ORIGINAL

BEFORE THE

FLORIDA PUBLIC SERVICE COMMISSION

DIRECT TESTIMONY OF

LEE L. SELWYN

ON BEHALF OF

AT&T COMMUNICATIONS OF THE SOUTHERN STATES, INC.

AND

MCI TELECOMMUNICATIONS COMPANY

AND

MCI METRO ACCESS TRANSMISSION SERVICES, INC.

DOCKET NOs. 960833-TP/960846-TP/971140-TP

November 13, 1997

DIRECT TESTIMONY OF

LEE S. SELWYN

ON BEHALF OF

AT&T OF THE SOUTHERN STATES, INC. AND

MCI TELECOMMUNICATIONS COMPANY AND

MCI METRO ACCESS TRANSMISSION SERVICES, INC.

DOCKET NOs: 960833-TP/960846-TP/971140-TP

TABLE OF CONTENTS

Qualifications:

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

A. My name is Lee L. Selwyn; I am president of Economics and Technology, Inc., One Washington Mall, Boston, Massachusetts 02108. Economics and Technology, Inc. ("ETI") is a research and consulting firm specializing in telecommunications economics, regulation, management and public policy.

Q. Please summarize your educational background and previous experience in the field of telecommunications regulation and policy.

A. I have prepared a Statement of Qualifications, which is attached hereto as Exhibit LLS-1.

Q. Have you previously testified before any regulatory or judicial body?

A. Yes. I have testified before this Commission on a number of occasions dating back to the mid-1970s, on the subjects of rate design and service cost analysis on behalf of business telecommunications users as well as the State of Florida Department of General Services. These cases have included Dockets 74805-TP, 760842-TP, 810035-TP and 820294-TP involving Southern Bell, Docket 74792-TP involving

General Telephone Company of Florida, and Docket 750320-TP involving Central Telephone Company of Florida. My most recent appearance before this Commission was in Docket 950696-TP on the subject of Universal Service, on behalf of Time Warner AxS and Digital Media Partners.

Assignment:

Q. On whose behalf is this testimony being offered?

A. This testimony is offered on behalf of AT&T Communications of the Southern States, Inc. ("AT&T").

Q. What is the purpose of your testimony in this proceeding?

A. The purpose of my testimony is to provide a discussion of the economic principles underlying the appropriate regulatory treatment of BellSouth's proposal relating to recovery of capital expenditures and operating costs that it claims it will incur in upgrading and using its Operations Support Systems (OSS) to accommodate a modern, multi-provider telecommunications industry environment, and to offer recommendations with respect to rate design principles and policies for the recovery of such outlays. The specific economic principles and policy recommendations that I will be addressing in this testimony have been incorporated into the AT&T/MCI Nonrecurring Cost Model that is being presented by Mr. Jack P. Lynott in this proceeding.

Q. Have you prepared a report on this subject?

A. Yes. AT&T requested that I prepare a "white paper" that reviews the historic development of ILEC operations support systems and their current, forward-looking condition that is the appropriate basis for use in Total Element Long Run Incremental Cost (TELRIC) and Total Service Long Run Incremental Cost (TSLRIC) studies that are developed to support both recurring and nonrecurring charges both for bundled ILEC services as well as for unbundled network elements (UNEs). That paper, *Regulatory Treatment of ILEC Operations Support Systems Costs*, is attached to this testimony as Exhibit LLS-2 and is made a part hereof. Although the paper is generic in the sense that it is addressed to ILECs generally rather than to BellSouth specifically, the principles and recommendations set forth in the paper are directly relevant and applicable to the Florida-specific issues to be addressed in this case. The next few pages of this testimony provide a brief summary of the analysis and conclusions that are set forth in detail in the paper.

RATE DESIGN PRINCIPLES

FOR NONRECURRING CHARGES

Nonrecurring charges for ILEC bundled services and unbundled network elements should be based upon the forward-looking economic cost of fulfilling these transactions assuming the most efficient use of the integrated operations support systems that are available today.

Q. What is the appropriate economic standard that ILECs are required to apply when setting nonrecurring (and, for that matter, recurring) charges for the provision of services and unbundled elements to CLECs?

A. It is my understanding that ILECs are required by the Florida PSC to set recurring and nonrecurring rates for unbundled network elements (UNEs) on the basis of those elements' Total Service Long Run Incremental Cost (TSLRIC). Nonrecurring charges that are applicable in connection with bundled services provided for resale are to be based upon the prevailing retail NRC, less the wholesale discount that is established in accordance with Section 252(d)(3) of the *Telecommunications Act of 1996* ("Act"). If there is no corresponding retail price for a particular nonrecurring charge transaction (e.g., for the "migration" of an ILEC retail customer to a reseller), the applicable NRC is to be based upon the TSLRIC for such transactions.

The FCC, in its *First Interconnection Order*,[1] expressly required the use of Total Element Long Run Incremental Cost (TELRIC) in setting nonrecurring charges for UNEs. Moreover, while the 8th Circuit Court of Appeals has reversed the FCC's preemption of state jurisdiction over the pricing of these elements, it has not challenged the validity of the FCC's adoption of TELRIC as the appropriate pricing standard.[2] The FCC has recently further clarified its position with regard to NRCs when it ordered that a Bell Operating Company (BOC) must show "that its non-recurring charges reflect forward-looking economic costs" in order to comply with Section 271 requirements for BOC entry into the interLATA long distance market.[3] Counsel has advised me that the Florida PSC has determined that there is no substantial difference between the TELRIC and TSLRIC for an element.

Q. What is the specific definition of "forward-looking economic cost" that is appropriate for use in TELRIC/TSLRIC studies?

A. In the context of the TELRIC/TSLRIC study methodology, the term "forward-looking economic cost" is to be interpreted as that which would prevail assuming the use of the most advanced technology that is available to the ILECs and that they can deploy today, utilized in the most efficient manner.

ILEC investment in integrated operations support systems has been driven by these companies' long-standing goals of improving their own efficiency and competitiveness, and thus cannot reasonably be ascribed to any legislation or regulations requiring ILECs to provide interconnections, unbundled network elements, and bundled resale services to CLECs.

Q. Please summarize the principal conclusions and recommendations that are set forth in your paper.

A. Section 251(c) of the federal Act imposes a number of specific duties upon incumbent local exchange carriers (ILECs) with respect to the provision of bundled services and access to unbundled network elements (UNEs) to other telecommunications providers, including resellers and competitive local exchange carriers (CLECs). The transformation by state commissions and the FCC of these statutory requirements into rules and regulations has proven to be a lengthy, complex and highly contentious process, a process that has itself worked to slow the pace of entry and investment by non-ILEC providers into the local telecommunications market. Among other things, ILECs contend that compliance with the requirements of Section 251(c) imposes extensive new costs, costs that the ILECs seek to recover directly and exclusively from their new rivals.

Specifically, ILECs contend that they must incur costs to acquire and to adapt existing Operations Support Systems (OSS) and for other organizational changes in order to accommodate the Act's requirements for interconnection, unbundling and resale. ILECs argue that these and similar "cost onsets" are "caused" by the new entrants and, they claim, should be recovered from these entities through a variety of pricing devices. The paper examines these arguments, but arrives at fundamentally different conclusions:

Most, if not all, of the "costs" that ILECs claim are being imposed upon them by the Act and associated federal and state implementation regulations represent efficiency improvement programs that either were already underway prior to the enactment or that should be pursued by ILECs irrespective of the presence of competitors or any specific Section 252(c) obligations. In most cases, these programs actually result in substantial efficiency gains that both reduce ongoing ILEC costs and/or that enhance the ILECs' own competitiveness, such that their "costs," when expressed in terms of the net present value of the overall investment program, are actually *negative*.

Costs incurred by ILECs in order to accommodate their operation in a multi-carrier environment, such as the costs of establishing and operating electronic interfaces with other local exchange carriers, are not compliance-driven costs. Expenditures of this same type are also incurred by those other carriers (e.g., for establishing electronic interfaces with ILECs and with each other) and are thus ordinary and necessary costs of doing business in a multi-carrier marketplace. Each carrier — ILEC, CAP or CLEC — is responsible for its own costs incident to interacting with other local carriers.

- To the limited extent that any *positive* compliance costs may be incurred by ILECs alone, these should be recovered across the entire community of ILEC customers, and not be imposed exclusively upon CLECs and resellers. In enacting the 1996 legislation, Congress specifically described the new law as "an Act to promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies." Congress intended and expected that competition would be broadly beneficial to *all* consumers, not just to those who elected to purchase services from the new providers. As such, to the extent that there actually are any net positive costs imposed upon ILECs to establish the machinery necessary to accommodate a multi-provider industry, those costs may not be imposed solely and exclusively upon the new entrants.

- Such OSS-related investment costs that are found to be appropriately recoverable by ILECs — if in fact any such costs are present at all — should be included in and recovered through recurring rates spread across all ILEC services and rate elements whose provision these systems support, and not through up-front nonrecurring charges (NRCs) imposed solely in conjunction with a service- or UNE-related transaction.

The AT&T/MCI Nonrecurring Cost Model correctly applies TELRIC principles by assuming the use by ILECs of efficient, fully integrated operations support systems that are accessible to CLECs and that permit them to transact business with ILECs via electronic interfaces.

Q. Are you familiar with the AT&T/MCI Nonrecurring Cost Model that is being presented in this proceeding by Mr. Lynott?

A. Yes. I have participated as an advisor to AT&T and MCI in its development, and am familiar with its design and structure and with the various assumptions and economic principles that it embodies.

Q. Does the AT&T/MCI Nonrecurring Cost Model embody the various economic, regulatory and rate design principles that you have presented in your paper?

A. Yes, it does. The model applies the TELRIC methodology to the development of nonrecurring costs. It correctly excludes from the components of nonrecurring costs all operations support system investment-related costs that require either no specific recovery (because they represent ongoing productivity/efficiency improvements that will actually result in *lower* ILEC costs overall) or because such costs, if and to the extent they are specifically recoverable, are appropriately included in *recurring* rates spread broadly and in a competitively-neutral manner across all users (customers and competitors) of ILEC services and unbundled elements. Consistent with TELRIC principles, the Nonrecurring Cost Model assumes the adoption of efficient, fully integrated operations support systems that are accessible by CLECs via electronic interfaces for purposes of conducting business with ILECs. Access to and use of these ILEC systems by competitors virtually eliminates the need for most ILEC manual (i.e., labor-intensive) activity and dramatically reduces the potential for error. This direct, on-line entry and processing of CLEC orders and other transactions permits ILECs to achieve a "flow-through" of error-free transactions at levels that are comparable with those that are regularly and routinely expected and achieved in other comparably complex network-based industries, industries that have not been protected by the legacy of monopoly under which the ILECs have operated for more than a century. Finally, while recognizing the possibility that certain OSS costs may in theory be sensitive to the aggregate volume of service-related transactions, the Nonrecurring Cost Model correctly treats such transaction-sensitive costs as *de minimis*.

Accordingly, I believe that the Nonrecurring Cost Model correctly applies the TELRIC methodology and produces cost estimates that are economically sound and that provide a valid basis for the establishment of appropriate nonrecurring charges for ILEC service and element transactions.

Q. Does this conclude your direct testimony at this time?

A. Yes, it does.

ENDNOTES

1. *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98, First Report and Order, FCC 96-325 (rel. August 8, 1996), (*First Interconnection Order*), at paras. 672-703.

2. *Iowa Utilities Board, et. al. v. FCC*, No. 96-3321 and consolidated cases (8th Cir., filed July 18, 1997), at 20.

3. *Application of Ameritech Michigan Pursuant to Section 271 of the Communications Act of 1934, as amended, To Provide In-Region, InterLATA Services in Michigan*, CC Docket No. 97-137, *Memorandum Opinion and Order*, FCC 97-298 (rel. August 19, 1997), at para. 296.

EXHIBITS

Exhibit LLS-1:	Statement of Qualifications
Exhibit LLS-2:	Regulatory Treatment of ILEC Operations Support Systems Costs

Exhibit LLS-1

Statement of Qualifications

DR. LEE L. SELWYN

Dr. Lee L. Selwyn has been actively involved in the telecommunications field for more than twenty-five years, and is an internationally recognized authority on telecommunications regulation, economics and public policy. Dr. Selwyn founded the firm of Economics and Technology, Inc. in 1972, and has served as its President since that date. He received his Ph.D. degree from the Alfred P. Sloan School of Management at the Massachusetts Institute of Technology. He also holds a Master of Science degree in Industrial Management from MIT and a Bachelor of Arts degree with honors in Economics from Queens College of the City University of New York.

