BEFORE THE
COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF TELECOMMUNICATIONS AND ENERGY
BOSTON, MA 02110

IN THE MATTER OF

PHASE II OF

THE DEPARTMENT OF TELECOMMUNCATIONS AND ENERGY

ORDER ON ALTERNATIVE REGULATION

D.T.E. 01-31

TESTIMONY OF

PROFESSOR DAVID GABEL

ON BEHALF OF THE

OFFICE OF ATTORNEY GENERAL

COMMONWEALTH OF MASSACHUSETTS

SEPTEMBER 4, 2002

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1 EXECUTIVE SUMMARY

The primary findings of this testimony are that:

1) The only retail cost data available for the Department to rely upon in its investigation of its regulatory plan to succeed price cap regulation for Verizon has not been refreshed since the 1980's, but network conditions have changed dramatically since then;

2) The Verizon proposal would improperly raise prices on the mistaken assumption that residential rates are subsidized;

3) Residential service is not subsidized based on current prices and current estimates of the costs of service;

4) Loop costs should not be recovered exclusively from residential basic exchange rates since the loop is not a separate service and is increasingly being used to provide additional telecommunication services;

5) Residual pricing no longer makes sense due to the increasing availability of substitutes for traditional wireline service;

6) Based on existing cost data the proposed increase in rates by the Verizon is not reasonable and would exceed embedded costs by nearly $3 per month;

7) Verizon's pricing proposals are not consistent with economic efficiency;

8) Verizon's proposal is not entirely consistent with the pricing behavior of firms in competitive markets; and

9) Verizon's Proposal does not comply with the legal requirements of section 254 (k) of the Telecommunications Act of 1996.

The Office of Attorney General recommends that the Department take the following actions:

1) Freeze retail basic residential exchange rates at their current levels since there is no justification for increasing prices based on Verizon's regulatory plan;

2) Open a new docket whose purpose will be to examine the current cost of provisioning retail residential exchange services, and to ascertain if Verizon's revenues are indeed adequate in light of these costs or exorbitantly high;

3) Require Verizon to carry out a new Cost of Service Study if the DTE does not accept the analysis presented here which is based on publicly available FCC data since there is otherwise no justification for Verizon's proposed rate increases; and

4) Enact a regulatory plan which is based on economic principles as enunciated in this testimony so that the price of residential service reflects true costs and the policy objectives of promoting competition, ensures that customers face just and reasonable prices, and maintains a high level of service quality."

2 INTRODUCTION

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

A. My name is David Gabel, and my business address is 31 Stearns Street, Newton, Massachusetts 02459-2441. I am a Professor of Economics at Queens College in New York City, and a Visiting Scholar in the Massachusetts Institute of Technology Internet and Telecommunications Convergence Consortium in Cambridge, Massachusetts. I hold a PhD in Economics from the University of Wisconsin – Madison, and have over 20 years consulting experience in the telecommunications sector. I have advised the Federal Communications Commission (FCC) and the Public Service Commissions in Washington, Maine, and New Mexico, and I also have extensive experience providing consulting advice to foreign commissions. I have assisted the state commissions with the resolution of various issues that have arisen due to the passage of the 1996 Telecommunications Act. My first regulatory work was as a staff member of the predecessor of the Department of Telecommunications and Energy (DTE), the Department of Public Utilities (DPU). Finally, I am an instructor at the National Association of Regulatory Commissioners (NARUC) summer training course held at Michigan State University each year

My Curriculum Vitae, attached as Exhibit 6, provides a job history and a listing of my publications.

Q. On whose behalf are you appearing?

A. I am appearing on behalf of the Office of the Attorney General of the Commonwealth of Massachusetts.

Q. Have you ever testified in a regulatory proceeding before?

A. Yes. I have testified before the Wisconsin, Maine, New York, Indiana, Connecticut, and the Pennsylvania Public Service Commissions, as well as the Canadian Radio and Television Commission.

3 PURPOSE OF TESTIMONY

Q. Can you please summarize the important issues at hand which you will address in your testimony?

A. The Massachusetts Department of Telecommunications and Energy (DTE) has ordered an investigation of its regulatory plan to succeed price cap regulation for Verizon, New England, Inc. d/b/a Verizon Massachusetts ("Verizon") under Phase II of DTE 01-31 – Alternative Regulation.[1] The DTE believes that Verizon, as the incumbent

[1] Investigation By The Department Of Telecommunications And Energy On Its Own Motion Into The Appropriate Regulatory Plan To Succeed Price Cap Regulation For Verizon New England, Inc. D/B/A

provider, has demonstrated "sufficient competition" for most of its retail services, and is investigating a new regulatory framework proposed by Verizon for residential services.[2]

The Office of Attorney General, however, does not believe that the regulatory plan, as currently proposed, achieves its regulatory objectives. Verizon has requested freedom to raise the price of basic residential telephone service. The plan does not "accomplish the complementary goals of promoting competition, ensuring that customers face just and reasonable prices, and maintaining a high level of service quality" as stated by the DTE.[3]

The reasonableness of rates for regulated public utilities has always been judged with reference to cost.[4] Strikingly absent from Verizon's rate proposal, or the Department's tentative conclusion that residential rates should increase five percent per annum, is reference to any recent cost estimates. The Department has recognized that, at the wholesale level, cost estimates must be reviewed at least every five years, and perhaps more frequently, as "…technological and market changes in the telecommunications industry over the past six years have been so significant as to render six-year-old information of far too limited value for our present purposes."[5] The same network infrastructure is used to provide both wholesale and retail services.

Yet, in the present instance, the Department is relying on retail cost data from the 1980's to rationalize the need to raise prices on residential services.[6] This makes no sense given the Department's recognition that changing market conditions renders even six-year-old information useless for the purposes of setting wholesale rates. The same

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Verizon Massachusetts' Intrastate Retail Telecommunications Services In The Commonwealth Of Massachusetts, D.T.E. 01-31-Phase I, May 8, 2002 (Phase I Order).

[2] Ibid, Page ix.

[3] Ibid, Page ix.

[4] See, for example, Richard Posner, "Natural Monopoly and its Regulation," Stanford Law Review, Vol. 21, 1969, pp. 592-593; and Farmers Union Cen Exch v. FERC 734 F.2d 1486, 15092 (DC Cir), *cert denied*, 469 US 1034 (1984).

[5] Investigation by the Department of Telecommunications and Energy on its own Motion into the Appropriate Pricing, based upon Total Element Long-Run Incremental Costs, for Unbundled Network Elements and Combinations of Unbundled Network Elements, and the Appropriate Avoided-Cost Discount for Verizon New England, Inc. d/b/a Verizon Massachusetts' Resale Services in the Commonwealth of Massachusetts, D.T.E. 01-20, *Order of the Department of Telecommunications and Energy*, July 11, 2002, at p. 90.

[6] For example, in the Department's Phase I Order, the Commission relied on an order issued in 1990: "Because historic evidence has shown that residential rates are likely below their efficient levels (see New England Telephone and Telegraph Co., D.P.U. 89-300 (1990)." . see 01-31, Phase I Order , P.97. D.P.U. 89-300 involved the consideration of a cost of service study that was based on the revenue requirement determined by the D.P.U. in 86-33-G. (see New England Telephone and Telegraph Co., D.P.U. 89-300 (1990), p.1 The test year for the revenue requirement began in 1985. See New England Telephone and Telegraph Co., D.P.U. 86-33-G at 19 and 66 (1987).

technological and market changes that have affected wholesale services have also, of necessity, affected retail services.

To argue that six-year-old information serves no purpose in wholesale rate making while at the same time relying on data over fifteen years old for the purposes of retail rate making makes no sense. As noted by the Department, "there continues to be significant change in telecommunications technology…"[7] By relying on cost data from the 1980s, the Department is basing its pricing decisions on information that is not reflective of today's telecommunications network. By relying on stale data, the Department is implicitly saying that residential retail subscribers should not benefit from the scale and scope economies, as well as technological changes and merger savings, which have occurred over the past fifteen years.[8]

Allowing retail rates to rise without there being an underlying cost justification for the increase violates two fundamental regulatory principles: raising rates absent current supporting cost data and ensuring that rates reasonably approximate what would obtain in a competitive market. When faced with a similar proposal the Connecticut Department of Public Utility Control (DPUC) found that increasing rates without a solid analytical cost study to verify the accuracy of the increase would penalize Connecticut consumers and that attempts "…to increase rates without any current factual information to support the claim that residential local exchange service rates are operating at a near loss could never be approved by the Department."[9] As the DPUC noted: "Raising rates is not an appropriate method for increasing competition. Rather, the purpose of competition is to increase efficiency and lower costs."[10]

In the next section, I provide a detailed discussion comparing current rates to more updated current and embedded cost data, taking into account the rapidly changed network conditions that have occurred in the telecommunications market since the 1980s. The data shows that a rate increase would be unreasonable and economically inefficient.

Whereas there is no cost data that justifies an increase in the price of residential service, I propose that the Department freeze the current rates pending a further investigation of the cost of service. Furthermore, the Department should maintain retail quality of service standards.

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[7] D.T.E. 01-20, *Order of the Department of Telecommunications and Energy*, July 11, 2002, at p. 90.

[8] The Department has taken into account these changes in its UNE cost orders. See, for example, D.T.E. 01-20, July 11, 2002, pp. 22, 107, 109, 112, and 162-63.

[9] Before the Department of Public Control, DPUC Investigation Of The Southern New England Telephone Company's Alternative Regulation Plan, Docket No. 00-07-17, *Decision*, May 16, 2001, at p. 29.

[10] *Id*. at p. 27.

4 THE VERIZON PROPOSAL WOULD IMPROPERLY RAISE PRICES ON THE MISTAKEN ASSUMPTION THAT RESIDENTIAL RATES ARE SUBSIDIZED

Q. What are the fundamental rate making policies implicit in the Verizon proposal?

A. There are three fundamental arguments implicit in the Verizon proposal.[11] First, residential rates are subsidized by access charges. This implies that when access rates are reduced, residential rates should be increased to offset the lost revenue. This shift in revenue recovery, known as rate re-balancing, is an attempt to align revenue flows with alleged cost causation. The second argument is that loop costs should be recovered through loop rates, and the third argument is that residual revenue should be recovered through loop rates because loop services are inherently less price elastic than other services. This testimony will point out that the premises on which these arguments were based are no longer true, and thus a policy that increases residential rates to offset reductions in access charges is not just and reasonable.

Q. What is the basis for the argument that residential customers are being subsidized?

A. The basis for this argument is the Cost of Service Study (COSS) submitted in Docket 89-300 to the Department of Public Utilities (DPU). According to the COSS, it would be necessary to increase residence class rates by 39.5% and decrease revenue by 22.2%, 13.0%, and 53.2% for business, coin, and carrier access, respectively, to equalize the class rate of returns. Given these results, it is understandable that there was a desire to rebalance rates.[12] However, because there is no COSS currently before the Department, and because rates and costs have changed since the time of that study, it is necessary to look at other information to determine if residential consumers are currently being subsidized.

4.1 Residential Service In Not Subsidized Based On Current Prices And Current Estimates Of The Costs Of Service

Q. What alternative information could be used to determine whether the residential customers are currently being subsidized?

A. The alternative information I propose to use is the relationship between rates and costs since this is the way that economists measure subsidies. If the current rate is equal to or above cost then the residential customers are not being subsidized.[13]

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[11] D.P.U. 89-300, pages 20-24 and 36-41.

[12] The attorney general's office asserted that the study was biased towards increasing the residential costs, and did not agree with the implications of the study. The inferences about subsidies described above are those of the Department in D.P.U 89-300.

[13] For the limited purpose of this testimony, the price cost comparisons implicitly assume that all of the

Q. What are the current and proposed residential rates for service?

A. The current residential rate is $23.34 per month for unlimited local service. This rate is a combination of dial-tone line service ($9.91), local usage ($6.94)[14], the subscriber line charge ($6.00), and touch-tone service ($0.49). While touch-tone service is currently optional, Verizon is proposing to eliminate the separate charge for touch-tone service, and increase its dial-tone line charge to all customers to recover the revenue from the elimination of the touch-tone rate. The new dial-tone line rate will be $12.28. Adding this rate to the local usage rate and the subscriber line charge establishes a new residential rate of $25.22. In addition, the subscriber line charge is scheduled to increase to approximately $6.41 on July 1, 2003, and this will raise the residential rate to $25.63.

