided for in that section would enhance economic efficiency. More importantly, such a move would provide greater incentives for equally-efficient competitors to serve residential customers.

Q. IS THERE ANY WAY TO ASCERTAIN WHETHER, IN FACT, THE SUBSIDY SUPPORT HAS BEEN REMOVED FROM END-USER RATES FOR RBLTS?

A. Yes. Economic theory prescribes a price floor and a price ceiling for ensuring that no service provided by a multi-service firm (such as an ILEC) either *receives* a subsidy or *provides* a subsidy. The price floor in question is the total service long run incremental cost ("TSLRIC") and the price ceiling in question is the stand-alone cost ("SAC"). Ensuring that each ILEC service is priced somewhere in between its TSLRIC and its SAC prevents either the provision or receipt of a subsidy.[21] Accordingly, if the end-user rate for RBLTS is no lower than its TSLRIC (per unit of volume), then it cannot be receiving any subsidy support.

Q. IS THERE ANY OTHER ACCOMPANYING CONDITION THAT MUST BE MET FOR SERVICE PRICES TO BE CONSIDERED SUBSIDY-FREE?

A. Yes. The ILEC in question must at least "break even," i.e., its total revenue from all services must at least equal its total cost to provide those services in the long run.

Q. HOW RELIABLY CAN THE PRICE FLOOR AND CEILING BE

[21] G.R. Faulhaber, "Cross-Subsidization: Pricing in Public Enterprises," *American Economic Review*, 65(5), 1975, at 966-977. Note that this principle defines the price of a *total service*. Individual *units* of service can be sold efficiently at a price below the TSLRIC of the service—but no lower than the long run incremental cost ("LRIC") of those units—provided the incremental revenue from the service *as a whole* covers its incremental cost, here the TSLRIC.

DETERMINED IN ORDER TO OPERATIONALIZE THE SUBSIDY-FREE PRICING CONDITION?

A. TSLRIC is simply the sum of (1) the direct incremental cost of providing the entire volume of a service and (2) all fixed costs specific to that service. Other things being equal, these are costs that would be avoided in their entirety if the service were dropped from the ILEC's lineup of services (or, alternately, the costs that would be added if the service were added to the lineup of existing services). TSLRIC is now routinely estimated for various telephone services, including RBLTS.

SAC is the cost to provide the entire volume of a new service on a stand-alone basis, i.e., by use of dedicated network/production facilities and independently of any of the ILEC's other services. It is the same as the TSLRIC when the ILEC provides only one service. In reality, however, unless an ILEC provides only RBLTS, determining its SAC can be problematic and even impossible. That is because when the ILEC experiences shared (or common) costs, those costs *cannot* be attributed directly to individual services (as they would be in any SAC study).

Fortunately, this limitation of the SAC (as the price ceiling) for a multi-service ILEC need not be critical for determining whether or not RBLTS rates are subsidized. First, the function of the SAC is to determine whether a service is *providing* a subsidy—it would do so if the revenue earned by the service exceeds the SAC. If, however, it could be determined separately that none of the ILEC's services is *receiving* a subsidy, then no service could be providing any. Second, if for an ILEC that at least breaks even, every service price is set at or above its respective TSLRIC (per unit volume), then there can be no question of subsidy support to any individual service. Thus, for RBLTS, an end-user rate that is no lower than TSLRIC (per unit volume) must, by definition, be free of subsidy. In a revenue-neutral realignment of the RBLTS end-user rate and the intrastate switched access rate, a reduction of that access rate that suffices to raise the end-user rate for RBLTS to at least its TSLRIC per unit level would ensure that the subsidy support has been removed properly. Whether that would happen simply by reducing intrastate switched access rates to parity with interstate such rates is another matter; at least, it would be a move in the right direction.

Q. AT THE END OF THE TRANSITION PERIOD OF TWO TO FOUR YEARS, SHOULD END-USER RATES FOR RBLTS AND INTRASTATE SWITCHED ACCESS RATES BE SET *EQUAL* TO THEIR RESPECTIVE TSLRICS?

A. No, that should not be the goal of any policy that implements Section 364.164. Aside from the fact that there is no explicit requirement in that section for the two rates to be so set, it should also not be inferred that the purposes of Section 364 can be best served (or only be served) by setting the service rates exactly at their respective TSLRICs per unit.

Q. PLEASE EXPLAIN WHY NOT.

A. Modern multi-service ILECs (that provide RBLTS, switched access service, and other services out of shared network facilities) experience economies of scale and/or scope.[22] Any ILEC in that position cannot recover all of its costs (i.e., inclusive of fixed and incremental costs) by pricing all of its services *exactly* at their respective TSLRICs per unit. This feature of multi-service provision would remain true no matter how efficiently the ILEC in question functions or how intensely the ILEC and its rival CLECs compete in the market. The efficient pricing principle that enables complete recovery of the multi-service ILEC's legitimate total costs would then be to allow the ILEC to mark up its service prices

[22] A firm with high fixed costs and relatively low variable or operational costs (such as a modern ILEC) can often benefit from both *increasing* and *diversifying* production. Provided that the relatively low variable costs do not increase steeply as the volume of service grows, the ILEC's *average* cost of service may actually decline with volume expansion. This is the effect known as *economies of scale*, i.e., the ability to provide service less expensively as service volume is expanded. Similarly, when that ILEC can use shared fixed resources (such as network facilities and various administrative functions) to generate multiple and distinct services, it can be more economical to provide those services together than to provide them on a stand-alone (or separate) basis. This is the effect known as *economies of*

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above their respective TSLRICs per unit. If the markups are done right, the contribution so generated from each service price would enable the ILEC to fully recover its shared and common costs.