Dr. Selwyn has testified as an expert on rate design, service cost analysis, form of regulation, and other telecommunications policy issues in telecommunications regulatory proceedings before some forty state commissions, the Federal Communications Commission and the Canadian Radio-television and Telecommunications Commission, among others. He has appeared as a witness on behalf of commercial organizations, non-profit institutions, as well as local, state and federal government authorities responsible for telecommunications regulation and consumer advocacy.

He has served or is now serving as a consultant to numerous state utilities commissions including those in Arizona, Minnesota, Kansas, Kentucky, the District of Columbia, Connecticut, California, Delaware, Maine, Massachusetts, New Hampshire, Vermont, New Mexico, Wisconsin and Washington State, the Office of Telecommunications Policy (Executive Office of the President), the National Telecommunications and Information Administration, the Federal Communications Commission, the Canadian Radio-television and Telecommunications Commission, the United Kingdom Office of Telecommunications, and the Secretaria de Comunicaciones y Transportes of the Republic of Mexico. He has also served as an advisor on telecommunications regulatory matters to the International Communications Association and the Ad Hoc Telecommunications Users Committee, as well as to a number of major corporate telecommunications users, information services providers, paging and cellular carriers, and specialized access services carriers.

Dr. Selwyn has presented testimony as an invited witness before the U.S. House of Representatives Subcommittee on Telecommunications, Consumer Protection and Finance and before the U.S. Senate Judiciary Committee, on subjects dealing with restructuring and deregulation of portions of the telecommunications industry.

In 1970, he was awarded a Post-Doctoral Research Grant in Public Utility Economics under a program sponsored by the American Telephone and Telegraph Company, to conduct research on the economic effects of telephone rate structures upon the computer time sharing industry. This work was conducted at Harvard University's Program on Technology and Society, where he was appointed as a Research Associate. Dr. Selwyn was also a member of the faculty at the College of Business Administration at Boston University from 1968 until 1973, where he taught courses in economics, finance and management information systems.

Dr. Selwyn has published numerous papers and articles in professional and trade journals on the subject of telecommunications service regulation, cost methodology, rate design and pricing policy. These have included:

"Taxes, Corporate Financial Policy and Return to Investors"
National Tax Journal, Vol. XX, No.4, December 1967.

"Pricing Telephone Terminal Equipment Under Competition"
Public Utilities Fortnightly, December 8, 1977.

"Deregulation, Competition, and Regulatory Responsibility in the Telecommunications Industry"
Presented at the 1979 Rate Symposium on Problems of Regulated Industries - Sponsored by: The American University, Foster Associates, Inc., Missouri Public Service Commission, University of Missouri-Columbia, Kansas City, MO, February 11 - 14, 1979.

"Sifting Out the Economic Costs of Terminal Equipment Services"
Telephone Engineer and Management, October 15, 1979.

"Usage-Sensitive Pricing" (with G. F. Borton)
(a three part series)
Telephony, January 7, 28, February 11, 1980.

"Perspectives on Usage-Sensitive Pricing"
Public Utilities Fortnightly, May 7, 1981.

"Diversification, Deregulation, and Increased Uncertainty in the Public Utility Industries"
Comments Presented at the Thirteenth Annual Conference of the Institute of Public Utilities, Williamsburg, VA - December 14 - 16, 1981.

"Local Telephone Pricing: Is There a Better Way?; The Costs of LMS Exceed its Benefits: a Report on Recent U.S. Experience."
Proceedings of a conference held at Montreal, Quebec - Sponsored by Canadian Radio-Television and Telecommunications Commission and The Centre for the Study of Regulated Industries, McGill University, May 2 - 4, 1984.

"Long-Run Regulation of AT&T: A Key Element of A Competitive Telecommunications Policy"
Telematics, August 1984.

"Is Equal Access an Adequate Justification for Removing Restrictions on BOC Diversification?"
Presented at the Institute of Public Utilities Eighteenth Annual Conference, Williamsburg, VA - December 8 - 10, 1986.

"Market Power and Competition Under an Equal Access Environment"
Presented at the Sixteenth Annual Conference, "Impact of Deregulation and Market Forces on Public Utilities: The Future Role of Regulation"
Institute of Public Utilities, Michigan State University, Williamsburg, VA - December 3 - 5, 1987.

"Contestable Markets: Theory vs. Fact"
Presented at the Conference on Current Issues in Telephone Regulations: Dominance and Cost Allocation in Interexchange Markets - Center for Legal and Regulatory Studies Department of Management Science and Information Systems - Graduate School of Business, University of Texas at Austin, October 5, 1987.

"The Sources and Exercise of Market Power in the Market for Interexchange Telecommunications Services"
Presented at the Nineteenth Annual Conference - "Alternatives to Traditional Regulation: Options for Reform" - Institute of Public Utilities, Michigan State University, Williamsburg, VA, December, 1987.

"Assessing Market Power and Competition in The Telecommunications Industry: Toward an Empirical Foundation for Regulatory Reform"
Federal Communications Law Journal, Vol. 40 Num. 2, April 1988.

"A Perspective on Price Caps as a Substitute for Traditional Revenue Requirements Regulation"
Presented at the Twentieth Annual Conference - "New Regulatory Concepts, Issues and Controversies" - Institute of Public Utilities, Michigan State University, Williamsburg, VA, December, 1988.

"The Sustainability of Competition in Light of New Technologies" (with D. N. Townsend and P. D. Kravtin)
Presented at the Twentieth Annual Conference - Institute of Public Utilities Michigan State University, Williamsburg, VA, December, 1988.

"Adapting Telecom Regulation to Industry Change: Promoting Development Without Compromising Ratepayer Protection" (with S. C. Lundquist)
IEEE Communications Magazine, January, 1989.

"The Role of Cost Based Pricing of Telecommunications Services in the Age of Technology and Competition"
Presented at National Regulatory Research Institute Conference, Seattle, July 20, 1990.

"A Public Good/Private Good Framework for Identifying POTS Objectives for the Public Switched Network" (with Patricia D. Kravtin and Paul S. Keller)
Columbus, Ohio: *National Regulatory Research Institute*, September 1991.

"Telecommunications Regulation and Infrastructure Development: Alternative Models for the Public/Private Partnership"

Prepared for the Economic Symposium of the International Telecommunications Union Europe Telecom '92 Conference, Budapest, Hungary, October 15, 1992.

"Efficient Infrastructure Development and the Local Telephone Company's Role in Competitive Industry Environment" *Presented at the Twenty-Fourth Annual Conference, Institute of Public Utilities, Graduate School of Business, Michigan State University, "Shifting Boundaries between Regulation and Competition in Telecommunications and Energy"*, Williamsburg, VA, December 1992.

"Measurement of Telecommunications Productivity: Methods, Applications and Limitations" (with Françoise M. Clottes)
Presented at Organisation for Economic Cooperation and Development, Working Party on Telecommunication and Information Services Policies, `93 Conference "Defining Performance Indicators for Competitive Telecommunications Markets", Paris, France, February 8-9, 1993.

"Telecommunications Investment and Economic Development: Achieving efficiency and balance among competing public policy and stakeholder interests"
Presented at the 105th Annual Convention and Regulatory Symposium, National Association of Regulatory Utility Commissioners, New York, November 18, 1993.

"The Potential for Competition in the Market for Local Telephone Services" (with David N. Townsend and Paul S. Keller)
Presented at the Organization for Economic Cooperation and Development Workshop on Telecommunication Infrastructure Competition, December 6-7, 1993.

"Market Failure in Open Telecommunications Networks: Defining the new natural monopoly," *Utilities Policy*, Vol. 4, No. 1, January 1994.

"The Enduring Local Bottleneck: Monopoly Power and the Local Exchange Carriers," (with Susan M. Gately, et al) a report prepared by ETI and Hatfield Associates, Inc. for AT&T, MCI and CompTel, February 1994.

"Commercially Feasible Resale of Local Telecommunications Services: An Essential Step in the Transition to Effective Local Competition," (Susan M. Gately, et al) a report prepared by ETI for AT&T, July 1995.

"Efficient Public Investment in Telecommunications Infrastructure"
Land Economics, Vol 71, No.3, August 1995.

"Market Failure in Open Telecommunications Networks: Defining the new natural monopoly," in *Networks, Infrastructure, and the New Task for Regulation*, by Werner Sichel and Donal L. Alexander, eds., University of Michigan Press, 1996.

Dr. Selwyn has been an invited speaker at numerous seminars and conferences on telecommunications regulation and policy, including meetings and workshops sponsored by the National Telecommunications and Information Administration, the National Association of Regulatory Utility Commissioners, the U.S. General Services Administration, the Institute of Public Utilities at Michigan State University, the National Regulatory Research Institute at Ohio State University, the Harvard University Program on Information Resources Policy, the Columbia University Institute for Tele-Information, the International Communications Association, the Tele-Communications Association, the Western Conference of Public Service Commissioners, at the New England, Mid-America, Southern and Western regional PUC/PSC conferences, as well as at numerous conferences and workshops sponsored by individual regulatory agencies.

Exhibit
Docket No.s: 960833-TP/960846-TP/971140-TP
Selwyn Exhibit LLS-2
Regulatory Treatment of ILEC Operations
Support Systems Costs

REGULATORY TREATMENT OF ILEC OPERATIONS SUPPORT SYSTEMS COSTS

Lee L. Selwyn

September, 1997

ETi ECONOMICS AND TECHNOLOGY, INC.
ONE WASHINGTON MALL • BOSTON, MASSACHUSETTS 02108

PREFACE

The federal *Telecommunications Act of 1996* and the ensuing implementation activities of state and federal regulatory agencies are working to transform the local exchange telephone business from its traditional regulated monopoly market structure into a multi-carrier, multi-provider industry. For the first time, incumbent local exchange carriers (ILECs) face the prospect of having to interface and deal with peer competitors in addition to their traditional interactions with customers and with service providers in the adjacent premises equipment and long distance markets. ILECs are thus confronted with the need both to meet the market challenges offered by their new rivals as well as to comply with specific interconnection, unbundling and resale requirements imposed by the *Act* and by state and federal regulators.

Meeting these challenges and demands will require ILECs to effect sometimes major organizational changes as well as to improve existing operating practices and deploy new systems. ILECs have argued that, as incumbent carriers with historic service obligations, they are entitled to various types of financial compensations including, among other things, reimbursements for the costs of new operations support systems that, they claim, are required in order for them to meet statutory and regulatory mandates.

This paper explores the validity of these claims and addresses the appropriate regulatory treatment of any net increase in cost that ILECs may incur as a consequence of the new multi-provider market environment. The paper was prepared for AT&T by Lee L. Selwyn. Dr. Selwyn is President, Economics and Technology, Inc. (ETI), One Washington Mall, Boston, Massachusetts 02108. ETI is a research and consulting organization specializing in telecommunications economics, management, regulation and public policy. Joseph W. Laszlo and Douglas S. Williams, Senior Analysts at ETI, and Melissa N. Markley, Analyst at ETI, assisted in its preparation.

Boston, Massachusetts

September, 1997

TABLE OF CONTENTS

INTRODUCTION

Section 251(c) of the federal *Telecommunications Act of 1996* ("Act") imposes a number of specific duties upon incumbent local exchange carriers (ILECs) with respect to the provision of bundled services and access to unbundled network elements (UNEs) to other telecommunications providers, including resellers and competitive local exchange carriers (CLECs). Specifically, the Act obligates ILECs to comply with each and all of the following specific requirements:

> (2) INTERCONNECTION- The duty to provide, for the facilities and equipment of any requesting telecommunications carrier, interconnection with the local exchange carrier's network--
>
> (A) for the transmission and routing of telephone exchange service and exchange access;
>
> (B) at any technically feasible point within the carrier's network;
>
> (C) that is at least equal in quality to that provided by the local exchange carrier to itself or to any subsidiary, affiliate, or any other party to which the carrier provides interconnection; and
>
> (D) on rates, terms, and conditions that are just, reasonable, and nondiscriminatory, in accordance with the terms and conditions of the agreement and the requirements of this section and section 252.
>
> (3) UNBUNDLED ACCESS- The duty to provide, to any requesting telecommunications carrier for the provision of a telecommunications service, nondiscriminatory access to network elements on an unbundled basis at any technically feasible point on rates, terms, and conditions that are just, reasonable, and nondiscriminatory in accordance with the terms and conditions of the agreement and the requirements of this section and section 252. An incumbent local exchange carrier shall provide such unbundled network elements in a manner that allows requesting carriers to combine such elements in order to provide such telecommunications service.

