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June 8, 2000

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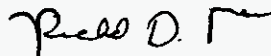
Re: UNE Docket No. 990649-TP

Dear Ms. Bayó:

Enclosed for filing on behalf of Bluestar Networks, Inc., Covad Communications Company and Rhythms Links Inc. are the original and fifteen copies of Direct Testimony of Terry L. Murray.

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

Very truly yours,



Richard D. Melson

RDM/kcg  
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cc: Parties of Record

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**BEFORE THE FLORIDA PUBLIC  
SERVICE COMMISSION  
DOCKET NO. 990649-TP**

**DIRECT TESTIMONY OF  
TERRY L. MURRAY  
ON BEHALF OF  
BLUESTAR NETWORKS INC.,  
COVAD COMMUNICATIONS COMPANY AND  
RHYTHMS LINKS INC.**

**DATED: June 8, 2000**

DOCUMENT NUMBER-DATE

**07038 JUN-88 003950**

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Exhibit \_\_\_\_\_ (TLM-1): Curriculum Vitae

1 **I. INTRODUCTION AND SUMMARY**

2

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

4 **A. My name is Terry L. Murray. I am President of the consulting firm Murray &**  
5 **Cratty, LLC. My business address is 227 Palm Drive, Piedmont, California**  
6 **94610.**

7

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

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

17 **My professional background includes employment and consulting**  
18 **experiences in the fields of telecommunications, energy, and insurance**  
19 **regulation. As a consultant, I have testified or served as an expert on**  
20 **telecommunications issues in proceedings before state regulatory commissions**  
21 **in California, Connecticut, Delaware, the District of Columbia, Hawaii,**  
22 **Illinois, Kansas, Maryland, Massachusetts, Michigan, Nevada, New Jersey,**  
23 **New York, North Carolina, Pennsylvania, South Carolina, Texas, Virginia,**  
24 **Washington, and Wisconsin, and before the Federal Communications**

Direct Testimony of Terry L. Murray

1 Commission ("FCC"). I have extensive experience reviewing the cost studies  
2 that incumbent local exchange carriers ("ILECs") have presented to state  
3 regulatory commissions in support of their proposed prices for unbundled  
4 network elements and collocation.

5 Before I became a consultant in 1990, I was employed for  
6 approximately six years in a variety of positions (including Director of the  
7 Division of Ratepayer Advocates) at the California Public Utilities  
8 Commission and had significant responsibility for telecommunications matters.  
9 I have also taught economics and regulatory policy at both the undergraduate  
10 and graduate levels.

11

12 **Q. Have you included a copy of your curriculum vita with this testimony?**

13 **A. Yes. My curriculum vita, included as Exhibit \_\_\_\_\_ (TLM-1) to this**  
14 **testimony, provides more detail concerning my qualifications and experience.**

15

16 **Q. What is the purpose of your testimony?**

17 **A. BlueStar Networks, Inc. ("BlueStar"), DIECA Communications, Inc. d/b/a**  
18 **Covad Communications Company ("Covad") and Rhythms Links Inc.**  
19 **("Rhythms") have asked me to address Issues 6 and 9b with respect to all three**  
20 **incumbents, BellSouth Telecommunications, Inc. ("BST"), GTE Florida**  
21 **Incorporated ("GTE") and Sprint – Florida, Incorporated ("Sprint") in this**  
22 **proceeding.**

23



Direct Testimony of Terry L. Murray

1 **Q. Please summarize the conclusions in your testimony.**

2 **A. In my testimony, I explain the basis for the following conclusions concerning**  
3 **Issue 6:**

- 4 • **Nonrecurring charges inherently create barriers to entry because they are**  
5 **sunk costs. The higher the nonrecurring charge, the greater the barrier to**  
6 **entry.**
- 7 • **The nonrecurring charges that the Florida incumbents have proposed in this**  
8 **proceeding are, in many cases, so high as to pose a significant threat to**  
9 **competitive entry.**
- 10 • **The Commission can mitigate, although not eliminate, this barrier to entry**  
11 **by recovering some or all of the identified nonrecurring costs through**  
12 **recurring charges.**

