RECEIVED

NOV 16 2001

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

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. etc.	)	CC Docket No. 00-249
In the Matter of Petition of AT&T Communications of Virginia Inc. etc.	)	CC Docket No. 00-251

SUPPLEMENTAL REBUTTAL TESTIMONY OF
FRANCIS J. MURPHY
ON BEHALF OF
VERIZON VIRGINIA INC.

November 16, 2001

TABLE OF CONTENTS

I. INTRODUCTION AND PURPOSE OF TESTIMONY 1

II. THE MODIFIED SYNTHESIS MODEL REMAINS FUNDAMENTALLY FLAWED DESPITE AT&T/WORLDCOM'S CODING AND INPUT VALUE CHANGES. 4

A. AT&T/WorldCom's Numerous Revisions to the Model Are Largely Undocumented. 4

B. AT&T/WorldCom's New Switching and Interoffice Module Is Fundamentally Flawed. 5

1. Despite AT&T/WorldCom's Recent Coding and Input Value Changes, the Modified Synthesis Model Cannot Accurately Determine SONET Requirements. 5

2. AT&T/WorldCom's New Switching and Interoffice Module Is Incapable of Accurately Estimating IOF Costs 9

3. The Modified Synthesis Model Cannot Accurately Determine ADM Requirements 11

C. The Most Recent Version of the Modified Synthesis Model Does Not Contain Any Umbilical Cable Investment 15

D. The Modified Synthesis Model Is Incapable of Determining the Traffic Sensitive/Non-Traffic Sensitive Portions of Switches 17

E. The Modified Synthesis Model Does Not Properly Assign Network Operations Expenses to UNEs. 19

F. The Revised Version of the Modified Synthesis Model Drops Central Offices and Access Lines 20

III. RECOMMENDATIONS 23

I. INTRODUCTION AND PURPOSE OF TESTIMONY

Q. Please state your full name, employer and business address.

A. My name is Francis J. Murphy. I am the President of Network Engineering Consultants, Inc. ("NECI"), located at 5 Cabot Place, Suite #3, Stoughton MA, 02072.

Q. Are you the same Francis J. Murphy who filed rebuttal testimony on August 27, 2001?

A. Yes.

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

A. The purpose of my supplemental rebuttal testimony is to respond to the cost model changes described in the surrebuttal testimony of Mr. Brian Pitkin, Ms. Catherine Pitts, and Mr. Steven Turner, and the corresponding revisions to the Modified Synthesis Model ("MSM" or "Model") filed on behalf of AT&T Communications of Virginia, Inc. ("AT&T") and WorldCom, Inc. ("WorldCom") (collectively, "AT&T/WorldCom") on September 21, 2001. I will show why, based on my analysis, the most recent revisions to the MSM adversely affect and distort the Model's ability to calculate Verizon Virginia Inc.'s ("Verizon VA") forward-looking costs of providing unbundled network elements ("UNEs").

Q. Do other Verizon VA witnesses address AT&T/WorldCom's latest cost model revisions?

A. Yes. Dr. Timothy Tardiff of National Economic Research Associates, Inc. addresses the significant economic and modeling flaws identified during his examination of the latest version of the Modified Synthesis Model. In certain

instances, my testimony and Dr. Tardiff's testimony address similar aspects of the latest version of the MSM, with my testimony focusing on the Model's engineering and operational shortcomings, and Dr. Tardiff's focusing on the Model's failure to adhere to basic economic and modeling principles.

Q. Please summarize the main points of your supplemental rebuttal testimony.

A. In their September 21, 2001 filing, AT&T/WorldCom made numerous program coding and input value changes, which effectively resulted in the creation of an entirely new version of the Modified Synthesis Model. The documentation produced in response to Verizon VA's discovery request for an explanation of the changes was sketchy at best, and generally insufficient to facilitate a detailed analysis of AT&T/WorldCom's changes. Furthermore, AT&T/WorldCom presume the correctness of their changes, albeit mistakenly, without the benefit of public scrutiny and comment by all interested parties, and contrary to the Federal Communications Commission's ("FCC" or "Commission") practice with respect to prior Synthesis Model changes.

In making these changes to the Model, AT&T/WorldCom create new problems and aggravate existing Model flaws. Notwithstanding the wholesale replacement of the Model's Switching and Interoffice Module, the Model still cannot estimate accurately the cost of an interoffice facilities ("IOF") SONET configuration. The flaws in the MSM are not merely computational errors. At the most fundamental level, the MSM adopts an inherently impractical approach to estimating the cost of IOF elements.

1

2 The MSM's Switching and Interoffice Module attempts to calculate the total
3 investment cost of the entire IOF network needed to satisfy demand in Verizon
4 VA's serving areas. The reliability of the resulting UNE cost estimates depends
5 entirely on the accuracy and reasonableness of the macroscopic network
6 investment calculation. But the reliability of the MSM's approach to modeling is
7 suspect. The most essential information needed to approximate a solution – data
8 on demand between each pair of nodes in the network when there are hundreds of
9 nodes – is not used in the Model. Even if this demand were available, the MSM
10 would still be unable to arrive at an optimal solution since the IOF network must
11 still be able to serve randomly varying demand over its useful life. Obviously, the
12 Model cannot do this. Moreover, despite AT&T/WorldCom's acknowledgement
13 that the amount of traffic entering and exiting each node on a SONET ring is
14 limited by the need for traffic to pass through nodes on the ring,[1] the MSM's
15 algorithms fail to reflect this reality.