In economic theory, while any deviation of price from the underlying incremental cost triggers a loss of *allocative* economic efficiency, it is possible to set the ILEC's service prices in a manner that minimizes the cumulative loss of economic efficiency. Economic theory prescribes relying on the strength of market demand for each service to determine what markup its price should bear. This market-determined method can be shown to be superior (in terms of economic efficiency outcomes) to an arbitrary and across-the-board percent markup in service prices. It is important to note, however, that whether or not end-user rates for RBLTS and intrastate switched access rates contain any markup (or contribution) *toward the ILEC's shared and common costs* should at least be subjected to the market demand test. What is clear from Section 364.164 is that an earnest effort needs to be made to minimize, if not eliminate, the contribution *toward subsidy support* for RBLTS end-user rates.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

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scope.

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION
EXHIBIT WET-1 OF WILLIAM E. TAYLOR, Ph.D.
DOCKET NO.
AUGUST, 2003

CURRICULUM VITAE

WILLIAM E. TAYLOR

BUSINESS ADDRESS

National Economic Research Associates, Inc.
One Main Street
Cambridge, Massachusetts 02142
(617) 621-2615

william.taylor@nera.com

Dr. Taylor received a B.A. *magna cum laude* in Economics from Harvard College, an M.A. in Statistics and a Ph.D. in Economics from the University of California at Berkeley. He has taught economics, statistics, and econometrics at Cornell and the Massachusetts Institute of Technology and was a post doctoral Research Fellow at the Center for Operations Research and Econometrics at the University of Louvain, Belgium.

At NERA, Dr. Taylor is a Senior Vice President, heads the Cambridge office and is Director of the Telecommunications Practice. He has worked primarily in the field of telecommunications economics on problems of state and federal regulatory reform, competition policy, terms and conditions for competitive parity in local competition, quantitative analysis of state and federal price cap and incentive regulation proposals, and antitrust problems in telecommunications markets. He has testified on telecommunications economics before numerous state regulatory authorities, the Federal Communications Commission, the Canadian Radio-Television and Telecommunications Commission, federal and state congressional committees and courts. Recently, he was chosen by the Mexican Federal Telecommunications Commission and Telmex to arbitrate the renewal of the Telmex price cap plan in Mexico. Other recent work includes studies of the competitive effects of major mergers among telecommunications firms and analyses of vertical integration and interconnection of telecommunications networks. He has appeared as a telecommunications commentator on PBS Radio and on The News Hour with Jim Lehrer.

He has published extensively in the areas of telecommunications policy related to access and in theoretical and applied econometrics. His articles have appeared in numerous telecommunications industry publications as well as *Econometrica*, the *American Economic Review*, the *International Economic Review*, the *Journal of Econometrics*, *Econometric Reviews*, the *Antitrust Law Journal*, *The Review of Industrial Organization*, and *The Encyclopedia of Statistical Sciences*. He has served as a referee for these journals (and others) and the National Science Foundation and has served as an Associate Editor of the *Journal of Econometrics*.

EDUCATION

UNIVERSITY OF CALIFORNIA, BERKELEY
Ph.D., Economics, 1974

UNIVERSITY OF CALIFORNIA, BERKELEY
M.A., Statistics, 1970

HARVARD COLLEGE
B.A., Economics, 1968
(Magna Cum Laude)

EMPLOYMENT

NATIONAL ECONOMIC RESEARCH ASSOCIATES, INC. (NERA)
1988- Senior Vice President, Office Head, Telecommunications Practice Director.

BELL COMMUNICATIONS RESEARCH, INC. (Bellcore)
1983-1988 Division Manager, Economic Analysis, formerly Central Services Organization, formerly American Telephone and Telegraph Company: theoretical and quantitative work on problems raised by the Bell System divestiture and the implementation of access charges, including design and implementation of demand response forecasting for interstate access demand, quantification of potential bypass liability, design of optimal nonlinear price schedules for access charges and theoretical and quantitative analysis of price cap regulation of access charges.

BELL TELEPHONE LABORATORIES
1975-1983 Member, Technical Staff, Economics Research Center: basic research on theoretical and applied econometrics, focusing on small sample theory, panel data and simultaneous equations systems.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
Fall 1977 Visiting Associate Professor, Department of Economics: taught graduate courses in econometrics.

CENTER FOR OPERATIONS RESEARCH AND ECONOMETRICS
Université Catholique de Louvain, Belgium.

1974-1975 Post Doctoral Research Associate: basic research on finite sample econometric theory and on cost function estimation.

CORNELL UNIVERSITY

1972-1975 Assistant Professor, Department of Economics. (On leave 1974-1975.) taught graduate and undergraduate courses on econometrics, microeconomic theory and economic principles.