13 **I also address the following conclusion concerning Issue 9(b):**

- 14 • **The Commission should not address BST's proposed costs and rates for**  
15 **line-sharing splitters in this proceeding because doing so would be contrary**  
16 **to the all-party stipulation that the Commission approved on December 17,**  
17 **1999.**

18

19 **II. ISSUE 6: UNDER WHAT CIRCUMSTANCES, IF ANY, IS IT**  
20 **APPROPRIATE TO RECOVER NONRECURRING COSTS**  
21 **THROUGH RECURRING RATES?**

22

23 **Q. What is the economic significance of nonrecurring charges?**

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1 A. Nonrecurring charges are important because they are, in effect, entrance fees.  
2 The higher the nonrecurring charge, the more difficult it will be for new  
3 entrants to offer competitive local exchange services using the incumbent's  
4 unbundled network elements (or bundled wholesale services). Typically, the  
5 new entrant must pay nonrecurring charges to the incumbent before it can  
6 obtain the unbundled network elements it needs to offer service to an end user.  
7 This procedure increases the capital that a new entrant must invest up-front  
8 before it receives even a penny of revenue from its retail customer and  
9 therefore makes entry more difficult. Again, the higher the nonrecurring  
10 charge, the greater the up-front capital that a new entrant must invest and thus  
11 the more difficult entry becomes.

12 It is possible to mitigate the effect of these up-front capital costs on  
13 entry, and indeed, as I will discuss below, the FCC has required GTE's merger  
14 partner Bell Atlantic to implement an Optional Payment Plan for nonrecurring  
15 charges that attempts to address this issue. It is not possible, however, to  
16 change the essential reality that a nonrecurring charge is a sunk cost and thus  
17 creates a barrier to entry.

18

19 **Q. What is a sunk cost?**

20 A. A sunk cost is a cost that, once incurred, a firm cannot recover if it ceases  
21 business. In essence, sunk costs are costs incurred for which the firm does not  
22 acquire some tangible asset that can be resold. The reason sunk costs create a

Direct Testimony of Terry L. Murray

1 barrier to entry is that they impose greater risks for a new entrant that the cost  
2 will not be recovered from sales in the market than do other costs.

3

4 **Q. Why do nonrecurring charges create a barrier to entry?**

5 **A. Unlike recurring charges for unbundled network elements or recurring costs**  
6 **for a new entrant's own facilities, nonrecurring charges are a sunk cost. A new**  
7 **entrant cannot obtain a refund or repayment for any or all of the nonrecurring**  
8 **charges it pays the incumbent, even if the new entrant loses the retail customer**  
9 **on whose behalf it incurred the nonrecurring charges or goes out of business**  
10 **entirely. In contrast, if a new entrant loses a retail customer that it had been**  
11 **servicing using an unbundled loop, or exits the local exchange business entirely,**  
12 **the new entrant is no longer obligated to pay monthly recurring charges for the**  
13 **loop it no longer needs. Similarly, if the new entrant loses a retail customer**  
14 **that it had been servicing using its own switch, it can use the freed-up switching**  
15 **capacity to serve a different retail customer or lease that capacity to another**  
16 **carrier. If the new entrant leaves the local exchange business entirely, it can**  
17 **sell its switch to another local exchange provider. As these examples illustrate,**  
18 **nonrecurring charges for unbundled network elements create a greater risk of**  
19 **non-recovery of a new entrant's costs than do either recurring charges for**  
20 **unbundled network elements or recurring costs for a new entrant's own**  
21 **facilities.**

22 The only way that a new entrant can be sure of recovering the full cost  
23 of the nonrecurring charges it incurs on behalf of a retail customer is to impose

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1 an up-front nonrecurring charge on the retail customer that equals or exceeds  
2 the nonrecurring charge the new entrant had to pay the incumbent to order the  
3 unbundled network element or elements needed to serve that customer. This is  
4 easier said than done. There are no nonrecurring costs or nonrecurring charges  
5 when an existing customer of an incumbent local exchange carrier chooses to  
6 stay with that incumbent. For new entrants to persuade consumers to switch  
7 local exchange carriers, they may have to forego or minimize up-front charges,  
8 similar to the process that has occurred in the interLATA markets with the  
9 Primary Interexchange Carrier ("PIC") change charges. New entrants will  
10 have to try to recover any nonrecurring charges they must pay at least in part in  
11 the rates they receive on a recurring basis from their customers. The higher the  
12 nonrecurring charges, the less likely that a new entrant can recover those costs  
13 through a markup on recurring rates over the average "life" of a customer,  
14 particularly given the frequency of customer churn that one might reasonably  
15 expect in a newly competitive market. This simply adds to the barrier to entry  
16 that nonrecurring charges create.

