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August 30, 2002

Honorable Sara Kyle
Chairman
Tennessee Regulatory Authority
460 James Robertson Parkway
Nashville, TN 37243-0505

Re: Generic Docket to Consider Technology Advances
Docket No. 02-00434

Dear Chairman Kyle:

Please find enclosed the original and fourteen copies of the Testimony of Terry L. Murray filed on behalf of Covad Communications Company in the above-captioned proceeding.

Very truly yours,

BOULT, CUMMINGS, CONNERS & BERRY, PLC

By: Henry Walker
Henry Walker

HW/nl

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8/30/2002

TESTIMONY OF
TERRY L. MURRAY
ON BEHALF OF
COVAD COMMUNICATIONS COMPANY

I. INTRODUCTION

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

A. My name is Terry L. Murray. I am President of the consulting firm Murray & Cratty, LLC. My business address is 227 Palm Drive, Piedmont, CA 94610.

Q. Please describe your qualifications and experience as they pertain to this proceeding.

A. I am an economist specializing in analysis of regulated industries. I received an M.A. and M.Phil. in Economics from Yale University and an A.B. in Economics from Oberlin College. At Yale, I was admitted to doctoral candidacy and completed all requirements for the Ph.D. except the dissertation. My fields of concentration at Yale were industrial organization (including an emphasis on regulatory and antitrust economics) and energy and environmental economics.

My professional background includes employment and consulting experiences in the fields of telecommunications, energy, and insurance regulation. As a consultant, I have testified or served as an expert on telecommunications issues in proceedings before state regulatory commissions in California, Connecticut, Delaware, the District of Columbia, Florida, Georgia, Hawaii, Illinois, Kansas, Maryland, Massachusetts, Michigan, Minnesota, Missouri, Nevada, New Jersey, New York, North Carolina, Ohio, Oklahoma, Pennsylvania,

South Carolina, Texas, Virginia, Washington, and Wisconsin, and before the Federal Communications Commission ("FCC").

Before I became a consultant in 1990, I was employed for approximately six years at the California Public Utilities Commission in a variety of positions, culminating in my service as Director of the Division of Ratepayer Advocates. In virtually all of these positions, I had significant responsibility for telecommunications matters. I have also taught economics and regulatory policy at both the undergraduate and graduate levels. My curriculum vitae, included as Exhibit TLM-1 to this testimony, provides more detail concerning my qualifications and experience.

Q. What is the purpose of your testimony?

A. Dieca Communications Company d/b/a Covad Communications Company ("Covad") has asked me to address issues related to the deployment of Digital Subscriber Line ("DSL") services over fiber-fed loops in Tennessee. BellSouth, in replacing copper wires with fiber-optic technology, has taken steps that effectively place the customers served by nearly half of the Remote Terminals ("RTs") in Tennessee off-limits to DSL competition.[1] This effective "remonopolization" of the bottleneck facility of the local loop is the very essence of discrimination in providing access to loops, and, as such, BellSouth's actions should prevent it from gaining approval for its 271 application in accordance with Checklist Item 4.

[1] BellSouth Response to Consolidated CLEC Data Request 80 ("Data Request"), which indicates that nearly 50% of all remote terminals are not served by alternative copper feeder cable facilities.

Q. Why is the issue of providing DSL services over fiber-fed loops significant?

A. The issue of providing DSL services over fiber-fed loops is significant because, as I will explain below, competitors are often unable to supply Tennessee customers with competitive DSL services when those customers are served over fiber feeder and Digital Loop Carrier ("DLC") instead of copper feeder cable. BellSouth is aggressively deploying fiber/DLC technology throughout Tennessee; thus, over time, fewer and fewer Tennessee consumers and small businesses will be able to reap the benefits of DSL competition as BellSouth regains complete monopoly control over the bottleneck facility of the local loop.

II. DESCRIPTION OF DSL TECHNOLOGY

Q. Must DSL-based services be provided over all-copper loops?

A. No. The predominant method for provisioning DSL-based services today is to use a "clean copper loop"—*i.e.*, an all-copper loop without load coils or excessive bridged tap. Nevertheless, some currently available DLC equipment allows carriers to provide DSL-based services over fiber/DLC loops.

Q. When you speak of "DLC equipment," what do you mean?

A. Most basic telephone service today is provided over loops that are either all-copper or loops that combine an initial (feeder) segment that is fiber optic cable with a copper (distribution) cable that completes the loop connection to individual homes and businesses. When fiber optic cable is deployed as part of the loop, electronics systems, commonly referred to as DLC, are deployed at both ends of the fiber cable. This DLC equipment is placed in an RT at the interface between

the fiber and copper cable. Certain modern DLC equipment allows the provisioning of DSL services to customers served by that RT.

Q. How does Covad provide DSL over an all-copper loop?

A. Like other competitors, Covad provides DSL services over all-copper loops in one of two basic ways: (1) Covad can use a loop that is dedicated to providing DSL (a "stand-alone loop"), or (2) Covad can provide DSL over a loop over the high-frequency portion of a loop that also provides basic voice services ("line sharing"). In both configurations, Covad provides DSL over a copper pair that runs all the way from the customer premises back to the BellSouth central office where it is connected to Covad's collocated Digital Subscriber Line Access Multiplexer ("DSLAM"), a piece of equipment that collects various end-user DSL connections and allows these signals to be routed to a single, high-speed packet switch. In this way, all of the information coming from all of Covad's customers served from a single central office is collected and connected to Covad's high-speed network.

In the stand-alone loop configuration, the available bandwidth of the all-copper loop is used exclusively for DSL services. In the line-sharing configuration, the loop passes through a "splitter" in the central office before being connected to Covad's DSLAM. The splitter "splits" the signal in the loop, with the high frequency portion being sent to Covad and the low-frequency, voice portion being sent to BellSouth or (in what is called "line splitting") to another voice provider.

Q. Can Covad use the same process to provide DSL when BellSouth provides the loop in part over fiber feeder, instead of over entirely copper cable?

A. No. When loops have fiber feeder, Covad (or any other carrier) must place the DSLAM functionality out in the field, so that it can interface directly with the copper cable. The remotely located DSLAM functionality collects all of DSL signals from the end users served by that RT and sends this information back to the central office over fiber. I am aware of two technically feasible ways that this is being done (at least to some degree) today.

Q. What is the first option for providing DSL when the loop includes fiber feeder?

A. The competitor can install a DSLAM at the RT to perform precisely the same function as the DSLAM that previously would have been located in the central office. This option effectively requires each competitor to create a collocation-type arrangement at each RT (*i.e.,* in the middle of each separate loop facility route) and to obtain transport facilities from its remote DSLAM to the Central Office. BellSouth has 6318 such RT structures in Tennessee alone.[2] I will explain in detail below why this option is unlikely to be feasible for competitors other than BellSouth in most, if not all, situations.

Q. What is the second approach for providing DSL over a loop with fiber/DLC?

A. Certain modern DLC systems can support the provision of DSL service if they are equipped with suitable line cards, which are different from the line cards that are used for basic voice-only service. With a suitable array of line cards, it is my

understanding that these currently available DLC systems can accommodate voice, ISDN, and a wide variety of DSL-based services such as ADSL, HDSL and SDSL.[3]

Q. Is this second arrangement widely deployed today?

A. Yes. DSL services are currently being deployed over such DLC systems across the country. At least one major incumbent, SBC, has determined that it can actually reduce its costs by substantially accelerating the deployment of forward-looking DLCs that can support DSL-based services. SBC has announced that its "Project Pronto" initiative, which is designed to extend the reach of DSL-based services and other broadband services to the substantial majority of SBC end users using currently available DLC technology, will produce that benefit by delivering "profound impacts on its cost structure" with "efficiencies ... conservatively targeted to yield annual savings of about $1.5 billion by 2004" such that the savings "will pay for the cost of deployment on an NPV [Net Present Value] basis."[4]

Q. Does BellSouth provide its own broadband services over fiber/DLC systems in Tennessee?

A. Yes. BellSouth admits that it is currently providing such services to 15,438 customers in Tennessee through remote DSLAMs collocated at the RT, a number representing approximately 30% of BellSouth's total DSL customer base in

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[2] BellSouth Response to Data Request 83.

[3] The DSL and voice signals may, or may not, travel on physically separate fiber strands in this arrangement.

[4] SBC Investor Briefing No. 211, October 18, 1999, at 7.

Tennessee.[5] Further, BellSouth also admits that it is at least testing the option of providing DSL using "dual purpose line cards" to provide broadband services through its Tennessee RTs using modern DSL-capable DLC technology.[6]

III. COMPETITIVE ISSUES RELATED TO PROVISIONING DSL VIA "REMOTE DSLAMS"

Q. BellSouth has claimed in the past that physical collocation of DSLAMs at the RT can solve the problem of competitive access to the DSL market for fiber-fed loops. Is this collocation option adequate to enable DSL providers other than BellSouth or its affiliates to offer Tennessee consumers competitive alternatives for advanced services throughout the state?

A. No. Physical collocation of DSLAMs at the RT may be a viable option for some competitors at some locations, but the physical collocation option will not enable DSL providers to offer ubiquitous alternatives to BellSouth's own DSL services. The cost of collocation alone may prohibit competitors other than BellSouth from employing this option.

In testimony filed before the FCC, Covad has provided a sample business case for RT collocation based on realistic (but conservative) parameters derived from Covad's experience nationwide and the testimony of incumbent local exchange carriers concerning collocation costs and customer take rates for broadband services. This sample business case shows that it would take Covad an average of 14.2 years just to break even on the cost of RT collocation, even under optimistic assumptions about the penetration that Covad could achieve at each RT

[5] BellSouth Response to Data Request 86 and 87.

and the cost to Covad of such collocation. That estimate entirely ignores all of the other costs Covad would incur to provide DSL service to the customers served by those RTs, such as the cost of the DSLAMs, the cost of the loops, the cost of customer premises equipment (the DSL modems) and so on. Based on this estimate, Covad concluded that "[n]o CLEC could make a profit faced with these economics."[7]

A recent decision of the Wisconsin Public Service Commission ("PSC") supports this conclusion. The Wisconsin PSC found that "[c]ollocation by competitors at remote terminals ('RTs') is costly and time consuming and may present difficulties with space considerations, availability of dark fiber, and completing an engineering controlled splice."[8] As evidence of the prohibitive cost of RT collocation, the Wisconsin PSC cited a study by Sprint indicating that it would cost more than $22 million dollars to collocate only at the Wisconsin RTs that were already equipped with NGDLC terminals, not to mention those that would be upgraded in the future.[9]

These findings are not surprising. Collocation at central offices is already an expensive and complex process for competitors. Collocation of DSLAMs at Tennessee's 6318 RTs would require thousands of additional collocations, on a

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[6] Affidavit of William J. McNamara, III attached to BellSouth's Petition for Stay (April 10, 2002) in TRA Docket No. 00-00544.