Q. Why do you include the subscriber line charge in the residential rate?

A. I included the subscriber line charge because the cost of service that I will compare to the residential rate includes the unseparated cost of access. That is, the cost estimates do not separate costs into interstate and state jurisdiction access costs. Rather, the entire cost of the loop is included in the embedded and unbundled network element (UNE) cost estimates.

Q. Please explain further?

A. Telephone investment, cost and revenues are divided between the state and interstate jurisdictions based on the FCC's Part 36 rules. The loop plant (specifically the Category 1.3 C&WF) is divided between the jurisdictions based on a 25% gross allocator. That means that 25% of the plant and associated costs are assigned to the interstate jurisdiction, and 75% of the plant and associated costs are assigned to the state jurisdiction. Carriers recover their interstate loop costs through the subscriber line charge, and their state costs through state approval rates. The embedded and UNE cost estimates included in this testimony do not separate costs between the state and interstate jurisdictions. These estimates included the cost associated with 100% of the loop plant. The residential rate must include those rates associated with 100 percent of the loop plant. Therefore, the SLC is added to the state rates.

Q. Do the cost estimates include any interstate switching or transport costs?

A. No. The switching and transport cost reflect the cost of local usage.

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cost of the loop should be recovered through the bundled price of local exchange service. Later in my testimony I discuss why this assumption is incorrect and consequently results in an understatement of the profitability of basic residential exchange service.

[14] $6.94 is the rate for unlimited calls within the local calling area. Higher rates apply for calling plans that provide unmeasured calls to certain exchanges outside the customer's local calling area. http://www22.verizon.com/ForYourHome/SAS/res_fam_localcalling.asp

Q. What is the UNE cost of residential service?

A. This cost is the sum of the UNE loop, port and switching cost, plus the retail costs of providing residential exchange service. The statewide average loop cost is $14.98. The port cost is $2.00.[15] Retail costs, the sum of customer service and marketing expenses, are $1.73 (Exhibit 1). The estimate of switching costs varies depending on usage, the date of the approved rate, and whether transport is included. The estimate made by the National Regulatory Research Institute (NRRI) is $3.30, and I have made an alternative estimate of $4.63. Therefore, the UNE cost of service plus the retail cost is between $22.01 and $23.34.

Q. Please explain the differences between the $3.30 switching cost estimate and the $4.63 estimate?

A. The differences are due to differences in per–minute rates and the inclusion of local transport costs. The estimates are similar in that they estimate the cost of 1000 local minutes, and that half of these minutes occur on peak and half off-peak. In the $3.30 cost estimate, the rates used were those in effect as of July 1, 2002. The rates used in the $4.63 are those that are currently in effect. The $3.30 cost estimate includes only switching costs, while the $4.63 cost estimate includes not only the cost of switching, but also the cost of transport and tandem switching. The later estimate uses the local usage pattern, function and function usage pattern described in the declaration of Michael Lieberman, filed on behalf of AT&T in FCC CC Docket No. 02-7, the Verizon Vermont Section 271 proceeding. The local usage pattern is the percentage of local usage that: (i) is between two customers served by the same switch (intra-switch, 35% of the minutes); (ii) the customers are served by different switches and the switches are directly connected (64% of the minutes); and (iii) customers are served by different switches and the switches are connected by the tandem switch (1% of the minutes). The functions are end-office usage, local transport, trunk ports and tandem usage, and the function usage pattern identifies whether the function is used for a particular call. The patterns and switch cost estimate are provided in Exhibit 4.

Q. Given the information about residential costs and rates, are residential customers receiving a subsidy?

A. No. Residential customers are not receiving a subsidy because the residential rate is above the cost of service. The residential rate, including the SLC and Touch-Tone service, is $23.34, and is scheduled to increase to approximately $25.63 in July 2003. The current embedded cost of service is $22.72 and is discussed more fully at page 14, and the current UNE cost plus retail costs is between $22.01 and $23.34 depending on differences in the estimation of switching costs.[16] Therefore, Verizon MA is either

[15] http://www.nrri.ohio-state.edu/programs/telcom/pdf/UNE_Matrix_0702.xls

[16] The cost estimates are biased upward because of the treatment of vertical services, advanced telecommunications services, and GR-303 technology. These factors are discussed below in greater detail.

breaking even or earning a surplus from residential customer basic rates. Given these relationships, it impossible for the residential customers to be receiving a subsidy under the current rates, and the increasing the basic service rates, as proposed, can not reduce a non-existent subsidy. Furthermore, an increase in the price of residential basic exchange service would be inefficient since the price already exceeds 100% of the shared cost of the loop.

4.2 Loop Costs Should Not Be Recovered Exclusively From Residential Rates Since The Loop Is Not A Separate Service And Is Increasingly Being Used To Provide Additional Telecommunication Services

Q. What is the basis for recovering all of the loop costs from loop rates?

A. The argument for recovery of loop costs from loop rates rests on two propositions. First, it is argued that the loop is a separate service, and second that the loop is a dedicated non-traffic-sensitive cost. Therefore, because it is a service and is dedicated to a particular end-user it should be recovered from that end-user.

Q. What is wrong with those arguments?

A. The loop is not a separate service. It is an input into the production of almost all other telecommunications services.[17]

In addition, the FCC recognizes that the loop is an input into production of other services because, first, the FCC recognizes that the loop is a common cost, and, second when the FCC reviews price squeeze claims, it allows revenues from vertical services to support loop costs.

Q. Please explain how the FCC recognizes that the loop is a common cost.

A. The FCC discussed the common cost related to services in its local competition proceeding. There it noted that “the cost of local loops and their associated line cards in local switches, for example, are common facilities to interstate access service and local exchange service, because once these facilities are installed to provide one service they are able to provide the other at no additional cost.”[18] These same common loop facilities also provide state toll access service and vertical services at no additional cost,

[17] "The defining characteristic of a service is that it is or would be demanded in its own right." Alfred Kahn and William Shew, "Current Issues in Telecommunications Regulation Pricing," Yale Journal on Regulation 200, 201 (1987). Jerry Hausman, testifying on behalf of Pacific Bell, correctly stated that "nobody would buy a local loop just because it's a local loop." *In the Matter of Alternative Regulatory Framework for Local Exchange Carriers,"* California PUC 87-11-033, March 13, 1992, transcript page 19126.

[18] FCC, First Report and Order, In the Matter of Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, CC docket No. 96-98, released August 8, 1996, FCC 96-325, at 678.

and are therefore, common cost inputs to all of these telephone services. As a common input, loop costs should be supported by all of the services that depend on the loop.

Q. Please explain how the FCC's review of price squeeze claims recognizes that the loop is a common input rather an independent service?

A. The FCC reviews price squeeze claims as part of its Section 271 proceeding public interest reviews.[19] [20] The price squeeze occurs when the revenues less UNE or wholesale costs are insufficient to allow the competitive carrier to earn a sufficient margin.[21] The sufficient margin is that margin which is high enough over cost to allow competitive carriers an opportunity to compete. Even though AT&T and Worldcom asserted that margin should be $10.00,[22] the FCC has never determined exactly how high the margin should be. Instead, it noted what the margin was in each case, and asserted that the margin must be high enough because competitors were active in the market. The FCC acknowledged that the statewide margin was $5.62 in NJ[23] and 31 percent in Vermont.[24] In each case, these margins had been calculated by the competitor carrier and included revenue associated with vertical services. In Vermont, the revenue included an average vertical service revenue of $2.25,[25] and in NJ, the revenue included in call waiting revenue of $4.59 per customer.[26] By including the vertical services in the legitimate revenue stream that could be used to support the loop UNE, the FCC acknowledged that these revenues are derived from services that are dependent on the loop, that the loop is a common input, and that all services that use that common input should share in its cost recovery.

Q. Are loop facilities dedicated non-traffic-sensitive facilities?

[19] It is worth noting that, unlike for most states, the FCC never did a price squeeze examination in the case of MA Verizon 271. For this reason, the Attorney General's Office is appealing this "non-action" by the FCC to the DC Circuit Court of Appeals. See *Worldcom v. FCC*, DC Cir. 01-1198.

[20] In the Matter of the Application by Verizon New England Inc., for Authorization to Provide In-region InterLATA services in Vermont, *Memorandum Opinion and Order*, CC Docket No. 02-7, FCC 02-118, released April 17, 2002, (Vermont 271 Order); and In the Matter of the Application by Verizon New Jersey Inc., for Authorization to Provide In-Region InterLATA Services in New Jersey, Memorandum Opinion and Order, WC Docket No. 02-67, FCC 02-189, released June 24, (New Jersey 271 Order).

[21] Vermont 271 Order at 70 and New Jersey 271 Order at 172.

[22] Declaration of Michael Lieberman, filed on Behalf of AT&T Corp., FCC CC Docket No. 02-7, filed February 6, 2002, at 18; and Declaration of Vijetha Huffman on Behalf of Worldcom, Inc., CC Docket No. 01-347, filed on January 14, 2002, at 3.

[23] New Jersey 271 Order at 172.

[24] Vermont 271 Order at 68.

[25] Declaration of Michael Lieberman, filed on Behalf of AT&T Corp., FCC CC Docket No. 02-7, filed February 6, 2002, Exhibit B-1.

[26] Declaration of Vijetha Huffman on Behalf of Worldcom, Inc., CC Docket No. 01-347, filed on January 14, 2002, Attachment 1.

A. A loop facility is a dedicated non-traffic-sensitive facility if neither the end-user's traffic pattern nor his neighbors' traffic patterns determined the amount of loops available to him. Depending on the type of technology used to provide the loop service, the loop can be either a non-traffic or traffic-sensitive facility.

In the old copper loop technology, the traffic of multiple end-users was not commingled until it reached the wire center (at least as long as the end-users had single party service). However, with the addition of loop electronics via digital loop carriers, the loop now contains traffic-sensitive components. These facilities are shared by many end-users. Each end-user is not provided with a dedicated path. Rather, the traffic is concentrated. "Typically, residential service can be concentrated at a 4:1 ratio … for business the typical traffic concentration is 3:1. The actual concentration ratio chosen for a given application is a function of the traffic load to be carried by the NGDLC (next generation digital loop carrier)."[27]

That is, the facilities that provide paths between the switch and the digital loop carrier device (the parts of the digital loop carrier device that communicate with the switch and the switch port) are part of a traffic-sensitive network. An end-user can experience blocking at the digital loop carrier because the traffic from other end-users precluded his use of the loop facility. Moreover, this network does not provide all end-users with equal access to the switch. Instead, it provides business customers with more paths than it provides residential customers.[28]

As loops are upgraded and more digital carrier devices are installed, the loop is becoming a traffic-sensitive rather than a non-traffic-sensitive facility. Prices that should signal correct behavior today and in the future must consider this changeover. Therefore, recovering loop costs only from flat end-user dial-tone rates is no longer providing the correct signal to end-users and investors.

Q. Is it likely that the sum of the total element long run incremental costs (TELRICs) of the unbundled network elements (UNEs) necessary to provide dial-tone represent a good approximation of the long run total service incremental cost (TSLRIC) of dial-tone (as suggested by the DTE)?[29]

A. No, it is not at all likely. The sum of the TELRICs of the UNEs necessary to provide dial tone probably greatly exaggerate the TSLRIC of dial tone. In saying this, I am not questioning how the relevant TELRICs are estimated, but rather, for the

[27] Direct Testimony of W. Keith Milner, BellSouth Telecommunications, Inc., Before the Alabama Public Service Commission, Docket No. 27821, November 8, 2000, at 6.

[28] D.T.E. 01-20, July 11, 2002, at 162-63.