17

18 **Q. How do nonrecurring charges associated with a customer's change of**  
19 **service provider affect the relative competitive positions of incumbents**  
20 **and new entrants?**

21 **A. Because incumbent local exchange carriers start the competitive era with**  
22 **virtually a 100% market share for local service, the difference in the effect of**  
23 **nonrecurring charges on the competitive positions of incumbents and new**

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1 entrants is enormous. At least initially, almost all nonrecurring charges  
2 associated with customers' switching service providers will fall on new  
3 entrants. Thus, all of the increased risk associated with the sunk costs that  
4 nonrecurring charges represent falls on new entrants. All other things being  
5 equal, the risk associated with nonrecurring charges will increase the expected  
6 return that investors will demand to provide capital to new entrants. The  
7 higher the nonrecurring charges, the greater the risk and the greater the  
8 increased cost of capital to new entrants.

9 This difference in capital costs makes competitive entry very difficult.  
10 Even if a new entrant is equally as efficient as the incumbent in every other  
11 respect, a higher cost of capital means that the minimum price that a new  
12 entrant must charge retail customers to recover all of its costs will exceed the  
13 minimum fully compensatory price that the incumbent can charge. Because  
14 new entrants generally must offer *lower* prices than the incumbent to win  
15 customers, it is clear that nonrecurring charges create a difficult bind for new  
16 entrants.

17

18 **Q. Do the nonrecurring charges proposed in this proceeding create the risk**  
19 **of imposing a significant barrier to entry in Florida?**

20 **A. Yes. Several of the nonrecurring charges that the incumbents have proposed in**  
21 **this proceeding are sufficiently high that they would, if adopted, create a**  
22 **significant barrier to entry in Florida. This problem is especially acute with**  
23 **respect to the nonrecurring charges for the unbundled network elements that**

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1 competitors such as BlueStar, Covad and Rhythms must obtain to offer  
2 advanced services based on Digital Subscriber Line ("DSL") technology to  
3 Florida consumers.

4 For example, the loop "conditioning" charges that BST and GTE have  
5 proposed present a high barrier to entry in themselves. In GTE's case, the  
6 company's proposed nonrecurring "conditioning" charges are so extreme that  
7 they are actually higher than the entire cost to build a new unbundled loop in  
8 GTE's TELRIC analysis. In fact, GTE proposes a nonrecurring charge of  
9 \$1,448.22 for removing load coils from a loop, *one and a half times* GTE's  
10 own estimate of the entire loop investment, \$960.20 (*i.e.*, its total reported cost  
11 to build an entirely new loop from scratch, which may itself be inflated). GTE  
12 proposes a nonrecurring charge of \$911.76 for removing a single occurrence of  
13 bridged tap. And, if a competitor is unlucky enough to order a loop containing  
14 both load coils and bridged tap, GTE proposes that competitors pay from  
15 \$1,709.68 (removal of load coils and one bridged tap) to \$2,072.18 (removal or  
16 load coils and multiple bridged tap). Such extreme nonrecurring charges  
17 create a substantial barrier to entry.

18 Although they are not as astronomical as GTE's, BST's proposed  
19 "conditioning" charges are also sufficiently high to constitute substantial entry  
20 barriers. For example, BST has proposed a charge of \$772.31 for removing  
21 the first load coil from a loop of greater than 18,000 feet. For comparison,  
22 BST has calculated the average investment required for an entire 2-wire basic  
23 loop as \$835.14. (Although BST's proposed rates for "conditioning" loops up

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1 to 18,000 feet in length are lower, it appears that BST is proposing to apply  
2 nonrecurring "conditioning" charges to *every* xDSL-capable loop, including  
3 those that do not require "conditioning.")

