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DIRECT TESTIMONY OF SARAH J. GOODFRIEND

ON BEHALF OF MCI

MCI/GTE ARBITRATION DOCKET

August 26, 1996

I. PERSONAL BACKGROUND

Q. PLEASE STATE YOUR NAME AND ADDRESS.

A. My name is Sarah J. Goodfriend. My business address is 701 Brazos St., Austin, Texas, 78701.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND AND EXPERIENCE.

A. Since September 1995, I have been employed as an Executive Staff Member in the Regulatory and Public Policy Analysis Section of MCI Telecommunications Corporation in Washington, DC. In this capacity I am responsible for the formulation, development and execution of regulatory strategies and policies to promote local exchange competition.

Before joining MCI, from 1993-1995, I served as a Commissioner with the Public Utility Commission of Texas (PUCT), which regulates franchise utilities providing electric and telecommunications services. As a member of the National Association of Regulated Utility Commissioners (NARUC), I served on the Committee on Communications (1993-1995), the Board of Directors of the National Regulatory Research Institute at Ohio State University (1993-1995) and the Advisory Council of the Center for Public Utilities at New Mexico State University (1995). During this time, I had the opportunity to participate in many regulatory forums as an invited speaker.

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These opportunities are detailed in my resume, Exhibit ____ (SJG-1). Prior to my appointment to Commissioner, I served as the Director of the Division of Economic and Regulatory Policy of the PUCT.

Before returning to Texas, I worked for seven years in Washington, DC. From 1987 to 1992, I was employed by the Office of Economic Policy, an advisory office to the Chair of the Federal Energy Regulatory Commission. In this capacity, I developed economic theory to improve regulation of the electric and natural gas industries, as these industries evolved toward more competitive market structures. From 1985 to 1987, after receiving my graduate degree, I was employed by the Bureau of Economics of the Federal Trade Commission (FTC). At the FTC, my work addressed issues of emerging competition and regulatory reform across a variety of industries. I am a graduate of the University of Texas at Austin and received my Ph.D. in Economics from the University of North Carolina at Chapel Hill in 1985.

Q. HAVE YOU TESTIFIED BEFORE?

A. Yes. A list of my testimonies is contained in my resume.

Q. WHAT IS THE BASIS OF YOUR TESTIMONY?

A. MCI assembled a group of seven economists to evaluate the economic issues that need to be addressed by state regulators during the arbitrations under the Telecommunications Act of 1996 ("the 1996 Act"). The seven economists are Gus Ankum, Steven R. Brenner, Richard Cabe, Nina W. Cornell, myself, A. Daniel Kelley, and Terry L. Murray. These economists produced a jointly authored white paper. The testimony that follows is the same as that white paper, except that it has been converted into question-and-answer format.

II. ECONOMIC PRINCIPLES

Q. HOW HAS THE 1996 ACT CHANGED THE WAY TELECOMMUNICATIONS IS TO BE REGULATED IN THE UNITED STATES?

A. The 1996 Act calls for competition to replace regulated monopoly whenever market conditions permit. This is stated most clearly in Section 257(b), which reads:

> NATIONAL POLICY—In carrying out subsection (a), the Commission shall seek to promote the policies and purposes of this Act favoring diversity of media voices, vigorous economic competition, technological advancement, and promotion of the public interest, convenience, and necessity.

Subsection (a) calls for the Federal Communications Commission ("FCC") to complete a proceeding within 15 months of enactment of the 1996 Act to identify and eliminate market barriers to entry.

Q. WHAT ARE THE CURRENT TELECOMMUNICATIONS MARKETS IN WHICH THE INCUMBENT LOCAL EXCHANGE CARRIERS STILL HAVE MARKET POWER OR EVEN A MONOPOLY?

A. Incumbent local exchange carriers (LECs) possess market power, and often monopoly positions, in many local exchange service markets. The First Report and Order issued by the Federal Communications Commission ("FCC") in CC Docket No. 96-98, In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 ("Order") is intended to begin eliminating market barriers to entry, and to establish rules to govern opening entry into local exchange markets.

Q. HAS THE FCC DECIDED ALL OF THE ISSUES THAT NEED TO BE DECIDED BEFORE ENTRY CAN BECOME EFFECTIVE COMPETITION IN LOCAL EXCHANGE MARKETS?

A. No. In that Order, the FCC has decided a number of major issues, but has left others to the states to decide. The issues left to the states are sufficient that the intent of Congress could be thwarted if consistent principles are not used to decide them.

Q. WHAT ARE THE PRINCIPLES THAT THE FCC RELIED ON IN MAKING THE DECISIONS IT MADE?

A. In terms of its economic underpinnings, the FCC's Order rests on six basic premises.

Q. WHAT IS THE FIRST OF THE FCC'S SIX BASIC ECONOMIC PREMISES?

A. The first basic economic premise of the FCC establishes as the fundamental requirement for achieving the goals of the 1996 Act that the incumbent local exchange companies must share with entrants their economies of density, connectivity, and scale. As the FCC said:

> The incumbent LECs have economies of density, connectivity, and scale; traditionally, these have been viewed as creating a natural monopoly. As we pointed out in our NPRM, the local competition provisions of the Act require that these economies be shared with entrants. We believe they should be shared in a way that permits the incumbent LECs to maintain operating efficiency to further fair competition, and to enable the entrants to share the economic benefits of that efficiency in the form of cost-based prices. (Paragraph 11, footnote omitted)

Q. WHAT IS THE SECOND OF THE FCC'S BASIC ECONOMIC PREMISES?

A. The second basic economic premise of the FCC is that nondiscrimination means that the incumbent LECs must not discriminate between an entrant and itself, or between different entrants based on any criterion other than cost differences. As the FCC noted:

> We believe that the term "nondiscriminatory," as used throughout section 251, applies to the terms and conditions an incumbent LEC imposes on third parties as well as on itself. (Paragraph 218)

> Also, incumbent LECs may not discriminate against parties based upon the identity of the carrier (*i.e.*, whether the carrier is a CMRS provider, a CAP, or a competitive LEC). (Paragraph 218)

> Thus, we conclude it would be insufficient to define the obligation of incumbent LECs to provide "nondiscriminatory access" to mean that the quality of the access and unbundled elements LECs provide to all requesting carriers is the same. As discussed above with respect to interconnection, an incumbent LEC could potentially act in a nondiscriminatory manner in providing access or elements to all requesting carriers, while providing preferential access or elements to itself. (Paragraph 312, footnote omitted)

> On the other hand, price differences based not on cost differences but on such considerations as competitive relationships, the technology used by the requesting carrier, the nature of the service the requesting carrier provides, or other factors not reflecting costs, the requirements of the Act, or applicable rules, would be discriminatory and not permissible under the new standard. (Paragraph 861)

Q. WHAT IS THE THIRD BASIC ECONOMIC PREMISE OF THE FCC?

A. The third basic economic premise of the FCC is that telecommunications is an industry with a great deal of technological change, and that its rules should not interfere with the pace or pattern of that change. As the FCC stated:

> The rapid pace and ever changing nature of technological advancement in the telecommunications industry makes it essential that we retain the ability to revise our rules as circumstances change. Otherwise, our rules might impede technological change and frustrate the 1996 Act's overriding goal of bringing the benefits of competition to consumers of local phone services. (Paragraph 246, footnote omitted)

Q. WHAT IS THE FOURTH BASIC ECONOMIC PREMISE OF THE FCC?

A. The fourth basic economic premise of the FCC is that forward-looking economic costs, not embedded costs, should be the basis for pricing interconnection and unbundled elements. As the FCC stated:

> In the following sections, we first set forth generally, based on

> the current record, a cost-based pricing methodology based on forward-looking economic costs, which we conclude is the approach for setting prices that best furthers the goals of the 1996 Act. In dynamic competitive markets, firms take action based not on embedded costs, but on the relationship between market-determined prices and forward-looking economic costs. (Paragraph 620)
>
> The substantial weight of economic commentary in the record suggests that an "embedded cost"-based pricing methodology would be pro-competitor -- in this case the incumbent LEC -- rather than pro-competition. (Paragraph 705, footnote omitted)

Q. WHAT IS THE FIFTH BASIC ECONOMIC PREMISE OF THE FCC?

A. The fifth basic economic premise of the FCC is that rates must recover costs in a manner that reflects the way they are incurred. This takes on special significance because rate structures that do not consistently reflect the way forward-looking economic costs are incurred, for example, by imposing nonrecurring charges for recurring costs, may become vehicles for over-recovery of costs, and thus, act as a barrier to entry. The FCC applies this principle, for example, to shared facilities to equitably match, insofar as practical, costs and payments for benefits in time. As the FCC stated:

> ...we find that imposing nonrecurring charges for recurring costs could pose a barrier to entry because these charges may be excessive, reflecting costs that may (1) not actually occur; (2) be incurred later than predicted; (3) not be incurred for as long

as predicted; (4) be incurred at a level that is lower than predicted; (5) be incurred less frequently than predicted; and (6) be discounted to the present using a cost of capital that is too low. (Paragraph 747)

We require, however, that state commissions take steps to ensure that incumbent LECs do not recover nonrecurring costs twice and that nonrecurring charges are imposed equitably among entrants. (Paragraph 750)

A state commission may, for example, decide to permit incumbent LECs to charge the initial entrants the full amount of costs incurred for shared facilities for physical collocation service, even if future entrants may benefit. A state commission may, however, require subsequent entrants, who take physical collocation service in the same central office and receive benefits as a result of costs for shared facilities, to pay the incumbent LEC for their proportionate share of those costs, less depreciation (if an asset is involved). Under this approach, the state commission could require the incumbent LEC to provide the initial entrants *pro rata* refunds, reflecting the full amount of the charges collected from the subsequent entrants. Alternatively, a state commission may decide to permit incumbent LECs to charge initial entrants a proportionate fraction of the costs incurred, based on a reasonable estimate of

the total demand by entrants for the particular interconnection service or unbundled rate elements. (Paragraph 750)

Q. WHAT IS THE SIXTH BASIC ECONOMIC PREMISE OF THE FCC?

A. The sixth basic economic premise of the FCC is that the incumbent LECs have virtually no incentives to voluntarily provide the various unbundled network elements and interconnection needed by entrants at prices or under the terms and conditions that would make effective competition a reality. Instead, incumbent LECs have both the incentive and the ability—absent regulatory intervention—to force entrants to accept prices, terms, and conditions that would be insufficient to bring consumers the benefits the 1996 Act sought to convey. As the FCC stated:

> Because an incumbent LEC currently serves virtually all subscribers in its local serving area, an incumbent LEC has little economic incentive to assist new entrants in their efforts to secure a greater share of that market. An incumbent LEC also has the ability to act on its incentive to discourage entry and robust competition by not interconnecting its network with the new entrant's network or by insisting on supracompetitive prices or other unreasonable conditions for terminating calls from the entrant's customers to the incumbent LEC's subscribers. (Paragraph 10, footnote omitted)

> Congress recognized that, because of the incumbent LEC's incentives and superior bargaining power, its negotiations with new entrants over the terms of such agreements would be quite

different from typical commercial negotiations. As distinct from bilateral commercial negotiation, the new entrant comes to the table with little or nothing the incumbent LEC needs or wants. The statute addresses this problem by creating an arbitration proceeding in which the new entrant may assert certain rights, including that the incumbent's prices for unbundled network elements must be "just, reasonable and nondiscriminatory." (Paragraph 15, footnote omitted)

We find that incumbent LECs have no economic incentive, independent of the incentives set forth in sections 271 and 274 of the 1996 Act, to provide potential competitors with opportunities to interconnect with and make use of the incumbent LEC's network and services. Negotiations between incumbent LECs and new entrants are not analogous to traditional commercial negotiations in which each party owns or controls something the other party desires. Under section 251, monopoly providers are required to make available their facilities and services to requesting carriers that intend to compete directly with the incumbent LEC for its customers and its control of the local market. Therefore, although the 1996 Act requires incumbent LECs, for example, to provide interconnection and access to unbundled elements on rates, terms, and conditions that are just, reasonable, and nondiscriminatory, incumbent LECs have strong incentives to

> resist such obligations. The inequality of bargaining power between incumbents and new entrants militates in favor of rules that have the effect equalizing bargaining power in part because many new entrants seek to enter national or regional markets. (Paragraph 56)
>
> In particular, a new entrant that has already constructed facilities may have a relatively weak bargaining position because it may be forced to choose either to accept transport and termination rates not in accord with these rules or to delay its commencement of service until the conclusion of the arbitration and state approval process. (Paragraph 1065)

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to provide an economic analysis of how state regulators should take these same six basic premises into account in addressing the issues that are reserved to state regulators to decide under the FCC's Order. This paper applies these six premises to eight issues: (1) the need for additional unbundled network elements, (2) the need to prevent discriminatory non-price terms and conditions for acquiring unbundled network elements, (3) the need to identify the costs and cost structures of unbundled elements and efficient unbundling, (4) the recurring rates to be charged for unbundled elements, (5) the non-recurring rates to be charged for unbundled network elements, including, in particular, the costs of unbundling that the incumbent LECs should be allowed to charge entrants, (6) the costs and cost structure of transport and termination of local exchange traffic, (7) the compensation rates for transport and

termination, and (8) the desirability of initiating state access reform now.

III. UNBUNDLED NETWORK ELEMENTS

Q. WHAT ARE THE ISSUES THAT STATE REGULATORS MUST DECIDE WITH RESPECT TO UNBUNDLED NETWORK ELEMENTS?

A. There are five issues that state regulators must decide with regard to unbundled elements. The first is whether to order the incumbent LECs to unbundle any elements in addition to the minimum list ordered unbundled by the FCC. The second is to prevent discriminatory nonprice terms and conditions for acquiring unbundled network elements. The third is to identify the costs and cost structures of the unbundled elements themselves and the costs associated with efficient unbundling of a wholesale LEC network. The fourth is to set recurring rates for the unbundled elements, both those on the FCC's list of elements to be unbundled and any additional elements. The fifth is to set the non-recurring rates for ordering unbundled network elements. Both recurring and non- recurring rates must be set to comply with the forward-looking economic costing methodology known as TELRIC (Total Element Long Run Incremental Cost). Both recurring and non-recurring rates must be structured to reflect how costs are incurred.

Q. DO INCUMBENT LOCAL EXCHANGE CARRIERS WANT TO PROVIDE UNBUNDLED NETWORK ELEMENTS IN A MANNER THAT FACILITATES LOCAL EXCHANGE COMPETITION?

A. No. As the FCC stated:

> As discussed above at sections II.A, II.B and V.B, we believe

that incumbent LECs have little incentive to facilitate the ability of new entrants, including small entities, to compete against them and, thus have little incentive to provision unbundled elements in a manner that would provide efficient competitors with a meaningful opportunity to compete. (Paragraph 307)

Therefore, refusing to provide additional unbundled elements and setting rates above efficient economic costs both can prevent efficient competitors from having "a meaningful opportunity to compete."

A. **Additional Unbundled Network Elements: Loop Distribution Plant**

Q. **THE FCC HAS ORDERED THAT A MINIMUM LIST OF UNBUNDLED NETWORK ELEMENTS BE PROVIDED. CAN STATE REGULATORS ADD TO THIS LIST?**

A. Yes. The FCC has determined that state regulators can order the incumbent LECs to unbundle more network elements than those on the FCC's minimal list.

Q. **SHOULD STATE REGULATORS ADD TO THE FCC'S MINIMUM LIST OF UNBUNDLED NETWORK ELEMENTS?**

A. Yes. One additional network element should be added to the list: unbundled distribution, which is a loop subelement. The network implementation white paper accompanying this white paper explains why this additional network element is needed, how it would be used, why it is technically feasible to unbundle, and why, for some period of time, it cannot be provided at an equal or lower cost or in as timely a fashion by (at least) MCImetro as by the incumbent LEC.

Q. WHY SHOULD ANOTHER UNBUNDLED NETWORK ELEMENT BE ADDED TO THE FCC'S MINIMUM LIST?

A. Forcing an entrant to purchase the whole loop even though it has facilities that could be used for a portion of the loop exemplifies an incumbent LEC practice, that, if it were to be sanctioned by a regulator, surely undermines the entrant's "meaningful opportunity to compete" using an architecture which rivals the incumbent's. The FCC provided clear instruction. The FCC identified a "technically feasible" standard and an "impairment" standard to which incumbent LECs should be held when states evaluate unbundling requests beyond the minimal FCC list.