[29] The DTE suggests unbundled network element prices that match a particular service can be used as a good estimate of the incremental cost of that service—Phase I Final Order, p. 101.

purposes of answering this question, assume the TELRICs are correctly estimated. Instead, there is a problem on another level.

The incremental costs of a service are any costs incurred solely because the particular service is supplied, and do not include any costs incurred when another service is supplied. Put in the negative, the incremental costs of a service cannot be incurred except for supply of that service. As an example, consider a remote town, called Faraway. A trunk line linking that town to the general telecommunications network which serves no other purpose except linking the town to the network, is part of the incremental cost of supplying that town with telecommunications. The trunk line would not exist except to link Faraway to the network. No other service is supplied on that line. However, if the trunk line went through Faraway and on to another town, call it Evenfarther, then the cost of the line out to Faraway could no longer be considered the incremental cost of linking Faraway to the network. The bulk of the cost of the link to Faraway would be incurred if the link to Evenfarther was made and so is a shared cost of service to Faraway and Evenfarther. The incremental cost of linking Faraway would only be those costs necessary to dimension the link *beyond the level necessary to supply Evenfarther's needs*. That is, only those costs solely necessary because of the calls generated by Faraway, could be called incremental costs. Those costs are incurred only to carry Faraway's traffic and absent Faraway's presence, would not be incurred.

Similarly, the incremental costs of dial tone are those costs that would not be incurred except for the supply of dial tone. However, local loop costs are incurred to supply any form of calling (including call receipt and the right to make calls, even if no calls are actually made). As a result, the incremental cost of dial tone cannot include local loop costs and if the incremental cost is not zero, it is very close to it.

The error of the DTE is that it attempts to treat TSLRIC prices as if they can be estimated from TELRIC prices. TELRIC is used to price network elements, the kinds of things one must rent, purchase or build to have control over the physical infrastructure necessary to supply telecommunications service, at incremental cost. TSLRIC is used to price retail services, like dial tone or local calling or long distance calling, at incremental cost. However, the summed TELRIC price of a series of unbundled network elements used to supply a service is *not* equal to the TSLRIC price of the service. Instead, the TELRIC price is generally much larger than the TSLRIC price. The reason for this is that the incremental cost of a network element is defined in the context of producing a physical network independent of the services that element or network might be used to supply. That is, its focus is the output of a *wholesale product*, that is, parts of a network or a network, rather than the supply of retail services. As a result, the TELRIC of, say a copper wire from the house to the nearest concentrator or local exchange, shares almost no costs with the concentrator or exchange. In contrast, as already outlined, telecommunications *services* almost always share costs with each other. As a result, as already noted, the local loop, a physical input necessary to supply services, cannot be treated as a retail service.

Q. Do you believe it correct to say that to measure the marginal cost of access to the network "it was not necessary to estimate the marginal cost of access to the network, since the costs associated with the access function are principally customer-related and can be determined more simply by dividing the allocated cost of access by the number of customer lines"?[30]

A. No, this is incorrect for reasons similar to those outlined in my answer to the previous question. For any individual, the incremental cost of access to the network is, or nearly is, zero. To supply any call type at all to that individual requires at least most of the local loop infrastructure that is also necessary for access to the network. As a result, most, indeed probably all, of the local loop costs are shared by telephone calls and the service access to the local loop. The mistake made here is to confuse the incremental cost of the local loop (that is, the incremental cost of a piece of the network) with the incremental cost of the alleged service, access to the network.

Of course, my answer would be different if access to the network was not intended to be a retail service, but rather referred to the physical pieces required to connect a customer to the larger telephone network. However, this cannot be what the DTE intended by the phrase, "access to the network" as the price being determined is the price paid by a consumer, not by telecommunications firm in the wholesale market.

4.3 Residual Pricing No Longer Makes Sense Due To The Increasing Availability Of Substitutes For Traditional Wireline Service

Q. What were the principles of residual pricing established by Order No. 89-300?

A. This order declared that traffic-sensitive rates should be set at marginal costs, and that any residual revenue requirement should be collected via rates in a customer charge or other similar non-elastic price element (Order at 17). The efficiency of such a pricing strategy is associated with the Ramsey pricing rules.

Q. How is the current Verizon proposal based on Order No. 89-300?

A. The current proposal reduces the access charges and increases the dial-tone line charge. In so doing, it proposes to set the traffic-sensitive access rates equal to the interstate charges and collect the residual revenue requirement from the so-called non-elastic price element, the dial-tone line charge.

Q. Does this strategy still make sense in the current competitive telephone environment?

A. No, because it is no longer clear that the dial tone line charge is the non-elastic price element. Elasticity is affected by the availability of substitutes. In the past, when

[30] DTE 89-300, p. 13.

there were no substitutes for wireline telephone service, it was probably true that a customer charge was the most inelastic part of the total bill. However, in the current competitive environment, the measure of elasticity could have changed significantly. There are now wireless carriers, competitive wireline carriers, and cable companies offering service that compete with the standard dial tone. In addition, digital subscriber line service competes with dial-tone line service. Therefore at this time, it is not clear that the dial-tone line service is the inelastic service. The recent reductions in the number of lines served could be result of changes in price elasticity relationships among services.[31] Until Verizon Ma can verify that the ancient truths about service elasticity remain the same today as they did in yesteryear, it is irresponsible to act in accordance with traditional beliefs. In short, we do not know the price elasticities, and therefore the price increases can not be characterized as Ramsey efficient. Furthermore, the rates are not just and reasonable because they exceed both the embedded and economic cost.

5 BASED ON EXISTING COST DATA THE PROPOSED INCREASE IN RATES BY VERIZON IS NOT REASONABLE AND WOULD EXCEED EMBEDDED COSTS BY NEARLY $3 PER MONTH

Q. Please summarize this section of your testimony?

A. This section of my testimony estimates the embedded cost of providing residential exchange service. This service includes exchange and interexchange access to the public switched network, and the use of the local switches and transport network for the purpose of making local telephone calls. The embedded cost of service is compared to the current and proposed rates for this service. Because the cost is below the current rate, I will argue that the proposed rate increase is not just and reasonable. In addition, I will argue that approval of the rate increase will negate this Commission's responsibilities regarding the prohibition of subsidies to competitive services by services included in the definition of universal service under Section 254(k) of the Telecommunications Act of 1996.

Q. What is your estimate of the cost of providing residential service?

A. The embedded cost of residential service is $22.72 per month. This is the sum of the loop cost of $13.45, switching cost of $5.77, inter-office local transport cost of $0.70, General Support facilities capital cost of $1.07, and customer operations expenses cost of $1.73.

Q. What data sources did you rely on to make this estimate?

A. The data sources were The Universal Service Fund 2001 Submission of 2000 Study Results by The National Exchange Carrier Association which was filed with the

[31] The slow down in line growth and even the reduction in lines served could also be caused by the economic recession.

Federal Communications Commission (FCC) on October 1, 2001, and data contained in the Automated Reporting and Management Information System (ARMIS) managed by the FCC. All of the data are in the public domain. The cost estimate is for the year 2000 because that is the most recent year for which the Universal Service data submission results are available. Year 2001 results will be available on October 1, 2002.

Q. How did you estimate the loop cost of $13.45 per month?

A. This estimate is based on the universal service algorithm contained in tab 3 of the filing, pages 1 to 3 of The Universal Service Fund 2001 Submission of 2000 Study Results by The National Exchange Carrier Association filed with the Federal Communications Commission on October 1, 2001. The algorithm contains 26 steps. The result of each step in the algorithm is shown in Exhibit 1, rows 1 to 26. Row 25, the total annual cost, is the sum of rows 13 through 24. Dividing the total by the number of lines generates the study area cost per line recorded in row 26, and row 26 divided by 12 months produces the $13.45 embedded loop cost per month. The study area cost per line recorded in row 26 of $161.36 is the same amount as shown for Verizon Massachusetts in the Universal Service Fund 2001 submission, tab 6, page 17 of 42. This match verifies that Exhibit 1 calculates embedded cost according to the FCC universal service rules.

The study area cost is the sum of the expenses, taxes and return associated with the loop. Expenses and taxes are calculated in rows 12 through 21. The cable and wire facilities (C&WF) maintenance expense is the product of the total regulated subject to separations C&WF expense, and the appropriate investment ratio. In this case, the investment ratio equals the category 1 C&WF plant divided by total C&WF, depicted in row 3 as 60%. All other expense items are calculated in a similar manner. That is, a total company subject to separations expense is multiplied by the appropriate investment ratio.

The return components are calculated in rows 23 and 24. In row 23, the C&WF rate base is multiplied by 11.25%, the FCC's allowed return capital. The rate base is the sum of C&WF plant investment (row 1), assigned material and supplies (row 7), less reserves (row 9).

Q. Why does the estimate of loop cost include central office equipment (COE) return and expenses?

A. The COE return and expenses included in the loop cost estimate are associated with Exchange Line Circuit Equipment excluding wideband, Category 4.13. This equipment augments the loop facilities. An example of Category 4.13 equipment would be digital subscriber line equipment.

At this point, the reader is referred to Exhibit 5 for a more detailed discussion of how various cost parameters were estimated.

6 VERIZON'S PRICING PROPOSALS ARE NOT CONSISTENT WITH ECONOMIC EFFICIENCY

Q. What is the purpose of this section of your testimony?

A. In this section of my testimony I analyze the pricing aspects of the DTE's Phase 1 Order 01-31. I do this in the context of the DTE's rate structure goals, but especially with a focus on economic efficiency.

Q. Is it true that, as the DTE states, in competitive markets prices do not fall below incremental cost and do not lie above stand-alone cost[32]?

A. As a general statement that is true. Moreover, for the purposes of this discussion it is reasonable to ignore special cases where it might not be true, for example, due to the presence of externalities, lack of knowledge, information asymmetries, and the complexities of optimization in the presence of discontinuities.

Q. Is it true that, as the DTE states, "any price within this range could prevail in an efficient, competitive market"?[33]

A. Absolutely not. Typically, only a very specific set of prices can prevail in any given competitive market. It is true that these prices can be expected to lie between incremental and stand alone costs, but it is not true that any price in this range is possible. Thus it is true that by looking at many competitive markets (note plural), each with different circumstances, that conceptually any range of prices between incremental and stand alone cost could be observed. However, in any specific market only a very narrow range of prices, albeit ones that lie between incremental and stand alone cost, would typically be possible market outcomes.

Q. Are incremental cost floors and stand alone cost ceilings sufficient criteria by which efficient or just and reasonable or fair (by the DTE's definition[34]) prices may be determined?

A. Absolutely not. It is well known that prices that lie between these two boundaries need be neither economically efficient nor just and reasonable. This is especially so in telecommunications where the incremental cost of any service is typically very small in comparison to its stand-alone cost. Two examples suffice to demonstrate how inefficiency, injustice and unreasonableness can result from prices that meet the

[32] DTE. 01-31-Phase I, Page 98.

[33] Ibid, Page 99.

[34] *Id*.

proposed standard (that is, that prices do not fall below incremental cost nor are set above stand alone cost):

1. Wherever there are shared costs, the sum of all services' incremental costs is less than total cost. If all prices are set to exactly cover the incremental cost of each service (thereby meeting the proposed standard) then the supplying firm would not recover its costs. This is obviously unjust and unreasonable. Shareholders would pay for network infrastructure costs without compensation. If shareholders knew this they would not make any investments, and if such prices were imposed after they had sunk efficient investments, then this would expropriate their sunk investment. Such prices are also inefficient. Price signals to consumers would understate the cost of the service overall. Worse, future investments that involved shared costs, despite being efficient, would not be made. Growth and development, which is arguably the chief source of efficiency gains in any market, but more certainly in telecommunications, would simply not occur.

2. Wherever there are shared costs, the sum of all services' stand-alone costs exceed total cost. If all prices were set to cover exactly the stand-alone cost of each service (thereby meeting the proposed standard) then total revenues would exceed total costs. In telecommunications, total costs would be hugely over-recovered. It could hardly be considered just or reasonable that a regulator was allowing unnecessarily steep prices and exorbitant profits, all at the expense of consumers. Such prices would also be inefficient. The signals received by consumers would overstate costs and inefficiently little consumption would take place.