[7] Joint Declaration of Anjali Joshi, Eric Moyer, Mark Richman, and Michael Zulevic on Behalf of Covad Communications Company in CC Docket Nos. 01-338, 96-98, and 98-147, April 5, 2002, at ¶ 40. A copy of this Declaration, containing the sample business case for RT collocation, is attached hereto as Exhibit TLM-2. Section VII of the Joint Declaration filed at the FCC provides additional detail concerning the competitive issues I address in this testimony.

[8] Final Decision of the Wisconsin Public Service Commission in Docket No. 6720-TI-161, Investigation Into Ameritech Wisconsin's Unbundled Network Elements, March 21, 2002, (hereafter, "Wisconsin Order") at 11-12, ¶ 67.

route-by-route basis, in each central office area merely to achieve or maintain the ability to provide broadband service at parity with BellSouth. Excluding the costs of construction, equipment, loops, etc., the total application fees alone for these new collocations would amount to millions of dollars.[10]

Further, unlike at a central office, the level of concentration present at a remote terminal is often as low as a hundred or a few hundred lines in total. Therefore, the cost of establishing an entire collocation arrangement at each remote terminal may be so prohibitive as to never make economic sense given the few customers that any given competitor might serve from an individual RT location. Indeed, a requirement to collocate a stand-alone DSLAM at the remote terminal might be sufficient to eliminate competition in most locations served by DLC.

The cost of RT collocation also places BellSouth's competitors at a substantial financial disadvantage in those instances in which BellSouth or its affiliates are able to offer DSL-based services using line cards placed in BellSouth's DLC.

Without a requirement to unbundle a full array of options for providing DSL over fiber-fed loops, BellSouth could severely disadvantage competitive providers of DSL-based services. As the FCC has observed:

> When an incumbent has deployed DLC systems, requesting carriers must install DSLAMs at the remote terminal instead of

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[9] *Id.* at 12, ¶ 68.

[10] *See* Covad's Interconnection Agreement with BellSouth, Attachment 4, Exhibit D. The application fee alone that Covad would have to pay to BellSouth for each remote terminal collocation site would be $872.95, *bringing the total cost to Covad of doing nothing more than applying for remote terminal collocation at all locations to $5,515,298.10.*

> at the central office in order to provide advanced services. We agree that, if a requesting carrier is unable to install its DSLAM at the remote terminal or obtain spare copper loops necessary to offer the same level of quality for advanced services, the incumbent LEC can effectively deny competitors entry into the packet switching market.[11]

Absent a regulatory constraint, it is simply rational for incumbents such as BellSouth to evolve their local exchange networks in a manner that supports advanced services options that they or their affiliates plan to implement, while creating technical or pricing disadvantages for competing providers. Moreover, the incumbents also have an incentive to delay competitors' access to options that are built into the incumbents' networks. Unless regulators give clear direction to incumbents to take the needs of competition into account as part of the network modernization process, the incumbents will continue to follow their self-interest, "slow rolling" competitors' access to network options. Such a process has the inefficient effect of forcing competitors to begin lengthy regulatory procedures to win access to network options one-at-a-time.

Thus, while the Commission should certainly ensure that BellSouth offers physical collocation at the RT at prices, terms and conditions that comply with the FCC's *UNE Remand Order*, this action alone will not suffice to provide competitive choices to the many Tennessee consumers served by fiber/DLC systems.

Q. Are there other problems with RT collocation?

A. Yes. Even if it were economically possible for Covad and other competitors to collocate at RTs, BellSouth still has a tremendous competitive advantage in

[11] *UNE Remand Order* at ¶ 313.

choosing where to spend money on RT DSLAM and NGDLC deployment. This advantage arises from the decades of data that BellSouth possesses (strictly as a result of its former outright monopoly) concerning the customers served by each of its RTs—information such as what services they order for their local phones and their payment history. This information allows BellSouth to upgrade its RTs only in those neighborhoods where its experience proves that it will be able to recoup its investment. Neither Covad nor any other competitor has access to such data derived during an era of monopoly power. Thus, in deciding to collocate at a BellSouth RT, Covad would be taking a higher risk than BellSouth ever has to take in making the same decision.

Given all of these considerations, BellSouth's proposed RT collocation solution is no solution at all. Essentially, BellSouth is proposing that competitors spend substantial sums of money (which will be difficult, if not impossible, to obtain in today's investment climate) to expand collocation RT-by-RT. Doing so requires not only buying collocation space and installing new equipment (if space is available), but also obtaining spare fiber capacity (if it is available), thereby creating excess capacity because of the low concentration of customers served by any single RT. Meanwhile, BellSouth can use its superior customer knowledge developed over decades of monopoly power to invest in placing remote DSLAMs only in those RTs where it is assured of a profit and to selectively and exclusively roll out line-card-based DSL service in other areas.

Q. Can competitors rely on alternative, all-copper facilities to provision DSL services to Tennessee consumers and small businesses where BellSouth serves the end-user via fiber/DLC facilities?

A. No. As BellSouth indicated in its response to Data Request 80, 48.9% of the RTs in Tennessee do not have alternate copper facilities available. Hence, unless competitors have access to a DLC-based option to provide service to customers served from those RTs, BellSouth can effectively remonopolize a substantial portion of the Tennessee marketplace for DSL services and for combined voice and DSL service.

IV. SOLUTIONS TO THE PROBLEM OF DSL OVER FIBER-FED LOOPS

Q. Has the Authority already taken steps to help solve this problem?

A. Yes. The Authority has already recognized the competitive disadvantage to which competitors are subjected when BellSouth moves central office functionality out to RTs. To address this problem, the Authority has ordered BellSouth "to install, for the CLECs' use, dual-purpose line cards in the fiber-fed Next Generation DLC equipment in the remote terminal."[12] This is an extraordinarily important first step to bring the benefits of DSL competition to all Tennessee consumers. I recommend that the Commission take another step to address the problem of DSL over fiber-fed loops and further extend the benefits of DSL competition.

[12] April 3, 2002 Order in Docket No. 00-0054 ("Generic Docket to Establish UNE Prices for Line Sharing," etc.) (hereafter, "TRA Line Sharing Order") at 43.

Q. What other solution to this problem do you recommend?

A. An additional solution to the problem of BellSouth's discrimination would be to mandate the creation of an end-to-end Broadband UNE. This is the approach that the Wisconsin PSC adopted in its recent Order.[13] The Wisconsin PSC ordered Ameritech to provide competitors with a "Broadband end-to-end UNE" in part because, without it, "CLECs will incur higher costs, experience lower or less consistent levels of quality, have less ubiquitous access to similar facilities, and encounter more troublesome operational issues."[14]

Failing the immediate adoption of the Broadband UNE, the Authority should, at least, open a docket to investigate the competitive effects of BellSouth's ongoing remonopolization of the bottleneck local loop facility and to set prices for an end-to-end Broadband UNE.

Q. What do you mean by an end-to-end Broadband UNE?

A. By an end-to-end Broadband UNE, I mean the creation of a loop UNE from the customer's premises to BellSouth's central office that allows competitors to provide DSL services to any customer regardless of the technology that BellSouth deploys at a given RT. In other words, this UNE would be provisioned over whatever technology existed to serve Covad's target customer.

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[13] Wisconsin Order at 12, ¶ 69.

[14] *Id.* at 11, ¶ 66.

Q. What should the TRA do in the interim before the Broadband UNE can be implemented?

A. I recommend that this Authority take a position similar to that taken by several other state commissions[15] by prohibiting BellSouth, or any of its affiliates, from providing DSL-based services over fiber facilities in Tennessee until BellSouth has set forth terms, conditions and prices that would allow unaffiliated competitors access to that capability for both stand-alone and line-shared loops and parties have had an opportunity to litigate the propriety of the BellSouth proposals. In other words, until BellSouth ceases its discriminatory practices and until rates are set for whatever solution the Authority deems most appropriate, BellSouth should not be allowed to add DSL customers in those areas where it has already remonopolized the bottleneck loop facilities.

V. SUMMARY

Q. Please summarize your conclusions and recommendations.

A. BellSouth serves a large and growing proportion of Tennessee consumers over fiber-fed loops. For nearly half of these consumers, there are no alternative all-copper facilities available. As the Wisconsin PSC has observed, physical collocation at the RT is often so expensive that it amounts to a barrier to

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[15] *See* Order, *Investigation by the Department on its own motion as to the propriety of the rates and charges set for in M.D.T.E. No. 17*, D.T.E. 98-57-Phase III at 80 (Sept. 29, 2000) at 94-96; Public Service Commission of Maryland, Case No. 8842, Phase I, Order No. 76488, Oct. 6, 2000, at 15-16; and New York Public Service Commission, Case 00-C-0127, Opinion No. 00-12, issued and effective, Oct. 31, 2000, at 25-27. *See also*, Illinois Commerce Commission Arbitration Decision, Dockets 00-0312 and 00-0313, Aug. 17, 2000, at 31.

competitive entry and, even where its cost might be justified, would prove unworkable in many instances.

Therefore, the Commission should open a new docket to consider pricing for an end-to-end Broadband UNE like the one adopted by the Wisconsin PSC to be provisioned over whatever technology BellSouth chooses to use in its Tennessee RTs.

Otherwise, BellSouth will slowly choke off all DSL competition in Tennessee to the detriment of Tennessee consumers and small businesses. This outcome is antithetical to the Telecommunications Act of 1996.[16] In short, the Authority has the power and the mandate to act to prevent the remonopolization of the local loop in Tennessee, and it should take the appropriate steps to ensure that this occurs before granting BellSouth's 271 application.