(4) RESALE- The duty--
  (A) to offer for resale at wholesale rates any telecommunications service that the carrier provides at retail to subscribers who are not telecommunications carriers; and
  (B) not to prohibit, and not to impose unreasonable or discriminatory conditions or limitations on, the resale of such telecommunications service, except that a State commission may, consistent with regulations prescribed by the Commission under this section, prohibit a reseller that obtains at wholesale rates a telecommunications service that is available at retail only to a category of subscribers from offering such service to a different category of subscribers.

The transformation by state commissions and the FCC of these statutory requirements into rules and regulations has proven to be a lengthy, complex and highly contentious process, a process that has itself worked to slow the pace of entry and investment by non-ILEC providers into the local telecommunications market.[1] Among other things, ILECs contend that compliance with the requirements of Section 251(c) imposes extensive new costs, costs that the ILECs seek to recover directly and exclusively from their new rivals.[2]

1. *See, e.g.*, "MCI Complains ILECs Are Trying to Reopen Interconnect Agreements," *TR Daily*, Telecommunications Reports, September 10, 1997; "MCI Net Falls 6.7% on Costs of Going Local," *Wall Street Journal*, July 31, 1997, at B8; "Obstacles Still Block Competition — Demise of the FCC's Interconnection Rules Coupled With MCI Losses Signal More Woes," *CommunicationsWeek*, July 28, 1997; "Local Entry Costs and Delays Cut AT&T Profit 37.6% in 2nd Quarter," *Communications Daily*, July 22, 1997; "Carriers Debate Need for Intellectual Property Licenses to Use Unbundled Network Elements," *Telecommunications Reports*, April 21, 1997; and "Court Ruling Delays Local Competition," *CommunicationsWeek*, October 21, 1996.

2. ILECs also contend that the onset of local competition creates various "competitive losses" as well as "stranded investment" which, they argue, impair their ability to recover previously-incurred investment expenditures and to earn a reasonable return thereon. These alleged "costs" imposed by the federal Act are not, however, being addressed in this paper.

Specifically, ILECs contend that they must incur costs to acquire and to adapt existing Operations Support Systems (OSS) and for other organizational changes in order to accommodate the Act's requirements for interconnection, unbundling and resale. ILECs argue that these and similar "cost onsets" are "caused" by the new entrants and should be recovered from these entities through a variety of pricing devices. This paper examines these arguments, but arrives at fundamentally different conclusions:

- Most, if not all, of the "costs" that ILECs claim are being imposed upon them by the Act and associated federal and state implementation regulations represent efficiency improvement programs that either were already underway prior to the enactment or should be pursued by ILECs irrespective of the presence of competitors or any specific Section 251(c) obligations. In most cases, these programs actually result in substantial efficiency gains that both reduce ongoing ILEC costs and/or enhance the ILECs' own competitiveness, such that their "costs," when expressed in terms of the net present value of the overall investment program (including operating expense savings and revenue enhancements), are actually *negative*.

- Costs incurred by ILECs in order to accommodate their operation in a multi-carrier environment, such as the costs of establishing and operating electronic interfaces with other local exchange carriers, are not compliance-driven costs. Expenditures of this same type are also incurred by those other carriers (e.g., for establishing electronic interfaces with ILECs and with each other) and are thus ordinary and necessary costs of doing business in a multi-carrier marketplace. Each carrier — ILEC, CAP or

CLEC — is responsible for its own costs incident to interacting with other local carriers.

- To the limited extent that any *positive* compliance costs may be incurred by ILECs alone, these should be recovered across the entire community of ILEC customers, and not be imposed exclusively upon CLECs and resellers. In enacting the 1996 legislation, Congress specifically described the new law as "an Act to promote competition and reduce regulation in order to secure lower prices and higher quality services for American telecommunications consumers and encourage the rapid deployment of new telecommunications technologies."[3] Congress intended and expected that competition would be broadly beneficial to *all* consumers, not just to those who elected to purchase services from the new providers. As such, if there actually are any net positive costs imposed upon ILECs to establish the machinery necessary to accommodate a multi-provider industry, those costs should not be imposed solely and exclusively upon the new entrants.

- Such OSS-related investment costs that are found to be appropriately recoverable by ILECs — if in fact any such costs are present at all — should be included in and recovered through recurring rates spread across all ILEC services and rate elements whose provision these systems support, and not through up-front nonrecurring

3. *Telecommunications Act of 1996*, Pub. L. No. 104-104, 110 Stat. 56, *to be codified at* 47 U.S.C. §§ 151, *et. seq.*, long title of Act.

charges (NRCs) imposed solely in conjunction with a service- or UNE-related transaction.

Such costs as may be appropriately imposed upon ILEC customers and competitors for the provision of bundled services and unbundled elements are to be determined on the basis of forward-looking economic cost, under the Total Element Long Run Incremental Cost (TELRIC) or Total Service Long Run Incremental Cost (TSLRIC) methodology, as applicable.[4] In the context of the TELRIC/TSLRIC study methodology, the term "forward-looking economic cost" is to be interpreted as that which would prevail assuming the use of the most advanced technology that is available to the ILECs and that they can deploy today, utilized in the most efficient manner.

4. Nonrecurring charges that are applicable in connection with bundled services provided for resale are to be based upon the prevailing retail NRC, less the wholesale discount that is established in accordance with Section 252(d)(3) of the *Telecommunications Act of 1996* ("Act"). If there is no corresponding retail price for a particular nonrecurring charge transaction (e.g., for the "migration" of an ILEC retail customer to a reseller), the applicable NRC is to be based upon the TELRIC for such transactions.

OPERATIONS SUPPORT SYSTEMS

Operations Support Systems are management tools that improve the efficiency of ILEC operations and the quality of ILEC services and performance.

Operations Support Systems (OSS) are network management tools whose purpose is to improve the overall efficiency of ILEC operations and quality of ILEC services and performance. In a forward-looking, efficient network environment, OSS tend to be computerized systems that link different levels of network operations, and that generally reduce the need for direct human intervention in the ordering, provisioning, and maintenance processes that keep the network functioning properly. They serve to automate the processing of service order transactions, including service connections, disconnections, moves and changes, as well as to provide more efficient and effective control of ongoing ILEC network operations.

The hardware and software that comprise the network OSS replace and integrate a myriad of separate, often manual activities. Among other things, OSS provide

- Electronic interfaces between service ordering and service provisioning functions;
- Integration and coordination of multiple customer and operations databases;
- Fault identification, maintenance tracking, and resolution; and
- Ongoing network performance monitoring and reporting.

The evolution of ILEC operations support systems has progressed through a series of stages beginning in the 1970s and continuing to the present and beyond:

(1) *Mechanization* — the conversion of manual record-keeping functions into basic data processing tasks, but accomplished in separate, isolated systems on a function-by-function basis.

(2) *Automation* - the replacement of manual interfaces between and among individual systems with either on-line data communications channels or machine-readable transaction records (e.g., the creation of billing tapes by central office switches that are then physically transported to and processed by mechanized billing systems).

(3) *Integration* — the establishment of standard real-time data interchange protocols among the various ILEC systems and data bases, supporting seamless flow-through of transaction to and among all affected functional areas, and synchronization of data bases among otherwise separate systems.

(4) *Unification* — the replacement of separate systems and data bases with a single data base containing all plant, customer, maintenance and transactions records.

Before the development of powerful, modern, cost-efficient computer processing capabilities, the basic operations support functions were necessarily performed manually, often involving procedures requiring large numbers of ILEC network personnel and extensive inter-departmental information flows that were communicated either on paper or processed through isolated, uncoordinated systems and data bases. The development and implementation of mechanized ILEC operations support systems began in the late 1960s with the initiation of the "Business Information Systems Program" ("BISP") at Bell Laboratories, an initiative funded by BOC ratepayers under the predivestiture License Contract, and by other ILEC customers through separate agreements with Bell Laboratories.[5]

The primary goal of the original BIS Program was "to enable Bell System companies to manage the flow of business information more effectively by combining the latest in electronic data processing technology with modern communications facilities."[6] The designers of the BIS architecture explain that it was intended to "mechanize traditional methods of record keeping, information handling, and administrative procedures."[7] The BIS systems were not, however, designed to operate as a synchronized whole. Rather, BIS was designed as four *totally independent* systems, each comprised of a number of subsidiary systems, that roughly paralleled the then-existing separate, manual network processes of customer service, trunk and special service provisioning, numbering, and general systems administration.[8] Bell Labs' BIS Program replaced some, and complemented other, similar

5. The BIS program was a management information systems (MIS) software development project undertaken by Bell Telephone Laboratories for the Bell System telephone companies under a contract executed in 1967, and known as the "BIS Agreement." *See:* G. N. Thayer, "BIS in the Bell System," *Bell Laboratories Record*, Vol. 46, December 1968, at 355-361.

6. G. N. Thayer, "BIS in the Bell System," *Bell Laboratories Record*, Vol. 46 (December, 1968), at 355.

7. *Id.*

8. *Id.*, at 358-361.

efforts that were being undertaken independently by non-Bell operating company groups (e.g., GTE), as well as by individual ILECs themselves.[9]

Because BIS and the other early efforts at operations mechanization were not seen as integrated approaches, they were typically undertaken on a function-by-function basis, with fairly crude, often manual (i.e., paper) linkages remaining ***between*** the various functional areas, even as those functions themselves became more and more mechanized. For example, the service representative would collect the required data from customers (e.g., for a new service installation order), then send this information to the appropriate department on paper, either via multipart carbon form or a printout created from manual entry of the service order into the ILEC's order entry system. Because these individual "systems" were isolated from one another, ensuring synchronization among the various network-related data bases was almost impossible, and mismatches were common.

Thus, when a customer discontinued service, that fact would have to be captured and reflected in billing, central office, loop, and other data bases. However, since each data base would have to be updated individually, with no automated method for ensuring consistency between them, there existed great potential for errors to creep into the system. If the loop data base was not updated to reflect the fact that the specific loop associated with the customer's service had been disconnected, that loop would continue to be classified as "in use" even though it was in fact idle and available for reassignment to serve another customer. Conversely, if a loop that was marked as idle were actually in use, a service connection order

9. *Id.*, at 358.

that made use of that particular loop would "fall out" when the plant craftsman attempted to make the new connection, and have to be re-specified and re-processed.

This is not to say that no attempts had been made at achieving greater integration of the various mechanized OSS. As early as 1978, at least some degree of automated interfacing was possible between the BIS customer service and loop maintenance systems.[10] However, such interfaces remained very limited in scope, and the various operations support systems themselves continued to be designed and implemented "to perform unique, isolated sets of functions ... [while] little thought was initially given to how they might share data with other operations systems."[11]

As local networks grew in size and complexity, it became clear that this initial "system of systems" model for OSS did not allow for the most efficient use of network resources. There was therefore a substantial potential for cost savings if the ILECs and their suppliers were to build *automated* linkages between and among the various departmental systems. This process was facilitated by the continual and significant advances in computer networking and data base management technology that have occurred in recent years. However, the mere establishment of automated linkages among the various systems and data bases did not guarantee that the individual data bases would be consistent or synchronized; even today

10. Phillip S. Boggs and Charles E. Stenard, "Integrating Loop Operations Systems: Two Giants Working Together," *Bell Laboratories Record*, Vol. 56 (July/August 1978), at 187.

11. Timothy M. Bauman and Christopher N. Day, "TMN in Perspective," *Bellcore Exchange*, Winter, 1996, at 9.

many ILECs continue to encounter significant flow-through problems due to inconsistent and erroneous data.

However, it is now possible for these previously uncoordinated and largely isolated systems to be *integrated* and synchronized, and eventually to be combined into a single *unified* companywide data base serving all functional and departmental operations support systems. In fact, efforts aimed at achieving a very high level of integrated operations support systems have been underway for a number of years. Electronic Data Interchange (EDI) and other inter-system communications protocols and other systems management standards now provide for a high degree of interoperability among the various individual systems. In so doing, these standards permit highly accurate and coordinated data base synchronization, even among systems that have been in place for some time (so-called "legacy systems"). Such integration is further facilitated by ongoing efforts at mechanizing those remaining manual procedures and data bases that are still in use. The deployment and use of integrated operations support systems that can intercommunicate with one another over standardized data interchange protocols and that are capable of maintaining synchronized and accurate data bases represents the current state-of-the-art. This state-of-the-art drives the application of the TELRIC/TSLRIC study methodology, which is based upon the "forward-looking cost" of the service, element, or function that would prevail assuming the deployment of the most advanced technology that is available to the ILEC and that can be deployed today and utilized in the most efficient manner. It is this level of OSS development that must be assumed in forward-looking incremental TELRIC or TSLRIC recurring and nonrecurring cost studies.