A wide range of other prices that lie between the incremental cost floor and the stand alone cost ceiling of each service would have similar problems. In some cases, total costs would not be covered, in others they would be more than recovered.

Worse, many prices that meet the proposed standard would treat different classes of customers quite differently which is likely to be discriminatory, unjust, and unreasonable, and violate the DTE's definition of fairness.[35] For example, the DTE's standard would be met if consumers and governments were independently charged their stand-alone costs, while businesses only incremental cost. Again, this hardly seems just or reasonable (revenues from consumers and governments together would more than recover total costs), and, for the same reason, would likely also not be efficient. In short, the boundaries proposed by the DTE are not sufficient to define efficient or just or reasonable or fair (by the DTE's definition) prices.

[35] DTE 89-300, Pages 11-12.

Q. Are prices which just cover total costs, and neither lie below incremental cost nor above stand-alone cost, necessarily efficient or just and reasonable and do they necessarily meet the DTE's definition of fairness?[36]

A. No. Such prices can unnecessarily and inefficiently distort choice and arbitrarily recover costs from different classes of consumers. In general, and in telecommunications specifically, a wide range of prices can exactly recover total costs while each individual price still remains between the incremental and stand alone costs of the priced item. Some of these prices could place substantial burdens on arbitrarily chosen customers. For example, in telecommunications the stand-alone cost of providing the ability to call a range of people and be called by a range of people is quite high, while the marginal cost is typically quite low. As a result, a set of highly discriminatory prices, harshly penalizing some subscribers and greatly benefiting others could recover costs while not violating the incremental cost floor or stand alone cost ceiling of those subscribers. This would not be just and reasonable and would violate the DTE's definition of fairness.[37]

Such prices are also unlikely, in general, to be efficient, since usually a wide range of such prices exist (as would typically be the case in telecommunications), almost all of which cannot be said to minimize efficiency losses. Indeed, often reasonably obvious adjustments to many such prices will increase economic efficiency.

Q. In the case of Verizon's rates in Massachusetts, could the allocation of all shared costs to dial tone (or the dial tone and local call bundle) be efficient?

A. Not in my opinion. This can only be efficient under exceptional circumstances where either:

- the own-price elasticity of demand[38] for dial-tone (or dial-tone plus local calling services) is essentially zero (demand is completely unresponsive to price), but all other demand elasticities are distinguishable from zero; or

- the own-price elasticity of demand for all services excluding dial tone (or dial tone plus local calling services) is nearly infinite (measured in absolute value terms).

Such circumstances rarely if ever apply in practice. For example, some consumers will curtail their purchases of dial tone or dial-tone and local calls bundled if the price

[36] *Id*.

[37] *Id*.

[38] The own-price elasticity of demand is measured by the change in output demanded brought about by a 1% change in price, and is usually expressed in terms of its absolute value (so takes values that range from zero to positive infinity).

increases contemplated by the DTE ($1.90-$2.37) are implemented. In short, demand for dial tone or dial tone and local calls bundled is responsive to price, or the own-price elasticity of demand for these services is not zero. Similarly, the own-price elasticities of demand for all other telecommunications services are not infinite. New England Telephone found that rather than being highly elastic (as an elasticity of infinity would imply) "all [econometric] models, in total and for each mileage band, confirm that [in-state] toll minutes of use are inelastic with respect to price."[39] In some cases, demand was found to be highly inelastic.

Q. Can you describe what would characterize efficient prices?

A. While one could quibble with details, the DTE has described efficient prices as follows:

> "In competitive markets for telephone services, efficient market prices are based on incremental cost plus a mark-up for joint and common costs, based on Ramsey pricing principles. Pursuant to Ramsey pricing principles, joint and common costs are recovered from services in inverse proportion to the demand elasticity of particular services."[40]

Q. You said one could quibble with the details of the quote just given from the DTE. What details would you quibble with and how are they relevant if at all?

A. Competitive markets has a technical meaning, and in markets that are competitive in that technical sense, firms set price to marginal cost (that is, with no mark-up). I would prefer to say "workably" or "effectively" competitive.

I agree that in some effectively competitive markets, prices are based on incremental cost plus a mark-up (which are derived from Ramsey pricing principles) to recover joint and common costs. I also agree that where prices are set in this manner they are likely to be efficient. However, prices are not always set this way in effectively competitive markets. How prices are set depends on a range of factors including the degree of competition in the market and strategic variables firms have available to compete with.

Finally, it is not strictly true that, "Pursuant to Ramsey pricing principles, joint and common costs are recovered from services in inverse proportion to the demand elasticity of particular services." This holds under a special set of conditions, for example, that all service demands are independent and there are no opportunities for

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[39] That is, the (absolute value of the) demand elasticity takes a value that lies between 0 and 1 (price decreases lead to a less than proportionate increase in demand). Data from New England Telephone, 1992, Mass Transitional Filing—Demand Analysis Tracking Report, supplied under cover of a letter dated 19 October 1992, for DTE 92-100—New England Telephone. See also New England Telephone, 1993, Mass Transitional Filing—Demand Analysis Tracking Report for Docket 93-125, Item AG RR #75.

[40] DTE. 01-31-Phase I, Page 63. References omitted.

inefficient bypass. However, despite not being strictly true, the basic principal as outlined by the DTE is modified rather than overturned by these complexities.

Q. Do you agree that "it is impractical for regulators to determine demand elasticity"?[41]

A. Fundamentally, no. Demand estimation is a common procedure and one that the DTE has requested and relied on many times in the past. New England Telephone has undertaken many demand elasticity studies.[42] Moderately good estimates of demand elasticities can even be obtained by relying on past studies or studies from outside of Massachusetts. Indeed, to answer some basic questions in price setting even econometric evidence is unnecessary. For example, I have already argued that dial tone or the dial-tone local call bundle should not be used to recover all shared costs unless either has a demand that is perfectly inelastic in the range of a $2 price increase. Many marketers, regulators and even customers with experience in the supply of dial tone and local call would be in a position to pass judgment on whether that was true.

Q. Do you think it is impractical for regulators to set Ramsey prices?

A. I would agree that it is unrealistic to expect a regulator to develop a full-blown set of Ramsey prices. That is, I do not think it practical for regulators to estimate all the own-price demand and cross-price demand elasticities necessary to implement Ramsey prices. However, this does not prevent regulators from applying the basic insights of Ramsey pricing to efficiently set prices.

Q. What do you mean by "applying the basic insights of Ramsey pricing to efficiently set prices"?

A. Perhaps the most basic insight of Ramsey pricing is that all goods should be priced so as to bear some fraction of shared costs. This has a long history in economics[43] and the optimal tax literature:[44] A broadly based tax—spreading the burden—is an efficient tax. The principle applies so long as all services from which shared costs are potentially recoverable are to some degree or another responsive to price increases. As already noted, this is the case in general and in telecommunications. Dial-tone or dial-tone and local calls bundled do not have a zero own-price demand elasticity in the range of the price rises contemplated by the DTE

[41] DTE. 01-31-Phase I, Page 63.

[42] Two are cited in footnote 39 above.

[43] For example, is implied in Frank P. Ramsey's original paper written in 1927 ("A Contribution to the Theory of Taxation," Economics Journal, Volume 37, March, Pages 47-61).

[44] Diamond, PA and Mirrlees, JA, 1971 "Optimal Taxation and Public Production, I: Production Efficiency," American Economic Review, 61 (1) March, Pages 8-27.

($1.90-$2.37). Nor are any other telecommunications services completely unresponsive to changes in price.

Furthermore, a good would only be excluded under the principle if demand for it is perfectly elastic. However, no telecommunications service currently sold in Massachusetts would no longer be purchased if price was raised by a small amount. In fact, the evidence outlined above for intra-state toll calls suggests quite the opposite: that a relatively small reduction in purchases occurs when intra-state call prices are raised. This strongly suggests that intra-state toll prices should play a role in the recovery of shared costs.

A second Ramsey insight for efficient pricing is that a greater burden of shared costs should be borne by those retail services with highly inelastic demands. The fact that intra-state toll calls in Massachusetts have inelastic demands suggests the mark-up over marginal cost on the price of these services should not be too different to the mark-up applied to other services with similar elasticities. For example, there is little reason to believe that local call own-price elasticities would differ so significantly from those of intra-state toll calls that their prices should be marked-up significantly more over their marginal cost than the mark-up imposed on intra-state calls.

A third Ramsey insight is to treat services that are likely to be similar in demand elasticity similarly. To do otherwise would distort consumer choice and hence economic efficiency. This principle would suggest that relatively inelastic services face similar mark-ups over incremental costs for the purpose of recovering shared costs.

Q. Is it practical for regulators to take account of Ramsey insights?

A. The examples I just gave are not difficult to implement. In some cases, they do not even require elasticity estimates (a broad-based tax is an efficient tax). In other cases, even rough estimates would be helpful. For example, inter-state and international long distance calls are typically thought to be more elastic than demand for local and intra-state toll calls. This would suggest that a greater degree of cost recovery should come from the latter pair than the former. Similarly, the practical application of Ramsey principles suggests the DTE's proposed approach is inefficient.

Q. Would you agree that the promotion of competition in the supply of access to the network or dial-tone or the bundle of dial-tone plus local calling could justify pricing all other services at their incremental cost and recovering all shared costs through dial-tone or the bundle of dial-tone plus local calling?

A. No, I do not. The premise appears to be that high prices for access to the network or dial-tone or the bundle of dial-tone plus local calling would make entry for supply of any or all of these more attractive, making the market more competitive, and hence it would be a good thing. There are two flaws of this argument, the first being fundamental:

1. Competition is not good for its own sake. Competition is good because it brings great benefits to society as a whole, most notably being lower prices, improved quality and service and innovation. Artificially creating competition by having high prices does not bring any of these benefits and indeed can be extremely costly. At artificially high prices, firms with inefficiently high prices can profitably enter the market. This generates two forms of efficiency loss: the usual welfare triangle losses associated with monopoly prices (because prices in the market are artificially high); and much larger losses due to the high costs of inefficient firms.

2. Such analysis looks at one segment of the broad telecommunications market without considering the impacts on other segments. Thus, even if it were true that it was a good idea to increase competition for access to the network or dial-tone or the bundle of dial-tone plus local calling by artificially raising price (and it is not), doing so by shifting the burden of shared costs to these services necessarily and artificially lowers prices of all other telecommunications services supplied by Verizon. As a result, competition is thwarted in these other markets. In effect, the regulatory rate base is being used to subsidize Verizon's prices in other markets under the direction of the regulator.

7 VERIZON'S PROPSAL IS NOT ENTIRELY CONSISTENT WITH THE PRICING BEHAVIOR OF FIRMS IN COMPETITIVE MARKETS

Q. What is the purpose of this section of your testimony?

A. In this section of my testimony I provide for the Department Of Telecommunications And Energy's (DTE) consideration examples drawn from case studies as to the actual pricing behavior of firms in competitive markets.

Q. How is this presentation relevant to the present inquiry being undertaken by the Department?

A. Earlier in this testimony I argued that the DTE was relying on a mistaken application of economic theory when it tentatively concluded that efficient market prices in competitive markets are based on incremental cost plus a mark-up for joint and common costs, with joint and common cost recovery being assigned solely to the service with the least elastic demand; that being the dial-tone line, or network access, in the present instance.

