Ex.__ (LKV-T)

GTE NORTHWEST INCORPORATED

DIRECT TESTIMONY OF

LAWRENCE K. VANSTON, PH.D.

WUTC UT-961632

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Lawrence K. Vanston. My business address is 13740 Research Blvd., Suite C-1, Austin, Texas.

Q. BY WHOM ARE YOU EMPLOYED AND IN WHAT CAPACITY?

A. I am President of Technology Futures, Inc. ("TFI"). In this capacity, I direct TFI's telecommunications and forecasting research, and I direct TFI's public seminar, *Technology Forecasting for the Telecommunications Industry*. I am also the publisher of TFI's research journal, *New Telecom Quarterly*.

Q. WHAT IS TFI?

A. TFI is a research institution established in 1978. It specializes in technology forecasting and strategic planning in several industries, including the telecommunications industry. TFI has performed technology forecasts in the telecommunications arena since 1984.

Q. WHAT IS YOUR EDUCATIONAL BACKGROUND AND EXPERIENCE?

A. I hold a Ph.D. in Operations Research and Industrial Engineering from the University of Texas at Austin, where I also earned my Master of Science and Bachelor of Arts degrees. For four years I was a Member of Technical Staff at Bell Labs and Bellcore in network planning. I have been with TFI since 1984, specializing in technology forecasting. I have 17 years of experience in

technology forecasting for the telecommunications industry. My resume and a list of publications and previous testimony is attached as Schedule LKV-1.

PURPOSE OF TESTIMONY

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?

A. The purpose of my testimony is to support the depreciation lives proposed by GTE Northwest Incorporated ("GTE Northwest") in this proceeding. I will show how technology advances, new services, regulatory policy and competition are rapidly rendering the existing local telephone network obsolete, especially the copper cables.

Q. PLEASE SUMMARIZE THE KEY POINTS CONTAINED IN YOUR TESTIMONY.

A. The key points of my testimony are:

- I support the depreciation lives proposed by GTE Northwest. Their proposals are consistent with the GTE Telephone Operations ("Telops") specific forecast, which is appropriate for use for GTE Northwest in Washington.
- Regulatory depreciation schedules are much too long, especially given the climate of rapid change we are entering.
- Capital must be recovered while the investment is still useful -- before it is retired. The competitive environment will not allow local exchange companies ("LECs") like GTE Northwest to recover investment in both old and new technologies simultaneously.
- To stay competitive, GTE Northwest and other LECs will have to adopt new technology and replace old technology at a rate faster than is

suggested by current depreciation schedules.

- Technological superiority, not wear-out, is a key driver for replacement of technology today. New technology has been a primary enabler of competition. New competitors adopt the most modern technology without the handicap of having to evolve an existing network. These new competitors also take advantage of the local exchange company's existing network through interconnection or resale agreements while they build their own modern network.
- Rapid advances in technology, such as microelectronics and fiber, are reshaping telecommunications economics at an unprecedented pace. These changes are impacting all parts of the network simultaneously.

Q. PLEASE DESCRIBE THE METHODS YOU USED TO DETERMINE DEPRECIATION LIVES.

A. There are reliable methods from the discipline of technology forecasting that allow us to forecast future technology changes, and thus depreciation lives. Developed and tested over many years, within and without the telecommunications industry, these methods have proven very reliable for forecasting. Their basis lies in an understanding of the process of technology change and the use of available data to produce quantitative forecasts.

One technology forecasting method, *substitution analysis*, has been proven effective in projecting the adoption of new technologies and the obsolescence of old technologies. Substitution refers to the displacement of an established technology by a newer technology when the new technology

provides substantially improved capabilities, performance, or economies. With substitution, technological superiority of the new technology -- not wear-out -- is the driver for replacement.

Q. WHAT IS SUBSTITUTION ANALYSIS?

A. With substitution analysis, we examine patterns of technology substitution. The pattern is remarkably consistent from one substitution to another, characterized by an S-shaped curve when the market share of the new technology is plotted over time. Of the several substitution models available, we have found the Fisher-Pry model -- and its extensions, notably, multiple substitution models based on the same principles -- to be the most useful for forecasting.