Looking beyond integration of otherwise separate functional systems and data bases, the next stage in OSS development is the creation of a single, *unified* companywide data base to which all ILEC operations support systems have access. Efforts aimed at the formulation of standards and designs for such a unified approach began in the early 1990s, when the RBOCs began to seek an integrated and systematic approach to interaction with the components of the network that would meet the changing needs in the business. They formulated an industry-wide effort, with Bellcore acting as facilitator, to develop an architecture for organizing network resources and management functions around the various needs of customers, other employees and management.

In response to this need, Bellcore, working in conjunction with "a collection of telecommunications companies and software vendors, led and facilitated by the International Telecommunications Union (ITU),"[12] developed the so-called *Telecommunications Management Network* (TMN) architecture.[13] In addition to structure, the TMN effort resulted in the development of a proposed set of business processes supported by new state-of-the-art OSS to unify as many functions and sub-tasks as possible. TMN represents a major break with the previous approach to managing the network OSS. "In the past, when network elements were not very 'intelligent' — not software controlled — operations systems replicated and

---

12. Mark J. Effinger, "Operations Support: The Next Generation," *Bellcore Exchange*, Summer, 1997, at 14.

13. Bellcore, TMN Generic Requirements, Document No. GR-2869, Issue 2, October, 1996.

duplicated among themselves information they actually shared about the network."[14] TMN, by contrast, views the network itself as "one distributed database," which reduces redundancy, increases synchronization, and thereby reduces or even eliminates errors, and ultimately "reduces the costs of doing business in telecommunications."[15] The TMN architecture thus represents the next stage in the evolution of automated ILEC network operations and management. "Almost all vendors of operations-support software claim TMN compliance" at least to some degree.[16] However, even where TMN-compliant systems are not being immediately deployed, the promulgation of the TMN standard by itself serves to establish system design principles and philosophies, as well as to define achievable performance goals, that are applicable to existing (legacy) as well as to forthcoming (i.e., TMN-compliant) OSS implementations.

OSS mechanization/automation/integration/unification efforts were not driven by any regulatory or legislative mandates, but were initiated by the telecommunications industry in response to ILEC concerns about *their own* efficiency and competitiveness.

It is important at this point to observe that work on OSS mechanization/automation/integration/unification was not driven by any regulatory or legislative mandates for the ILECs with respect to interconnection, unbundling, resale or local competition generally. Rather, the

14. Mark J. Effinger, "Operations Support: The Next Generation," *Bellcore Exchange*, Summer, 1997, at 15.

15. *Id.*, at 15.

16. Mark J. Effinger, "Operations Support: The Next Generation," *Bellcore Exchange*, Summer, 1997, at 14.

development of modern OSS design principles — and even the TMN architecture itself — were initiated by the telecommunications industry in response to ILEC concerns about *their own* efficiency and competitiveness. The development of TMN in the early 1990s,[17] as well as other OSS automation and computerization efforts, pre-date by as much as five years (or perhaps even longer) the enactment of the *Telecommunications Act of 1996* and associated FCC and state PUC interconnection, resale, and other requirements.

The process of mechanizing, automating, integrating, and ultimately unifying the various operations support systems improves efficiency in two significant ways: It replaces repetitive manual operations with automated processes, and it integrates and coordinates multiple systems and data bases. Among other things, these systems:

- permit increased utilization of plant resources through improved inventory management;

- reduce, and often eliminate, opportunities for errors and "fallout"[18];

- improve the rapidity and accuracy with which network faults can be identified and corrected;

---

17. *Id.*

18. "Fallout" is the network operations term for when a process that is supposed to flow through a designated series of steps for whatever reason does not do so, and must therefore be done manually or be re-entered into the system.

- reduce and in many cases eliminate the need for on-site inspections and repairs;
- improve labor productivity overall; and
- improve demand forecasting and construction planning, and postpone or even eliminate some relief jobs through the application of "just in time" inventory management techniques.

Although some, or even all, of these gains may help to *facilitate* interactions between ILECs and other telecommunications providers, the driving force behind OSS integration, and the primary ILEC benefit from doing so, lies squarely within the ILEC's own operations. In no sense could it be claimed that competitors or competition are somehow "responsible" for requiring that ILECs invest in OSS; indeed, there is every indication that such investments and pursuits are highly cost-effective and would (or should) be undertaken even if local competition, interconnection, unbundling and resale were not in the picture.[19] Advanced, automated OSS create an improvement in ILEC service quality that *by itself* easily justifies the initial capital outlay.

19. Between 1973 and the break-up of the former Bell System in 1984, more than $1.7-billion was spent by Bell Laboratories on the Business Information Systems Program. During that period, BOCs regularly offered testimony in numerous general rate case proceedings as to the economic gains and value of such efforts, which were (at that time) funded entirely by flow-throughs to ratepayers. The potential economic gains from the deployment of modern integrated operations support systems easily surpasses the modest, and sometimes questionable, gains produced through the BIS program.

Modern integrated OSS improve an ILEC's service quality by enabling it to offer customers significantly more rapid, and sometimes even instantaneous, fulfillment of service orders and other requests. These systems can also greatly reduce the interval between the receipt of a service complaint and its correction. Across the country today, large customers can be *and are already being* provided with direct on-line access to ILEC databases and other resources for entering service orders, performing testing operations, and other transactions that eliminate the need for intermediate customer service contacts.

While ILEC investments in advanced OSS have facilitated ILEC *competitiveness*, there is an important distinction between "facilitating competitiveness" and "facilitating competition." Competition has been a factor in the US telecommunications industry for nearly three decades, and has been a key concern of local telephone companies since the break-up of the former Bell System in 1984. For example, ILECs' Centrex or Centrex-like offerings compete in the business telephone systems market with customer-premises PBX systems and equipment. ILECs also compete with interexchange carriers in the intraLATA toll market, with Competitive Access Providers in the special access market and, most recently, with resellers and CLECs in the retail and facilities-based local exchange service market. To become and to remain competitive with the new entrants in these markets, ILECs must improve their own efficiency and responsiveness.

An advanced OSS deployment program facilitates ILEC competitiveness in a number of ways: It improves service quality and responsiveness with respect to competitive services such as Centrex; it facilitates the more rapid introduction of new services and service features in response to rapidly changing marketplace conditions; it also reduces the cost of competitive services overall.

With very few modifications, the *same* advanced OSS will also facilitate regulatory compliance with requirements of Sections 251 and 252 of the Act and associated regulatory requirements with respect to the offering of bundled services on a wholesale basis and the offering of UNEs to competing local exchange carriers. These systems can enable competing providers to order services and UNEs efficiently and can potentially provide competitors with access to network information and data bases that is identical to that which is available to those segments of the ILEC's overall operations with which the new entrants compete. For example, in order to provide customers with fully equivalent retail services, resellers of ILEC bundled services must have the same or equivalent access to the service ordering, scheduling, number assignment, and status verification systems and data bases as would an ILEC retail service representative. *Integrated operations support systems make this possible.*

The Telecommunications Act of 1996 and the various state and FCC regulations addressing issues of interconnection, unbundling and resale all impose an obligation upon ILECs to facilitate competition by permitting other non-affiliated entities to gain access to the ILECs' networks, particularly where replication or duplication of existing ILEC infrastructure elements would be infeasible and/or uneconomic. ILECs thus confront a specific *business need* to be competitive, and regulatory and legislative *requirements* to facilitate the entry of competitors into their traditionally monopolized markets. Investment in advanced OSS is essential for the ILECs to meet *both* of these objectives.

OSS investments are economically justified and result in a net decrease in ILEC operating costs overall.

Operations Support Systems modifications that ILECs claim are driven by the need for their compliance with interconnection, unbundling and resale requirements imposed by the Act and associated regulations differ in an important way from previous regulatory mandates that ILECs modify systems so as to facilitate competition. Whereas ILEC investments like those required to provide equal access for interLATA long distance carriers were made solely in response to regulatory mandate, OSS investments are economically justified, and would be prudently pursued by ILECs without any regulatory requirement whatsoever.

Following the divestiture and the FCC's initial *Access Charge* order,[20] ILECs were forced to upgrade or replace central offices with equipment capable of providing "equal access" to all interexchange carriers. However, accommodating equal access was the *principal purpose* of the central office replacements and upgrades that the ILECs were required to pursue following the break-up of the former Bell System. While the new switches may also have provided other benefits to the ILECs, the driver for these investments was clearly the requirement that multiple IXCs be permitted to compete on an equal basis for interLATA long distance business.

Moreover, since the ILECs were, at that time, expressly prohibited from entering and competing in the interLATA toll market, they possessed neither the incentive nor any reason

20. *MTS and WATS Market Structure*, CC Docket No. 78-72, Phase I, Report and Order, FCC 86-89 (rel. February 28, 1986).

to deploy equal access in a discriminatory or anticompetitive manner; in fact, because the ILECs were required to charge IXCs (other than AT&T) heavily discounted "non-premium" access charges prior to the introduction of equal access in a given central office, they actually had a strong revenue enhancement incentive to deploy equal access as rapidly as possible.

Unlike the case with equal access, the use of OSS in facilitating compliance with statutory obligations is an *ancillary* (although clearly an important) use of these new systems; it is not and has not been the economic driver behind such investment. ILECs realize significant economic, operational and competitive gains from the deployment of these systems irrespective of any regulatory compliance requirements.[21] This is borne out by the fact that work on the development of the new integrated architecture began long before the promulgation of any legislative or regulatory mandates. There clearly exists an economic justification for the deployment of efficient and integrated OSS that does not turn on the need to accommodate competitive access or other regulatory obligations.

ILEC investment in improved OSS would be economically justified even without the specific statutory/regulatory requirements relating to CLECs:

> Bellcore analyses have shown that the cost-per-line savings resulting from the target operations support environment outlined in this article [i.e., investing in an integrated OSS architecture] can be substantial both for existing narrowband networks and advanced broadband networks. These savings can be realized in areas ranging from customer

21. They may also derive significant benefit from such compliance. For example, Bell Operating Companies that satisfy the "competitive checklist" contained in Section 271 of the *Act* will be permitted to enter the interLATA long distance market.

> contact to service activation and repair, and are incremental to the major reeingineering efforts many companies have already undertaken.[22]

The target network and OSS environment described by Bellcore is one that incorporates forward-looking OSS components to create a target environment in which "end users have more control over their service, and business processes and network technologies are more flexible and efficient."[23] *Inter alia*, this target environment includes greater customer control; the rapid introduction and delivery of services; price, service, and quality choices; multiple-service retailers providing multiple services; simple and frequent service; customer self-service; real-time rating and discounting; communications companies functioning as unbundled network providers; and a network based upon dynamic resource allocation, software-intensive activation, proactive surveillance, and the use of the network itself as a data resource.[24]

The functional system architecture described in the article includes three main divisions: End-user access systems (for sales, customer network management, and operations and administration); business processes (following the TMN categorization into functional layers); and information products (including customer information, product and service information,

---

22. Michael A. Kret, "Operations Support: Managing the Choices. Managing the Change," *Bellcore Exchange*, Winter 1996, at 7.

23. *Id.*, at 5.

24. *Id.*, at 5, Table 1.

and network inventory information). These three divisions would be linked by open interfaces.[25]

Tangible cost savings, such as reduced manual labor time, significantly reduced fallout, elimination of duplicate data entry operations, improved plant utilization, and other benefits, are likely fully sufficient to satisfy any cost/benefit, discounted cash flow/business case test for investment in integrated OSS.

Whether used in providing specific UNEs to CLECs or utilized by the ILEC in constructing and configuring its own retail services, a primary function of modern, integrated OSS is the construction of services out of elemental network resources.

By their nature, integrated operations support systems are designed and intended precisely to provide the ILEC with the capability to construct *services* out of the various constituent network elements. In fulfilling an order for a residential access line, for example, the ILEC must identify and assign to the bundled service a set of network elements including, among other things, the subscriber loop including all sub-loop elements, the drop wire or building cable, digital loop carrier (DLC) interfaces and time slots, cross-connect points and appearances, central office entrance facilities, main distribution frame (MDF) appearances, central office inside plant, central office switch port, telephone number, special switch functions (e.g., to support Custom Calling and/or CLASS features), and any special signalling, conditioning, or other requirements, and must administratively record all of this information in

25. *Id.*, at 6, Table 2.

multiple data bases. The operations support system is designed to organize and to assemble all of these components into a total service, to allow each resource to be separately managed, assigned, connected and tested, and to maintain consistent, synchronized and integrated records that associate each network element with the total bundled service of which it is a component.