16

17 The coding changes also cause the Model to omit the host/remote umbilical
18 facilities and incorrectly calculate excess ADMs. Such omissions underscore the
19 problems that arise when making untested and hurried changes to the Model.
20 Furthermore, AT&T/WorldCom's revisions contribute to the Model's omission of
21 over 500,000 access lines, including the two missing wire centers, thereby further

[1] Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *AT&T/WorldCom's Response to Verizon VA's Fifteenth Set of Data Requests, Response Nos. 2 and 3* (Oct. 31, 2001).

distorting and misstating the costs that the Model develops. In addition, Ms. Pitts' recommended ratio between traffic sensitive ("TS") and non-traffic sensitive ("NTS") switch investment continues to represent fanciful switch engineering and should be rejected. Similarly, AT&T/WorldCom's effort to properly distribute Network Operations expenses falls short.

After analyzing the changes made by AT&T/WorldCom, it is clear that their revisions create further problems and fail to perform as "advertised" by AT&T/WorldCom, thereby further distorting the Model's results and its UNE cost estimates. Moreover, AT&T/WorldCom's changes do not remedy the Model's inherent flaws that I and other witnesses have already discussed. Despite AT&T/WorldCom's significant modifications, the Model is still incapable of accurately estimating Verizon VA's forward-looking costs of providing UNEs.

II. THE MODIFIED SYNTHESIS MODEL REMAINS FUNDAMENTALLY FLAWED DESPITE AT&T/WORLDCOM'S CODING AND INPUT VALUE CHANGES

A. AT&T/WorldCom's Numerous Revisions to the Modified Synthesis Model Are Largely Undocumented

Q. Describe the changes contained in the revised version of the Modified Synthesis Model filed by AT&T/WorldCom on September 21, 2001.

A. The revised version of the Modified Synthesis Model contains many algorithmic and input changes, the most significant of which being the complete replacement of the Model's Switching and Interoffice Module, a 700,000 reduction in the quantity of special access lines forecasted by Mr. Pitkin for the year 2002, as well as a change to the TS/NTS ratio. The new Switching and Interoffice Module

1 contains numerous code changes to the Model's underlying algorithms, as well as
2 seven brand new input value changes.

3 **Q. Did AT&T/WorldCom document the coding and input changes to the Model**
4 **that were made in their surrebuttal filing?**

5 A. No. Mr. Pitkin mentioned generally in his surrebuttal testimony that changes to
6 the Model were made; however, he failed to identify specifically the coding and
7 input changes he had made, especially his substitution of an entirely new
8 Switching and Interoffice Module. Further details, albeit very limited, were
9 provided at a later date in response to a Verizon VA data request;[2] however, in
10 some cases complete explanations of certain AT&T/WorldCom's changes have
11 yet to be provided.

12 **B. AT&T/WorldCom's New Switching and Interoffice Module Is**
13 **Fundamentally Flawed**

14 **1. Despite AT&T/WorldCom's Recent Coding and Input Value**
15 **Changes, the Modified Synthesis Model Cannot Accurately**
16 **Determine SONET Requirements**

17 **Q. Does AT&T/WorldCom's use of a brand new Switching and Interoffice**
18 **Module, with its coding changes and revised input values, affect the Model's**
19 **IOF SONET cost estimates?**

20 A. Yes. As discussed more fully below, the use of a new Switching and Interoffice
21 Module, and the many coding and input value changes contained therein, has
22 affected the Model's development of IOF SONET costs.

---

[2] Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *AT&T/WorldCom's Responses to Verizon VA's Fourteenth Set of Data Requests, Response No. 10* (Oct. 4, 2001).

1 **Q. Does the new Switching and Interoffice Module reflect all of the changes that**
2 **were made in the New York proceeding as Mr. Pitkin claims?**
3 A. No. Mr. Pitkin claims that he changed the Modified Synthesis Model for Virginia
4 to reflect the same changes made to the HAI Model's Switching and Interoffice
5 Module in a New York proceeding. Though not providing a list of specific
6 changes made to the Switching and Interoffice Module, AT&T/WorldCom's
7 response to question 10 of Verizon VA's Fourteenth Set of Data Requests
8 acknowledges what Verizon VA's analysis has confirmed[3] -- that the Switching
9 and Interoffice Module filed by Mr. Pitkin includes numerous code changes that
10 were either identified incorrectly in AT&T/WorldCom's response to question 10
11 or were not contained in the model sponsored in the New York proceeding,
12 despite Mr. Pitkin's allegations to the contrary.
13
14 AT&T/WorldCom's additional input and algorithmic changes are simply a back
15 door attempt to offset the increase in investment resulting from the correction
16 made to the algorithm errors identified in my rebuttal testimony.
17 **Q. Have you summarized the numerous code changes that were inconsistent**
18 **with AT&T/WorldCom's description of the changes they allegedly made?**
19 A. Yes. I have compared the code changes made in AT&T/WorldCom's September
20 21, 2001 surrebuttal filing with those identified by AT&T/WorldCom in their data
21 request response. Attachment A to my testimony shows 14 coding changes that

[3] "A different model was proposed in New York than in Virginia. While some portions of those modules may be similar to those in the Synthesis Model, AT&T/WorldCom have not performed this evaluation...." Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *AT&T/WorldCom's Response to Verizon VA's Fourteenth Set of Data Requests, Response No. 10(c)* (Oct. 4, 2001).