Q. WHAT ARE THE "TECHNICALLY FEASIBLE" AND "IMPAIRMENT" STANDARDS OF THE FCC?

A. The 1996 Act gives entrants the right to have the incumbent LECs unbundle any network element that it is technically feasible to unbundle. According to the FCC:

> We conclude that the term "technically feasible" refers solely to technical or operational concerns, rather than economic, space, or site considerations. We further conclude that the obligations imposed by sections 251(c)(2) and 251(c)(3) include modifications to incumbent LEC facilities to the extent necessary to accommodate interconnection or access to network elements. Specific, significant, and demonstrable network reliability concerns associated with providing interconnection or access at a particular point, however, will be regarded as relevant evidence that interconnection or access at that point is technically infeasible. . . . Finally, we conclude that

> incumbent LECs must prove to the appropriate state commission that a particular interconnection or access point is not technically feasibile [sic]. (Paragraph 198)

The incumbent LECs should be ordered to provide this additional unbundled network element because it is needed to minimize the cost to entrants of competing on a broad scale with the incumbent LECs for local exchange service. In the section of its Order discussing access to unbundled (proprietary) network elements, the FCC provided an economic and competitive interpretation to define the "impairment standard" to which incumbent LECs should be held when states evaluate requests for unbundling beyond the FCC's minimal list. According to the FCC:

> We believe, generally, that an entrant's ability to offer a telecommunications service is "diminished in value" if the quality of the service the entrant can offer, absent access to the requested element, declines and/or the cost of providing the service rises. . . . Accordingly, we interpret the "impairment" standard as requiring the Commission and the states, when evaluating unbundling requirements beyond those identified in our minimum list, to consider whether the failure of an incumbent to provide access to a network element would decrease the quality, or increase the financial or administrative cost or the service a requesting carrier seeks to offer, compared with providing that service over other unbundled elements in the incumbent LEC's network. (Paragraph 285, footnotes omitted)

As the accompanying Network Implementation white paper explains, it is both technically feasible and economically necessary under the standards adopted by the FCC to require incumbent LECs to unbundle Loop Distribution plant.

Q. DID THE FCC ELABORATE ON ITS IMPAIRMENT STANDARD?

A. Yes. The FCC elaborated on its meaning of the impairment standard when it explained further that:

> The interpretation advanced by most of the BOCs and GTE, described above, means that, if a requesting carrier could obtain an element from a source other than the incumbent, then the incumbent need not provide the element. We agree with the reasoning advanced by some of the commenters that this interpretation would nullify section 251(c)(3) [of the 1996 Act] because, in theory, any new entrant could provide all of the elements in the incumbent' networks. Congress made it possible for competitors to enter local markets through the purchase of unbundled elements because it recognized that duplication of an incumbent's network could delay entry, and could be inefficient and unnecessary. (Paragraph 287, footnote omitted)

For me, the significance of the rejection of the incumbents' proposed standard is very clear: Under the Act, no regulator may permit a refusal to unbundle, where technically feasible, to result in the imposition of inefficiencies and unnecessary costs on entrants. Such acquiescence is permission to undermine competition.

B. Discriminatory Practices: Terms and Conditions of Interconnection

Q. IS THE IMPAIRMENT STANDARD THE ONLY STANDARD OR SAFEGUARD CREATED TO PRESERVE EMERGING COMPETITION?

A. No. The impairment standard is one of a number of standards or safeguards created to preserve emerging competition to its fullest potential. In paragraphs 217 and 218 of its Order, the FCC found that Congress intended a more stringent legal standard of nondiscrimination to apply under the 1996 Act section 251(c)(2) than under section 202(a) of the original Act. On this legal basis and considering the procompetitive purpose of the 1996 Act, the FCC recognized, again, that "... the [incumbent] LEC has the incentive to discriminate against its competitors by providing them less favorable terms and conditions of interconnection than it provides itself..." finding that "by providing interconnection to a competitor in a manner *less efficient* (emphasis added) than an incumbent LEC provides itself, the incumbent LEC violates the duty to be 'just' and 'reasonable' under Section 251(c)(2)(D)...."

Q. WHAT ARE OTHER WAYS THAT INCUMBENT LECS CAN UNDERMINE THE PROCOMPETITIVE ASPECTS OF NETWORK UNBUNDLING?

A. Refusals to unbundle and improper pricing of unbundled elements, the main topics of this section, are but two ways incumbent LECs may undermine the procompetitive aspects of network unbundling. The Network Implementation white paper discusses cross-connect points. Cross-connection facilities include the house cabling and jumper cables that make it possible for an entrant's unbundled loop to be connected to its collocation equipment. This "glue" that holds the network together and connects unbundled elements must be priced properly. The pricing of house cabling and jumper

cables can be every bit as important in limiting the incumbent's ability to discriminate in the provision of unbundled elements as is the pricing of the unbundled elements themselves. The FCC pointedly addressed the example of cross-connect facilities to unbundled loops, including the house cabling and jumper cables necessary to allow a competitor to connect an unbundled loop to its collocated equipment, noting that several entrants had alleged that incumbent LECs had required unreasonable rates, terms and conditions for such cross-connection facilities in the past. (See Paragraph 386)

The Operations Support Systems Implementation white paper discusses the various databases to which entrants must have access, and describes the various functions -- pre-ordering, ordering, provisioning, maintenance and repair, and billing -- for which access to operations support systems are necessary. Refusal to provide access to databases efficiently is an expression of discrimination. Terms and conditions of access can become instruments for the creation of barriers to competition.

Similarly, the Ancillary Arrangements And Services Requirements white paper describes seven specific ancillary arrangements or services, and, for each, recommends specific state action needed to reduce barriers to competition.

B. Recurring Rates for Unbundled Network Elements

Q. WHAT IS THE BASIS ON WHICH RECURRING RATES FOR UNBUNDLED NETWORK ELEMENTS ARE TO BE SET?

A. The FCC has adopted a costing and pricing methodology based on forward-looking, economic costs, finding that such a methodology best replicates the conditions of a competitive market and reduces the ability of an incumbent LEC to engage in anticompetitive behavior. (See, for example, paragraph 679). The FCC has said that prices for unbundled network elements (and for interconnection) should "be based on

the TSLRIC (Total Service Long Run Incremental Cost) of the network element[s], which we will call Total Element Long Run Incremental Costs (TELRIC)." (Paragraph 672) The prescribed TELRIC costing methodology is provided in Part 1 of Title 47 of the C.F.R. as Subpart F - Pricing of Elements, and applies to the costing and pricing of network elements, interconnection, and methods of obtaining access to unbundled elements, including physical collocation and virtual collocation. In the following discussion, I use the term "element" to refer to items covered by Subpart F.

1. Requirements for Conformity With the TELRIC Methodology

Q. WHAT IS REQUIRED FOR A STUDY TO CONFORM TO THE TELRIC METHODOLOGY ORDERED BY THE FCC?

A. The cost study methodology ordered by the FCC essentially requires the study to be conducted as though the local exchange carrier was split into two virtually separate subsidiaries: a wholesale subsidiary and a retail subsidiary. The sole purpose of the wholesale subsidiary is to run the network and provide unbundled elements not only to entrants, but also to the retail subsidiary of the incumbent LEC. The methodology also requires that the costs be studied as though only the retail subsidiary puts network elements together to form services sold at retail to end users. According to the FCC:

> Common costs also include costs incurred by a firm's operations as a whole, that are common to all services and elements (e.g., salaries of executives involved overseeing all activities of the business), although for the purpose of pricing interconnection and access to unbundled elements, which are intermediate products offered to competing carriers, the relevant common costs do not include billing, marketing and other costs

attributable to the provision of retail service...(Paragraph 694)

We further conclude that, for the aggregate of all unbundled network elements, incumbent LECs must be given a reasonable opportunity to recover their forward-looking common costs attributable to operating the wholesale network.... (Paragraph 698)

2. States Must Examine Cost Studies to Set Element Prices

Q. WILL STATE REGULATORS HAVE TO EXAMINE COST STUDIES TO SET RECURRING RATES FOR UNBUNDLED NETWORK ELEMENTS?

A. Yes. I urge state regulators to begin to examine TELRIC cost studies now, recognizing that the sooner states act to set prices in accordance with required cost studies, the greater certainty all market participants will have. While the default proxies established by the FCC provide some bounds for entry decisions, even use of these proxies will require states to identify the appropriate translation of local loop proxy ceilings into geographically-deaveraged rates. State regulators will have to examine cost studies proposed for this purpose.

If the state regulator adopts a proxy for arbitration purposes, the proxy must be superseded once the state regulator completes its review of cost studies and finds compliance with the FCC rules. Thus, regardless of the way in which the state commission resolves its immediate need to identify prices for interconnection, collocation and unbundled elements, ultimately the commission will be required to closely examine cost studies for compliance with the definitions and procedures set forth in sections 51.505 and 51.511 of the FCC rules.

