1 **Q. Is AT&T/WorldCom's modification to the Synthesis Model's node selection**
2 **criteria appropriate?**

3 A. No. Based on Mr. Riolo's recommendation, Mr. Pitkin changed the Synthesis
4 Model's node selection criteria. This change causes the Model to use distance
5 (PRIM algorithm) rather than average cost (modified PRIM algorithm) as the
6 basis for connecting nodes (FDIs/SAIs) to the central office. Distance is selected
7 as the only criteria, and other OSP input values and code changes that are relevant
8 to node selection are consequently ignored. As a result, the ability to
9 meaningfully evaluate the impact of other input changes, code changes, and
10 implementation errors (such as the structure sharing adjustment) is lost.
11
12 The Commission has considered and rejected the use of a PRIM algorithm
13 based solely on distance as the basis for selecting nodes. Instead, the Commission
14 adopted the modified PRIM algorithm, stating "the modified PRIM algorithm
15 provides a good approximation of the way in which real-world engineers are
16 likely to design the feeder network, since the network grows naturally from the
17 central office, by adding new nodes on the basis of minimum attachment cost as
18 new communities are established."[66]
19
20 Although the Commission's comments discredit Mr. Riolo's node
21 selection recommendation, it is also clear that the Modified Synthesis Model is

[66] AT&T/WorldCom Cost Model Documentation at Attachment B, p. 13.

flawed irrespective of which PRIM algorithm is used. Clearly, the Modified Synthesis Model fails to apply real-world engineering and economic practices when connecting nodes to the central office; if it did, the Model would produce a quantity of serving areas that more closely resemble the number actually deployed by Verizon VA.

2. Common Support Services Expense

Q. What are Common Support Services expenses?

A. Common Support Services expenses, as the name suggests, are those expenses that are common to all services. Unlike plant-specific expenses, Common Support Services expenses cannot be attributed directly to individual elements or services, but must be spread by some allocation methodology. These expenses represent a significant portion of an ILEC's total costs in providing UNEs.

Q. What is included in the Synthesis Model's definition of Common Support Services expenses?

A. The Synthesis Model defines Common Support Services expenses to include, in whole or in part, the following ARMIS accounts: Other Property, Plant and Equipment (account 6510), Corporate Operations (account 6700), Customer Operations (accounts 6610-Marketing and 6620- Services Expenses), and Plant Non-Specific Network Operations (account 6530).

1 **Q. Has Mr. Pitkin correctly implemented his changes to the Synthesis Model**
2 **regarding UNE Common Support Services expense?**

3 **A.** No. In changing the definition of Common Support expense and the method of
4 assigning this expense to UNEs, Mr. Pitkin eliminates from the Synthesis Model's
5 calculations the cost of Marketing. For those accounts that Mr. Pitkin does
6 include in the Modified Synthesis Model's calculations (e.g., Network
7 Operations, Services Expenses and Corporate Operations) -- he significantly
8 understates the expenses.

9

10 **Q. Do you agree with Mr. Pitkin that Common Support Services expenses**
11 **associated with marketing should be excluded in calculating TELRICs for**
12 **UNEs?**

13 **A.** No. Mr. Pitkin eliminates all Common Support Services expenses associated with
14 marketing because he assumes, incorrectly, that all expenses in this account are
15 retail-related and will be avoided when UNEs are provided.[67] By ignoring this
16 account, Mr. Pitkin eliminates many of the costs of UNE-related activities, such
17 as product forecasting, product management, regulatory implementation, and
18 other activities specifically devoted to assisting the wholesale market. Mr. Pitkin
19 fails to recognize that the cost in this account reflects Verizon VA's forward-
20 looking cost of providing service and does not disappear if the customer happens
21 to be a CLEC purchasing individual UNEs. Mr. Pitkin is wrong in suggesting that

[67] Pitkin Direct Testimony at pgs. 15-16.

1 the Common Support expenses included in the Modified Synthesis Model for
2 USF cost calculations should be excluded when determining UNE costs. Rather
3 than being eliminated categorically, the costs in this account should be examined
4 to determine which costs are and are not appropriate to UNE calculations.

5 **3. Network Operations Expense**

6

7 **Q. What are Network Operations expenses?**

8 **A.** Network Operations expenses are the costs required to operate the
9 telecommunications network that are common to all services. The costs include
10 power, network administration, facilities testing, and general engineering and
11 administration.