1 AT&T/WorldCom failed to identify correctly. For the most part,
2 AT&T/WorldCom either failed to identify the Model change in their
3 documentation or the Model change was not made in the New York proceeding.
4 Many of these differences impact several cells or even an entire column of cells.
5 Obviously, AT&T/WorldCom's suggestion that all of the changes made on
6 surrebuttal had been scrutinized in the New York proceeding is simply
7 erroneous.[4] Moreover, even with regard to those changes that were made in New
8 York, as discussed by Dr. Tardiff in his supplemental rebuttal testimony, the New
9 York Public Service Commission's recommended decision rejected the HAI
10 Model outright, and thus AT&T/WorldCom's proposed changes to the Model as
11 well.[5]

12 **Q. Did you evaluate the effect of these changes on the Model?**

13 **A.** Yes, to the extent possible. Conducting a thorough analysis of the numerous
14 changes made to the Switching and Interoffice Module has been somewhat
15 hampered by the other modifications and errors included in Mr. Pitkin's
16 surrebuttal filing, which include a redistribution of lines for all wire centers, a
17 change in the special access DS-0 equivalents, the dropping of a significant
18 number of lines as a result of the true-up process, and the dropping of entire wire
19 centers. These factors disguise the impact of Mr. Pitkin's coding and input
20 changes, and make a thorough analysis of these changes quite difficult. For

---

[4] Attachment A hereto identifies three new algorithms (items 6, 7, and 10) that were not included in those filed in New York.

[5] Before the New York Public Service Commission, Proceeding on Motion of Commission to examine New York Telephone Company's Rates for Unbundled Network Elements, Case 98-C-1357, *Recommended Decision on Module 3 Issues by Administrative Law Judge Joel A. Linsider* (May 16, 2001).

1 example, the dropping of the Centreville wire center (discussed below) between
2 the initial and surrebuttal filing, in conjunction with the other Model changes
3 made by Mr. Pitkin, results in an entirely new SONET ring configuration. More
4 specifically, the number of SONET "physical rings"[6] declined from 19 in the
5 initial cost model filing to 15 in the surrebuttal filing. This revised network
6 configuration also suggests that another configuration would probably occur if the
7 Model were capable of including both of the dropped wire centers (i.e.,
8 Centreville and McLean).

9 **Q. Does the Modified Synthesis Model accurately determine SONET**
10 **requirements as a result of AT&T/WorldCom's recent coding and input**
11 **value changes?**

12 A. Absolutely not. Any suggestion that AT&T/WorldCom's surrebuttal changes
13 remedy the flaws resident in AT&T/WorldCom's prior version of their Model is
14 incorrect. While AT&T/WorldCom's changes correct certain issues raised in my
15 rebuttal testimony, as well as some problems identified by others, new problems
16 have been introduced. For example, it appears that Mr. Pitkin's algorithmic
17 change to the "ring io" worksheet for "excess maximum-rate units" (cell BY) is
18 flawed because the Model does not calculate any excess ADMs for IOF "physical
19 ring" number 15.[7] This is but one example of the Model's lack of accuracy and

[6] In Mr. Turner's Surrebuttal Testimony, he explains that the term "physical ring" refers only to the layout of fiber in the IOF network but has no relationship to the configuration of ADMs into SONET rings. Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *Surrebuttal Testimony of Steven E. Turner* (Sept. 21, 2001) at p. 10 ("Turner Surrebuttal Testimony"). Though he suggests that actual SONET rings would consist of subsets of these "physical rings," the MSM does not produce any output that identifies actual SONET rings.

[7] Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *AT&T/WorldCom's Response to Verizon VA's Fifteenth Set of Data Requests, Response No. 1* (Oct. 31,

sophistication, and demonstrates its overall inability to model an appropriate IOF SONET network.

2. AT&T/WorldCom's New Switching and Interoffice Module Is Incapable of Modeling Forward-Looking IOF Costs

Q. Could you please explain the underlying flaws with Mr. Pitkin's cost model that his changes are incapable of correcting.

A. The difficulty in determining demand between nodes does not imply that reasonable estimates of IOF network costs cannot be produced. However, a practical approach must reflect the realities of this fundamental IOF problem (i.e., the need to interconnect among hundreds of nodes in a network) and its effects on SONET network design and deployment. The data needed to design a whole SONET network at one time, accounting for the node-to-node circuit demand, is extraordinarily large and essentially unreliable for purposes of a model, because the demand constantly varies. Moreover, even if the data could be created, the required computations are unmanageably large.

Q. Is AT&T/WorldCom's claim that the MSM can optimize the IOF network credible?

A. Absolutely not. Developers of the Switching and Interoffice Module used in the MSM claim to have solved this planning problem with a PC-based program that runs in less than an hour. They claim to produce an "optimum" solution. The claim is beyond credibility. Furthermore, the most essential information needed even to begin approximating a solution -- i.e., data concerning demand between

---

2001); *ATT15_Sonetsur.xls*; Tab: *Ring IO*; Col: *AQ + BY*; Row: *215*. This flaw only occurs to the last SONET ring, in this case number 15, calculated by the Model and is probably due to the unexpected consequences of an erroneous algorithmic change.

each pair of nodes in the network -- is not used in the Model. Indeed, in response to Verizon VA Data Request 15-1(a), AT&T/WorldCom admit, "The Modified Synthesis Model does not identify actual SONET rings because the Synthesis Model does not have the level of information necessary to engineer SONET layers based on the point-to-point demand of nodes on the SONET rings."[8]

Of course, even if this demand were available for one point in time, it would not be sufficient to arrive at the "optimum," forward-looking, long-term solution claimed by the MSM's proponents. To be truly optimum, the IOF network must be designed to serve the randomly varying demand it will face over its useful life. The MSM's Switching and Interoffice Module is incapable of modeling the costs of such an IOF network, and AT&T/WorldCom have not shown any evidence that suggests otherwise. Indeed, as explained below, the MSM's algorithms fail to account for even the most basic principle of SONET ring engineering -- the amount of traffic that can enter and exit each node of a SONET ring is limited by the need for traffic to pass through nodes on the ring.