3. Incumbent LEC Cost Studies

Q. CAN STATE REGULATORS USE EXISTING INCUMBENT LEC COST STUDIES FOR THIS PURPOSE?

A. No. The historical "just trust us" approach of incumbent LECs to cost studies is no longer allowed. The FCC has called for all parties to be able to review cost information and for state regulators to give "full and fair effect to the costing methodology" it adopts. (Paragraph 619) Moreover, the states must take into account that the incumbent LECs have an "asymmetric access to cost data." (Paragraph 680) This gives the incumbent LEC unequal power. Historically the inequality has been between those who would critically evaluate LEC cost studies -- such as the commission staffs and others -- and the incumbent LECs. In paragraph 680, the FCC explains that, because of this asymmetry of power over information, the FCC will require the incumbent LEC to "... prove to the state commission that the rates for each element it offers do not exceed the forward-looking economic cost per unit of providing the element." (Section 51.505(e))

For an economist, this standard of "proof" can be met only if critical analysis of the results of the cost study or model is possible in order to evaluate its reasonableness. In turn, this requires examination so that judgments may be formed about the reasonableness of inputs, outputs and the relationships used to translate inputs into outputs, namely, the foundations and relationships of the "model" itself. In the following section, I provide an example of a dramatic difference in cost claimed for remote call forwarding. The magnitude of difference makes abundantly clear the necessity of evaluating a model for reasonableness to obtain confidence in the results.

Moreover, from the analyst's perspective, the results and summary of methodology of a cost study are, in a sense, only the tip of the iceberg: behind each cost

study are a multitude of workpapers, and behind the workpapers are data sources and assumptions. All of these need to be reasonably explained and subject to examination to be able to determine whether a given cost study accurately reflects the appropriate methodology and accurately estimates costs. Sufficient information must be available so that informed analysis and evaluation is possible.

Historically, LEC cost studies have been "black box" models. By "black box" I mean that the relationships used to translate from inputs to outputs are unavailable to those who would bring engineering and economic judgements to bear and engage in an open dialogue about the proper way to characterize and express cost-causation relationships and the meaning and application of best practice operations and processes in a model.

The lack of openness of incumbent LEC cost studies goes beyond the absence of visible formulas and publicly-available documentation. It extends to issues of what data are used as model or study "inputs." Historically, it has been difficult to assess the reasonableness of LEC input data because it has not been easy or even possible to compare the inputs from one LEC's studies to those used in the studies of another LEC. Thus, apart from certain requirements for reporting uniformity, such as ARMIS filings in compliance with the Uniform System of Accounts, it is not easy to bring together data from different LECs in a form that facilitates comparisons. Extensive use of non-disclosure requirements tends to protect rather than expose atypical or idiosyncratic data and individual states do not typically require LECs to show how their data inputs compare to data inputs used by other incumbent LECs.

The FCC has ruled that incumbent LEC cost studies must comply with the requirements for forward-looking economic cost studies. It is now time for state commissions to pry the lid, once and for all, from the LEC "black box" and expose the

inner workings of all proffered cost models to the light of open debate.

4. The Hatfield Model Complies With the Requirements for Cost Studies

Q. YOU HAVE SAID THAT THE COMMISSION CANNOT USE THE COST STUDIES OF THE INCUMBENT LEC TO SET THE RECURRING RATES FOR UNBUNDLED NETWORK ELEMENTS. IS THERE A COST STUDY THEY CAN USE FOR THIS PURPOSE?

A. Yes. In contrast to the prevailing LEC practice of secrecy is the Hatfield Model, a telecommunications costing model developed by Hatfield Associates, Inc. of Boulder, Colorado at the request of AT&T and MCI. The Hatfield Model (Version 2.2, Release 2) is a model of the costs that an efficient local exchange carrier would incur to provide basic exchange service and unbundled network functions.

The Hatfield Model is a publicly available model that allows users to examine all the model's inputs, algorithms and results to evaluate whether the model produces reasonable estimates of element cost. Some of the inputs the user can directly specify; others are incorporated into the model itself, but both are readily visible to the user. The inner workings of the model are captured by a set of Excel spreadsheets, which can be studied to see exactly how inputs are transformed into outputs, stage-by-stage. Documentation of the model includes descriptions of the model algorithms, inputs and assumptions. The model is open for inspection and analysis. A user may run the model to his or her heart's content to test the sensitivities of the model to changes in inputs. These characteristics of the model make it appropriate to use as a basis for evidentiary findings about the nature and magnitude of forward-looking economic cost. The Hatfield Model (Version 2, Release 2.2) is the current evolution in a series of models

which, finally, have broken the incumbent LEC stranglehold on information necessary to actually engage in the debate required for reasoned decisionmaking in this area.

Q. YOU NOTE THAT THE HATFIELD MODEL IS OPEN FOR INSPECTION AND ANALYSIS. DOES IT MEET THE CRITERIA THE FCC HAS RULED MUST BE MET FOR A TELRIC COST STUDY?

A. Based on a careful reading of the FCC's order and my understanding of the Hatfield Model and its methodology, I believe that the model captures the costs that the FCC requires to be included in the prices of unbundled network elements and interconnection services. I also believe the Hatfield Model conforms more closely to the FCC costing principles than the cost studies of the incumbent LECs with which I am familiar. One way in which most incumbent LEC cost studies do not conform is that they have not followed a TELRIC methodology. The Hatfield Model attempts to identify all of the forward-looking costs that an efficient wholesale-only LEC would incur to produce the entire range of network elements that the FCC's Order requires to be unbundled.

The Hatfield Model estimates cost of individual network elements by first determining the capital requirements for each network element and then adding both the capital-related and non-capital-related expenses for each element. Where plant is used by only a single element, the Hatfield model assigns those costs to that individual element, consistent with the requirements of the FCC's TELRIC methodology that the capital costs and expenses be attributed directly to individual network elements "to the greatest extent possible." (Paragraph 694) Where two or more network elements use the same plant, the Hatfield Model attributes costs to each of the network elements that use that plant so that the sum of the capital costs for each of the network elements equals the total capital costs for providing all the network elements together. This approach

conforms with the FCC's requirement that the prices for network elements reflect the economies of scale, scope and density that the incumbent LECs enjoy. (Paragraph 11) Moreover, the model attributes costs common to a particular group of elements to only those network elements using reasonable, nondiscriminatory factors (such as apportioning the costs of shared plant according to the ratio of the costs of the plant that is not shared between network elements). Therefore, it is consistent with the FCC's requirement that the incumbent LECs not be allowed to recover costs of shared plant disproportionately from network elements that would be especially hard for new entrants to build themselves or acquire from another source at this time. (Paragraph 696)

To these estimates of capital and network operations costs that are either part of the TELRIC of an individual element or that element's share of costs common to more than one network element, the Model adds a 10% markup, as an estimate of forward-looking overhead costs. This 10% markup reflects the level of "general and administrative" costs that a firm operating in a competitive environment would incur to provide a total level of output equivalent to the total quantity of each network element. It includes a share of the expenses for corporate managers' salaries, support operations such as the legal and human resources department, and the like.

The FCC's rules require that such overhead costs be included to the extent that they vary with the output of particular network elements (despite their accounting classification), and thus are part of the TELRIC of those elements. The FCC also requires, to the extent that there are any such overhead costs that are common to several wholesale elements, or to wholesale and other functions, that the prices of of network elements include "a reasonable share of common costs." The procedure of estimating the overhead costs of a wholesale-only carrier, which is what Hatfield does by adding the 10% markup, satisfies the FCC requirements. While statistical evidence and a

growing literature on activity-based accounting systems suggest that many of the costs that have traditionally been considered "overhead" costs should actually be considered service-specific or element-specific costs, the Hatfield Model method for treating overhead costs renders any precise distinction between element-specific and "common" overhead costs unnecessary. Insofar as the 10% markup captures all of the relevant overhead costs, it includes any element-specific costs and a reasonable share of any "common" overhead costs. This approach ensures that each network element recovers at least its "reasonable" share of such common costs, to the extent that they exist. Moreover, if regulators set prices for network elements equal to the costs that the Hatfield Model reports for each element, these prices would allow a firm that is engaged solely in providing network elements on a wholesale basis (with no retail functions) to recover all of its economic costs of doing business, including a reasonable profit, but no more. From this vantage point also, the Hatfield approach lies well within the bounds of reasonableness. I therefore urge regulators to adopt the Hatfield Model costs as the prices for unbundled network elements and interconnection services.

C. Non-Recurring Rates And Costs of Unbundling Elements

Q. DO STATE REGULATORS HAVE TO USE THE SAME PRINCIPLES IN SETTING NON-RECURRING RATES FOR UNBUNDLED NETWORK ELEMENTS?

A. Yes. Incumbent LECs do not only charge recurring rates for the use of their networks, they also charge non-recurring rates to recover the costs of ordering and any initial non-recurring costs of making the service or element available. These rates must also be set by state regulators. Granting incumbent LECs the discretion to set non-recurring rates without regard to economic costs would allow them to act on their incentive to

impede or prevent entry just as much as granting them discretion to set recurring rates without regard to economic costs. In particular, excessive non-recurring upfront costs can function as a financial barrier to entry. (See, Paragraph 749 of the Order) Thus, all of the same considerations that the FCC has laid out for determining proper recurring costs should be applied to non-recurring costs.