MISCELLANEOUS

1985-1995 Associate Editor, *Journal of Econometrics*, North-Holland Publishing Company.
1990- Board of Directors, National Economic Research Associates, Inc.
1995- Board of Trustees, Treasurer, Episcopal Divinity School, Cambridge, Massachusetts.

PUBLICATIONS

"Smoothness Priors and Stochastic Prior Restrictions in Distributed Lag Estimation," *International Economic Review*, 15 (1974), pp. 803-804.

"Prior Information on the Coefficients When the Disturbance Covariance Matrix is Unknown," *Econometrica*, 44 (1976), pp. 725-739.

"Small Sample Properties of a Class of Two Stage Aitken Estimators," *Econometrica*, 45 (1977), pp. 497-508.

"The Heteroscedastic Linear Model: Exact Finite Sample Results," *Econometrica*, 46 (1978), pp. 663-676.

"Small Sample Considerations in Estimation from Panel Data," *Journal of Econometrics*, 13 (1980) pp. 203-223.

"Comparing Specification Tests and Classical Tests," Bell Laboratories Economics Discussion Paper, 1980 (with J.A. Hausman).

"Panel Data and Unobservable Individual Effects," *Econometrica*, 49 (1981), pp. 1377-1398 (with J.A. Hausman).

"On the Efficiency of the Cochrane-Orcutt Estimator," *Journal of Econometrics*, 17 (1981), pp. 67-82.

"A Generalized Specification Test," *Economics Letters*, 8 (1981), pp. 239-245 (with J.A. Hausman).

"Identification in Linear Simultaneous Equations Models with Covariance Restrictions: An Instrumental Variables Interpretation," *Econometrica*, 51 (1983), pp. 1527-1549 (with J.A. Hausman).

"On the Relevance of Finite Sample Distribution Theory," *Econometric Reviews*, 2 (1983), pp. 1-84.

"Universal Service and the Access Charge Debate: Comment," in P.C. Mann and H.M. Trebing (editors), *Changing Patterns in Regulation, Markets, and Technology: The Effect on Public Utility Pricing*. The Institute of Public Utilities, Michigan State University, 1984.

"Recovery of Local Telephone Plant Costs under the St. Louis Plan," in P.C. Mann and H.M. Trebing (editors), *Impact of Deregulation and Market Forces on Public Utilities*. The Institute of Public Utilities, Michigan State University, 1985.

"Access Charges and Bypass: Some Approximate Magnitudes," in W.R. Cooke (editor), *Proceedings of the Twelfth Annual Telecommunications Policy Research Conference*, 1985.

"Federal and State Issues in Non-Traffic Sensitive Cost Recovery," in *Proceedings from the Telecommunications Deregulation Forum*. Karl Eller Center, College of Business and Public Administration, University of Arizona, Tucson, Arizona, 1986.

"Panel Data" in N.L. Johnson and S. Kotz (editors), *Encyclopedia of Statistical Sciences*. John Wiley & Sons, New York, 1986.

"An Analysis of Tapered Access Charges for End Users," in P.C. Mann and H.M. Trebing (editors), *New Regulatory and Management Strategies in a Changing Market Environment*. The Institute of Public Utilities, Michigan State University, 1987 (with D.P. Heyman, J.M. Lazorchak, and D.S. Sibley).

"Efficient Estimation and Identification of Simultaneous Equation Models with Covariance Restrictions," *Econometrica*, 55 (1987), pp. 849-874 (with J.A. Hausman and W.K. Newey).

"Alternative NTS Recovery Mechanisms and Geographic Averaging of Toll Rates," in *Proceedings of the Thirteenth Annual Rate Symposium: Pricing Electric, Gas, and Telecommunications Services*. The Institute for the Study of Regulation, University of Missouri, Columbia, 1987.

"Price Cap Regulation: Contrasting Approaches Taken at the Federal and State Level," in W. Bolter (editor), *Federal/State Price-of-Service Regulation: Why, What and How?*, Proceedings of the George Washington University Policy Symposium, December, 1987.

"Local Exchange Pricing: Is There Any Hope?", in J. Alleman (editor), *Perspectives on the Telephone Industry: The Challenge of the Future*. Ballinger Publishing Company, Cambridge, Massachusetts, 1989.

"Generic Costing and Pricing Problems in the New Network: How Should Costs be Defined and Assessed," in P.C. Mann and H.M. Trebing (editors) *New Regulatory Concepts, Issues, and Controversies*. The Institute of Public Utilities, Michigan State University, 1989.

"Telephone Penetration and Universal Service in the 1980s," in B. Cole (editor), *Divestiture Five Years Later*. Columbia University Press, New York, New York, 1989 (with L.J. Perl).

"Regulating Competition for IntraLATA Services," in *Telecommunications in a Competitive Environment*, Proceedings of the Third Biennial NERA Telecommunications Conference, 1989, pp. 35-50.

"Costing Principles for Competitive Assessment," in *Telecommunications Costing in a Dynamic Environment*, Bellcore-Bell Canada Conference Proceedings, 1989 (with T.J. Tardiff).

"Optional Tariffs for Access in the FCC's Price Cap Proposal," in M. Einhorn (ed.), *Price Caps and Incentive Regulation in the Telecommunications Industry*. Kluwer, 1991 (with D.P. Heyman and D.S. Sibley).