Q. Does that conclude your testimony at this time?

A. Yes, it does.

[16] I am also informed by counsel that T.C.A. § 65-4-124 gives this Authority the power to order the creation of a Broadband UNE wholly apart from the power granted to it by the 1996 Act.

EXHIBIT TLM-1

CURRICULUM VITAE OF TERRY L. MURRAY

Terry L. Murray

President, Murray & Cratty, LLC
January 1998 - present
Economic consulting and expert witness testimony specializing in regulatory and antitrust matters.

Principal, Murray and Associates
April 1992 - December 1997
Economic consulting and expert witness testimony, primarily in the fields of telecommunications, energy and insurance regulation and antitrust.

Director, Regulatory Economics, Morse, Richard, Weisenmiller & Associates, Inc.
April 1990 - April 1992
Economic consulting and expert witness testimony, primarily in the fields of telecommunications and energy regulation.

California Public Utilities Commission
June 1984 - March 1990

Director, Division of Ratepayer Advocates (DRA)
March 1989 - March 1990
Headed a staff of over 200 analysts who provided expert witness testimony on behalf of California ratepayers in contested proceedings involving telecommunications, electric, gas, water and transportation utilities. Major proceedings included evaluation of proposed merger between Southern California Edison and San Diego Gas and Electric Companies.

Program Manager, Energy Rate Design and Economics Branch, DRA
October 1987 - March 1989
Managed a staff of over 30 analysts who testified on electric and gas rate design and costing issues, sales forecasts and productivity analyses. Testified as lead policy witness in electric utility incentive ratemaking and transportation policy proceedings.

Senior Policy Analyst, Policy and Planning Division
March 1987 - October 1987
Organized *en banc* hearing and drafted notice of investigation for major telecommunications incentive regulation proceeding. Headed Commission task force on open network architecture.

Commissioner's Advisor
July 1985 - March 1987
Lead advisor on independent power industry and cost of capital issues. Analyzed proposed decisions on energy, telecommunications, water and transportation issues and made recommendations for Commission action. Co-authored Commission order establishing conditions for approval of San Diego Gas and Electric Company application to form a holding company.

Staff Economist, Public Staff Division
June 1984 - July 1985
Testified on cost of capital and telecommunications bypass issues. Served on telecommunications strategy task force charged with developing recommendations for post-divestiture regulatory policies.

Instructor, Golden Gate University
1986 - 1987
Taught courses on telecommunications regulation to students in the Masters in Telecommunications Management program and students in a special program for federal government telecommunications managers.

Acting Assistant Professor of Economics, Wesleyan University
July 1981 - June 1982
Taught undergraduate courses in microeconomics, macroeconomics, econometrics, and economics and policy of regulation.

TESTIMONY

California Department of Insurance

- File Nos. PA-94-0012-00 & PA-94-0012-0A, In re 20th Century Insurance Company and 21st Century Casualty Company.
- File Nos. PA-93-0014-00 *et al.*, In the Matter of the Rates and Rating Practices, and Rate Applications of: State Farm Mutual Automobile Insurance Company, State Farm Fire and Casualty Company, State Farm General Insurance Company, Applicants and Respondents, 3/1/94, 3/29/94.
- File Nos. PA-93-0009-00 *et al.*, In the Matter of the Rate Applications of Nationwide Mutual Insurance Company, Nationwide Mutual Fire Insurance Company, Nationwide Property and Casualty Insurance Company, Applicants, 9/11/93.

California Public Utilities Commission

- R.93-04-003/I.93-04-002, Rulemaking and Investigation on the Commission's Own Motion to Govern Open Access to Bottleneck Services and Establish and Framework for Network Architecture Development of Dominant Carrier Networks, and R. 95-04-043/I.95-04-044, Rulemaking and Investigation on the Commission's Own Motion into Competition for Local Exchange Service (consolidated for purposes of evaluating Pacific Bell's Section 271 application), 8/23/01.
- A.01-02-024, Joint Application of AT&T Communications of California, Inc. (U 5002 C) and WorldCom, Inc. for the Commission to Reexamine the Recurring Costs and Prices of Unbundled Switching in Its First Annual Review of Unbundled Network Element Costs Pursuant to Ordering Paragraph 11 of D.99-11-050, and A.01-02-035, Application of AT&T Communications of California, Inc. (U 5002 C) and WorldCom, Inc. for the Commission to Reexamine the Recurring Costs and Prices of Unbundled Loops in Its First Annual Review of Unbundled Network Element Costs Pursuant to Ordering Paragraph 11 of D.99 11-050, 8/20/01.
- A.01-01-010, Application by Pacific Bell Telephone Company (U 1001 C) for Arbitration of an Interconnection Agreement with MCImetro Access Transmission Services, L.L.C. (U 5253 C) Pursuant to Section 252(b) of the Telecommunications Act of 1996,. 2/2/01.

- A.00-01-022, Application of AT&T Communications of California, Inc., *et al.*, for Arbitration of an Interconnection Agreement with Pacific Bell Pursuant to Section 252(b) of the Telecommunications Act of 1996, 1/24/00, 3/5/00.
- A.00-01-012, In the Matter of Covad Communications Company's (U 5752 C) Petition for Arbitration of Interconnection Agreement with Roseville Telephone Company (U 1015 C), 1/7/00.
- A.98-12-005, In the Matter of the Joint Application of GTE Corporation ("GTE") and Bell Atlantic Corporation ("Bell Atlantic") to Transfer Control of GTE's California Utility Subsidiaries to Bell Atlantic Which Will Occur Indirectly as a Result of GTE's Merger with Bell Atlantic, 6/7/99.
- A.99-03-047, In the Matter of the Petition by Pacific Bell (U 1001 C) for Arbitration of an Interconnection Agreement with Metropolitan Fiber Systems/ Worldcom Technologies, Inc. (MFS/Worldcom) Pursuant to Section 252(b) of the Telecommunications Act of 1996, 4/16/99, 5/24/99.
- A.98-05-038, In the Matter of the Application of Pacific Bell for Authority for Pricing Flexibility and to Increase Certain Operator Services, to Reduce the Number of Monthly Directory Assistance Call Allowances, and Adjust Prices for Four Centrex Optional Features, 11/17/98.
- A.98-06-052, In the Matter of the Petition of PDO Communications, Inc. for Arbitration Pursuant to Section 252 of the Federal Telecommunications Act of 1996 to Establish an Interconnection Agreement with Pacific Bell, 8/14/98.
- In the Matter of the Petition of MCImetro Access Transmission Services, Inc. for Arbitration of Interconnection Rates, Terms, and Conditions Pursuant to 47 U.S.C. § 252(b) of the Telecommunications Act of 1996 (re: GTE California, Inc.), 9/96.
- A.96-04-038, In the Matter of the Joint Application of Pacific Telesis Group and SBC Communications, Inc. for SBC to Control Pacific Bell, 9/30/96.
- A.93-03-054, Application to Modify Diablo Canyon Pricing and Adopt a Customer Electric Rate Freeze in Compliance with Decision 95-12-063, 9/9/96.
- R.93-04-003/I.93-04-002, Rulemaking and Investigation on the Commission's Own Motion to Govern Open Access to Bottleneck Services and Establish and Framework for Network Architecture Development of Dominant Carrier Networks, 6/14/96, 7/10/96, 3/18/97, 12/19/97, 2/11/98, 4/8/98, 4/27/98, 5/1/98, 6/5/98, 12/18/98, 1/11/99, 2/8/99, 3/15/00, 3/27/00, 4/5/00, 5/2/00, 6/11/01, 6/25/01, 7/24/01.
- I.95-04-044, Order Instituting Investigation on the Commission's Own Motion into Competition for Local Exchange Service, 10/2/95, 10/9/95, 12/95.
- I.94-04-032, Order Instituting Investigation on the Commission's Proposed Policies Governing Restructuring California's Electric Services Industry and Reforming Regulation, 12/8/94.
- Application Nos. 93-05-008 *et al.*, In the Matter of the Application of Sierra Pacific Power Company to Authorize a Return on Equity for Calendar Year 1994 Pursuant to Attrition Rate Adjustment Mechanism, 8/93.
- Application Nos. 92-05-002 and 92-05-004, Application of GTE California Incorporated for Review of the Operations of the Incentive-Based Regulatory Framework Adopted in Decision 89-10-031, 5/93, 7/93.
- Case No. 91-12-028, The City of Long Beach, in its Proprietary Capacity and as Trustee for the State of California, Complainant, vs. Unocal California Pipeline Company, a Unocal Company, Defendant, 5/15/93.
- I.87-11-033 *et al.*, In the Matter of Alternative Regulatory Frameworks for Local Exchange Carriers (Phase III, Implementation and Rate Design), 9/23/91, 12/16/91, 1/17/92.
- General freight deregulation proceeding, 10/88.

- I.86-10-001, Risk, Return and Ratemaking, 3/88.
- Southwest Gas General Rate Case, 8/85.
- Application No. 85-01-034, Pacific Bell Test Year 1986 General Rate Case, 4/22/85.
- CP National South Lake Tahoe Gas General Rate Case, 12/84.

Colorado Public Service Commission

- Docket No. 91A-480EG, In the Matter of the Joint Application of the Parties to Revised Settlement Agreement II in Docket Nos. 91S-091EG and 90F-226E for Commission Consideration of Decoupling Revenues from Sales and Establishment of Regulatory Incentives to Encourage the Implementation of DSM Programs, 11/8/91, 4/30/92, 9/8/92, 9/14/92.

Connecticut Department of Public Utility Control

- In the Matter of the Petition of MCImetro Access Transmission Services, Inc. for Arbitration of Interconnection Rates, Terms, and Conditions Pursuant to 47 U.S.C. § 252(b) of the Telecommunications Act of 1996 (with The Southern New England Telephone Company), 12/96.
- Docket Nos. 95-06-17 *et al.*, Application of The Southern New England Telephone Company for Approval to Offer Unbundled Loops, Ports and Associated Interconnection Arrangements, 9/8/95.

Delaware Public Service Commission

- Docket No. 96-324, Bell Atlantic - Delaware Statement of Terms and Conditions Under Section 252(F) of the Telecommunications Act of 1996, 2/4/97.
- Docket No. 45, In the Matter of the Development of Regulations for the Facilitation of Competitive Entry into the Telecommunications Local Exchange Service Market, 7/3/96.

