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August 13, 2001

Magalie R. Salas, Esq.
Secretary
Federal Communications Commission
445 12th Street, S.W.
Washington, DC 20554

Re: CC Docket Nos. 00-218 & 00-251
In the Matter of Petition of AT&T Communications of Virginia, Inc., TCG Virginia, Inc., ACC National Telecom Corp., MediaOne of Virginia and MediaOne Telecommunications of Virginia, Inc. for Arbitration of an Interconnection Agreement With Verizon Virginia, Inc. Pursuant to Section 252(e)(5) of the Telecommunications Act of 1996

In the Matter of Petition of WorldCom, Inc. Pursuant to Section 252(e)(5) of the Communications Act for Expedited Preemption of the Jurisdiction of the CC Docket No. 00-218 Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia Inc., and for Expedited Arbitration

Dear Ms. Salas:

It has recently come to our attention that the paper copies of the Direct Testimony of Terry Murray, filed on behalf of AT&T and WorldCom on July 31, 2001, did not include the last page, page 60. The electronic copies of the testimony were complete.

To insure your files are complete, enclosed please find an original and three paper copies of the Direct Testimony of Terry Murray, including page 60.

Thank you for your attention to this matter.

Sincerely yours,

Mark Keffer
Allen Freifeld

cc: Service List

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

In the Matter of	)	
Petition of AT&T Communications	)	
of Virginia, Inc., Pursuant	)	
to Section 252(e)(5) of the	)	
Communications Act, for Preemption	)	**CC Docket No. 00-251**
of the Jurisdiction of the Virginia	)	
State Corporation Commission	)	
Regarding Interconnection Disputes	)	
with Verizon-Virginia, Inc.	)	
	)	

CERTIFICATE OF SERVICE

I hereby certify that on this 13th day of August, 2001, a copy of this letter and a complete paper copy of the Direct Testimony of Terry Murray was hand delivered or sent via overnight delivery to:

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Before the
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Washington, D.C. 20554

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In the Matter of Petition of WorldCom, Inc. Pursuant To Section 252 (e)(5) of the Communications Act for Expedited Preemption of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes With Verizon Virginia, Inc., and for Expedited Arbitration	)	CC Docket No. 00-218
In the Matter of Petition of Cox Virginia Telecom, Inc. Pursuant to Section 252 (e)(5) of the Communications Act for Preemption Of the Jurisdiction of the Virginia State Corporation Commission Regarding Interconnection Disputes with Verizon Virginia, Inc. and for Arbitration	)	CC Docket No. 00-249
In the Matter of Petition of AT&T Communications Virginia Inc., Pursuant to Section 252 (e)(5) of the Communications Act for Preemption of the Jurisdiction of the Virginia Corporate Commission Regarding Interconnection Disputes with Verizon Virginia, Inc.	)	CC Docket No. 00-251

DIRECT TESTIMONY OF TERRY L. MURRAY

ON BEHALF OF AT&T AND WORLDCOM, INC.

JULY 31, 2001

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Exhibit (TLM-1): Curriculum Vitae of Terry L. Murray

1 **I. INTRODUCTION AND SUMMARY**

2 **Q. PLEASE STATE YOUR NAME, TITLE AND BUSINESS ADDRESS.**

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

5 **Q. PLEASE DESCRIBE YOUR QUALIFICATIONS AND EXPERIENCE AS**
6 **THEY RELATE TO THIS PROCEEDING.**

7 A. I am an economist specializing in analysis of regulated industries. I received an
8 M.A. and M.Phil. in Economics from Yale University and an A.B. in Economics
9 from Oberlin College. At Yale, I was admitted to doctoral candidacy and
10 completed all requirements for the Ph.D. except the dissertation. My fields of
11 concentration at Yale were industrial organization (including an emphasis on
12 regulatory and antitrust economics) and energy and environmental economics.
13 My professional background includes employment and consulting
14 experiences in the fields of telecommunications, energy and insurance regulation.
15 As a consultant, I have testified or served as an expert on telecommunications
16 issues in proceedings before state regulatory commissions in California,
17 Connecticut, Delaware, the District of Columbia, Florida, Georgia, Hawaii,
18 Illinois, Kansas, Maryland, Massachusetts, Michigan, Missouri, Nevada, New
19 Jersey, New York, North Carolina, Oklahoma, Oregon, Pennsylvania, South
20 Carolina, Texas, Virginia, Washington and Wisconsin, and before the Federal
21 Communications Commission ("Commission"). My testimony in these

proceedings has concerned such issues as costing and pricing for retail services, unbundled network elements and interconnection; universal service policy; competition policy (including policy toward proposed mergers); and incentive regulation. My curriculum vitae, attached as Exhibit (TLM-1) to this testimony, provides more detail concerning my qualifications and experience.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY IN THIS PROCEEDING?