"Alternative Measures of Cross-Subsidization," prepared for the Florida Workshop on Appropriate Methodologies for the Detection of Cross--Subsidies, June 8, 1991.

"Predation and Multiproduct Firms: An Economic Appraisal of the Sievers-Albery Results," *Antitrust Law Journal*, 30 (1992), pp. 785-795.

"Lessons for the Energy Industries from Deregulation in Telecommunications," *Proceedings of the 46th Annual Meeting of the Federal Energy Bar Association*, May 1992.

"Efficient Price of Telecommunications Services: The State of the Debate," *Review of Industrial Organization*, Vol. 8, pp. 21-37, 1993.

"Status and Results of Regulatory Reform in the U.S. Telecommunications Industry," in C.G. Stalon, *Regulatory Responses to Continuously Changing Industry Structures*. The Institute of Public Utilities, Michigan State University, 1992.

"Post-Divestiture Long-Distance Competition in the United States," *American Economic Review*, Vol. 83, No. 2, May 1993 (with Lester D. Taylor). Reprinted in E. Bailey, J. Hower, and J. Pack, *The Political Economy of Privatization and Deregulation*. London: Edward Elgar, 1994.

"Comment on 'Pricing of Inputs Sold to Competitors,' by W.J. Baumol and J.G. Sidak," *Yale Journal on Regulation*, Vol. 11, Issue 1, 1994, pp. 225-240 (with Alfred E. Kahn).

"Comments on Economic Efficiency and Incentive Regulation," Chapter 7 in S. Globerman, W. Stanbury and T. Wilson, *The Future of Telecommunications Policy in Canada*. Toronto: Institute for Policy Analysis, University of Toronto, April 1995.

"Revising Price Caps: The Next Generation of Incentive Regulation Plans," Chapter 2 in M.A. Crew (ed.) *Pricing and Regulatory Innovations under Increasing Competition*. Boston: Kluwer Academic Publishers, May 1996 (with T. Tardiff).

"An Analysis of the State of Competition in Long-Distance Telephone Markets," *Journal of Regulatory Economics*, May 1997, pp. 227-256 (with J.D. Zona).

"An Analysis of the Welfare Effects of Long Distance Market Entry by an Integrated Access and Long Distance Provider," *Journal of Regulatory Economics*, March 1998, pp. 183-196 (with Richard Schmalensee, J.D. Zona and Paul Hinton).

"Market Power and Mergers in Telecommunications," *Proceedings of the Institute of Public Utilities; 30th Annual Conference: Competition in Crisis: Where are Network Industries Heading?* The Institute of Public Utilities, Michigan State University, 1999.

"The Baby and the Bathwater: Utility Competition, But at What Price?," Public Utilities Fortnightly, Vol. 137, No.21, November 15, 1999, pp. 48-56 (with Anne S. Babineau and Matthew M. Weissman).

TESTIMONIES

Access Charges

Florida Public Service Commission (Docket No. 820537-TP), July 22, 1983.

Arkansas Public Service Commission (Docket No. 83-042-U), October 7, 1985.

Public Utility Commission of Texas (Docket No. 8585), December 18, 1989.

Mexican Secretariat of Communications and Transport, affidavit filed October 18, 1995 (with T. Tardiff).

Federal Communications Commission (CC Docket No. 96-98), affidavit July 8, 1996; *ex parte* letters filed July 22, 1996 and July 23, 1996.

Federal Communications Commission (CC Docket No. 96-262 et. al.) with Richard Schmalensee, January 29, 1997). Rebuttal February 14, 1997.

New York Public Service Commission (Case 94-C-0095 and 28425), Panel Testimony, May 8, 1997. Rebuttal Panel Testimony July 8, 1997.
Pennsylvania Public Utility Commission (Docket No. I-00960066), June 30, 1997. Rebuttal July 29, 1997. Surrebuttal August 27, 1997.
Connecticut Department of Public Utility Control (Docket No. 96-04-07), October 16, 1997.
Federal Communications Commission (*ex parte* CC Docket No. 96-262 *et. al.*), with Richard Schmalensee, January 21, 1998.
Federal Communications Commission (CCB/CPD 98-12), March 18, 1998.
Federal Communications Commission (CC Docket Nos. 96-262, 94-1, 97-250 and RM 9210), October 26, 1998. Reply November 9, 1998.
Federal Communications Commission (Docket No. 99-24), with Karl McDermott, January 20, 1999. Reply April 8, 1999.
Vermont Public Service Board (Docket No. 6167), May 20, 1999. Supplemental May 27, 1999.
Virginia State Corporation Commission, (Case No. PUC 000003), May 30, 2000.
Maryland Public Service Commission (Case No. 8745), March 23, 2001. Rebuttal May 21, 2001. Surrebuttal June 11, 2001.
Federal Communications Commission (RM No. 10593) (with A.E. Kahn), Declaration filed December 2, 2002.