District of Columbia Public Service Commission

- Formal Case No. 962, In the Matter of the Implementation of the District of Columbia Telecommunications Act of 1996 and Implementation of the Telecommunications Act of 1996, 3/24/97, 5/2/97, 5/9/97, 1/11/02.

Federal Communications Commission

- CC Docket Nos. 00-218, 00-249 and 00-251, In the Matter of the Petition of WorldCom, Inc., Pursuant to Section 252(e)(5) of the Communications Act for Expedited Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia, Inc., and for Expedited Arbitration, *et al.*, 7/31/01, 8/27/01, 9/21/01.
- File No. E-98-12, MCI Telecommunications Corp. and MCImetro Access Transmission Services, Inc., Complainants, v. Bell Atlantic Corp., Defendant, 12/19/97, 3/25/98.
- CC Docket No. 94-1, In the Matter of Price Cap Performance Review for Local Exchange Carriers, 6/29/94.
- W-P-C 6913 *et al.*, In re the Matter of the Application of Pacific Bell for Authority Pursuant to Section 214 of the Communications Act of 1934, and Section 63.01 of the Commission's Rules and Regulations to Construct and Maintain Advanced Telecommunications Facilities to Provide Video Dialtone Services to Selected Communities.

Florida Public Service Commission

- Docket No. 990649-TP, In re: Investigation into the Pricing of Unbundled Network Elements, 8/11/99, 9/10/99, 10/15/99, 6/8/00, 7/31/00, 8/28/00.
- Docket No. 930424-EI, In re: Request for Approval of Proposal for Incentive Return on Demand-Side Management Investments by Florida Power Corporation, 11/22/93.
- Docket No. 93-444-EI, In re: Request for Approval of Proposal for Revenue Decoupling by Florida Power Corporation, 11/22/93.

Georgia Public Service Commission

- Docket No. 11900-U, In re: Investigation of BellSouth Telecommunications, Inc.'s Provision of Unbundled Network Elements for xDSL Service Providers, 11/13/00, 12/20/00.

Hawaii Public Service Commission

- Docket No. 7702, In the Matter of Public Utilities Commission Instituting a Proceeding on Communications, Including an Investigation of the Communications Infrastructure of the State of Hawaii, 7/3/97, 8/29/97, 6/2/00.

Illinois Commerce Commission

- Docket No. 00-0393, Illinois Bell Telephone Company Proposed Implementation of High Frequency Portion of Loop (HFPL) / Line Sharing Service, 9/1/00, 9/20/00, 10/4/00.
- Docket Nos. 00-0312 and 00-0313, Petitions of Covad Communications Company and Rhythms Links Inc. for Arbitration Pursuant to Section 252(b) of the Telecommunications Act of 1996 to Establish an Amendment for Line Sharing to the Interconnection Agreement with Illinois Bell Telephone Company d/b/a Ameritech Illinois, and for an Expedited Arbitration Award on Certain Core Issues, 5/15/00, 6/22/00, 11/21/00, 12/12/00, 12/21/00, 7/13/00.
- Docket No. 98-0396, Investigation into the Compliance of Illinois Bell Telephone Company with the Order in Docket 96-0486/0569 Consolidated Regarding the Filing of Tariffs and the Accompanying Cost Studies for Interconnection, Unbundled Network Elements and Local Transport and Termination and Regarding End to End Bundling Issues, 3/29/00, 5/5/00, 7/12/00.
- Docket No. 99-0593. Investigation of Construction Charges, 2/17/00, 3/8/00, 3/22/00.
- In the Matter of the Petition of MCImetro Access Transmission Services, Inc. for Arbitration of Interconnection Rates, Terms, and Conditions Pursuant to 47 U.S.C. § 252(b) of the Telecommunications Act of 1996 (Ameritech – Illinois), 12/96.

Kansas Corporation Commission

- Docket No. 00-DCIT-997-ARB, In the Matter of the Petition of Covad Communications Company for Arbitration of Interconnection Rates, Terms, Conditions and Related Arrangements for Line Sharing with Southwestern Bell Telephone Company, 6/12/00.
- Docket No. 00-DCIT-389-ARB, In the Matter of the Petition of DIECA Communications, Inc. d/b/a Covad Communications Company for Arbitration of Interconnection Rates, Terms, Conditions and Related Arrangements with Southwestern Bell Telephone Company, 1/7/00, 1/25/00, 2/21/00.
- Docket Nos. 190, 192-U, In the Matter of a General Investigation into Competition within the Telecommunications Industry in the State of Kansas, 11/14/94.

Maryland Public Service Commission

- Case No. 8879 – In the Matter of the Investigation into Rates for Unbundled Network Elements Pursuant to the Telecommunications Act of 1996, 5/25/01, 9/5/01, 10/15/01.
- Case No. 8745 – In the Matter of the Provision of Universal Service to Telecommunications Consumers, 5/21/01, 6/11/01.
- Case No. 8842 – In the Matter of Rhythms Links Inc. and Covad Communications Company vs. Bell Atlantic-Maryland, Inc., pursuant to Section 252(B) of the Telecommunications Act of 1996, 5/5/00, 7/14/00, 10/27/00.
- Case No. 8820, In the Matter of the Investigation into Affiliated Activities, Promotional Practices and Codes of Conduct of Regulated Gas and Electric Companies, 10/1/99, 10/26/99, 12/10/99.
- Docket No. 8797, In the Matter of The Potomac Edison Company's Proposed: (a) Stranded Cost Quantification Mechanism; (b) Price Protection Mechanism; (c) and Unbundled Rates, 1/26/99.
- Docket No. 8795, In the Matter of Delmarva Power and Light Company's Proposed Stranded Cost Quantification Mechanism, Price Protection Mechanism, and Unbundled Rates, 12/28/98.
- Docket No. 8794, In the Matter of Baltimore Gas and Electric (BGE)'s Proposed Stranded Cost Quantification Mechanism, Price Protection Mechanism, and Unbundled Rates, 12/22/98, 7/23/99, 8/3/99.
- Docket No. 8786, In the Matter of the Investigation of Non-Recurring Charges for Telecommunications Interconnection Service, 5/27/98, 11/16/98, 12/18/98.
- Docket No. 8731, Phase II, In the Matter of the Petitions for Approval of Agreements and Arbitration of Unresolved Issues Arising Under §252 of the Telecommunications Act of 1996, 3/7/97.
- Case No. 8731, In the Matter of the Petitions for Approval of Agreements and Arbitration of Unresolved Issues Arising under Section 252 of the Telecommunications Act of 1996, 10/96.
- Case No. 8715, In the Matter of the Inquiry into Alternative Forms of Regulating Telephone Companies, 11/95, 4/1/96.

Massachusetts Department of Telecommunications and Energy

- Docket No. DTE 98-57, Investigation by the Department on its own motion as to the propriety of the rates and charges set forth in the following tariffs: M.D.T.E. Nos. 14 and 17, filed with the Department on April 2, 1999, to become effective May 2, 1999, by New England Telephone and Telegraph Company d/b/a Bell Atlantic – Massachusetts, 7/26/99, 11/9/99.

Michigan Public Service Commission

- Case No. U-12540, In the Matter of the Application of Ameritech Michigan for Approval of Cost Studies and Resolution of Disputed Issues Related to Certain New UNE Offerings, 9/15/00, 10/13/00.
- Case No. U-10755, In the Matter of the Application of Consumers Power Company for Authority to Increase Its Rates for the Sale of Natural Gas and for Other Relief, 6/9/95.
- Case No. U-10685, In the Matter of the Application of Consumers Power Company for Authority to Increase Its Rates for the Sale of Electricity, 3/29/95, 5/5/95.
- Case No. U-10647, In the Matter of the Application of City Signal, Inc., for an Order Establishing and Approving Interconnection Arrangements with Michigan Bell Telephone Company, 8/5/94, 11/7/94, 11/30/94.

Minnesota Public Utilities Commission

- PUC Docket No. P-421/CI-01-1370, In the Matter of a Commission Investigation into Qwest's Compliance with Section 272(c)(2)(B) of the Telecommunications Act of 1996; Checklist Items 3, 7, 8, 9, 10 and 12, 1/28/02, 2/22/02.

Missouri Public Service Commission

- Case No. TO-2001-439, In the Matter of the Determination of Prices, Terms, and Conditions of Conditioning for xDSL-Capable Loops, 6/22/01, 7/13/01.
- Case No. TO-2000-322, In the Matter of the Petition of DIECA Communications, Inc. d/b/a Covad Communications Company for Arbitration of Interconnection Rates, Terms, Conditions and Related Arrangements with Southwestern Bell Telephone Company, 1/7/00, 1/27/00, 2/10/00.

Nevada Public Service Commission

- In re a Petition of the Staff of the Public Utilities Commission to Open a Docket to Investigate Costing and Pricing Issues Related to Industry-Wide Collocation Costs Pursuant to the Telecommunications Act of 1996 and the Commission's Regulations, 11/3/00.
- Docket No. 96-9035, In re a Petition by the Regulatory Operations Staff to Open an Investigation into the Procedures and Methodologies that Should Be Used to Develop Costs for Bundled or Unbundled Telephone Services or Service Elements in the State of Nevada, 5/8/97, 5/23/97.

New Jersey Board of Public Utilities

- Docket No. TO00060356, In the Matter of the Board's Review of Unbundled Network Elements Rates, Terms and Conditions of Bell Atlantic – New Jersey, 10/12/00.
- Docket No. TX95120631, Notice of Investigation into Local Exchange Competition for Telecommunications Services, 8/30/96, 12/20/96.

New York Public Service Commission

- Case No. 98-C-1357, Proceeding on Motion of the Commission to Examine New York Telephone Company's Rates for Unbundled Network Elements, 9/23/99, 10/18/99, 10/22/99, 2/7/00, 2/22/00, 3/31/00, 4/17/00, 6/26/00, 10/19/00, 11/13/00.
- Case Nos. 94-E-0098 and 94-E-0099, Niagara Mohawk Fuel Adjustment Clause Target and S.C. 6 Update Filing, 11/17/95.
- Case Nos. 93-E-0912 and 93-E-1075, Proceeding on Motion of the Commission to Review Long-Run Avoided Cost Estimation Policies and Methods, 5/10/95, 5/31/95.
- Case Nos. 92-E-1055 and 92-G-1056, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations for Central Hudson Gas & Electric Company for Electric Service and Gas Service, respectively, 3/93.
- Case Nos. 92-E-0108 *et al.*, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Niagara Mohawk Power Corporation for Electric Service, 1992.
- Case Nos. 91-E-0863 *et al.*, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of New York State Electric & Gas Corporation for Electric Service, 1/92.
- Case Nos. 91-E-0765 *et al.*, Proceeding on Motion of the Commission as to the Rates, Charges, Rules and Regulations of Rochester Gas & Electric Corporation for Electric Service, 11/91.