Q. WHAT IS THE RATIONALE BEHIND THE FISHER-PRY MODEL?

A. The adoption of a new technology starts slowly because, when it is first introduced, a new technology is usually expensive, unfamiliar, and imperfect. The old technology, on the other hand, has economies of scale and is well-known and mature. As the new technology improves, it finds more and more applications, it achieves economies of scale and other economic efficiencies, and it becomes generally recognized as superior. The old technology, because of its inherent limitations and falling market share, cannot keep up. The result is a period of rapid adoption of the new technology, beginning at the 10% to 20% penetration level. This corresponds with a period of rapid abandonment of the old technology. Toward the end of the substitution, adoption of the new technology slows down again as the last strongholds of the old technology are penetrated.

Q. HOW IS THE FISHER-PRY METHOD USED IN FORECASTING TECHNOLOGICAL SUBSTITUTIONS AND EQUIPMENT LIVES?

A. The pattern of how a new technology replaces an old one is consistent. The pattern can therefore be applied to a technology substitution in progress, or one just beginning, to forecast the remainder of the substitution and estimate the end date for the old technology. We can apply substitution analysis even in cases where the substitution has yet to begin by using appropriate analogies, precursor trends, or evaluation of the driving forces.

MORTALITY ANALYSIS AND SUBSTITUTION ANALYSIS COMPARED

Q. HOW DOES SUBSTITUTION ANALYSIS COMPARE TO MORTALITY ANALYSIS IN ESTIMATING DEPRECIATION LIVES?

A. Substitution analysis provides better indicators of lives than mortality-based methods because substitution analysis recognizes that technological obsolescence is the major driver for retirements rather than physical life.

Q. HOW CAN SUBSTITUTION ANALYSIS PREDICT AN IMPENDING AVALANCHE OF RETIREMENTS?

A. Substitution analysis recognizes the early adoptions of the new technology years before significant quantities of the old technology are retired—and even when large investments in the old technology are still being placed. The early adoptions, corresponding to the first, relatively flat part of the S-shaped substitution curve, are often for growth applications that do not cause significant retirements. However, they are a *precursor* for later replacement programs that do result in retirements. This is one reason why substitution analysis can predict

the edge of the waterfall. The steep part of the S-shaped curve, where new technology is placed very rapidly, corresponds to the avalanche of retirements.

Q. HOW DOES TODAY'S SITUATION REGARDING TECHNOLOGY SUBSTITUTION DIFFER FROM THE PAST?

A. Throughout the history of telephony, technology advances have caused the replacement of old technology, as evidenced by previous avalanche curves and S-shaped substitution curves. However, there are several factors that make today's situation very different. First, we are in a period where rapid advances in microelectronics and fiber optics technology are reshaping telecommunications economics at an unprecedented pace. Second, these changes are impacting all parts of the network simultaneously, leading rapidly to a broadband network architecture that is fundamentally different than today's. Third, there are two other drivers, competition and new services, that reinforce the already strong technology driver. The result will be simultaneous avalanche curves occurring in all major investment categories during the late 1990s and early 2000s.

Q. WHY IS IT NOW SO IMPORTANT TO USE TECHNOLOGY FORECASTING FOR LIFE ESTIMATION?

A. Historically, avalanche curves have been recognized by the regulatory depreciation process after the fact because traditional depreciation analysis provides no way to predict them. Since avalanches usually reflect retirements that occur before the end of the equipment's prescribed depreciation life, they signify depreciation reserve deficiencies. In the past, these reserve deficiencies have been recovered by amortizations over future years. This approach worked

satisfactorily in the days when avalanches were the exception rather than the rule, and when the monopoly structure of the industry allowed reserve deficiencies to be recovered from future ratepayers. In the new environment, however, this approach is less likely to work. Capital must be recovered while the investment is still useful -- before it is retired. The competitive environment will not allow LECs to recover investment in both old and new technologies simultaneously. Therefore lives must be accurately estimated as early as possible -- before the avalanche begins, and even before explicit replacement programs are in place.