Incentive and Price Cap Regulation

Federal Communications Commission (Docket No. 87-313), March 17, 1988.
Florida Public Service Commission (Docket No. 880069-TL), June 10, 1988.
Federal Communications Commission (Docket No. 87-313), August 18, 1988. Rebuttal November 18, 1988.
New Hampshire Public Service Commission (Docket 89-010), March 3, 1989.
Federal Communications Commission (Docket No. 87-313), June 9, 1989.
Federal Communications Commission (Docket No. 87-313), August 3, 1989. (2 filings)
New York State Public Service Commission (Case 28961 - Fifth Stage), September 15, 1989.
Georgia Public Service Commission (Docket No. 3882-U), September 29, 1989.
Federal Communications Commission (Docket 87-313), May 3, 1990.
Federal Communications Commission (Docket 87-313), June 8, 1990 (2 filings).
State of Maine Public Utilities Commission (Docket No. 89-397), June 15, 1990.
Montana Public Service Commission (Docket No. 90.8.46), October 4, 1990.
Federal Communications Commission (Docket 87-313), December 21, 1990.
Tennessee Public Service Commission, February 20, 1991.
Federal Communications Commission (Docket 87-313) with Alfred E. Kahn), June 12, 1991.
California Public Utilities Commission (Phase II of Case 90-07-037) with Timothy J. Tardiff, August 30, 1991. Supplemental testimony January 21, 1992.
Rhode Island Public Utilities Commission (Docket No. 1997), September 30, 1991.
Montana Public Service Commission (Docket No. 90.12.86), November 4, 1991. Additional testimony January 15, 1992.
Federal Communications Commission (Pacific Bell Tariff F.C.C. No. 128, Transmittal No. 1579) with T.J. Tardiff, April 15, 1992. Reply comments July 31, 1992.

California Public Utilities Commission (Docket No. I.87-11-033), with T.J. Tardiff, May 1, 1992.

Delaware Public Utilities Commission (Docket No. 33), June 22, 1992.

Florida Public Service Commission (Docket No. 920260-TL), December 18, 1992.

California Public Utilities Commission (Docket No. I.87-11-033), with T.J. Tardiff, April 8, 1993, reply testimony May 7, 1993.

Canadian Radio-Television and Telecommunications Commission (Docket No. 92-78), with T.J. Tardiff, April 13, 1993 (2 filings).

Federal Communications Commission (Petition for Declaratory Ruling and Related Waivers to Establish a New Regulatory Model for the Ameritech Region), April 16, 1993. Reply Comments, July 12, 1993.

Delaware Public Utilities Commission (Docket No. 33), June 1, 1993. Supplementary statement, June 7, 1993. Second supplementary statement," June 14, 1993.

Vermont Public Service Board (Dockets 5700/5702), September 30, 1993. Rebuttal testimony July 5, 1994.

Pennsylvania Public Utility Commission (Docket No. P-009350715), October 1, 1993. Rebuttal January 18, 1994.

Massachusetts Department of Public Utilities (Docket No. D.P.U. 94-50), April 14, 1994. Rebuttal October 26, 1994.

Federal Communications Commission (CC Docket 94-1), May 9, 1994. Reply June 29, 1994.

Federal Communications Commission (CC Docket 94-1) with R. Schmalensee, May 9, 1994. Reply June 29, 1994.

New York State Public Service Commission (Case 92-C-0665), panel testimony, October 3, 1994.

State of Maine Public Utilities Commission (Docket Nos. 94-123/94-254), December 13, 1994. Rebuttal January 13, 1995.

Canadian Radio-Television and Telecommunications Commission (Application of Teleglobe Canada for Review of the Regulatory Framework of Teleglobe Canada Inc.), December 21, 1994.

Kentucky Public Service Commission, testimony re concerning telecommunications productivity growth and price cap plans, April 18, 1995.

California Public Utilities Commission (U 1015 C), May 15, 1995. Rebuttal January 12, 1996.

State of Connecticut, Department of Public Utility Control (DPUC Docket No. 95-03-01), June 19, 1995.

Louisiana Public Service Commission (Docket No. U-17949, Subdocket E), July 24, 1995.

California Public Utilities Commission (Investigation No. I.95-05-047), with R.L. Schmalensee and T.J. Tardiff, September 8, 1995. Reply September 18, 1995.

Mississippi Public Service Commission (Docket No. 95-UA-313), October 13, 1995.

Louisiana Public Service Commission (Docket No. U-20883), November 21, 1995.

Federal Communications Commission (CC Docket No. 94-1), with T. Tardiff and C. Zarkadas, December 18, 1995. Reply March 1, 1996.

North Carolina Utilities Commission (Docket No. P-7, Sub 825; P-10, Sub 479), February 9, 1996.

Rhode Island Public Utilities Commission (Docket No. 2370), February 23, 1996. Rebuttal June 25, 1996.

Pennsylvania Public Utility Commission (Docket No. P-00961024), April 15, 1996. Rebuttal July 19, 1996.

Canadian Radio-Television and Telecommunications Commission, in response to CRTC Telecom Public Notice CRTC 96-8 (2 filings), June 10, 1996.

Federal Communications Commission (CC Docket 96-262 et al.), *ex parte* March 1997.

Federal Communications Commission (CC Docket Nos. 93-193, Phase 1, Part 2, 94-65), May 19, 1997.

Vermont Public Service Board (Docket no. 6000), January 19, 1998.

Colorado Public Utilities Commission (Docket No. 97A-540T, January 30, 1998. Rebuttal May 14, 1998.

