

BEFORE THE FLORIDA PUBLIC SERVICE COMMISSION

11/14/95
FILED

DIRECT TESTIMONY OF

DR. NINA W. CORNELL

ON BEHALF OF

MCI METRO ACCESS TRANSMISSION SERVICES, INC.

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FPSC-RECORDS/REPORTING

1 Q. PLEASE STATE YOUR NAME AND ADDRESS.

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

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

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

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

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

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

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2 Q. HAVE YOU PUBLISHED ANY PAPERS ON TELECOMMUNICATIONS?

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

7

8 Q. HAVE YOU TESTIFIED BEFORE?

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

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15 Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

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17 A. My testimony addresses 1) the appropriate technical arrangements for the provision
18 to MCImetro of unbundled local loops; and 2) the appropriate price for the provision
19 to MCImetro of unbundled local loops and any associated concentration,
20 multiplexing, and transport. I recommend that the Commission require BellSouth to
21 provide unbundled loops, loop concentration, and loop transport to MCImetro. I
22 recommend that the price for these functions be set at their direct economic costs,
23 namely total service long run incremental cost.

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25 Q. WHY SHOULD BELL SOUTH PROVIDE UNBUNDLED LOOPS TO

1 MCIMETRO?

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3 A. The Commission should require BellSouth to provide unbundled loops because this
4 is essential if consumers in Florida are to receive the maximum possible benefits
5 from local exchange entry. It is unclear whether alternative loop providers can exist
6 in all locations. It is possible, at least for some time to come, that loop plant in some
7 locations may exhibit the characteristics of a natural monopoly, while alternative
8 originating switching service providers could exist in those same locations. The only
9 way that the market can allow effective competition for being the local exchange
10 switched service provider in those locations where loop plant may be a natural
11 monopoly is if loops are unbundled and supplied as a essential monopoly input
12 function or service, rather than being treated like a retail service. For this reason,
13 I consider loops to be an essential monopoly input function.

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15 Q. WHAT OTHER FUNCTIONS SHOULD BELLSOUTH BE REQUIRED TO
16 PROVIDE ALONG WITH UNBUNDLED LOOPS?

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18 A. BellSouth should also be required to provide loop concentration and loop transport.

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20 Q. WHAT ARE LOOP CONCENTRATION AND LOOP TRANSPORT, AND WHY
21 SHOULD BELLSOUTH BE REQUIRED TO PROVIDE THEM?

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23 A. Loop concentration is the function of concentrating the traffic from a number of loops
24 onto a single channel. Loop transport is the function of connecting concentrated
25 loops from the central office of the incumbent local exchange provider to the network

1 of an entrant. Loop concentration and loop transport are required if the offering of
2 unbundled loops is to be anything other than an empty gesture.

3 Loops today run from a customer's premise to the central office of the
4 incumbent local exchange carrier, where the loop gets connected to a switch through
5 a line card or its equivalent. An unbundled loop would still run all the way from a
6 customer's premise to the central office of the incumbent, but it would not be
7 connected to the incumbent's switch. Instead, the unbundled loop would be available
8 at the central office of the incumbent to be connected to the network of an entrant.

9 If an entrant is to use an unbundled loop, the loop now must continue on from
10 the incumbent local exchange carrier's central office to the location of the switch of
11 the entrant. To do this in an economically efficient manner requires loop
12 concentration and loop transport. Otherwise, it would be the equivalent either of
13 offering hot water pipes, connecting them to faucets with H on them, but refusing to
14 take those pipes all the way back to the hot water heater, or insisting that each faucet
15 must be connected separately to the hot water heater. Under the first scenario, the
16 user turning on a faucet with an H on it will get no water at all, hot or cold.
17 Similarly, an unbundled loop not carried all the way to the entrant's switch will get
18 no dial tone, whether from the entrant or the incumbent. Under the second scenario,
19 the user would get hot water, but at such a high cost for plumbing that few sinks
20 would have the H faucets connected. Similarly, unbundled loops that must be
21 connected individually, rather than being concentrated, to an entrant's network would
22 mean that very few, if any, unbundled loops would actually be used.

23 Loop concentration is the function of concentrating a number of different
24 loops onto a transport facility before the loops terminate in a switch. In essence,
25 loop concentration allows an entrant to take a given number of unbundled loops from

1 a given central office of the incumbent local exchange carrier and use many fewer
2 channels for loop transport between the incumbent's central office and the network
3 of the entrant to extend the feeder portion of those loops so that the loops can
4 terminate at the switch of the entrant. The concentration operates in a manner similar
5 to how traffic is concentrated onto interoffice trunks, allowing many fewer channels
6 to serve the traffic than the number of loops that were used to originate and terminate
7 that same traffic. Without loop concentration, an entrant would have to use a
8 separate facility for each unbundled loop to get that loop from the central office of
9 the incumbent to its own switch. This is very inefficient, and not how a modern
10 local exchange carrier provides new loop plant today.

