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August 23, 1996

Ms. Blanca S. Bayó
Director, Records & Reporting
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399-0850

960833-TP

Re: Docket No. 960846-TP

Dear Ms. Bayó:

On behalf of MCI Telecommunications Corporation and MCI metro Access Transmission Services, Inc. (MCI), I have enclosed for filing in the above docket the original and 15 copies of the direct testimony of Nina W. Cornell and Drew Caplan.

By copy of this letter this document has been provided to the parties on the attached service list.

Very truly yours,

Richard D. Melson
Richard D. Melson

ACK _____

AFA _____

ADD _____ RDM/cc

Enclosures

cc: Parties of Record

Reith

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Stamp

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Cornell 09042-96

Caplan 09043-96

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Lew
PROSECUTOR GENERAL
STATE OF FLORIDA

CERTIFICATE OF SERVICE

I HEREBY CERTIFY that a copy of the foregoing was furnished to the following parties by hand delivery this 23rd day of August, 1996.

Donna Canzano
Division of Legal Services
Florida Public Service Commission
2540 Shumard Oak Boulevard
Tallahassee, FL 32399

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DIRECT TESTIMONY OF NINA W. CORNELL

ON BEHALF OF MCI

DOCKET NO. ~~960833-TP~~

August 23, 1996

I. PERSONAL BACKGROUND

Q. PLEASE STATE YOUR NAME AND ADDRESS.

A. My name is Nina W. Cornell. My address is 1290 Wood River Road, Meeteetse, Wyoming 82433.

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

A. I am an economist in private practice, specializing in microeconomic analysis of regulatory and antitrust issues. Until late 1988, I was with the firm of Cornell, Pelcovits & Brenner Economists Inc., of which I was president.

Before entering private practice, I was Chief of the Office of Plans and Policy, Federal Communications Commission (FCC). As Chief of the Office of Plans and Policy, I served as chief economist to the Commission and participated in virtually all FCC agenda meetings.

Prior to being associated with the FCC, I was the Senior Staff Economist for regulatory, transportation, environmental, and health and safety issues for the Council of Economic Advisers (CEA). In this position I reported directly to Charles L. Schultze,

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Chairman of the Council.

Prior to being with the CEA, I was employed as an economist with the Council on Wage and Price Stability, where I served on the Task Force on Reform of Federal Energy Administration Regulations. Before joining the Federal Government, I spent four years at the Brookings Institution as a Research Associate. I am a graduate of Swarthmore College, and received my Ph.D. in Economics from the University of Illinois in 1972.

Q. HAVE YOU PUBLISHED ANY PAPERS ON TELECOMMUNICATIONS?

A. Yes. I have published a number of papers on the regulation of telecommunications as well as on other regulatory and natural resource issues. A list of my publications is contained in my resume -- Exhibit ____ (NWC-1).

Q. HAVE YOU TESTIFIED BEFORE?

A. Yes. I have served as an expert witness in several court and a number of regulatory proceedings, particularly proceedings involving telecommunications issues. I have also testified before various committees of the U.S. Congress. A list of my testimonies is also contained in my resume.

Q. WHAT IS THE BASIS OF YOUR TESTIMONY?

A. MCI assembled a group of seven economists to evaluate the economic issues that need to be addressed by state regulators during the arbitrations under the Telecommunications

1 Act of 1996 ("the 1996 Act"). The seven economists are Gus Ankum, Steven R.
2 Brenner, Richard Cabe, myself, Sarah Goodfriend, A. Daniel Kelley, and Terry L.
3 Murray. These economists produced a jointly authored white paper. The testimony that
4 follows is the same as that white paper, except that it has been converted into
5 question-and-answer format.

6

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II. ECONOMIC PRINCIPLES

8

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

11

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

14

NATIONAL POLICY—In carrying out subsection (a), the

15

Commission shall seek to promote the policies and purposes of

16

this Act favoring diversity of media voices, vigorous economic

17

competition, technological advancement, and promotion of the

18

public interest, convenience, and necessity.

19

Subsection (a) calls for the Federal Communications Commission ("FCC") to complete a

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proceeding within 15 months of enactment of the 1996 Act to identify and eliminate

21

market barriers to entry.

22

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

- 1
- 2 A. Incumbent local exchange carriers (LECs) possess market power, and often monopoly
- 3 positions, in many local exchange service markets. The First Report and Order issued
- 4 by the Federal Communications Commission ("FCC") in CC Docket No. 96-98, In the
- 5 Matter of Implementation of the Local Competition Provisions in the
- 6 Telecommunications Act of 1996 ("Order") is intended to begin eliminating market
- 7 barriers to entry, and to establish rules to govern opening entry into local exchange
- 8 markets.
- 9
- 10 Q. HAS THE FCC DECIDED ALL OF THE ISSUES THAT NEED TO BE DECIDED
- 11 BEFORE ENTRY CAN BECOME EFFECTIVE COMPETITION IN LOCAL
- 12 EXCHANGE MARKETS?
- 13
- 14 A. No. In that Order, the FCC has decided a number of major issues, but has left others to
- 15 the states to decide. The issues left to the states are sufficient that the intent of Congress
- 16 could be thwarted if consistent principles are not used to decide them.
- 17
- 18 Q. WHAT ARE THE PRINCIPLES THAT THE FCC RELIED ON IN MAKING THE
- 19 DECISIONS IT MADE?
- 20
- 21 A. In terms of its economic underpinnings, the FCC's Order rests on six basic premises.
- 22
- 23 Q. WHAT IS THE FIRST OF THE FCC'S SIX BASIC ECONOMIC PREMISES?
- 24
- 25 A. The first basic economic premise of the FCC establishes as the fundamental requirement

1 for achieving the goals of the 1996 Act that the incumbent local exchange companies
2 must share with entrants their economies of density, connectivity, and scale. As the
3 FCC said:

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

13

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

15

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

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

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

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218)
Thus, we conclude it would be insufficient to define the obligation of incumbent LECs to provide “nondiscriminatory access” to mean that the quality of the access and unbundled elements LECs provide to all requesting carriers is the same. As discussed above with respect to interconnection, an incumbent LEC could potentially act in a nondiscriminatory manner in providing access or elements to all requesting carriers, while providing preferential access or elements to itself. (Paragraph 312, footnote omitted)
On the other hand, price differences based not on cost differences but on such considerations as competitive relationships, the technology used by the requesting carrier, the nature of the service the requesting carrier provides, or other factors not reflecting costs, the requirements of the Act, or applicable rules, would be discriminatory and not permissible under the new standard. (Paragraph 861)

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

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

1 essential that we retain the ability to revise our rules as
2 circumstances change. Otherwise, our rules might impede
3 technological change and frustrate the 1996 Act's overriding
4 goal of bringing the benefits of competition to consumers of
5 local phone services. (Paragraph 246, footnote omitted)

6

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

8

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

12 In the following sections, we first set forth generally, based on
13 the current record, a cost-based pricing methodology based on
14 forward-looking economic costs, which we conclude is the
15 approach for setting prices that best furthers the goals of the
16 1996 Act. In dynamic competitive markets, firms take action
17 based not on embedded costs, but on the relationship between
18 market-determined prices and forward-looking economic costs.
19 (Paragraph 620)

20 The substantial weight of economic commentary in the record
21 suggests that an "embedded cost"-based pricing methodology
22 would be pro-competitor -- in this case the incumbent LEC --
23 rather than pro-competition. (Paragraph 705, footnote omitted)

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

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

...we find that imposing nonrecurring charges for recurring costs could pose a barrier to entry because these charges may be excessive, reflecting costs that may (1) not actually occur; (2) be incurred later than predicted; (3) not be incurred for as long as predicted; (4) be incurred at a level that is lower than predicted; (5) be incurred less frequently than predicted; and (6) be discounted to the present using a cost of capital that is too low.