Q. How are IOF networks developed given the problems described?

A. For the most part, SONET networks have been deployed throughout the industry by learning from experience and responding to real-world demand as it develops. The most pragmatic approach to modeling forward-looking IOF costs would reflect this reality, as Verizon VA's IOF model does.

---

[8] Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *AT&T/ WorldCom's Responses to Verizon VA's Fifteenth Set of Data Requests, Response No. 15(a)* (Oct. 31, 2001).

Q. Does Verizon's IOF Model reflect the characteristics necessary to develop IOF costs?

A. Yes. As Verizon VA's cost witnesses have explained, Verizon VA's IOF model creates unit capacity cost estimates using a real-world, functioning IOF network to derive the critical parameters that have driven SONET network costs based on demand as it has developed in Virginia. Verizon VA's model then makes adjustments as appropriate so that those parameters reflect a forward-looking SONET infrastructure. This approach allows the cost model to reflect a SONET network that has been created incrementally over time as demand emerges, using architectures that experience proves to be efficient in minimizing overall cost and delivering service reliably to Virginia customers. As demand changes going forward, which it is bound to do, Verizon VA's IOF model is based on a network architecture that is capable of serving that demand efficiently.

3. The Modified Synthesis Model Cannot Accurately Determine ADM Requirements

Q. Do Mr. Pitkin's recent changes enable to the Modified Synthesis Model to determine the number of ADMs with any accuracy?

A. No. As Mr. Turner acknowledges, the number of DS-3s that can enter and exit an OC-48 ADM is directly impacted by the number of nodes (i.e., ADMs) that are placed on the ring.[9] AT&T/WorldCom's cost panel rebuttal testimony acknowledges the same principle: "[T]he larger the number of nodes on the ring serving 96 ports, the lower the utilization of any one of these individual nodes.

[9] *Id.*; Turner Surrebuttal Testimony at p. 10, fn. 19.

1 Each of the OC-48 SONET nodes has the ability to actually terminate 48 DS-3
2 circuits. As such, as more nodes are added to each SONET ring, the potential
3 utilization of the SONET nodes on those rings decreases."[10] This principle
4 reflects the reality that, as the number of nodes on a SONET ring increases, the
5 need for traffic to pass through multiple nodes before exiting the ring also
6 increases. However, the MSM makes no attempt to account for the size of a
7 SONET ring when determining the number of DS-3s that each ADM can serve.
8 Instead, the MSM simplistically and incorrectly assumes that, without regard to
9 the number nodes on a ring, each OC48 ADM will be able to serve as many as 48
10 DS-3s and that each OC12 ADM will be able to serve 12 DS-3s. This assumption
11 simply is not true for a SONET ring with multiple nodes, as AT&T/WorldCom's
12 witnesses themselves have acknowledged.

13 **Q. Is Mr. Turner's reference to the alleged average number of ADMs per**
14 **SONET ring that Verizon VA uses valid?**

15 A. No. Mr. Turner attempts to use Verizon VA's cost study to support his contention
16 that the SONET ring and ADM deployment example contained in my rebuttal
17 testimony is unrealistic.[11] First, the MSM does not provide data about the actual
18 number of SONET rings that the Model configures, making any determination of
19 the number of nodes per SONET ring -- an out-of-model calculation. Second,
20 even if it was able to calculate the number of nodes per SONET ring, a

[10] Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *Rebuttal Testimony of Michael R. Baranowski, Terry L. Murray, Catherine E. Pitts, Joseph P. Riolo and Steven E. Turner* (Aug. 27, 2001) at p. 127, lines 4-9 ("AT&T/WorldCom Recurring Cost Panel Rebuttal Testimony").