12

13 **Q. Does Mr. Pitkin appropriately account for the Network Operations expense**
14 **for UNEs?**

15 **A.** No. By manipulating the Modified Synthesis Model logic and inputs, Mr. Pitkin
16 substantially understates the Network Operations expense assigned to UNEs.
17 Specifically, Mr. Pitkin manipulates the use of forecasted lines, expenses, and a
18 hybrid version of the Commission's Common Support Services expense
19 methodology. Mr. Pitkin changes produce an out-of-model estimate of the per-
20 line or per-toll minute amount for Network Operations expense. These values
21 serve as the inputs, which are further manipulated by two new worksheets
22 inserted in the expense module. These worksheets are purportedly designed to
23 reallocate the per-unit input values to individual UNEs based on each UNEs

1 proportion of direct costs. The combined effect of Mr. Pitkin's manipulations is a
2 significant understatement of the Network Operations expense assigned to UNEs.
3 Dr. Tardiff provides additional discussion on this subject.
4
5 **Q. Why is Mr. Pitkin's calculation of Network Operations expense values**
6 **inappropriate for determining UNE cost estimates?**
7 A. Mr. Pitkin's calculation of Network Operations expense values is flawed and
8 understates the UNE cost estimates produced.[68] First, Mr. Pitkin inappropriately
9 uses a forecast of 2002 expense data, claiming that he is making the data
10 consistent with his estimated demand data.[69] However, Mr. Pitkin offers no
11 explanation to support this claim that the use of forecasted 2002 Network
12 Operations expense and demand data are consistent, or appropriate for use, with
13 the Modified Synthesis Model's expense factors, most of which are of 1998
14 nationwide vintage. Nor does he identify what adjustment, if any, he makes to
15 account for the discrepancy. Mr. Pitkin's method of developing forecasted
16 expenses suffer from the same infirmities previously identified with respect to his
17 forecast of demand.
18
19 More significantly, Mr. Pitkin inappropriately combines his flawed
20 forecast of demand and expense data to develop per-unit values for use in the

[68] The concerns expressed regarding network operations apply to all Common Support Services expense calculations that are used in the Model and manipulated in the two new expense module worksheets.

[69] Pitkin Direct Testimony at p. 14.

1 Model. Attachments D and E to AT&T/WorldCom's cost study show that Mr.
2 Pitkin has exaggerated demand growth and distorted any relationship between
3 demand and expense. The result is significantly understated unit values. As such,
4 use of Mr. Pitkin's methodology is inconsistent with the Commission's TELRIC
5 requirements.
6
7 **Q. Are Mr. Pitkin's modifications to the USF Common Support Services**
8 **methodology appropriate?**
9 **A.** No. The Common Support Services methodology was specifically designed to
10 meet the federal USF requirements. This methodology utilizes values derived
11 from a regression analysis that develops expenses as a function of the percentage
12 of switched lines, special lines and toll minutes. The values derived from the
13 regression are used as a means of allocating Common Support Services expenses
14 between the supported services and other services. Mr. Pitkin modified the
15 Commission's Common Support Services methodology by using the original
16 nationwide regression values with his forecast of nationwide switched lines,
17 special access lines and toll usage. He then used this data to apportion his year
18 2002 forecast of Verizon Common Support Services expenses to switch, special
19 access, and toll services, and then divided his Common Support Services
20 expenses figures by his forecast of year 2002 Verizon demand for these services.
21 I have a significant concern with Mr. Pitkin's modified methodology because of
22 the use of special access DS-0 lines, which I previously explained in my
23 discussion on the use of special access DS-0 line equivalents in the Modified

Synthesis Model. Using DS-0 lines in the common support methodology means that DS-3 Network Operations expenses are 672 times greater than those of a two-wire copper loop used to provide basic exchange service. Such an illogical assumption exaggerates a network's efficiencies, and thus will not produce a reliable estimate of actual Network Operations expense for any UNE.

Q. Please explain your concerns with Mr. Pitkin's manipulation of the Synthesis Model's logic to assign Network Operations expense to UNEs.

A. The use of the previously described input values introduces significant distortions regarding the data vintages used by the Model. Mr. Pitkin inserts two completely new and complex worksheets into the expense module that purportedly select the appropriate input value(s) for switched lines, special lines, and toll usage. The worksheets then assign the value to individual UNEs based on each UNEs proportion of direct costs.

The Model's use of these new worksheets effectively creates a significant modification to the expense module -- a module that, as a result, has not yet had its logic and algorithms validated. Verizon VA requested the necessary documentation in discovery, but has not yet received any information. In addition, Mr. Pitkin has not demonstrated that his new modification received any public scrutiny or has been tested by an independent third party. In effect, AT&T/WorldCom is asking the Commission and all parties in this case to trust

1 AT&T/WorldCom simply on the basis of its word, without any empirical
2 evidence to support its claim.
3
4 **Q. Explain the distortions that result from the use of forecasted 2002 Network**
5 **Operations expenses input values in the Modified Synthesis Model.**
6 **A.** Distortions are introduced into the Modified Synthesis Model as a result of
7 mixing data from significantly different time periods and different geographic
8 areas. For example, the Network Operations expenses are specific to Verizon
9 VA's operations and are based on forecasts of 2002 demand and expense levels.
10 In the Modified Synthesis Model expense module, these expenses are applied to
11 the direct costs calculated by the Model, the preponderance of which use 1998
12 nationwide expense factors and either 1997 nationwide average prices for OSP
13 facilities or 1999 nationwide average prices for digital switching and transmission
14 facilities. The net effect is a significant understatement of Network Operations
15 expenses and a distortion in the amount of Network Operations expenses assigned
16 to each UNE.
17
18 **Q. Is Mr. Pitkin's assignment of Network Operations expenses appropriate?**
19 **A.** No. The input values for each service are based on the values developed for the
20 federal USF mechanism, adjusted to reflect nationwide demand relationships and
21 then assigned to elements in the Modified Synthesis Model based on direct costs
22 developed from a forecast of Verizon VA's demand. To assume that these USF-
23 based per-unit input values can be extensively manipulated and then assigned to

individual UNEs is absurd. Any in-depth analysis, however, is significantly constrained by the absence of documentation.