(Paragraph 747)

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

A state commission may, for example, decide to permit incumbent LECs to charge the initial entrants the full amount of costs incurred for shared facilities for physical collocation service, even if future entrants may benefit. A state commission may, however, require subsequent entrants, who take physical

1 collocation service in the same central office and receive
2 benefits as a result of costs for shared facilities, to pay the
3 incumbent LEC for their proportionate share of those costs, less
4 depreciation (if an asset is involved). Under this approach, the
5 state commission could require the incumbent LEC to provide
6 the initial entrants *pro rata* refunds, reflecting the full amount of
7 the charges collected from the subsequent entrants.

8 Alternatively, a state commission may decide to permit
9 incumbent LECs to charge initial entrants a proportionate
10 fraction of the costs incurred, based on a reasonable estimate of
11 the total demand by entrants for the particular interconnection
12 service or unbundled rate elements. (Paragraph 750)

13

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

15

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

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Because an incumbent LEC currently serves virtually all
subscribers in its local serving area, an incumbent LEC has little
economic incentive to assist new entrants in their efforts to

1 secure a greater share of that market. An incumbent LEC also
2 has the ability to act on its incentive to discourage entry and
3 robust competition by not interconnecting its network with the
4 new entrant's network or by insisting on supracompetitive prices
5 or other unreasonable conditions for terminating calls from the
6 entrant's customers to the incumbent LEC's subscribers.

7 (Paragraph 10, footnote omitted)

8 Congress recognized that, because of the incumbent LEC's
9 incentives and superior bargaining power, its negotiations with
10 new entrants over the terms of such agreements would be quite
11 different from typical commercial negotiations. As distinct from
12 bilateral commercial negotiation, the new entrant comes to the
13 table with little or nothing the incumbent LEC needs or wants.
14 The statute addresses this problem by creating an arbitration
15 proceeding in which the new entrant may assert certain rights,
16 including that the incumbent's prices for unbundled network
17 elements must be "just, reasonable and nondiscriminatory."

18 (Paragraph 15, footnote omitted)

19 We find that incumbent LECs have no economic incentive,
20 independent of the incentives set forth in sections 271 and 274
21 of the 1996 Act, to provide potential competitors with
22 opportunities to interconnect with and make use of the
23 incumbent LEC's network and services. Negotiations between
24 incumbent LECs and new entrants are not analogous to
25 traditional commercial negotiations in which each party owns or

1 controls something the other party desires. Under section 251,
2 monopoly providers are required to make available their
3 facilities and services to requesting carriers that intend to
4 compete directly with the incumbent LEC for its customers and
5 its control of the local market. Therefore, although the 1996
6 Act requires incumbent LECs, for example, to provide
7 interconnection and access to unbundled elements on rates,
8 terms, and conditions that are just, reasonable, and
9 nondiscriminatory, incumbent LECs have strong incentives to
10 resist such obligations. The inequality of bargaining power
11 between incumbents and new entrants militates in favor of rules
12 that have the effect equalizing bargaining power in part because
13 many new entrants seek to enter national or regional markets.

14 (Paragraph 56)

15 In particular, a new entrant that has already constructed facilities
16 may have a relatively weak bargaining position because it may
17 be forced to choose either to accept transport and termination
18 rates not in accord with these rules or to delay its
19 commencement of service until the conclusion of the arbitration
20 and state approval process. (Paragraph 1065)

21

22 Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

23

24 A. The purpose of my testimony is to provide an economic analysis of how state regulators
25 should take these same six basic premises into account in addressing the issues that are

1 reserved to state regulators to decide under the FCC's Order. This paper applies these
2 six premises to eight issues: (1) the need for additional unbundled network elements, (2)
3 the need to prevent discriminatory non-price terms and conditions for acquiring
4 unbundled network elements, (3) the need to identify the costs and cost structures of
5 unbundled elements and efficient unbundling, (4) the recurring rates to be charged for
6 unbundled elements, (5) the non-recurring rates to be charged for unbundled network
7 elements, including, in particular, the costs of unbundling that the incumbent LECs
8 should be allowed to charge entrants, (6) the costs and cost structure of transport and
9 termination of local exchange traffic, (7) the compensation rates for transport and
10 termination, and (8) the desirability of initiating state access reform now.

11 12 III. UNBUNDLED NETWORK ELEMENTS

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

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17 A. There are five issues that state regulators must decide with regard to unbundled
18 elements. The first is whether to order the incumbent LECs to unbundle any elements in
19 addition to the minimum list ordered unbundled by the FCC. The second is to prevent
20 discriminatory nonprice terms and conditions for acquiring unbundled network elements.
21 The third is to identify the costs and cost structures of the unbundled elements
22 themselves and the costs associated with efficient unbundling of a wholesale LEC
23 network. The fourth is to set recurring rates for the unbundled elements, both those on
24 the FCC's list of elements to be unbundled and any additional elements. The fifth is to
25 set the non-recurring rates for ordering unbundled network elements. Both recurring

1 and non- recurring rates must be set to comply with the forward-looking economic
2 costing methodology known as TELRIC (Total Element Long Run Incremental Cost).
3 Both recurring and non-recurring rates must be structured to reflect how costs are
4 incurred.

5

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

9

10 A. No. As the FCC stated:

11 As discussed above at sections II.A, II.B and V.B, we believe
12 that incumbent LECs have little incentive to facilitate the ability
13 of new entrants, including small entities, to compete against
14 them and, thus have little incentive to provision unbundled
15 elements in a manner that would provide efficient competitors
16 with a meaningful opportunity to compete. (Paragraph 307)

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

20

21 A. Additional Unbundled Network Elements: Loop Distribution Plant

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

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

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

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

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

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

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

3

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

6 We conclude that the term "technically feasible" refers solely to
7 technical or operational concerns, rather than economic, space,
8 or site considerations. We further conclude that the obligations
9 imposed by sections 251(c)(2) and 251(c)(3) include
10 modifications to incumbent LEC facilities to the extent necessary
11 to accommodate interconnection or access to network elements.
12 Specific, significant, and demonstrable network reliability
13 concerns associated with providing interconnection or access at a
14 particular point, however, will be regarded as relevant evidence
15 that interconnection or access at that point is technically
16 infeasible. . . . Finally, we conclude that incumbent LECs
17 must prove to the appropriate state commission that a particular
18 interconnection or access point is not technically feasible [sic].

19 (Paragraph 198)

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

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

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

18
19 Q. DID THE FCC ELABORATE ON ITS IMPAIRMENT STANDARD?

20
21 A. Yes. The FCC elaborated on its meaning of the impairment standard when it explained
22 further that:

23 The interpretation advanced by most of the BOCs and GTE,
24 described above, means that, if a requesting carrier could obtain
25 an element from a source other than the incumbent, then the

1 incumbent need not provide the element. We agree with the
2 reasoning advanced by some of the commenters that this
3 interpretation would nullify section 251(c)(3) [of the 1996 Act]
4 because, in theory, any new entrant could provide all of the
5 elements in the incumbent' networks. Congress made it possible
6 for competitors to enter local markets through the purchase of
7 unbundled elements because it recognized that duplication of an
8 incumbent's network could delay entry, and could be inefficient
9 and unnecessary. (Paragraph 287, footnote omitted)

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

14
15 B. Discriminatory Practices: Terms and Conditions of Interconnection

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

19
20 A. No. The impairment standard is one of a number of standards or safeguards created to
21 preserve emerging competition to its fullest potential. In paragraphs 217 and 218 of its
22 Order, the FCC found that Congress intended a more stringent legal standard of
23 nondiscrimination to apply under the 1996 Act section 251(c)(2) than under section
24 202(a) of the original Act. On this legal basis and considering the procompetitive
25 purpose of the 1996 Act, the FCC recognized, again, that "... the [incumbent] LEC has

1 the incentive to discriminate against its competitors by providing them less favorable
2 terms and conditions of interconnection than it provides itself..." finding that "by
3 providing interconnection to a competitor in a manner *less efficient* (emphasis added)
4 than an incumbent LEC provides itself, the incumbent LEC violates the duty to be 'just'
5 and 'reasonable' under Section 251(c)(2)(D)...."