4 Even some of the basic ordering and provisioning charges that the  
5 incumbents have proposed for DSL-capable loops — charges that would apply  
6 to each and every loop that competitors order — are high enough to pose an  
7 entry barrier. For example, BST's proposed nonrecurring charges for  
8 provisioning an xDSL loop range from \$347.77 for a long copper loop to  
9 \$475.16 for an HDSL loop (\$155.44 of which is the disconnect charge). In all  
10 cases except the long copper loop, BST would add a \$120.98 "conditioning"  
11 charge that it seeks to impose on all xDSL-capable loops under 18,000 feet.

12 GTE has not been entirely clear regarding which nonrecurring charges  
13 would apply for xDSL-capable loops. However, if GTE intends that xDSL-  
14 capable loops fall into its "Advanced - Basic" category, as its nonrecurring cost  
15 study documentation seems to indicate, then a (semi-mechanized) ordering  
16 charge of \$25.03 and a provisioning charge of \$573.73 would apply.

17 The cumulative effect of the various nonrecurring charges that the  
18 incumbents have proposed is onerous indeed. For example, the nonrecurring  
19 charges BST proposes for an ADSL compatible loop, which include an  
20 electronic service order element in addition to those listed above, sum to  
21 \$581.88. (This total does not include any charges for manual service order  
22 processing, order coordination, manual loop qualification, or specific loop  
23 "conditioning," each of which would add to the total.) The nonrecurring

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1 charge for an xDSL-capable loop longer than 18,000 feet (UCL-long) that  
2 requires removal of load coils would total \$1,123.28, substantially more than  
3 the entire investment for an average loop.

4 GTE's proposed ordering and provisioning charges for an xDSL-  
5 capable loop, which I discussed above, sum to \$598.76. (Once again, this total  
6 does not include any charges for manual service order processing or loop  
7 "conditioning.") For those loops requiring removal of load coils, nonrecurring  
8 charges would total \$2,046.98.

9 The following table shows how some of the nonrecurring charges that  
10 BST and GTE propose for installing an xDSL loop compare to BST's and  
11 GTE's own calculations of the entire forward-looking investment required to  
12 provision an average loop.

13

14 **Table 1 - Incumbent Proposed Nonrecurring Charges for xDSL**  
15 **Loops Compared to the Incumbent's Reported Investment for the**  
16 **Average Complete Unbundled Loop.**

17	Nonrecurring	Average
18	Charge	Investment
19	<b><u>BellSouth</u></b>	
20	Total Reported Investment Per Average Loop:	\$ 835.14
21	Long Loop Ordering and Provisioning (min) \$ 350.97	42%
22	Long Loop Load Coil Removal \$ 772.31	92%
23	Long Loop with Load Coil Removal \$1,123.28	135%



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**GTE**

Total Reported Investment Per Average Loop:		\$ 960.20
xDSL Ordering and Provisioning (min)	\$ 598.76	62%
Load Coil Removal	\$1,448.22	151%
xDSL Loop with Load Coil Removal	\$2,046.98	213%

This table shows that the extreme nonrecurring charges that the incumbents are proposing simply to make an existing loop available to DSL competitors are nearly equal to, and sometimes more than, the total investment the incumbents have claimed, in this same proceeding, is sufficient to build an entirely new loop. For example, BST proposes to charge competitors for an existing ADSL loop 42% of the cost to build one from scratch, including all of the investment and placement costs for the loop and supporting structure. At the nonrecurring charges that BST is proposing, if a competitor bought three existing ADSL loops, BST could have built from scratch more than one entirely new loop. If BST also must remove load coils from the existing ADSL loop, BST would charge 135% of the cost of an all-new loop—in other words, the competitor would be better off paying BST to build a new loop from scratch, without any load coils.

The FCC has required that incumbents provide unbundled loops under the “necessary and impair” standard of the Telecommunications Act of 1996. In essence, the FCC has found that it is financially unfeasible for competitors

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1 to incur the substantial investments needed to replicate the loop plant that the  
2 incumbents have built up over the decades during which they enjoyed a legally  
3 protected monopoly (and typically a guaranteed return). Forcing a new entrant  
4 to pay as much (or nearly as much) to gain access to an existing loop as it  
5 would cost to build a new loop represents as severe a financial barrier to entry  
6 as if the unbundled loop were simply unavailable. The incumbents' proposed  
7 nonrecurring charges for xDSL-capable loops, therefore, do not comport with  
8 the spirit of the unbundling requirement.