Q. Has Mr. Pitkin failed to properly account for any other expenses in his UNE cost calculations?

A. Yes. Mr. Pitkin also fails to include the cost of local number portability. Mr. Pitkin assumes, incorrectly, that a CLEC's ability to purchase individual or bundled elements means that the ILEC will no longer incur these costs. This is simply not true. Additionally, Mr. Pitkin, in determining services expenses, uses a HAI Model derived surrogate value of $1.69 per-line per-year for customer service expenses in account 6623. The HAI Model documentation shows this value is based on 1996 nationwide expense and line data reflecting the cost to provide IXC access service.[70] The use of this historic nationwide expense and demand data is not based on Verizon's current cost to serve the CLEC market in Virginia and is inconsistent with the TELRIC standard that unit costs be forward-looking and based on the ILEC's provisioning of other elements.

Q. Has Mr. Pitkin used an appropriate methodology for developing forward-looking Corporate Operations expenses?

A. No. Mr. Pitkin's use of an 8 percent factor for Corporate Operations expenses is conceptually flawed and inconsistent with the assignment of other Common Support Services expenses, as well as with the Synthesis Model's logic, which

[70] HAI Model, Release 5.0a, HIPS, at Appendix C, p. 157.

1 includes these expenses as a dollar amount per unit of demand. Mr. Pitkin offers
2 little support for his 8 percent factor,[71] but my most significant concern is that Mr.
3 Pitkin's factor is being applied to a base of expenses that is inconsistent with the
4 base from which it was developed. This approach has the effect of overstating
5 efficiencies for these Corporate Operations expenses that have already been
6 accounted for in the cost base to which the factor is being applied. Mr. Pitkin's 8
7 percent factor is based on booked costs, but is being applied to a base of costs
8 already adjusted for forward-looking assumptions. This understates the resources
9 required to support the facilities and services, including UNEs provisioned by
10 Verizon VA. Even the flawed methodology employed by Mr. Pitkin for Network
11 Operations expense, is a more appropriate approach than Mr. Pitkin's use of the 8
12 percent factory.[72] Dr. Tardiff addresses the impact of Mr. Pitkin's flawed
13 approach.
14
15 **Q. What impact do the Model platform flaws you discussed in this section have**
16 **on the Model output?**
17
18 **A.** Each of the platform flaws I have identified will, to some degree, result in
19 unrealistic, unsupportable and understated cost estimates. Collectively, the
20 impact is significant. The use of the Modified Synthesis Model's code and input

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[71] AT&T/WorldCom Cost Model Documentation at Attachment A.

[72] Mr. Pitkin describes an alternative approach for assigning Corporate Operations expense using the methodology employed for the Network Operations expense component of Common Support Services. While this alternative approach is applied incorrectly, it is nevertheless an improvement on his methodology for Corporate Operations Expenses. Pitkin Direct Testimony at p. 17.

changes causes the Model to apply unrealistic engineering, service quality and economic assumptions, thus producing an insufficient number of serving areas required to serve Verizon VA's customers. The unrealistic assumptions in-turn cause the Model to underestimate forward looking costs. The Modified Synthesis Model eliminates the cost of Marketing from its calculations. By ignoring the Marketing expenses, the Modified Synthesis Model eliminates many of the costs of UNE-related activities such as product forecasting, product management, regulatory implementation and others specifically devoted to the wholesale market. The Modified Synthesis Model also significantly understates the expenses associated with Network Operations, Services Expenses and Corporate Expenses which collectively, understate the costs of providing UNEs.

IV. THE MODIFIED SYNTHESIS MODEL'S INPUT VALUES ARE FUNDAMENTALLY FLAWED (JDPL ISSUES II-1 TO 11-1-C; II-2 TO II-2-C)

A. The Underlying Default Inputs Used In The Modified Synthesis Model Are Inappropriate

Q. Are the Synthesis Model's default inputs adopted by the Commission in the Tenth Report and Order appropriate for calculating Verizon VA's cost of providing UNEs?

A. No. The Commission's Tenth Report and Order cautioned against using the inputs that were adopted for the federal USF proceeding to develop individual state UNE costs.[73] In the Order, the Commission stated repeatedly that its

[73] Tenth Report and Order at ¶¶ 30, 31, 32, 92, 238.

decisions were based on the assumption that the Synthesis Model and its input values will be used solely to produce average state cost estimates to be used when calculating federal USF support.[74] In contrast, state regulatory bodies were charged with analyzing costs in far greater detail and with much greater accuracy when calculating state USF or UNE cost estimates.[75]

Similarly, the Commission determined that the default input values included in the Synthesis Model for determining federal USF support should reflect the "nationwide average,"[76] and made "no finding as to whether nationwide values would be appropriate for purposes other than determining federal universal service support."[77]

Q. Do the Synthesis Model's default input values reflect Verizon VA's or any efficient carrier's forward-looking cost of providing UNEs in Virginia?