Since the Department has stated that "…actual competitive telecommunications markets are preferable to regulation as a surrogate for competition" [45] I thought some

[45] Investigation By The Department Of Telecommunications And Energy On Its Own Motion Into The

examples from real world competitive market situations would be useful in rounding out the more theoretical discussion provided earlier. In particular what these examples clearly demonstrate is that the Department's conclusions regarding efficient market pricing in competitive situations is unfounded. Instead, research has shown that in competitive markets firms' strategic pricing decisions are much more complex than the simplistic notion of prices being driven towards cost.[46]

Recognizing that "...people do not make purchases by evaluating the products alone but by evaluating the entire purchase opportunity"[47] firms in competitive markets typically take a more nuanced approach to pricing, considering it as much a function of strategic positioning and marketing as it is of cost recovery. "Moreover, the cost of servicing different buyer segments, and the intensity of the competition to serve them, also varies greatly for the same product. Consequently, effective pricing often requires a strategy of segmented pricing."[48] This type of strategy takes many forms, some of which are: segmentation by peak-load pricing, such as is seen in the electric utility and telecommunications industries; segmentation by product design, which can be found in the transportation, software, retail industries, and telecommunications and; segmentation through the creation of different service bundles (for example, as seen in telecommunications).[49]

Appropriate Regulatory Plan To Succeed Price Cap Regulation For Verizon New England, Inc. D/B/A Verizon Massachusetts' Intrastate Retail Telecommunications Services In The Commonwealth Of Massachusetts, D.T.E. 01-31-Phase I, May 8, 2002 (Phase I Order) at Page 98.

[46] See, for example, Thomas T. Nagle and Reed K. Holden, The Strategy and Tactics of Pricing; A Guide to Profitable Decision Making, Prentice-Hall, Inc., 1987 (Nagle 1987).

[47] *Id*., at p. 168. Interestingly enough Southern New England Telephone expressed a similar view to the Connecticut Department of Public Utilities: "competitors will look at the total basket of services a customer buys, not any single service, in making a decision to market to that customer. Put differently, it is the profitability of individual customers, not individual services, that is attractive to competition." *Response of Southern New England Telephone, TE052 Supplemental Response*, October 13, 1995, Application of the Southern New England Telephone Company for Financial Review and Proposed Framework for Alternative Regulation, Docket 95-03-01.

[48] Nagle 1987, Page 123.

[49] See, for example, John S. Ying and Theodore E. Keeler, "Pricing in a Deregulated Environment: The Motor Carrier Experience," Rand Journal of Economics, 22(2) (Summer 1991), pp. 264-273; and Severin Borenstein and Nancy L. Rose, "Competition and Price Dispersion in the U.S. Airline Industry," Journal of Political Economy 102 (1994): 653- 683.

It is important to note that firms that have never been subject to price regulation also use complex pricing strategies, which effectively segment customers in order to price discriminate among them. See, for example, "The Nature of Competition in Electronic Markets: An Empirical Investigation of Online Travel Agent Offerings," Eric K. Clemons, Il-Horn Hann, and Lorin M. Hitt, Department of Operations and Information Management, working paper, Wharton School of Business, June 1999.

The assertion that price discrimination is found in many industries, not just regulated industries, is consistent with theoretical writings on this topic. As noted by Borenstein and Rose, "[T]heoretical works...indicate...that price discrimination may increase as a market moves from monopoly to imperfect competition." Id. Page 658.

The variety of strategic pricing options that are used by firms under conditions of competition, of which the above is just a small sample, imply the existence of a much more dynamic and fluid pricing environment than one in which prices are merely driven to incremental cost.

Q. What types of pricing strategies have you observed in telecommunications markets?

A. In the United Kingdom, NTL, the UK's largest cable TV provider (CATV), serves as an illuminating example of the strategies and pricing behaviors actually utilized by firms in competitive telecommunications markets.[50]

NTL has been installing a full-service network capable of providing a high speed, high capacity, two-way voice, data and video communications pathway to the customer. This approach allows the Company to pursue four revenue streams (residential telephony, residential cable television, business telecommunications services and Internet access services) on its network without a significant increase in fixed investment."[51] NTL believes that this capacity provides it with a competitive advantage in the residential market because it enables the Company to offer multi-product packages designed to encourage customers to subscribe to multiple services.

NTL's strategy has been to "... maximize gross profit contribution per home passed, rather than revenue per customer, by increasing overall penetration of the number of services provided over its network."[52] The Company is pursuing this objective via an intricate and differentiated pricing strategy involving bundled product offerings to encourage subscriptions to multiple services as well as more "a la carte" and transaction-oriented services that increase network utilization.[53] What NTL has not done is set the price of customer access equal to the cost of providing its entire platform. Rather, it seeks to recover its platform costs through the packaging of multiple products.

Q. Your NTL example is interesting, but isn't the company currently struggling to emerge out of bankruptcy?

A. That is true, however, the bankruptcy of the company resulted from an acquisition binge indulged in during the 1990s, not its pricing strategies. These

[50] See, U.K. Regulators Raise New Hurdle for NTL's Cable TV Purchase, TR Daily, November 12, 1999.

[51] NTL 10-k report filed with SEC 3/31/99.

[52] I Ibid.

[53] Ibid.

currently yield an average revenue per user of $62.03, a 20% increase over the fourth quarter of 2000, which is very good given current market and economic conditions.[54]

Q. Do you have other examples from the telecommunications sector?

A. Yes, I do. The pricing behavior of CLECs with regard to vertical features, which are unregulated services, should provide a concrete example of how firms in competitive telecommunications sectors actually price. A fine local example may be seen in how RCN prices vertical features in Massachusetts. As Table 1 below illustrates, RCN has chosen to utilize value-of-service pricing for its Call Waiting and Voice Mail services.

TABLE 1: RCN VALUE-OF-SERVICE PRICING

		1999[55]		2002[56]	
	Estimated Cost of Service[57]	Residential Rate	Business Rate	Residential Rate	Business Rate
Call Waiting	$0.0007	$2.57	$4.26	$2.65	$5.00
Voice Mail	NA	$3.75 to $7.00	$10.00	$3.75	$10.00

For a business user, being notified of incoming calls while the line is engaged, coupled with the option to put the current caller on hold so as to take the new call, or have to calls sent to Voice Mail, is an important business and client management tool. As such, demand for these services by business users is less price elastic than the demand for these services by residential users, and RCN prices them accordingly.

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[54] "NTL Earnings Down as Subscribers Leave", Braden Reddall, UK telecoms correspondent, LONDON (Reuters), Wed Aug 14, 9:40 AM ET, story available at http://story.news.yahoo.com/news?tmpl=story&u=/nm/20020814/bs_nm/telecoms_ntl_dc_1. And European Stockwatch - Thursday 26th July 2001 available at http://www.hemscott.co.uk/hstoday/eurofile/eurostories/ntl_260701.htm.

[55] RCN-BecoCom, LLC,d/b/a RCN of Massachusetts, Massachusetts Tariff No.1, *Exchange Access Service 1999*; Business, Section 5, 1st Revised P.4; Residential, Section 6 2nd Revised p.6. And Business, Section 5, 1st Revised P.3 and 4; and Residential, Section 5, 2nd Revised p.15, Section 6 2nd Revised p.13. Rates for Voice Mail are $3.75 for basic Voice Mail and $7.00 for more advanced Voice Mail features.

[56] 2002 rates are as of August 28, 2002 and are based on telephone calls to RCN MA Representatives. For residential Voicemail the $3.75 rate quoted was for basic Voice Mail service.

[57] Data in the Estimated Cost of Service column is from Direct Testimony of Stanley Baker, New England Telephone and Telegraph Company, State of Maine, Docket No. 96-781, April 22, 1997, Exhibit 1-B, page 5 of 9.

Table 1 also shows that prices for these vertical features are no lower now (in the case of call waiting they are higher) than they were in 1999. This is very interesting given the fact that during the intervening years competition in Massachusetts has increased significantly, with the CLEC share of end-user switched access lines growing from 6% as of December 1999 to 12% as of June 30, 2001.[58] Thus, while the Department may want to believe that competition drives prices to incremental cost, the evidence indicates that under actual competition firms choose to price products utilizing other strategies, such as the value-based-pricing one illustrated here.

Q. How about the wireless sector? That has been highly competitive, what, if anything, have you observed there?

A. The mobile phone market in the US has experienced incredibly rapid growth over the past several years, with the number of wireless customers increasing from 34 million to 118 million between December 1995 and June 2001.[59] Part of this growth is attributable to innovations in the pricing of wireless services.

In recent years wireless operators have developed a wider variety of innovative, and attractively packaged calling plans. These plans have been increasingly designed with the intention of getting and retaining groups of customers and encouraging them to use more calling minutes. For example, one early plan was AT&T's "AT&T Family Plan" which is intended, among other things, to more fully integrate its wireline and wireless offerings. This plan permitted up to five family members to make unlimited wireless calls to each other and to their landline telephone at home, within a defined 'family calling area.' There was no charge as long as at least one family member subscribed to AT&T's $24.98 plan (covering 60 minutes of calling, $49.99 plan (covering 400 minutes of calling) or $69.99 plan (600 minutes of airtime). The plan linked to AT&T's wireline long distance service, which was available at a rate of 7 cents per minute (no monthly fee) to Family Plan customers.[60] Shortly after AT&T rolled out this plan Bell Atlantic and Sprint introduced similar, competing plans.[61] This bundling trend has continued to the present as is demonstrated by Verizon's recently announced "Veriations All" package, which bundles long-distance, wireless and Internet components into a package that Verizon anticipates will add $500 million to $1 billion in revenue over the next five to six years, partly through reductions in customer churn and billing costs.[62]

[58] *Trends in Telephone Service*, May 2002, Industry Analysis Division, Common Carrier Bureau, Federal Communications Commission, Table 9.6. This report can be downloaded from the FCC-State Link Internet site at www.fcc.gov/wcb/stats.

[59] Id., Table 12.2.

[60] AT&T Sees New Rate Plans as Step Toward Integration, TR Daily of 8/30/99.

[61] Bell Atlantic to Sell New Group Wireless-Calling Plan, Bloomberg Wire Service, October 29, 1999.

[62] "Verizon Expects Incremental Rev Gain From Bundle Package", August 6, 2002 12:29 p.m. EDT, available at http://online.wsj.com/article/0,,BT_CO_20020806_004412.djm,00.html.

The variety, and the segmented nature of the calling plan options currently available in the mobile market, shows the effect that competition can have on a firm's pricing strategy. A few years back an Organization for Economic Co-Operation and Development (OECD) report found that when one firm controls the market, it tends to view that market as static; consequently, it does not actively seek new customers or experiment with new pricing plans and products. While the local exchange companies (LECs) have traditionally seen access as a burden associated with providing telephone service, competitive mobile suppliers have lowered the price of access to obtain market share.[63] In the mobile market, the handset, the access point to the mobile network, has primarily been seen as a commodity to be heavily discounted, or given away, in order to gain more network subscribers. The mobile operators knew that success in this highly competitive market depended on network size. The more members on the network, the more valuable the network becomes for existing subscribers and the more attractive it becomes for non-network subscribers. The more subscribers to the network, the more profits the company can earn from commissions on airtime.[64]

The experience of the wireless market further supports the proposition that competition promotes a proliferation of different pricing structures, including those with reduced network member access fees.

There is another insight that can be drawn from examining the pricing strategies of wireless providers. Wireless providers charge their end users a roaming fee each time a call is originated outside the carrier's service territory. In doing so they are not penalizing their users for using the phone outside the territory—they do not have an incentive to do so as the possibility of such a penalty would encourage users to switch to a provider with a larger service territory. Rather, wireless providers charge each other for access to their respective networks and this cost is passed on to subscribers in the form of a roaming fee. This roaming fee illustrates that in unregulated wireless markets, a firm will not give another network provider free access to its network members. If a subscriber needs access to another supplier's network, they have to pay for the privilege.

Q. You concluded your example from the mobile phone sector by pointing out that competition, as you have observed it in the telecommunications sector, sometimes results in reduced customer access fees. You also made this point at the end of your NTL example. Could you elaborate on the relevance of this point to the current discussion?

A. Certainly. In deciding to reduce switched access rates and make up the ensuing revenue shortfall by increasing the end-user dial-tone line charge, or customer network access charge, the Department has relied on the oft repeated arguments made by those who contend that economic efficiency requires that the non-traffic-sensitive costs

[63] OECD, "Mobile Communications: Pricing Strategies and Competition," 15 May 1995, ¶80-97.

[64] "Motorola Goes for the Hard Cell," Business Week, September 23, 1996, p. 39.

of the local exchange should be recovered exclusively through the local exchange access rate as costs associated with the access function are principally customer-related.[65] This is an argument that has been repeated so frequently that it has come to be viewed as an obvious and uncontestable fact of economic life; such is not the case.