11 Loop transport is the function of actually transporting the concentrated loops
12 between the incumbent local exchange carrier's central office and the location where
13 the entrant has the switch on which it wants to terminate those loops. In virtually all
14 locations, only the incumbent local exchange carrier has the facilities in place to
15 provide this function. Moreover, unless the rules are changed, even where an
16 alternative provider has transport capabilities, the incumbent local exchange carrier
17 currently does not allow the alternative transport provider to connect to facilities of
18 a third carrier as part of colocation, or does not allow any party to put a loop
19 concentrator in a colocation space. As long as any of these restrictions remain in
20 place, even where alternative transport providers have facilities that would be
21 sufficient for providing loop transport, that function remains a monopoly of the
22 incumbent local exchange provider because of the restrictions.

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24 Q. HOW DOES A MODERN LOCAL EXCHANGE CARRIER PROVIDE NEW
25 LOOP PLANT?

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A. Loop plant has two major parts: feeder and distribution. Feeder plant is closer to the central office, while distribution plant takes a loop from the end of a feeder run to the premise of the customer. Today, feeder plant for all but relatively short loops no longer uses a separate set of wires for each loop, but rather combines a number of loops onto a smaller number of facilities. The most modern equipment for combining loops actually concentrates the traffic, making feeder plant more like interoffice trunks than used to be the case. The result of this concentration is to greatly reduce the cost of this portion of the loop, and changes the economic trade-off between having longer loops and fewer switches versus having shorter loops and more switches.

A local exchange provider must decide how many switches it wants to place given the expected number and geographic location of its subscribers. The fewer switches it deploys for a given number and geographic distribution of subscribers, the longer the loops serving those customers will have to be. The more switches it deploys, the shorter those loops will have to be. Thus, switches can substitute for part of each loop, although not for the entire loop. How many switches to use versus the length of loops depends upon the cost of having more switches versus the cost of having longer loops. If loop concentration is used, the trade-off shifts towards longer loops and fewer switches than without loop concentration. Thus, under present technology, loop concentration allows the use of fewer of society's scarce resources than would be the case without concentration.

Q. HOW SHOULD PRICES FOR UNBUNDLED LOOPS, LOOP CONCENTRATION, AND LOOP TRANSPORT BE SET?

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A. The prices for these unbundled elements should be set at direct economic cost, which is total service long run incremental cost. Any other level of price above cost would have no ability to permit BellSouth to pass an imputation test, enabling BellSouth to create a price squeeze. A price squeeze exists whenever a firm that supplies essential inputs to a competitor recovers less in its end user rates for those essential inputs than it charges its competitors. Given the flat rates charged for local exchange service, and particularly residential local exchange service, a price for loops that was greater than TSLRIC would create a price squeeze for entrants.

Q. WHAT IS THE PROBLEM IF THERE IS A PRICE SQUEEZE?

A. If a price squeeze is allowed to exist, then an equally efficient firm will be prevented from entering the market. Whatever is the relationship of the price set for the monopoly inputs by the supplier to that supplier's cost of providing them, the price set by the monopolist is a cost for a purchasing firm. If that purchaser is equally efficient as the monopoly firm in supplying the end user service, that means that the rest of the purchasing firm's costs are equal to the monopolist's costs for everything but the monopoly input. If there is a price squeeze, however, that equally efficient firm cannot cover its costs at the price established by the monopoly firm for the end user service, and so it cannot enter the market.

Q. IS PRIVATE LINE SERVICE THE APPROPRIATE WAY TO PROVIDE UNBUNDLED LOOPS?

1 A. No. Private lines are an end to end service, not unbundled functions. For example,
2 BellSouth performs all of the testing and engineering for private lines, aspects of
3 service that entering local exchange firms would perform for unbundled local loops.
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6 Q. DOES THIS CONCLUDE YOUR TESTIMONY?
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8 A. Yes.
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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.

PUBLICATIONS

"Regulation and Optimal Technological Change: Not Whether but How," in The Changing Nature of Telecommunication/Information Infrastructure, Computer Science and Telecommunications Board, National Research Council, Washington, D.C., National Academy Press, 1995.