TECHNOLOGY CHANGE

Q. WHAT TECHNOLOGY CHANGES ARE IMPACTING THE LOCAL EXCHANGE NETWORK?

A. The major changes are outlined as follows:

Outside Plant: The adoption of fiber optics in the interoffice, feeder and distribution parts of the outside plant. Especially important are Fiber in the Loop ("FITL") architectures that extend fiber into the distribution portion of the local loop. With FITL, the last link to the customer may be on fiber, copper pairs, coaxial cable, or wireless. Not only does fiber increase the bandwidth available for new customer services, but it also provides significant operations, maintenance, and provisioning savings.

Circuit Equipment: The adoption of Synchronous Optical Network ("SONET") equipment which can efficiently multiplex different types of traffic on the same pair of fibers. Because of this, and a long list of other advantages, all fiber

transmission systems are likely to be upgraded to SONET. Also, unlike traditional equipment, SONET can extract an individual channel from a multiplexed signal without breaking down the whole signal. This will render redundant much existing circuit equipment, including digital crossconnects and multiplexers. Thus, SONET will replace essentially all of today's digital circuit equipment.

Switching: Major upgrades to existing digital switching to provide more efficient service, as well as new services such as ISDN, and the adoption of broadband switches based on Asynchronous Transfer Mode (ATM) technology. ATM, the next major switching generation, is optimized to handle all types of traffic on the network efficiently and quickly, without the limitations of today's narrowband switch fabrics. Currently, ATM is being targeted to serve data and video applications, but soon it will become the most efficient switching fabric for all types of communications, including voice.

Q. WHAT ARE THE ADVANTAGES OF THESE TECHNOLOGIES?

A. In a nutshell, the benefits of these technologies are reduced operating costs, reduced investments, better service, or, in some cases, new services. For example, SONET uses standardized optical and electrical interfaces to which all suppliers must adhere, so carriers can mix-and-match circuit equipment using different manufacturers' equipment. This, of course, provides operational and equipment savings, as well as more competition among manufacturers. Later on, SONET interfaces will be built directly into switches, leading to even more equipment savings. Circuits could be transferred from one switch to another

instantaneously, giving carriers much more flexibility when dealing with switch manufacturers. SONET will directly benefit customers as well. In addition to the inherent economic benefits of a more efficient network, SONET will provide greater reliability through its support of fiber ring architectures and enhanced response time and flexibility in provisioning new channels.

Q. DO THESE TECHNOLOGIES REQUIRE ANY BREAKTHROUGHS?

A. No. The technologies are largely understood and do not require scientific, engineering, or economic breakthroughs to be deployed. There is widespread agreement about their benefits and their cost targets. While there is some controversy about the details and timing, there is consensus that the future of telecommunications is built around these technologies.

Q. ARE THESE TECHNOLOGIES INDEPENDENT?

A. No. They are extremely interconnected and ultimately lead to the broadband network of the future. For example, fiber optics and SONET provide an extremely powerful combination for efficiently transporting a wide variety of traffic types found on today's telecommunications networks. The combination becomes even more powerful and efficient when SONET is directly interfaced to modern digital switches, eliminating much of today's line equipment. ATM switching matches the bandwidth capabilities of fiber and SONET to enable a host of wideband and broadband services that today's narrowband switch fabrics cannot handle. Ultimately, fiber, SONET, and ATM combine to provide a full-service network that can handle voice, video, and data in a way that: (a) is highly efficient for all services -- individually and in combination; (b) provides the digital

communications services needed in the information age; and (c) allows local exchange carriers such as GTE Northwest to meet competitors who are already adopting this technology on even terms.

COMPETITION

Q. IS COMPETITION A FACTOR IN ASSESSING NEW TECHNOLOGY ADOPTION AND DEPRECIATION LIVES BY LECS?

A. Yes. Competition has entered the local exchange business, and it will increase dramatically over the next few years. So far, most local exchange competition has centered on the large business customer. Competitive access providers ("CAPs") are already serving large businesses in concentrated areas, and cable television companies are providing alternative access for high-bandwidth services. CAPs are installing the latest, most efficient technology -- fiber optics, SONET, and in states where they may provide switched services, modern digital switching. LECs such as GTE Northwest will have no choice but to match these capabilities to stay competitive.