- Case No. 91-E-0506, Proceeding on Motion of the Commission as to the Rates, Charges, Rules, and Regulations for Central Hudson Gas & Electric Company for Electric Service, 9/91, 10/91.
- Case Nos. 29327 *et al.*, Niagara Mohawk Power Corporation Financial Recovery Agreement proceeding, 3/91.
- Docket No. 89-E-176, In the Matter of the Proceeding on Motion of the Commission to Examine Ratemaking Practices and Incentive Mechanisms Promoting Least-Cost Planning and Demand-Side Management by Electric Utilities, 4/19/90, 5/4/90, 4/18/91, 6/20/91.

North Carolina Utilities Commission

- Docket Nos. P-7, Sub 825, and P-10, Sub 479, In the Matter of Petition of Carolina Telephone and Telegraph and Central Telephone Company for Approval of a Price Regulation Plan Pursuant to G. S. 62-133.5, 1/31/96.
- Docket No. P-55, Sub 1013, In the Matter of Application of BellSouth Telecommunications, Inc., for, and Election of, Price Regulation and Motion for a Hearing, 1/28/96, 2/1/96.

Ohio Public Utilities Commission

- Case No. 96-922-TP-UNC, In the Matter of the Review of Ameritech Ohio's Economic Costs for Interconnection, Unbundled Network Elements, and Reciprocal Compensation for Transport and Termination of Local Telecommunications Traffic, 10/6/00.

Oklahoma Corporation Commission

- Cause No. PUD 200000192, Applicant: Southwestern Bell Telephone Company; Relief Sought: Approval of Nonrecurring Rates for Conditioning Unbundled Digital Subscriber Line ("DSL") Capable Loops, 7/12/00, 8/1/00.

Oregon Public Utility Commission

- Case No. UM-731, Phase IV, In the Matter of the Investigation of Universal Service in the State of Oregon, 1/17/00.

Pennsylvania Public Utility Commission

- Docket No. R-00016683, Generic Investigation of Verizon Pennsylvania, Inc.'s Unbundled Network Element Rates, 12/7/01, 1/11/02, 2/8/02.
- Docket No. M-00001353, Re Structural Separation of Verizon-Pennsylvania Inc. Wholesale and Retail Operations, 10/10/00.
- Docket No. R-00005261, In re: Further Pricing of Bell Atlantic Pennsylvania, Inc.'s Unbundled Network Elements, 10/4/00.
- Docket Nos. R-00994697 and R-994697C0001, Pennsylvania Public Utility Commission v. Bell Atlantic – Pennsylvania, Inc./ Rhythms Links Inc., Complainant v. Bell Atlantic – Pennsylvania, Inc., Respondent, 12/21/99, 1/14/00.
- Docket Nos. P-00991648, Joint Application of NEXTLINK Pennsylvania, Inc., *et al.* and P-00991649, Joint Application of Bell Atlantic – Pennsylvania, Inc., *et al.*, 4/22/99, 6/11/99.
- Docket Nos. A-310200F0002 *et al.*, In re the Joint Application of Bell Atlantic Corporation and GTE Corporation for Approval of Agreement and Plan of Merger, 3/23/99, 5/19/99.
- Docket No. I-00960066, Generic Investigation of Intrastate Access Charge Reform, 6/30/97, 7/29/97, 8/27/97.
- Docket No. A-31023670002, In the Matter of the Application of MCI Metro Access

Transmission Services, Inc. for a Certificate of Public Convenience and Necessity to Provide and Resell Local Exchange Telecommunications Services in Pennsylvania, 9//96.

- Petition for Arbitration by AT&T-PA for an Interconnection Agreement with GTE-PA, 9/96.
- Petition for Arbitration by Eastern TeleLogic for an Interconnection Agreement with Bell Atlantic - Pennsylvania, 9/96.
- Petition for Arbitration by AT&T-PA for an Interconnection Agreement with Bell Atlantic - Pennsylvania, 9/96.
- Docket No. I-940035, Formal Investigation to Examine and Establish Updated Universal Service Principles and Policies for Telecommunications Services, 1/11/96, 2/14/96, 2/27/96.
- Docket No. A-310203F002, Application of MFS Intelenet of Pennsylvania, Inc., for Approval to Operate as a Local Exchange Telecommunications Company, 1/30/95, 2/22/96, 3/22/96, 1/13/97, 2/97.

South Carolina Public Service Commission

- Docket No. 95-720-C, Application of BellSouth Telecommunications, Inc. d/b/a Southern Bell Telephone and Telegraph Company for Alternative Regulation, 8/21/95, 9/11/95.
- Docket No. 95-862-C, Re: BellSouth Telecommunications, Inc. d/b/a Southern Bell Telephone and Telegraph Company Investigation of Level of Earnings, 8/21/95, 9/11/95.

Texas Public Utility Commission

- Docket Nos. 22168, Petition of IP Communications Corporation to Establish Public Utility Commission of Texas Oversight Concerning Line Sharing Issues and 22469, Complaint of Covad Communications Company and Rhythms Links, Inc. against Southwestern Bell Telephone Company and GTE Southwest Inc. for Post-Interconnection and Arbitration under the Telecommunications Act of 1996 Regarding Rates, Terms, Conditions and Related Arrangements for Line-Sharing, 5/17/00, 9/5/00 (rev. 10/6/00), 10/20/00.
- Docket Nos. 20226, Petition of Accelerated Connections, Inc. d/b/a ACI Corp. for Arbitration to Establish an Interconnection Agreement with Southwestern Bell Telephone Company, and 20272, Petition of DIECA Communications, Inc., d/b/a Covad Communications Company for Arbitration of Interconnection Rates, Terms and Conditions and Related Arrangements with Southwestern Bell Telephone Company, 2/19/99, 4/8/99.

Vermont Public Service Board

- Docket No. 5780, Green Mountain Power Company General Rate Case, 1/13/95.
- Docket No. 5695, Tariff Filing of Green Mountain Power Company Requesting an 8.60% Rate Increase to Take Effect 11/15/93, 1/94.

Virginia State Corporation Commission

- Petitions for Arbitration of AT&T-VA and MCI Communications Corporation for an Interconnection Agreement with Bell Atlantic - Virginia, 9/20/96.
- Petition for Arbitration of AT&T-VA for an Interconnection Agreement with GTE-VA, 8/96, 10/29/96.

Washington Utilities and Transportation Commission

- Docket No. UT-960639 *et al.*, Phase II, In the Matter of the Pricing Proceeding for Interconnection, Unbundled Elements, Transport and Termination, and Resale, 8/20/98, 9/11/98.
- Docket No. UT-950200, Washington Utilities and Transportation Commission vs. U S WEST Communications, Inc., 8/28/95, 12/15/95.
- Docket No. UT-941464 *et al.*, Washington Utilities and Transportation Commission vs. U S WEST Communications, Inc., 4/17/95, 5/31/95.
- Docket No. UT-911488 *et al.*, Washington Utilities and Transportation Commission vs. U S WEST Communications, Inc.

Wisconsin Public Service Commission

- In the Matter of the Petition of MCImetro Access Transmission Services, Inc. for Arbitration of Interconnection Rates, Terms, and Conditions Pursuant to 47 U.S.C. § 252(b) of the Telecommunications Act of 1996 (Ameritech – Wisconsin), 12/96.

EDUCATION

A.B., Oberlin College, Oberlin, Ohio. Major: Economics. National Merit Scholar, recipient of Hanson Prize in Economics, elected to Phi Beta Kappa.

M.A., M.Phil., Yale University, New Haven, Connecticut. Economics. Admitted to Ph.D. candidacy and completed all Ph.D. requirements except dissertation. Fields of specialization included industrial organization and energy and environmental economics. Honorable mention, National Science Foundation Fellowship; recipient of University Fellowship and Sloan Foundation dissertation research fellowship.

Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers	)	CC Docket No. 01-338
Implementation of the Local Competition Provisions of the Telecommunications Act of 1996	)	CC Docket No. 96-98
Deployment of Wireline Services Offering Advanced Telecommunications Capability	)	CC Docket No. 98-147

JOINT DECLARATION OF ANJALI JOSHI, ERIC MOYER, MARK RICHMAN, AND MICHAEL ZULEVIC ON BEHALF OF COVAD COMMUNICATIONS COMPANY

I. Witness Qualifications

1. My name is Anjali Joshi. I am the Executive Vice President for Engineering for Covad Communications Company ("Covad"). My business address is 3420 Central Expressway, Santa Clara, CA 95051. I am responsible for network infrastructure planning and implementation. I have extensive experience in designing and building carrier class networks for voice and data. Prior to joining Covad, I worked for AT&T, where I developed AT&T's InterSpan ATM service. I have Masters degrees in Engineering and Computer Engineering and a BS degree in Electrical Engineering.

2. My name is Eric Moyer. I am the Director of Marketing Operations at Covad and am responsible for strategic business projects at Covad. My business address is 3420 Central Expressway, Santa Clara, CA 95051 . Previously, I was the Director of Product Management for Consumer Services (also Consumer/Business Access Services) for three

and a half years at Covad. Prior to coming to Covad, I worked at Hewlett Packard for 8 years in a variety of positions, including Industry Marketing Manager for US Wireless segment; Industry Marketing Manager for Fiber Optic Test; various other marketing, technical, and sales positions at HP, all in the telecommunications industry. I hold an MBA from Harvard Business School (1998) and a BS degree in electrical engineering and computer science from Johns Hopkins University (1988).