6

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

9

10 A. Refusals to unbundle and improper pricing of unbundled elements, the main topics of
11 this section, are but two ways incumbent LECs may undermine the procompetitive
12 aspects of network unbundling. The Network Implementation white paper discusses
13 cross-connect points. Cross-connection facilities include the house cabling and jumper
14 cables that make it possible for an entrant's unbundled loop to be connected to its
15 collocation equipment. This "glue" that holds the network together and connects
16 unbundled elements must be priced properly. The pricing of house cabling and jumper
17 cables can be every bit as important in limiting the incumbent's ability to discriminate in
18 the provision of unbundled elements as is the pricing of the unbundled elements
19 themselves. The FCC pointedly addressed the example of cross-connect facilities to
20 unbundled loops, including the house cabling and jumper cables necessary to allow a
21 competitor to connect an unbundled loop to its collocated equipment, noting that several
22 entrants had alleged that incumbent LECs had required unreasonable rates, terms and
23 conditions for such cross-connection facilities in the past. (See Paragraph 386)

24 The Operations Support Systems Implementation white paper discusses the
25 various databases to which entrants must have access, and describes the various

1 functions -- pre-ordering, ordering, provisioning, maintenance and repair, and billing --
2 for which access to operations support systems are necessary. Refusal to provide access
3 to databases efficiently is an expression of discrimination. Terms and conditions of
4 access can become instruments for the creation of barriers to competition.

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

8

9 B. Recurring Rates for Unbundled Network Elements

10

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

13

14 A. The FCC has adopted a costing and pricing methodology based on forward-looking,
15 economic costs, finding that such a methodology best replicates the conditions of a
16 competitive market and reduces the ability of an incumbent LEC to engage in
17 anticompetitive behavior. (See, for example, paragraph 679). The FCC has said that
18 prices for unbundled network elements (and for interconnection) should "be based on the
19 TSLRIC (Total Service Long Run Incremental Cost) of the network element[s], which
20 we will call Total Element Long Run Incremental Costs (TELRIC)." (Paragraph 672)
21 The prescribed TELRIC costing methodology is provided in Part 1 of Title 47 of the
22 C.F.R. as Subpart F - Pricing of Elements, and applies to the costing and pricing of
23 network elements, interconnection, and methods of obtaining access to unbundled
24 elements, including physical collocation and virtual collocation. In the following
25 discussion, I use the term "element" to refer to items covered by Subpart F.

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1. Requirements for Conformity With the TELRIC Methodology

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

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

Common costs also include costs incurred by a firm's operations as a whole, that are common to all services and elements (e.g., salaries of executives involved overseeing all activities of the business), although for the purpose of pricing interconnection and access to unbundled elements, which are intermediate products offered to competing carriers, the relevant common costs do not include billing, marketing and other costs attributable to the provision of retail service...(Paragraph 694)

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

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2. States Must Examine Cost Studies to Set Element Prices

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

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

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

3. Incumbent LEC Cost Studies

Q. CAN STATE REGULATORS USE EXISTING INCUMBENT LEC COST STUDIES

1 FOR THIS PURPOSE?

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

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

22 Moreover, from the analyst’s perspective, the results and summary of
23 methodology of a cost study are, in a sense, only the tip of the iceberg: behind each cost
24 study are a multitude of workpapers, and behind the workpapers are data sources and
25 assumptions. All of these need to be reasonably explained and subject to examination to

1 be able to determine whether a given cost study accurately reflects the appropriate
2 methodology and accurately estimates costs. Sufficient information must be available so
3 that informed analysis and evaluation is possible.

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

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

21 The FCC has ruled that incumbent LEC cost studies must comply with the
22 requirements for forward-looking economic cost studies. It is now time for state
23 commissions to pry the lid, once and for all, from the LEC “black box” and expose the
24 inner workings of all proffered cost models to the light of open debate.

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

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

7
8 A. Yes. In contrast to the prevailing LEC practice of secrecy is the Hatfield Model, a
9 telecommunications costing model developed by Hatfield Associates, Inc. of Boulder,
10 Colorado at the request of AT&T and MCI. The Hatfield Model (Version 2.2, Release
11 2) is a model of the costs that an efficient local exchange carrier would incur to provide
12 basic exchange service and unbundled network functions.

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

1 actually engage in the debate required for reasoned decisionmaking in this area.

2

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

6

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

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

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

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

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

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

16

17 C. Non-Recurring Rates And Costs of Unbundling Elements

18

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

21

22 A. Yes. Incumbent LECs do not only charge recurring rates for the use of their networks,
23 they also charge non-recurring rates to recover the costs of ordering and any initial
24 non-recurring costs of making the service or element available. These rates must also be
25 set by state regulators. Granting incumbent LECs the discretion to set non-recurring

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

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

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

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

25 The Settling parties agree that SWBT will charge a Secondary

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

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

20 By contrast, in Ill. C.C. Docket 95-0296, Ameritech Illinois proposed Standard
21 Business Service ordering Charges of \$34.50. (ILL.C.C. No. 5, Part 2 - Section 28,
22 2nd Revised Page 5, Effective October 3, 1995.) Ameritech revised both the costs
23 studies and the service ordering charge a number of times; the proposed charges,
24 however, are never below \$30.00 per number ported. Also, I understand that the cost
25 studies supporting these charges, though proprietary, show costs greatly in excess of the

1 \$34.50, which caused Ameritech to claim that their rates were really very reasonable.
2 These costs were based, however, on ordering costs in a retail environment, not a
3 wholesale one.

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

8
9 Q. YOUR LAST EXAMPLE DISCUSSED NON-RECURRING RATES TO RECOVER
10 THE COSTS OF ORDERING. DO NON-RECURRING RATES ALSO RECOVER
11 THE COST OF UNBUNDLING?

12
13 A. Yes. Just as with non-recurring costs for ordering a service, state regulators should also
14 insist that the costs recovered by the incumbent LECs for unbundling network elements
15 be calculated based on efficient unbundling. This is another area in which the incumbent
16 LECs can act forcibly on their incentives to impede or block competition. It is also an
17 area in which few of the other safeguards such as an insistence on strict
18 nondiscrimination can blunt the ability to act on those incentives. Therefore, state
19 regulators need to be particularly vigilant in examining with a critical eye claims about
20 the costs of unbundling.

21 In most cases, the costs of unbundling will be non-recurring costs. In this
22 regard, state regulators must take strongly into account the principle that costs be
23 recovered only once, and be recovered equitably. The FCC's example of how to treat
24 shared facilities for physical collocation service that will benefit future entrants matches
25 costs and payments for benefits in time when facilities are shared between or among

1 entrants. (See, Paragraph 750) This principle should be generalized, insofar as
2 practical, to all elements shared in time. Said differently, if the first entrant pays the
3 efficient costs that an incumbent LEC would incur to be able to provide a particular
4 unbundled network element, later users of the same unbundled network element should
5 share equitably in the recovery of that cost. The logic should apply to any non-recurring
6 cost that later entrants benefit from that an original requester pays.

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

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

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

8

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**IV. COMPENSATION FOR THE TRANSPORT AND
TERMINATION OF LOCAL TRAFFIC**

10

11

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

14

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

24

25 Q. HOW HAS THE FCC RULED THAT COMPENSATION SHALL BE PROVIDED

1 FOR THE TRANSPORT AND TERMINATION OF LOCAL EXCHANGE TRAFFIC?

2
3 A. The FCC has established a framework to govern interconnection and compensation for
4 terminating local exchange traffic. Interconnection is the physical linking together of
5 two networks, and the FCC has set rules that govern interconnection. The FCC has
6 separated compensation into transport and termination. The FCC has ruled that
7 termination of a local call by the incumbent LEC as used in the 1996 Act means the act
8 of switching the call to the intended recipient at the end office switch that serves that
9 subscriber. The FCC has also ruled that the 1996 Act separately discusses transport of
10 that call to the end office when an entrant does not interconnect at that end office
11 directly. As the FCC noted:

12 We define "transport," for purposes of section 251(b)(5), as the
13 transmission of terminating traffic that is subject to section
14 251(b)(5) from the interconnection point between the two
15 carriers to the terminating carrier's end office switch that
16 directly serves the called party (or equivalent facility provided
17 by a non-incumbent carrier.) (Paragraph 1039)

18 We define "termination," for purposes of section 251(b)(5), as
19 the switching of traffic that is subject to section 251(b)(5) at the
20 terminating carrier's end office switch (or equivalent facility)
21 and delivery of that traffic from that switch to the called party's
22 premises.