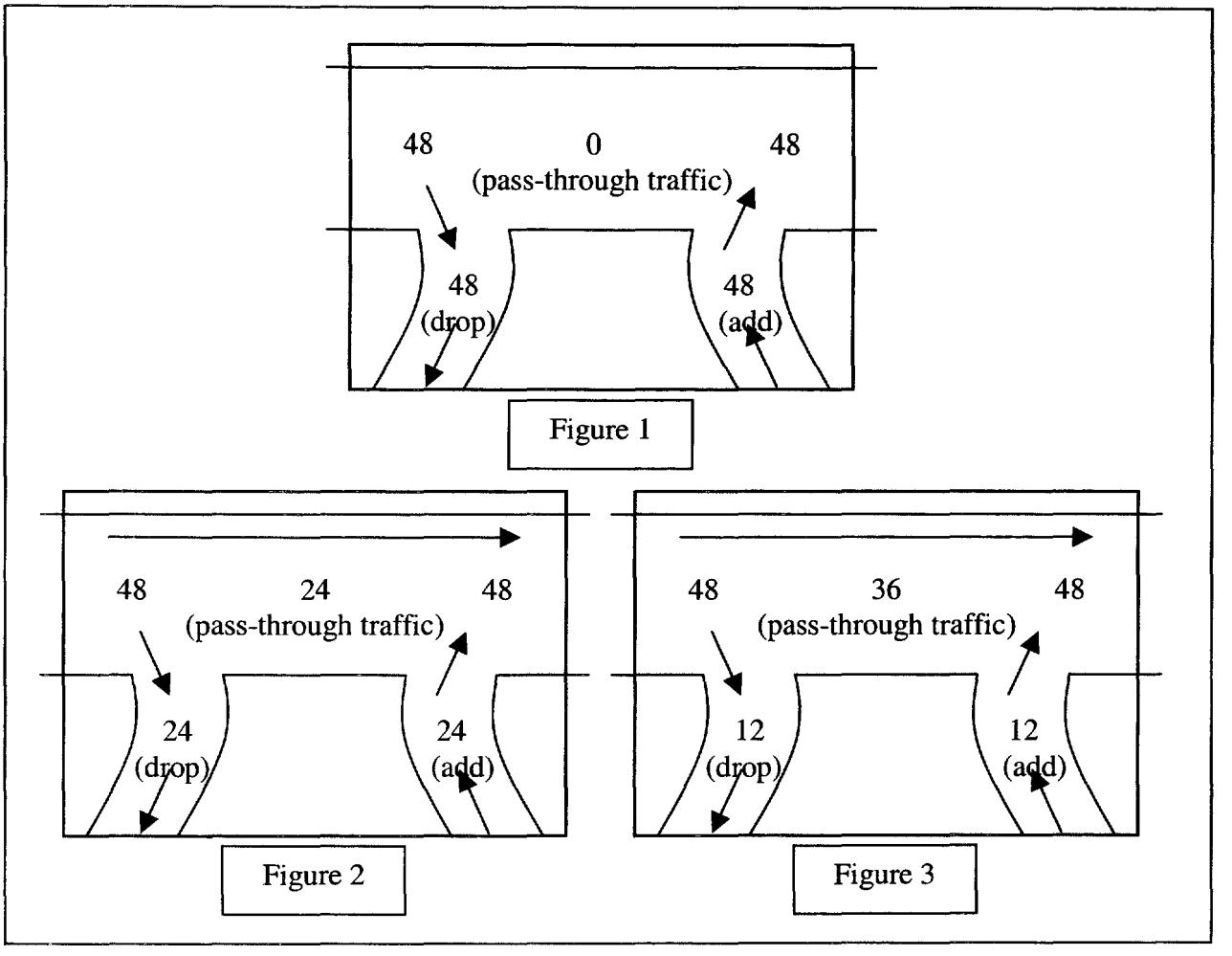
[11] The MSM only produces a count of physical SONET rings.

comparison of the number of nodes per ring produced by the MSM to the number of nodes per ring in Verizon's network would be meaningless because the MSM grossly underestimates the total number of ADMs needed to serve demand in Virginia. Indeed, as Dr. Tardiff points out in his supplemental rebuttal testimony, the newest version of the MSM submitted by AT&T/WorldCom produces a mere 285 OC-48 ADMs in interoffice rings in Verizon's VA's network, fewer than half as many ADMs as Verizon has in its existing network. This produces a dramatic understatement of the total cost of a forward-looking IOF network, and this problem is magnified by the allocation of that understated cost to improperly inflated estimates of demand.

Q. Can you demonstrate the impact of passing through nodes on a SONET ring?

A. Yes. The following diagram illustrates the impact of traffic passing through nodes on the number of DS-3s that can be added or dropped at each node. Figure 1 of the diagram below shows that with no pass-through traffic (essentially a point to point configuration), 48 DS-3s can be added or dropped at a given node. Figure 2 of the diagram shows that with 24 DS-3s passing through the node, the maximum number of DS-3s that could be added or dropped at the ADM would be 24. Figure 3 shows that with 36 DS-3s passing through the node, the maximum number of DS-3s that could be added or dropped would be 12.

Diagram - SONET OC-48 Pass-Through Effect on Adding and Dropping DS-3s



Q. Can the ring topography also affect ADM requirements?

A. Yes. There is no doubt that most of the interoffice traffic (i.e., special access, dedicated switched access, and common transport) emanating from end offices has to be brought to a tandem location. This requirement affects the number of rings and the number of ADMs per ring. This phenomenon, however, is not reflected in the MSM's SONET algorithms, and as AT&T/WorldCom

1 acknowledge, this transiting traffic will decrease the number of DS-3s that the
2 ADM can add or drop at the ADM node.[12]

3 **Q. Did Mr. Turner admit there were other limiting factors that affect the**
4 **number of ADMs required?**

5 A. Yes. Mr. Turner stated that the capacity of an OC-48 ADM is limited by two
6 other factors, the first being the number of nodes that are placed on the ring, and
7 the second being the fiber cross-section between any two nodes on the SONET
8 ring, which cannot exceed the capacity of the SONET ring (i.e., 48 DS-3s on a
9 four fiber OC-48 SONET ring).[13]

10

11 AT&T/WorldCom also acknowledged something that I had already explained in
12 my rebuttal testimony and discussed previously herein -- that the Model does not
13 contain or develop the very basic traffic data needed to calculate the number of
14 SONET rings or the correct number of ADMs.[14] In another data request response,
15 AT&T/WorldCom recognized these additional limitations of the Model, which
16 impact the number of rings, as well as the capacity limits of ADMs.[15]

17 **C. The Most Recent Version of the Modified Synthesis Model Does Not**
18 **Contain Any Umbilical Cable Investment**

19 **Q. How does the Modified Synthesis Model connect host and remote switches?**

---

[12] Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *AT&T/WorldCom's Responses to Verizon VA's Fifteenth Set of Data Requests, Response No.* 3 (Oct. 31, 2001).

[13] *Id.*

[14] Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *AT&T/ WorldCom's Responses to Verizon VA's Fifteenth Set of Data Requests, Response No. 1(a)* (Oct. 31, 2001).