A. AT&T Communications of Virginia, Inc.,[1] ("AT&T") and WorldCom, Inc. ("WorldCom") have asked me to address economic issues relating to the modeling of recurring and nonrecurring costs for unbundled network elements and the establishment of cost-based prices for these elements. Based on my analysis, I have reached the following conclusions:

- As this Commission has already concluded for itself, both recurring and nonrecurring prices for unbundled network elements should reflect forward-looking economic costs. Forward-looking economic cost is the cost standard that would prevail in a competitive market. Moreover, prices based on forward-looking economic cost are nondiscriminatory in that all competitors, including Verizon, will face the same cost for use of

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1 This Affidavit is presented on behalf of AT&T Communications of Virginia, Inc., TCG Virginia, Inc., ACC National Telecom Corp., MediaOne of Virginia and MediaOne Telecommunications of Virginia, Inc. (together, "AT&T").

comparable network functionality. Finally, prices based on forward-looking economic costs give providers an incentive to realize efficiencies and thereby to reduce costs.

- This Commission has previously adopted a Synthesis Model that embodies forward-looking economic cost concepts and applies them to the modeling of incumbent local exchange carrier network costs. As this Commission is well aware, the same forward-looking economic cost concepts apply to the modeling of costs for unbundled network elements. Moreover, incumbent local exchange carriers provide unbundled network elements over the same network that they use to provide universal service. Therefore, the Synthesis Model provides a reasonable starting point for developing costs for unbundled network elements.
- The "cost objects" being modeled in this arbitration proceeding are wholesale unbundled network elements, not retail local exchange service. Therefore, the Synthesis Model must be adjusted to reflect this change in "cost objects" before it can be used to produce estimates of the cost of unbundled network elements.
- Furthermore, the unbundled network elements at issue are those that Verizon Virginia provides to competitors such as AT&T and WorldCom. Therefore, the Synthesis Model inputs and assumptions need to be closely examined to ensure that the model results reflect Virginia-specific input

values and assumptions *to the extent that an efficient carrier would make different forward-looking choices, given Virginia-specific conditions, from the choices reflected in the nationwide input values and assumptions that this Commission previously adopted for use in calculating universal service costs.*

- I understand that AT&T and WorldCom have reviewed these aspects of the Synthesis Model and have made the modifications deemed necessary to reflect the change of cost object from universal service to unbundled network elements and to incorporate current conditions in Virginia. Therefore, the results that AT&T/WorldCom witness Brian F. Pitkin sponsors in his accompanying testimony provide an appropriate basis for setting cost-based recurring prices for unbundled network elements.
- The Commission should ensure that it adopts a recurring price structure for unbundled switching that reasonably reflects Verizon's capacity-driven cost structure. A price structure that mimics the incumbent's underlying cost structure best promotes fair competition between Verizon and entrants using unbundled switching.
- To avoid unnecessary barriers to entry, the Commission should adopt prices that reflect the distinctions between recurring and nonrecurring costs inherent in the Synthesis Model and the AT&T/WorldCom Nonrecurring Cost Model ("NRCM").

- The nonrecurring cost estimates that the NRCM produces reasonably reflect forward-looking economic cost principles. Therefore, the results that AT&T/WorldCom witness Richard Walsh sponsors in his accompanying testimony provide an appropriate basis for setting cost-based nonrecurring prices for unbundled network elements.
- The Commission should not permit Verizon to impose any explicit charge for loop "conditioning" because the cost-based prices that AT&T and WorldCom are proposing for unbundled loops are sufficient to recover the full forward-looking economic cost of the function of providing "conditioned" loops.
- If the Commission permits Verizon to assess any charge whatsoever for access to loop makeup information, that charge should be very close to $0 because the forward-looking economic cost of providing access to such information is *de minimis*.

The remainder of my testimony explains the basis for each of these conclusions.

1 **II. THE COMMISSION SHOULD SET RECURRING AND NON-**
2 **RECURRING PRICES FOR UNBUNDLED NETWORK ELEMENTS**
3 **THAT ARE COST-BASED AND NON-DISCRIMINATORY.**

4 **Q. THE COMMISSION WILL ESTABLISH RECURRING AND NON-**
5 **RECURRING CHARGES FOR UNBUNDLED ELEMENTS IN THIS**
6 **PROCEEDING. WHAT ECONOMIC PRINCIPLE OR PRINCIPLES**
7 **SHOULD GUIDE THE COMMISSION IN SETTING THESE PRICES?**

8 A. Two key principles should guide the Commission in establishing costs and setting
9 prices for unbundled network elements.

10 First, as is consistent with the Commission's Total Element Long Run
11 Incremental Cost ("TELRIC") methodology, the prices for unbundled network
12 elements should mimic the prices that would prevail if Verizon sold the same
13 functionalities in a competitive market. Competitive market forces would drive
14 prices down to efficient forward-looking economic costs. Thus, to allow all
15 providers of local exchange service to purchase inputs as if they were doing so in
16 a competitive market, the Commission should establish prices for unbundled
17 network elements that do not exceed forward-looking economic costs.