"Optimal Costing and Pricing Methodologies for Regulated Monopoly Telephone Companies," in William Pollard, Editor, Marginal Cost Techniques for Telephone Services: Symposium Proceedings, Columbus, Ohio, The National Regulatory Research Institute.

Contributor, "The State of Competition in Telecommunications," in Barry G. Cole, Editor, After The Breakup: Assessing the New Post-AT&T Divestiture Era, New York: Columbia University Press, 1991.

Co-Author, "Public Utility Rate-of-Return Regulation: Can It Ever Protect Consumers?" by Nina W. Cornell and Douglas W. Webbink, in Robert W. Poole, Jr., editor, Unnatural Monopolies, Lexington, Mass.: Lexington Books, 1985.

Co-Author, "Access Charge Theory and Implication: A Slip Twixt Cup and Lip," by Michael D. Pelcovits, Nina W. Cornell, and Steven R. Brenner, in Patrick C. Mann and Harry M. Trebbing, Editors, Changing Patterns in Regulation: The Effect on Public Utility Pricing, Proceedings of the Institute of Public Utilities Fourteenth Annual Conference, East Lansing, Michigan: Institute of Public Utilities Graduate School of Business Administration, 1984.

Co-Author, "Toward Competition in Phone Service: A Legacy of Regulatory Failure," by Nina W. Cornell, Michael D. Pelcovits, and Steven R. Brenner, in Regulation, July/August 1983.

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Co-Author, "Access Charges, Costs, and Subsidies: The Effect of Long Distance Competition on Local Rates," by Nina W. Cornell and Michael D. Pelcovits, in Eli Noam, editor, Telecommunications Regulation Today and Tomorrow, New York: Harcourt Brace Jovanovich, 1983.

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Co-Author, "Social Objectives and Competition in Common Carrier Communications: Incompatible or Inseparable?" by Nina W. Cornell, Daniel A. Kelley, and Peter R. Greenhalgh, in Harry Trebing, ed., Energy and Communications in Transition, Michigan State University Public Utilities Papers, 1981.

"Rate of Return Regulation: Protecting Whom from What?", Regulation, November/December 1980.

Co-Author, "Common Carrier Regulation and Technological Change: The New Competition in the Communications Industries," by Nina W. Cornell and Douglas W. Webbink, Joint Economic Committee of Congress, Special Study on Economic Change, Volume 5, December 8, 1980.

Co-Author, Policies for Regulation of Direct Broadcast Satellites, by Florence O. Setzer, Bruce A. Franca, and Nina W. Cornell, Staff Report, Office of Plans and Policy, Federal Communications Commission, September 1980.

"For Spectrum Economics," Mobile Times, February 1980; and "More on the Spectrum Economics Debate: Rebuttal for the Proposal," Mobile Times, March 1980.

"The Politics of Policy Analysis," American Journal of Agricultural Economics, Vol. 61, No. 4, part 2, November 1979.

"Can Safety Be Mandated?" Economic Effects of Government-Mandated Costs, Public Policy Research Center, University of Florida, 1978.

Co-Author, Regimes for the Ocean, Outerspace, and the Weather, by Seyom Brown, Nina W. Cornell, Larry L. Fabian, and Edith Brown Weiss, The Brookings Institution, 1977.

Co-Author, "Safety Regulation" by Nina W. Cornell, Roger C. Noll, and Barry Weingast, in Henry Owen and Charles L. Schultze, eds., Setting National Priorities: The Next Ten Years, The Brookings Institution, 1976.

"Manganese Nodule Mining and Economic Rent," Natural Resources Journal, Vol 14, No. 4, October 1974.

SELECTED CONFERENCE PRESENTATIONS

Asilomar Conference on Lifting the MFJ Restrictions, A Symposium Sponsored by The Communications Committee of the National Association of Regulatory Utility Commissioners and the California Public Utilities Commission, Asilomar Conference Center, Pacific Grove, California, January 2-5, 1990

"Emerging IntraLATA Rate Structures and the Impact of IntraLATA Pricing on Competition," presented at the 1988 NARUC Advanced Regulatory Studies Program, Williamsburg, Virginia, February 28, 1988.

"Local Telephone Prices and the Subsidy Question," with Roger C. Noll, presented at the Bell Communications Research Telecommunications Demand Modeling Conference, New Orleans, Louisiana, October 25, 1985.

TESTIMONY — REGULATORY COMMISSIONS

Canadian Radio-television and Telecommunications Commission:

- Inquiry Into Telecommunications Carriers' Costing and Accounting Procedures: Phase III - Costing of Existing Services, 9/30/82.