One of the most important requirements a state commission can insist upon is that charges for non-recurring costs reflect the forward-looking economic costing principle required by the FCC. To do otherwise is to allow the incumbent LECs to impose unduly high non-recurring costs on entrants not because they represent the efficient costs of providing those unbundled elements but in order to impede or prevent entrants from entering by using unbundled network elements. This requirement needs to apply to two forms of non-recurring costs: the costs of ordering service, and the determination of the costs of unbundling.

This is not merely a hypothetical concern. The experience that has occurred in several states with the ordering charges for Remote Call Forwarding (RCF) as an interim local number portability solution offers a clear example of how non-recurring charges can be used to prevent use of an element or function of an incumbent LEC's network. Although the functions are performed in networks that use very similar facilities, the prices to be charged to order RCF differed between Texas and Illinois by an enormous amount.

In paragraph 6 of a stipulation and agreement in the Texas Public Utility Commission Docket No. 14940, signed by SWBT and a number of other parties, such as Texas PUC and Time Warner Communications, SWBT commits to the following:

> The Settling parties agree that SWBT will charge a Secondary Service Order charge of $16.95 per telephone number ported.

As an alternative to the $16.95 charge per telephone number ported, to recognize the efficiencies associated with large volumes of service orders, SWBT agrees to allow the LSPs to utilize a mechanized system to make bulk transfers of service orders by using a similar system to that currently allowed in Section 10 of SWBT's General Exchange tariff relating to Call Management Services. Specifically, after payment of a one time charge of $4,100.00 for the initial programming, SWBT will accept number changes via magnetic tape, or other agreed medium, at a rate of $10.00 per program run and $1.00 per telephone number ported. Any LSP or bill aggregator, (i.e., a clearing house type entity) who submits orders on tape pursuant to these provisions may submit orders on behalf of other LSPs without payment of additional programming fees or additional programming runs.

These provisions mean that if competitors collectively order 50,000 ported numbers over the course of 50 orders of 1000 numbers per tape (possibly one tape per month) then the effective service ordering charge is $1.092 per number ported.

By contrast, in Ill. C.C. Docket 95-0296, Ameritech Illinois proposed Standard Business Service Ordering Charges of $34.50. (ILL.C.C. No. 5, Part 2 - Section 28, 2nd Revised Page 5, Effective October 3, 1995.) Ameritech revised both the costs studies and the service ordering charge a number of times; the proposed charges, however, are never below $30.00 per number ported. Also, I understand that the cost studies supporting these charges, though proprietary, show costs greatly in excess of the

$34.50, which caused Ameritech to claim that their rates were really very reasonable. These costs were based, however, on ordering costs in a retail environment, not a wholesale one.

In general, state regulators should require that the ordering systems whose costs form the basis of part of any non-recurring charges should reflect electronic ordering, ordering in bulk, and all other applicable efficiencies that can exist in a wholesale, rather than a retail, market.

Q. YOUR LAST EXAMPLE DISCUSSED NON-RECURRING RATES TO RECOVER THE COSTS OF ORDERING. DO NON-RECURRING RATES ALSO RECOVER THE COST OF UNBUNDLING?

A. Yes. Just as with non-recurring costs for ordering a service, state regulators should also insist that the costs recovered by the incumbent LECs for unbundling network elements be calculated based on efficient unbundling. This is another area in which the incumbent LECs can act forcibly on their incentives to impede or block competition. It is also an area in which few of the other safeguards such as an insistence on strict nondiscrimination can blunt the ability to act on those incentives. Therefore, state regulators need to be particularly vigilant in examining with a critical eye claims about the costs of unbundling.

In most cases, the costs of unbundling will be non-recurring costs. In this regard, state regulators must take strongly into account the principle that costs be recovered only once, and be recovered equitably. The FCC's example of how to treat shared facilities for physical collocation service that will benefit future entrants matches costs and payments for benefits in time when facilities are shared between or among entrants. (See, Paragraph 750) This principle should be generalized, insofar as

practical, to all elements shared in time. Said differently, if the first entrant pays the efficient costs that an incumbent LEC would incur to be able to provide a particular unbundled network element, later users of the same unbundled network element should share equitably in the recovery of that cost. The logic should apply to any non-recurring cost that later entrants benefit from that an original requester pays.

Another way in which the FCC's example should be generalized is to include the incumbent LEC as one of the possible beneficiaries through time. In effect, some requests for unbundled network elements may be filled by the incumbent LEC by upgrading the facility in a manner that will be valuable to the LEC in the future, while charging the entrants for all of the costs of the upgrade. To the extent the incumbent LEC will benefit from the upgrade because it regains use of the facility in the future, through customer churn or some other event, the effect of such a charge would be to force the entrant to bear the cost of the incumbent LEC's network upgrades that are intended to make it easier for the incumbent to compete in the future. In this case, the requirement that the charge be imposed equitably needs to be expanded to take into account the future benefits to the incumbent LEC from activities taken to unbundle a network element for an entrant that may only be used for a fixed period of time before it reverts to the incumbent LEC to reuse.

An example of such a situation would arise if an entrant requests unbundled loops, and to provide them the incumbent LEC has to condition them. If the entrant later relinquishes the loop—perhaps because the customer has decided to return to the incumbent LEC or because the customer moved and the new occupant chose the incumbent LEC—the incumbent LEC benefits from the conditioning performed on the loop.

Extending the principle of an equitable matching of costs and payments for

benefits in time to include the incumbent LEC's future use of facilities is particularly important. The incumbent LEC has the incentive and the ability to force the entrants to pay for unnecessary work (from the entrant's perspective) on unbundled network elements in order to impede competitive entry. It is a double blow to competition to have the entrant not only pay for unnecessary work, but to have that work position the incumbent LEC to be in a better position to compete.

IV. COMPENSATION FOR THE TRANSPORT AND TERMINATION OF LOCAL TRAFFIC

Q. WHY IS THERE A NEED FOR COMPENSATION FOR THE TRANSPORT AND TERMINATION OF LOCAL TRAFFIC?

A. Local networks must be interconnected if the public is to have any chance to gain the benefits of local exchange competition. Consumers demand the ability to reach all customers in the local calling area, and to do so without having to pay elevated prices to reach customers that subscribe to a different local carrier. If local networks are not interconnected, an entrant cannot provide this ubiquity of reach, and the incumbent can use its absence to convince customers not to shift to the services of the entrant. Thus, interconnection of local networks is absolutely essential if consumers are to have any chance of getting the benefits of local exchange competition. Interconnection opens up the question of what the compensation will be for terminating local exchange traffic.

Q. HOW HAS THE FCC RULED THAT COMPENSATION SHALL BE PROVIDED FOR THE TRANSPORT AND TERMINATION OF LOCAL EXCHANGE TRAFFIC?

A. The FCC has established a framework to govern interconnection and compensation for

terminating local exchange traffic. Interconnection is the physical linking together of two networks, and the FCC has set rules that govern interconnection. The FCC has separated compensation into transport and termination. The FCC has ruled that termination of a local call by the incumbent LEC as used in the 1996 Act means the act of switching the call to the intended recipient at the end office switch that serves that subscriber. The FCC has also ruled that the 1996 Act separately discusses transport of that call to the end office when an entrant does not interconnect at that end office directly. As the FCC noted:

> We define "transport," for purposes of section 251(b)(5), as the transmission of terminating traffic that is subject to section 251(b)(5) from the interconnection point between the two carriers to the terminating carrier's end office switch that directly serves the called party (or equivalent facility provided by a non-incumbent carrier.) (Paragraph 1039)
>
> We define "termination," for purposes of section 251(b)(5), as the switching of traffic that is subject to section 251(b)(5) at the terminating carrier's end office switch (or equivalent facility) and delivery of that traffic from that switch to the called party's premises.

Both of these functions are included in the FCC's rules governing compensation due the incumbent LEC for completing local calls that originate on another carrier's network. Within the framework of its rules, however, there are a number of vital issues that state regulators must still decide. In particular, state regulators must determine the actual compensation to be paid

the incumbent LEC and the compensation the incumbent LEC shall pay the entrant.