23 Both of these functions are included in the FCC's rules governing compensation due the
24 incumbent LEC for completing local calls that originate on another carrier's network.

25 Within the framework of its rules, however, there are a number of vital issues that state

1 regulators must still decide. In particular, state regulators must determine the actual
2 compensation to be paid the incumbent LEC and the compensation the incumbent LEC
3 shall pay the entrant.

4

5 A. Compensation to the Incumbent

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

9

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

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States have three options for establishing transport and termination rate levels. A state commission may conduct a thorough review of economic cost studies prepared using the TELRIC-based methodology outlined above in the section of the pricing of interconnection and unbundled elements.

Alternatively, the state may adopt a default price pursuant to the default proxies outlined below. If the state adopts a default price, it must either commence review of a TELRIC-based economic cost study, request that this Commission review such a study, or subsequently modify the default price in accordance with any revised proxies we may adopt. As previously noted, we intend to commence a future rulemaking on developing

1 proxies using a generic cost model, and to complete such
2 proceeding in the first quarter of 1997. As a third, alternative,
3 in some circumstances states may order a "bill and keep"
4 arrangement, as discussed below. (Paragraph 1055, footnote
5 omitted)

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

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

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

1 ruled on when and how bill-and-keep can be used.

2

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

5

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

13

14 Q. HOW SHOULD LOCAL EXCHANGE TERMINATING TRAFFIC BE MEASURED?

15

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

25

1 Q. WHY DO YOU RECOMMEND THE USE OF A PERCENT LOCAL USAGE
2 FACTOR, RATHER THAN THE DEVELOPMENT OF A NEW SYSTEM FOR
3 MEASUREMENT AND BILLING OF TERMINATING LOCAL EXCHANGE
4 TRAFFIC?

5

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

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

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Q. IS THIS JUST A THEORETICAL CONCERN?

A. No. The development of measurement and billing systems for switched access shows that this concern is not an idle one. AT&T prior to divestiture wanted a new measurement and billing system for interconnection for what were then called Other Common Carriers—the first ones being MCI and Sprint—in order to be able to charge them for all of the so-called non-conversation time: the time spent setting up calls that occurs in addition to the time when conversations actually occur. Until the advent of the Other Common Carriers, all that the switches were designed to measure was conversation time, as that was all that was billed to end users. AT&T knew the average non-conversation time of a call, and could have factored the costs of that into rates based on conversation time, but it chose not to take that approach.

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

The incumbent local exchange carriers are indeed working on developing a new system to measure terminating local exchange traffic coming from other carriers that

1 uses Signaling System 7 (SS7) data. If implemented, this would have several bad effects
2 on entrants. First, it is going to add significant costs to the cost of terminating local
3 exchange traffic. I understand that, based on data provided under proprietary
4 agreements in at least two U S West states, Washington and Oregon, developing such a
5 measurement and billing system could more than double the forward-looking economic
6 cost of the end office switching function for terminating traffic from the cost without
7 measurement and billing. This is a significant cost burden to add to local exchange
8 service. Second, it will penalize entrants because they will not be able to use it for all
9 of the traffic that incumbent LECs terminate to them, as not all LEC switches are yet
10 equipped to use SS7. Thus, although all of the traffic going from an entrant to an
11 incumbent could be sorted and measured in this manner, the converse would not be true.

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

19 In order to be able to participate in a measured approach to compensation, the
20 entrants would also have to incur the costs to install measurement equipment in their
21 networks. The entrants cannot opt out of this requirement because to do so would put
22 them at an even bigger disadvantage than if they installed the equipment. If
23 compensation were to be on a measured use basis and the entrants did not install
24 measurement equipment, they would not only pay the incumbent to terminate their
25 traffic, but would also pay to terminate the incumbent's traffic. Thus, they would be

1 forced to install measurement equipment themselves. As noted above, however, not all
2 traffic from incumbent LECs uses SS7 signaling.

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

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

21

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

25

1 A. Yes. That incumbent LECs see an opportunity to impose disproportionate costs on
2 entrants is supported by the nature of the agreement that BellSouth negotiated with
3 entrants. The BellSouth agreement requires both the incumbent and the entrant to
4 measure traffic. There are a number of fixed costs incurred for measurement and billing
5 even if measurement and billing is based on exchanging Percent Local Usage
6 information. The entrant must spread the fixed costs of installation and use over a much
7 smaller total base of operations. The result is that average cost per unit of traffic is
8 raised more for the entrant than for the incumbent.

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

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

1 measurement equipment that may not even be used.

2

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

6

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

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

18

19 B. Compensation to the Entrant

20

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

23

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

1 compensation to be reciprocal.

2

3 Q. WHAT HAS THE FCC RULED CONSTITUTES RECIPROCAL COMPENSATION?

4

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

8 Symmetrical compensation arrangements are those in which the
9 rate paid by an incumbent LEC to another telecommunications
10 carrier for transport and termination of traffic originated by the
11 incumbent LEC is the same as the rate the incumbent LEC
12 charges to transport and terminate traffic originated by the other
13 telecommunications carrier. (Paragraph 1069)

14 Given the advantages of symmetrical rates, we direct states to
15 establish presumptive symmetrical rates based on the incumbent
16 LEC's costs for transport and terminating of traffic when
17 arbitrating disputes under section 252(d)(2) and in reviewing
18 BOC statements of generally available terms and conditions. If
19 a competing local service provider believes that its cost will be
20 greater than that of the incumbent LEC for transport and
21 termination, then it must submit a forward-looking economic
22 cost study to rebut this presumptive symmetrical rate.

23 (Paragraph 1089)

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

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

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

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

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

23
24
25

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

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

3

4 A. The FCC provides for three approaches to compensation. One of these is bill-and-keep,
5 which could in principle be implemented without an examination of cost studies. A
6 careful reading of the Order, however, suggests that the FCC intends to limit
7 bill-and-keep to apply only to termination, not transport. Although section 51.701(e)
8 includes both transport and termination in its definition of reciprocal compensation
9 arrangements, succeeding sections narrow the applicability of bill-and-keep. Section
10 51.713, in particular, limits the definition of bill-and-keep arrangements for reciprocal
11 compensation to "those in which neither of the two interconnecting carriers charges the
12 other for the termination of local telecommunications traffic that originates on the other
13 carrier's network."

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

18

19 **V. INTRASTATE ACCESS CHARGE REFORM**

20

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

23

24 A. With every decision prying open local exchange markets to competition, the need to
25 eliminate above cost prices for access becomes more immediate. New entrants are

1 making decisions affecting local competition which are distorted whenever prices for
2 access exceed cost. (Even the temporary "surcharge" placed by the FCC on unbundled
3 local switching can be expected to distort decisionmaking.) For this period of
4 arbitrations, while business decisions about whether, how, and which local markets to
5 enter are being made at a rapid pace, it is vitally important that any state that has not
6 already done so initiate intrastate access reform. Otherwise, emerging competition will
7 be damaged, new competitors will gravitate toward more favorable procompetitive
8 environments, and competition will be plagued by inefficient choices that raise
9 interexchange carriers costs and so limit price reductions in intrastate toll charges.

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

14
15 Q. ARE THERE SPECIFIC EVENTS DRIVING THE NEED TO INITIATE ACCESS
16 CHARGE REFORM NOW?

17
18 A. Yes. Two events drive the need to initiate access charge reform now: (1) the
19 announcement in the Order that the FCC will be addressing access charge reform
20 concurrent with its adoption of a competitively-neutral universal service mechanism, and
21 (2) the section 271 public interest test that requires elimination of the artificial advantage
22 conferred on BOCs by above-cost access charges. In the first case, alignment of
23 intrastate access rates to cost must occur in tandem with the federal reforms to ensure
24 that ratepayers are not paying twice for universal service support. In the second case,
25 above-cost access confers an ability to discriminate that distorts and disrupts the

1 competitiveness of both the local and long distance markets. In at least MCI's view,
2 until access charges, both interstate and intrastate, are reduced to forward looking,
3 economic cost, regulators may not legally allow BOC entry into in-region long distance
4 under the 1996 Act.