A. Absolutely not. The preponderance of the Synthesis Model's inputs represents nationwide values that are derived from investment and expense calculations of different vintages. Additionally, as I will discuss later, some of the Synthesis Model's values are set at embedded levels, and some of the relevant investments are simply ignored. Mr. Pitkin's updates for demand, plant-specific expenses, and

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[74] *Id.*

[75] Tenth Report and Order at ¶ 92.

[76] Tenth Report and Order at ¶ 31.

[77] *Id.* (emphasis added).

overhead do not correct any of these infirmities, and actually compound the Modified Synthesis Model's understated and distorted cost estimates.

Q. Which of the Synthesis Model's default input values are set at nationwide levels?

A. Many significant investment and expense inputs, including those used to determine OSP and switching UNE prices and costs, are based on nationwide inputs. Additionally, nationwide factors are used to calculate General Support facilities expenses. Further, the Synthesis Model's default logic used to determine costs for Common Support Services is based on nationwide data. Although, Mr. Pitkin attempts to replace some nationwide values with Virginia-specific data, in many instances he fails to do so correctly and his modifications often exacerbate the Model's underlying flaws. Other times, after review of the Virginia-specific data, and presumably not satisfied with the values, Mr. Pitkin simply decides to disregard them in favor of inappropriate nationwide values that produce understated costs.

B. The Model Inappropriately Uses Data Of Mixed Vintages

Q. Are the Synthesis Model's default values based on data from the same vintage?

A. No. The Taylor Nelson Sofres ("TNS") (formerly PNR Associates, Inc. ("PNR")) customer location and demand data used by the Synthesis Model and the Modified Synthesis Model are from different time periods. TNS customer location data are based on pre-1998 sources, with some dating back to 1990,

while the road segment data used by TNS are of 1995 vintage. In contrast, the Model's default demand data (lines and usage) associated with the TNS customer base are for 1998. Yet, each of these assorted vintages must interact to determine customer location and line requirements -- a function the Modified Synthesis Model is not designed to or is not sophisticated enough to perform.

The OSP cable and switching prices from the NRRI study also utilize data of mixed vintages. Specifically, the Synthesis Model and the Modified Synthesis Model use 1997 outside plant price levels with Commission-projected 1999 switch price,[78] and digital circuit equipment. However, the expense factors for OSP, switching (including circuit equipment) and General Support facilities are set at 1998 levels. The General Support ratios become distorted when input values with different time vintages are used with erroneous geographic levels of aggregation, including:

1. General support investment based on Verizon VA's 2000 embedded levels;

[78] The Commission states that "In order to estimate the costs associated with the purchase and installation of new switches, and exclude the costs associated with upgrading switches, we removed those switches installed more than three years prior to the reporting of their associated book-value costs." Because the Commission's preclusion of "growth jobs" excluded 70 percent of the original switches, the Commission also expanded the time period for switch costs back to 1983 in order to enlarge the data set. Tenth Report and Order at Appendix C, ¶ 2.

2. General support expense based on 1998 nationwide current levels;

3. OSP investment based on 1997 nationwide current levels;

4. OSP expense based on 1998 nationwide current levels;

5. Central office switching and transmission equipment investment based on 1999 current levels; and

6. Central office switching and transmission equipment expense based on 1998 nationwide current levels.

Effectively, AT&T/WorldCom would have the Commission believe that this "apples-to-oranges" approach produces accurate results -- in fact, nothing could be further from the truth.

Q. Is the Modified Synthesis Model's use of the NRRI study data for OSP and switching appropriate for calculating TELRIC-compliant UNEs in Virginia?

A. No. The NRRI study contains serious vintage problems that significantly reduce cost. In its analysis of OSP data, the NRRI study used RUS data from the 1990s and earlier vendor contracts that were then converted to 1997 price levels. When developing switching input values, the Commission adopted a subset of the NRRI data points and employed a time series regression to convert switch prices to 1997 levels.

To develop more current Synthesis Model input values, the Commission determined that switching and digital equipment prices should be projected to 1999 levels in order to capture expected declines in costs. However, the

Commission, in its decision to bring switch prices up to 1999 values, chose not to project the costs of OSP cable and structure or General Support facility investments, despite the fact that the data demonstrated that current investments for these items were increasing relative to book costs (in contrast to the declining switch prices). This disparity serves to inappropriately reduce costs. Not surprisingly, this model deficiency was not corrected by AT&T/WorldCom in the Modified Synthesis Model.

Q. Please explain your statement that some Model default inputs were set at embedded levels and some of the relevant investments were simply ignored.

A. For General Support facility investments, such as garages, motor vehicles, work equipment, furniture/office equipment, and buildings, the Modified Synthesis Model's methodology uses embedded relationships to calculate forward-looking investment levels. As Dr. Tardiff shows, these embedded relationships produce lower costs than the current values. In other instances, relevant investment values are simply omitted. For example, the logic of the Synthesis Model, and by default the Modified Synthesis Model, fails to include any investment for the land required by General Support facilities. The existence of these errors and omissions is no secret. The Commission has acknowledged them,[79] but concluded that both were platform issues that would be addressed in a future model proceeding. AT&T/WorldCom, however, fail to correct, or even acknowledge, either of these errors.