California Public Utilities Commission, affidavit on economic principles for updating Pacific Bell's price cap plan. Filed February 2, 1998.

California Public Utilities Commission, reply comments on Pacific proposal to eliminate vestiges of ROR regulation and inflation minus productivity factor formula/index, filed June 19, 1998.

Pennsylvania Public Utility Commission (Docket No. P-00981410), October 16, 1998. Rebuttal February 4, 1999.

Comisión Federal de Telecomunicaciones de México ("Cofetel"), "Economic Parameter Values in the Telmex Price Cap Plan," arbitrator's report regarding the renewal of the price cap plan for Telmex, February 15, 1999.

Kentucky Public Service Commission (Docket No. 98-292), April 5, 1999.

Federal Communications Commission (Docket Nos. 94-1, 96-26), January 7, 2000. Reply comments filed January 24, 2000, Ex parte comments filed May 5, 2000.

New Mexico Public Regulation Commission, direct testimony filed December 10, 1999.

Arizona Corporation Commission (Docket No. T-01051B-99-105), rebuttal filed August 21, 2000; rejoinder filed September 19, 2000.

Connecticut Department of Public Utilities (Docket No. 00-07-17), filed November 21, 2000.

Pennsylvania Public Utility Commission (Docket No. P-00981449), filed October 31, 2000. Rebuttal testimony filed February 20, 2001.

NERA Report: Economic Assessment of the Consumer Choice and Fair Competition Telecommunications Amendment (Proposition 108) (with Aniruddha Banerjee and Charles Zarkadas), November 2000.

Canadian Radio-Television and Telecommunications Commission, in response to CRTC Telecom Public Notice CRTC 2000-108, oral panel testimony, January 11, 2001.

Maine Public Utilities Commission (Docket No. 99-851, January 8, 2001. Rebuttal filed February 12, 2001.

Before the Massachusetts Department of Telecommunications and Energy, April 12, 2001. Rebuttal testimony September 21, 2001.

New York Public Service Commission, (Case 00-C-1945), May 15, 2001.

Canadian Radio-Television and Telecommunications Commission (Public Notice CRTC 2001-37), filed May 31, 2001, rebuttal evidence filed September 20, 2001.

The New Jersey Board of Public Utilities (Docket No. TO01020095), February 15, 2001. Rebuttal filed June 15, 2001. Supplemental rebuttal filed September 25, 2001.

Utah Public Service Commission, October 5, 2001. Rebuttal filed November 22, 2001.

New York Public Service Commission, (Case 00-C-1945), (panel testimony), filed February 11, 2002.

State of Rhode Island And Providence Plantations Public Utilities Commission (Docket Nos. 3179 and 3445). Direct testimony filed July 1, 2002 (Docket No. 3179). Rebuttal testimony filed October 22, 2002 (Docket No. 3445).

Massachusetts Department of Telecommunications and Energy (D.T.E. 01-31, Phase II (Track B)). Direct testimony filed August 28, 2002. Rebuttal testimony filed September 18, 2002.

Comisión Federal de Telecomunicaciones de México, "Telmex's 2003-2006 Price Cap Tariff Proposal." Expert report (with A. Ros, G. Martinez and A. Banerjee), filed December 13, 2002.

South Carolina Public Service Commission (Docket Nos. 2002-367-C and 2002-408-C), direct testimony filed March 5, 2003, responsive testimony filed July 30, 2003.

Payphone

California Public Utilities Commission (Case 88-04-029), July 11, 1988.

Illinois Commerce Commission (Docket No. 88-0412), August 3, 1990. Surrebuttal December 9, 1991.

Michigan Public Service Commission (Case No. U-11756), October 9, 1998.

South Carolina Public Service Commission (Docket No. 97-124-C), December 7, 1998.

New Jersey Board of Public Utilities (OAL DOCKET Nos. PUCOT 11269-97N, PUCOT 11357-97N, PUCOT 01186-94N AND PUCOT 09917-98N), March 8, 1999. Surrebuttal June 21, 1999.

Louisiana Public Service Commission (Docket No. U-22632), July 17,2000.

Tennessee Regulatory Authority, Docket No. 97-00409, October 6, 2000.

Economic Costing and Pricing Principles

Florida Public Service Commission (Docket No. 820400-TP), June 25, 1986.

Delaware Public Service Commission (Docket No. 86-20, Phase II), March 31, 1989. Rebuttal November 17, 1989.

Delaware Public Service Commission (Docket No. 89-24T), August 17, 1990.

Florida Public Service Commission (Docket No. 900633-TL), May 9, 1991.

Maryland Public Service Commission (Case No. 8584, Phase II), December 15, 1994. Additional direct testimony May 5, 1995. Rebuttal testimony filed June 30, 1995.

Canadian Radio-Television and Telecommunications Commission, Response to Interrogatory SRCI(CRTC) 1Nov94-906, "Economies of Scope in Telecommunications," January 31, 1995.

Pennsylvania Public Utility Commission (Docket Nos. A-310203F0002, A-310213F0002, A-310236F0002 and A-310258F0002), March 21, 1996.

State of Connecticut, Department of Public Utility Control (DPUC Docket No. 95-06-17), July 23, 1996.

New Jersey Board of Public Utilities (Docket No. TX95120631), August 15, 1996. Rebuttal filed August 30, 1996.