18 The Commission should also ensure that the price structures reflect cost
19 causation. For example, if the cost of a function does not vary with the level of
20 usage, then the price for that function should not be usage-based. Similarly, if the
21 cost of a function is a recurring cost, then the price for that function should not be
22 a one-time, nonrecurring charge.

23 Second, the prices for unbundled network elements should be non-
24 discriminatory. In other words, the Commission should establish prices that

1 prevent Verizon from leveraging its monopoly control over local exchange
2 facilities and central office locations to gain a competitive advantage over new
3 entrants. To ensure non-discrimination, the prices for unbundled network
4 elements should not exceed the costs that Verizon itself bears for comparable uses
5 of network functionalities.

6 **Q. WHAT DO YOU MEAN BY "FORWARD-LOOKING ECONOMIC**
7 **COSTS"?**

8 A. By forward-looking economic costs, I mean the forward-looking cost over the
9 long run of the total quantity of the facilities and functions that are directly
10 attributable to, or reasonably identifiable as incremental to, each unbundled
11 network element, holding constant the incumbent local exchange carrier's
12 provision of other elements. This definition corresponds to the Commission's
13 conceptual definition of its TELRIC methodology as reflected in 47 C.F.R.
14 § 51.505(b).

15 The total quantity of facilities should include existing and reasonably
16 foreseeable demand for all uses of each element. In other words, the network
17 modeled should be one that has sufficient capacity to supply all existing demand
18 for all uses of each element, taking into account constraints such as the lumpiness
19 of investment and the need for a limited amount of spare capacity to allow for
20 defective equipment and some "churn" in the locations at which demand will
21 occur. "Growth" spare should not be reflected in the sizing of the network except
22 to the extent that placing such spare capacity today results in lower costs, on a net

present value basis, than would placing the capacity at the time at which it is needed to fulfill demand. If any "growth" spare is included in sizing the network, the total quantity of demand over which costs are unitized must reflect both the current and "growth" demand, so that current customers do not subsidize the costs of providing plant for future customers.

Q. IF THE COMMISSION BASES PRICES ON FORWARD-LOOKING ECONOMIC COSTS RATHER THAN "ACTUAL" EMBEDDED COSTS, WILL VERIZON RECEIVE ADEQUATE COMPENSATION FOR THE RISKS THAT IT INCURS IN PROVIDING UNBUNDLED NETWORK ELEMENTS?

A. Yes. Basing prices on forward-looking economic costs will provide adequate compensation to Verizon because Verizon will receive the compensation that a firm in a competitive market would receive. A firm that can recover all of its long run forward-looking economic costs but no more is a firm that can remain in business even in the long run. Such a firm is able to attract the capital necessary to replace its plant and equipment as it becomes economically obsolete, and to grow if the market is growing or if not all of the other firms with which it competes can match the efficiency of the firm in question. Capital markets see that such a firm can recover the costs that will prevail in that particular market even under the most rigorous of competitive conditions. Thus, capital markets view prices that are set at forward-looking long-run economic costs as being fully compensatory.

1 Firms in competitive markets have no *guarantee* that they will recover all
2 of their costs. Instead, they have an *opportunity* to recover all of their costs *if* they
3 are efficient providers of services and/or facilities. To the extent that Verizon's
4 "actual" embedded costs exceed the efficient, forward-looking, long-run costs of
5 unbundled network elements, these are costs caused by its inefficiency, and not
6 costs that should be borne by the new entrants that purchase network elements
7 from Verizon.

8 Forward-looking economic costs include a cost of capital that reflects the
9 return that investors demand to compensate them for the risk associated with
10 investments. If Verizon were *guaranteed* recovery of its "actual" embedded costs,
11 then the appropriate cost of capital for use in a cost study for unbundled network
12 elements would be much closer to a risk-free cost of capital than to the market-
13 based cost that AT&T/WorldCom witness John M. Hirshleifer proposes that the
14 Commission use to establish cost-based prices for unbundled network elements.

15 III. THE SYNTHESIS MODEL, AS MODIFIED BY AT&T AND 16 WORLDCOM, PROVIDES FORWARD-LOOKING ECONOMIC COST 17 ESTIMATES OF THE RECURRING COSTS OF UNBUNDLED 18 NETWORK ELEMENTS.

19 **Q. WHAT INFORMATION DO YOU RECOMMEND THAT THE**
20 **COMMISSION USE TO SET RECURRING PRICES FOR UNBUNDLED**
21 **NETWORK ELEMENTS THAT BEST REFLECT VERIZON'S**
22 **CURRENT FORWARD-LOOKING ECONOMIC COSTS?**

23 A. I recommend that the Commission base recurring prices for Verizon's unbundled
24 network elements on the recurring costs that AT&T/WorldCom witness Mr.