[79] Tenth Report and Order at ¶¶415, 418, fn. 1273.

Q. Is it appropriate for a cost model to use mixed vintages of data?

A. Cost models and cost studies often rely on mixed vintages of data to develop cost estimates. To ensure reasonable and accurate cost estimates the cost study or model developer must use care and make appropriate adjustments to maintain consistency within the cost development. For example, as explained in Verizon VA's cost panel testimony, Verizon VA made a number of adjustments to data to insure all aspects of the costs being estimated were for a consistent forward-looking time period.

AT&T/WorldCom made no attempt to insure consistency in data sources, but rather deliberately abused the use of mixed vintages of data to achieve its objective of having a model produce low UNE costs. Blatant examples of this include: 1) projecting residence and business lines four years further in time than the housing units and business location data and making no attempt to adjust the housing units and business location data to include the obvious growth that is occurring; and 2) taking advantage of the downward trend in switching costs by projecting switching investments into the future while inconsistently excluding the upward trend in OSP by using OSP investment costs from a past period.

C. The Modified Synthesis Model's Fill Factors Are Inappropriate

Q. What is a utilization factor and how is it used in the Modified Synthesis Model?

1 **A.** A utilization factor (also called a fill factor) compares the portion of a network
2 facility that is "filled" to the total capacity of the facility.[80] The Modified
3 Synthesis Model uses target fill factors to determine the capacity of various
4 facilities that will be included in the Model's hypothetical network.
5
6 **Q. Is it appropriate to use lower fill factors when calculating UNE costs than**
7 **when determining appropriate levels of universal service funding?**
8 **A.** Yes. The Commission acknowledged the appropriateness of lower UNE fill
9 factors when stating that the federal USF mechanism should reflect current
10 demand and not be burdened by the costs resulting from the industry practice of
11 building to ultimate demand.[81] Mr. Pitkin's UNE fill factors, which are higher
12 than USF fill factors, thus conflict with the Commission's recommendation
13 regarding UNE fill factors. Mr. Pitkin fails to explain why the fill factors for
14 UNEs should be higher than those for USF.
15
16 **Q. Are the Modified Synthesis Model's utilization factors attainable in an**
17 **efficient, forward-looking network?**
18 **A.** No. By using target fill factors to build distribution facilities, the Modified
19 Synthesis Model ignores accepted planning standards and guidelines for building
20 distribution facilities and builds insufficient distribution capacity to serve existing
21 demand efficiently. Likewise, the Model ignores the variety of real-world factors

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[80] Verizon VA's Cost Panel Testimony at Section IV-C-2.

[81] Tenth Report and Order at ¶ 199.

that prevent an efficiently-designed network from achieving the utilization levels assumed by Mr. Pitkin.

Q. How does the Modified Synthesis Model violate accepted planning standards and guidelines for building distribution facilities?

A. Accepted planning standards and guidelines for building efficient distribution facilities require building two or more pairs per subscriber location to accommodate subscribers' needs for multiple lines.[82] This allows local exchange carriers to activate orders for new service without incurring the added expense and delay associated with rearranging existing distribution pairs or installing additional distribution cables each time a subscriber orders an additional line at a customer location. The Modified Synthesis Model ignores these accepted industry practices and instead attempts to size distribution facilities by building a target level of spare capacity based on actual demand for the number of lines. As a result, the Model does not guarantee that at least one additional distribution pair is allocated to each subscriber location. The Model further fails to account for the resulting additional costs and delays of having to rearrange or install additional distribution pairs more frequently to meet customer demand for additional lines. The Model also fails to account properly for distribution facilities at vacant residential and business units.[83] As a result, the Modified Synthesis Model substantially understates distribution investment.

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[82] *See supra* Section III-B; Verizon VA's Cost Panel Testimony at pgs. 114-116.

[83] *See supra* Section III-B.

1

2 **Q. Does this understated distribution investment have an effect on a carrier's**
3 **ability to conform to the service quality standards imposed by the Virginia**
4 **Commission and expected by Virginia consumers?**

5 A. Yes. As previously noted, the Modified Synthesis Model fails to build
6 sufficient distribution plant to accommodate demand fluctuations and customer
7 churn. If Verizon VA had to operate a network with such undersized distribution
8 facilities, Verizon VA would not be able to fill orders for additional lines on a
9 timely basis, because it often would have to rearrange existing distribution pairs
10 or install an additional copper cable on distribution poles just to complete an order
11 for an additional line. Thus, Verizon VA thus could not meet the service quality
12 standards and order completion time lines imposed by the Virginia Commission
13 and expected by Virginia consumers.