Florida Public Service Commission (Docket No. 980000-SP), September 24, 1998.

Nebraska Public Service Commission, (Application No. C-1628), October 20, 1998. Reply November 20, 1998.

Florida Public Service Commission (Docket No. 980000-SP), November 13, 1998.

Wyoming Public Service Commission (Docket No. 70000-TR-99), April 26, 1999.

New Mexico Public Regulation Commission (Utility Case No. 3147), December 6, 1999, rebuttal testimony filed December 28, 1999.

New Mexico Public Regulation Commission (Case No. 3008, rebuttal testimony filed May 19, 2000.

North Dakota Public Service Commission, (Case No. PU-314-99-119), May 30, 2000.

New Mexico Public Regulation Commission (Case No. 3225, direct testimony filed August 18, 2000. Rebuttal filed September 13, 2000.

New Mexico Public Regulation Commission (Case No. 3300), rebuttal testimony filed October 19, 2000.

Alabama Public Service Commission (Docket Nos. 15957 and 27989), direct testimony filed August 3, 2001. Rebuttal testimony filed August 13, 2001. Additional rebuttal testimony filed August 17, 2001.

The New Jersey Board of Public Utilities (Docket No. TO01020095), February 15, 2001. Rebuttal filed June 15, 2001.

Statistics

Arizona State Air Pollution Control Hearing Board (Docket No. A-90-02), affidavit December 7, 1990.

Expert testimony: Michigan Circuit Court (Case No. 87-709234-CE and 87-709232-CE), *Her Majesty the Queen, et al., v. Greater Detroit Resource Recovery Authority, et al.*, February, 1992.

Expert testimony: United States District Court, Eastern District of New York, *Jancyn Manufacturing Corp. v. The County of Suffolk*, January 11, 1994.

New York Public Service Commission (Case Nos. 93-C-0451 and 91-C-1249), July 23, 1996.

New York Public Service Commission (Cases 95-C-0657, 94-C-0095, 91-C-1174 and 96-C-0036): panel testimony, March 18, 1998. Rebuttal June 3, 1998.

InterLATA Toll Competition

Canadian Radio-Television and Telecommunications Commission (Docket No. 1990-73), November 30, 1990.

Federal Communications Commission (Docket 91-141), August 6, 1991.

Federal Communications Commission (CC Docket 92-141), July 10, 1992.

Federal Communications Commission (In the Matter of Policy and Rules Concerning Rates for Competitive Common Carrier Services and Facilities Authorization Therefor) with A.E. Kahn, November 12, 1993.

U.S. District Court for the District of Columbia *United States of America v. Western Electric Company, Inc. and American Telephone and Telegraph Company*, Affidavit with A.E. Kahn, May 13, 1994.
U.S. Department of Justice, *United States of America v. Western Electric Company, Inc. and American Telephone and Telegraph Company*, August 25, 1994.
Federal Communications *ex parte* filing in CC Docket No. 94-1, March 16, 1995.
Federal Communications Commission (CC Docket No. 79-252) *ex parte* comments with J. Douglas Zona, April 1995.
U.S. Department of Justice in *United States of America v. Western Electric Company, Inc. and American Telephone and Telegraph Company*, regarding Telefonos de Mexico's provision of interexchange telecommunications services within the United States, affidavit May 22, 1995.
U.S. Department of Justice in *United States of America v. Western Electric Company, Inc. and American Telephone and Telegraph Company*, regarding provision of interexchange telecommunications services to customers with independent access to interexchange carriers, May 30, 1995.
Expert testimony: *US WATS v. AT&T*, Confidential Report, August 22, 1995. Testimony October 18-20, 25-27, 30, 1995. Rebuttal testimony December 4, December 11, 1995.
Expert testimony: United States District Court for the Northern District of Texas, Dallas Division, Civil Action 394CV-1088D, *Darren B. Swain, Inc. d/b/a U.S. Communications v. AT&T Corp.* Confidential Report, November 17, 1995.
U.S. District Court, Southern District of New York, *Multi Communications Media Inc., v. AT&T and Trevor Fischbach* (96 Civ. 2679 (MBM)), December 27, 1996.
Federal Communications Commission (CC Docket Nos. 96-262 and 96-45), March 18, 1998.
Subcommittee on Communications of the Senate Committee on Commerce, Science and Transportation, *Statement* and oral testimony regarding long distance competition and Section 271 of the Telecommunications Act of 1996, March 25, 1998.
Federal Communications Commission (CC Docket No. 96-262), with P.S. Brandon, October 16, 1998.
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IntraLATA Toll Competition

New Jersey Board of Public Utilities (Docket No. TX90050349), December 6, 1990.
New York Public Service Commission (Case No. 28425) with T.J. Tardiff, May 1, 1992.
New Jersey Board of Regulatory Commissioners (Docket No. TX93060259), Affidavit October 1, 1993.
New Jersey Board of Public Utilities (Docket Nos. TX90050349, TE92111047, TE93060211), April 7, 1994. Rebuttal April 25, 1994. Summary Affidavit and Technical Affidavit April 19, 1994.
Delaware Public Utilities Commission (Docket No. 42), October 21, 1994.
Pennsylvania Public Utility Commission (Docket No. I-940034), panel testimony, December 8, 1994. Reply February 23, 1995. Surrebuttal March 16, 1995.
Public Service Commission of West Virginia (Case No. 94-1103-T-GI), March 24, 1995.

