

REBUTTAL TESTIMONY

OF

MICHAEL J. DOANE

Prepared on Behalf of Verizon New England, Inc.

d/b/a Verizon Massachusetts

Before the Massachusetts

Department of Telecommunications and Energy

REDACTED VERSION – PROPRIETARY INFORMATION DELETED

September 21, 2001

1 **REBUTTAL TESTIMONY OF MICHAEL J. DOANE**

2

3 **I. INTRODUCTION AND PURPOSE OF TESTIMONY**

4

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

6 A. My name is Michael J. Doane. I am President of PM Industrial Economics, a
7 subsidiary of PM Keypoint LLC. My business address is 2200 Powell Street,
8 Suite 1080, Emeryville, California 94608.

9

10 Q. Please summarize your professional experience and educational background.

11 A. My expertise is in applied microeconomics and econometrics, and I have over
12 eighteen years of consulting experience in regulatory economics. I have
13 conducted economic research on a variety of antitrust and regulatory issues in
14 network industries, including the telecommunications, electric power, natural gas,
15 oil pipeline, and computer industries. My research includes econometric analyses
16 of demand; studies of pricing and rate design; analyses of alternative regulatory
17 approaches; cost and productivity measurement; and analyses of price formation,
18 industry performance, and market power. I served as a consultant to the Antitrust
19 Division of the U.S. Department of Justice in the Microsoft antitrust case and to
20 the U.S. Federal Trade Commission on antitrust matters involving the competitive
21 effects of horizontal and vertical mergers.

22 Prior to joining PM Industrial Economics, I was Vice President and
23 Principal of Analysis Group Economics, where I managed the firm's San

1 Francisco office and directed the firm's energy and telecommunications practice
2 areas. I have published articles in a number of academic journals, including the
3 *Journal of Law & Economics*, the *Quarterly Journal of Economics*, the *Journal of*
4 *Law, Economics & Organization*, the *Energy Law Journal*, the *Yale Journal on*
5 *Regulation*, and the *Hume Papers on Public Policy*, among others. I received a
6 M.A. degree in applied economics from the University of California at Santa
7 Barbara, and my B.A. in economics is from the University of Connecticut. A
8 copy of my *curriculum vitae* is attached as Exhibit MJD-1.

9

10 Q. What is the purpose of your rebuttal testimony?

11 A. My rebuttal testimony responds to the testimonies of Dr. John W. Mayo,
12 testifying on behalf of AT&T Communications of New England, Inc., and Dr. Lee
13 L. Selwyn, testifying on behalf of the Office of the Attorney General of the
14 Commonwealth of Massachusetts. Dr. Mayo's testimony provides his
15 recommendations on how to determine whether telecommunications markets are
16 sufficiently competitive to allow market-based prices. Dr. Selwyn provides a
17 similar set of recommendations and offers statistics he interprets as providing
18 evidence regarding the ability of Verizon Massachusetts ("Verizon MA") to
19 exercise market power. The purpose of a market power study in the current
20 context is to ascertain whether, in the absence of price regulation, Verizon MA
21 would have the ability to raise prices above the competitive level for a non-
22 transitory period. As explained below, with respect to the services for which
23 Verizon MA has requested market-based rates, the answer to that inquiry is "no."

24

1 Q. Please summarize your primary conclusions.

2 A. Dr. Mayo and Dr. Selwyn both advocate and apply well-known methods for
3 evaluating the ability of a firm to exercise market power. That methodology
4 begins by defining relevant product and geographic markets and then proceeds to
5 analyze firm market shares, entry conditions (e.g., supply elasticities), and
6 demand elasticities.

7 I disagree with their assertion that Verizon MA has not presented data to
8 specifically address that relevant market power methodology in the current case.
9 I also observe that Dr. Mayo and Dr. Selwyn fail to appreciate the role unbundled
10 network elements (“UNEs”) play in the current investigation. The
11 Telecommunications Act of 1996 requires incumbent local exchange carriers
12 (“ILECs”) to provide access on an unbundled basis to the elements of their
13 networks required to offer retail services, as well as to resell retail services at an
14 avoided-cost discount.¹ The Massachusetts Department of Telecommunications
15 and Energy has established total element long run incremental cost (“TELRIC”)
16 based rates at which competitive local exchange carriers (“CLECs”) can acquire
17 UNEs.² The ability to offer competing retail services using UNEs and resale of
18 Verizon MA’s retail services reduces entry barriers by allowing CLECs to avoid
19 incurring the sunk costs of building network facilities that the ILEC previously
20 incurred.

¹ See Communications Act of 1934, as amended, at §§ 251(c)(3)-(4).

² TELRIC-based rates for UNEs are designed to allow recovery of forward looking incremental costs, plus a uniform markup to cover common costs. For a discussion of this pricing approach, see Michael J. Doane, David S. Sibley, and Michael A. Williams (1999), *Having Your Cake – How to Preserve Universal-Service Cross Subsidies While Facilitating Competitive Entry*, YALE JOURNAL ON REGULATION, Vol. 16, No. 2, pp. 312-326.

1 The fundamental point of my rebuttal testimony is that Dr. Mayo and Dr.
2 Selwyn have erred in applying their market power methodology. Their primary
3 error is the failure to analyze, both conceptually and empirically, the existence of
4 low barriers to entry in relevant markets. As a consequence of this error, they
5 have recommended that the Department engage in the impractical exercise to
6 conduct (by implication) more than 18,000 separate market power studies. The
7 effect of such a proposal if adopted is that the Department would likely never
8 complete its full analysis of Verizon MA's business markets. As a result,
9 unnecessary price regulation would continue to be imposed indefinitely, thereby
10 reducing consumer welfare.

11 An examination of the entry of CLECs into individual wire centers
12 demonstrates that no significant entry barriers exist, as large numbers of Verizon
13 MA customers have switched to CLECs. Not surprisingly, CLEC entry has been
14 more significant in large wire centers that offer greater profit opportunities.
15 Lower CLEC shares in relatively small wire centers do not indicate the presence
16 of barriers to entry, but rather lower profit opportunities. That is, there is no
17 evidence to suggest that barriers to entry exist in small wire centers when such
18 barriers do not exist in large wire centers.

19 **[BEGIN PROPRIETARY]** The fact that, across Massachusetts, roughly
20 ██████ to ██████ of business lines are currently being served by a provider other than
21 Verizon MA demonstrates quite forcefully that there exist no significant barriers
22 to entry. **[END PROPRIETARY]** Since all of Verizon MA's services are
23 subject to competition by an entrant leasing UNEs at TELRIC-based rates,

1 Verizon MA does not have the ability to raise prices above the competitive level
2 for a non-transitory period. Thus, Verizon MA's business service markets are
3 effectively competitive.
4

5 **II. DR. MAYO'S AND DR. SELWYN'S MARKET POWER**
6 **METHODOLOGIES**
7

8 Q. Please summarize the analysis of market power that Dr. Mayo and Dr. Selwyn
9 advocate should be performed prior to the removal of price regulation.

10 A. Dr. Mayo states that a market power analysis should begin by defining the
11 relevant product and geographic markets. After the relevant markets have been
12 defined, Dr. Mayo states that the evaluation of a firm's ability to exercise market
13 power should be based on a review of the following: (1) its market share; (2) the
14 presence or absence of barriers to new entry or expansion by existing firms (i.e.,
15 the elasticity of supply); and (3) the market demand elasticity.³

16 Dr. Selwyn's criteria are similar to those advocated by Dr. Mayo. Dr.
17 Selwyn states that a market power study should examine (1) market share, (2)
18 entry and expansion barriers (elasticity of supply), and (3) the market demand
19 elasticity. (Selwyn, at 7.) Dr. Selwyn also takes the position that, since Verizon
20 MA is a vertically integrated firm while CLECs often are not, Verizon MA's

³ Dr. Mayo also argues that, prior to conducting a market power analysis, the Department should ensure that competition-enabling policies are implemented. Five such policies that, in his opinion, facilitate competition and follow from the Telecommunications Act of 1996 are: (1) the elimination of regulatory and legal barriers to entry into local exchange markets by competitive local exchange carriers; (2) unbundling the network elements owned by an incumbent local exchange carrier; (3) establishing economically efficient prices for those network elements; (4) requiring the ILEC to offer its retail services to CLECs for resale at wholesale prices; and (5) ensuring equal interconnection quality. What Dr. Mayo fails to acknowledge, however, is that these policies have successfully been implemented in Massachusetts, as evidenced by the FCC's approval of Verizon MA's provision of long distance within its service region.