14

15 **Q. Are the other target utilization factors used by the Modified Synthesis Model**
16 **attainable in a forward-looking network?**

17 A. No. For example, the 100 percent utilization factor for fiber strand is unrealistic
18 and fails to reflect the way fiber optic cables are actually installed, and ignores the
19 requirement for a level of administrative spare capacity necessary to perform
20 maintenance, and accommodate moves and relocations. Most sizes of fiber cables
21 are manufactured with individual strands grouped in ribbons of 12 -- it is far more
22 efficient to work with these 12-ribbon strands.[84] Though this may produce very

[84] Verizon VA's Cost Panel Testimony at pgs. 108-111.

low utilization levels (33 percent at the RT level where 4 of the 12 strands from each ribbon are in use), the added cost of the unused strands is far lower than the additional costs necessary to install cable containing loose strands (i.e., strands that are not grouped in ribbons of 12). Thus, the Model decreases costs as a result of the cost savings associated with a loose strand construction, but ignores the significantly higher installation costs associated with installing loose strands.

The Model's utilization factors for copper feeder cable, which range from 70 percent to 82.5 percent depending on the density zone, also are unreasonably high for a forward-looking network. An efficient, forward-looking network should include a sufficient amount of spare copper feeder cable (15 percent of total capacity) to accommodate administrative and maintenance needs.[85] Copper feeder facilities also must be sized to accommodate growth that occurs during the relief planning period to avoid substantial additional costs and delays associated with having to rearrange or install additional feeder facilities more frequently to meet customer demand. The Model's target utilization levels fail to provide sufficient spare capacity to accommodate these needs and the Model further fails to account for the substantial additional costs that would be associated with attempting to operate a network with inefficiently high copper feeder utilization levels.

Q. Is the line fill input in the Synthesis Model a utilization factor?

[85] Verizon VA's Cost Panel Testimony at pgs. 102-105.

1 **A.** No. The Model does not have an input for line fill.

2

3 **Q. Is Mr. Riolo's recommended change to the Synthesis Model's default input**

4 **value for line fill appropriate?**

5 **A.** No. Mr. Riolo was mistaken in his interpretation that the line fill input value

6 represents utilization of the line cards associated with a DLC system. The Model

7 documentation provided by AT&T/WorldCom specifically states otherwise:

8

9 The line fill percent specifies the percentage of the line limit that will be
10 used as a constraint by the initial divisive clustering algorithm. Since the
11 full line constraint is not met initially, the optimization routines can
12 actually reassign locations from cluster to cluster.[86]

13

14 Later in the same document AT&T/WorldCom state:

15 As explained in section 3.1 this factor seeks to determine a good
16 approximation to the cost minimizing number of clusters in more densely
17 populated regions. The line fill factor has no effect on any of the
18 clustering algorithms in sparsely populated regions. When the divisive
19 algorithm is used, a line fill factor less than (SIC) is recommended. Since
20 both the agglomerative and nearest neighbor algorithms produce a larger
21 number of clusters than the divisive, it is recommended that the line fill
22 factor be set to 100% when these algorithms are used.[87]

23 Thus the very basis for Mr. Riolo's recommendation and Mr. Pitkin's

24 implementation of this input change is unjustified and unsupported.

25 **Q. What does the Modified Synthesis Model use for utilization of the line cards**

26 **associated with a DLC system?**

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[86] AT&T/WorldCom Cost Model Documentation at Attachment B, p. 7.

[87] *Id.* at Attachment B, p. 32, fn. 30.

1 **A.** The Model does not have an input for line card utilization. The Model builds
2 remote terminals by adding the input for DLC investment per line times the
3 number of working lines to the DLC common equipment costs. For example,
4 using Mr. Riolo's recommended value, the Model would estimate the investment
5 for a remote terminal in a cluster with 1,000 working lines as $88,500 (line 3) +
6 1,000*$77.50 (line 4).[88]

7 **Q. What is the effective percent utilization of the line cards that the Modified**
8 **Synthesis Model uses?**

9 **A.** The Model uses an effective percent utilization of 100 percent, despite the fact
10 that Mr. Riolo stated that "a 90 percent utilization rate for DLC line cards is very
11 reasonable" and recommended using a 90 percent utilization for line cards.[89]

12

13 **Q. Does the Modified Synthesis Model design and estimate DLC costs**
14 **appropriately?**

15 **A.** No. Mr. Riolo[90] recognized, as did the Verizon cost panel,[91] the need to consider
16 growth demands as well as working lines in stating that the DLC design and cost
17 estimates should be based on a utilization factor for line card cost development.

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[88] Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *Direct Testimony of Joseph P. Riolo* (July 31, 2001), table on page 14 ("Riolo Direct Testimony").

[89] *Id.* at p. 38.

[90] *Id.* at pgs. 37-38.

[91] Verizon Cost Panel Direct Testimony at pgs. 104-106.

1 Due to a platform flaw, the Model fails to reflect any utilization factor in the line
2 card cost development. This platform flaw results in approximately an 11 percent
3 understatement of the DLC line card investment given Mr. Riolo's
4 inappropriately high utilization recommendation and approximately a *****Begin**
5 **AT&T Proprietary*** XXX ***End AT&T Proprietary***** understatement
6 of the line card investment given Verizon VA's more appropriate *****Begin**
7 **Verizon-VA Proprietary*** XXX ***End Verizon-VA Proprietary*****
8 factor.[92]

9 **Q. Does the Modified Synthesis Model estimate DLC costs based on a utilization**
10 **factor for the common equipment and electronics?**
11 A. No. The Modified Synthesis Model ignores the spare capacity margins needed to
12 accommodate administrative requirements and growth demands on the remote
13 terminals and inappropriately builds strictly to the working lines.[93]

14 **Q. Does the Modified Synthesis Model contain a reasonable number of remote**
15 **terminals?**
16 A. No. As I have explained, the Model drastically understates the number of
17 distribution areas and therefore also drastically understates the number of remote
18 terminals.