Public Utilities Board for the Province of Alberta, Canada:

- In the Matter of "The Alberta Government Telephones Act," Being Chapter A-23 of the Revised Statutes of Alberta, 1980, as Amended; And in the Matter of "The Public Utilities Board Act," Being Chapter P-37 of the Revised Statutes of Alberta, 1980, as Amended; and in the Matter of an Application by Alberta Government Telephones to the Public Utilities Board for an Order Approving the Deletion of Certain Basic Terminal Equipment (Voice) Services. (On Proper Conditions to Apply to Local Telephone Company Services in order to have a Competitive Equipment Market), 2/10/83.

Alaska Public Utilities Commission

- In the Matter of Consideration of Regulations Governing the Market Structure for Intrastate Interexchange Telecommunications Service, Docket No. R-90-1, 6/5/90.

Arizona Corporation Commission:

- In the Matter of the Application of the Mountain States Telephone and Telegraph Company, a Colorado Corporation, for a Hearing to Determine the Earnings of the Company, the Fair Value of the Company for Ratemaking Purposes, to Fix a Just and Reasonable Rate of Return Thereon, and to Approve Rate Schedules Designed to Develop Such Return, Docket No. E-1051-84-100, and In the Matter of the Mountain States Telephone & Telegraph Company Filing New Tariff Pages for Approval by the Commission, Which Introduce Access Services, Docket No. E-1051-83-293, 8/23/85.
- 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 Arizona, Docket No. U-2432-84-003, 1/11/85.
- In the Matter of a General Investigation on the Commission's Own Motion into Competition for Intrastate Interexchange Services, Docket No. U-0000-84-058, 9/4/84.

Arkansas Public Service Commission:

- In the Matter of an Investigation of Intrastate Separations, Settlements and Intrastate Toll Rates of Return, Docket No. 83-042-U, 5/28/85.

Public Utilities Commission of California:

- Order Instituting Rulemaking on the Commission's Own Motion Into Competition for Local Exchange Service; Order Instituting Investigation on the Commission's Own Motion Into Competition for Local Exchange Service; R.95-04-043, et al., 10/27/95.
- Investigation on the Commission's Own Motion into the Second Triennial Review of the Operations and Safeguards of the Incentive-Based Regulatory Framework for Local Exchange Carriers, I. 95-05-047, 9/28/95.
- In the Matter of Alternative Regulatory Frameworks for Local Exchange Carriers and Related Matters, I.87-11-033, 5/18/92; 10/9-10/91.

- Application of AT&T Communications of California, Inc. (U 5002 C) under Rule 18 for a Certificate of Public Convenience and Necessity for Authority to Provide Intrastate InterLATA AT&T MEGACOM and AT&T MEGACOM 800 Service; Application of AT&T Communications of California, Inc. (U 5002 C) under Rule 18 for a Certificate of Public Convenience and Necessity for Authority to Provide AT&T PROsm WATS California; Application of AT&T Communications of California, Inc. (U 5002 C) for Authority to Provide Intrastate AT&T 800 READYLINE Service, A.88-07-020, A.88-08-051, A.89-03-046, 3/2/90, 5/7/90.
- In the Matter of the Application of the Pacific Telephone and Telegraph Company, a corporation, for authority to establish a rate stability plan for Centrex-CO and associated services, to expand Centrex-CO service to smaller line size customers and to lower certain Centrex-CO service rates, Application No. 83-05-45, 12/27-28/83.
- Order Instituting Investigation to determine whether competition should be allowed in the provision of telecommunications transmission services within the state. And related matters. OII 83-06-01, Applications No. 82-12-21, No. 83-10-20, No. 83-05-16, No. 83-05-26, No. 83-05-40, No. 83-06-54, No. 83-07-21, No. 83-08-26, No.83-09-37, Case No. 83-05-05, 9/26-27/83 and 10/21/83.
- In the Matter of the Application of the Pacific Telephone and Telegraph Company, a corporation, for authority to increase certain intrastate rates and charges applicable to telephone services furnished within the State of California due to increased depreciation expense and Related Cases, Application No. 82-11-07, Application Nos. 83-01-22; 83-06-65; OII 83-04-02, 8/25-26/83.