1 market power must be examined separately with respect to its two vertically
2 integrated components.⁴

3

4 Q. Do you agree with Dr. Mayo's and Dr. Selwyn's application of their market
5 power approach?

6 A. No. Dr. Mayo and Dr. Selwyn recommend an approach generally used to
7 evaluate the competitive effects of horizontal mergers. Their recommendation is
8 not useful in this instance. Dr. Mayo, for example, argues that formal studies
9 must be performed for at least 68 different services in each of Verizon MA's 272
10 wire centers. Thus, the number of formal market power studies required would be
11 at least 18,496. Assuming that a formal market power study of a given market
12 could be completed in one week, the time required to perform all the market
13 power studies recommended by Dr. Mayo would be approximately 356 years. Of
14 course, this task is impractical in the extreme and would, in effect, turn the
15 Department into the Federal Power Commission circa 1960, when that regulatory
16 agency had proceedings into wellhead price regulation anticipated for completion
17 by the year 2000.⁵

18 In reality, there is no reason to analyze each of the 68 services in a wire
19 center in separate market power studies if, throughout the state, the same

⁴ Dr. Selwyn recognizes that if competitors can expand supply when another firm in the market increases its price, the firm imposing the price increase will find that increase unprofitable as customers switch to alternative suppliers. Of course, this is the case when entrants can acquire UNEs at economically efficient prices.

⁵ See Stephen Breyer and P.W. MacAvoy (1974), *ENERGY REGULATION BY THE FEDERAL POWER COMMISSION*, Brookings Institution; P.W. MacAvoy (Spring 1971), *The Formal Work-Product of the Federal Power Commission*, *BELL JOURNAL OF ECONOMICS AND MANAGEMENT SCIENCE*, Vol. 2.

1 underlying facilities and competition-enabling policies are used to provide
2 essentially all these services. In this case, entry conditions will be essentially the
3 same in any given wire center.

4

5 Q. What competition-enabling policies has the Department implemented in
6 Massachusetts that specifically facilitate the development of competition in local
7 exchange markets?

8 A. The Department has implemented policies that require an ILEC (1) to offer its
9 unbundled network element inputs at TELRIC-based rates and (2), as discussed
10 below, to resell its retail services at avoided-cost discounts. Access to UNEs
11 provides CLECs with an entry path that allows them to avoid incurring the sunk
12 costs of building their own local exchange network facilities. Unbundling thus
13 plays a critical role in market power analyses of local exchange markets. Dr.
14 Mayo and Dr. Selwyn, however, fail to account properly for the role of UNEs at
15 TELRIC-based rates in their market power analyses. Dr. Mayo does argue that
16 the provision of unbundled network elements at TELRIC-based prices enables
17 CLECs to avoid the sunk costs previously incurred by the ILEC in building local
18 exchange network facilities. (Mayo, at 14-15.) He further states that such UNE-
19 based entry facilitates the entry process and increases the prospects for effective
20 competition in local exchange markets. Notwithstanding these conclusions,
21 however, his market power analysis does not take into account the competitive
22 effects of low barriers to entry caused by the existence of TELRIC-based UNEs.

23

1 Q. Have Dr. Mayo and Dr. Selwyn failed to consider the role of resale in facilitating
2 the development of effective competition in local exchange markets?

3 A. Yes. Resale offers both new and established telecommunications firms the
4 opportunity to enter local exchange markets rapidly and with low sunk costs.
5 Resellers can establish their brand names with retail customers without having to
6 incur costs in building network facilities. Resale entry, thus, offers an efficient
7 entry path for new local exchange carriers. Upon building brand name
8 recognition with retail customers, resellers are in a position to expand their entry
9 by either leasing UNEs or constructing their own facilities. Thus, the availability
10 of resale also contributes to the existence of low barriers to entry.

11

12 Q. Do Dr. Mayo and Dr. Selwyn provide support to your view of how to evaluate
13 market power correctly in this instance?

14 A. Yes. Dr. Mayo admits that inferences regarding a firm's ability to exercise
15 market power cannot be reached by consideration of its market share alone.
16 (Mayo, at 22-23.) Similarly, Dr. Selwyn concedes that firms possessing large
17 market shares do not necessarily possess market power. (Selwyn, at 8.) On this
18 point, at least, we all agree.⁶

⁶ Dr. Selwyn also claims, however, that "the fact that Verizon maintains a significant share of the local service market with respect to both its [wholesale and retail operations] provides a clear demonstration that neither market segment is sufficiently competitive, and therefore the incumbent has market power with respect to both segments." (Selwyn, at 8.) Dr. Selwyn's opinion is not consistent with modern economic analyses of market power. Although Dr. Selwyn agrees that "firms possessing large market shares do not necessarily also possess market power," in this instance his analysis concludes otherwise. Dr. Selwyn's analysis is incomplete because it fails to examine whether barriers to entry exist in the provision of wholesale and retail services. This is a critical flaw in his analysis because, in a market with low barriers to entry, no firm can exercise market power, regardless of its market share.

1 Modern theoretical and empirical research in economics demonstrates that
2 a high market share alone is not sufficient to enable a firm to exercise market
3 power. In a market with no significant barriers to entry, a firm cannot exercise
4 market power, regardless of its market share. As one modern textbook
5 summarizes: “Though not sufficient for a finding of market power, high market
6 shares are likely necessary for such a finding. Whether market shares are
7 reflective of market power depends on barriers to entry.”⁷ Thus, a high market
8 share can be indicative of market power only if barriers to entry exist.

9

10 Q. Do you agree with any other portions of Dr. Mayo’s testimony?

11 A. Yes. Dr. Mayo also concedes “where barriers to entry and expansion are low or
12 nonexistent, then regardless of the extent of competition within the market the
13 incumbent firm will be endowed with little monopoly power.” (Mayo, at 24.) I
14 agree with Dr. Mayo’s statement. This finding has an important implication in
15 the current proceeding because of the role of unbundled network elements and
16 resale. A wire-center-by-wire-center analysis of new entry into local exchange
17 markets in Massachusetts shows that barriers to entry are low. Thus, regardless of
18 its current market shares, Verizon MA has no significant market power – i.e., the
19 existing local exchange markets are effectively competitive.

20

21 Q. Despite Dr. Mayo’s acknowledgement of the correct way of evaluating the
22 sufficiency of competition, he concludes that Verizon MA did not effectively

⁷ Jeffrey Church and Roger Ware (2000), *INDUSTRIAL ORGANIZATION*, McGraw-Hill, p. 604.

1 utilize the standard market power approach in attempting to demonstrate the
2 presence of effective competition. Do you agree?

3 A. No, I do not agree with Dr. Mayo's conclusion that Verizon MA has failed to use
4 generally accepted procedures for measuring market power. For example, Dr.
5 Mayo argues that the relevant geographic markets in the current matter consist of
6 the areas served by individual central offices (i.e., wire centers). (Mayo, at 28.)
7 Dr. Selwyn similarly argues that the geographic markets are smaller than the state
8 of Massachusetts (Selwyn, at 5), and he claims that Verizon MA has failed to
9 examine entry at the wire center level (Selwyn, at 9).