The inherent ability of integrated operations support systems to perform these functions in an automated fashion is precisely what is required in order for the ILEC to interconnect its network with CLEC facilities,[26] and to furnish UNEs to CLECs.[27] The very same network resources and components that the ILEC uses to construct its own retail bundled services are to be offered by the ILEC on an unbundled basis to other certificated local service providers. The very same type of on-line access to operations support systems and databases that ILEC retail service representatives require in order to enter, validate, verify and process retail orders for bundled services is also needed by resellers and CLECs in order to efficiently enter service and UNE orders and to conduct other transactions with the ILEC. In short, *an OSS that is designed to handle efficiently ILEC-only transactions should also be fully capable of accommodating the order entry and access requirements of CLECs*; hence, there is no reason to expect that ILECs will incur any consequential "incremental cost" to provide a CLEC-accessible OSS that would not be present in an ILEC-only environment.

26. As expressly required by Section 251(c)(2) of TA96.

27. As expressly required by Section 251(c)(3) of TA96

It might be argued that systems that are accessible by "outsiders" — i.e., by individuals not employed by the ILEC — require a more robust and secure design than a system where access is limited to "in-house" or "friendly" use. While that may be the case with the relatively simple systems used by small firms, *in large organizations such as ILECs the security requirements for an "in-house-only" deployment are not substantially different from those that would be required in a well-designed, efficient system that accommodates both "inside" and "outside" users.*

Complex systems typically support a broad range of transactions and functions, only some of which are accessible by individual users. Airline reservation/operations management systems offer a good example. These systems are accessible to in-house reservations agents as well as to independent travel agencies. Both groups are permitted to make and to cancel individual reservations, make other data base inquiries (such as fare rules and flight availability), to reserve flights on another carrier, and to issue tickets. Certain functions are not offered to travel agents, e.g., the ability to overbook a particular flight. But the same restrictions might also be in effect for a junior level airline reservations agent, whereas someone at a supervisory level may be permitted to override a "full flight" condition where, in that person's determination, such action is warranted. Reservations agents and travel agents cannot, however, modify flight schedules, crew schedules or aircraft deployment, even though the same system supports these functions as well. Even if no outside travel agents were given access to these systems, the same levels of access restrictions and security requirements would still be needed to prevent unauthorized access or use by the airline's own personnel.

Any organization that designs or builds a complex management information system on the assumption that it will only have to deal with "friendly users" does so at its peril. And the issue here goes well beyond concerns merely about unauthorized or malicious access: In complex systems, it is necessary for the various functions and data bases to be aligned and coordinated, and systems must be designed to achieve this outcome without worrying about whether any individual user will use the system incorrectly. For example, if an airline decides to substitute one type of aircraft for another on a particular flight, this fact needs to be communicated to the reservation database for that flight so that any subsequent, "downstream" changes that may be required (for example, in seat assignments) can be effected. Similarly, if the airline makes a change in the flight schedule or cancels a flight altogether, such changes must also be communicated to the reservations data bases so that passengers can be rebooked, notified or, if previously-booked flight connections are implicated, these can be adjusted as needed.

One of the traditional deficiencies in ILEC systems and data bases is their *failure* to communicate with one another. When a customer makes a change in service, that fact must be conveyed to a number of ILEC departments and functions, including plant assignment, billing, directory, and customer records. Efficiently designed operations support systems will be able to accomplish this coordination whether the transaction is physically initiated within the ILEC or by an outside entity, such as a reseller or a CLEC. The inclusion of reseller/ CLEC access within the specifications of such systems should have no consequential impact upon their development, design and implementation cost.

OSS investment costs are being recovered in the ordinary course of ILEC operations, and not through any specific fees or surcharges imposed upon ILEC customers or competitors.

For many years, regulators have explicitly taken into account ongoing ILEC investment in improved operations and systems. Under both rate of return regulation (RORR) and alternative, incentive-based regulatory paradigms such as price cap regimes, utilities are *expected* to operate their businesses in the most efficient manner. Incentive regulation programs expressly reward ILECs for improved efficiency by permitting them to retain, for a time (and in some cases indefinitely), some or all of the increased earnings that result from the deployment of efficiency-improving programs. Mechanization of operations support activities through the introduction of integrated OSS and/or TMN-compliant systems is precisely the type of activity that is expected of ILECs under incentive regulation.

Although there may be certain up-front capital cost outlays associated with these systems, their overall financial effect is to *reduce*, not to increase, the ILEC's costs on an ongoing basis. Under RORR, these capital outlays would be included in rate base and would thereby contribute to the depreciation and cost of money "revenue requirement" to be recovered in rates. However, assuming that these systems are economically justified, these additional cost elements should be more than offset by *savings* in ongoing operating expenses. Hence, under RORR, the deployment of efficient, integrated operations support systems should in the end result in a net *decrease* in rates overall.

Under incentive regulation, the ILEC would be permitted to retain some or even all of the economic gains associated with deployment of new OSS. These gains represent the return on the ILEC's investment in these new assets and should, assuming the overall OSS deployment is cost-effective, recover the associated investment costs. There is no basis, under incentive regulation, for the recovery of up-front investment costs of OSS specifically from any individual services or customers, either on a nonrecurring or on a recurring basis. ILEC investment in improved OSS and other efficiency/productivity-improvement programs was expressly contemplated *and expected* by the FCC and by state regulators in their respective adoptions of price cap and other incentive regulation programs. Development and implementation of management systems and techniques that improve overall ILEC efficiency was a specific goal of price cap and other incentive regulation programs to which ILECs have been subject since the late 1980s.[28] Incentive regulation programs also provide other reasons for ILECs to pursue deployment of new, integrated operations support systems.

In fact, several state price cap/incentive regulation plans expressly include specific performance rewards and penalties that relate directly or indirectly to the deployment of efficient OSS.[29] ILECs may be penalized if they fail to maintain, or even to improve,

---

28. *Policy and Rules Concerning Rates for Dominant Carriers*, CC Docket No. 87-313, Second Report and Order, FCC 90-314 (rel. October 4, 1990), at ¶s 1-3 and 30-31. *See also, e.g.*, Maryland PSC, *Inquiry into Alternative Forms of Regulating Telephone Companies*, Case No. 8715, Order No. 73011, November 8, 1996, at 3; Washington Utilities and Transport Commission, *Petition of GTE, Northwest, Incorporated To Adopt an Alternative Regulatory Framework*, Docket No. U-89-3031-P, July 23, 1990, at 3; and California PUC, *Alternative Regulatory Frameworks for Local Exchange Carriers*, Decision 89-10-031, October 12, 1989, 107 PUR 4th, at 15.

29. *See*, e.g., Mass. DPU, *Petition of New England Telephone & Telegraph Company, d/b/a NYNEX, for an Alternative Regulation Plan for the Company's Massachusetts Intrastate Telecommunications Services*, DPU No. 94-50, May 12, 1995, at 229-238; Illinois Commerce Commission, *Illinois Bell Telephone Company, Petition to Regulate Rates and Charges of*
(continued...)

service quality, which in many cases is defined to include, among other things, the time it takes to process a new service order, the time it takes to effect a repair or clear a trouble report, and other activities that are directly affected by the availability of integrated operations support systems.[30] Price cap and other incentive regulation systems thus expressly contemplate ongoing ILEC investment in efficiency- and productivity-improving measures, and have accommodated both the investment costs and economic benefits associated therewith in the incentive plans' price adjustment mechanisms.

Rather than resulting in higher rates, ILEC investment in OSS should be expected to reduce ILEC costs — and rates — overall.

As this paper has explained, it is not at all apparent that an ILEC's investment in integrated operations support systems will necessarily engender any net increase in aggregate revenue requirement, inasmuch as the primary purpose of this initiative is to *reduce costs*, not to increase them. Any aggregate change in the overall rate level — which is more likely to be a net decrease than a net increase — associated with or resulting from OSS investment must be recovered in a manner that is consistent with the constraints and practices of the prevailing regulatory paradigm.

---

29. (...continued)
Noncompetitive Services Under An Alternative Form of Regulation, Order, Case No. 92-0448, October 11, 1994, at 56-59; Connecticut DPUC, *Application of the Southern New England Telephone Company for Financial Review and Proposed Framework for Alternative Regulation*, Decision, Docket No. 95-03-01, March 13, 1996, at 40-49; and Maine PUC, *Investigation into Regulatory Alternatives for the New England Telephone and Telegraph Company d/b/a NYNEX*, Order, Docket No. 94-123, May 15, 1995, at 68-87.

30. US West, for example, has been subject to service quality penalties and/or other regulatory sanctions in Arizona, Colorado, Idaho, Minnesota, Oregon and Washington.

Under price cap or other incentive regulation systems, OSS investments whose purpose is to improve ILEC efficiency and productivity are not specifically recoverable except through the operation of the prevailing rate adjustment mechanism, i.e., the price cap index. To the extent that the net effect of such investment is a reduction in ILEC costs, the ILEC will retain some or all of the net economic benefit, and no flow-through of the OSS investment cost in rates is appropriate. At the same time, the improved efficiency and productivity arising from the ILEC's deployment of integrated operations support systems should be recognized in the next scheduled review of the incentive regulation program, and the rate adjustment mechanism should be adjusted accordingly.

Under RORR, OSS investment would be recoverable ratably through increased depreciation and cost of money charges, but would be offset by the resulting cost savings. To the extent that the net effect of such investment is a reduction in ILEC costs, the net savings should be flowed through to those services and elements that specifically benefit from the efficiency gain (subject only to regulatory lag).

Whatever method of flow-through, if any, of the costs and/or net economic benefits of OSS investment is to occur, it must be accomplished in a competitively-neutral manner. That is, the ILEC should not be permitted to impose costs disproportionately upon monopoly services or UNEs, or to flow through benefits disproportionately to its own competitive services.[31]

---

31. In a recent filing before the Maine PUC, NYNEX strongly suggested that the removal of "competitive" services from the operation of the Alternative Form of Regulation (AFOR)
(continued...)

A major source of OSS-driven efficiency gains stems from the substantial increase in overall "flow-through" of service order processing transactions.

While actual ILEC OSS performance data is generally proprietary in nature, subject matter experts, data from other industries, and some nonproprietary local exchange company filings all contribute to the conclusion that, in general, if the various OSS components are functioning properly and have been appropriately integrated and coordinated, "flow-through" rates are significantly improved, and "fallout" rates should approach zero and in no event should exceed 1% to 2% level that is assumed in the AT&T/MCI Nonrecurring Cost Model.[32] This is in marked contrast with past ILEC performance, which has included

---

31. (...continued)
will have the effect of *reducing* the "productivity offset" or "X factor" overall, since, according to the Company, its competitive services exhibit greater overall productivity growth than its "monopoly" services. (Maine PUC, Midterm Review of AFOR, Docket No. 97-344, *Comments of NYNEX on Scope of AFOR Review*, April 22, 1997, at 7-8.) While creative, this argument must be rejected. If in fact the NYNEX claim — that its competitive services are provided more efficiently than its monopoly services — is correct, that begs the question as to why this is the case. This outcome, to the extent it is even being accurately described, may well be the result of selective deployment of efficiency-producing systems and technologies to those services that happen to confront at least some competition. Such management tactics would be objectionable on their face and may well constitute an unlawful cross-subsidy of the competitive category to the extent that monopoly services provided any of the financial support for the new systems investment.

32. Southwestern Bell recently indicated in a Texas filing that its EASE system, which services residential lines, has a fallout rate of 1% (Transcripts; Open Meeting Prehearing Conference, June 24, 1997, Southwestern Bell before the PUC and ALJ). In addition, US West stated in a cost study filed with the Minnesota Public Service Commission on July 11, 1997 that "97% of all CSB PIC Changes are completely mechanized." In addition, Pacific Bell has reported that "about 95%" of orders taken by its retail service representatives flow through its ordering and provisioning systems without further human intervention. David P. Discher, Pacific Bell Legal Group, Letter dated May 23, 1997, to All Parties in California

(continued...)

error/fallout rates of as high as 30% to 40% or more, due largely to the lack of synchronization and coordination among the various systems and data bases.[33] Fallout rates of this magnitude would never be tolerated in any competitive network-based industry, such as banking, airlines, and express delivery services. Fallout in these industries arises largely from human error in data entry or from random equipment malfunction (e.g., a check sorting machine occasionally mutilating a check), not from fundamental lack of data base synchronization and accuracy. Moreover, even the potential for human error is minimized by sophisticated error detection and correction mechanisms that catch and correct most errors at the time they are made. Fallout in ILEC operations, while often ultimately the result of *undetected* human error, is more the result of fundamental systems failure than it is endemic to the nature of ILEC operations itself. Such systems failures can be eliminated almost entirely even without deployment of TMN-compliant systems by cleaning up existing data

32. (...continued) PUC Workshop on OSS, April 29, 1997-May 2, 1997, Re. Responses of Pacific Bell to Workshop Questions.