A. Compensation to the Incumbent

Q. WHAT HAS THE FCC RULED SHALL BE THE APPROACH TO COMPENSATION TO THE INCUMBENT?

A. The FCC rules governing compensation to the incumbent LEC for completing local calls have several components. The FCC has ruled that the compensation for transport and termination of local calls will be based on economic cost. To achieve this, the FCC ruled:

> States have three options for establishing transport and termination rate levels. A state commission may conduct a thorough review of economic cost studies prepared using the TELRIC-based methodology outlined above in the section of the pricing of interconnection and unbundled elements. Alternatively, the state may adopt a default price pursuant to the default proxies outlined below. If the state adopts a default price, it must either commence review of a TELRIC-based economic cost study, request that this Commission review such a study, or subsequently modify the default price in accordance with any revised proxies we may adopt. As previously noted, we intend to commence a future rulemaking on developing proxies using a generic cost model, and to complete such proceeding in the first quarter of 1997. As a third, alternative, in some circumstances states may order a "bill and keep" arrangement, as discussed below. (Paragraph 1055, footnote

omitted)

If a state selects the first option, after performing the thorough review of the economic cost studies both for conformance with the TELRIC principles the FCC has given and for accuracy of results, it must set the rates to recover only what the FCC has defined as economic costs. As the FCC stated:

> Consistent with our conclusions about the pricing of interconnection and unbundled network elements, we conclude that states that elect to set rates through a cost study must use the forward-looking economic cost-based methodology, which is described in greater detail above, in establishing rates for reciprocal transport and termination when arbitrating interconnection arrangements. (Paragraph 1056, footnote omitted)

The FCC has ruled that the structure of compensation paid to incumbent LECs for transport and termination should follow the switched access model of separate rate elements for different functions (although the level of those rate elements is not to be based on switched access charges). Thus, it has ruled that incumbent LECs shall be paid for tandem switching, for transport between the tandem and the end office, and for end office switching if any of these elements are used by an entrant. It has required, however, that these payments must be based on the TELRIC costs of supplying them, plus a reasonable share of forward-looking common costs, but no more. It has also ruled on when and how bill-and-keep can be used.

Q. WHAT SHOULD STATE REGULATORS USE TO SET TELRIC-BASED RATES FOR COMPENSATION?

A. I urge that the state regulators use the Hatfield Model to establish prices in conformance with TELRIC principles, under the presumption of symmetry in rates (unless the entrant proves it is entitled to be paid a higher rate). As was discussed in the section above on unbundled network elements, the Hatfield model produces reasonable estimates of TELRIC costs, and estimates more consistent with the FCC's required TELRIC methodology than cost estimates derived from incumbent LEC cost studies with which I am familiar.

Q. HOW SHOULD LOCAL EXCHANGE TERMINATING TRAFFIC BE MEASURED?

A. I urge that only the most efficient measurement and billing procedures be used to implement compensation, and that the incumbent LECs be allowed to recover in any rates charged to compensate for transport and termination only the forward-looking costs of the most efficient measurement and billing procedures. Specifically, I urge that auditable Percent Local Usage reports be used to determine the portion of traffic for which local interconnection compensation is due, rather than new measurement systems married to the billing system for switched access that would have to be developed and implemented at substantial cost. To do otherwise would prevent consumers from gaining the benefits sought from the 1996 Act.

Q. WHY DO YOU RECOMMEND THE USE OF A PERCENT LOCAL USAGE FACTOR, RATHER THAN THE DEVELOPMENT OF A NEW SYSTEM FOR

MEASUREMENT AND BILLING OF TERMINATING LOCAL EXCHANGE TRAFFIC?

A. Just as the incumbents have the incentive and the ability to try to prevent genuine competition using unbundled network elements by imposing excessively high non-recurring costs, the incumbents have the same incentives and ability to try to thwart the development of effective competition by imposing excessive and disproportionate costs for measurement and billing on entrants.

Many incumbent local exchange carriers do not now have a means to determine whether terminating traffic is local or intraLATA without imposing inefficiencies on the carrier delivering that traffic by requiring them to send it on separate trunk groups, which forces them to lose some of the economies of scale available in trunking. Developing and implementing a new system to do this will be costly. While it is the case that incumbent local exchange carriers can and do measure and bill for at least some of their local exchange traffic, the systems they use for that purpose exist mainly in the originating switch and cannot be used to determine whether a terminating call is a local or intraLATA toll call. Moreover, the measurement system that does exist for measuring some terminating traffic, switched access, cannot handle calls that are not preceded by a "1." Thus, any arrangement for terminating local exchange traffic that would have a charge per minute could force incumbents and entrants to develop new systems to sort out different kinds of traffic. Costs associated with the creation of systems for measuring and billing terminating local exchange calls will fall disproportionately on new entrants.

Q. IS THIS JUST A THEORETICAL CONCERN?

A. No. The development of measurement and billing systems for switched access shows

that this concern is not an idle one. AT&T prior to divestiture wanted a new measurement and billing system for interconnection for what were then called Other Common Carriers—the first ones being MCI and Sprint—in order to be able to charge them for all of the so-called non-conversation time: the time spent setting up calls that occurs in addition to the time when conversations actually occur. Until the advent of the Other Common Carriers, all that the switches were designed to measure was conversation time, as that was all that was billed to end users. AT&T knew the average non-conversation time of a call, and could have factored the costs of that into rates based on conversation time, but it chose not to take that approach.

Because switched access was to be measured and billed differently from how end user calls were measured and billed, the incumbent LECs needed new measurement and billing systems. The new systems turned out to be much more costly than the systems used for end user measurement and billing. According to data supplied in Massachusetts in 1995, it costs NYNEX only $0.000007 per message to bill a local exchange call, but $0.000215 per minute to bill a carrier access call. (Attachment 3 to the testimony of Ms. Paula Brown, in D.P.U. 94-185) According to Page 2 of 9 of Ms. Brown's Attachment 3, the average duration of a call is 3.16 minutes. Multiplying that times her carrier access billing cost shows a cost almost 100 times greater to bill a single call using the billing system for carrier access than the cost to bill an end user.

The incumbent local exchange carriers are indeed working on developing a new system to measure terminating local exchange traffic coming from other carriers that uses Signaling System 7 (SS7) data. If implemented, this would have several bad effects on entrants. First, it is going to add significant costs to the cost of terminating local exchange traffic. I understand that, based on data provided under proprietary agreements in at least two U S West states, Washington and Oregon, developing such

a measurement and billing system could more than double the forward-looking economic cost of the end office switching function for terminating traffic from the cost without measurement and billing. This is a significant cost burden to add to local exchange service. Second, it will penalize entrants because they will not be able to use it for all of the traffic that incumbent LECs terminate to them, as not all LEC switches are yet equipped to use SS7. Thus, although all of the traffic going from an entrant to an incumbent could be sorted and measured in this manner, the converse would not be true.

Moreover, I understand that the same cost data showed that the measurement function would be even more costly than the measurement function now performed for switched access. U S West proposed to use the same billing system it uses for interexchange carriers, with billing costs that are higher than the costs to bill measured local exchange traffic. In summary, the proposal is a way to increase the already inefficiently high costs of measuring and billing regular switched access, and impose those costs on entrants.

In order to be able to participate in a measured approach to compensation, the entrants would also have to incur the costs to install measurement equipment in their networks. The entrants cannot opt out of this requirement because to do so would put them at an even bigger disadvantage than if they installed the equipment. If compensation were to be on a measured use basis and the entrants did not install measurement equipment, they would not only pay the incumbent to terminate their traffic, but would also pay to terminate the incumbent's traffic. Thus, they would be forced to install measurement equipment themselves. As noted above, however, not all traffic from incumbent LECs uses SS7 signaling.

Additionally, based on the experiences to date with the billing for carrier access charges, the use of a bad measurement and billing system will pose additional costs in

the form of auditing and verification costs. Carrier access bills have been sufficiently in error that it has been cost effective for interexchange carriers to hire people full time to audit and try to get corrections made in these bills. These auditing costs have not been one-time costs, but continue to be incurred today. The costs to the interexchange carriers are less than the savings from what they otherwise would have been required to pay, but these additional expenditures on auditing due to the use of a bad measurement and billing system bring with them no social benefits whatsoever. In other words, these additional costs are a total dead weight loss to society.

Increases in these costs would fall disproportionately on entrants. The incumbent LEC would experience at least some of the same costs for each minute or message delivered to an entrant for termination, but those minutes -- while most likely equal to the number received from the entrants -- would constitute a much smaller percentage of the incumbent LEC's total traffic, at least for some time to come. The result is that the impact is much less on the incumbent than on the entrants of being faced with unnecessary and, from the point of view of society, wasteful costs than it is on the entrants.

Q. IS THERE ANY EVIDENCE THAT THE INCUMBENT LECS WANT TO IMPOSE DISPROPORTIONATE COSTS FOR MEASUREMENT AND BILLING ON ENTRANTS?

A. Yes. That incumbent LECs see an opportunity to impose disproportionate costs on entrants is supported by the nature of the agreement that BellSouth negotiated with entrants. The BellSouth agreement requires both the incumbent and the entrant to measure traffic. There are a number of fixed costs incurred for measurement and billing even if measurement and billing is based on exchanging Percent Local Usage

information. The entrant must spread the fixed costs of installation and use over a much smaller total base of operations. The result is that average cost per unit of traffic is raised more for the entrant than for the incumbent.