10 My reply testimony, however, contains data on the number of resellers,
11 UNE entrants, CLECs using their own switches, and CLECs and other service
12 providers collocating at a Verizon MA central office, all evaluated at the wire
13 center level. As discussed below, these data show that no significant barriers to
14 entry exist in wire center geographic markets. More generally, recall that in these
15 wire centers entrants have the ability to acquire all the inputs necessary to offer
16 competing retail services by purchasing those inputs on an unbundled basis from
17 Verizon MA at TELRIC-based prices. This is a singular feature of local exchange
18 markets, a feature found in essentially no other markets where market power
19 studies have been performed.

20

21 Q. What conclusions do you draw from reviewing the relevant data regarding
22 Verizon MA's ability to exercise market power?

1 A. The evidence on CLEC entry into individual wire centers and the low barriers to
2 entry associated with such entry strongly demonstrate that Verizon MA faces
3 elastic firm-specific demands for its services, as discussed in further detail below.
4

5 **III. AN ANALYSIS OF ENTRY BY CLECS IN VERIZON'S WIRE CENTERS**
6

7 Q. Have you had an opportunity to review the market share of entrants on a wire
8 center basis?

9 A. No. Verizon MA does not have access to the CLEC data required to measure
10 market share precisely. However, using data available to Verizon MA, a
11 conservative estimate of CLEC market shares can be calculated. Exhibit MJD-2
12 to this testimony summarizes, for each of the 272 Verizon MA wire centers in
13 Massachusetts, the number of business lines providing service as of May 2001,
14 for each of the following categories: (1) Verizon MA retail; (2) resale of Verizon
15 MA service; (3) facilities-based service using a platform of unbundled network
16 elements ("UNE-P") secured from Verizon MA; and (4) facilities-based service
17 using a competitive local switch.⁸ For each wire center, I have calculated the
18 entrants' collective share of these business lines, both including resale and for
19 facilities-based provision only. The shares obtained by entrants vary considerably
20 from central office to central office. **[BEGIN PROPRIETARY]** Excluding
21 resale, entrants' total share of business lines at particular wire centers varies from

⁸ The number of business lines observed in Exhibits MJD-2 and MJD-3 are estimates based in part on telephone number listings presented in the E-911 database. All lines reported on the exhibits are those that were installed and offering service to a customer as of May 2001.

1 approximately [REDACTED] to [REDACTED] percent; taking resale into account, the shares range
2 from approximately [REDACTED] to [REDACTED] percent. Statewide, the average weighted
3 share of business lines served by facilities-based entrants in May of 2001 was
4 approximately [REDACTED] percent. Adding lines provided through resale, the weighted
5 average share was approximately [REDACTED] percent. The fact that, across
6 Massachusetts, roughly [REDACTED] to [REDACTED] of business lines are currently being served
7 by a provider other than Verizon MA demonstrates quite forcefully that there
8 exist no significant barriers to entry. **[END PROPRIETARY]**

9

10 Q. What do the data demonstrate when sorted by size of wire center?

11 A. Not surprisingly, the market share data show that there has been more entry in
12 wire centers with more business lines, and I believe that this is indicative of the
13 fact that the opportunities for profit are greater in such areas.⁹ Sorting the wire
14 centers identified in Exhibit MJD-2 by the total number of business lines served,
15 including resale lines, one can calculate similar weighted shares for the top ten
16 percent of exchanges, the second top ten percent of exchanges, and so on. (See
17 Table One.) **[BEGIN PROPRIETARY]** For the top ten percent of
18 Massachusetts wire centers (i.e., for those with total business lines in excess of
19 [REDACTED]), facilities-based entrants collectively served [REDACTED] percent of business lines,

⁹ Since the Telecommunications Act of 1996 was first implemented, CLECs have stated on numerous occasions that they intend to target high-value customers selectively. For example, AT&T spokesman David Arneke has stated the CLEC entry strategy clearly: “go where the money is and work your way down the money chain from there.” TRIANGLE BUSINESS JOURNAL, June 22, 1996 (Raleigh, North Carolina). That statement was essentially repeated in the *Wall Street Journal*, which reported in September 1997 that AT&T “aims to focus much of its future marketing on the top-tier of high-spending consumers of communications services.” John J. Keller, *AT&T is Planning Bold New Business Strategy*, WALL ST. J., Sept. 18, 1997.

1 and all resale- and facilities-based entrants together operated [REDACTED] percent of
2 lines. These shares generally decrease as the size of the wire centers declines.

3 **[END PROPRIETARY]**

4
5 TABLE ONE
6 ENTRANTS' SHARE OF BUSINESS LINES,
7 BY SIZE OF VERIZON MA WIRE CENTER
8 (MAY 2001)
9

[PROPRIETARY]	
----------------------	--

10
11 Similarly, if one sorts the wire centers in Exhibit MJD-2 by the four UNE
12 “density zones” (i.e., metropolitan, urban, suburban and rural), one sees a similar
13 result. (See Table Two.) Metropolitan areas, having the highest densities, exhibit
14 the highest penetration levels of competitive service providers. **[BEGIN**
15 **PROPRIETARY]** The average share of facilities-based entrants in metropolitan
16 areas, weighted by total business lines, equals [REDACTED] percent, and when resale is
17 included this share increases to [REDACTED] percent. Not surprisingly, urban zones have
18 entrant shares somewhat less than this but still greater than those exhibited by

1 suburban zones. And rural areas demonstrate the lowest levels of CLEC entry;
2 facilities-based carriers serve [REDACTED] percent of business lines in the [REDACTED] rural
3 exchanges of Massachusetts, while firms offering service through either resale or
4 their own facilities operate [REDACTED] percent of lines. **[END PROPRIETARY]**

5
6 TABLE TWO
7 ENTRANTS' SHARE OF BUSINESS LINES,
8 BY UNE DENSITY ZONE
9 (MAY 2001)
10

[REDACTED]

[PROPRIETARY]

11
12 Q. What do the shares obtained by competitive entrants at the wire center level
13 suggest regarding barriers to entry?

14 A. As noted above, there has been more entry in wire centers with more lines and
15 more metropolitan characteristics. However, neither Dr. Mayo nor Dr. Selwyn
16 has suggested that rural and small exchanges are in and of themselves more
17 difficult to enter. I am unaware of any characteristics of rural and small
18 exchanges that increase the likelihood or severity of entry barriers there relative to
19 the larger, more metropolitan wire centers.

1 **[BEGIN PROPRIETARY]** Overall, the market shares obtained by
2 competitive entrants at the wire center level, which statewide is roughly [REDACTED]
3 percent for facilities-based lines and [REDACTED] percent for all business lines,
4 demonstrate low barriers to entry. **[END PROPRIETARY]** Where access to
5 UNEs at TELRIC-based prices results in relatively high CLEC market shares,
6 barriers to entry must be low. And since barriers to entry are low, we can infer
7 that in wire centers where CLECs' market shares are relatively low the reason is a
8 lack of profitable entry opportunities.

9 Finally, I note that estimating CLEC market shares by examining share of
10 business lines served is conservative since entrants generally target larger, more
11 profitable customers. Thus, entrants' combined share of lines is typically less
12 than their share of revenues in any given wire center. It is also likely that line
13 shares, which are based on Verizon MA's internal ability to identify the presence
14 of a competitor serving customers in an area covered by a given wire center,
15 understate the extent of the competitive presence.