33. There are several sources of such problems. The presence of the same information in multiple data bases requires 100% synchronization, which is difficult to assure even in well-coordinated systems, and which is virtually impossible to achieve when the data bases do not communicate among themselves. For example, the same loop assignment information will appear in a loop (plant) data base as well as in a customer (service record) data base. When service is disconnected, the de-assignment of the loop must be recorded simultaneously in both of these systems. When this does not occur (for any of several reasons), the potential for mis-assignment of a working loop, or for non-assignment of a non-working loop, arises. One of the reasons why these systems do not properly communicate with one another is the lack of standardized interfaces and communications protocols. Adoption of long-established, standard Electronic Data Interchange (EDI) protocols can produce significant improvements in such communications, as can deployment of telecommunications industry-specific standards such as TMN. In many cases, however, even the versions of generic software associated with existing OSS may vary from system to system and from location to location, further exacerbating the communication and coordination difficulties.

bases and by operating legacy systems efficiently. On a forward-looking basis, integrated OSS will lead to greatly reduced fallout rates as compared with the historical ILEC performance.

There are several sources of fallout, all of which should be addressed and largely eliminated in integrated OSS:

- *Input errors.* If the initial input (typically made by the service representative) contains errors, mechanized processing will be interrupted and manual correction and re-processing will be required. Examples of input errors could include the address at which the service is to be provided, the specifications for the service, or similar information. Mechanized systems can validate much of the input data automatically, thereby correcting errors at the moment they are made. For example, input entries can be checked for internal consistency; customer addresses can be checked against geographic street address data base; and inward service orders can be checked for consistency vis-a-vis existing services at same customer location; among other things. Actual and possible errors in the data can be flagged for verification at the time of entry by the service representative (i.e., while the customer is still on the phone), and can be corrected on the spot.

- *Facilities assignment errors.* The lack of accurate and synchronized data bases is a frequent source of fallout. A service element (e.g., a loop) may be shown as available in an inventory data base when in actuality the resource is either in use or defective. This fact may not be determinable until the craftsman attempts to make the physical crossconnection. In such cases, the process is interrupted, the inventory data base is (in theory) corrected, a new loop is assigned, and another cross-connect order is issued.

- *Physical connection/configuration errors.* The requirement for manual cross-connections and other physical service installation tasks introduces the potential for error, the incidence of which can be significantly reduced in automated systems. For example, consistent use of Dedicated Inside Plant and Dedicated Outside Plant (DIP and DOP) in serving residential and small business premises dramatically reduces the need for physical connections and disconnections when a customer initiates or discontinues service, allowing virtually all of the service connection work to be accomplished remotely via OSS terminals and workstations. Use of digital cross-connect and digital loop carrier systems, also controlled remotely from OSS workstations, eliminates most of the potential for human error while also assuring accurate and consistent data base entries and records management.

When compared with many other (nonregulated) industries operating in competitive markets, ILEC transaction processing performance is unacceptably inefficient. ILEC fallout rates approach 30% to 40% or more, most of which require manual processing the costs of which dominate the aggregate cost of processing service ordering transactions. By contrast, fallout rates in many other industries fall in the range of 1% to 5% or even less.

For example, automated check processing systems reject rates have held at about 1% for the last five years, and have declined steadily over the past twenty years.[34] Even as early as 1971, the first year for which data are available, the reject rate was only 3.2%.[35] This steady improvement in performance over time is to be expected in a competitive industry, given continual advances in the technology involved, and competitive pressure to implement those advances.

United Parcel Service delivers 98.4% of ground packages, and 99.2% of air packages, on time (for corresponding failure rates of only 1.6% and 0.8%, respectively).[36] Again, the pressure from its numerous competitors means that UPS has little choice but to deliver extremely high levels of performance.

The growing adoption of Electronic Data Interchange (EDI) protocols by a wide variety of industries constitutes a third major example of the performance improvements that technology can, and indeed does, permit. EDI is a set of standard electronic formatting protocols that allow data to be passed between different companies and computer systems electronically, without human intervention. The RJ Reynolds Company, for example, has established an EDI system that it uses to exchange ordering and delivery information with its suppliers, replacing paper (fax) transactions and telephone ordering. One case study has

34. Bank Administration Institute, *1995 Benchmarks for Check Processing*, at 9-10.

35. *Id.*

36. Telephone conversation with Carl Strenger, UPS Customer Service Systems, June 12, 1997.

found that RJR's EDI system has reduced the costs for provisioning from $75 per paper order to only $0.93 per EDI order.[37] Another company adopting EDI transmitted 600,000 freight bills in 18 months electronically with zero errors.[38] There is every reason to expect and demand similar performance from the systems that CLECs will need in order to gain access to ILEC provisioning and maintenance. Throughout the academic and professional literature on EDI, it is repeatedly emphasized that the substantial efficiency improvements that result from the implementation of the technology lead to cost savings that can far exceed the initial investment costs in the EDI system. Given that integrated OSS enables an ILEC to manage its network the way EDI allows firms to manage the flow of orders and information between them, there is every reason to expect similar efficiency gains, and similar cost savings, from OSS investment.

Given well-designed integrated and coordinated systems, ILEC fallout rates should almost certainly approach these same levels. The presence of such low fallout rates in other similarly complex industrial processes demonstrates that significant improvement in ILEC performance is achievable and should be demanded. While certainly complicated, ILEC operations are comparable in overall complexity to other large industrial processes characteristic of network-based industries. As discussed above, package delivery services, banking and other network-based industries that confront challenges fully comparable to those facing the ILECs — with respect to coordinating diverse collections of facilities and systems — often operated by

---

37. Oklahoma State University Business School, Electronic Data Interchange (EDI), course Outline. Online version at: *www.bus.okstate.edu/sharda/mba5161/.*

38. *Id.*

multiple non-affiliated organizations sometimes in a number of countries speaking a number of different languages — report substantially lower fallout rates than have traditionally applied for ILECs. Consistent with the "competitive outcome" principle of economic regulation, ILECs should be expected to perform in a manner that is similar to the experience in these comparably complex competitive industries, and forward-looking ILEC cost studies should incorporate these ***achievable***, rather than achieved, fallout rates.

ILECs should not be permitted to pass on the costs of their unacceptably inefficient practices to customers and, in particular, to their competitors. Rather, they should be forced to invest in and upgrade their management systems and, until such deployment has been completed, to absorb the costs of inefficiencies present in legacy systems and operating practices. There is no reason why such state-of-the-art, integrated operations support systems should not be in place at the present time. The technology and the design for such systems has been available to ILECs for a number of years. Decisions by ILECs to defer deployment, or "non-decisions" in which the deployment issue was never even put on the table for management consideration, cannot justify burdening customers and competitors with costs and inefficiency that would simply be unacceptable under competitive market conditions.

Only the ILEC can ultimately control the pace at which fully-integrated OSS (of the TMN variety or otherwise) are deployed and the specific services/functions/geographic locations for which such deployment occurs. Allowing an ILEC to recover ongoing costs associated with inefficient legacy systems will effectively reward the ILEC for its past and present inefficiencies and impose those same inefficiencies upon ILEC competitors. There can be no reasonable justification for such a policy.

RATEMAKING TREATMENT OF OSS COSTS

OSS costs, to the extent that they even require specific ratemaking treatment in the first place, should be recovered in recurring rates, appropriately adjusted to reflect the salutary effects of the new integrated systems in reducing operating expenses overall.

Several ILECs have contended that investment in OSS primarily supports activities relating to the fulfillment of orders for wholesale bundled services for resellers and for unbundled network elements for CLECs. As such, ILECs propose to recover substantial portions of OSS investments and expenses through initial nonrecurring installation charges associated with such services and UNEs. The ILECs' contentions are wrong, for at least two separate reasons:

- First, as previous sections of this paper have demonstrated, OSS does not impose any net *increase* in ILEC costs; indeed, they result in net reductions. Moreover, the efficiency improvements engendered by OSS investment programs affect ongoing ILEC operations, plant utilization and other recurring activities as well as significantly reducing the costs and complexities associated with the processing of individual service transactions.

- Second, the overwhelming majority of OSS capital outlays and associated operating expenses are driven not by the volume of service-related transactions (i.e., ordering, provisioning, testing, disconnecting, etc.) but by the volume of service itself (i.e., the number of access lines, loops, switch terminations, interoffice trunks, etc.).

For both of these reasons, it is appropriate and economically efficient for OSS costs to be attributed to and recovered primarily through *recurring* rates for ILEC services and unbundled elements, and not through initial nonrecurring charges that are imposed in connection with specific service-related transactions. Moreover, inasmuch as OSS investment and deployment is driven by the desire by ILECs to reduce their own costs and to operate more efficiently, and not by any specific need imposed by the arrival of local competition and the associated interconnection, resale and unbundling requirements, there is certainly no basis for the ILEC to single out its competitors for disproportionate recovery of the ILEC's OSS deployment costs.

Improvements or upgrades to OSS that involve capital investments are incorporated into the ILEC's rate base. As such, they create ongoing revenue requirements rather than one-time costs. Capital investments — including capitalized installation costs — have traditionally been recovered through the use of recurring monthly rates rather than one-time charges imposed at the time a service is first installed.[39] This principle is maintained in the FCC's

39. Until 1986, a portion of ILEC service connection and installation costs were capitalized in accordance with Part 31 of the FCC's Rules, the (old) Uniform System of Accounts. (*Revision of the Uniform System of Accounts and Financial Reporting Requirements for Class A and Class B Telephone Companies (Parts 31, 33, 42, and 43 of the FCC's Rules)*, CC Docket No. 78-196, Report and Order, FCC 86-221 (Rel. May 15, 1986). For rate design purposes, these costs were treated as part of the *recurring* revenue requirement of the service, and were typically recovered through *recurring* monthly rates. Beginning in
(continued...)

Interconnection Order I, which calls for recovery of recurring costs through recurring, rather than through nonrecurring, charges.[40]

Failure to correctly match the accounting treatment of these costs with the manner in which they are recovered could result in a mis-match in the *timing* of costs and revenues, creating spurious "deficiency" conditions that the ILEC may seek to recover through a general rate increase or other rate level adjustment. While this problem arises both under RORR and under incentive regulation systems, it is particularly acute in the latter case.

ILEC financial performance and earnings are measured in terms of discrete accounting periods, typically one year in length. If the timing of costs and revenues is not synchronized, it is possible that a surplus could arise in one accounting period offset by a deficit in a subsequent period, or vice versa. Under RORR, rates can be adjusted to reflect these conditions such that, even though there will typically be some lag, on the whole revenue

---

39. (...continued)
1986, FCC accounting rules were modified such that most installation labor costs were expensed at the time they were incurred (*Id.*, at ¶s 133-137) and ILECs responded by revising their intrastate rate structures so as to shift the recovery of these now-expensed costs from recurring to nonrecurring charges.

40. The Order concluded that "recovering a recurring cost through a nonrecurring charge would be unjust and unreasonable because it is unlikely that incumbent LECs will be able to calculate properly the present value of recurring costs." *Implementation of the Local Competition Provisions of the Telecommunications Act of 1996*, CC Docket No. 96-98, First Report and Order, FCC 96-325 (rel. August 8, 1996), (*First Interconnection Order*) at ¶ 746.

levels can, over time, be tied fairly closely with revenue requirement.[41] Even here, however, RORR tends to be biased in favor of allowing ILECs to retain earnings surpluses longer than sustaining earnings deficiencies. In the case of a deficiency, the ILEC can initiate a general rate case proceeding for purposes of adjusting its rate level upward so as to correct the shortfall. However, the ILEC is typically not obligated to symmetrically initiate a general rate case to reduce rates in the presence of a surplus. Regulators (or, perhaps, intervenors) can take such action, but will sustain the burden of proof against the ILEC, where the ILEC is in control of the vast majority of the financial and other data necessary for an effective rate reduction case to be made. Thus, under RORR, the ILEC can hold onto a surplus for a longer period of time than it will be required to sustain a shortfall, creating the potential for windfall gains where the timing of accounting costs and revenues does not precisely track.

Under incentive regulation, this bias is significantly magnified. For example, the current FCC price cap plan, as modified in the Commission's May 21, 1997 Order,[42] removes entirely any ceiling on ILEC earnings or requirement that excess ILEC earnings be "shared" with or refunded to ratepayers. At the same time, the current FCC plan permits an ILEC to seek an upward adjustment in its rate level if realized (interstate) earnings fall below 10.25%, i.e., 100 basis points under the "authorized" 11.25% interstate rate of return.[43] Some state

---

41. For example, test year adjustments can be made to recognize known and measurable changes, so certain mismatches of revenues and costs, particularly where these occur in consecutive accounting periods, can be reconciled.