That the average cost per unit of traffic is raised more for the entrant than for the incumbent is a feature of the interplay between the cost structure of the billing system and the vastly different proportions of total traffic that is interconnected for the incumbent and the entrant. It has been argued that measurement costs nonetheless may be worth incurring so that, among other reasons, the payments a carrier receives for terminating interconnected traffic can vary with the volume of that traffic. The usual claim is that this is particularly important because of the possibility that the flow of traffic between two carriers might be substantially unbalanced.

The billing and measuring system required by the BellSouth agreement, however, would not serve this function. It would not allow a carrier to receive larger net payments if it terminated substantially more interconnected traffic than it originated because the agreement requires that bill-and-keep take over if traffic is *out* of balance by more than 105 percent. Thus bill-and-keep is used when traffic is out of balance and explicit payment is used when traffic is roughly in balance -- the exact opposite of the FCC requirement for use of bill-and-keep. It is difficult to make much sense of this arrangement, but it is easy to see that it does ensure that entrants' costs of serving a customer will be disproportionately increased by the requirement that they install measurement equipment that may not even be used.

Q. WHAT SHOULD STATE REGULATORS ORDER FOR DETERMINING THE AMOUNT OF LOCAL EXCHANGE TRAFFIC PASSING FROM ONE NETWORK TO ANOTHER?

A. To avoid the imposition of disparate and inefficient administrative costs, state regulators should require all carriers—incumbents and entrants alike—to report a percentage local traffic amount subject to an auditing requirement as the basis for compensation payments for transport and termination. This would mirror the current practice for jurisdictional reporting of terminating switched access.

Carriers can count minutes of use coming into their switches over a trunk group. Taking that count, plus the percentage of local traffic would enable the receiving carrier to bill for transport and termination without having to invent a whole new measurement and billing system. This would be far more efficient than allowing the incumbent LECs to act on their incentives to impose unnecessary and disparate cost burdens on entrants in an attempt to impede the development of local exchange competition.

B. Compensation to the Entrant

Q. WHAT ARE THE REQUIREMENTS GOVERNING COMPENSATION TO THE ENTRANT FOR TERMINATING LOCAL EXCHANGE TRAFFIC?

A. The 1996 Act addresses compensation to be paid to entrants when they complete local calls that originate on the network of the incumbent. The 1996 Act calls for such compensation to be reciprocal.

Q. WHAT HAS THE FCC RULED CONSTITUTES RECIPROCAL COMPENSATION?

A. The FCC has ruled that reciprocal compensation should be symmetrical compensation, unless an entrant can prove through the use of economic cost studies that the entrant should be paid a higher rate. As the FCC stated:

Symmetrical compensation arrangements are those in which the

> rate paid by an incumbent LEC to another telecommunications carrier for transport and termination of traffic originated by the incumbent LEC is the same as the rate the incumbent LEC charges to transport and terminate traffic originated by the other telecommunications carrier. (Paragraph 1069)
>
> Given the advantages of symmetrical rates, we direct states to establish presumptive symmetrical rates based on the incumbent LEC's costs for transport and terminating of traffic when arbitrating disputes under section 252(d)(2) and in reviewing BOC statements of generally available terms and conditions. If a competing local service provider believes that its cost will be greater than that of the incumbent LEC for transport and termination, then it must submit a forward-looking economic cost study to rebut this presumptive symmetrical rate. (Paragraph 1089)

In considering how entrants should be compensated, the FCC specifically addressed tandem switching functionality. The C.F.R. in section 51.709(a)(3) states:

> Where the switch of a carrier other than an incumbent LEC serves a geographic area comparable to the area served by the incumbent LEC's tandem switch, the appropriate rate for the carrier other than an incumbent LEC is the incumbent LEC's tandem interconnection rate.

In the text of its Order, the FCC made clear that by the use of the "tandem interconnection rate," the FCC meant the sum of the tandem charge, the transport charge, and the end office termination charge. As the FCC stated:

> We, therefore, conclude that states may establish transport and termination rates in the arbitration process that vary according to whether the traffic is routed through a tandem switch or directly to the end-office switch. In such event, states shall also consider whether new technologies (*e.g.*, fiber ring or wireless networks) perform functions similar to those performed by an incumbent LEC's tandem switch and thus, whether some or all calls terminating on the new entrant's network should be priced the same as the sum of transport and termination via the incumbent LEC's tandem switch. (Paragraph 1090)

The Network Implementation white paper describes the ways in which the physical networks can be interconnected for traffic delivery between the entrant and incumbent LEC networks. It describes the charges that apply based on the rules the FCC has prescribed.

C. Why the FCC Rules Reduce the Benefits From Bill-and-Keep

Q. YOU SAID THE FCC RULES PREVENT BILL-AND-KEEP FROM BRINGING ITS GREATEST BENEFITS TO CONSUMERS. WHY?

A. The FCC provides for three approaches to compensation. One of these is bill-and-keep, which could in principle be implemented without an examination of cost studies. A careful reading of the Order, however, suggests that the FCC intends to limit

bill-and-keep to apply only to termination, not transport. Although section 51.701(e) includes both transport and termination in its definition of reciprocal compensation arrangements, succeeding sections narrow the applicability of bill-and-keep. Section 51.713, in particular, limits the definition of bill-and-keep arrangements for reciprocal compensation to "those in which neither of the two interconnecting carriers charges the other for the termination of local telecommunications traffic that originates on the other carrier's network."

As a result, the FCC approach would not end the need to measure terminating traffic, one of the important benefits of bill-and-keep. Measurement would still be needed for transport. The failure of the FCC to include transport in a bill-and-keep approach makes it less beneficial for competition than it would otherwise be.

V. INTRASTATE ACCESS CHARGE REFORM

Q. WHY ARE YOU ADDRESSING SWITCHED ACCESS CHARGES IN THIS ARBITRATION?

A. With every decision prying open local exchange markets to competition, the need to eliminate above cost prices for access becomes more immediate. New entrants are making decisions affecting local competition which are distorted whenever prices for access exceed cost. (Even the temporary "surcharge" placed by the FCC on unbundled local switching can be expected to distort decisionmaking.) For this period of arbitrations, while business decisions about whether, how, and which local markets to enter are being made at a rapid pace, it is vitally important that any state that has not already done so initiate intrastate access reform. Otherwise, emerging competition will be damaged, new competitors will gravitate toward more favorable procompetitive environments, and competition will be plagued by inefficient choices that raise

interexchange carriers costs and so limit price reductions in intrastate toll charges.

This arbitration proceeding provides the state commission with the opportunity to price intrastate access charges at economic cost. The Hatfield Model provides the means to identify the appropriate cost and prices. I urge the state commission to iniate intrastate access reform now.

Q. ARE THERE SPECIFIC EVENTS DRIVING THE NEED TO INITIATE ACCESS CHARGE REFORM NOW?

A. Yes. Two events drive the need to initiate access charge reform now: (1) the announcement in the Order that the FCC will be addressing access charge reform concurrent with its adoption of a competitively-neutral universal service mechanism, and (2) the section 271 public interest test that requires elimination of the artificial advantage conferred on BOCs by above-cost access charges. In the first case, alignment of intrastate access rates to cost must occur in tandem with the federal reforms to ensure that ratepayers are not paying twice for universal service support. In the second case, above-cost access confers an ability to discriminate that distorts and disrupts the competitiveness of both the local and long distance markets. In at least MCI's view, until access charges, both interstate and intrastate, are reduced to forward looking, economic cost, regulators may not legally allow BOC entry into in-region long distance under the 1996 Act.

I urge each state to initiate a proceeding now, if it has not already done so, in which the requisite record can be developed to eliminate completely prices for access that exceed forward-looking economic cost. Taking charge of intrastate access reform now not only gives the state control over the date when the temporary "surcharge" on the unbundled local switching element introduced by the FCC is eliminated but also

allows the state to coordinate its access charge reform with its creation of a competitively-neutral universal service support mechanism.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes.

SARAH GOODFRIEND, Ph.D.

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EXPERIENCE

MCI Telecommunications Corporation, Austin, TX
Executive Staff Member, Regulatory and Public Policy Analysis 9/95 - present Professional staff member responsible to corporate headquarters (Washington, DC) for formulation, development and execution of regulatory strategies and policies to promote international, national, state and local exchange competition. Formulate and oversee external consulting contracts, provide economic theory to identify, create and support legislative and regulatory policy initiatives. Sponsor presentations and testimony.

Public Utility Commission of Texas (PUC), Austin, TX
Commissioner 9/93 - 5/95 Administered the Public Utility Regulatory Act (PURA). Assured the availability of safe, adequate and efficient electric and telecommunications services for the citizens of Texas. Assured that rates, services, and operations are just and reasonable to consumers and utilities. Participated in federal activities which may affect the Public Utility Commission's administration of PURA.