16

17 Q. Have you had an opportunity to review the number of entrants on a wire center
18 basis?

19 A. Yes. As shown in Exhibit MJD-3 to this testimony, there has been CLEC entry
20 into all 272 wire centers in Massachusetts, by providers offering service either
21 through resale or the deployment of competitive facilities. **[BEGIN**
22 **PROPRIETARY]** Taking an (unweighted) average of all 272 offices, one sees
23 that there are [REDACTED] resellers per wire center. There are also approximately [REDACTED]

1 carriers offering facilities-based service using a platform of unbundled network
2 elements secured from Verizon MA and another [REDACTED] carriers offering facilities-
3 based dialtone from a competitive local switch per wire center, again on an
4 unweighted average basis. In addition, there are on average [REDACTED] service
5 providers collocated at the Verizon MA central office.¹⁰ [END
6 PROPRIETARY]

7 As with the entrant market shares noted above, the presence of
8 competitive local carriers tends to be greatest in wire centers serving the largest
9 areas. Sorting the wire centers again by the total number of business lines
10 offered, either through retail by Verizon MA or through resale or facilities-based
11 provision by a competing entrant, one sees that the top ten percent of wire centers
12 exhibits the greatest number of entrants, on average. (See Table Three.) [BEGIN
13 PROPRIETARY] For the [REDACTED] largest exchanges (i.e., for those with total
14 business lines in excess of [REDACTED]), there were on (unweighted) average XXX
15 resellers, [REDACTED] UNE-P facilities-based providers, [REDACTED] switched-based providers,
16 and [REDACTED] collocating firms. These figures are well in excess of the statewide
17 averages given above. As one looks at wire centers in lower percentile brackets,
18 these averages tend to decline gradually, such that the offices with the fewest lines

¹⁰ Collocated service providers differ from those operating a competitive local switch in the following regard: Those operating a CLEC switch are defined to be those providing switched dialtone service in an exchange by means of their own switch. Collocating service providers, by contrast, do not necessarily provide dialtone. They may instead be such entities as DSL providers, competitive access providers, private line service operators, and others that require proximity to the ILEC switch to provide competitive “local” services other than basic dialtone. Verizon MA cannot, of course, identify with certitude firms that offer competitive local dialtone over facilities that entirely bypass Verizon MA’s network (as might be the case with cable telephony providers like AT&T Broadband). The CLEC switched-based entrants listed on Exhibit MJD-3 were identified by Verizon MA through a review of E911 database listings submitted by CLECs.

1 also see the fewest competitors. Across the [REDACTED] exchanges in Massachusetts
2 representing the lowest ten percent when ranked by total business lines (i.e., those
3 with fewer than [REDACTED] lines), there were just [REDACTED] resellers, [REDACTED] UNE-P
4 facilities-based providers, [REDACTED] switched-based providers, and [REDACTED] collocating
5 firms, on average. **[END PROPRIETARY]**

6
7 TABLE THREE
8 COMPETITIVE SERVICE PROVIDERS
9 BY SIZE OF VERIZON MA WIRE CENTER
10 (MAY 2001)
11

[PROPRIETARY]

12

13 Q. How do the numbers look for a density-zone basis?

14 A. Observing UNE density zones, the pattern is much the same. **[BEGIN**
15 **PROPRIETARY]** The four metropolitan wire centers in Massachusetts each
16 host on average [REDACTED] resellers, [REDACTED] facilities-based providers using UNE-P,
17 [REDACTED] facilities-based providers employing their own switches, and [REDACTED]
18 collocating service providers. These are all well in excess of the statewide

1 averages. (See Table Four.) The metropolitan figures are also greater than those
2 for urban zones, which are in turn greater than those for suburban areas, and rural
3 wire centers again display the lowest average incidence of competitive entry. On
4 average, each of the 81 rural exchanges have experienced entry by [REDACTED] resellers,
5 [REDACTED] UNE-based facility operators, [REDACTED] operators of a CLEC switch, and [REDACTED]
6 collocating service providers. **[END PROPRIETARY]**

7
8 TABLE FOUR
9 COMPETITIVE SERVICE PROVIDERS
10 BY UNE DENSITY ZONE
11 (MAY 2001)
12

[PROPRIETARY]

13
14 Q. Do the data on CLEC entry into wire centers demonstrate no significant barriers
15 to entry?

16 A. Yes. There are too many CLECs in too many wire centers to suggest any
17 significant barriers to entry. I interpret the large presence of competitive local
18 business service providers throughout Massachusetts as evidence of limited
19 barriers to entry.
20

1 Q. Given this determination, what is the relevance of Verizon's market share in any
2 particular wire center?

3 A. As discussed by Dr. Mayo, a firm's market share has no relevance when barriers
4 to entry are low. Thus, Verizon MA's market share in the provision of any
5 particular service in any given wire center has no relevance to a market power
6 study in this case. For this reason, Dr. Selwyn's application of the Herfindahl-
7 Hirschman Index ("HHI") also has no relevance.¹¹ (Selwyn, at 29-30.) Since the
8 HHI equals the sum of firms' squared market shares, it is most strongly affected
9 by the market share of the largest firm in the market. But since Verizon MA's
10 market share does not indicate that the firm has an ability to exercise market
11 power (because of low barriers to entry), neither does a relatively high HHI
12 indicate that Verizon MA has market power. In the presence of significant
13 barriers to entry, a high HHI can indicate that a firm has the ability to exercise
14 market power, either unilaterally or via coordinated behavior with rival suppliers.
15 But when low barriers to entry exist, firms have no ability to exercise market
16 power, either unilaterally or collusively, regardless of their market shares or the
17 HHI.

18 Moreover, Dr. Selwyn fails to calculate the HHI in the manner specified
19 by the HORIZONTAL MERGER GUIDELINES issued by the U.S. Department of
20 Justice and the Federal Trade Commission. The agencies state in the GUIDELINES
21 that when potential entrants can enter a market while incurring low sunk costs,

¹¹ The HHI, which represents the sum of each participant's squared market share, is a measure of the level of concentration among service providers in a market. In a single-firm (monopoly) market, the firm's share is 100 percent, which results in an HHI value of 100^2 , or 10,000. By contrast, a market served by many

1 those firms' estimated market shares should be included in the HHI, even when
2 they do not currently sell services in the relevant market.¹² Dr. Selwyn's
3 calculation of HHIs conflicts with the methodology in the HORIZONTAL MERGER
4 GUIDELINES because he does not include the market shares of firms that could
5 enter the relevant markets while incurring low sunk costs. He thus over-estimates
6 the HHIs by excluding uncommitted entrants. This is a critical flaw in his market
7 power analysis. Dr. Selwyn fails to recognize that the markets in question are
8 effectively competitive precisely because there are low barriers to entry.

9

10 Q. Is the number of CLEC entrants, both actual and potential, sufficiently large to
11 dispel concerns regarding allegedly collusive behavior on the part of local
12 exchange providers?

13 A. Yes. As documented by Verizon MA, a large number of different CLECs are
14 competing in the different local exchanges across Massachusetts. Given the lack
15 of barriers to entry in wire centers, an anticompetitive price increase for a given
16 service certainly would be met with new or expanded CLEC entry as those firms
17 attempted to capture the profits caused by the (temporary) price increase. In other
18 words, there are simply too many actual and potential CLEC entrants to maintain
19 a collusive price.

20

firms of small market share will display an HHI near zero. Therefore, the higher the value of HHI, the more concentrated is the market.

¹² See U.S. Department of Justice and Federal Trade Commission, HORIZONTAL MERGER GUIDELINES, at § 1.3 (1997).

1 Q. Dr. Selwyn claims: “It is only where the relative sizes of the various firms in a
2 market are approximately equal that no one firm can act as price-setter.”
3 (Selwyn, at 18.) Do you agree?