9 Although Sprint's proposed nonrecurring charges are generally more  
10 reasonable than those of BST and GTE, the cumulative impact of the charges,  
11 including those for loop "qualification" and "conditioning," could also create a  
12 barrier to entry.

13  
14 **Q. What consequences would result if the Commission were to approve a**  
15 **significant portion of the full nonrecurring charges proposed by the**  
16 **Florida incumbents?**

17 **A. If the incumbents are permitted to erect nonrecurring charges as a substantial**  
18 **barrier to entry, Florida consumers will be the ultimate losers. Fewer firms**  
19 **will be able to enter the local exchange market, if any enter at all. Those that**  
20 **do enter will have to charge higher prices than they might otherwise have been**  
21 **able to charge. All of this limits or prevents consumers from getting the**  
22 **benefits that were supposed to come from opening up local exchange markets**  
23 **to competition using unbundled network elements and total service resale.**

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**Q. How can the Commission mitigate the effect of these nonrecurring charges on entry?**

**A. To create the conditions under which local competition can flourish, nonrecurring charges must not exceed the level necessary to compensate the incumbent for the nonrecurring costs that the new entrant truly causes the incumbent to bear. Thus, the first and most important step is for the Commission to undertake a rigorous review of the proposed nonrecurring charges and to eliminate costs that are not truly efficient, forward-looking economic costs.**

**Incumbents have every incentive to make nonrecurring charges an even larger barrier to entry than they would otherwise be by exaggerating the level of nonrecurring cost associated with the preordering, ordering, and provisioning of unbundled network elements and bundled wholesale services. When the Commission reviews the evidence that parties present concerning the errors in the nonrecurring cost studies that the incumbents have filed in this proceeding, it will become clear that the Florida incumbents have acted on this incentive.**

**My initial review of all three incumbents' nonrecurring charges submitted in this docket reveals that this Commission should significantly reduce those charges in compliance with the TELRIC pricing methodology. (For example, after a similar review, the Public Utility Commission of Texas ordered a nonrecurring interim rate for an xDSL loop of \$15.03, a price that is**

1 dramatically lower than the nonrecurring charges that the Florida incumbents  
2 have proposed. See Petition of Rhythms Links Inc. and Covad  
3 Communications for Arbitration to Establish an Interconnection Agreement  
4 with Southwestern Bell Telephone Company, Dockets No. 20226 et al.,  
5 Arbitration Award at 11 (Nov. 30, 1999) affirmed by Order Approving  
6 Interconnection Agreements (Feb. 07, 2000).)

7 Nonetheless, if this Commission adopts total, cumulative nonrecurring  
8 charges that create a barrier to competitive entry in Florida, the Commission  
9 should consider converting some or all of the remaining nonrecurring charges  
10 to recurring charges. Section 51.507(e) of the FCC's pricing rules for  
11 unbundled network elements explicitly permits such a step: "[s]tate  
12 commissions may, where reasonable, require incumbent LECs to recover  
13 nonrecurring costs through recurring charges over a reasonable period of  
14 time."

15  
16 **Q. Is there any precedent for recovering nonrecurring costs through**  
17 **recurring charges as a means of reducing barriers to entry?**

18 **A. Yes. As a condition of its approval of Bell Atlantic's merger with NYNEX,**  
19 **the FCC required Bell Atlantic to implement an Optional Payment Plan for**  
20 **nonrecurring charges. The explicit purpose of this requirement was to reduce**  
21 **entry barriers. See Memorandum Opinion and Order, *In the Application of***  
22 ***NYNEX Corp. Transferor, and Bell Atlantic Corp. Transferee for Consent to***

1           *Transfer Control of NYNEX Corp. and Its Subsidiaries*, File No. NSD-L-96-10  
2           (rel. Aug. 14, 1997) (“*Merger Order*”), ¶ 197.