Director, Division of Economic and Regulatory Policy 11/92 - 8/93 Created workplan and hired staff for new division. Advised Commissioners and coordinated with other divisions to develop policy in the public interest.

Federal Energy Regulatory Commission (FERC), Office of Economic Policy, Washington, DC
Advisory Economist and Expert Witness 6/87 - 9/92 Developed and applied microeconomic theory to electric utility and natural gas industries. Wrote and defended testimony. Spoke for staff in settlement negotiations. Assisted lawyers and technical staff in understanding and analyzing positions, cross-examining witnesses and writing briefs.

Federal Trade Commission (FTC), Bureau of Economics, Washington, DC
Expert Witness and Research Economist 10/85 - 6/87 Developed and applied microeconomic theory. Wrote and defended testimony. Independently initiated and proposed empirical research projects promoting reform of regulation in various industries.

Carolina Power and Light Company, Conservation and Load Management Department, Raleigh, NC
Consulting Economist 5/83 - 5/84 Led project to evaluate new computer simulation model of load management effects. Analyzed data to capture representative features. Evaluated model for use by CP&L.

University of North Carolina, Department of Economics, Chapel Hill, NC
Teacher Training Program Supervisor 5/81 - 5/83, Teaching Instructor 8/80 - 5/81, Research Assistant 8/79 - 5/80 Taught faculty and students.

Public Utility Commission of Texas, Division of Economic Research, Austin, TX
Economist 5/78 - 5/79 Wrote and defended testimony.

EDUCATION

Ph.D. Economics, University of North Carolina, Chapel Hill, NC 1985
Estimation of a Q-Ratio Function for Regulated Electric Utilities: A Test of the Stigler-Peltzman Hypothesis of Regulatory Behavior (dissertation)

B.A. Economics with high honors, University of Texas, Austin, TX. 1978
Phi Kappa Phi Honorary Society
Grinnell College, Grinnell, IA. 1974-1976

PROFESSIONAL ACTIVITIES

National Regulatory Research Institute at Ohio State University,
Board of Directors 1993 - 1995
National Association of Regulatory Utility Commissioners,
Committee on Communications 1993 - 1995
Center for Public Utilities at New Mexico State University,
Advisory Council 1995
American Economic Association
American Bar Association (Associate)

NATIONAL PRESENTATIONS OR PAPERS

Federal-State Legislation and Regulation: Competition in the Local/IntraLata Markets, Bonbright Center 16th Annual Telecommunications Conference, Atlanta, GA.. 3/96

Incentive Design and Pricing Flexibility in Telecommunications, 27th Annual Conference of the Institute of Public Utilities, Williamsburg, VA., 12/95

Assessing The Workability Of Competition In Utility Industries, NARUC Annual Regulatory Studies Program at Michigan State University 1995, East Lansing, MI., 8/95

Utility Consolidation and Reorganization, NARUC Annual Regulatory Studies Program at Michigan State University 1995, East Lansing, MI., 8/95

Preparing for a Competitive Structure: Unbundling and Revaluing Utility Asssets, Current Issues Challenging the Regulatory Process, Center for Public Utilities at New Mexico State University, Sante Fe, NM., 3/95

Experience and Implementation Issues of Incentive and Performance Based Regulation, Commissioners' Policy Information Forum, NARUC Subcommittee on Commissioner Education, Washington, DC., 2/95

Public Right of Way (NARUC representative) Federal-State-Local Telecom Summit, Annenberg Washington Program and the Department of Commerce, Washington, DC., 1/95

Regulatory Challenges of Horizontal Restructuring, 26th Annual Conference of the Institute of Public Utilities, Williamsburg, VA., 12/94

Regulators on Retail Wheeling, Fitch Research Special Report, Fitch Investors Service, Inc., New York, NY., 10/94

What it's Like to be a Utility Regulatory Commissioner, NARUC Biennial Regulatory

Information Conference, Columbus, OH., 9/94

Assessing The Workability Of Competition In Utility Industries, NARUC Annual Regulatory Studies Program at Michigan State University 1994, East Lansing, MI., 8/94

Telecommunications: The Next American Revolution, National Governor's Association Report, Contributed to Chapter Seven: Universal Service, Washington, DC., 7/94

Do we Need New or Different Regulatory Bodies? New Authorities?, KMB Video Conference - Reinventing State Regulatory Structures in the Convergence Era, St. Petersburg, FL., 5/94

International Activities of Utility Affiliates - When and Where is Regulation Needed?, American Bar Association Seventh Annual Conference on Electricity Law and Regulation, San Antonio, TX., 3/94

Presentation and Q and A Interview with Financial Analysts, Regulatory Research Associates, Inc., New York, NY., 3/94

Analyzing Mergers in Markets in Competitive Transition, Annual Conference of the Southern Economic Association, Washington, DC, 11/92 (Published in NARUC Biennial Information Conference Proceedings, Columbus, OH. 12/92)

Public Utility Regulation, Annual Conference of the Southern Economic Association, Washington, DC., 11/92

Developments in Transmission Access in Electricity Markets, Southeastern Electric and Gas Utility Conference, University of Georgia, Atlanta, GA., 10/92

Analyzing Market Power in Electric Utility Mergers, NARUC Biennial Information Conference, Columbus, OH., 9/92

Electricity Markets and All Resource Options: Beyond Integrated Resource Planning, EMA, EDF, NEES, PG&E, and SRC, sponsors, San Francisco, CA., 2/92

Applying Antitrust Principles in the Electric Utility Industry: Market Definition in Utility Mergers, Advanced Workshop in Regulation and Public Utility Economics, Rutgers University, San Diego, CA., 7/90

REGIONAL PRESENTATIONS

Yes, Regulators Are Still Out There - State Regulation, Moderator, Texas Association of Long Distance Telephone Companies Twelfth Annual Conference and Trade Exhibition, Austin, TX., 4/95

Trends and Directions at the Public Utility Commission, Texas Renewables 94 Conference, Austin, TX., 11/94

Universal Service Fund, Five State Regulatory Conference, Tulsa, OK., 10/94

Telecommunications Planning Efforts in Texas, UT System Office of Telecommunication Services - Telecommunication and Networking in Higher Education, Austin, TX., 10/94

Regulatory Structure Roundtable, Oklahoma Corporation Commission Telecommunications Symposium, Stillwater, OK., 7/94

The Role of Regulators in an Increasingly Competitive Electric Industry, Fall Conference of the Gulf Coast Cogeneration Association, Austin, TX., 9/94

Public Utility Commission of Texas - Who We Are and What We Do, University of Texas at

Dallas, Richardson, TX., 5/94

Regulatory Trends at the Public Utility Commission, Texas Industrial Energy Consumers Annual Meeting, Houston, TX., 5/94

The Information Economy and Global Competitiveness: Are We All (or soon to be) Accountants, Now?, Texas Society of Certified Public Accountants, Austin, TX., 4/94

Update on the Public Utility Commission of Texas, Senior Citizens Alliance, Ft. Worth, TX., 4/94

Update on Public Utility Commission of Texas, Travis County Bar Association's Administrative Law Section, Austin, TX., 3/94

Interview - Goodfriend Speaks Out on Merits of Competition, Measured Phone Service, Special Interest Groups, Economic Development Rates, Other PUC Issues, Texas State Agencies Newsletter, Vol. 2, No. 16, 2/26/94

Energy Policy Act Implementation in Texas, Fall Conference of the Gulf Coast Cogeneration Association, Austin, TX., 10/93

EXPERT TESTIMONY

On behalf of the Public Utility Commission of Texas:

PUC Initiatives Related to NAFTA, Texas State Senate Committee on International Relations, Trade and Technology, Austin, TX., 12/94

Impact of Federal Telecommunications Legislation on Texas Regulatory Policy, Texas State Senate Joint Interim Committees on Telecommunications and the Public Utility Commission, Austin, TX., 5/94

On behalf of the Staff of the Federal Energy Regulatory Commission:

Northeast Utilities Service Company (Re: Public Service Company of New Hampshire), FERC, Washington, DC., Direct Testimony 5/90, Rebuttal Testimony 6/90, Deposition 6/90 and 7/90

Proposed Merger between Southern California Edison and San Diego Gas and Electric Company, FERC, Washington, DC., Direct Testimony 12/89, Cross-Examination 5/90

On behalf of the Bureau of Economics of the Federal Trade Commission:

Analysis of the 256K DRAM Market in Japan, U.S. Department of Commerce, Washington, DC., 4/86

Analysis of the DRAM Market, U.S. International Trade Commission, Washington, DC., 4/86

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