First off, the guiding principle behind the development of the network from the introduction of the T-1 carrier system in the 1960's up to today's evolving integrated Next Generation Digital Network has been to evolve the network toward meeting the needs of non-voice advanced services.[66] This being the case, it is clear that the primary "cost-causers" driving network access costs today, and for the foreseeable future, are the users of non-voice advanced services such as xDSL, peer-to-peer computing, online gaming, streaming media and the like. The key question for 21st century regulation thus becomes -- now that the loop may jointly be used for the delivery of more advanced data and entertainment services along with voice services, what is the appropriate mechanism for efficiently sharing loop related costs among these services? Put another way, the local loop facility, as the potential conveyer of multiple products and services, affords its owner the opportunity to take advantage of multiple revenue streams. In recovering the cost of this facility, the entire revenue stream the facility collects should be taken into account. The FCC acknowledged the suitability of this approach in its 1998 ruling on GTE's proposed DSL service offering:

> When a requesting carrier purchases these unbundled network elements, the facilities in question are capable of supporting a variety of services in addition to ADSL, such as local exchange service and access services. Competitors

[65] See, for example, Alfred Kahn and William Shew, "Current Issues in Telecommunications Regulation: Pricing," Yale Journal on Regulation 4: 191, 202 (1987); and Alfred Kahn, "The Road to More Intelligent Telephone Pricing," Yale Journal on Regulation 1: 139, 142-143, 155 (1984); and David L. Kasserman and John W. Mayo, "Cross-Subsidies in Telecommunications: Roadblocks on the Road to More Intelligent Telephone Pricing," Yale Journal on Regulation 11: 119, 135 (1994).

[66] See, for example, Grant Lenahan, Executive Director, NGN Solutions, Bellcore, Next Generation Networks: A Practical View of Network Evolution, http://www.telcordia.com/aboutus/vision/changingcommunications.html, December 1998; Edward Traupman, Pete O'Connell, and John Minnis, Alcatel USA, Marc Jadoul and Huterer Mario, Alcatel, The Evolution of the Existing Carrier Infrastructure, IEEE Communications Magazine, June 1999; T.P Byrne, R. Coburn, and H.C. Mazzoni, American Telephone and Telegraph Company, G.W. Aughenbaugh and J.L. Duffy, Bell Telephone Laboratories, "Positioning the Subscriber Loop Network for Digital Services", A Paper Presented at the International Symposium on Services and Local Access (ISSLS) Conference in Toronto, September 20-24, 1982, and; C.S. Skryzpczak and J.H. Weber, American Telephone and Telegraph Company, W.E. Falconer, Bell Telephone Laboratories, Bell System Planning of ISDN, IEEE International Conference on Communication: Denver Colorado, Vol. 1 of 4, 1981 at p. 19.6.1; and E.A. Smith, W.A.G. Walsh, and M.J. Wilson, How Non-voice Services Affect the Evolution Toward the ISDN, Telephony, June 14, 1982, at 44; The desired goal of an integrated single multifunction network, rather than multiple networks supporting circuit switching, packet switching, and various private line services was also articulated in various internal bell company documents around 1988. See, for example, Architectural Implications of High Speed Private Line Services in an Evolving ISDN Environment, BellCore Document # TM-NPL-013390, December 23, 1988.

> need not recover their costs from ADSL service alone; they have the same opportunity as GTE to recover the costs of network elements from all of the services they offer using those facilities. Thus, a carrier choosing to offer only data service over a facility that is capable of carrying more, such as GTE's ADSL offering, may not reap the entire revenue stream that the facility has to offer. (Footnotes omitted)[67]

A mixture of ILECs, CLECs, and IXCs supported this position. For example, in a recent FCC hearing Bell Atlantic noted that "...competitors have the same opportunity as local carriers to offer a variety of services over those facilities, such as local exchange service, not just ADSL. And just like the local exchange carriers, competitors can recover their costs of subscribing to the network's elements from all the services they offer through the facilities."[68] Raising only dial-tone line service rates to offset lowered intrastate access rates results in residential voice rates that are subsidizing the advanced telecommunications services that are currently driving enhancements and construction.

The second point I would like to make on this issue is that the re-engineering of the network for the provision of non-voice advanced services has pushed the traffic-sensitive portion of the network farther out into the local loop as more and more access lines around the country are being supported by fiber based Next Generation Digital Loop Carriers (NGDLCs), also referred to as Integrated Digital Loop Carriers (IDLC).[69] These IDLCs possess some call processing capabilities similar to a Local Digital Switch and have been viewed by the ILECs as an extension of the central office to the

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[67] Before the Federal Communications Commission, *In the Matter of GTE Telephone Operating Cos. GTOC Tariff No. 1 GTOC Transmittal No. 1148*, Memorandum Opinion and Order, CC Docket No. 98-79, FCC 98-292 (rel. October 30, 1998), ¶31.

[68] See, for example, Comments of Bell Atlantic on Direct Cases, In the Matter of GTE Telephone Operating Cos. GTOC Tariff No. 1 GTOC Transmittal No. 1148, CC Docket No. 98-79; BellSouth Telecommunications, Inc., BellSouth Tariff No.1, BellSouth Transmittal No. 476; Pacific Bell Telephone Company, Pacific Bell Tariff FCC No. 128, Pacific Bell Transmittal No. 1986, Submitted September 14, 1998, Page 11.

Bell Atlantic expressed a similar view a few years ago when its economic consultant, Dr. William Taylor argued that it would be "economically incorrect" to recover the cost of its broadband platform from one service, such as video dial-tone. Dr. Taylor declared that "the common cost of the network platform should be recovered from all services that use the platform." Affidavit of William Taylor, Exhibit A, pp. 4-5, *In the Matter of The Bell Atlantic Telephone Companies Tariff FCC No. 10 Video Dial-tone Service*, Transmittal No. 741, March 6, 1995.

[69] See, for example, DSL Anywhere: A Paper Designed To Provide Options For Service Providers To Extend The Reach Of DSL Into Previously Un-Served Areas, a DSL Forum Whitepaper submitted December 12, 2001 in the National Telecommunications and Information Docket No. 011109273-1273-01, In the Matter of Request for Comments on the Deployment of Broadband Networks and Advanced Telecommunications, available at http://www.ntia.doc.gov/ntiahome/broadband/comments/dslf/dsl_anywhere.pdf, at 27.

customer.[70] Given the fact that the Department assumes a network comprised of approximately 58.8% fiber with 39.2% IDLCs,[71] and since it recognizes that this equipment is engineered based on busy-hour traffic,[72] rather than the number of customer access lines, if the Department truly wished to abide by its stated objectives of maximizing economic efficiency, it would re-tariff that portion of the local loop running from the IDLC to the Central Office Switch as traffic-sensitive.[73]

Finally, as the examples I have provided demonstrated, competition in the telecommunications' markets has caused firms to seek market share, and to differentiate themselves from their competitors, through the introduction of innovative pricing packages offering telecommunications services bundled to suit a diverse range of consumer preferences. Network access is just a part of the bundle and in competitive markets, customer access line costs are not recovered entirely through the price of access.

Price discriminating behavior and market segmentation is not unique to the telecommunications market., it can found in other deregulated. For example, Richard Vietor's Contrived Competition: Regulation and Deregulation in America (Cambridge, Harvard University Press, 1994), summarizes the impact of deregulation in six industries. He points out that pricing mechanisms became more complex once government controls were reduced. Rather than moving to cost-based pricing, as had been predicted, many of the markets exhibited an increased level of price discrimination, because firms used pricing to segment customers and establish customer loyalty.

Q. Do you have any examples this type of pricing behavior from firms that have never been regulated?

A A firm which has learned the art of strategic pricing extraordinary well is Gillette. Gillette has chosen to focus on a "shaving systems" approach in order to take full advantage of "the principle of complementary products under which the relative prices

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[70] Ehreth, Strategies for Unbundling Remote Access Terminals, at 1. The Class 5 switch that is connected to an NGDLC controls the switching (concentration) function at the NGDLC through the GR-303's built in network management channel, and Before the New Mexico State Corporation Commission, Rebuttal Testimony of Todd Bohling on Behalf of AT&T, In The Matter Of The Interconnection Contract Negotiations Between AT&T Communications Of The Mountain States, Inc. And U S West Communications, Inc., Pursuant To 47 U.S.C. Section 252, Docket No. 96-411-TC, January 21, 1997, at 26.

[71] Phase I Order at p. v.

[72] D.T.E. 01-20, July 11, 2002, at 162-63.

[73] Economists have typically found that capacity costs incurred "…in this way are traffic-sensitive, because they are marginally attributable to usage, and may be regarded as the long-run marginal cost equivalent of the congestion costs that they mitigate." (See, Alfred E. Kahn and William B. Shew, "Current Issues in Telecommunications Regulation: Pricing", 4 Yale Journal on Regulation 191 (1987), at 226.)

of products can be exploited because they must be used together. The razor, a quite substantial product, is sold at low price to get it into the consumer's hands. This facilitates the sales of profitable, replacement blades which fit only the systems for which they have been designed."[74]

A study of Gillette pointed out that another component of the Company's strategy has been:

> to continually add features to the basic razors, and hence make more profit per blade as consumers buy up in features. This started with the Trac II twin blade system, and continued with the pivot head first on the Atra, and then later on the Good News disposable. Following this introduction was the addition of a lubricating strip on the blade that would release a lubricant when wet. This feature was first put on the Atra Plus, and later added to the Good News Plus.
>
> What Gillette has been effectively doing is hooking the consumer with a low priced razor and blade, and then having him buy upscale a little each time. With a fixed market size, this is almost the only way to increase profits.[75]

8 VERIZON'S PROPOSAL DOES NOT COMPLY WITH THE LEGAL REQUIREMENTS OF SECTION 254 (k) OF THE TELECOMMUNICATIONS ACT OF 1996

Q. What are the state responsibilities under Section 254(k) of the Telecommunications Act of 1996?

A. This section requires states to share the loop cost recovery burden among the services that use the loop. It also prohibits service that are not competitive from being allowed to subsidize competitive services.

Section 254(K) explicitly states that:

> "… the States, with respect to intrastate services, shall establish any necessary cost allocation rules, accounting safeguards, and guidelines to ensure that services included in the definition of universal service bear no

[74]Thomsen, Kenneth A. "The Global Strategy of the Gillette Corporation," MIT MS Thesis 1987, p. 44. To some extent, the printer business is like the razor business: The printer may be cheap, inkjets currently can be had for around $99, but the expensive part is buying the ink cartridges, which can run from 26 to 66% of the $99 printer price. So, printer manufacturers use low upfront costs for the printers to attract customers that then become locked into having to purchase cartridges that only fit the specific printer purchased. ("How Good Could a $99 Printer Be", by Walter S. Mossberg, *The Wall Street Journal*, Page D5, 08/07/02.)

[75] Ibid., p. 29.

more than a reasonable share of the joint and common costs of facilities used to provide those services."

Q. Is residential service included in the definition of universal service?

A. Yes, access to the local network and local usage are included in the definition of universal service.

Q. Are state toll services, advanced telecommunications services, such as DSL, and vertical services included in the definition of universal service?

A. No.

Q. Has the FCC provided guidance to the state commissions with regard to the meaning of what is a reasonable share of the joint and common costs that services included in the definition of universal service should bear?

A. No. But recovering 100% of the joint and common costs from services included in the definition of universal service and zero percent for services excluded from that definition is clearly not a reasonable sharing of the joint and common costs.

Q. What is the basis for your statement that 100% of the joint and common costs of facilities used to provide those services are recovered from services included in the definition of universal service?

A. The rate for residential service, a service included in the definition of universal service, is greater than its embedded and forward-looking cost of service. These cost of service estimates include 100% of the loop costs. The loop is a joint and common facility used to provide residential service, state toll service, advanced telecommunications services, and vertical services. Currently, 100% of the joint and common costs are recovered from the residential service. The problem would be exasperated if the price of basic residential service was allowed to increase as proposed by Verizon. This situation is in conflict with Section 254(k).