Q. PLEASE DESCRIBE THE RELATIONSHIP BETWEEN COMPETITION AND NEW TECHNOLOGY ADOPTION.

A. Because they are more efficient, the new technologies offer very substantial cost advantages to new entrants in local telecommunications. These new entrants can invest in the most efficient modern equipment without regard to the LECs' embedded infrastructure. This, in turn, will pressure LECs to adopt new technology to stay competitive. Thus, competition reinforces the technology drivers and magnifies the obsolescence of the old technology.

Q. HOW DOES COMPETITION IMPACT THE DEPRECIATION LIVES OF EXISTING EQUIPMENT?

A. First, to stay competitive, LECs will have to adopt new technology, and thereby replace old technology, at a rate faster than suggested by current depreciation schedules. Second, the rapidly falling cost of competitive alternatives means that the value of existing assets must also decline rapidly. Third, the inevitable loss of market share to competition, along with falling prices for service, means that existing assets will earn less revenue in the future and thus decline rapidly in value. The lives we are recommending in this proceeding reflect the first factor, but do not fully reflect the other two. Thus, they are higher than they would be if the full economic impact of competition were included.

Q. HOW DOES COMPETITION AFFECT THE NEED TO PROVIDE NEW SERVICES?

A. Because some of the new services blur the traditional distinctions between telephony, television, publishing, information systems, and computing, they foster a new type of competition focused on the convergence of these industries. In this environment, competitive advantage belongs to those companies that can deliver a package of diverse services for the least cost. As it happens, the new technologies allow delivery of multiple services at overall costs that are comparable or less than the traditional delivery mechanisms for the individual services. Again, this means that, to stay competitive, GTE Northwest will have no choice but to adopt these technologies in response to competition.

IMPACTS ON DEPRECIATION LIVES

Q. WHAT IS THE OVERALL IMPACT OF NEW TECHNOLOGY, COMPETITION, REGULATORY POLICY WHICH ENCOURAGES COMPETITION, AND NEW SERVICES ON DEPRECIATION LIVES?

A. Alone, any one of these drivers would cause significant change in the deployment of technology. Together, they are forcing unprecedented change that will render most of today's telephone network obsolete. Although functional for voice services, today's network is expensive to operate and offers limited functionality in terms of mobility and digital services. It was optimized and constructed for the age of manual and electromechanical switching and copper cable, an age which for a decade has been giving way to digital switching and fiber optics. Even much of the equipment placed in the last decade is becoming obsolete in the face of new technologies such as SONET and ATM. Thus, if GTE Northwest is to remain viable, it must rebuild its network. This will involve, first, continued investment in new technology, and, second, much shorter lives for existing investment than are currently prescribed.

TFI TELECOMMUNICATIONS TECHNOLOGY FORECASTING STUDIES

Q. WHAT STUDIES HAS TFI PERFORMED IN THE AREA OF TELECOMMUNICATIONS TECHNOLOGY FORECASTING?

A. TFI has produced numerous major studies on telecommunications technology adoption for over 10 years, long enough to establish a track record. A list of these studies is shown on pages 2-4 of Schedule LKV-1.

The TFI studies fall into three general categories. First are a series of industry studies on the adoption of new technology in the telephone network. We

started doing these studies in 1985 and have issued updates over the years. The report, *Transforming the Local Exchange Network: Analyses and Forecasts of Technology Change*, was issued in 1994 and covers switching equipment, outside plant, and circuit equipment. These studies provide quantitative forecasts of the adoption of new technology -- and the replacement of old technology -- in future years.