1 Pitkin presents in his testimony. Mr. Pitkin determined these costs using a
2 version of the Synthesis Model, adapted for use in calculating unbundled network
3 element costs.

4 With reasonable modifications to produce state-specific results and to
5 report results for UNEs instead of universal service, the Synthesis Model is an
6 appropriate vehicle on which to base forward-looking economic cost estimates.
7 As the Commission is well aware, it selected that Model after an extensive review
8 of alternative cost models of non-rural incumbent local exchange carrier networks.
9 Parties to the Commission's universal service proceeding that developed the
10 Synthesis Model included a broad and nearly all-inclusive array of incumbent
11 local exchange carriers and their competitors, plus a significant number of
12 consumer advocates, state regulatory commissions and other interested parties.
13 This wide-ranging participation ensured that virtually every possible issue that
14 could arise in the context of an engineering economic model of non-rural
15 incumbent local exchange carrier networks was aired in the publc record.

16 The Commission applied forward-looking economic cost principles in
17 evaluating the various models and in melding their best features to develop the

1 Synthesis Model.[2] The Commission has already concluded that the Synthesis
2 Model "generates reasonably accurate estimates of forward-looking costs."[3]

3 **Q. ARE YOU SUGGESTING THAT THE FCC EVALUATED THE USE OF**
4 **THE SYNTHESIS MODEL AS THE BASIS FOR UNE COSTS AND**
5 **PRICES?**

6 A. No. However, the forward-looking economic cost criteria that the Commission
7 applied in developing the Synthesis Model for universal service purposes are
8 consistent with and largely identical to the forward-looking economic cost criteria
9 that the Commission has adopted for unbundled network elements. Indeed, in
10 adopting its forward-looking cost methodology for universal service, the
11 Commission specifically noted the desirability of using the same methodology
12 and cost basis for both universal service support calculations and permanent
13 prices for unbundled network elements.[4]

14 The Commission did caution that the *nationwide input values* used in the
15 Synthesis Model to calculate federal universal service support may not be

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2 In the Matter of Federal-State Joint Board on Universal Service, CC Docket No. 96-45 and Forward-Looking Mechanism for High Cost Support for Non-Rural LECs, CC Docket No. 97-160, FCC 99-304, adopted October 21, 1999 ("Inputs Order") at ¶¶ 21-22, footnotes omitted.

3 *Id.* at ¶ 23.

4 Report and Order, In the Matter of Federal-State Joint Board on Universal Service, CC. Docket No. 96-45, adopted May 7, 1997, at ¶ 251. The FCC described its forward-looking cost methodology for universal service in the preceding paragraph of that order.

appropriate for other purposes, such as determining prices for unbundled network elements.[5] Nevertheless, the Commission subsequently has made use of the Synthesis Model to "benchmark" the appropriateness of the relative prices for unbundled loops and switching in two recent orders addressing applications for interLATA authority under Section 271 of the Telecommunications Act of 1996.[6]

Q. DOES THE MANNER IN WHICH AT&T AND WORLDCOM HAVE USED THE SYNTHESIS MODEL IN THIS PROCEEDING PRODUCE COSTS THAT ARE AN APPROPRIATE BASIS FOR PRICING UNBUNDLED NETWORK ELEMENTS?

A. Yes. The results that Mr. Pitkin reports are not merely the outputs that one would obtain using the nationwide input values that the Commission adopted for universal service purposes. Instead, the results reflect a variety of Virginia-specific inputs. Subject-matter experts assessed the default Synthesis Model inputs and determined which of those inputs should be replaced with state-specific values.

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5 Inputs Order at ¶ 32.

6 In the Matter of Joint Application by SBC Communications Inc., Southwestern Bell Telephone Company, and Southwestern Bell Communications Services, Inc., d/b/a Southwestern Bell Long Distance for Provision of In-Region, InterLATA Services in Kansas and Oklahoma, CC Docket No. 00-217, released January 22, 2001, at ¶ 84; In the Matter of Application of Verizon New England Inc., Bell Atlantic Communications, Inc. (d/b/a Verizon Long Distance), NYNEX Long Distance Company (d/b/a Verizon Enterprise Solutions) and Verizon Global Networks Inc., for Authorization to Provide In-Region, InterLATA Services in Massachusetts, CC Docket No. 01-09, released April 16, 2001, at ¶¶ 22-23.

1 Also, as Mr. Pitkin explains in his testimony, certain of the Synthesis
2 Model expense calculations require modification to identify the expenses
3 associated with wholesale unbundled network elements, rather than retail
4 universal service. The modifications that Mr. Pitkin has performed remove retail-
5 related expenses, identify certain general support costs with specific unbundled
6 network elements to the extent that precise attribution is possible and add a
7 wholesale-only markup for overhead expenses to the various UNEs. In addition,
8 Mr. Pitkin has adjusted Synthesis Model loop investment calculation to ensure
9 that high capacity service line counts do not result in an under-assignment of
10 facility costs to the basic loop UNE. I have reviewed the methodology that Mr.
11 Pitkin used in making these modifications to the Synthesis Model and find that
12 the modifications are consistent with forward-looking economic cost principles.