9 RECOMMENDATIONS

Q. Based on your testimony today, do you have any recommendations you would like to place before the Department for its consideration?

A. Yes I do. I would recommend that the Department take the following actions:

1) Freeze retail basic residential exchange rates at their current levels since there is no justification for increasing prices based on Verizon's regulatory plan;

2) Open a new docket whose purpose will be to examine the current cost of provisioning retail residential exchange services, and to ascertain if Verizon's revenues are indeed adequate in light of these costs or exorbitantly high;

3) Require Verizon to carry out a new Cost of Service Study if the DTE does not accept the analysis presented here which is based on publicly available FCC data since there is otherwise no justification for Verizon's proposed rate increases; and

4) Enact a regulatory plan which is based on economic principles as enunciated in this testimony so that the price of residential service reflects true costs and the policy objectives of promoting competition, ensures that customers face just and reasonable prices, and maintains a high level of service quality."

I make these recommendations because the only retail cost data available for the Department to rely upon in forming a decision in this investigation has not been refreshed since the 1980's. As my testimony has shown, network conditions have dramatically changed since then. Having recognized that "the dynamic pace of changes in the telecommunications industry"[76] necessitates a review of wholesale cost estimates every five years, the Commission can do no less than to recognize that the same necessity applies equally to retail cost estimates that are fifteen years out of date. Failure to do otherwise would be a grave disservice to the citizens of the Commonwealth.

Q. Does this conclude your direct testimony?

A. Yes.

[76] Investigation by the Department of Telecommunications and Energy on its own Motion into the Appropriate Pricing, based upon Total Element Long-Run Incremental Costs, for Unbundled Network Elements and Combinations of Unbundled Network Elements, and the Appropriate Avoided-Cost Discount for Verizon New England, Inc. d/b/a Verizon Massachusetts' Resale Services in the Commonwealth of Massachusetts, D.T.E. 01-20, *Order of the Department of Telecommunications and Energy*, July 11, 2002, at p. 518.

EXHIBIT 1

Summary of Algorithm for Estimation of Loop, Switching and Transport Costs

Row	Item	Loop	Switching	Transport	Total
1	Cable and Wire Facilitiers and Leases	2,376,056,406	-	46,724,000	2,422,780,4(
2	Central Office Equipment and Leases	751,867,322	1,307,798,558	120,566,380	2,180,232,2(
3	"A" Factor Cable and Wire Facilities	0.60	-	0.01	0.61
4	"B" Factor Central Office Equipment	0.17	0.30	0.03	0.50
5	"C" Factor Cable and Wire Facilities	0.24	-	0.0048	0.25
6	"D" Factor Central Office Equipment	0.08	0.13	0.01	0.22
7	Material and Supplies assigned to C&WF	(3,295,642)	-	(64,807)	(3,360,44
8	Material and Supplies assigned to COE	(1,042,856)	(1,813,945)	(167,228)	(3,024,02
9	Acc. Dep.Plus Def. Operating Taxes, C&WF	1,470,988,381	-	28,926,275	1,499,914,6(
10	Acc. Dep.Plus Def. Operating Taxes, COE	449,789,795	782,364,690	0	1,232,154,4(
11	"E" Factor Cable and Wire Facilities	0.22	-	0.00	0.23
12	"F" Factor Central Office Equipment	0.07	0.13	0.01	0.22
13	Cable and Wire Facilitiers Maintenance Expense	129,757,357	-	2,551,616	132,308,97
14	Central Office Equipment Maintenance Expense	13,667,584	23,773,405	2,191,678	39,632,66
15	Network Support and General Support Expenses	36,557,084	15,284,676	1,955,178	53,796,93
16	Network Operations Expenses	62,846,548	26,276,416	3,361,215	92,484,17
17	Depreciation and Amortization assigned to C&WF	137,622,887	-	2,706,288	140,329,17
18	Depreciation and Amortization assigned to COE	59,998,404	104,361,267	9,621,100	173,980,77
19	Corporate Operations Expense	77,409,714	32,365,339	4,140,095	113,915,14
20	Operating Taxes	84,658,595	35,396,128	4,527,786	124,582,5(
21	Benefits other Corporate Operations Expenses	25,894,452	10,826,583	1,384,910	38,105,94
22	Rents	15,123,661	6,323,269	808,857	22,255,78
23	Return Component for C&WF	101,449,393	-	1,994,953	103,444,34
24	Return Component for COE	33,866,401	58,907,241	5,430,678	98,204,32
25	Total Costs	778,852,080	313,514,324	40,674,352	1,133,040,7(
26	Study Area Cost Per Line	161.36	69.25	8.43	239.04
28	Monthly Per Line Embedded Cost of Service	13.45	5.77	0.70	19.92
27	Return Component for General Support Facilities				30,672,42
28	General Support Facilities Depreciation				27,336,20
29	Additional GSF embedded cost				58,008,62
30	GSF Additional PER Line Embedded Cost				12.81
29	Marketing				12,784,00
30	Customer Services				46,814,57
31	Total additional Customer costs				59,598,57
32	Total Additional Customer Costs Per Line				20.7(
32	Total Embedded Cost of Service Per Line				272.6
33	Monthly Per Line Embedded Cost of Service				$ 22.72

EXHIBIT 2

Calculation of General Support Facilities (GSF) Capital Cost

Row	Item	Amount $
1	Total Plant In Service (TPIS)	9,714,699,799
2	General Support Facilities Investment (GSF)	959,175,000
3	TPIS Less GSF	8,755,524,799
4	Investment Allocated To Embedded Cost	4,603,012,666
5	GSF Ratio	0.53
6	GSF Investment Allocated To Embedded Line Cost	504,263,853
7	GSF Material And Supplies	(699,425)
8	GSF Accumulated Depreciation	376,378,000
9	GSF Accumulated Depreciation Allocated To Embedded Cost	197,871,943
10	GSF Net Non-Current Deferred Operating Taxes	62,863,000
11	GSF Net N-C Def. Taxes Allocated To Embedded Cost	33,048,754
12	GSF Embedded Line Cost Rate Base	272,643,732
13	GSF Return Component	30,672,420
14	General Support Facilities Depreciation	51,997,000
15	GSF Depreciation Allocated To Embedded Line Cost	27,336,208.29

EXHIBIT 3

Calculation of Customer Service Expense

Row	Item	Amount $
1	Other Customer Services	128,017,000
2	Basic Revenue	1,082,771
3	Total State Revenue	1,909,296
4	Ratio of Basic to Total revenue	57%
5	Residential Lines	2,870,085
6	Total Lines (Residential and Business)	4,450,868
7	Ratio of Residential to Total Lines	64%
8	Customer Services for embedded cost	46,814,570

EXHIBIT 4

Calculation of Local Switching and Transport Cost

		Local Traffic			
		Occurrence			
Function	Rate	Intraswtich	Direct Inter	Tandem	Total
EO switching orig	0.0015	1	1	1	
Common Trunk Port	0.0005275	0	2	2	
Common Switched Xport	0.001345	0	1	2	
Tandem Switching	0.0042545	0	0	1	
EO Switching Term	0.0015	1	1	1	
Tandem Switch Common Port	0.0005275	0	0	2	
Cost per Minute		0.003	0.0054	0.0120545	
Minutes		350	640	10	1000
Cost		1.05	3.456	0.120545	$4.63

Assumptions: Adopts the NRRI assumptions of 1000 minutes; and 50 percent peak and 50 percent off peak usage. Uses rates filed in DTE MA No. 17, adopts the functions and function usage patterns supported by the declaration of Michael Lieberman filed on behalf of AT&T Corp. in CC Docket No. 02-7, the Verizon Vermont Section 271 Proceeding

EXHIBIT 5

Technical Discussion of Calculation of Local Switching Costs, Transport Costs, General Support Facilities Capital Costs, and Customer Operation Expense

Q. How did you estimate the local switching cost of $5.77?

A. I adjusted the loop universal service algorithm so that it reflected switching costs. The adjustment requires a change in two selected investment accounts. In the loop algorithm, these selected accounts are the estimates of C&WF and COE investment that is assigned to the loop. The switch cost estimate includes C&WF and COE investments that are used to provide local usage service. These selected investments are data line 710 and data line 250 of the USF Data Collection Form. [77]

In the loop cost algorithm, data line 710 is equal to the cost study average C&WF average category one investment, and data line 250 is equal to the COE category 4.13 investment. To determine switching cost, data line 710 is set equal to zero because there are no C&WF allocated to the switching function. Data line 250 is set equal to the local switching investment allocated to the provision of local calling. This investment is the product of the local switching investment subject to separations and the ratio of local dial equipment minutes (DEM) to total DEM minutes. The local switching investment subject to separations is found in ARMIS 43-04, row 1212, column b. Local DEM minutes are published in Table 8.7 of the FCC Monitoring Report and total DEM minutes are published in Table 8.10 of the FCC Monitoring Report.

Once these substitutions were made, the algorithm allocates recalculated the investment ratios, determined the appropriate levels of expense and return, and summed the expenses and return components to determine the annual cost. Annual costs were divided by the USF loops to determine the study area cost per line. USF loops were used instead of total loops because total loops include narrow band special access and state private line loops that do not use the switch and thus, should not be included in the denominator of the ratio that calculates switch cost per line. This methodology does not allocate any switching costs to vertical switching features and therefore results in an over assignment of costs to basic local exchange service.

Q. What are the inter-office transport costs?

A. These are the costs of transporting a local call from one wire center to another for the purposes of completing a local telephone call. These costs do not include local transport calls associated with making a state or interstate toll call.

Q. How did you estimate the inter-office local transport cost of $0.70?

[77] The data collection form is contained in tab 2 of The Universal Service Fund 2001 Submission of 2000 Study Results by The National Exchange Carrier Association filed with the Federal Communications Commission on October 1, 2001.).

A. I adjusted the loop universal service algorithm so that it reflected inter-office local transport cost. In this instance, data line 710 of the USF Data Collection Form was adjusted to reflect the C&WF investment used to transport local calls between wire centers and data line 250 of the USF Data Collection Form was adjusted to reflect the COE investment used to transport local calls between wire centers.

The CW&F investment is the exchange trunk C&WF investment allocated to the state jurisdiction (ARMIS 43-04, rows 1471 and 1472, column c). However, there was no way to separate out the inappropriate investment. The COE investment is the sum of allocated tandem investment and the appropriate circuit equipment. The tandem investment is the tandem investment subject to separation multiplied by the percentage of tandem minutes used for local calls. Tandem investment subject to separations is reported in ARMIS 43-04, row 1204, column b, and the ratio of tandem local to total minutes is reported in the FCC's Synthesis model inputs tab. The appropriate circuit equipment is the COE exchange circuit equipment category 4.12 (ARMIS 43-04, rows 1231 and 1232). Once these substitutions were made, the algorithm allocated investment, recalculated the investment ratios, determined the appropriate levels of expense and return, and summed the expenses and return components to determine the annual cost. Annual costs were divided by the total number of loops to determine the study area cost per line.

Q. Why did you make separate estimates of General Support Facilities (GSF) capital costs and customer operations expenses?

A. General Support Facilities (GSF) capital costs and customer operations expenses are not included in the universal algorithm. This exclusion creates a downward bias in the universal service algorithm cost estimates. The separation estimates of GSF capital costs and customer operations expenses eliminate this bias.

Q. How did you estimate the GSF capital cost of $1.07?

A. The first step in estimating GSF capital cost is to calculate the ratio of GSF investment allocated to residential service to the GSF investment subject to separations. The numerator of this ratio is the investment allocated to residential C&WF and COE investment. This is the sum of the investments shown in rows 2 and 3 of Exhibit 1 and reported in row 4 of exhibit 2. The denominator of this ratio is the total plant in service (TPIS- NECA data collection from row 160) less the GSF investment (ARMIS 43-04, row 1000, column b). The GSF ratio, reported in row 5 of Exhibit 2, is applied to GSF investment, accumulated depreciation, net non-current deferred taxes, and depreciation to determine the amount of these items allocated to residential service. The GSF residential rate base, Exhibit 2, row 12, is the sum of GSF investment and material and supplies less accumulated depreciation and deferred taxes. The GSF return component is the product of the GSF rate base and the FCC's 11.25% cost of capital.