Second are a set of seven studies completed between 1991 and 1993 on the need for and adoption of new digital telecommunications services. In these studies, we assessed the drivers and benefits, as well as the constraints, of new services to provide applications such as advanced fax, electronic imaging, interactive multimedia, local area network interconnection, videoconferencing, and interactive television. We concluded that a potential mass-market exists for these applications, and that the widespread availability of digital services was required to serve them. We then developed quantitative forecasts of demand over time for digital services at various data rates. The results of the studies were summarized in our 1993 report *New Telecommunications Services and the Public Telephone Network*.

Third are several studies on the effect of competition on the existing investment in the local exchange network. These studies quantify the revenue losses in voice services that are likely due to competitors using technologies that render today's copper network obsolete. The reports are: *Wireless and Cable Voice Services: Forecasts and Competitive Impacts*,[1] *Depreciation Lives for*

[1] Lawrence K. Vanston & Curt Rogers, *Wireless and Cable Voice Services:*

Telecommunications Equipment: Review & Update,[2] and *Advanced Video Services: Analysis and Forecasts for Terrestrial Service Providers*.[3] The second of these three studies, *Depreciation Lives for Telecommunications Equipment: Review & Update*, is attached to this testimony as Schedule LKV-2.

A unifying conclusion from these studies is that regulatory depreciation lives are much too long, especially given the climate of rapid change we are entering.

Q. HOW WERE THE STUDIES SPONSORED?

A. Most of the studies were sponsored by the Telecommunications Technology Forecasting Group ("TTFG"), an industry association of major LECs in the United States and Canada which was formed in 1985. The mission of the TTFG is to support the understanding and use of technology forecasting to predict and support the continued evolution of the telecommunications network.

Q. HAS YOUR FIRM CONDUCTED STUDIES SPECIFICALLY FOR GTE TELEPHONE OPERATIONS (TELOPS) AND ITS MARKETS?

Forecasts and Competitive Impacts (Technology Futures, Inc. 1995).

[2] Lawrence K. Vanston & Ray L. Hodges, *Depreciation Lives for Telecommunications Equipment: Review & Update* (Technology Futures, Inc. 1995).

[3] Lawrence. K. Vanston, Curt Rogers, & Ray L. Hodges, *Advanced Video Services: Analysis and Forecasts for Terrestrial Service Providers* (Technology Futures, Inc. 1995).

A. Yes. TFI prepared a study specifically for GTE Telops based on its markets and technology utilization in September 1995. This report, *Technology Forecast for GTE Telephone Operations*, is attached to this testimony as Schedule LKV-3.

Q. HOW DO THE RESULTS OF THE INDUSTRY STUDIES APPLY TO WASHINGTON?

A. The industry perspective is generally applicable to individual states, including GTE Northwest in Washington, because the same basic drivers are present across the nation (technology advances, competition, and the need for new services). Naturally, there are specific differences, including the age and type of plant in service, the regulatory situation, environmental conditions, growth, population characteristics, and business climate. However, the general drivers for change are so strong that Washington is unlikely to stray far from the forecast ranges for the industry. Also, the GTE Telops specific study was relied upon, which is more focused on GTE Northwest's markets and technology.

SUMMARY

Q. PLEASE SUMMARIZE THE RELATIONSHIP BETWEEN REGULATORY POLICY, COMPETITION, AND NEW TECHNOLOGY.

A. First, new technology has been the primary enabler of competition. Without going into all of the history, the availability of new, efficient technologies has enabled new entrants to target segments of the market. Especially vulnerable are those segments of the market that have been traditionally subsidizing other segments of the market. These are the situations regulatory policy must rectify to foster fair and open competition.

Second, new competitors are adopting the most modern technology, without the handicap of having to evolve an existing network. In fact, through interconnection or resale agreements, they can usually take advantage of the existing network while they build their own modern one.

Third, in a competitive market, a provider with obsolete technology has nowhere to hide. We have seen time and time again the consequences of failure in this area. The rail, steel, and automobile industries paid a high price for lagging in technology, as have individual companies such as IBM and Digital.

Fourth, GTE Northwest's competitors will be offering a full range of services, moving to become the customer's sole communications provider. GTE Northwest will have to compete on the same basis.