13 **IV. THE COMMISSION SHOULD ADOPT A PRICE STRUCTURE FOR**
14 **UNBUNDLED SWITCHING THAT REFLECTS VERIZON'S CAPACITY-**
15 **DRIVEN COST STRUCTURE.**

16 **Q. SHOULD PRICES REFLECT THE UNDERLYING COST STRUCTURE**
17 **THAT VERIZON DOES OR WOULD FACE IF IT OPERATED**
18 **EFFICIENTLY?**

19 A. Yes. UNE prices should accurately reflect the structure of Verizon's forward-
20 looking economic costs, not just the average level of those costs. Price structures
21 that are not cost-based lead to less efficient outcomes and fewer benefits for
22 consumers. Moreover, price structures that do not track the incumbent's
23 underlying cost structure create the potential for unfair competition.

The Commission has previously addressed similar issues in the context of geographically deaveraged prices for unbundled loops. In this proceeding, I urge the Commission to address the match between price structures and cost structures in the context of unbundled switching.

Q. WHAT IS VERIZON'S UNDERLYING COST STRUCTURE FOR UNBUNDLED SWITCHING?

A. As AT&T/WorldCom witness Catherine E. Pitts explains, Verizon's switching costs are, for the most part, capacity-related costs. The primary driver of the non-traffic-sensitive ("NTS") portion of Verizon's switching costs is the number of switch ports that Verizon serves either for its own end-users or on behalf of competitors that purchase unbundled switching from Verizon. To the extent that the remaining costs are traffic-sensitive, Ms. Pitts makes clear that those costs would be caused by the need to serve *peak* minutes of use. In other words, Verizon's switching *cost* structure is largely a per-line or per-port cost structure.

Peak-period usage can cause Verizon to incur additional switching costs. As I will discuss further below, this does not mean that a rate structure relying on minute-of-use charges accurately reflects Verizon's switching costs.

Q. SHOULD PRICES REFLECT THE UNDERLYING COST STRUCTURE THAT VERIZON DOES OR WOULD FACE IF IT OPERATED EFFICIENTLY?

A. Yes. A price structure that departs from the structure of efficient, forward-looking economic costs can lead to over- or underconsumption of Verizon's unbundled switching and over- or underrecovery of Verizon's costs.

Verizon's UNE price structure becomes the true cost structure of the competitors that purchase UNEs from Verizon. Thus, if those competitors set cost-based prices for the retail services that they offer to Virginia consumers to reflect UNE prices that do not reflect the structure of Verizon's forward-looking economic cost, the competitors' retail prices will send consumers the wrong message about the costs that the consumers' decisions cause Verizon to incur. For example, the competitors may pass along Verizon's switching usage charges as per-minute charges to end users. Positive prices for usage may lead customers to make fewer or shorter calls in off-peak periods when Verizon incurs few, if any, usage-related costs to provide switching to the customer's retail service provider.

Similarly, positive prices for usage or features when Verizon incurs no incremental cost to supply those rate elements can lead to substantial overrecovery of forward-looking economic costs. The substantial growth in switching usage over several years provides an instructive example of the potential for such overrecovery. Assume that Verizon's prices for unbundled switching would have exactly recovered all of its forward-looking economic costs at, *e.g.*, 1996 volumes, but that its price structure reflected a significant level of

costs that are actually incurred on a per-port basis as usage sensitive. Also assume that Verizon's true forward-looking economic costs for each rate element did not change from 1996 to 2000 and that only the volumes for switching usage changed. Under these assumptions, Verizon would recover more than its total forward-looking economic cost for switching if it sold all of its switched minutes of use in 2000 at the prices that were accurate based on 1996 data. The possibility of overrecovery under real-world conditions demonstrates the competitive significance of rate structures. Improper volume-sensitive pricing creates potential windfalls for Verizon and can severely deter competitive entry.

For all of these reasons, UNE prices should accurately reflect the structure of Verizon's forward-looking economic costs, not just the average level of those costs. Price structures that are not cost-based lead to less efficient outcomes and fewer benefits for consumers.

Q. CAN THE COMMISSION APPLY THE COSTS THAT MR. PITKIN IS SPONSORING TO DEVELOP A REASONABLE COST-BASED RATE STRUCTURE FOR UNBUNDLED SWITCHING?

A. The Commission can apply the costs that Mr. Pitkin is sponsoring to develop unbundled switching prices; however, the costs that Mr. Pitkin reports for unbundled switching require some additional explanation and consideration before the Commission can develop an appropriate cost-based rate structure for this element.