Q. How did you estimate the customer operations expense of $1.73?

A. Customer operations expense is the sum of customer services expenses and marketing expenses. The estimate of customer service expenses starts with the state allocated other customer services expenses (ARMIS 43-04, row 7310, column c). These expenses contained expenses related to many services. To determine the expenses associated with basic service, the expenses were multiplied by the ratio of basic revenues to total state revenue. This product was multiplied by the ratio of residential lines to total access lines to arrive at the customer services expenses associated with the provision of residential services. Marketing expenses were estimated as 16% of state allocated marketing expenses (ARMIS 43-01, row 1140, column j). The 16% is the percentage of product management expenses assigned to the residential class in the Massachusetts 1992 cost of service study. The FCC in determining marketing expenses for its universal service model relied upon this study.[78] By applying the product management percentage to product management, sales and advertising, the marketing estimate used in my testimony is higher than the value included in the FCC study because the FCC only included advertising costs in its study. Finally because customer operations expenses were estimated for residential customers only, the total customer operations expenses were divided by residential lines to determine the customer operations cost per line.

[78] In Matter of the Federal-State Joint Board on Universal Service, CC Docket NO. 96-45, rel. November 2, 1999, Tenth Report and Order, Paragraphs 403-407 and Appendix D-7.

EXHIBIT 6

CURRICULUM VITAE

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DEGREES:

B.A. Boston University, magna cum laude, 1976, Awarded distinction in history.
M.S. University of Wisconsin-Madison, 1982, economics.
Ph.D. University of Wisconsin-Madison, 1987, economics.

DISSERTATION TITLE: The Evolution of a Market: The Emergence of Regulation in the Telephone Industry of Wisconsin, 1893-1917.

FIELDS OF INTEREST: Industrial Organization, Regulation, Economic History.

WORK EXPERIENCE:

Queens College. 1987-
Professor of Economics since 1997. Teach industrial organization, statistics, econometrics, economics of the Internet, microeconomics, business economics, and economic history.

Graduate School, City University of New York. 1988-
Teach Industrial Organization.

Massachusetts Institutes of Technology. 2001-
Internet and Telecommunications Convergence Consortium, Visiting Scholar.

Columbia University. 1988-1998
Affiliated Research Fellow, Center for Telecommunications and Information Studies, Graduate School of Business.

Ohio State University. 1991-1998
Institute Associate, National Regulatory Research Institute.

Northeastern University. 1993-95
Visiting Research Associate.

Michigan Divestiture Research Fund. 1986-87.
Wrote report that identified the cost of telephone services in the information age. Quantified the stand-alone and incremental cost-of-service of different telephone services.

Office of Chief Economist, Wisconsin Public Service Commission, 1979-1980, 1983-1985.
Directed cost study that quantified the stand-alone and incremental cost-of-service of different telephone services. Supervised cost study of local measured service. Written and oral testimony presented on costing and pricing issues.

New York State Consumer Protection Board, 1985-1986.
Presented expert testimony to the New York Public Service Commission. Quantified the incremental and embedded cost of message and access services, and the elasticity of demand for various telephone services.

American Telephone and Telegraph Company, 1982-1983.
Responsible for developing interfaces between engineering simulation models and a financial forecasting system. Analyzed the impact of changes in demand on capital expenditures.

Dean Witter Reynolds, 1982.
Advised management on the procurement of telephone networks and hardware. Developed economic model for analyzing different capital expenditure alternatives.

Richard Gabel, Communication Consultant, Summer 1976 and 1980, 1981-82.
Researched the technical impact long distance service had on the design of the local telephone network. Analyzed Bell Operating Company's forecasting procedures. Assisted in the analysis of private line costing and pricing issues raised in antitrust litigation.

Massachusetts Department of Public Utilities, 1977-1979.
Developed costing and pricing procedures for gas, electric, and telephone services. Hearing examiner.

Yadkin Valley Telephone Corporation, 1976-1977.
Outside plant and PBX installations.

TEACHING EXPERIENCE:

1994-. Teach course on how to conduct a cost study at Michigan State University NARUC training seminar.

1987-. Teach industrial organization, regulation, microeconomics, business economics, statistics, econometrics and economic history. Queens College.

1988 Teach course at Ohio State University on how to calculate the cost of telephone services.

1980-81, 1984. University of Wisconsin. Teaching Assistant for introductory economics and economic history.

PUBLICATIONS POST-QUEENS COLLEGE EMPLOYMENT:

"Accessibility of Broadband Telecommunications Services by Various Segments of the American Population," (with Florence Kwan), in Communications Policy in Transition: The Internet and Beyond, eds. Benjamin Compaine and Shane Greenstein, pp.295-320, MIT Press, 2001.

"Current Issues in the Pricing of Telecommunications Services," American Association of Retired Persons, 2001, http://research.aarp.org/consume/d17416_pricing.html

"Who's Taking Whom: Some Comments and Evidence on the Constitutionality of TELRIC," (with David Rosenbaum), Federal Communications Law Journal, March 2000, pp. 239-271.

"Proxy Models and the Funding of Universal Service," (with Scott Kennedy) in Competition, Regulation, and Convergence: Current Trends in Telecommunications Policy Research. Lawrence Erlbaum Associates. 1999, pp. 213-233.

"Household Financing of the First 100 Feet," David Gabel and Milton Mueller, appearing in The First 100 Feet: Options for Internet and Broadband Access, Deborah Hurley and James Keller, eds., MIT Press, 1999, pp. 11-23.

"Pricing Telecommunications Services in Competitive Markets," appearing in Making Universal Service Policy: Enhancing the Process Through Multidisciplinary Evaluation, eds. Barbara A. Cherry, Allen S. Hammond IV, and Steven S. Wildman, eds. Lawrence Erlbaum Associates, 1999, pp. 135-157.

"Universal Service," in The Froehlich/Kent Encyclopedia of Telecommunications, vol. 17, eds. Fritz Froehlich and Allen Kent, Marcel Dekker, Inc., 1999, pp. 181-198.

Book Review of Gerald Brock's Telecommunications Policy for the Information Age, Review of Industrial Organization 13: 491-94 (1998).

"Estimating the Cost of Switching and Cables Based on Publicly Available Data," with Scott Kennedy. Monograph published by the National Regulatory Research Institute 1998.

"Historical Perspectives on Competition and Interconnection between Local Exchange Companies," (with David Weiman) Opening Networks to Competition: The Regulation and Pricing of Access. Coeditor David Gabel and David Weiman. Kluwer Academic Press. 1998.

"Introduction," (co-author David Weiman) to Opening Networks to Competition: The Regulation and Pricing of Access. Coeditor David Gabel and David Weiman. Kluwer Academic Press. 1998.

"Is Residential Service Subsidized? Moving Past the Rhetoric Through an Empirical Analysis of the Cost and Revenue Associated with the Kiwi Share," Universal Service with Network Competition, University of Auckland Press, Centre for Research in Network Economics and Communications, 1996.

"The Effect of Cellular Service on the Cost Structure of a Land-Based Telephone Network," (with Mark Kennet), appearing in Telecommunications Policy (1997).

"Fully Distributed Cost Pricing, Ramsey Pricing, and Shapley Value Pricing: A Simulated Welfare Analysis for the Telephone Exchange," (with Mark Kennet). Review of Industrial Organization, vol. 12 (August 1997), pp. 485-499.

"The Effect of Cellular Service on the Cost Structure of a Land-Based Telephone Network," National Regulatory Research Institute Quarterly Bulletin (with Mark Kennet), vol. 17 (Winter 1996-97), pp. 561-577.

"Private Telecommunications Networks: An Historical Perspective." in Public Networks Public Objectives, Ed. Eli Noam and Aine Níshúilleabháin, Elsevier Science, 1996, pp. 35-49.

"Improving Proxy Cost Models for Use in Funding Universal Service," National Regulatory Research Institute, The Ohio State University, 1996, 57 pages, 96-34.

“On the Validity of Capacity Costs,” (with James D. Cowie). Published in the Proceedings of the Tenth NARUC Biennial Regulatory Information Conference, Vol. I, pp. 29-48, National Regulatory Research Institute at the Ohio State University. 1996.

"AT&T's Transition to Automatic Switching: Market versus Institutional Influences," (with Joan Nix), Journal of Economic Issues, vol. 30, September 1996.

“Competition-Enhancing Costing and Pricing Standards for Telecommunications Interconnection,” National Regulatory Research Institute, The Ohio State University, 1996. NRRI 96-22.

Book Review of Richard Vietor's Contrived Competition: Regulation and Deregulation in America, The Annals of the American Academy, March 1996, pp. 234-35.

"Prices, costs, externalities and entrepreneurial capital: lessons from Wisconsin,” (with David Rosenbaum), Antitrust Bulletin (Fall 1995), pp. 581-608.

“Pricing Voice Telephony Services: Who is Subsidizing Whom?” Telecommunications Policy 19 (August 1995), pp. 453-64.

"Federalism: An Historical Perspective." in Crossing Lines: American Regulatory Federalism and the Telecommunications Infrastructure (1995) (ed. Paul Teske), pp. 19-31.

“Privatization, Deregulation, and Competition: Learning From the Cases of Telecommunications in New Zealand and the United Kingdom,” (with William Pollard). Monograph Published by the National Regulatory Research Institute, Ohio State University, 1995. 114 pages.

“Current Issues in the Pricing of Voice Telephone Services,” Monograph Published by the American Association of Retired Persons, 1995.

"Economies of Scope in the Local Telephone Market." (with Mark Kennet). Journal of Regulatory Economics. Nov. 1994, vol. 6, no. 4, pp. 381-398.

"Competition in a Network Industry: The Telephone Industry, 1894-1910," Journal of Economic History, vol. 54, September 1994, pp. 543-572.

“Designing Reasonable Cost and Pricing Standards for Multiproduct Utilities,” (with Mark Kennet and Robert Loube) in Proceedings of the Ninth NAURC

Biennial Regulatory Information Conference, vol. 1, pp. 341-56, National Regulatory Research Institute, Ohio State University, 1994.

"AT&T's Strategic Response to Competition: Why Not Preempt Entry?" (with Joan Nix). Journal of Economic History, June 1993, pp. 377-387.

"Regulatory Assessment of Investments in Telephone and Electric Utilities" (with Joan Nix). Law and Policy, vol.15 (April 1993), pp. 123-37.

Book Review of Claude Fischer's America's Calling, Spectrum Magazine, June 1993.

"Pricing of Telecommunication Services." with Mark Kennet. Review of Industrial Organization. 1993. pp. 1-14; and "Reply to Taylor," 7 pages.

"The Effects of Divestiture, Privatization, and Competition on Productivity in U.S. and U.K. Telecommunications: a Brief Note," Review of Industrial Organization. 1993, pp. 63-66.

"Estimating the Cost Structure of the Local Telephone Exchange Network." (with Mark Kennet), Monograph Published by the National Regulatory Research Institute, Ohio State University, 1991. 150 pages.

"Regulation of the Telephone Industry," Journal of Economic Issues, (1991): 597-605.

"An Application of Stand-Alone Costs to the Telecommunications Industry," Telecommunications Policy, February 1991, pp.75-84.

"Using Process Data to Estimate Changes in the Cost Structure of an Industry--A Case Study of the Telephone Industry," with Mark Kennet, in Marginal Cost Techniques for Telephone Services: Symposium Proceedings (Columbus: National Regulatory Research Institute at Ohio State University, 1991), pp. 311-347.

"Divestiture, Spin-Offs, and Technological Change in the Telecommunications Industry--A Property Rights Analysis." 3 Harvard Journal of Law and Technology (1990), pp. 75-102.

"Deregulation: Should the Local Telephone Market be Next?" New England Law Review, Volume 24 (1989), pp. 39-61.

"Rejoinder," Telecommunications Policy, vol. 12, September 1988, pp. 288-89.