SUMMARY

Q. PLEASE SUMMARIZE YOUR OVERALL TESTIMONY.

A. Dramatic changes are taking place in the telecommunications industry, driven by technology, new services, and competition. A series of TFI studies address these changes and quantitatively forecast their impact on the telephone network. These studies were used by GTE Northwest witness Al Sovereign in developing proposed equipment lives.

In the emerging environment, the technological superiority of new technology will cause avalanches of retirements of existing obsolete equipment. Traditional mortality analysis is ill-equipped to handle this type of situation and leads to gross over-estimates of remaining equipment lives. The substitution analysis method incorporated in the TFI studies, on the other hand, is ideal for

forecasting lives when technological obsolescence is the driver for change.

Avalanches of technological change will soon occur across the network in the major accounts. Fiber optics (and fiber/coax) is displacing copper in the outside plant. SONET is displacing all other varieties of circuit equipment. In the long run, ATM will displace existing digital switching; in the meantime, ongoing improvements in digital switching will cause significant interim retirements. All of these new technologies have compelling benefits for cost, efficiency, and new services. Together they define the network of the future. Competition will leave carriers such as GTE Northwest no choice but to adopt them aggressively.

The result is depreciation lives for older technologies that are significantly shorter than those currently prescribed. Based on TFI's studies, the lives proposed by GTE Northwest witness Al Sovereign reflect well the new reality in WHICH GTE NORTHWEST OPERATES IN WASHINGTON.

Q. DOES THIS CONCLUDE YOUR TESTIMONY?

A. Yes, it does.

Lawrence K. Vanston, Ph.D.

Dr. Vanston is president of Technology Futures, Inc. (Austin, Texas). He is a recognized authority in the use of technology forecasting in the telecommunications industry. His research centers on the adoption of new technology for telecommunication networks and on future telecommunications services.

Dr. Vanston is the author of numerous articles and reports about the telecommunications future and its significance to organizations and people. He is director of Technology Futures' business seminar entitled *Technology Forecasting for the Telecommunications Industry* and is publisher of the research journal, *New Telecom Quarterly*.

Prior to joining Technology Futures in 1984, Dr. Vanston spent four years as a Member of Technical Staff with Bell Labs and Bellcore in network planning.

Between 1976 and 1979, Dr. Vanston was with the Texas Petroleum Research Committee and the Center for Energy Studies at the University of Texas at Austin. His work there concerned computer modeling and optimization for the petroleum and electric power industries.

Dr. Vanston received his M.S. (1977) and Ph.D. (1979) in Operations Research and Industrial Engineering from the University of Texas at Austin. He holds a BA in Government (1975), also from the University of Texas.

Lawrence K. Vanston, Ph.D.

Publications

Technology's Impact on Lives of Telecommunications Equipment at New York Telephone, Technology Futures, Inc. (1985).

Comparisons of Technology Substitutions in Telecommunications and Other Industries, Ralph C. Lenz and Lawrence K. Vanston (1986).

The Effects of Various Levels of Aggregation in Technology Substitutions, Ralph C. Lenz and Lawrence K. Vanston (1987).

Technological Substitution in Transmission Facilities for Local Telecommunications, Lawrence K. Vanston and Ralph C. Lenz (1988).

Technological Substitution in Switching Equipment for Local Telecommunications, Lawrence K. Vanston and Ralph C. Lenz (1989).

Technological Substitution in Circuit Equipment for Local Telecommunications, Lawrence K. Vanston (1989).

Future Technology in the Local Telecommunications Network, An Expert Opinion Survey, Lawrence K. Vanston and William J. Kennedy (1989).

"How Fast is New Technology Coming?" *Telephony*, Lawrence K. Vanston, Ralph C. Lenz, and Richard Wolff (September 18, 1989).

An Analysis of the Effects of Telecommunications Technology Changes and Network Evolution on the Phase-Out of Multi-Party Lines and Suburban Mileage Charges, Ralph C. Lenz and Lawrence K. Vanston (1990) for the Washington (State) Utilities and Transportation Commission.