3. My name is Mark Richman. I am Chief Financial Officer for Covad. My business address is 3420 Central Expressway, Santa Clara, CA 95051. I have over 18 years of financial management experience. Prior to joining Covad, I was vice president and CFO for MainStreet Networks. Before MainStreet, I held senior management positions at Adecco S.A. where I was vice president of finance and administration for Adecco U.S., a $3 billion operating division. I was also vice president and corporate treasurer at the parent company. I also have worked for Merisel, Inc., ING Capital, Manufacturers Hanover Trust Company and Wells Fargo Bank. I hold a B.S. degree in managerial economics from the University of California at Davis and a MBA from the Anderson School at UCLA.

4. My name is Michael Zulevic. I am a Director of External Affairs for Covad Communications Company. My business address is 13769 North Slazenger Drive, Oro Valley, Arizona 85737. I am responsible for providing technical and witness support to Covad's Government and External Affairs Department in connection with regulatory proceedings. Prior to joining Covad, I was employed by U S WEST (now Qwest) for 30 years, most recently as Manager, Depreciation and Analysis for the last year I was employed by US WEST. Prior to that, I worked in Network and Technology Services

("NTS") for several years, providing technical support to U S WEST Interconnection Negotiation and Implementation Teams. While working in these two capacities, I provided testimony on technical issues in support of arbitration cases and/or cost dockets in Minnesota, Iowa, Montana, Washington, Oregon, Arizona, New Mexico, Nebraska, Utah, Wyoming, and Idaho.

II. Background on Covad

5. Covad is the nations' largest competitive digital subscriber line ("DSL") service provider. DSL is a broadband data service that offers consumers high speed connectivity over copper and fiber loops with data speeds that are more than twenty times faster than conventional dial-up modems. To offer service to its customers, Covad raised more than two billion dollars in debt and equity financing and constructed a nationwide facilities-based broadband network[1]. In addition to purchasing and deploying its own broadband equipment, Covad leases unbundled loops, the high frequency portion of the loop, dedicated interoffice transport and collocation space from ILECs around the country. With over 350,000 customers, Covad is likely the nation's largest user of standalone unbundled loops and line sharing network elements. Indeed, Covad's services are currently available in the top 94 metropolitan statistical areas, and its network covers more than 40 million homes and businesses.

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1 Covad raised $1.4 billion in debt and $0.7 billion in equity.

III. Covad's Network Architecture

6. Covad specifically relied upon the Commission's UNE rules in designing its network architecture. By way of background, Covad's network is structured as follows:

(A) Covad has collocated a digital subscriber line access multiplexer ("DSLAM") at each ILEC central office at which the loops of its target end users terminate;

(B) Covad creates hub locations by collocating ATM equipment at an ILEC central office that collects traffic from a group of central offices with a DSLAM;[2]

(C) Covad connects each of its DSLAMs to a hub central office with dedicated interoffice transport ("transport");

(D) Covad interconnects its ATM equipment both within each region and between regions with transport; and

(E) Covad and its Internet service provider ("ISP") partners connect their IP Points of Presence ("POPs") to ATM equipment in one or more regions.

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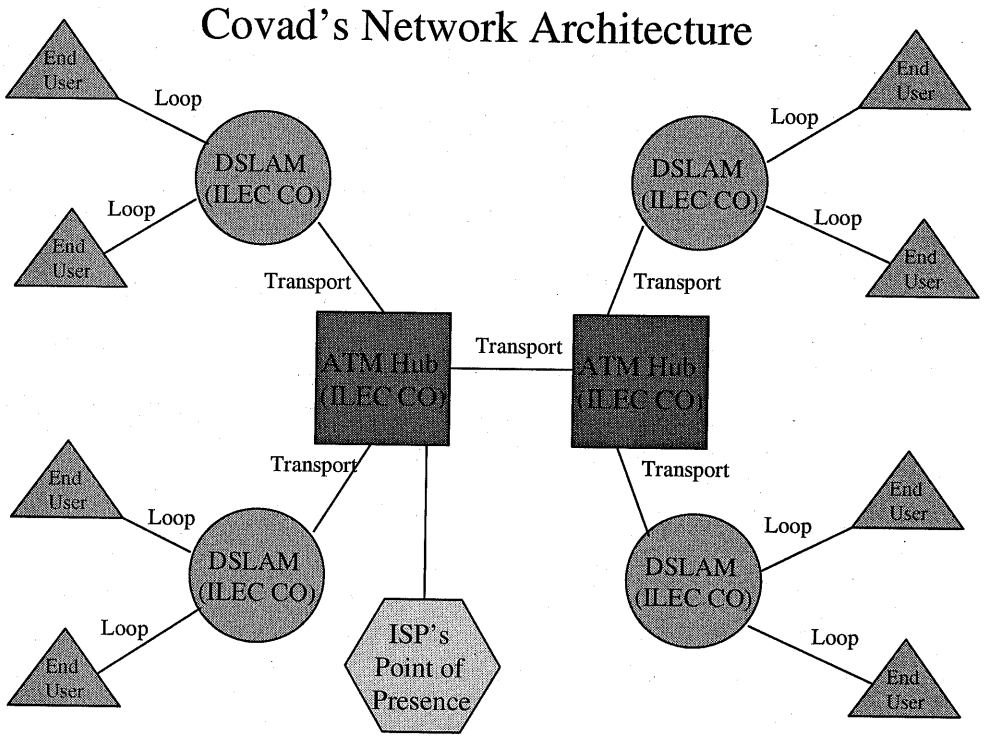
[2] Covad determines the ratio of hubs (ATM equipment) to spokes (DSLAMs) through the use of a cost optimization algorithm, which weighs the transport and DSLAM costs against the cost of the ATM equipment. The actual number of DSLAMs per piece of ATM equipment varies throughout Covad's footprint.



7. For purely illustrative purposes, Covad's network looks like the diagram above.

8. As the diagram makes plain, Covad's network is designed to aggregate traffic from a large number of central offices at hub locations. In determining what level of aggregation to use, Covad relied upon the availability of UNE transport. As the price of transport increases, so too does the value of aggregating traffic and thereby creating economies of scale. If the Commission were to take unbundled transport off the list of UNEs, Covad's network would no longer be efficient or viable. Covad would need to deploy additional hubs in order to aggregate more traffic and reduce its costs to transport each unit of traffic. An architecture with a large number of hubs would justify placing different (and smaller) ATM equipment because the traffic would be more distributed. Alternatively, if Covad did not add hubs, it would have to de-activate DSLAMs whose

transport costs are too high (e.g., those serving residential customers), which means serving fewer customers in general and contracting Covad's business.

9. It would be undesirable and costly for Covad to reduce the size of its central office footprint. Covad has an obvious incentive to make its services available to as large an addressable market as is financially and technically feasible. Moreover, Covad does not relish the prospect of forcing end users to leave its network. At the same time, it would be even more costly and time-consuming for Covad to convert to a more aggregated network architecture because: (a) it would have to buy and collocate smaller ATM equipment; and (b) it would have to re-configure its existing transport network to create smaller aggregation zones.

IV. Covad's Financial Model

10. To assist the Commission in understanding the impact of removing certain network elements from the UNE list, we provide below a breakdown of Covad's monthly cost of providing service (total costs, excluding SG&A[3] expenses and capital investments[4]):

- ILEC loop costs are approximately 22% of monthly costs;
- ILEC dedicated transport costs are approximately 25% of monthly costs;
- ILEC collocation costs (including rent and power) are approximately 15% of monthly costs;
- Covad's operations costs (e.g., salaries and related costs) are approximately 25% of monthly costs; and
- Other miscellaneous costs of service are approximately 13% of monthly costs.

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[3] Sales, General & Administrative ("SG&A") expenses.

[4] Capital expenses include the investment that Covad made in DSL equipment that it collocated in ILEC central offices.

11. In addition, Covad's use of self-installation kits for line sharing customers has improved these numbers dramatically. When Covad had to install ADSL service for consumers over stand-alone loops, it cost approximately $150 for each dispatch (and often times more than one dispatch was necessary for individual consumers). Because margins are so low on residential lines, the cost of dispatching to install residential orders prevented Covad from offering these services profitably, and the lack of line sharing would have forced Covad eventually to exit the residential broadband market entirely. As with ILECs, Covad can only deploy DSL profitably to residential customers if line sharing is available.

V. Copper DSL Loops and Line Sharing

12. For Covad, there are no alternatives to the ILEC's loop plant.[5] Contrary to the ILECs' arguments, cable, competitive fiber, wireless and satellite facilities are not viable alternatives to DSL (for both residential and business customers).

13. Starting with cable,[6] it is hardly trivial to an independent broadband provider like Covad that cable providers do not lease their plant to other carriers, and thus is not available as an alternative to ILEC loop plant. The costs to Covad of placing new cable plant would be phenomenal (and not much different than replicating the ILEC's loop plant, which would cost hundreds of billions of dollars). Even if cable providers were willing to unbundle their equipment, cable is a fundamentally different service than DSL, as the next five paragraphs demonstrate. This also helps explain why retail DSL services

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5 We should also note that it is often not possible to provide DSL service to residential consumers over a stand-alone loop (in lieu of line sharing) because many consumers have only one line coming to their home.

6 *See* NPRM, ¶ 28.

offered by Covad are an important choice for consumers to have as an alternative to cable modem services.

14. First, because of the shared nature of cable modem networks, all data sent to or from a given subscriber is transmitted to all subscribers in the neighborhood. While measures can be taken to secure this data, security remains a primary concern, especially for business or home office users. By contrast, DSL networks operate on a point-to-point basis between the subscriber and the service provider and therefore do not present the opportunity for a one subscriber to attempt to view another's traffic. Because of the shared nature of the cable system, Covad would have little control over the kinds of broadband services offered over cable. All of the users on a cable system get basically the same broadband service. DSL service, by contrast, runs over loops that are dedicated to each end user and thereby allow the DSL provider to offer dramatically different network access services (including, but not limited to, access to the Internet and virtual private networks) to different customers. DSL providers differentiate their products through the available bandwidth (both upstream and downstream), the quality of service, and the manner in which traffic is prioritized, which would be difficult on a shared platform.

15. Second, cable modem service is generally not available to businesses. When cable providers originally wired cities, they went after residential customers. For the most part, they did not wire commercial centers. On the other hand, Covad can provide a

variety of business-class broadband services[7] to small business customers using DSL because they all have telephone lines.