[15] *Id.* at Response No. 2.

1 A. Host and remote switches are connected to allow traffic to pass via umbilical
2 facilities, which ride on SONET facilities. The host office also provides certain
3 centralized functions supportive of the remote switches that require connectivity
4 between the two switches. In establishing these umbilical facilities, the Modified
5 Synthesis Model assigns a 24-strand fiber cable to support the required facilities.
6 The Model uses this same algorithm to determine IOF fiber facilities. The version
7 of the Model, filed on July 2, 2001, allocated a single 24-strand fiber cable for an
8 interoffice fiber network, which may be insufficient for SONET rings in larger
9 urban centers; therefore, more than one fiber cable may be required.

10 **Q. Did AT&T/WorldCom modify the version of the Model filed on September**
11 **21, 2001 to enable it to add more than one fiber cable?**

12 A. Yes.

13 **Q. Did you identify any problems that occurred after AT&T/WorldCom**
14 **modified the Model in this regard?**

15 A. Yes. The version of the Modified Synthesis Model filed on September 21, 2001
16 did not contain any umbilical cable investment to link together host and remote
17 offices.[16] This investment simply disappeared after AT&T/WorldCom made their
18 surrebuttal coding changes to the Model.

19 **Q. Based on your analysis of the Model, to what do you attribute the loss of this**
20 **investment?**

[16] Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *AT&T/WorldCom's Supplemental Responses to Verizon VA's Fifteenth Set of Data Requests, Response No. 1* (Oct. 31, 2001). Attached file named *ATT15_Sonetsurr.xls, Wire center investment worksheet, Col. AT.*

A. The loss of the umbilical cable facility investment is the result of the coding change that was made to increase the number of fiber cables created by the Model to support interoffice connectivity. Again, this problem is another instance where AT&T/WorldCom's algorithmic changes to the Model, allegedly to correct one problem, create yet another problem.

D. The Modified Synthesis Model Is Incapable of Determining the Traffic Sensitive/Non-Traffic Sensitive Portions of Switches

Q. In their surrebuttal filing, did AT&T/WorldCom change the Model's ratio between traffic sensitive and non-traffic sensitive switch investment?

A. Yes. Although Ms. Pitts did not explicitly state in her surrebuttal testimony that a parameter change for the ratio between traffic sensitive and non-traffic sensitive switch investment was made to the MSM,[17] Mr. Pitkin briefly mentioned such a change at the conclusion of his surrebuttal testimony. In fact, much of Ms. Pitts' discussion regarding her proposed methodology for determining the ratio between traffic sensitive and non-traffic sensitive appeared in the cost panel rebuttal testimony, in which she stated that Attachment 5 to the testimony revealed the correct TS/NTS ratio.[18] However, the ratio proposed in the cost panel rebuttal testimony was not the ratio ultimately used in the MSM. When AT&T/WorldCom filed their new, revised version of the MSM on September 21, 2001, Ms. Pitts' proposed TS/NTS ratio had changed. In fact, Ms. Pitts supported

[17] Ms. Pitts stated in her surrebuttal testimony, "The Synthesis Model filed by Mr. Pitkin used a 30% allocation of switch investment to line ports with the residual 70% of the switch assigned to the minute of use element." Although the version of the MSM filed on July 2, 2001 used these values, the revised MSM filed on September 21, 2001 contained the revised TS/NTS values recommended by Ms. Pitts. Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, 251, *Surrebuttal Testimony of Catherine E. Pitts* (Sept. 21, 2001) at p. 6, fn. 15 ("Pitts Surrebuttal Testimony").

[18] AT&T/WorldCom Recurring Cost Panel Rebuttal Testimony at p. 115.

1 a different TS/NTS ratio in her direct testimony, the cost panel rebuttal testimony,
2 and her surrebuttal testimony.

3 **Q. Do Verizon VA and AT&T/WorldCom agree on the definition of traffic**
4 **sensitive and non-traffic sensitive components of the switch?**

5 A. No. Verizon VA addresses these differences in its Surrebuttal Panel Testimony
6 on Recurring Costs, and the surrebuttal testimony of David Garfield.

7 **Q. Does Ms. Pitts' line and trunk port ratio adjustment to Verizon VA's SCIS**
8 **results remedy the flaws in Ms. Pitts' TS/NTS recommendation?**

9 A. Absolutely not. Ms. Pitts' manipulation of Verizon VA's SCIS results in her
10 surrebuttal workpapers -- to allegedly make the results fit the Modified Synthesis
11 Model -- does not alter the faulty logic Ms. Pitts initially used to assign a large
12 portion of the switch investment to the port. Ms. Pitts' suggestion that the results
13 she derived for Verizon VA, once adjusted to compensate for the Modified
14 Synthesis Model's treatment of switch costs, might be comparable should thus be
15 rejected.[19]

16 **Q. Is the Modified Synthesis Model capable of determining the traffic sensitive**
17 **and non-traffic sensitive portions of a switch?**

18 A. Absolutely not. The Model does not possess an algorithm that classifies
19 components of the switch as traffic sensitive or non-traffic sensitive. This
20 classification is performed entirely outside the Switching and Interoffice Module,
21 after the switch investment has already been determined. As a result, any change

[19] "Verizon VA's switch model and the Synthesis Model treat traffic-sensitive and non-traffic-sensitive costs in different ways, requiring that the percent non-traffic-sensitive data from Verizon's model be adjusted before it can be used as an input to the Synthesis Model." Pitts Surrebuttal Testimony at p. 7, fn. 17.

to the Model's TS/NTS ratio would not change the amount of switch investment at all. In fact, the TS/NTS ratio used in the Model must be determined from data sources outside the Model and then entered into the Model as an input parameter.