New Jersey Board of Public Utilities (Docket No. TX94090388), April 17, 1995. Rebuttal May 31, 1995.
New York Public Service Commission (Case 94-C-0017), August 1, 1995.
Rhode Island Public Service Commission (Docket No. 2252), November 17, 1995.
Massachusetts Department of Telecommunications and Energy (Docket No. 98-85), October 20, 1998.

Local Competition

Massachusetts Department of Public Utilities (Docket No. D.P.U. 94-185), May 19, 1995. Rebuttal August 23, 1995.
The Public Utilities Commission of Ohio (Case No. 94-1695-TP-ACE), May 24, 1995.
Vermont Public Service Board (Open Network Architecture Docket No. 5713), June 7, 1995. Rebuttal July 12, 1995.
New Jersey Board of Public Utilities (with Kenneth Gordon and Alfred E. Kahn), paper filed in connection with arbitration proceedings, August 9, 1996.
Florida Public Service Commission, "Local Telecommunications Competition: An Evaluation of a Proposal by the Communications Staff of the Florida Public Service Commission," with A. Banerjee, filed November 21, 1997.
Rhode Island Public Utilities Commission (Docket No. 2681), January 15, 1999.
Connecticut Department of Public Utility Control (Docket No. 95-06-17RE02), June 8, 1999.
CPR Institute for Dispute Resolution Arbitral Tribunal, Rebuttal Affidavit in arbitrations between BellSouth Telecommunications and Supra Telecommunications & Information Systems, November 5, 2001.
Florida Public Service Commission (Docket Nos. 020119-TP and 020578-TP). Direct testimony filed October 23, 2002, rebuttal filed November 25, 2002.
Georgia Public Service Commission (Docket No. 11901-U). Rebuttal testimony filed November 8, 2002.
Florida Public Service Commission (Docket No. 020507-TP). Rebuttal testimony filed December 23, 2002.

Interconnection and unbundling

Federal Communications Commission (Docket 91-141), September 20, 1991.
Maryland Public Service Commission (Case No. 8584) with A.E. Kahn, November 19, 1993. Rebuttal January 10, 1994. Surrebuttal January 24, 1994.
Maryland Public Service Commission (Case No. 8659), November 9, 1994.
Federal Communications Commission (CC Docket No. 95-185), affidavit March 4, 1996.
Federal Communications Commission (CC Docket No. 96-98), videotaped presentation on economic costs for interconnection, FCC Economic Open Forum, May 20, 1996.
New York Public Service Commission (Case 01-C-0767), October 31, 2001.
Federal Communications Commission (CC Docket Nos. 01-338, 96-98, 98-47) (with Aniruddha Banerjee, Charles Zarkadas and Agustin Ros) filed July 17, 2002.
Federal Communications Commission (CC Docket Nos. 01-338, 96-98, 98-47), ex parte on local switching, October 4, 2002.

Federal Communications Commission (CC Docket Nos. 01-338, 96-98, 98-47), ex parte on inter-office transport, October 11, 2002.

Imputation

New Hampshire Public Service Commission (Docket DE 90-002), May 1, 1992. Reply testimony July 10, 1992. Rebuttal testimony August 21, 1992.
Canadian Radio-Television and Telecommunications Commission (Telecom Public Notice CRTC 95-36), August 18, 1995.
Massachusetts Department of Public Utilities (Docket No. D.P.U./D.T.E. 94-185-C), Affidavit February 6, 1998. Reply Affidavit February 19, 1998.
New Jersey Board of Public Utilities (BPU Docket No. TO97100808, OAL Docket No. PUCOT 11326-97N), July 8, 1998. Rebuttal September 18, 1998.
Vermont Public Service Board (Docket No. 6077), November 4, 1998.

Economic Depreciation

Florida Public Service Commission (Docket No. 920385-TL), September 3, 1992.
Louisiana Public Service Commission (Docket No. U-17949, Subdocket E), November 17, 1995. Surrebuttal, December 13, 1995, Further Surrebuttal, January 12, 1996.
Federal Communications Commission (CC Docket No. 98-137), with A. Banerjee, November 23, 1998.

Spectrum

Federal Communications Commission (ET Docket 92-100) with Richard Schmalensee, November 9, 1992.
Federal Communications Commission (Amendment of Part 90 of the Commission's Rules to Adopt Regulations for Automatic Vehicle Monitoring Systems, PR Docket No. 93-61), with R. Schmalensee, June 29, 1993.

Mergers

U.S. District Court for the District of Columbia, *United States of America v. Western Electric Company, Inc. and American Telephone and Telegraph Company*, with A.E. Kahn, January 14, 1994.
Vermont Public Service Board (Docket No. 5900), September 6, 1996.
Maine Public Utilities Commission (Docket No. 96-388), September 6, 1996. Rebuttal October 30, 1996.
New Hampshire Public Service Commission (Docket DE 96-220), October 10, 1996.
Federal Communications Commission (Tracking No. 96-0221), with Richard Schmalensee, October 23, 1996.
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