4 A. No. There is no economic theory or empirical work to support this claim.
5 **[BEGIN PROPRIETARY]** Moreover, Dr. Selwyn goes on to cite an example in
6 which Verizon MA’s market share equals █████ percent and 161 other firms
7 collectively have the remaining █████ percent of the market. **[END**
8 **PROPRIETARY]** He concludes: “[C]ompeting fringe firms cannot realistically
9 be expected to offer any serious pricing challenge or pressure Verizon MA if the
10 dominant firm, following price deregulation, were to impose supracompetitive
11 prices.” (Selwyn, at 18.) This claim is entirely unsupported by either theory or
12 empirical work in modern industrial organization. Consider, for example, the
13 following statement from the HORIZONTAL MERGER GUIDELINES:

14 Other things being equal, market concentration affects the
15 likelihood that one firm, or a small group of firms, could
16 successfully exercise market power. The smaller the percentage of
17 total supply that a firm controls, the more severely it must restrict
18 its own output in order to produce a given price increase, and the
19 less likely it is that an output restriction will be profitable. If
20 collective action is necessary for the exercise of market power, as
21 the number of firms necessary to control a given percentage of
22 total supply decreases, the difficulties and costs of reaching and
23 enforcing an understanding with respect to the control of that
24 supply might be reduced.¹³

25 Clearly, if there are 161 rival firms in the market today, there cannot be
26 any significant barriers to entry. Suppose, following price deregulation, that
27 Verizon MA were to charge supracompetitive prices in this market. What would

¹³ U.S. Department of Justice and Federal Trade Commission, HORIZONTAL MERGER GUIDELINES, at § 2.0 (1997).

1 be the likely response of both the existing rival suppliers as well as other potential
2 entrants? They would undercut Verizon MA's price to capture the (temporary)
3 economic profits, with the effect that prices would return to the competitive level.
4 The presence of many rival suppliers in a market with low barriers to entry or
5 expansion makes this market effectively competitive.

6

7 Q. Does this conclude your rebuttal testimony?

8 A. Yes.

EXHIBIT MJD-1
CURRICULUM VITAE OF MICHAEL J. DOANE

Michael Doane is President of PM Industrial Economics, an economic research and consulting firm. Mr. Doane has conducted economic research on a variety of antitrust and regulatory issues in the electric power, natural gas, oil, pipeline, computer software, and telecommunication industries. He has served as an expert witness before courts of law, arbitration panels, and federal and state regulatory commissions. His published articles have appeared in a number of academic journals, including the *Journal of Law and Economics*, *Journal of Law, Economics & Organization*, *Quarterly Journal of Economics*, *Yale Journal on Regulation*, and the *Energy Journal*, among others. A specialist in applied microeconomics with an emphasis on network industries, his research includes:

- ✍ Economic analysis of entry regulation, rate regulation, and market power; industries examined include natural gas, oil pipeline, electric power, telecommunications, and computers;
- ✍ Analyses of public utility pricing and rate design, cost allocation methodologies, cost and productivity measurement, electricity and natural gas demand, and energy conservation policies and investment;
- ✍ Evaluation of the effects of mergers on industry structure and competition;
- ✍ Valuation of natural resources for severance tax purposes;
- ✍ Studies of economic liability and damages in cases involving such issues as copyright infringement, breach of contract, product liability, price fixing, product tying, and foreclosure;
- ✍ Development of statistical models for certification and damage calculations in class action complaints; and
- ✍ Development of customer surveys and econometric models for various retail-based industries to predict product choice and market share; industries examined include transportation, telecommunications, retail gasoline, hotel, computers, food products, and home appliances;

Mr. Doane received his M.A. in applied economics from the University of California at Santa Barbara and has completed additional graduate study in price theory and econometrics. He holds a B.A. in economics from the University of Connecticut. Prior to joining PM Industrial Economics, Mr. Doane was a Vice President and Principal of Analysis Group, Inc., where he managed the firm's San Francisco office and directed the firm's energy and telecommunications practices. He also served as a Senior Economist at Arthur D. Little, Inc.

SELECTED CASEWORK

FEDERAL TRADE COMMISSION

In the Matter of Pepsi-Co, Inc., and Quaker Oats Company

Economic analysis of the competitive effects of proposed merger, 2001.

UNITED STATES BANKRUPTCY COURT FOR THE SOUTHERN DISTRICT OF FLORIDA

In re: Southeast Banking Corporation, Debtor.

Analysis of liability faced by directors and officers of a failed regional bank holding company, 2001

UNITED STATES DISTRICT COURT FOR THE SOUTHER DISTRICT OF NEW YORK

Geneva Pharmaceutical Technology Corp. v. Barr Laboratories, et al.

Economic analysis of relevant antitrust market and monopolization claims, 2000.

FEDERAL COMMUNICATIONS COMMISSION

In the Matter of Application of MCI WorldCom Inc., and Sprint Corporation for Transfer of Control of Sprint Corporation to MCI WorldCom, Inc.

Economic analysis of competitive effects of proposed merger in long-distance telecommunication markets, 2000.

FEDERAL ENERGY REGULATORY COMMISSION

San Diego Gas and Electric Company, Docket, Nos. ER98-496-000 and ER 98-2160-000, 2000.

Affidavit. Economic evaluation of tariff amendments requested by the California Independent System Operator Corporation concerning the operation of reliability must-run generating units.

UNITED STATES DISTRICT COURT, TRAVIS COUNTY, TEXAS

BMC Software, Inc. v. Peregrine/Bridge Transfer Corp., Skunkware, Inc, NEON Systems, Inc. Wayne E. Fisher, and John J. Moores v BMC Software BMC Software, Inc. and Max P. Watson, 1999.

Economic analysis of product tying and predatory pricing claims. Economic analysis of damage claims.

FLORIDA PUBLIC SERVICE COMMISSION.

Investigation Into Pricing of Unbundled Network Elements, Docket No. 990649, 1999.

Prepared Direct and Rebuttal testimonies. Economic analysis of proposals to deaverage the prices of unbundled network elements sold to competitive local exchange carriers.

FEDERAL TRADE COMMISSION

Exxon Corporation's proposed acquisition of Mobil Corporation, 1999.

Consultant to Federal Trade Commission. Economic analysis of the competitive effects of the proposed merger.

PUBLIC UTILITY COMMISSION OF TEXAS

Project No. 21155 ? Request for Comments on Additional Questions Regarding Anti-Competitive Standard, 1999.

Economic analysis of alleged price squeeze in the provision of wholesale telecommunication services.

FEDERAL TRADE COMMISSION

Barnes & Noble, Inc.'s proposed acquisition of Ingram Book Company, 1999.

Consultant to Federal Trade Commission. Economic analysis of horizontal and vertical aspects of proposed merger.

UNITED STATES DISTRICT COURT, DISTRICT OF COLUMBIA

United States of America v. Microsoft Corporation, Civil Action No. 98-1232 (TPJ) and Civil Action No. 98-1233 (TPJ), 1998.

Consultant to the U.S. Department of Justice, Antitrust Division. Economic analysis of the competitive effects of Microsoft's bundling and contractual practices.

UNITED STATES DISTRICT COURT, WESTERN DISTRICT OF MISSOURI

Riverside Pipeline Company, et al. v. Panhandle Eastern Pipeline Company, 1998.

Economic analysis of Panhandle's interconnection policy and alleged Sherman Act violations.

UNITED STATES DISTRICT COURT, SOUTHERN DISTRICT OF TEXAS

Phillips Petroleum Company, et al. v. Heeremac, v.o.f., et al., 1998.

Economic analysis of damages arising from a price fixing conspiracy involving heavy-lift marine transportation.

UNITED STATES DISTRICT COURT, SOUTHERN DISTRICT OF NEW YORK

Barr Laboratories, Inc. v. Dupont Merck Pharmaceutical Company, 1998.

Economic analysis of damages resulting from the delayed introduction of a generic prescription drug.

NORTH CAROLINA UTILITIES COMMISSION

Docket No. P-100, Sub 133d, 1998.

Direct Testimony and Rebuttal Testimony on stranded costs in local telephony. Oral cross examination.

NATIONAL ENERGY BOARD, CANADA

Alliance Pipeline Application for a Certificate of Public Convenience and Necessity, 1998.

Economic analysis of the cost effectiveness and public interest implications of the proposed Alliance Pipeline in the Province of Canada.