5 I urge each state to initiate a proceeding now, if it has not already done so, in
6 which the requisite record can be developed to eliminate completely prices for access
7 that exceed forward-looking economic cost. Taking charge of intrastate access reform
8 now not only gives the state control over the date when the temporary "surcharge" on
9 the unbundled local switching element introduced by the FCC is eliminated but also
10 allows the state to coordinate its access charge reform with its creation of a
11 competitively-neutral universal service support mechanism.

12

13 Q. DOES THIS CONCLUDE YOUR TESTIMONY?

14

15 A. Yes.

16

17

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25

BIOGRAPHY

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EXPERIENCE

- 10/88-Present Private consultant. Microeconomic consulting, primarily in fields of telecommunications and antitrust.
- 2/82 - 10/88 President: Cornell, Pelcovits & Brenner Economists Inc. Microeconomic consulting, primarily in fields of telecommunications, broadcasting, environmental, and antitrust economics. Assignments have included serving as an expert witness before State and Canadian regulatory agencies on many emerging issues in telecommunications such as: the appropriate structure of access charges to interexchange companies; the public interest benefits of competition and of resale; the need to separate the unregulated from the regulated activities of telephone companies; appropriate telephone costing methodology, market rules, and industry structure; the proper costing of Centrex service; the setting of appropriate prices for the sale of embedded terminal equipment; and the appropriate application of cost and demand studies to the design of telephone tariffs; assisting in the cross examination of opposing witnesses and preparation of information requests; sponsoring cellular tariffs in cellular applications to the FCC; and testifying before Congressional committees on the economics of home taping, copyright, and the First Sale Doctrine.
- 3/81 - 2/82 Vice President: Owen, Cornell, Greenhalgh & Myslinski Economists Inc. Microeconomic consulting in telecommunications, broadcasting, environmental, and antitrust economics. Assignments included serving as expert witness in court cases, including U.S. v. AT&T, and before the Public Service Commission of the State of Florida on the public interest benefits of competition in long haul services and of resale, and on standards for access charges for competitors; assisting in preparation of depositions and cross examination of opposing witnesses; preparing an analysis of the economic impact of the broadcasting regulations on the video industry; preparing a cost-benefit analysis of proposed water pollution control regulations for the steel industry and defending it before EPA.
- 5/78 - 2/81 Chief: Office of Plans and Policy, Federal Communications Commission. Responsible for proposing policy and directing medium and long-range planning for the Commission. During this period, developed an in-house economics capability and functioned as chief economist for the Commission, sat at all Commission meetings, and advised the Commissioners on economic policy issues and alternatives. Directed a staff of 28-35 of mixed disciplines, mainly economics and engineering. Projects of the Office covered such topics as appropriate regulation for common carriers, including involvement in developing a new cost manual, further extensions of resale to switched intercity services, appropriate instances to require separate subsidiaries, and proper regulatory treatment of non-dominant common carriers; direct broadcast satellites; public coast stations; and radio; appropriate policies to achieve an improved UHF TV service; children's television; and how to improve spectrum management.

- 2/77 - 5/78 Senior Staff Economist: Council of Economic Advisors. Covered all areas of regulation except energy for the Council. Some major areas of activity were development of the regulatory analysis requirement in Executive Order 12044; the Regulatory Analysis Review Group; development of policy on various EPA activities such as prevention of significant deterioration of air quality; beverage container deposit legislation; revisions to the Clean Air, and the Clean Water Acts; minerals policy; and carcinogen regulation; also amendments of the laws governing civil aviation, trucking and communications.
- 6/76 - 2/77 Senior Economist: Council on Wage and Price Stability. Worked on energy issues. Major activity was as lead economist on the Presidential Task Force on Reform of Federal Energy Administration Regulation.
- 8/72 - 4/76 Research Associate: The Brookings Institution. First two years were in Foreign Policy Studies working as the economist on an interdisciplinary study on international institutions for managing oceans, outerspace, and weather modification. Last two years were in Economic Studies working with Charles L. Schultze on energy policy and working on safety and health regulation.
- 9/65 - 6/67 Teaching Assistant: Department of Economics, University of Illinois at Urbana-Champaign.

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- In re: Petition of MCI Telecommunications Corporation for a Certificate of Public Convenience and Necessity, Docket No. 820450-TP, 3/21/83.
- In the Matter of: Resale of Wide Area Telephone Service and Message Toll Service, Docket No. 1 810239-TP, 1/22/82.
- Application of Microtel, Inc. for a Certificate to Construct and Operate a Microwave System, Docket No. 800333-TP, 11/5/81.

Georgia Public Service Commission:

- Docket No. 3522-U, 8/15/85.
- Application of MCI to Provide Intrastate Toll Service, Docket No. 3446-U, 2/29/84 (Direct testimony only).

State of Illinois, Illinois Commerce Commission:

- In the Matter of Illinois Bell Telephone Company Petition to Regulate Rates and Charges of Non-Competitive Services Under an Alternative Form of Regulation, Docket No. 92-0448, 8/3/93.
- In the Matter of: Independent Coin Payphone Association and Total Communication Services, Inc. Complaint to Reclassify Illinois Bell Telephone Company Pay Telephone Service as a Competitive Service in Illinois Market Service Area 1 (MSA 1), Docket No. 88-0412, 11/14-15/91, 2/5/92.
- Centel Network Communications, Inc., Application for Certification of Service Authority Pursuant to Sec. 13-404; and For Other Authority and Waivers of Commission Rules and Regulations, Docket No. 89-0132, 1/16/90.
- In the Matter of Illinois Bell Telephone Company and Commonwealth Edison Company, Illinois Power Company, Central Illinois Light Company, Central Illinois Public Service Company, and the Illinois Telephone Association and Illinois Cable Television Association, Docket Nos. 86-0192, 86-0228, 86-0229, 3-15-88, 3-22-88.
- In the Matter of the Application of GTE Sprint Communications Corporation for a Certificate of Public Convenience and Necessity pursuant to section 55 of the Illinois Public Utilities Act, to Provide INTRA-MSA Telecommunications Services Within the State of Illinois, No. 83-0634, 11/14/84.
- In the Matter of the Application of AT&T Communications of Illinois, Inc. for the issuance of a Certificate of Public Convenience and Necessity to provide interexchange/INTER-MSA telephone and telecommunications services between and among Market Service Areas in the State of Illinois, 83-0648, 6/15/84.
- Satellite Business Systems Application for a Certificate of Public Convenience and Necessity pursuant to Section 55 of the Illinois Public Utilities Act, to provide INTER-MSA Telecommunications Services Within the State of Illinois, 84-0025, 4/30/84.
- GTE Sprint Communications Corporation Application for a Certificate of Public Convenience and Necessity pursuant to Section 55 of the Illinois Public Utilities Act, to Pro-

vide INTER-MSA Telecommunications Services Within the State of Illinois, 83-0633, 2/16/84.

Indiana Utility Regulatory Commission:

- In the Matter of the Complaint of the Indiana Payphone Association, Incorporated, an Indiana Not-For-Profit Incorporated Association, Complainant, v. Indiana Bell Telephone Company, Inc., Respondent, Cause No. 39474, 5/31/94, 6/2/94.
- Petition of MCI Telecommunications Corporation for a Certificate of Territorial Authority to Provide Intercity Telecommunications Services Within Indiana, Cause No. 37240, 10/3/83 and 11/21/83.

Iowa Utilities Board

- In re: IntraLATA Presubscription, Discounted Access Charges, and Imputed Access Charges, Docket No. INU-90-1, 8/13/90.
- Docket No. RPU-84-2, 10/17/84.

Public Service Commission of the Commonwealth of Kentucky

- In the Matter of An Inquiry into IntraLATA Toll Competition, an Appropriate Compensation Scheme for Completion of IntraLATA Calls by Interexchange Carriers, and WATS Jurisdictionality, Administrative Case No. 323, 12/13/89, 10/29/90.