Q. Did you conduct any other analyses to determine if switch investment changes in the Modified Synthesis Model as a result of a change in usage?

A. Yes. Given that all of the parties seem to agree that a sizable portion of the switch is traffic sensitive, it logically follows that the investment in the switch will vary based on variations in usage demand. However, when the Model's usage input is substantially varied, the switch investment does not change at all -- regardless of the magnitude of the change in customer usage.[20] This inability to reflect any change in switch investment, regardless of the changes in calling usage, underscores why the Model should not be used to estimate UNE costs or any other network-related costs.

Q. Should AT&T/WorldCom's proposed parameter for the traffic sensitive/non-traffic sensitive ratio be used to calculate UNE switch costs?

A. Absolutely not. Ms. Pitts' ever-changing TS/NTS ratio should not be relied upon. Ms. Pitts' proposed TS/NTS ratio, combined with the Model's inability to vary switch investment as usage varies, makes the MSM an inappropriate tool for determining the relationship between traffic sensitive and non-traffic sensitive switch investment.

E. The Modified Synthesis Model Does Not Properly Assign Network Operations Expenses to UNEs

[20] *See* Accompanying Workpapers filed herewith, file: VA_C And P Tel Co of VA_VA Surrebuttal Filing 10_20_DZ.xls; Unit Costs Tab, Col. L-N, line 65.

1 **Q. Did Mr. Pitkin indicate that there was a problem in the version of the**
2 **Modified Synthesis Model filed on July 2, 2001 that caused Network**
3 **Operations expenses to be spread improperly?**
4 A. Yes. Mr. Pitkin admitted that a portion of Network Operations expenses were not
5 properly allocated, but stated that he has corrected the problem with his recent
6 changes to the Modified Synthesis Model. His changes, however, did not correct
7 the error and Dr. Tardiff comments on this in his testimony.
8 **Q. Would correcting Mr. Pitkin's error allow the Modified Synthesis Model to**
9 **correctly assign Network Operations expenses to UNEs?**
10 A. No. As I discussed in my rebuttal testimony, the use of special access DS-0
11 equivalents in the Model results in an understatement of the Network Operations
12 expense assigned to the 2-wire basic exchange POTS line. This understated 2-
13 wire loop value is then carried forward to the 4-wire, DS-1, and DS-3 costs
14 developed by Mr. Pitkin using an out-of model-methodology. This approach is
15 flawed and significantly understates UNE costs.

16 **F. The Revised Version of the Modified Synthesis Model Drops Central**
17 **Offices and Access Lines**

18 **Q. Does the revised version of the Modified Synthesis Model account for all wire**
19 **centers in Virginia?**
20 A. No. The Modified Synthesis Model, as filed on September 21, 2001, excludes
21 two wire centers with the CLLI code designations CNVIVACT and
22 MCLNVALV.[21]

[21] CNVIVACT and MCLNVALV are the CLLI codes for the Centreville and McLean central offices, respectively. CLLI is a trademark of Telcordia Technologies, Inc. and represents the Common Language

1 **Q. How many access lines does Mr. Pitkin forecast for these two wire centers?**

2 A. Mr. Pitkin forecasts that the Centreville wire center has over 236,000 lines and the

3 McLean wire center has over 156,000 lines.[22]

4 **Q. Why does the Modified Synthesis Model drop wire centers?**

5 A. It is unclear why the Model omits wire centers, although it appears that this

6 deficiency is related to the maximum number of raster points being exceeded

7 during the clustering process.[23]

8 **Q. Does the Modified Synthesis Model drop other access lines in addition to the**

9 **two missing wire centers?**

10 A. Yes. The Modified Synthesis Model also drops another 164,000 access lines,

11 which are spread in varying amounts across numerous Virginia wire centers.[24]

12 This problem appears to occur because the Modified Synthesis Model's true-up

13 function compares Mr. Pitkin's projected central office access lines to outdated

14 household data. Unable to successfully "true up" the two sets of data, the

15 Model's clustering program rejects these 164,000 access lines.

Location Identification code for a specific network entity. This testimony refers to these wire centers as Centreville and McLean; however, other Verizon VA witnesses may refer at times to the McLean wire center as Lewinsville.

[22] The quantity of access lines shown are based on Mr. Pitkin's year 2002 forecast and spread of access lines rather than Verizon VA's reported line counts for these offices. *See* Before the Federal Communication Commission, CC Docket Nos. 00-218, -249, -251, *Surrebuttal Testimony of Brian F. Pitkin; Supporting Workpapers* at file *Line Count_Surrebuttal.xls* (Sept. 21, 2001) ("Pitkin Surrebuttal Supporting Documentation").

[23] Mr. Pitkin testified that the reason these wire centers were omitted is because the line counts are too high. *See* Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *Transcripts* (Oct. 30, 2001) at p. 4429, lines 3-10.

[24] The quantity of access lines are also based on Mr. Pitkin's year 2002 forecast and spread of access lines rather than Verizon VA's reported access line count for each wire center. *See* Accompanying Workpapers filed herewith, file: Sum_missinglines.xls, Row 15, Comparison of HMWK work file to HCPM.mdb input file.