Mr. Pitkin's output reports both traffic-sensitive and non-traffic-sensitive switching costs. Again, recall that the "traffic-sensitive" switching costs are primarily capacity costs driven by peak usage. To assist the Commission in developing prices for unbundled switching, his output states the switching costs in two formats: first, a more traditional format in which the total non-traffic-sensitive switching cost is reported on a per-switch-port basis and the total traffic-sensitive switching cost is reported on an average per minute-of-use basis; and second, a format in which the total cost for unbundled switching is reported on a per-switch-port basis.

Q. WHICH OF THESE FORMATS REFLECTS THE MANNER IN WHICH VERIZON ACTUALLY INCURS FORWARD-LOOKING SWITCHING COSTS?

A. Neither format precisely captures the manner in which Verizon actually incurs switching costs, although both formats provide a reasonable basis for cost recovery of Verizon's non-traffic-sensitive switching costs. These non-traffic-sensitive costs are reported as per-port costs in both of Mr. Pitkin's reporting formats. This treatment of non-traffic-sensitive switching costs comports with Ms. Pitts' analysis of cost causation for Verizon's "getting started" costs and appropriately captures all other port-driven costs. The cost of vertical features is included in the port cost in both reporting formats.

The statement of Verizon's traffic-sensitive switching costs on a unit cost basis presents a more difficult problem.

The "correct" way to report these traffic-sensitive costs — that is, the reporting that would best reflect cost causation — would be to assign capacity costs across usage at different times of the day and different days of the year based on the likelihood of a peak occurring at that time. Each of Verizon's switches would have a different distribution of likely peaks, so the cost output of the Synthesis Model would have to be calculated differently for each switch. The public data available to AT&T and WorldCom do not enable us to unitize Verizon's peak-driven switching costs in a manner that precisely reflects cost causation. Furthermore, unless Verizon were to charge different prices for use of each of its switches, the Commission would still be faced with the problem of how to aggregate the capacity costs for the individual switches into a meaningful statewide average for Verizon.

As a practical solution to this problem, Mr. Pitkin has shown two alternatives for unitizing Verizon's traffic-sensitive costs. One method spreads the peak-driven costs over *all* minutes-of-use; the other spreads the peak-driven costs over *all* switch ports.

Q. WHAT PRICE STRUCTURE WOULD BEST REFLECT VERIZON'S UNDERLYING COST STRUCTURE?

A. The best rate design to recover Verizon's non-traffic-sensitive switching costs is a flat-rated port charge. The best rate design to recover Verizon's traffic-sensitive switching costs is less straightforward because the available cost data do not precisely match Verizon's underlying cost structure.

At first blush, it might appear that traffic-sensitive costs should be recovered through a usage-based price. That conclusion does not necessarily follow, however, when the traffic-sensitive costs are peak-driven (as is the case for Verizon's switching costs) and the usage-based price is applied to *all* usage, off-peak as well as peak.

A price structure that recovers peak- or capacity-driven costs by spreading those costs over all minutes of use would not accurately reflect the structure of Verizon's forward-looking economic costs. As the Commission recently observed in the context of reciprocal compensation, "[t]o the extent that transport and termination costs are capacity-driven, moreover, virtually any minute-of-use rate will overestimate the cost of handling an additional call whenever a carrier is operating below peak capacity."[7] This observation applies equally well to all of Verizon's peak-driven costs for unbundled switching.

Q. WHAT CONSEQUENCES WOULD FOLLOW FROM USAGE PRICES THAT OVERSTATE THE COST OF OFF-PEAK MINUTES?

A. As I noted above, recovery of peak-driven costs through average minute-of-use prices can lead to underconsumption of Verizon's unbundled switching in off-peak periods and overrecovery of Verizon's costs. Moreover, an average minute-

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7 In the Matter of Implementation of the Local Competition Provisions in the Telecommunications Act of 1996 and In the Matter of Intercarrier Compensation for ISP-Bound Traffic, CC Dockets No. 96-98 and 99-68, FCC 01-131, released April 27, 2001, at ¶ 76.

of-use price structure for Verizon's peak-driven costs could give Verizon an unfair competitive advantage over new entrants that purchase unbundled switching.

All of these undesirable consequences flow from one uncontrovertible fact: Verizon's UNE price structure is, for the competitors that purchase UNEs from Verizon, the competitors' cost structure.[8] A competitor that must pay Verizon usage-based charges for all minutes of use incurs real off-peak usage costs, even though Verizon itself incurs little or no cost for off-peak switching.

Q. PLEASE EXPLAIN HOW A MINUTE-OF-USE PRICE TO RECOVER PEAK-DRIVEN COSTS COULD LEAD TO UNDERCONSUMPTION OF SWITCHING AND OVERRECOVERY OF VERIZON'S COSTS.

A. The following example illustrates how a minute-of-use price to recover peak-driven costs could lead to underconsumption of off-peak switching and overrecovery of Verizon's costs. Assume that a new entrant buys the UNE platform from Verizon and pays a usage-based price for all minutes of use. Assume also that the new entrant charges its retail customers prices that reflect the structure of the competitor's costs. In that case, the new entrant would pass through Verizon's switching usage charges as per-minute charges to end users.