3

4   **Q.   Do such mitigation measures eliminate the barrier to entry associated with**  
5           **nonrecurring charges?**

6   **A.   No. Even mitigation measures such as the Optional Payment Plan that the**  
7           **FCC required Bell Atlantic to file as part of its merger conditions cannot undo**  
8           **the barrier to entry that nonrecurring charges inherently create. The Optional**  
9           **Payment Plan allows new entrants in essence to finance the nonrecurring**  
10           **charges over an extended period and, therefore, can ease the initial cash flow**  
11           **burden of nonrecurring charges. The Optional Payment Plan does not,**  
12           **however, convert the nonrecurring charges from sunk costs to variable costs**  
13           **because the obligation to pay the entire nonrecurring charges — including**  
14           **carrying charges — persists even if the new entrant loses the retail customer**  
15           **after only a short period. Thus, even if the Commission were to adopt a similar**  
16           **approach to allow new entrants in Florida to pay nonrecurring charges over an**  
17           **extended period of time, such a program could not eliminate the significant and**  
18           **long-term anti-competitive effect that excessive nonrecurring charges have on**  
19           **competitive carriers seeking to enter and stay in the Florida market. The**  
20           **Commission must therefore conduct a thorough review of the high**  
21           **nonrecurring charges that the Florida incumbents have proposed and eliminate**  
22           **all cost elements that exceed efficient, forward-looking economic costs.**

23

1 **III. ISSUE 9(B): SUBJECT TO THE STANDARDS OF THE FCC'S THIRD**  
2 **REPORT AND ORDER, SHOULD THE COMMISSION REQUIRE**  
3 **ILECS TO UNBUNDLE ANY OTHER ELEMENTS OR**  
4 **COMBINATIONS OF ELEMENTS? IF SO, WHAT ARE THEY AND**  
5 **HOW SHOULD THEY BE PRICED?**

6  
7 **Q. In addition to the unbundled network elements identified in Issue 9(a) of**  
8 **the Commission's Issue List, BST has proposed costs and rates relating to**  
9 **line sharing splitters (element J.4). Should the Commission address line**  
10 **sharing in this proceeding?**

11 **A. No, it should not. All parties to this proceeding, including BST, had**  
12 **previously stipulated that line sharing issues would not be considered in this**  
13 **proceeding. See ¶ 5 of the "Stipulation of Certain Issues and Schedule of**  
14 **Events" approved by the Commission in Order No. PSC-99-2467-PCO-TP**  
15 **issued on December 17, 1999. Therefore, the Commission should address**  
16 **rates for line-sharing-related elements, including splitters, in a different forum.**

17

18 **Q. Does that conclude your testimony at this time?**

19 **A. Yes, it does.**

**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**

- 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.
- 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.

**Federal Communications Commission**

- 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.
- 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.

**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 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.

- 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.
- 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-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 No. 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. 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-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.

**Missouri Public Service Commission**

- 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**

- 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. 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.
- Case Nos. 94-E-0098 *et al.*, Niagara Mohawk Fuel Adjustment Clause Target and S.C. 6 Update Filing, 11/17/95.
- Case Nos. 93-E-0912 *et al.*, Proceeding on Motion of the Commission to Review Long-Run Avoided Cost Estimation Policies and Methods, 5/10/95, 5/31/95.
- Central Hudson Gas & Electric Company General Rate Case
- Niagara Mohawk Power Corporation General Rate Case
- Case Nos. 91-E-0863 *et al.*, New York State Electric & Gas Corporation General Rate Case, 1/92.
- Case Nos. 91-E-0765 *et al.*, Rochester Gas & Electric Corporation General Rate Case, 11/91.
- Case No. 91-E-0506, Central Hudson Gas & Electric Company General Rate Case, 9/91, 10/91.
- Case Nos. 29327 *et al.*, Niagara Mohawk General Rate Case, 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.

**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 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.
- 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, Green Mountain Power Company General Rate Case, 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.

**Civil Proceedings**

- Nationwide Business Telephones and Team Centrex, Plaintiffs, vs. Introlink Communication Systems, Inc., Pacific Bell, Inc., *et al.*, Defendants, 5/96.
- Power Producers v. Pacific Gas & Electric, 6/93.
- WindTec, Inc. v. Southern California Edison Company, 7/90.

**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.**