19

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92 *Id.* at p. 101.

93 For further discussion, see Verizon VA's Cost Panel Testimony at pgs. 102-105.

1 **D. The Modified Synthesis Model Understates Switch-Related Costs**

2 **Q. Does AT&T/WorldCom fail to account for switch growth in calculating UNE**
3 **switch costs?**

4 **A.** Yes. By failing to consider switch growth, the Modified Synthesis Model
5 understates Verizon VA's or any efficient carriers forward-looking costs of
6 providing UNEs. It is generally accepted that costs associated with switch growth
7 are higher than initial placement costs. By omitting these costs, significant switch
8 costs are being ignored.[94] Therefore, this Commission should include the costs of
9 switch growth to ensure that UNE costs more accurately reflect those costs
10 actually incurred by Verizon VA. The very fact that the regression analysis
11 utilized to develop switch investment inputs had to eliminate 70 percent of the
12 overall data points, as discussed earlier, proves that ILECs must actually grow
13 switches and incur the associated costs on a forward-looking basis.
14

15 **Q. Does the Synthesis Model understate power and main distribution frame**
16 **investment?**

17 **A.** Yes. The Modified Synthesis Model's proposed methodology produces an
18 unreasonably low figure of $8 per-line for main distribution frame ("MDF") and
19 power investment.[95] This level of power investment was purportedly based on

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[94] Tenth Report and Order at Appendix C, ¶ 2.

[95] In the Matter of the Federal-State Joint Board on Universal Service, In the Matter of Forward-Looking Cost Mechanism for High Cost Support for Non-Rural LECs, CC Docket Nos. 96-45 and 97-160, *Affidavit of Jason Zhang in Support of GTE's Petition for Reconsideration of the Commission's Tenth Report and Order* (Jan. 3, 2000) at ¶ 33. The Synthesis Model's default run produced approximately $112 per-line switching investment for Verizon. The power investment was 8 percent of that value or $8.30.

data supplied by Technology Futures, Inc. ("TFI") to the Commission. Use of this data, however, is inappropriate. Upon review of the Tenth Report and Order, TFI stated unequivocally that the Commission had misused its study. According to TFI, the actual investment for MDF and power is substantially higher than the Modified Synthesis Model's estimate. Properly interpreted, the TFI study should have produced an investment value of at least $45 per-line for MDF and power.[96] A copy of the letter from TFI is attached to this testimony as Attachment 4.

Q. How does the Modified Synthesis Model account for central office construction?

A. Central office buildings provide space for switches, distributing frames, transmission equipment, power equipment, and other supporting hardware. The Modified Synthesis Model uses several input tables to compute building construction costs and land investment. These tables include a range of central office space to support different line size switches, a unit construction cost that varies by line size, and a land cost based on line size. In developing its land and building investment, the Modified Syntheses Model relies on the Model's default table values.

Q. Does the default input value for central office construction differ greatly from AT&T's own experience?

[96] *Id.* at ¶ 34.

1 **A.** Yes. In response to a Verizon VA data request, AT&T stated that its central
2 office construction costs averaged *****Begin AT&T Proprietary*****
3 **XXX***End AT&T Proprietary*****[97] The default value in the Synthesis
4 Model, and the Modified Synthesis Model, for central office construction ranges
5 from $75 to $150 per square foot.[98] Even adding in the Model's most expensive
6 land cost ($20 per square foot) results in a construction cost of $190 per square
7 foot.[99] This is yet another instance in which AT&T/WorldCom has
8 acknowledged a difference between its actual costs and the grossly understated
9 costs used in the Modified Synthesis Model.
10

11 **E. AT&T/WorldCom's Input Modifications Are Inappropriate,**
12 **Uncorroborated, And Result In Additional Errors**

13
14
15 **Q. What input modifications has AT&T/WorldCom made to the Synthesis**
16 **Model?**
17 **A.** Mr. Pitkin, in collaboration with Mr. Riolo, has introduced numerous and
18 significant changes to the Synthesis Model's inputs. Mr. Pitkin's modifications
19 exacerbate flaws in the Synthesis Model, are unsupported and uncorroborated by
20 any credible evidence, and significantly understate the cost estimates produced by
21 the Model.

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[97] Before the Federal Communications Commission, CC Docket Nos. 00-218, -249, -251, *AT&T's Response to Verizon VA's First Set of Data Requests, Request No. VZ-VA I-6 (h)* (July 9, 2001).

[98] HAI Model, Release 5.0a, Inputs Portfolio at p. 78.

[99] *Id.* at p. 79. The land costs per square foot is adjusted by the default lot size multiplier of 2.