16. Third, in any event, cable plant generally does not provide the kind of upstream bandwidth that small business demands. Cable modem services are biased toward downloading, which meets the typical usage pattern of residential customers using the service for recreation purposes. Cable services are also inadequate for telecommuters, who are residential customers that often require high upload speeds.

17. Fourth, cable plant does not provide a dedicated circuit in the manner that DSL does. The bandwidth provided to each cable customer depends on the number of other users currently on the network in that neighborhood. DSL, by contrast, gives the customer dedicated bandwidth all the way to the central office. As a result, cable provides such a distinctly lower quality of service than DSL that the two truly are not technically comparable substitutes for one another.

18. Fifth, cable modem service in the past has been much less suitable than DSL for transmitting voice services. As the shared cable network becomes more congested, services that are sensitive to delay such as voice will become increasingly unreliable to the point where it may no longer be possible to provide toll quality voice services at all.[8]

19. Competitive fiber, over which competitors offer voice, data and T-1 services, is no alternative to DSL for two primary reasons. First, the costs of deploying competitive fiber make it economical only if the target market consists of large business

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[7] Business class competitive broadband service is an always-on Internet connection providing a minimum guaranteed bandwidth of 384 kbps both up- and downstream and priced at approximately $350/month (as opposed to roughly $1000/month for a T-1 service).

[8] By contrast, a single SDSL line could carry up to 16 voice lines reliably and with a high quality of service.

customers in commercial centers, not the residential and small business customers that Covad targets over individual loops.

20. Second, competitive fiber is by no means ubiquitous. For instance, the Joint Petition of BellSouth, SBC, and Verizon effectively admitted that 75% of the commercial buildings in the country were without access to competitive fiber.[9] And that study dealt with large buildings; competitive fiber is not nearly so prevalent in areas that predominantly contain residential and small business customers.

21. Offering broadband services over wireless networks is not an alternative to DSL for three reasons.[10] First, Covad is not aware of any wireless carriers that have made their broadband services or underlying network facilities available for resale. Similarly, Covad could not be expected to construct a wireless network itself. Setting aside the vast capital outlay that would be required (but most likely unavailable in today's market), there is also the problem of obtaining spectrum. It is far from clear what spectrum Covad could obtain and use to provide broadband services.

22. Second, the maximum bandwidth of most wireless networks is nowhere near that of DSL. Certain carriers, such as Winstar and Teligent, created much more powerful wireless networks, but those were targeted at large business customers. And even then, both of those companies drove themselves into bankruptcy pursuing a customer base that is far more lucrative than the residential and small business customers that Covad serves.

23. Third, the cost of adding subscribers to a wireless network is very high compared to DSL. For the most part, this cost difference is attributable to (1) the need to

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[9] *See Implementation of the Local Competition Provisions in the Telecommunications Act of 1996; Joint Petition of BellSouth, SBC, and Verizon for Elimination of Mandatory Unbundling of High-Capacity Loops and Dedicated Transport*, Joint Petition, CC Docket No. 96-98, at 11 (stating that only 25% of the nation's commercial buildings are served by a competitive fiber provider).

use relatively expensive customer premises equipment for wireless customers; (2) the more intense labor costs associated with installing wireless customers; and (3) the greater amount of engineering work tailored to each customer to ensure acceptable signal strength.

24. Satellite broadband services are not an alternative to DSL for four reasons. First, most such services are not two-way. While satellite dishes to receive programming are small enough (18" in diameter) to be ubiquitous, they are too small to send data back to the satellite. Most satellite services must use telephone lines to provide two-way communications, which severely limits upstream bandwidth. The few services that do offer two-way communications through the dish itself have very low upstream speeds. Consequently, satellite broadband service is either purely a residential product (because it provides significant bandwidth only for downloading) or a small business product only when coupled with a high capacity telephone line for uploading (which essentially would be DSL).

25. Second, the performance of satellite-based communications suffers from the delay caused by the distance that the signal must travel. These services typically use geostationary satellites that orbit over 22,000 miles above the equator. The time that it takes signals to cover that distance, even in one direction, prevents many applications from working properly. In addition, since the satellites orbit above the equator, subscribers in North America must be able to place their dish in position to have a clear view of the southern sky.

26. Third, satellite broadband platforms cannot offer both broadband *and* voice services to end users. There is simply too much delay in having the voice signal travel to

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[10] *See* NPRM, ¶ 28.

and from a satellite for such carriers to provide high quality voice services. Although there are satellite telephones available to end users, they use lower orbiting satellites that then lack the capability to offer broadband service.

27. Fourth, even if the technical problems with satellite broadband service did not exist, it would be unlikely that Covad could raise the capital in today's market to enter what would be a new line of business.

VI. DS-1 Loops

28. DS-1 loops can be either ordinary copper loops with DS-1 electronics installed along the loop or fiber loops with electronics installed at the customer's premise and the central office. DS-1 loops provide a reliable symmetric connection operating at 1.544 mbps.

29. There are no alternatives to DS-1 loops that could eliminate the need for an unbundling obligation. The various technologies discussed above (cable, fiber, wireless, and satellite) are even less appropriate substitutes for DS-1 loops, which are highly reliable, high-capacity facilities.

30. It is worth explaining why standard DSL loops are not an alternative for DS-1 loops.[11] First, DSL can deliver similar bandwidth to DS1 loops only over relatively short distances (approximately 8,000 feet from the central office).[12] DS-1 loops are designed to overcome the distance limitations of DSL by making use of technologies such as repeaters and fiber optics. DS-1 loop designers deploy the most appropriate technology

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[11] In fact, Verizon Communications has previously admitted that SDSL and T-1 services are very different. *See* letter of Michael E. Glover & Karen Zacharia (of Verizon) and Michael Olsen & William J. Bailey, III (of NorthPoint) to Jake Jennings, Deputy Division Chief, at 2 (filed in CC Docket No. 00-157, August 31, 2000).

based upon the distance of the end user from the central office as well as knowledge of the make-up and design details of the loop plant that serves the end user.

31. Second, because DS-1 loops are specially designed to be suitable for carrying DS-1 signals, they tend to be more reliable[13] and come with tighter time-to-restore targets. While DSL is generally a reliable technology, it typically runs on copper loops that are not specifically engineered to the specifications of the technology that they will carry. Therefore, it is less certain that a given DSL loop will be suitable for the service that will ultimately run over it.

32. Interestingly, end users who buy DS-1 service from Covad generally seek in the first instance to purchase DSL service (because it is much cheaper), but are unable to do so because of technical limitations on DSL that DS-1 service overcomes.

VII. Hybrid Copper/Fiber DSL Loops

33. More and more, ILEC loop networks are constructed using both copper wire and fiber optic cable.[14] In this configuration, a fiber loop feeder travels from the central office to a remote terminal ("RT") in the field, where digital loop carrier ("DLC") electronics convert the optical signal into an electrical one traveling over a copper loop (known as "distribution") to the customer's premises.

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[12] *See id.* ("whereas a T-1 line runs at a constant bandwidth of 1.544 Mbps, and SDSL line can run at that speed only at short distances from the central office").

[13] *See id.* (T-1 lines are "technically more robust" than SDSL lines, "are not limited by loop length from the central office and can be ordered for a long haul circuit of hundreds of miles").

[14] According to the Commission's 2000 ARMIS reports, of the 196 million local loop channels in service across the country, approximately 42 million, or 21% of those loops, were served at least partially over fiber facilities. *See FCC 2000 Trends in Telephone Service*, at 18-7, available at http://www.fcc.gov/Bureaus/Common_Carrier/Reports/FCC-State_Link/IAD/trend801.pdf. We expect that number to rise in the future, given that most ILECs have ceased deploying new all-copper loops.

34. Although DSL is primarily a technology for transmitting broadband services over copper loops, carriers can offer it over hybrid copper/fiber loops through two methods. First, they can use DLC at the RT that is DSL-compatible,[15] such as Alcatel's Lightspan 2000 product,[16] which employs fiber loops typically designed as follows:

(F) the feeder of the loop, carrying both digitized voice and data, is made of fiber optic cable that terminates at a remote terminal in the field (within several thousand feet of the customer);

(G) at the remote terminal, there are DLC electronics at the end of the fiber portion of the loop;

(H) these DLC electronics transform both the voice and data signals on the loop from optical to electrical form;

(I) as the loop signal exits the DLC electronics in electrical form, it travels over a copper cross-connect to the copper distribution cable; and

(J) that copper distribution cable travels to the customer's location.

35. Loops in this configuration (hereinafter the "Fiber DSL Loop") terminate in the central office on an optical concentration device ("OCD"), unlike traditional fiber loops carrying voice services that terminate on either DLC equipment or the ILEC's switch. An OCD acts essentially as an ATM demultiplexer and a termination point that is the equivalent of a main distribution frame. In other words, the OCD is the first point in the central office at which the signal from the loop terminates (by converting from optical to electrical form). The OCD also demultiplexes and distributes the signal to its next

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15 DLC that is DSL-compatible is commonly known as next generation DLC ("NGDLC").

16 ILECs can upgrade the Lightspan 2000 to handle DSL signals simply by adding to it certain line cards and other electronics. Both SBC and Verizon use the Lightspan 2000 DLC to a significant degree and have undertaken the upgrades discussed here. SBC has done so as part of Project Pronto. Verizon announced on February 20, 2002 that it plans to offer retail services based upon this configuration in Massachusetts beginning in July of this year. Verizon also has pre-positioned Lightspan 2000 equipment at certain RTs that is DSL-capable, albeit it still requires ADLU cards and ABCU cards to be added.

destination (which, although ILECs may intend to keep the traffic within their networks, can be to a group of CLECs collocated in the central office).

36. With Fiber DSL Loops, ILECs can offer customers voice services alone, voice and DSL services over the same line, or DSL service alone, all of which can be provisioned remotely once the appropriate line cards have been placed in the NGDLC.