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8 Of course, a complete analysis of the economic welfare implications of switching rate designs would have to consider the underlying cost structure to the switch vendor, as well as Verizon's and the competitor's cost and price structure. The discussion in this testimony takes Verizon's cost structure as a given and addresses the question of how to translate this cost structure into prices.

1 Positive prices for usage may lead customers to make fewer or shorter calls in off-
2 peak periods when Verizon incurs little, if any, traffic-sensitive costs to provide
3 switching to the customer's retail service provider.

4 The Commission has recognized this problem in the context of intercarrier
5 compensation. In its recent Notice of Proposed Rulemaking, the Commission
6 described the problem as follows:

7 Because these traffic-sensitive termination charges represent real
8 marginal costs to the carrier that pays them, they impose pressure
9 on the calling party's carrier to flow these costs through to end-
10 user customers and to adopt traffic-sensitive retail prices. If the
11 underlying network costs are non-traffic sensitive, however, then
12 these traffic-sensitive retail rates will reduce network usage to
13 inefficient levels.[9]

14 Similarly, positive prices for usage when Verizon incurs little or no
15 incremental cost to supply those rate elements can lead to substantial
16 overrecovery of forward-looking economic costs. Uneconomic usage-sensitive
17 pricing creates windfalls for Verizon.

18 Such pricing also gives Verizon an unfair advantage in offering services
19 that include switched minutes-of-use by inflating its competitors' off-peak
20 switching costs relative to those of Verizon. Anyone familiar with cellular and
21 PCS pricing plans can easily imagine Verizon offering a local exchange service

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[9] Notice of Proposed Rulemaking in CC Docket No. 01-92, *In the Matter of Developing a Unified Intercarrier Compensation Regime*, released April 27, 2001, at ¶ 17.

with a flat rate just sufficient to recover loop and retail-related costs, a per-minute charge only for peak-period minutes and unlimited off-peak calling without any additional charge. A competitor that must pay Verizon a positive price for every off-peak minute would have difficulty matching Verizon's price, even though the underlying cost to Verizon of supplying off-peak switching to the competitor would be equal to the cost that Verizon incurs to offer the same off-peak switching directly to the end-user.

Q. HOW COULD THE COMMISSION AVOID THESE PROBLEMS?

A. To avoid these problems, the Commission can use the alternative output that Mr. Pitkin reports to establish a flat-rated switching charge. This rate design would recover all of Verizon's costs for unbundled switching through a single per-port charge. A flat-rated switching charge would allow Verizon to recover (but not over-recover) all of its switching costs without putting pressure on competitive carriers to assess uneconomic off-peak usage charges on their retail customers. Thus, a flat-rated switching charge would promote full utilization of Verizon's network.

Q. ARE YOU SAYING THAT A FLAT-RATED SWITCHING CHARGE PERFECTLY MATCHES THE MANNER IN WHICH VERIZON INCURS SWITCHING COSTS?

A. No. A flat-rated switching charge would not perfectly match the manner in which Verizon incurs switching costs. Verizon would still incur certain peak-driven capacity costs. A flat-rated price structure does not convey any price signal

1 concerning these peak-driven costs; therefore, at least in theory, use of a totally
2 flat-rated price structure could lead to overutilization of Verizon's switch during
3 peak hours and to call blockage. Recovery of usage-related switching charges
4 through a usage-based rate element provides a partial signal to carriers of the costs
5 of on-peak usage, although the price is understated, if the cost of peak usage is
6 spread across all minutes of use.

7 The Commission must weigh the possibility of overutilization of
8 Verizon's switches during the peak period, given a flat-rated switching charge,
9 against the virtual certainty of underutilization of Verizon's switches during the
10 off-peak period, given an average minute-of-use-based switching price. In
11 weighing these alternatives, the Commission should keep in mind that Verizon
12 currently recovers local switching costs from *retail* residential customers through
13 flat-rated prices in Virginia (as do most local exchange companies with which I
14 am familiar) Therefore, the risk of overutilization resulting from a flat-rated local
15 switching charge is no greater than the risk that Verizon already undertakes for its
16 retail local exchange operations for residential customers. Competitors are most
17 likely to purchase unbundled switching as part of the UNE platform to serve
18 residential customers.[10]

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[10] In fact, competitors *cannot* buy unbundled switching in many areas on behalf of end-user customers with four or more lines, a restriction that focuses the use of unbundled switching on residential and certain small business customers. 47 U.S.C.
(continued)

1 WorldCom witness Mr. Goldfarb and AT&T witness Mr. Kirchberger
2 present each company's recommendation as to how the Commission can best
3 resolve this rate design issue in a manner that is consistent with the economic
4 principles and considerations that I have outlined above.