STATE OF INDIANA UTILITY REGULATORY COMMISSION

In the Matter of the Commission Investigation and Generic Proceeding on GTE's Rates for Interconnection Service, Unbundled Network Elements, Transport and Termination Under the Telecommunications Act of 1996 and Related Indiana Statutes, Cause No. 40618, 1997.

Direct Testimony and Rebuttal Testimony on stranded costs. Oral cross-examination.

UNITED STATES DISTRICT COURT, EASTERN DISTRICT OF NEW YORK
FOX News Network, L.L.C. v. Time Warner, Inc., Time Warner Entertainment Company, L.P., Turner Broadcasting System, Inc. and R. E. "Ted" Turner III, 1997.
Economic analysis of issues pertaining to Sections 1 and 2 of the Sherman Act.

FEDERAL ENERGY REGULATORY COMMISSION
City of Las Cruces, New Mexico, Docket No. SC 97-2-000.
Economic analysis of stranded costs in the context of municipalization.

STATE OF PENNSYLVANIA, PENNSYLVANIA PUBLIC SERVICE COMMISSION
Application of PECO Energy Company for Approval of its Restructuring Plan Under Section 2806 of the Public Utility Code, 1997.
Economic analysis of a proposed code of conduct to govern the relationship between PECO's regulated wire business and its competitive, unregulated businesses.

FEDERAL COMMUNICATIONS COMMISSION
Application of Ameritech Michigan Pursuant to Section 271 of the Telecommunications Act of 1996 to Provide In-Region, InterLATA Services in Michigan, 1997.
Analysis of competition in long distance phone markets and the public interest benefits of Ameritech's entry.

FEDERAL ENERGY REGULATORY COMMISSION
Southern Natural Gas Company, Docket Nos. RP94-67-000, et al., 1997.
Economic analysis of the prudence of long-term gas contracts.

ARBITRATION PROCEEDINGS
Implementation of the Local Competition Provisions in the Telecommunications Act of 1996.
Expert report and oral testimony in thirteen arbitration proceedings in nine states, 1996.

STATE OF CALIFORNIA, PUBLIC UTILITIES COMMISSION
Rulemaking on the Commission's Own Motion to Govern Open Access to Bottleneck Services and establish a Framework for Network Architecture Development of Dominant Network Carriers. Docket No. R.93-4-003, 1996.
Economic analysis of proposed pricing rules.

FEDERAL COMMUNICATIONS COMMISSION
Implementation of the Local Competition Provisions in the Telecommunications Act of 1996, CC Docket No. 96-98, 1996.
Economic analysis of the pricing provisions of the Act. Empirical study and affidavit prepared on behalf of GTE Service Corporation.

STATE OF ILLINOIS, ILLINOIS COMMERCE COMMISSION
Petition for a Total Local Exchange Service Wholesale Tariff from Illinois Bell Telephone Company d/b/a Ameritech Illinois and Central Telephone Company Pursuant to Section 13-505.5 of the Illinois Public Utilities Act, Docket No. 95-0458, 1995.
Economic analysis of the pricing of wholesale telecommunication services.

STATE OF CALIFORNIA, PUBLIC UTILITIES COMMISSION

Order Instituting Rulemaking on the Commission's Own Motion into Competition For Local Exchange Carriers, 1995.

Economic analysis of proposed local competition rules, including whether the rules afford the local exchange carrier an opportunity to earn a fair return on invested capital.

STATE OF WISCONSIN, PUBLIC SERVICE COMMISSION

Investigation of the Appropriate Standards to Promote Effective Competition in the Local Exchange Market in Wisconsin, Docket No. 05-TI-138, 1995.

Economic analysis of regulatory policy for the establishment of competitive local telephone services, including the pricing of interconnection, unbundled network elements, and wholesale services.

STATE OF MICHIGAN, PUBLIC SERVICE COMMISSION

In the Matter, on the Commission's Own Motion, to Establish Permanent Interconnection Arrangements Between Basic Local Exchange Service Providers, 1995.

Economic analysis of the pricing of wholesale telecommunication services.

FEDERAL ENERGY REGULATORY COMMISSION

SFPP, L.P., Docket Nos. OR92-8-000, et al.

Economic analysis of proposed ratemaking method for oil pipeline, and assessment of business risk claims, 1995.

STATE OF CALIFORNIA, PUBLIC UTILITIES COMMISSION

In the Matter of Alternative Regulatory Frameworks for Local Exchange Carriers, Docket NO. I.87-11-003.

Economic analysis of customer presubscription for intraLATA toll services, 1995.

FEDERAL COMMUNICATIONS COMMISSION

In the Matter of Market Entry and Regulation of Foreign-Affiliated Entities, IB Docket No. 95-22

Economic analysis of competition in international outbound long distance markets, 1995.

UNITED STATES DISTRICT COURT, DISTRICT OF COLUMBIA

U.S. v. Western Electric, Inc. and AT&T, Civil Action No. 82-0192 (HHG)

Economic analysis of competition in California long distance telecommunications markets, 1994.

UNITED STATES DISTRICT COURT, DISTRICT OF COLUMBIA

U.S. v. AT&T Corp. and McCaw Cellular Communications, Inc.

Economic analysis of proposed merger, 1994.

UNITED STATES DISTRICT COURT, DISTRICT OF COLUMBIA

U.S. v. Western Electric, Inc. and AT&T, Civil Action No. 82-0192 (HHG)

Economic analysis of competition in long distance telecommunications, 1994

FEDERAL ENERGY REGULATORY COMMISSION

Stingray Pipeline Company Docket, No. RP94-301-000

Economic analysis regarding the pricing of interruptible transportation services, 1994.

STATE OF NEW YORK, PUBLIC SERVICE COMMISSION

P.S.C. Case Nos. 94-E-0098 and 94-E-009

Tariff Design for commercial and industrial electricity customers, 1994.

FEDERAL COMMUNICATIONS COMMISSION

PP Docket No. 93-253

Implementation of Section 309(j) of the Communications Act Competitive Bidding. Auction Design for Personal Communications Services, 1994.

FEDERAL ENERGY REGULATORY COMMISSION

Mojave Pipeline Docket, No. CP93-258-000

Economic analysis of bypass in the natural gas industry, 1993.

STATE OF CALIFORNIA, PUBLIC UTILITIES COMMISSION

Application of GTE California for Review of the Operations of Incentive Based Regulatory Framework Adopted in Decision 89-10-031.

Economic analysis related to the role of productivity in the price-cap formula, 1993.

FEDERAL ENERGY REGULATORY COMMISSION

Great Lakes Gas Transmission Limited Partnership, Docket No. RP 91-143-000

Prepared Direct and Rebuttal Testimonies. Economic analysis regarding the pricing of pipeline expansion projects, 1992.

MATTER OF ARBITRATION

Between ProGas Limited and Texas Eastern Transmission Corporation.

Economic analysis regarding the redetermination of a gas purchase contract, 1992.

U.S. DISTRICT COURT, NORTHERN DISTRICT OF ILLINOIS, EASTERN DIVISION

The Protectoseal Company v. Charles Barancik

Economic analysis pertaining to interlocking directorates, 1992.

INTERNATIONAL CHAMBER OF COMMERCE

Court of Arbitration, Paris, France

Panhandle Eastern Pipeline Company v. Northwest Alaskan Pipeline Company

Affidavit and arbitration testimony. Economic analysis regarding the redetermination of a gas purchase contract, 1992.

MATTER OF ARBITRATION

Between W&T Offshore, Inc. and Texas Eastern Transmission Corporation

Deposition and arbitration testimony. Economic analysis regarding the performance of a natural gas purchase contract, 1991.

FEDERAL ENERGY REGULATORY COMMISSION

Great Lakes Gas Transmission Limited Partnership, Docket No. RP 91-143-000

Prepared Direct Testimony. Economic analysis regarding the pricing of pipeline expansion projects, 1991.