A Facsimile of the Future: Forecasts of Markets and Technologies, Lawrence K. Vanston, William J. Kennedy, and Samia El-Badry-Nance (1991).

Average Projection Lives of Digital Switching and Circuit Equipment, Lawrence K. Vanston, Bruce R. Kravitz, and Ralph C. Lenz (1992) for the United States Telephone Association (USTA).

Computer-Based Imaging and Telecommunications: Forecasts of Markets and Technologies, Lawrence K. Vanston, Samia El-Badry-Nance, William J. Kennedy, and Nancy E. Lux (1992).

Interactive Multimedia and Telecommunications: Forecasts of Markets and Technologies, Julia Marsh and Lawrence K. Vanston (1992).

Local Area Network Interconnection and Telecommunications, Bruce R. Kravitz and Lawrence K. Vanston (1992).

Video Communications, Lawrence K. Vanston, Julia Marsh, and Susan M. Hinton (1992).

Telecommunications for Television/Advanced Television, Lawrence K. Vanston, Julia Marsh, and Susan M. Hinton (1992).

New Telecommunications Services and the Public Telephone Network, Lawrence K. Vanston (1993).

Personal Communications: Perspectives, Forecasts, and Impacts, Ralph C. Lenz and Lawrence K. Vanston (1993).

Transforming the Local Exchange Network: Analyses and Forecasts and Technology Change, Lawrence K. Vanston (1994).

Wireless and Cable Voice Services: Forecasts and Competitive Impacts, Lawrence K. Vanston and Curt Rogers (1995).

Depreciation Lives for Telecommunications Equipment: Review and Update, Lawrence K. Vanston and Ray L. Hodges (1995).

Advanced Video Services: Analysis and Forecasts for Terrestrial Service Providers, Lawrence K. Vanston, Curt Rogers, Ray L. Hodges (1995).

Lawrence K. Vanston, Ph.D.

Expert Witness Testimony

Illinois Bell Telephone (IBT)
Illinois Commerce Commission
Docket No. 92-0448 and 93-0239 Consolidated
Petition to regulate rates and charges of noncompetitive services under an alternative form of regulation.

Rebuttal testimony: September 10, 1993
Surrebuttal testimony: October 27, 1993
Cross-Examination: December 1993

Rochester Telephone Corporation (RTC)
New York Public Service Commission
Case 93-C-0033
Petition of Rochester Telephone Corporation for Approval of a New Multi-Year Rate Stability Agreement.

Direct testimony: December 3, 1993
Rebuttal testimony: December 17, 1993.
Cross Examination: January 7, 1994

US West
State of Iowa, Department of Commerce - Utility Division
Docket No. RPU-93-9

Surrebuttal Testimony: February 22, 1994
Cross Examination: March 17, 1994

GTE California Incorporated
California Public Utility Commission
Case No. 93-06-057

Rebuttal Testimony: May 2, 1994
Cross Examination: May 12, 1994

Southwestern Bell
State Corporation Commission, Kansas
Docket No. 190,492-U
General Investigation into Competition within the Telecommunications Industry in the State of Kansas.

Direct Testimony: September 1994
Rebuttal Testimony: November 14, 1994
Cross Examination: November 28, 1994

US West
Washington Utilities and Transportation Commission
Docket No. UT-940641
Petition of US West Communications, Inc. for Depreciation Accounting Changes

Rebuttal Testimony: November 23, 1994

GTE Southwest
New Mexico State Corporation Commission
Docket No. 94-291-TC
Application of GTE Southwest, Inc. and Contel of the West, Inc. to Restructure their Respective rates

Rebuttal Testimony: January 6, 1995
Cross Examination: January 27, 1995

Southern New England Telephone
Connecticut Department of Public Utility Control
Docket No. 94-10-03
SNET's Intrastate Depreciation Rates

Presentation at Technical Meeting: December 12, 1994
Cross Examination: April 25, 1995

U S West
Oregon Public Utility Commission
Docket No. UM 767
Petition of US West Communications, Inc. for Depreciation Accounting Changes