Louisiana Public Service Commission

- In the Matter of Investigation of the Revenue Requirements, Rate Structures, Charges, Services, Rate of Return and Construction Program of South Central Bell Telephone Company of its Louisiana Intrastate Operations, the Appropriate Level of Access Charges, and All Matters Relevant to the Rates and Service Rendered by the Company, Docket No. U-17949-B (Generic Phase), 12/10/90 and 5/8/91.
- In the Matter of US Sprint Custom Network Services Tariff (UltraWATS Service), Docket No. U-17644, American Telephone and Telegraph Communications of South Central States Inc. (Megacom Service, Docket No. U-17578, and MCI Telecommunications Company Custom Network Services Tariff (Prism I and II), Docket No. U-17767.

Public Service Commission of Maryland:

- In the Matter of the Application of MFS Intelenet of Maryland, Case No. 8584, Phase II, 8/10/95.
- In the Matter of the Investigation by the Commission on Its Own Motion into Legal and Policy Matters Relevant to the Regulation of Firms, Including Current Telecommunications Providers and Cable Television Firms, Which May Provide Local Exchange and Access Services in Maryland in the Future, Case No. 8587, 8/8/94.
- In the Matter of the Application of MFS Intelenet of Maryland, Case No. 8584, 2/3/94.
- In the Matter of the Investigation by the Commission on its own Motion into the Rates and Charges of AT&T Communications of Maryland, Inc., Case No. 7941, 6/4/86, 7/10/86.
- In the Matter of the Application of MCI City Telecommunications Corporation for Authority to Provide Intercity Telecommunications Service within the State of Maryland, Case No. 7719, 8/29/83 and 11/29/83.

Commonwealth of Massachusetts, Department of Public Utilities:

- Investigation by the Department of Public Utilities on its Own Motion into IntraLATA and Local Exchange Competition in Massachusetts, D.P.U. No. 94-185, 7/7/95, 10/2/95.
- Petition for an Advisory Ruling as to the Competitive Nature of Public Pay Telephone Service, D.P.U. 88-45, November or December, 1988.
- Investigation by the Department of the cost studies filed by New England Telephone and Telegraph Company on April 18, 1986, pursuant to the Department's Orders in D.P.U. 1731, D.P.U. 86-33, 5/22-23/88.
- Investigation by the Department on its own motion as to the propriety of the rates and charges set forth in the following rates schedules: DPU Mass. No. 10, Part C - Sec. 7, Original of table of contents, page 1, Original of pages 1 thru 6, filed with the Department on December 15, 1987 to become effective January 14, 1988 by the New England Telephone and Telegraph Company, D.P.U. 88-13, 5/21-22/88.
- In the Matter of New England Telephone Company, Re: D.P.U. 86-33, D.P.U. 86-124, 9/16/86, 6/18-19-87, 8/3-4/87.
- Petition of the Attorney General for a Generic Adjudicatory Proceeding Concerning Intrastate Competition by Common Carriers in the Transmission of Intelligence by Electricity, Specifically as with Respect to IntraLATA Competition, and Related Issues, Filed with the Department on December 20, 1983, D.P.U. 1731, 7/19-20/84.
- Investigation by the Department on its Own Motion as to the Propriety of the Rates and Charges Set Forth in a Tariff for Carrier Access Charges filed by the New England Telephone and Telegraph Company with the Department on October 21, 1983, to Become Effective November 20, 1983, D.P.U. 1661, 2/22/84.

Public Service Commission of the State of Michigan:

- An Inquiry, on the Commission's Own Motion Into the Status of Competition in the Provision of Telecommunications Services, Case No. U-8716, 6/10/87.
- In the Matter of the Applications of MCI Telecommunications Corporation for special temporary authority or alternatively, for a finding of no jurisdiction over its proposed service, Case No. U-7853, and In the Matter of the Application of GTE Sprint Communications Corporation for a Certificate of Public Convenience and Necessity to Offer Intercity Telecommunications Services to the Public in the State of Michigan, Case No. U-7873, 5/8/84.

Minnesota Public Utilities Commission:

- In the matter of a consolidated proceeding to investigate the provision of intrastate inter-city telecommunications services within the State of Minnesota, Docket No. P-422, P-442, P-444, P-421, P-433/NA-84-212, 2/5-6/85.

Missouri Public Service Commission:

- In the matter of proposals to establish an alternate regulation plan for Southwestern Bell Telephone Company, Case No. TO-93-192, 8/93 (no cross examination).
- In the matter of Southwestern Bell Telephone Company's Application for Classification of its Non-Basic Services, Case No. TO-89-56, 11/2/90.
- The Staff of the Missouri Public Service Commission, Complainant, v. Southwestern Bell Telephone Company, A Missouri Corporation, Respondent, Case No. TC-89-14, et al., 1/31/89 and 4/11/89.
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Complainant v. Southwestern Bell Telephone Company, Respondent, Case No. TC-87-39; and In the Matter of the Applications of Southwestern Bell Telephone Company for Approval of a New Radio Common Carrier Interconnection Service Tariff, Case No. TR-87-58, 7/1/87.

- In the Matter of the Application of MCI Telecommunications Corporation for a Certificate of Public Convenience and Necessity to offer telecommunications service in Missouri, Case No. TA-84-82, and In the Matter of the Application of GTE Sprint Communications Corporation for a Certificate of Public Convenience and Necessity to Offer Intercity Telecommunications Services to the Public in the State of Missouri, Case No. TA-84-114, 8/8-9/84.

Montana Public Service Commission

- Presentation on Building Blocks, January 22, 1993.

Nebraska Public Service Commission:

- In the Matter of the Application of GTE Sprint Communications Corporation For a Certificate of Public Convenience and Necessity to Offer Intercity Telecommunications Services to the Public in the State of Nebraska, Docket C-497, 3/7/85.
- In the Matter of the Application of Northwestern Bell Telephone Company, Omaha, Nebraska, for Approval of Tariff Sheets of its General Exchange Tariff, Application No. C-353, 5/5/83.
- In the Matter of the Effect of Competition in Inter-exchange Telephone Service, Application No. C-506, 9/6/84.

Public Service Commission of Nevada:

- The Application of Centel Network Communications, Inc., for a Certificate of Public Convenience and Necessity, to Operate as an Intrastate and InterLATA Resale Carrier, Docket No. 88-1156, 4/20-21/89.

New Hampshire Public Utilities Commission

- Re: DE 90-002 - Generic Competition Docket, 9/24/92.

New Jersey Department of Energy, Board of Public Utilities:

- In the Matter of the Application of New Jersey Bell Telephone Company of Approval of its Plan for an Alternative Form of Regulation, Docket No. T092030358, 10/5/92.
- In the Matter of Investigation of Intrastate Tele-communications Competition, BPU Docket 8312-1126, Direct and Rebuttal Testimony, 1/31/84.

New Mexico State Corporation Commission

- In The Matter Of The Rates And Charges Of U S WEST Communications, Inc., Docket No. 92-227-TC, 3/11/93.

New York State Public Service Commission:

- Proceeding on Motion of the Commission to Investigate Performance-Based Incentive Regulatory Plans for New York Telephone Company, Case No. 92-C-0665, 12/12/94.
- Petition of Rochester Telephone Corporation for Approval of Proposed Restructuring Plan, Case 93-C-0103 and Petition of Rochester Telephone Corporation for Approval of New Multi-Year Rate Stability Agreement, Case 93-C-0033, by affidavit, 8/94.
- Proceeding on Motion of the Commission to Investigate Performance-Based Incentive Regulatory Plans for New York Telephone Company, Case No. 92-C-0665, 10/7/93.

- Proceeding on Motion of the Commission to Review Regulatory Policies for Segments of the Telecommunications Industry Subject to Competition, Case No. 29469, 9/28-29/87.

North Carolina Utilities Commission:

- In the Matter of Investigation to Consider Whether Intrastate Offerings of Long Distance Telephone Service Should be Allowed in North Carolina and What Rules and Regulations Should be Applicable to Such Competition if Authorized, P-100, Sub 72, 10/24/84.
- In the Matter of: Resale of Intrastate Telecommunications Services, Docket No. P-100, Sub 61, 11/16/82.