42. *Price Cap Performance Review for Local Exchange Carriers*, CC Docket No. 94-1, Fourth Report and Order, FCC 97-159, (Rel. May 21, 1997), (Fourth Price Cap Order).

43. *See*, FCC Fourth Price Cap Order, at paras. 11 and 149.

incentive regulation plans also incorporate similar asymmetric treatment of earnings surpluses and shortfalls, and ILECs can in most cases apply for an increase in rates even under price cap type regulation if they experience an earnings erosion. However, even in the absence of an explicit "low end earnings protection mechanism" such as the FCC's 100 basis point trigger, ILECs can still attempt to invoke Fifth Amendment "takings" and "confiscation" claims in the face of an earnings shortfall, while having no obligation, legal or otherwise, to voluntarily reduce rates or refund excess profits in the event that earnings increase to supra-competitive levels.

Recovery of OSS costs — if and to the extent that any net increase in overall operating costs can even be identified — through transaction-based nonrecurring charges will have the effect of imposing such costs disproportionately upon new ILEC customers and ILEC competitors, *despite the fact that the benefits of OSS improvements are realized broadly across all ILEC operations, services, and customer classes.* To the extent that OSS costs require explicit recovery at all, the only fair, equitably and economically efficient policy is to recover such costs ratably through recurring rates applied across all ILEC services and service elements.

OSS investments are a function of aggregate service volumes, and are not particularly sensitive to or driven by either the volume of service-related transactions that the ILEC may be required to process or the presence of local service competitors.

One of the most visible benefits arising from the deployment and use of efficient, integrated OSS is found in the manner in which service-related transactions are processed.

While OSS support both ongoing ILEC operations as well as the fulfillment of specific service transactions, the *costs* of these systems are driven primarily by aggregate retail and wholesale service *volumes* — number of access lines, number of interoffice trunks, number of central offices, number of minutes, etc. — rather than by the volume of service-related transactions. Thus, even though OSS resources facilitate service-related transactions, ***the aggregate costs of OSS deployment are not themselves materially driven or affected by the total volume of transactions that these systems are expected to accommodate.*** While the total cost of OSS deployment may, in theory, be slightly affected by the aggregate volume of service initiation/disconnection/modification transactions and by the incremental costs, *if any*, of accommodating CLEC access to ILEC OSS, it is likely that the actual impact of these latter two cost drivers is extremely small.

The size of data bases and quantities of connection and testing interfaces that collectively comprise an integrated operations support system will vary in proportion to the volume of service that the ILEC actually provides. For example, the loop assignment data base must be sized to accommodate one record for each wire pair or sub-loop element in the ILEC's outside plant. That size is *not*, however, affected by the frequency with which this data is added, deleted or modified in response to specific service ordering transactions. Similarly, the size of the customer records management data base is a function of the total number of ILEC customers, not of the rate at which customers place service orders or initiate other transactions with the ILEC. Thus, most OSS costs are driven by service volume, not transaction volume, and as such should be treated as part of the overall cost of each service and recovered through recurring rates. Only that portion of OSS investment that is specifically sensitive to the volume of transactions is potentially recoverable in nonrecurring transaction-based charges.

One aspect of OSS investment where such transaction-sensitivity might come into play is in the capacity of the central processing units (CPUs) of the computer systems that are employed in the transaction processing operation. In other words, a more powerful (i.e., faster) CPU — and/or more CPUs — will be required in order for the ILEC to process, for example, 10,000 transactions per week as compared with 1,000 transactions per week. The costs of the system software and data bases themselves will not be materially affected by the volume of such transactions.

Based upon this analysis, the overall magnitude of transaction processing costs in a mechanized operations support system is likely to be extremely small, both in aggregate and on a per-transaction basis. CPU costs, when expressed on a per-unit of processing capacity basis (e.g., Million Instructions Per Second (MIPS)) are among the most rapidly declining of all computer hardware and software elements. For example, the capital purchase price per MIPS of CPU capacity in 1997 for mainframe (hardware) computer systems is approximately $10,000, down from more than $100,000 in 1990.[44] Spread over, for example, a five-year recovery period, and assuming a 6-day work week, that cost works out to around $6.50 per

---

44. Aberdeen Group study, cited in Tim Ouelletter, "Software Costs Trap Mainframers," *Computerworld*, March 31, 1997. See also, *State of Florida Information Resource Commission Information Technology Update*, "Mainframe Computing: CMOS Technology for 'Big Iron,' August 8, 1996, mail.irm.sttc.fl.us/itumnfrm.html; and The Clipper Group *Navigator*, "1995 Retrospective on Enterprise Computers," December 29, 1995, www.clipper.com/NAV/1995ent.htm.

business day. Assuming an 8-hour day and 50% average CPU utilization, that translates into a capital cost of roughly 6/100ths of one cent per second of computer time, i.e., for the capability to execute one million computer instructions. One million instructions likely represents the correct order-of-magnitude of complexity for processing a service order transaction. However, even if such transactions required as much as *one full minute* of high-speed CPU time (which would constitute an astronomical amount of computer resource in the context of the types of transactions that are involved here), the capital cost *per transaction* would still be only about 3.5 cents! Thus, while there are certain transaction-sensitive investment costs in an operations support system, their magnitude is truly *de minimis* by any reasonable standard, indicating that as a practical matter these minuscule costs can effectively be ignored.

Rate design treatment for OSS cost recovery must comply with the principles of forward-looking TELRIC/TSLRIC principles and should track the primary drivers of OSS costs.

Section 251(c)(1) of the federal Act requires that interconnection and network element charges be "(i) based on the cost (determined without reference to a rate-of-return or other rate-based proceeding) of providing the interconnection or network element (whichever is applicable), and (ii) [be] nondiscriminatory." This provision of the Act is generally interpreted to require that interconnection and UNE rates be based upon forward-looking incremental cost.[45] Because the nature and extent of integrated OSS deployment affects the

45. FCC, *First Interconnection Order*, at ¶s 672-703. While the 8th Circuit Court of Appeals has reversed the FCC's preemption of state jurisdiction over the pricing of these

(continued...)

cost of all ongoing ILEC operations, the accurate determination of recurring TELRIC costs for individual UNEs must itself consider the impact of OSS improvements over the relevant time period.

Consider the following example. The TELRIC for an unbundled subscriber loop must reflect efficient engineering design of loop plant. Among other things, this means that the TELRIC should reflect an efficient level of fill or utilization of the loop plant, given the demand to be served and the need to reserve spare capacity for maintenance and repair and "churn." All other things being equal, higher utilization results in a lower cost per working loop.

Among the factors affecting the amount of spare capacity that an ILEC must have in its loop plant to allow for maintenance and repair and "churn" is the accuracy with which outside plant assignment records are maintained. The more accurate the outside plant assignment records, the less spare capacity the ILEC will require. If a loop is incorrectly identified in an ILEC database as "assigned" when it is actually idle, the ILEC will perceive a need to have an additional idle loop to meet its administrative spare target, which will reduce effective

---

45. (...continued)
elements, it has not challenged the validity of the FCC's adoption of Total Element Long Run Incremental Cost (TELRIC) as the appropriate pricing standard. *Iowa Utilities Board, et. al. v. FCC*, No. 96-3321 and consolidated cases (8th Cir., filed July 18, 1997), at 20. The FCC further clarified its position with regard to NRCs when it ordered that a BOC must show "that its non-recurring charges reflect forward-looking economic costs" in order to comply with Section 271 requirements for the offering of interLATA long distance. (*Application of Ameritech Michigan Pursuant to Section 271 of the Communications Act of 1934, as amended, To Provide In-Region, InterLATA Services in Michigan*, CC Docket No. 97-137, Memorandum Opinion and Order, FCC 97-298 (rel. August 19, 1997), at ¶ 296.)

utilization of its loop plant. High errors in loop assignment databases can actually cause premature plant additions, because the *apparent* utilization rate based upon the data base records exceeds the actual utilization rate. Both of these problems cause historic outside plant utilization levels to fall below the utilization rates achievable with deployment and efficient use of fully integrated OSS. Thus, a TELRIC study of unbundled loops should assume higher outside plant utilization than historic levels as a direct result of the improved inventory management associated with the efficient deployment of forward-looking OSS.

Similarly, a TELRIC study of unbundled loops should assume lower maintenance costs than historic levels, consistent with the assumption of efficient deployment of forward-looking OSS. In the past, poor record-keeping has increased ILEC maintenance costs because defective loops that are not correctly identified as such in the loop data base have been inadvertently assigned to customers, creating service problems that require correction, often involving physical on-site work. Accurate outside plant assignment records in a fully integrated OSS loop database will significantly reduce the incidence of such conditions, thereby reducing maintenance costs.

These examples highlight the interaction between the development of recurring costs and the OSS deployment level that is assumed in the TELRIC study. An ILEC cannot legitimately apply inputs such as pre-integration OSS maintenance costs and utilization rates in computing TELRIC costs for recurring UNE prices, while at the same time including future OSS deployment costs in the *nonrecurring charges* it imposes for these same services.

In no event is it appropriate for an ILEC to charge its customers and competitors for OSS costs unless the same level of OSS deployment is also assumed in developing recurring prices for the underlying services and UNEs themselves, i.e., unless the specific operations savings associated with that investment are fully reflected in the development of recurring service and UNE prices. Were this done, the *net effect* will almost always be negative; i.e., the added costs engendered by the OSS investment will be less than the *reduced* recurring costs associated with the service itself. OSS costs should be recovered in a manner that is consistent with the source of cost variation, i.e., in such a way as to accurately reflect the primary cost drivers associated with OSS investment. The following specific principles should be adopted:

- *The amount of any OSS-related transaction-based nonrecurring charge should in no event exceed whatever specific transaction-sensitive OSS processor costs can actually be isolated and identified, and should only be imposed to the extent that such costs, when expressed on a per-transaction basis, are more than de minimis.*

  The primary system element that is *transaction-sensitive* is central processor capacity. Data bases, physical storage devices, interconnections between and among the various operations support systems and network facilities (e.g., loops, trunks, switches) are sensitive to the total number of lines and/or usage, not to the number of transactions that are to be processed. Processor costs represent a very small fraction of total OSS/TMN investment, and may be *de minimis* when expressed on a per-transaction basis.

- ***All other OSS costs should be associated with and recovered in recurring rates.***

  - Those OSS components that are associated with subscriber loops (e.g., loop assignment databases, loop testing, IDLC interfaces, etc.) should be assigned to and recovered in bundled and unbundled loop rate elements.

  - Those OSS components that support central office line-side interfaces (e.g., number assignment databases, customer and class of service records, etc.) should be assigned to and recovered from bundled exchange service access lines and unbundled port elements.

  - Those OSS components that support traffic-sensitive central office and interoffice trunk facilities should be assigned to and recovered from usage-sensitive local and carrier access rate elements.

All OSS costs should be directly assignable to specific services and elements, because OSS investment should be a function of, i.e., should vary in rough proportion to, the overall scale of the business. Hardware elements of the OSS (e.g., memory, processor capacity) will vary in rough proportion to the volume of services (in the case of memory) or the volume of transactions (in the case of processor capacity). Software licenses are generally priced on the basis of volume, and also tend to vary in rough proportion to the overall size of the firm. As a result, in terms of a forward-looking, TELRIC methodology, there will be no consequential "shared" or "joint" OSS costs.

OSS and other transaction-sensitive costs that may be incurred by the ILEC under "least cost" forward-looking integrated operations support systems technology, are extremely small.

The key principle for an ILEC in setting nonrecurring service connection and other service or UNE transaction charges for UNEs (and for bundled wholesale services where no corresponding retail transaction charge exists) furnished to CLECs is that such nonrecurring charges should be set at the TELRIC/TSLRIC applicable to the specific service or UNE transaction, assuming the use of the least-cost forward-looking technology, and excluding all retail transaction functions.

Applying the "least cost" principle to the provision of service connection and transaction functions of this sort requires that nonrecurring charges be set on the assumption that the ILEC deploys modern, integrated operations support systems. And once deployed, these systems eliminate virtually all manual labor activities (except where physical cross-connections and drop wire installation is required). Moreover, because of their ability to align and coordinate the various data bases and systems, integrated OSS, whether these are legacy or new TMN-compliant systems, should exhibit extremely low error rates, creating minimal fall-out and minimal exception processing and error correction activities.