37. Second, carriers can collocate a traditional DSLAM at the RT that will perform the functions of DSL-compatible DLC. In this configuration:

(A) The fiber feeder of the loop, carrying both digitized voice and data signals, terminates on DLC and/or fiber optic multiplexing electronics in an RT in the field;

(B) The digitized voice signal (if present) is fed into the DLC, which converts the voice into an analog signal on a copper pair;

(C) The data signal is fed into a traditional DSLAM, which may be collocated there or at a feeder-distribution interface ("FDI")[17] located even closer to the end users;[18]

(D) The DSLAM converts the data into a DSL signal on a copper pair;

(E) If the voice and data are to share a single copper pair, the two pairs (from B and D, above) connect to a splitter that combines the low frequency voice signal with the high frequency DSL signal on a single pair; and

(F) the DSL signal, or combined voice and DSL signals, are transmitted over the copper distribution cable which then travels to the end user's location.[19]

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[17] An FDI is a cross-connection point where copper feeder cable from a fiber-served RT connects to copper distribution cable. Normally, several FDIs serve each RT.

[18] In the case of a line shared service, a splitter would handle the separate data and voice connections that pass through the RT. The splitter would be located within or adjacent to the DSLAM.

[19] Some ILECs have stated that they would not allow CLECs to receive data signals over the same fiber cable that serves the DLC electronics there. Instead, CLECs would have to purchase dark fiber from the RT to the central office in order to transmit the data signal to the RT. It is not likely that such dark fiber would be ubiquitously available at all RTs.

38. The difference between the two methods is that (1) with the first, the DLC performs all of the functions of the DSLAM in an integrated fashion; and (2) with the second, there are considerable inefficiencies associated with placing a stand-alone DSLAM in a RT (or FDI) and connecting it to the copper and fiber loop plant. These inefficiencies include:

(A) Placing a stand-alone DSLAM in an RT/FDI requires space that may not be available, depending on the RT;

(B) Stand-alone DSLAMs require an independent source of power that often is unavailable at RTs;

(C) Having to make new and separate connections between the stand-alone DSLAM and the fiber and copper appearances in the RT, that are otherwise unnecessary with a Fiber DSL Loop, is costly and may require a technician to be dispatched for each new line;[20] and

(D) There likely will be greater maintenance costs associated with maintaining equipment collocated at RTs, because there will be more points of failure.

We also estimate that, assuming Covad had the necessary capital, it would take as many as 10 years to collocate at RTs ubiquitously.[21]

39. Despite all of these inefficiencies, ILECs contend that the Commission should force CLECs to collocate stand-alone DSLAMs at RTs, rather than unbundle Fiber DSL Loops. The following sample business case explains why it would be financial suicide for CLECs to do so. The business case is based upon a typical Covad market, with 50

[20] The process would be further complicated because, as we understand the situation, ILECs are not proposing to give CLECs direct access to equipment collocated at RTs.

[21] It took Covad 3 years to collocate at approximately 1700 central offices. There are many more RTs than there are central offices, and it is much more difficult to collocate at RTs than at central offices. For that reason, we assume that the time to collocate at RTs ubiquitously would be more than triple Covad's time to collocate in ILEC central offices.

central offices, each serving an average of 15 RTs.[22] The case assumes that the average cost of collocating at an RT is $90,000, which is based upon Qwest testimony given in Minnesota.[23] The case also assumes that each RT serves 300 customers and that Covad is able to win the business of 5% of them (which is conservative estimate, given that broadband penetration for all platforms, including cable modem service, is 11% nationwide).[24]

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[22] Although in some cases, this business plan would require Covad to collocate at some FDIs that are associated with a given RT, Covad has not included that configuration in this business case for the sake of simplicity.

[23] Attached hereto as Exhibit A is the testimony of Georganne Weidenbach on behalf of Qwest Corporation, presented to the Minnesota Public Utilities Commission, Docket No. P-421/CI-01-1375, OAH Docket No. 12-2500-14490-2 (dated February 2, 2002). Ms. Weidenbach testified (at 8) that "Qwest estimates that it will cost approximately $90,000 per remote DSLAM." This fee will buy CLECs a slot in a collocation hotel that Qwest will build at each RT. For that reason, the estimate probably understates the cost to collocate at the RTs of ILECs that are not constructing such collocation hotels on a standard basis for CLECs. Indeed, we are aware that Sprint spent more than $130,000 to collocate next to an RT in Kansas. Sprint did not collocate in the RT because there was no room for its equipment. See *ex parte* letter of Richard Juhnke (Sprint) to Magalie Roman Salas, CC Docket Nos. 96-98 & 98-147 (dated July 18, 2001). We believe that the majority of RTs in the country will have such space constraints (perhaps even those in Qwest's territory because it cannot guarantee that there will be space in the collocation hotels for every CLEC). Thus, relying upon the Qwest cost estimate was conservative.

[24] In an Illinois proceeding on Ameritech's deployment of Project Pronto, Ameritech forecasted that CLECs would capture between 3 and 5 customers per RT. Covad conservatively assumes in the sample business case that at least three times that amount of customers will select its RT-based DSL service.

Sample Business Case for RT Collocation

Model Input	Model Assumptions/Conclusions
Central Offices	50
Remote Terminals Per CO	15
Total Remote Terminals	750
Cost to Collocate at RT	$90,000 per RT
Total RT Collo Costs	$67,500,000
Avg. # Customers Per RT	300
Total Number of RT Customers	225,000
Take Rate	5%
Total Customers Captured	11,250
Average monthly revenue per customer for Covad	$35
Total Annual Revenue to Covad for Captured Customers	$4,725,000
Years to Recover Investment in RT Collocation	14.2 years, assuming no churn in customer base

40. The business case demonstrates that it would take 14.2 years to recover *just* the cost of collocating at RTs from customers (assuming there is no churn).[25] The business case does not consider such other real and significant costs as: (A) the capital and collocation costs of placing DSL equipment in the central office; (B) the transport costs of sending DSL traffic from the end user's serving central office to the Internet; (C) the customer premises equipment costs (e.g., the DSL modem); (D) any of the recurring costs to use any of the associated network elements; (E) any of the recurring costs to collocate in RTs in the first place; or (F) any of the costs to provision DSL loops served by such RTs. No CLEC could make a profit faced with these economics.

41. ILECs, on the other hand, that upgrade their DLC to create Fiber DSL Loops enjoy a much rosier set of numbers. In announcing the roll-out of Project Pronto, SBC

[25] Interestingly, the Commission's depreciation lives for digital circuit equipment, such as the DSLAMs to be placed in RT collocations, are generally less than 14 years. The DSLAMs of CLECs

told the investment community that: "The network efficiency improvements alone will pay for this initiative, leaving SBC with a data network that will be second to none in its ability to satisfy the exploding demand for broadband services."[26] SBC further bragged that its

> new network investments will have a profound impact on its cost structure; in fact, the efficiencies SBC expects to gain will pay for the cost of the deployment on an NPV basis. These efficiencies are conservatively targeted to yield annual savings of about $1.5 billion by 2004 ($850 million in cash operating expense and $600 million in capital expenditures).[27]

Plainly, deploying Fiber DSL loops will be a infinitely more financially rewarding opportunity for ILECs than the prospect of collocating stand-alone DSLAMs at RTs would be for CLECs.

42. If the Commission decides to permit CLECs to unbundle Fiber DSL Loops, it should also allow them to modify the associated quality of service ("QoS") settings on the NGDLC. QoS determines the priority that the NGDLC assigns to particular types of traffic. Some end users may require a connection that provides a more stringent guarantee of what bandwidth will be available when the network is congested than other end users' traffic receives. For example, with voice or video conferencing services offered over the network, which are "real-time" services that are extremely sensitive to delay, the network must ensure that the traffic is delivered at a very consistent rate. When data and voice/video packets arrive at a congestion point, the data can wait,

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required to collocate at the RT would not have any remaining economic life before they ever produced a dime in profit.

[26] *See SBC Announces Sweeping Broadband Initiative*, SBC Investor Briefing, at 2 (October 18, 1999). It is our understanding that SBC has deployed a substantial portion of the Project Pronto facilities.

[27] *Id.*, at 7.

but the voice and video traffic generally cannot do so (without distorting the customer's service).

VIII. Dedicated Interoffice Transport

43. Covad provided the Declaration of Mark Shipley and Marie Chang last year in response to the petition of BellSouth, Verizon, and SBC to remove dedicated interoffice transport ("transport") from the list of unbundled network elements.[28]

44. Although competitive transport is not ubiquitously available, where it is available, it is expensive. CLECs providing competitive transport are competing with the ILEC's special access services (where both ILECs and CLECs seek to serve end users on a retail basis, not telecommunications carriers on a wholesale basis). For that reason, competitive transport providers price their services typically at a 20% discount from the ILEC's special access services, which is generally more than twice the UNE rate. Covad could not afford to use competitive transport, even if it was ubiquitously available.

45. Covad could not build its own transport facilities because it lacks both the expertise and the capital. Covad does not have the employees necessary to dig up the streets and lay fiber. Even if it did, Covad does not have the capital necessary for such operations, nor could it obtain that kind of money in today's market.

46. Today, most all transport and digital loop carrier runs over fiber facilities and uses Synchronous Optical Network ("SONET") electronics. SONET is merely "an

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[28] *Implementation of the Local Competition Provisions in the Telecommunications Act of 1996; Joint Petition of BellSouth, SBC, and Verizon for Elimination of Mandatory Unbundling of High-Capacity Loops and Dedicated Transport*, Declaration of Mark Shipley and Marie Chang, CC Docket No. 96-98 (June 11, 2001).

optical interface standard" by which manufacturers build all kinds of equipment – everything from digital loop carrier to common and dedicated interoffice transport.[29]

47. There is nothing special about SONET technology to warrant an exception from the Commission's unbundling rules. Indeed, such an exception would eviscerate any rules unbundling transport and fiber loops (carrying both voice and data traffic) because almost all of it is SONET-based.

48. Similarly, the fact that a piece of transport may be channelized on a larger facility is no reason not to unbundle it. It is generally efficient to channelize as much of the transport network as possible. For that reason, DS-1 transport is usually channelized on a DS-3 or OC-3 facility. But that does not mean that Covad or another CLEC could have either built the larger facility or leased it from another provider. When Covad needs a DS-1, it cannot build the facility, nor can it buy a much larger facility, such as DS-3, because the cost difference between the two can be huge. In addition, if Covad cannot find any alternative transport in general, it does not matter that CLECs theoretically also sell channelized DS-1 service.

49. This concludes our declaration.

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[29] *See* Newton's Telecom Dictionary, at 663-64 (14th Ed. 1998).

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing has been forwarded via fax or hand delivery and U.S. mail to the following on this the 30th day of August, 2002.

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