Direct Testimony: June 23, 1995
Rebuttal Testimony: December 1995

Cross Examination: January 9, 1996

U S West
Arizona Corporation Commission
Docket No. ____
Application of US West Communications 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

Direct Testimony: June 26, 1995

U S West
Public Service Commission of Utah
Request of US West Communications, Inc. for an increase in its Rates and Charges

Direct Testimony: July 26, 1995
Rebuttal Testimony: November 28, 1995
Cross Examination: December 4, 1995

Sprint Central Telephone of Nevada
Public Service Commission of Nevada
Docket Nos. 95-8034/8035
Applications of Central Telephone - Nevada for Regulation Under the Plan of Alternative Regulation and for Modifications to Jurisdictional Tariffs and Depreciation Rates

Direct Testimony: August 28, 1995
(Stipulated settlement reached December 1995)

US West
Washington Utilities and Transportation Commission
Docket No. UT-950200
Request of US West Communications, Inc. for an increase in its Rates and Charges

Rebuttal Testimony: October 3, 1995
Cross Examination: January 10, 1996

Nevada Bell
Nevada Public Service Commission
Dockets No. 96-3003, 96-3002 and 96-3003
Nevada Bell General Rate Case and Par Application

Direct Testimony: March 1, 1996

(Stipulated settlement reached August 1996)

GTE Hawaiian Telephone
Public Utilities Commission of Hawaii
Dockets No. 94-0298 and 95-0194
For Approval of Rate Increases and Revised Rate Schedules
For Approval of Changes to its Depreciation Rates (Capital Recovery)

Rebuttal Testimony: June 21, 1996
(Hearings stipulated August 1996)

US West
Iowa Department of Commerce-Utilities Board
Docket No. DPU-96-1
Revised Depreciation Rates

Direct Testimony: July 3, 1996
Rebuttal Testimony: October 16, 1996

Stentor
Canadian Radio-television and Telecommunications Commission (CRTC)
TPN / APT 96-8
Price Cap Regulation and Related Issues

Direct Testimony: July 5, 1996
Submission of Bell Canada study: October 1996
Hearings: October 25, 1996

New York Telephone
New York Public Service Commission
Case 95-C-0657
Joint Complaint of AT&T Communications et al. Against New York Telephone Company Concerning Wholesale Provisioning of Local Exchange Services, etc.
Case 94-C-0095
Proceeding on Motion of the Commission to Examine Issues Related to the Continuing Provision of Universal Service and to Develop a Regulatory Framework for the Transition to Competition in the Local Exchange Market
Case 91-C-1174
Proceeding on Motion of the Commission Regarding Comparably Efficient Interconnection Arrangements for Residence and Business Links

Direct Testimony: September 1996
Rebuttal Testimony: October 10, 1996

Hearings: November 7, 1996

New England Telephone
New Hampshire Public Utilities Commission
DE 96-252
Petition for Arbitration by AT&T Communications New Hampshire, Inc.

Direct Testimony: Sept/Oct 1996
Rebuttal Testimony: October 1996
Hearings: October 30, 1996

New England Telephone
Massachusetts Department of Public Utilities
DPU 96-73/74, DPU 96-75, DPU 96-80/81, DPU 96-83, DPU 96-94
Joint Arbitration Proceeding

Direct Testimony: Sept/Oct 1996
Rebuttal Testimony: October 1996
Hearings: November 6, 1996

Bell Atlantic-New Jersey, Inc.
New Jersey Board of Public Utilities
BPU Docket No. TX95120631
In the Matter of the Investigation Regarding Local Exchange Competition for Telecommunication Services

Direct Testimony: November 1 1996
Rebuttal Testimony: December 20, 1996
Hearings: February 4, 1997 (By Deposition)

Bell Atlantic-Pennsylvania, Inc
Pennsylvania Public Utility Commission
Docket Nos. A-310203F0002, A-310213F0002, A-310236F0002, A-310258F0002
Application of MFS INTELENET of Pennsylvania, Inc. et al.

Direct Testimony: December 1996
Rebuttal Testimony: Dec 96/Jan 97
Hearings: January 23, 1997