As previously noted, in the context of TELRIC/TSLRIC study methodology, the term "forward-looking cost" is to be interpreted as the most advanced technology that is available to the ILECs and that they can deploy today. As the forward-looking network architecture, integrated OSS should be used as the basis for all ILEC nonrecurring and recurring charges, even where such systems are not yet fully deployed. The specifications, technology and physical ability to deploy these systems have been in place for a number of years, and such systems are currently in use by at least some ILECs. The deployment of integrated OSS constitutes the only truly cost-effective and prudent means for ILEC management to maintain a modern, efficient network. An ILEC's failure to invest in or to have invested in and deployed such integrated systems does not justify burdening its competitors with the consequences of that unfortunate management decision. Indeed, to do so would have the effect of *rewarding* the ILEC (by allowing it to increase its competitors' costs of doing business) for its own failure to adopt the most efficient operating practices and systems.

ILECs have been operating under regulatory mandates to improve their overall efficiency, and have even been provided with powerful economic incentives to do so as rapidly as possible. For purposes of establishing appropriate nonrecurring charges for services and UNEs to be furnished to ILEC competitors, it is appropriate to *assume* that the ILEC has adopted efficient integrated operations support systems, and to require that it set its nonrecurring charges accordingly.

Costs incident to accommodating statutory/regulatory mandates regarding interconnection, unbundling and resale, if any such costs actually exist, are necessarily driven by the public policy goal of increased competition, not by individual competitors, and must not be imposed solely upon new local service providers.

As explained at length above, there is no reason to expect, with state-of-the-art integrated operations support systems in place, that an ILEC's costs to furnish bundled services to resellers or unbundled elements to CLECs will be greater than for comparable transactions associated with the ILEC's own retail customers. Indeed, to the extent that the competitor assumes responsibility for substantial portions of the data entry, validation and re-processing of orders where the fallout is the result of the competitor's error, the ILEC's costs should actually be considerably *lower* for competitor-initiated transactions than for orders initiated by its own retail service representatives. Even if, for the sake of argument, there were certain "extraordinary" costs that existed only where a competitor transaction was involved, it would be entirely inappropriate for the ILEC to recover such costs exclusively from its competitors, for several reasons.

First, the presence of such costs is entirely within the control of the ILEC and results from the manner in which the ILEC designs and deploys its operations support systems and practices. If the ILEC treats competitor-initiated orders as "exceptions" to its normal flow of order processing operations, it is no surprise that such "exceptions" would generate added costs. However, such treatment would be inconsistent with the principle of basing rates upon the most efficient, forward-looking technology and operating practices, particularly since integrated operations support systems are fully capable of dealing with ILEC- or competitor-initiated transactions on an entirely consistent and equivalent basis.

Second, even if under the best of circumstances such cost differentials (between ILEC- and competitor-initiated transactions) persisted, it would still be entirely inappropriate and inconsistent with the goals and requirement of the *Telecommunications Act* for the ILEC to impose differential charges. ILECs are required by the *Act* and by the FCC to deal with competitors on a nondiscriminatory basis, no differently than the ILEC deals with its own customers and operations. Consider the following simple example.

Suppose that the ILEC's price for a bundled exchange service access line is $20 and that its avoided retailing costs are $5. As I interpret the requirements of Section 251(d)(3) of the *Act*, this would imply a wholesale price of $15 (i.e., $20 retail price less $5 avoided retailing costs). Suppose, however, that the ILEC claims that it will incur reseller-specific "wholesaling costs" of $3, and is permitted to offset this amount against the $5 in avoided retailing cost in setting the wholesale price, i.e., is allowed to charge $18 for the wholesale bundled service ($20 – $5 + $3). Suppose that a competing reseller is more efficient than the ILEC's own retailing operations and is thus able to perform all of the required retailing functions for $4 (as compared with the $5 amount that is incurred by the incumbent). If the reseller were offered the wholesale service at $15, it could reflect its more efficient retailing operations in setting its price below the $20 ILEC retail price. However, if the ILEC is allowed to recover its claimed reseller-specific "wholesaling cost" exclusively from resellers, the reseller would be required to pay the ILEC $18 for the wholesale basic service, and then incur an additional $4 for its own retailing functions, forcing the reseller to charge no less than $22 (i.e., $18 + $4) in order to remain profitable. Thus, even though the reseller's retailing costs are $1 *less* than the incumbent's, it would be forced to set its own retail *price* at least $2 *above* that charged by the incumbent. This would be an anti-competitive outcome that would work to discourage, rather than to facilitate, the entry and development of competition.

Arguably, the cost of a "gateway" to permit competitors to access the incumbent's OSS is an example of a cost that the ILEC would not incur, but for the mandate to do so. Even these costs, however, should not be imposed solely upon new entrants to the local exchange market. Instead, the costs of developing the gateways necessary for entrants to use the OSS of the incumbent should be paid for by the incumbent, and the cost of the gateways that entrants have to develop should be paid for by the entrants. The need to develop gateways arises from the legal requirement that incumbent local exchange carriers open up their networks for multiple carriers. In this case, the government mandate constitutes what can be called competition onset costs.

This is by no means the first time a change in a law has imposed costs on an industry. The Americans With Disabilities Act ("ADA"), for example, imposed large costs on a number of industries, including hotels and restaurants. Existing hotels and restaurants could not impose the cost those incumbents incurred to comply with the ADA on entering hotels and restaurants, who also had to comply. Instead, the market price for hotel rooms and restaurant meals came to reflect the efficient costs of complying with the ADA.

The same requirement should apply here for two reasons. The first is that it would create a barrier to entry to allow incumbents, solely because of their control over bottleneck monopoly inputs, to try to pass these costs on to entrants who must also cover their own competition onset costs. The second is that to allow incumbents to pass these costs on to entrants would create an incentive for incumbents to comply with the government mandate in inefficient ways.

If entrants have to bear their own competition onset costs, such as the cost of the gateway, as well as the incumbent's competition onset costs, it would result in the entrants having to bear costs that the incumbents did not and do not bear. This is the classic definition of a barrier to entry. In the case of the gateway, the entrant will have to pay to develop two gateways, while the incumbent pays for none. Thus, even if the gateway created by the incumbent were done in the most efficient manner possible, it would create a barrier to entry.

If the entrant pays for the competition onset costs of the incumbent, including the gateway developed by the incumbent, there is virtually no chance that the incumbent will select the most efficient means for complying with the mandate to open its markets to competition. The incumbent does not want entry. If it can comply with the mandate at high cost but put the cost on the entrant, it is much less likely to face effective competition than if it cannot do so. The only way to create an incentive for the incumbent to comply with the mandate to open its markets to competition in the most efficient manner possible is if the incumbent has to bear the cost.

Thus, if it is determined that the ILEC does incur costs that are unique to processing transactions initiated by its competitors, the ILEC should in any event not be permitted to recover those allegedly extraordinary costs of fulfilling CLEC transactions solely from CLECs, but must either spread those costs across all services and customers, or include such costs, to the extent prudently incurred, in the capital costs of its OSS.[46]

---

46. Note that one must distinguish here between costs that ILECs might uniquely incur in processing CLEC-initiated orders involving interconnections, UNEs or wholesale bundled (continued...)

Retail and wholesale nonrecurring transactions should be separated and unbundled, with the same wholesale nonrecurring transaction charges applying to ILECs (on an imputed basis) and to CLECs.

An ILEC's costs of furnishing service to a reseller or UNEs to a CLEC should be considerably less than the costs it incurs in dealing with its own retail customer. Once fully integrated operations support systems are in place, the principal manual activity will be the customer contact, customer data capture, credit verification, order entry, and order status inquiry functions that occur at the retail level. Once the retail service representative enters the required data into the system, the remainder of the service provisioning process — assignment of facilities, issuance of setup and configuration commands to digital switches, intelligent digital carrier and cross-connect systems (DACS) and other network elements, creation of billing and accounting records, and scheduling of premises visits or other field activities where required — should be entirely automated. Most of the nonrecurring cost associated with such transactions thus takes place at the retail order entry level, and only *de minimis* processor costs are incurred as the retail order flows through the various system components and data bases.

When competitors are provided with efficient and non-discriminatory on-line access to these systems, the competitor, and not the ILEC, incurs those retail contact and order entry costs. In that instance, the only transaction costs that the ILEC incurs are those associated

---

46. (...continued)
services from the costs incident to other interactions between the ILEC and CLECs that may arise in these firms' day-to-day operations in a multi-provider marketplace. In this latter situation, each entity is responsible for its own costs, and compensation from the ILEC's peers should neither be expected nor required.

with the flow-through of the competitor's retail service order across the various ILEC operations support systems and data bases. and consist primarily of *de minimis* processor costs.

Any entity that is capable of communicating directly with the ILEC's OSS should be entitled to pay NRCs that reflect only the small processor capacity costs and operating expenses associated with the non-retail order processing and fulfillment functions.

Many, if not all, CLECs and resellers are currently deploying integrated (and in some cases TMN-compliant) OSS of their own, systems that are fully capable of direct data interchange and communications with ILEC systems that support compatible communications protocols. By statute and by regulation, ILECs may not discriminate as between their own retailing operations and those of bundled service and unbundled network element resellers and CLECs with respect to access to the ILEC's OSS/TMN for transaction processing and other services and transactions customarily furnished at the retail level (e.g., trouble reporting and testing).

The only portion of OSS investment that is theoretically CLEC-specific is that required for interfaces between the ILEC and CLEC systems. Even this component is only "theoretically" CLEC-specific because most, if not all, of these same functions and capabilities are required by the ILEC in order to provide similar OSS access to its own retail service personnel as well as to its largest corporate/government customers. As such, the incremental costs of providing reseller/CLEC interfaces may be at or near zero.

A number of firms in other industries already offer on-line access to their order entry and other operations support systems to their major customers and resellers. For example, automobile manufacturers provide their dealerships with access to on-line order entry systems for parts as well as for complete vehicles. Similar arrangements exist as between the manufacturer and the retailer in any number of other industries. As was discussed previously in this paper, airlines offer their retail travel agencies and major corporate/government travel customers on-line access to reservations and ticketing systems, and allow them to initiate virtually the same set of transactions as are available to an airline employee reservation agent; indeed, airlines now offer such access to individuals via the Internet or other on-line services. Federal Express and UPS offer customers on-line access to their systems for requesting pickups and for tracking the status of deliveries. These types of arrangement are becoming the norm, not the exception, in virtually all industries ***except for regulated incumbent monopoly local exchange telephone companies***!

The privileges and capabilities afforded a CLEC customer service/order entry representative should be substantially identical to those available to an ILEC customer service/order entry representative. There is thus no basis for any claim that ILECs must incur costs to accommodate reseller/CLEC access to their OSS systems that would not exist but for the presence of resellers/CLECs. Accordingly, the Board should adopt as a rebuttable presumption the principle that CLEC-specific OSS investment is zero.

CONCLUSION

ILEC investment in OSS and other efficiency-improving programs is driven by these companies' needs to reduce operating costs and to improve their own competitiveness in the increasingly competitive telecommunications marketplace. Accordingly, investment in integrated operations support systems *reduces* cost overall, and is in no sense a new category of cost that requires flow-through or recovery from any ILEC customer or competitor.

Moreover, while efficient operations support systems facilitate ILEC compliance with statutory and regulatory mandates that ILECs provide interconnections, unbundled network elements, and bundled services for resale to their new local service competitors, the deployment of these systems is not driven by such compliance requirements. Accordingly, even if there were any net positive costs that an ILEC may incur in improving existing or in deploying new operations support systems, which there are not, such costs are *in no sense caused* by ILEC competitors, and cannot be recovered exclusively from them. Competition in the local telecommunications market has been determined by the United States Congress to be broadly beneficial to all consumers, and so any costs incident to achieving a fully competitive local exchange marketplace must be spread broadly across all ILEC customers or absorbed by ILEC shareholders as the "cost" of obtaining the numerous deregulatory gains and market entry opportunities provided by the *Telecommunications Act*. Indeed, any policy that works to impose any costs of accommodating local competition solely or even disproportionately upon the new entrants would be discriminatory and would undermine the very policy that the Congress intended to implement.

Only transaction-sensitive OSS investment, if any, may be recovered through nonrecurring charges, and where this is done such costs must be recovered ratably over the economic life of these systems *and* only if the costs of all other transaction-related activities are treated on a forward-looking least-cost basis. Any ILEC capital costs that are uniquely associated with the required provision to CLECs of interconnections, unbundled elements, and wholesale bundled services (i.e., costs that would not be incurred but for such requirements) must be recovered ratably over the life of these systems through recurring charges applied in a competitively neutral manner, consistent with the prevailing regulatory paradigm in effect in the jurisdiction.