Public Utilities Commission, State of Colorado:

- In the Matter of Costing and Pricing for Telephone Services, Docket No. 92M-039T, 2/24-28/92, 12/1-3/92.
- In Re: Application of Mountain States Telephone and Telegraph Company, D/B/A, U S West Communications, Inc., for Approval of a Five Year Plan for Rate and Service Regulation and for a Shared Earnings Program, Docket No. 90A-655T, 10/28/91.
- In Re: Investigation and Suspension of Proposed Changes in Tariffs Filed by the Mountain States Telephone and Telegraph Company, d/b/a U S West Communications, Inc., in Advice Letter No. 2173, Docket No. 90S-544T, 7/23/91, 7/25/91.
- In Re: Rules Prescribing the Provision of Certain Services within Open Network Architecture, Docket No. 90R-512T, 11/26/90.
- In Re: Investigation of IntraLATA Interexchange Telecommunications Markets in the State of Colorado, Docket No. 89I-082T, 2/22/90.
- Investigation and Suspension of Proposed Changes and Additions to Exchanges in Network Services Tariff—Telephone, Mountain States Telephone and Telegraph Company, Denver, Colorado 80202, I & S Docket No. 1766, 11/29/88.
- William C. Danks, Complainant v. Mile Hi Cablevision, Inc., Mile Hi Cablevision Associates, Ltd., and The Mountain States Telephone and Telegraph Company, Respondents; The Mountain States Telephone and Telegraph Company, Complainant, v. American Television and Communications Corporation, d/b/a American Cablevision of Littleton, Inc., American Cablevision of Thornton, Inc., American Cablevision of Wheatridge, Inc., and American Cablevision of Northglenn, Inc., Respondent, 12/11/85.
- In the Matter of the Application of MCI Telecommunications Corporation for a Certificate of Public Convenience and Necessity to Offer Intrastate Telecommunications Services to the Public in the State of Colorado, Application No. 36337, 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 Colorado and for the Establishment of Initial Rates, Application No. 36360, In the Matter of the Authority to Provide Interexchange Switched Voice Telecommunications Service on an IntraLATA Basis in the State of Colorado, Application No. 36456, 11/2/84.

Connecticut Department of Public Utilities:

- DPUC Investigation into the Unbundling of The Southern New England Telephone Company's Local Telecommunications Network, Docket No. 94-10-02, 5/8/95 and 5/19/95.
- DPUC Investigation into the Cost of Service of Southern New England Telephone Company, Docket 94-10-01, 2/2/95; 3/1/95.
- DPUC Investigation into the Rate Structure and Operational and Financial Status of the Southern New England Telephone Company, Docket No. 89-12-05, 5/6/91.
- DPUC Investigation into Authorization of Competition for Intrastate Telecommunications Service Pursuant to P.A. 87-415, Docket No. 87-08-24, 2/4-5/88.
- DPUC Investigation into Competition for Intrastate Interexchange Telecommunications Service, Docket No. 85-06-04, 4/2-3/86 and 5/29-30/86.
- Investigation into Compensation to Telephone Companies by Interstate Common Carriers for Unauthorized Intrastate Calls, Docket No. 85-05-23, 7/9/85 and 7/17/85.

Public Service Commission, State of Florida:

- In re: Petition for Review of Rates and Charges Paid by PATS Providers to LECs, Docket No. 860723-TP, 8/2/90.
- In re: Review of Southern Bell Telephone and Telegraph Company's Capital Recovery Position, Docket No. 890256-TL, 3/29/90.
- In re: Investigation into Equal Access Exchange Areas (EAEAs), Toll Monopoly Areas (TMAs), 1+ Restriction to the Local Exchange Companies (LECs), and Elimination of the Access Discount, Docket No. 880812-TP, 11/2/89.
- In re: An Investigation into the Statewide Offering of Access to the Local Network for the Purpose of Providing Information Services, Docket No. 880423-TP, 2/17/89.
- In re: Investigation into NTS Cost Recovery - Phase II, Docket No. 860984-TP, 3/17/88.
- In re: Investigation into NTS Cost Recovery - Phase I Levels, Docket No. 860984-TP, 9/17/87.
- In re: Intrastate Access Charges for Toll Use of Local Exchange Services - Toll Monopoly Transmission Areas and Bypass Restrictions (Phase I), Docket No. 820537, 5/2/86.
- Application of AT&T Communications of the Southern States, Inc. for a Certificate of Public Convenience and Necessity/Motion for Waiver of Tariff Filing Requirements, Docket No. 830489-TI, 3/13/86.
- In re: Intrastate Access Charges for Toll Use of Local Exchange Services, Docket No. 820537-TP, 9/14/83.
- 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 Provide 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 Elec-

tricity, 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 intercity 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.
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- 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:

- 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.

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- 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:

- 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, I.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, I.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