1 **1. Structure Sharing**

2 **Q. Does the Modified Synthesis Model account for structure sharing?**

3 **A.** Yes. The Modified Synthesis Model, through its input values, accounts for
4 several types of OSP structure sharing, including: 1) sharing between an ILEC
5 and other utilities, 2) sharing between an ILEC's distribution and feeder facilities,
6 and 3) sharing between an ILEC's feeder and interoffice facilities. The Modified
7 Synthesis Model does not contain explicit input values to account for sharing
8 between distribution and feeder cable structure, although my testimony will
9 explain that some amount of sharing can occur within the Model.
10

11 **Q. Are AT&T/WorldCom's proposed structure sharing adjustments**
12 **appropriate?**

13 **A.** No. Mr. Pitkin's adjustments to the default inputs to reflect the sharing of
14 structure with other utilities and between feeder and distribution facilities are
15 inconsistent with the design assumptions and input values reflected in the
16 Modified Synthesis Model. The Modified Synthesis Model separately designs the
17 network for loop feeder, loop distribution, and inter-office transport based on the
18 assumed demand requirements unique to each. Therefore, the structure costs
19 incorporated in each of these separate designs does not reflect the additional costs
20 that may be required when designing a real-world network based on the demand
21 for all services. Similarly, the Modified Synthesis Model's structure costs do not
22 reflect the additional costs necessary to support the sharing of facilities with other

1 utilities (e.g., IXCs, CLECs, cable TV operators, and municipalities).[100] As such,
2 the Synthesis Model, with or without AT&T/WorldCom's adjustments, does not
3 produce TELRIC-compliant costs for UNEs.
4
5 **Q. Are Mr. Pitkin's adjustments to the default inputs that reflect sharing of**
6 **structure with other utilities appropriate?**
7 **A:** No. Mr. Pitkin adjusted the Synthesis Model's nationwide average default values
8 for structure sharing with other utilities allegedly to reflect more appropriate
9 forward-looking values for Verizon VA. He claims that these adjustments were
10 made on the basis of Mr. Riolo's recommendation. Surprisingly, however, Mr.
11 Riolo's testimony does not refer to this recommendation or discuss his proposed
12 changes. Thus AT&T/WorldCom has offered no rationale or support whatsoever
13 for changing these input values from their default levels. Predictably, in making
14 this one unsupported change, plant investment is reduced by $293 million and the
15 statewide average loop cost by $0.78.[101]
16
17 In many cases, the input value changes proposed by Mr. Pitkin were taken
18 from the HAI Model. However, Mr. Pitkin did not adjust these input values to
19 reflect the differences in feeder and distribution plant. Additionally, Mr. Pitkin

[100] In its Tenth Report and Order, the Commission recognized that issues such as the size and spacing of poles may either require a platform change or may be considered in a future proceeding to address changes to the Model. Tenth Report and Order at ¶ 222, fn. 804.

[101] See footnote to Table 1 of my testimony for an explanation of the development of the investment and loop cost change.

fails to explain why the structure sharing values for UNE cost calculations should be significantly lower than those adopted for use in the federal USF mechanism.

To appropriately account for sharing of structure with other possible users, the Model must have the capability to reflect the investment in structure made to accommodate other utilities. The Model only looks at the structure needed to meet the ILEC's current demand and sizes the structure accordingly. For example, the Model sizes poles and determines the spacing between poles based on the ILEC's current demand. It does not account for the facilities of other utilities such as electric companies, cable TV companies, CLECs and municipalities.

Further, the sharing must reflect the operating realities in Virginia faced by all possible uses of that structure. Almost without exception, every possible user of the structure needs to also consider available structure type (owned or shared) and the costs they face based on currently available technology, prices, local ordinances, and safety.

These considerations are not reflected in the Modified Synthesis Model's input values for sharing. As a result, Mr. Pitkin's reduction of the sharing values and the associated costs for most underground structure by as much as 50 percent, and for buried structure by as much as 67 percent are inappropriate and unjustified.

1

2 **Q. Are there other reasons why AT&T/WorldCom's adjustment for structure**
3 **sharing with other utilities is inappropriate?**

4 **A.** Yes. Significantly, for buried structure Mr. Pitkin assumes the opportunities for
5 sharing with other utilities will not vary by density zone. However, even the
6 Synthesis Model's default values recognized that there would be no measurable
7 sharing opportunities in the lowest density zones, and that the amount of sharing
8 opportunities would generally increase with density.

9

10 In addition, for aerial structure, Mr. Pitkin assumes that opportunities for
11 sharing with other utilities will reduce an ILEC's pole structure costs by 10 to 25
12 percent, depending on the density zone. Although sharing of aerial structure does
13 occur, the values proposed by Mr. Pitkin are unrealistic and assume efficiencies
14 that do not exist. Mr. Pitkin's change is nothing more than an attempt to produce
15 artificially low aerial structure costs that will be reflected in the costs produced
16 for the loop and inter-office transport elements.

17

18 **Q. Can you illustrate how AT&T/WorldCom's improper values for structure**
19 **sharing with other utilities affect costs?**

20 **A.** Yes. The following table shows the potential impact that an inaccurate value for
21 structure sharing with other utilities will have on pole costs. For illustrative