5 **V. THE COMMISSION SHOULD BE ESPECIALLY CAREFUL TO**
6 **PREVENT VERIZON FROM ERECTING BARRIERS TO ENTRY VIA**
7 **EXCESSIVE, NON-COST-BASED NONRECURRING CHARGES.**

8 **Q. DO THE NON-RECURRING PRICES AT ISSUE IN THIS DOCKET**
9 **HAVE ANY SPECIAL ECONOMIC SIGNIFICANCE?**

10 A. Yes, there are at least two respects in which non-recurring prices have particular
11 economic significance. First, non-recurring prices are significant because they
12 represent an up-front cost of doing business that new entrants will incur in
13 conjunction with each customer that they win from Verizon and that Verizon need
14 not incur to maintain its monopoly legacy customers. New entrants must
15 overcome this additional hurdle to entry into the local exchange markets for which
16 Verizon previously held an exclusive franchise. At a minimum, competitors that
17 seek to enter the market using unbundled network elements in conjunction with
18 their own facilities will be unable to avoid non-recurring charges. Non-recurring

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§51.319(c)(1)(B); *Third Report and Order and Fourth Further Notice of Proposed Rulemaking* in CC Docket 96-98 ("*UNE Remand Order*"), released November 5, 1999, at Appendix B.

1 charges can add significantly to the total cost that a new entrant will incur to use
2 Verizon's unbundled network elements, making competitive entry using those
3 elements uneconomic — even if the element prices themselves reflect sound
4 economic principles.

5 Second, non-recurring charges for unbundled network elements are
6 important because they are, in effect, entrance fees. Typically, the new entrant
7 must pay non-recurring charges for unbundled network elements to Verizon
8 before it can obtain the unbundled network elements it needs to offer service to an
9 end user. These "entrance fees" increase the capital that a new entrant must invest
10 up-front before it receives even a penny of revenue from its retail customer and
11 therefore make entry more difficult. Thus, to create the conditions under which
12 local competition can flourish non-recurring charges for unbundled network
13 elements must not exceed the forward-looking, efficient level necessary to
14 compensate Verizon for the costs that the new entrant truly causes Verizon to
15 bear. Non-recurring charges for unbundled network elements are a sunk cost and
16 thus create a barrier to entry.

17 **Q. IN GENERAL, WHY DO SUNK COSTS CREATE BARRIERS TO**
18 **ENTRY?**

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

1 because they increase the new entrant's risk that it will not recover the cost from
2 sales in the market.

3 **Q. SPECIFICALLY, WHY DO NON-RECURRING CHARGES CREATE**
4 **BARRIERS TO ENTRY?**

5 A. Unlike recurring charges for unbundled network elements or recurring costs for a
6 new entrant's own facilities, non-recurring charges are a sunk cost. A new entrant
7 cannot obtain a refund or repayment for any or all of the non-recurring charges it
8 pays Verizon, even if the new entrant loses the retail customer on whose behalf it
9 incurred the non-recurring charge or goes out of business entirely.

10 In contrast, if a new entrant loses a retail customer that it had been serving
11 using an unbundled loop, or exits the local exchange business entirely, the new
12 entrant is no longer obligated to pay monthly recurring charges for the loop it no
13 longer needs. Similarly, if the new entrant loses a retail customer that it had been
14 serving using its own switch, it can use the freed-up switching capacity to serve a
15 different retail customer or lease that capacity to another carrier. If the new
16 entrant leaves the local exchange business entirely, it can sell its switch to another
17 local exchange provider. As these examples illustrate, non-recurring charges for
18 unbundled network elements and collocation create a greater risk of non-recovery
19 of a new entrant's costs than do either recurring charges for unbundled network
20 elements or recurring costs for a new entrant's own facilities.

21 The only way that a new entrant can be sure of recovering the full cost of
22 the non-recurring charges it incurs on behalf of a retail customer is to impose an

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

17 **Q. HOW DO NON-RECURRING CHARGES ASSOCIATED WITH A**
18 **CUSTOMER'S CHANGE OF SERVICE PROVIDER AFFECT THE**
19 **RELATIVE COMPETITIVE POSITIONS OF INCUMBENTS AND NEW**
20 **ENTRANTS?**

21 A. Because incumbent local exchange carriers such as Verizon start the competitive
22 era with virtually a 100% market share for local service, the difference in the
23 effect of non-recurring charges on the competitive positions of incumbents and

new entrants is enormous. At least initially, almost all non-recurring charges associated with customers switching service providers will fall on new entrants because all of their customers are "new." Thus, all of the increased risk associated with the sunk costs that non-recurring charges represent falls on new entrants. All other things being equal, the risk associated with non-recurring charges will increase the expected return that investors will demand to provide capital to new entrants. The higher the non-recurring charges, the greater the risk and the greater the increased cost of capital to new entrants.

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

Verizon has every incentive to make non-recurring charges an even larger barrier to entry than they would otherwise be by exaggerating the level of non-recurring cost associated with the preordering, ordering, and provisioning of unbundled network elements.