Public Utilities Commission of Ohio:

- In the Matter of the Commission's Investigation Relative To Establishment of Intrastate Access Charges, Case No. 83-464-TP-COI, 10/17/83.

Oklahoma Corporation Commission:

- In re: Inquiry of the Oklahoma Corporation Commission Concerning the Regulation of Intrastate InterLATA Carriers, Cause No. 29217, 11/16/84.
- In re: Application of MCI Telecommunications Corporation, Cause No. 28713, 3/26/84.

Public Utility Commission of Oregon:

- In the Matter of the Investigation into the Cost of Providing Services, Docket UM 351, Phase II: Unbundling and Pricing Issues, 10/20/95.
- In the Matter of the Application of MCI Access Transmission Services, Inc. for a Certificate of Authority to Provide Local Exchange Telecommunications in Oregon, Docket No. CP 15, 7/12/95.
- In the Matter of the Revised Rate Schedules Filed by U S West Communications, Inc. for toll service. Advice No. 1291, Docket No. UT 94, 8/30/90.
- In the Matter of the Investigation into the Revenue Requirements and Rate Spread of Pacific Northwest Bell Telephone Company, dba U S West Communications, Docket No. UT 85, 6/8/89.
- In the Matter of the Petition of Pacific Northwest Bell Telephone Company d/b/a U S West Communications, Inc., to Price List Telecommunications Services Other Than Essential Local Exchange Services, Docket No. UT 80, 6/8/89.
- In the Matter of an Investigation Into Presubscription, Exchange Carrier Toll Rates, and Antitrust Implications of the "IntraLATA Access Charges Agreement" Proposed by Pacific Northwest Bell Telephone Company and the Oregon Independent Telephone Association, Docket No. UT-47, 3/18/87.

Pennsylvania Public Utilities Commission:

- Pennsylvania Public Utility Commission, et al., vs. Bell Atlantic-Pennsylvania, Inc., Docket Nos. R-963550 C0001-C0004, 8/6/96.
- Application of MFS Intelenet of Pennsylvania, Inc., For Approval to Operate As a Local Exchange Telecommunications Company, Docket No. A-310203F002, 2/9/95.
- In the Matter of the Bell Telephone Company of Pennsylvania's Petition for An Alternative Form of Regulation Under Chapter 30, Docket No. P-00930715, 2/7/94.
- Generic Access Charge Investigation, Docket No. P-830452, 11/3/83, 3/21-22/84.

South Carolina Public Service Commission:

- In re: Application of MCI Telecommunications Corporation for a Certificate of Public Convenience and Necessity, Docket No. 84-181-C, 7/23-24/84.

Public Utilities Commission of the State of South Dakota:

- In the Matter of the Inquiry into the Competitive Status of Private Line and Special Access Services in South Dakota, F-3741; In the Matter of the Inquiry into the Competitive Status of Cellular Radio Services, Premise Cable and Inside Wire, Centron and Centron-Like Services, and Billings and Collections Services in South Dakota, F-3742; In the Matter of the Inquiry into the Competitive Status of MTS, WATS, and New Products and Services in South Dakota, F-3743; In the Matter of the Inquiry into the Competitive Status of Optional Services in South Dakota, F-3744, 1/16 & 1/19/89.

Public Service Commission, State of Tennessee:

- South Central Bell Telephone Company v. Southeastern Telecommunications, Inc. and Intercall, Inc. TPSC Docket No. U-82-7167 (on resale), 7/3/82 and 7/7/82.

Public Utilities Commission of Texas:

- Applications of Southwestern Bell Telephone Company, GTE Southwest, Inc., and Contel of Texas, Inc. for Approval of Usage-Sensitive Loop Resale Tariffs Pursuant to PURA 1995, 3.453, SOAH Docket No. 473-95-1210, PUC Docket No. 14659, 1/22/96.
- Complaint of Intellicall, Inc Against Private Coin Phone Rates and Practices of Southwestern Bell Telephone Company; Complaint of Advanced Telecom Systems, Inc., Against Private Coin Phone Rates and Practices of Southwestern Bell Telephone Company; Complaint of Intellicall, et al. Against Private Coin Phone Rates and Practices of Southwestern Bell Telephone Company; Application of Southwestern Bell Telephone Company to Revise its Private Coin Service Tariff, Docket Nos. 7122, 7123, 7124, 7152, 6/29-30/87 (Deposition - case subsequently settled.)
- In re: Petition of the PUC of Texas for an Inquiry Concerning the Effects of the Modified Final Judgment and the Access Charge Order upon Southwestern Bell Telephone Company and the Independent Telephone Companies of Texas, Docket No. 5113, 11/8/83.
- In the Matter of the Petition of Southwestern Bell Telephone Company for Authority to Change its Rates, Docket No. 4545, 11/3/82.

Utah Public Service Commission:

- In the Matter of Restructuring the Utah Intrastate Universal Service Fund Which Was Established in Docket No. 89-999-01, Docket No. 93-999-05, November 8, 1994.
- In the Matter of the Request of U S WEST Communications Inc. for an Increase in its Rates and Charges, Docket No. 94-049-05, 2/1/93.
- In the Matter of the Application of U S West Communications for Approval of an Incentive Regulation Plan, Docket No. 90-049-03, and In the Matter of the Investigation into the Reasonableness of the Rates and Charges of U S West Communications, Docket No. 90-049-06, 3/7/91.
- In the Matter of Mountain States Telephone and Telegraph Company, Case No. 88-049-07, 5/24/89.

Vermont Public Service Board:

- Investigation into NET's tariff filing re: Open Network Architecture, including the unbundling of NET's network expanded interconnection and intelligent networks, Docket No. 5713, 8/31/95.
- Petition of New England Telephone and Telegraph Company, Docket Nos. 5700 and 5702, 6/22/94, 7/21/94.
- Investigation of Proposed Second Vermont Telecommunications Agreement, Docket No. 5540, 2/14/92.
- Joint Petition of New England Telephone and Telegraph Company and the Vermont Department of Public Service Requesting Approval of the Vermont Telecommunications Agreement of October 14, 1987, Docket No. 5252, 5/2-3/88.

Virginia State Corporation Commission:

- Ex Parte, in re: Investigation to Consider the Impact of Modified Final Judgment in United States v. American Telephone & Telegraph Company, Civil Nos. 74-1698 and 82-0192, 552 F. Supp. 131 (D.D.C. 1972) and In the Matter of MTS and WATS Market Structure, FCC Docket No. 78-72 (Feb. 28, 1983) on the Provision of Toll Service in Virginia, Case No. PUC830020, 9/10-11/86.
- Petition of AT&T Communications of Virginia for Authority to Set Rates and Charges Pursuant to 1 of the Code of Virginia, Virginia Case No. PUC 840023, 7/30-31/84.
- Application of MCI Telecommunications of Virginia for a certificate of public convenience and necessity to provide inter-LATA, inter-exchange telecommunications service and to have rates established on competitive factors, Virginia Case No. PUC 840022, 7/27/84.

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- Washington Utilities and Transportation Commission vs. U S West Communications, Inc., Docket No. UT-941464, et al, 6/28/95.
- Northwest Payphone Association, et al. v. U S WEST Communications, Inc., Docket UT-920174, 2/2/93, 12/13/93.
- Washington Utilities and Transportation Commission, Complainant, vs. U. S. West Communications, Respondent, Docket Nos. UT-911488, UT-911490, and UT-920252, 9/28-29/92, 2/9/93.
- In the Matter of Pacific Northwest Bell D/B/A U S West Communications Petition for an Alternative Form of Regulation, Docket No. U-89-3245-P, 11-28-89.
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- In the Matter of the Petition of AT&T Communications of the Pacific Northwest, Inc. for Classification as a Competitive Telecommunications Company, Cause No. U-86-113, 4/6/87.
- Washington Utilities and Transportation Commission, Complainant, vs. Pacific Northwest Bell Telephone Company, Petitioner and Respondent, Consolidated Cause Nos. U-86-34, U-86-35, U-86-36, U-86-86, U-86-90, 12/14-17/86, 2/9/87.
- In the Matter of the Petition of MCI Telecommunications Corporation for Classification as a Competitive Telecommunications Company, Cause No. U-86-79, 9/2-3/86.
- Washington Utilities and Transportation Commission v. Pacific Northwest Bell Telephone Company et al., Cause No. U-85-23 et al., 4/29/86.