SUPERIOR COURT OF THE STATE OF CALIFORNIA

City of Long Beach v. Pacific Refining Corporation

Deposition testimony and economic analysis of breach of contract claim, 1991.

FEDERAL ENERGY REGULATORY COMMISSION

Texas Eastern Transmission Corporation, Docket No. CP90-2154

Economic analysis of competition in the natural gas industry, 1991.

CANADIAN RADIO-TELECOMMUNICATIONS COMMISSION

Unitel and B.C. Rail/Lightel Applications to provide public long distance voice services and related resale and sharing issues.

Economic analysis of entry into the long-distance voice service market, 1991.

STATE OF ALASKA, DEPARTMENT OF REVENUE

Marathon Oil Company, Docket No. 89314

Economic analysis of alternative methods for valuing natural gas for severance tax purposes, 1990.

U.S. DISTRICT COURT, DISTRICT OF CONNECTICUT

Great Northern Nekoosa Corporation v. Georgia Pacific Corporation and NM Acquisition Corp., a wholly owned subsidiary of GP Corporation

Economic analysis of the proposed acquisition, 1989-1990.

PUBLIC UTILITIES COMMISSION, STATE OF CALIFORNIA

Southern California Edison Company and San Diego Gas and Electric Company, Docket No. CP88-12-035

Economic assistance to counsel during merger review, 1989.

U.S. DISTRICT COURT, WESTERN DISTRICT OF TEXAS

JJ - CC Limited v. Transwestern Pipeline Corporation and Enron Corporation

Economic analysis regarding the performance of a natural gas take-or-pay contract, 1988.

FEDERAL ENERGY REGULATORY COMMISSION

Mojave Pipeline Company, et al., Docket No. CP85-437-000

Economic analysis of the impact of bypass in a regulated natural gas market, 1987.

PUBLIC UTILITIES COMMISSION, STATE OF CALIFORNIA

Application of Southern California Gas Company for authority to sell and leaseback its Headquarters Property, Application No. 87-07-041

Economic analysis regarding the regulatory treatment of the sale and leaseback of headquarters property, 1987.

U.S. DISTRICT COURT, WESTERN DISTRICT OF NORTH CAROLINA
H. Deadwyler, et al. v. Volkswagen of America, Inc.
Econometric analysis of the lost resale value of automobiles with design flaws,
1987.

U.S. DISTRICT COURT, DISTRICT OF COLUMBIA
Joseph A. Albert, et al. v. General Motors Corporation
Economic analysis of damages, 1986.

U.S. INTERNATIONAL TRADE COMMISSION
Investigation No. 337-TA-194, Certain Aramid Fibers
Statistical analysis of titanium prices, 1985.

INTERSTATE COMMERCE COMMISSION
Santa Fe-Southern Pacific Corporation, Control, Docket No. 30400
Statistical analysis of stock market prices at the time of announced merger, 1985.

ARTICLES IN REFEREED JOURNALS

“Pricing Access to a Monopoly Input,” *Journal of Public Economic Theory*, 2001
(forthcoming) (with M.J. Doane, M.A. Williams, and S. Tsai).

“Having Your Cake: How to Preserve Universal-Service Cross Subsidies While
Facilitating Competitive Entry: A Response, *Yale Journal on Regulation*, (with David S.
Sibley and Michael A. Williams), Summer 1999.

“Transmission Access Pricing and ‘Non-Bypassable Competitive Transition Charges,”
Natural Resource Journal, (1997), Volume 37 (with Paul W. MacAvoy).

“Municipalization: Bypass and Opportunism in the U.S. Electric Utility Industry,”
Energy Law Journal, (1997), Volume 18, No. 2 (with Daniel F. Spulber).

“Forty Years of Regulatory Reform in the Natural Gas Industry,” *Oil and Gas Tax
Quarterly*, (1996), Volume 45, No. 1 (with Paul W. MacAvoy and Michael A. Williams).

“System Average Rates and Management Efficiency: A Statistical Benchmark Study of
U.S. Investor-Owned Electric Utilities,” *The Energy Journal*, (1996), Volume 17, No. 3
(with Ernst R. Berndt and Roy J. Epstein).

“Competitive Entry into Regulated Monopoly Services and the Resulting Problem of
Stranded Costs,” in *Humes Papers on Public Policy: Deregulation and Privatization in
the United States*, (1995) Volume 3, No.3, University of Edinburgh, Scotland, (with
Michael A. Williams).

“Evolution of the U.S. Spot Market for Natural Gas,” *Journal of Law & Economics*,
(1994) Volume XXXVII (2), (with D.F. Spulber). Also Kellogg Graduate School of
Management, Discussion Paper No. 91-48, Northwestern University. Invited paper
presented at the State of California Public Utilities Commission’s “En Banc Conference
on Natural Gas Procurement,” February 1992.

“Consumer Rationality and the Status Quo,” *Quarterly Journal of Economics*, (1991) February, (with R.S. Hartman and C.K. Woo).

“Status Quo Bias in the Measurement of Value of Service,” *Resources and Energy*, (1990) Vol. 12, (with R.S. Hartman and C.K. Woo) .

“Households’ Perceived Value of Electrical Service Reliability: An Analysis of Contingent Valuation Data,” *The Energy Journal*, (1988) Vol. 9, (with R.S. Hartman and C.K. Woo).

“Household Preference for Interruptible Rate Options and the Revealed Value of Electric Service Reliability,” *The Energy Journal*, (1988) Vol. 9, (with R.S. Hartman and C.K. Woo).

“The Use of Hedonic Analysis for Certification and Damage Calculations in Class Action Complaints,” *Journal of Law, Economics, and Organization*, (1987) Fall, (with R.S. Hartman).

“Taking the Con Out of Conservation Program Evaluation,” *Resources and Energy*, (1987) Vol. 9, (with R.S. Hartman). Also in *Papers and Proceedings of the 8th Annual North American Conference*, (1987) Massachusetts Institute of Technology.

“The Estimation of the Effects of Utility-Sponsored Conservation Programmes,” *Applied Economics*, (1986) January, (with R.S. Hartman) .

“Household Discount Rates Revisited,” *The Energy Journal*, (1986) Vol. 7, (with R.S. Hartman).

OTHER ARTICLES/WORKPAPERS/BOOK CHAPTERS

“Exclusionary Restrictions in U.S. vs. Microsoft,” (with David S. Sibley and A. Nayyar), *UWLA Law Review*, 2001.

“U.S. v. Microsoft: Were the Exclusionary Practices Anticompetitive” (with David S. Sibley), *Computer Industry Newsletter*, American Bar Association, Spring 2000, Vol. 5., No. 1.

“Electric Utility Rates and the Evaluation of Management Performance” (1995), *Electricity Journal*, August/September (with Ernst R. Berndt and Roy J. Epstein)

“Environmental Damages,” (1995) Book Chapter in *Litigation Services Handbook, Second Edition*, Edited by Roman Weil, Michael Wagner, and Peter Frank, John Wiley & Sons, Inc. New York, New York, (with Mark Egland).

“System Average Rates of U.S. Investor-Owned Electric Utilities: A Statistical Benchmark Study” (1995) Massachusetts Institute of Technology, Center for Energy and Public Policy Research, Working Paper, MIT-CEEPR 95-005WP (with Ernst R. Berndt and Roy J. Epstein).

“An Evaluation of Public Preferences for Superfund Site Cleanup (January 1995) ,” University of Colorado, Dept. of Economics, Working Paper, Presented at the American Economic Association, Annual Meetings, Washington, D.C.

“Design and Implementation of Electric Utility Curtailable Rate Programs,” (1990) Kellogg Graduate School of Management, Discussion Paper No. 90-30, Northwestern University, (with D.F. Spulber).

“Policy and Competitiveness Issues in California Long Distance Telephone Service Markets,” (December 94), Yale School of Management, Working Paper Series C, #39, Government-Business Relations, (with Paul W. MacAvoy and Michael A. Williams).