1 **Q. Can the user determine if the Modified Synthesis Model has dropped central**
2 **offices and rejected other access lines?**
3 A. Yes. The Modified Synthesis Model reports in file HMWKVA1950402.xls the
4 specific wire centers used.[25] This information can be easily mapped to the list of
5 wire centers contained in the HCPM.mdb input file to identify any central offices
6 originally present in the database file that are no longer shown in the results
7 summary reports. Similarly, a user can verify the total quantity of access lines
8 that the Model uses by matching the output from the HMWKVA1950402 file to
9 the total quantity of access lines Mr. Pitkin forecasted and then entered into the
10 Model by means of the ARMIS input worksheet.[26]

[25] One file tab entitled "Wire center Output by CLLI" provides a listing of the central office CLLI codes used by the Modified Synthesis Model.

[26] The workbook tab entitled "ARMIS Inputs" in the file named "VA_C and P Tel Co of VA Surrebuttal Filin_wirecenters.xls" identifies Mr. Pitkin's year 2002 forecast of residence, business, and special access lines. Mr. Pitkin shows his development of projected access lines on his revised Attachment D, shown as Attachment 1 to his workpapers filed with his Surrebuttal Testimony on Sept. 21, 2001.

1 **Q. In what way does the exclusion of the two wire centers and the loss of 164,000**
2 **access lines affect the cost estimates produced by the Model?**
3 A. The loss of these two wire centers and the omission of 164,000 access lines
4 affects all forms of loop, switching, and interoffice facility investment and costs.
5 Unexpected changes occur as a result of these missing wire centers and lines,
6 paramount among them is the Model's reconfiguration of the IOF SONET
7 network (discussed earlier) -- each model run effectively producing a different
8 cost estimate. For these reasons, as well as the others I have previously
9 enumerated, the costs developed by the MSM should not, and cannot, be
10 construed as providing an accurate estimate of UNE costs in Virginia.
11 **III. RECOMMENDATIONS**
12 **Q. What recommendations do you have for this Commission?**
13 A. Despite AT&T/WorldCom's recent code and input value changes, the Modified
14 Synthesis Model remains incapable of accurately calculating Verizon VA's
15 forward-looking UNE costs. In making these most recent changes,
16 AT&T/WorldCom have either aggravated existing problems or created new ones.
17 Other AT&T/WorldCom recommendations, such as the ratio between traffic
18 sensitive and non-traffic sensitive switch investment, change with each version of
19 their testimony. It has also been shown that traffic sensitive switch investment
20 does not change with changes in usage, a result that is completely contrary to
21 everyday realities and common sense. The IOF SONET network, which Mr.
22 Turner attempts to rehabilitate, still remains incapable of accurately calculating
23 SONET requirements because the Model adopts an inherently impractical

approach to establishing the cost of IOF elements and lacks the necessary modeling sophistication. Other problems, such as the dropped host/remote umbilical facilities, further demonstrate that last minute changes to the Model often precipitate other problems.

Despite AT&T/WorldCom's manipulations, the Model's infirmities and flaws make it incapable of accurately estimating forward-looking UNE costs in Virginia. No amount of modification can change this fact or make the Model worthy of being adopted by this Commission. For all of these reasons, this Commission should reject AT&T/WorldCom's Modified Synthesis Model for the purpose being proposed.

Q. Does this conclude your supplemental rebuttal testimony?

A. Yes.

Attachment A

Changes to Modified Synthesis Model That Differed From New York Changes

Item No.	Worksheet	Column or Cell Name	Column or Cell	Identified as a Change in DR 14-10	Algorithm Change
1.	Wire center inv.	Total tandem trunks	Column DQ	No	Changed VA to NY algorithm
2.	Wire center inv.	Total tandem BHCA	Column DR	No	Changed VA to NY algorithm
3.	Tandem and STP investment	Excess STP capacity, links	Cell D24	No	Changed VA to NY algorithm
4.	Tandem and STP investment	Excess STP capacity req.	Cell D25	No	Changed VA to NY algorithm
5.	Tandem and STP investment	Total operator traffic, CCS	Cell H8	Yes	Changed VA to NY algorithm (see Note 1)
6.	Tandem and STP investment	Total physical ring bridges required	Cell H28	Yes	Introduced a new algorithm (see Note 2)
7.	Tandem and STP investment	Total added ADM and DCS inv. per line	Cell H30	Yes	Introduced a new algorithm (see Note 3)
8.	Tandem and STP investment	Total OC-48s with fill	Cell H49	Yes	No change in algorithm
9.	Tandem and STP investment	No. of entrance facilities	Cell H50	No	Changed VA to NY algorithm
10.	Ring IO	Excess maximum-rate units	Column BY	No	Introduced a new algorithm (see Note 4)
11.	Host remote	Switch invest. per host	Column P	No	Changed VA to NY algorithm
12.	Host remote	Switch invest. Per remote	Column R	No	Changed VA to NY algorithm
13.	Inputs	Business tandem fraction	Cells Q72, R72, S72 and T72	No	Changed VA to NY algorithm
14.	Inputs	Residence tandem fraction	Cells Q73, R73, S73 and T73	No	Changed VA to NY algorithm

Notes

1. This algorithm was not identified as a change in either the 10/19/00 or 1/17/01 New York filing.
2. This algorithm was not identified as a change in either the 10/19/00 or 1/17/01 New York filing. This cell has no input or algorithm in either of these New York filings or the Virginia direct filing.
3. This algorithm was identified as a change in New York. This cell was changed from the Virginia direct to the Virginia surrebuttal filing but has a different algorithm than the one used in the New York filing.
4. This algorithm was not identified as a change in either the 10/19/00 or 1/17/01 New York filing. The Virginia direct is the same as the New York filings.