West Virginia Public Service Commission:

- Case Nos. 85-259-T-SC, et al., 1/27/86, 2/18/86.
- Case Nos. 85-282-T-GI and 85-022-T-P, 10/29/85.
- Case No. 83-259-T-SC, 11/1/83.

Public Service Commission, State of Wisconsin:

- Investigation of Intrastate Interexchange Access Charges and Related IntraLATA and InterLATA Compensation Matters, Docket No. 05-R-5, Part C, 2/2/87.
- Investigation of Application of MCI Telecommunications Corporation for Certificate of Public Convenience and Necessity to Offer Intrastate Toll Services (Petition for Interim InterLATA Authority), Docket No. 3258-NC-1, 10/29/84.
- In the Matter of: Proposed Tariff of Wisconsin Telephone Company for Centrex-CO Rate Stability, Docket No. 6720-TR-35, 3/15/83.

Public Service Commission, State of Wyoming

- In The Matter of the Joint Application of U S West Communications, Inc., and Range Telephone Cooperative, Inc., for Authority for U S West to Sell to Range Telephone the Following Telephone Exchanges, L.E. Gas Hills, Albin, Newcastle, Moorcroft, Thermopolis, Kaycee, Jeffrey City, Carpenter, Osage, Upton, Shoshoni, Pine Bluffs, Burns, Hulett, Worland, and Midwest, and for a Transfer of Requisite Certificate Authority, Docket Nos. 70000-TA-93-151 and 70001-TA-93-7, 9/28/93.
- In the Matter of a General Inquiry by the Public Service Commission into the Telecommunications Needs and Capabilities in Wyoming, General Order No. 67, 8/12/93.
- In the Matter of the Joint Application of U S West Communications, Inc. and Tri County Telephone Association, Inc., for Authority for U S West to Sell to Tri County the Following Telephone Exchanges, L.E., Lovell, Meeteetse, Greybull, Frannie and Basin, and for a Transfer of Requisite Certificate Authority, Docket No. 70000-TA-93-150 and Docket No. 70011-TA-93-8, 8/12/93; 9/30/93; 10/1/93.

TESTIMONY — US CONGRESS

Before the:

- House Judiciary Committee, Subcommittee on Courts, Civil Liberties, and the Administration of Justice, 10/27/83, [Economic Impacts of Repeal of the First Sale Doctrine for Audio-visual Works].
- Senate Committee on the Judiciary, Subcommittee on Patents, Copyrights and Trademarks, 10/25/83 [Home Taping of Audio and Video Works].
- Senate Committee on the Judiciary, Subcommittee on Patents, Copyrights and Trademarks, 4/29/83, [Economic Impacts of repealing the First Sale Doctrine for audio-visual Works].
- House Committee on the Judiciary, Subcommittee on Courts, Civil Liberties and the Administration of Justice, 9/22/82, Copyright Aspects of Home Audio Taping].
- Senate Committee on the Judiciary, 4/21/82, [Copyright Aspects of Home Videotaping].
- House Committee on the Judiciary, Subcommittee on Courts, Civil Liberties and the Administration of Justice, 4/13/82, [Copyright Aspects of Home Videotaping].
- Senate Committee on the Judiciary, 7/23/81, [Monopolization and competition in the Telecommunications Industry: Duties of the FCC under S.898].

- House Committee on Energy and Commerce, Subcommittee on Telecommunications, Consumer Protection, and Finance, 5/27/81, [Status of Competition and Deregulation in the Telecommunications Industry: Local Distribution].
- Senate Committee on Government Affairs, Subcommittee on Oversight of Government Management, 10/10/79, [FCC Compliance with Executive Order 12044].
- House Committee on Interstate and Foreign Commerce, Subcommittee on Communications, 6/6/79, [Communications Act of 1979].
- Senate Committee on Commerce, Science and Transportation, Subcommittee on Communications, 6/18/79, [Spectrum Management].

TESTIMONY — COURT CASES

- Clear Communications Limited v. Telecom Corporation of New Zealand Limited, et al., High Court of New Zealand, Wellington Registry, 6/24-26/92, 9/11/92.
- United States Football League, et al., v. National Football League, et al., United States District Court Southern District of New York, 84 Civ. 7484 (PKL), 6/17-19/86.
- International Telemeter Corporation v. Hamlin International Corporation, U.S. District Court - Western District of Washington, No. C76-487, 9/9-10/81.
- U.S. v. AT&T, U.S. District Court for the District of Columbia, Civil Action No. 74-1698, 6/19/81.

TESTIMONY — ARBITRATIONS

- In the Matter of An Arbitration Before the Right Honourable Sir Duncan McMullin Between Clear Communications Limited, Plaintiff, and Telecom Corporation of New Zealand Limited, Telecom Auckland Limited, Telecom Central Limited, Telecom Wellington Limited and Telecom South Limited, Defendants, 6/24/93.

ADDITIONAL ASSIGNMENTS, NO FORMAL TESTIMONY

- Consultation with Austel on implementation of a Decision-Making Framework for reviewing new proposed tariffs for anticompetitive effects, 5/94-6/94.
- Docket UM 351 Before the Public Utility Commission of Oregon, In the Matter of the Investigation into the Cost of Providing Telecommunications Services, Participation in Workshops on costing (Phase I), 8/90-6/94; Participation in Workshops on pricing (Phase II), 7/93-10/94.
- Civil Action No. 87-59-WS, General Electric Company, Plaintiff, vs. Thomas J. Zuchowski, Defendant; Civil Action No. C-87-249-WS, General Electric Company, Plaintiff, vs. R Squared Scan Systems, Inc., Defendant; and Civil Action No. C-90-78-WS, General Electric Company, Plaintiff, vs. R Squared Scan Systems, Inc., Defendant; participation for R Squared Scan Systems, Inc., in preparation for testifying on liability of General Electric Company for antitrust abuse of copyrighted software for maintaining and repairing computer assisted tomography scanners (CAT scanners), 1987-1991.

FILINGS — State Commissions

"Economic Efficiency and Unbundling the Monopoly Bottleneck: Incompatible or Indispensable?" A Response to the Economic Arguments made by Timothy J. Tardiff, Richard D. Emmerson, and Peter W. Huber on February 8, 1994, on Behalf of Pacific

Bell in Docket R.93-04-003 and Docket I.93-04-002 of the California Public Utilities Commission; March 31, 1994

FILINGS — FCC

"Accounting Separations: A Contradiction in Terms," with Michael D. Pelcovits, Appendix I to Reply Comments of Lee Enterprises, Incorporated, Before the FCC, January 21, 1986, in CC Docket No. 85-229 (Third Computer Inquiry), Attachment to the Written Testimony of Robert D. Ross, President, Call-It Co., Before the Subcommittee on Telecommunications, Consumer Protection & Finance, March 13 Hearing to Examine the Competitive Status of the Bell Operating Companies: Diversification and Its Impact upon Consumers.

FILINGS — COURT

Affidavits Before the United States District Court for the District of Columbia, Civil Action 82-0192, October, 1990; May, 1987.

EDUCATION

Ph. D. (Economics), University of Illinois at Urbana-Champaign, June 1972. Doctoral Dissertation: "The Role of the Nobility in Agricultural Change in Russia During the Reign of Catherine II".

M.A. (Economics), University of Illinois at Urbana-Champaign, June 1967.

A.B. (Economics), Swarthmore College, Swarthmore, Pennsylvania, June 1964.

AWARDS

1978-79 Harold and Margaret Sprout Award for the outstanding study on international ecological or environmental affairs.

PROFESSIONAL ASSOCIATION

American Economic Association

OTHER ACTIVITIES

1986-1988: Representative of the American Economic Association on the Executive Committee of the Consortium of Social Science Associations

1986-1988: Ex Officio Member, American Economic Association Committee on Economic Statistics

PERSONAL

BORN: February 17, 1942, in Boston, Massachusetts