“Federal Energy Regulatory Commission Order 636: Divestiture Of Gas Ownership By The Pipelines As The Penultimate Regulatory Reform In The Natural Gas Industry,” (December 1994), Yale School of Organization and Management, Working Paper Series C, #38, (with Paul W. MacAvoy and Michael A. Williams).

PRESENTATIONS

“The Costs of Regulatory Delay in Pharmaceutical Drug Markets,” *Annual Conference of the American Legislative Exchange Council*, Nashville, Tennessee, 1999.

“The Effects of Partial Deregulation on Gas Transportation Charges,” *Conference on Deregulated Markets for Natural Gas*, John M. Olin Foundation Research Program for the Study of Markets and Regulatory Behavior, Yale School of Management, New Haven, October 1996.

“Renegotiating the Regulatory Contract: Opportunism, Municipalization and Bypass,” EEI Municipalization and Bypass Conference,” Washington, D.C., October 1996.

“Transmission Access Pricing and ‘Non-Bypassable’ Competitive Transition Charges,” University of New Mexico Law School, Invited Paper, July 1996.

“Comments on Phase II Proposed Decisions: Wholesale Rates Established by Local Exchange Carriers,” California Public Utilities Commission, All Party Ex Parte Meeting, February 1996.

“Competitive Entry Into Regulated Monopoly Services and the Resulting Problem of Stranded Costs,” *Conference on Deregulation and Privatization in the United States*, John M. Olin Foundation Research Program for the Study of Markets and Regulatory Behavior, Yale School of Management, New Haven, May 1995.

“On the State of Competition in Long Distance Telecommunication Markets,” Presented at Economic Round Table of San Francisco, April 1995.

“The Design and Implementation of Electricity Curtailment Programs,” presented at the *Journal of Regulatory Economics* Editors’ Conference, San Diego, October 1992.

“The Evolution of the U.S. Spot Market for Natural Gas,” presented at the 14th Annual International Association for Energy Economics’ North American Conference, New Orleans, October 1992.

“The Impact of Open-Access Regulation on the Geographic Scope of the Natural Gas Spot Market,” Presented at the Center for Regulatory Studies Conference: “At the Crossroads -- Restructuring the Natural Gas Industry,” Chicago, October 1991.

“Outage Costs as Design Criteria for Product Differentiation,” (with C.K. Woo) New Service Opportunities for Electric Utilities: Creating Differentiated Products, Symposium sponsored by the Electric Power Research Institute and the University of California, Berkeley, September 1990.

“Estimating the Welfare Loss of Electrical Power Outages Using Contingent Valuation Survey Methods,” presented at the Electric Power Research Institute Conference: New Dimensions in Pricing Electricity, Syracuse, NY, September 1988.

“The Contingent Market for Priority Electric Service,” (with B. Neenan), presented at Rutgers University’s Advanced Workshop in Regulation and Public Utility Economics, New Paltz, NY, May 1988.

“Taking the Con Out of Conservation Program Evaluation,” presented at the 8th Annual International Association of Energy Economists North American Conference, MIT, Cambridge, MA, 1987.

“Measuring the Impact of Utility Conservation Programs,” presented at the Electric Power Research Institute Symposium: Buildings and Their Energy Systems, Chicago, IL, 1985.

RESEARCH REPORTS

Renegotiating the Regulatory Contract: Opportunism, Municipalization and Bypass in the U.S. Electric Power Industry (with Daniel F. Spulber); prepared for the Edison Electric Institute, May 1997.

An Assessment of the Factors Affecting San Diego Gas & Electric Company’s Electric Rates, prepared for San Diego Gas & Electric Company, May 1995.

An Evaluation of Public Preferences for Superfund Site Cleanup, Volume 1: A Preliminary Assessment (with W. Schulze, et al.). USEPA Cooperative Agreement # CR-821980, Office of Policy, Planning and Evaluation, U.S. Environmental Protection Agency, March 1994.

An Evaluation of Public Preferences for Superfund Site Cleanup, Volume 2: Pilot Study (with W. Schulze, et al.). USEPA Cooperative Agreement # CR-821980, Office of Policy, Planning and Evaluation, U.S. Environmental Protection Agency, March 1994.

Recommended Rate Redesign for the SC-3 and SC-3A Service Classes, prepared for Niagara Mohawk Power Corporation, 1993.

Analysis of the Electricity Tariffs of the Comision Federal de Electricidad, prepared for Secretary of Energy, Mines, and State Industries (SEMIP), 1993.

The Market for Electric Power in Niagara Mohawk Power Corporation's Service Territory, prepared for Niagara Mohawk Power Corporation, 1993.

Industrial Outage Cost Survey (with D. McClland, W. Schulze and C.K. Woo), prepared for Niagara Mohawk Power Corporation, 1990.

Residential Outage Cost Survey (with D. McClland, W. Schulze and C.K. Woo), prepared for Niagara Mohawk Power Corporation, 1990.

Recommended Approach for Collecting Data on Outage Cost and the Value of Service Reliability (with R.S. Hartman, W. Schulze and C.K. Woo), prepared for Niagara Mohawk Power Corporation, 1988.

A Review of Electricity Demand Price Elasticity Estimates, prepared for Southern California Edison Company, (with D. Aigner and E. Berndt), 1988.

An Econometric Analysis of Customer Subscription to the E20 Interruptible Rate, prepared for Pacific Gas and Electric Company, (with C.K. Woo), 1988.

An Analysis of the Determinants Space Heating Fuel Choice, prepared for Brooklyn Union Gas Company under subcontract to Opinion Research Corp., January 1988.

Recent Contributions to the Theory and Measurement of Customer Value of Service Reliability, prepared for Niagara Mohawk Power Corp., September 1987.

The Determinants of Savingpower Audit Participation: An Analysis of the Market for Home Energy Audits, prepared for Niagara Mohawk Power Corp., April 1986.

An Analysis of Space Heating Fuel Choice in the Homeowner Replacement and New Construction Markets, prepared for the American Gas Association, May 1986.

A Survey of Residential Outage Costs, prepared for Pacific Gas and Electric Company under subcontract to Meta Systems, Inc., (with A. Sanghi and K. Van Lier) December 1986.

An Analysis of the Fuel Choice Decisions of Commercial Firms, prepared for Boston Gas Company under subcontract to Arthur D. Little, Inc., 1985.

A Critical Review of the Maryland Power Plant Siting Commission's Econometric Electricity and Natural Gas Demand Forecasting Models, prepared for the Maryland Power Plant Siting Commission, 1985.

Measuring the Impact of Residential Conservation, Volume II: An Econometric Analysis of Portland Electric Company Data, (with R.S. Hartman) prepared for the Electric Power Research Institute, EA-3606, September 1984.

Measuring the Impact of Residential Conservation, Volume III: An Econometric Analysis of General Public Utilities Data, (with R.S. Hartman), prepared for the Electric Power Research Institute, EA-3606, September 1984.

Measuring the Impact of Residential Conservation, Volume IV: An Evaluation of Alternative Methods, (with R.S. Hartman), prepared for the Electric Power Research Institute, EA-3606, September 1984.

Electricity and Natural Gas Conservation Potential in the San Diego Gas and Electric Company Service Area, prepared for San Diego Gas and Electric Company before the California Public Utilities Commission, 1982.

Southern California Edison Projections of Conservation Goals: 1982-1986, prepared for Southern California Edison Company before the California Public Utilities Commission, October 1981.

Forecasting the Peak Demand for Residential Natural Gas, prepared for Pacific Gas and Electric Company, 1980.

REFeree

The Energy Journal, Journal of Economics and Management Strategy, and Science.

Exhibit MJD-2

**Massachusetts Business Line Provision by Wire Center
(May 2001)**

[PROPRIETARY]

Exhibit MJD-3
Competitive Service Providers by Wire Center
(May 2001)

[PROPRIETARY]