

forward-looking costs of provisioning UNEs. There is little room for debate on this point. The Commission has repeatedly and unequivocally stated that its universal service cost model should not be used to estimate the state-specific costs of UNEs. Nevertheless, AT&T/WorldCom continue to insist that the MSM, which differs from the Synthesis Model only where Petitioners found the resulting costs too high, can assess Verizon VA's specific TELRIC UNE costs.

Nothing could be further from the truth. Rather than remedy the Synthesis Model's deficiencies, AT&T/WorldCom have exacerbated its flaws, producing a cost model that they were forced to acknowledge throughout the course of this proceeding is replete with errors, and that is no more capable of assessing state- or company-specific UNE costs than its predecessor. AT&T/WorldCom's efforts to persuade the Commission otherwise ultimately reveal that their rationale for using the MSM — a cost model they do not even use in other pending UNE proceedings<sup>122/</sup> — amounts to nothing more than a desire to produce low costs, regardless of accuracy or plausibility.

**A. The Synthesis Model Was Designed Solely for Universal Service Proceedings, and Neither It Nor the MSM Can Assess State- and Company-Specific Costs.**

**1. The Synthesis Model Has Never Been Evaluated as or Demonstrated to Be a UNE Costing Model.**

Petitioners acknowledge, as they must, that the Synthesis Model was “developed for the purpose of setting universal service subsidies.” (AT&T/WCom Br. at 12.) They argue that their MSM nonetheless is appropriate for use in a UNE proceeding to “estimate the costs that an

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<sup>122</sup> AT&T is simultaneously sponsoring a version of the HAI Model in the ongoing Massachusetts UNE proceeding and a reconstituted version of Verizon's cost model in the Washington, D.C. UNE proceeding. (Tr. at 4281-82.)

efficient firm would incur to provide unbundled network elements.” (AT&T/WCom Br. at 12 .) Yet it is questionable that even they believe this is true. Just months ago, in oral argument before the Supreme Court, WorldCom argued that “[the investment from the Synthesis Model] is too low. And the FCC specifically said it was too low . . . because it’s designed to calculate universal service subsidies at the very most basic low level.”<sup>123/</sup>

Nonetheless, AT&T/WorldCom seek to defend the use of the MSM in these proceedings by repeatedly quoting from the Commission’s various universal service orders analyzing the value of the Synthesis Model itself. (See AT&T/WCom Br. at 28-30.) But these quotes do nothing to advance or substantiate Petitioners’ argument that the Synthesis Model (or the MSM) are useful for UNE proceedings: they demonstrate only that the Commission has found the Synthesis Model to be capable of identifying the relative cost differences among states. The same is true for their defense of the Synthesis Model as having been “the subject of rigorous analysis and examination.” (AT&T/WCom Br. at 27.) None of the “rigorous analysis” relates in any way to whether the Synthesis Model has any utility for UNE costing purposes.<sup>124/</sup>

Furthermore, AT&T/WorldCom’s suggestion that the Commission implicitly contemplated that its model “had the flexibility” for use in UNE costing purposes (AT&T/WCom Br. at 29) is belied by the Commission’s repeated pronouncements that the Synthesis Model should be used only for universal service purposes. As the Commission has

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<sup>123/</sup> Oral Argument, *Verizon Communications, Inc. et al. v. Federal Communications Commission, et al.*, Docket Nos. 00-511, 00-555, 00-587, 00-590, and 00-602 at 74. (Oct. 10, 2001) (“*Supreme Court Argument*”).

<sup>124/</sup> Whether Verizon and its predecessor entities were “full participants in the USF proceedings” is irrelevant. (AT&T/WCom Br. at 40.) Regardless of the extent of the participation by interested parties, the proceedings did not address the suitability of the Synthesis Model for estimating state- and company-specific UNE costs.

stated, it “never used the USF cost model to determine rates for a particular element, nor was it designed to perform such a task.”<sup>125/</sup> Moreover, the quote Petitioners select to support their erroneous claim (*see* AT&T Br. at 30) demonstrates the Commission’s recognition that even its *input values* likely were not useful for UNE costing purposes — something Petitioners nonetheless disregard whenever use of such inputs serves their needs.

## **2. The Synthesis Model’s Focus on Universal Service Concerns Makes It and the MSM Incapable of Estimating UNE Costs.**

The fact that the Synthesis Model “is designed to calculate universal service subsidies at the very most basic level” renders the model — and its progeny, the MSM — incapable of estimating company- and state-specific UNE rates with any accuracy. For example, as Petitioners admit, the Synthesis Model was designed specifically to calculate the cost of operating network facilities that provided *only* those “services that were eligible for universal service support.” (AT&T/WCom Br. at 29; *see also* VZ-VA Ex. 109 at 12; VZ-VA Ex. 108 at 4-5, 9.) Accordingly, the Synthesis Model, by design sacrificed the specificity needed to produce cost estimates for the full range of UNEs that are unrelated to the provision of basic service. (*See* AT&T/WCom Br. at 26.)

AT&T/WorldCom nonetheless erroneously portray their MSM as capable of modeling “the costs that an efficient supplier would incur, over the long run, to supply *the entire output of*

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<sup>125/</sup> Memorandum Opinion and Order, *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*, 16 FCC Rcd 8988, 9003-04, ¶ 32 (rel. April 16, 2001) (“Massachusetts § 271 Order”); *see also*, *Tenth Report and Order* at 20172, 20229, ¶¶ 32, 162.

*network elements currently produced by Verizon.*” (AT&T/WCom Br. at 12 (emphasis added).)

This is absurd: the MSM is not designed to model, nor can it be modified to account for, the costs of the full and robust network that is the focus of UNE proceedings. (See VZ-VA Ex. 108 at 7-12; VZ-VA Ex. 109 at 10-12.) For example, in developing the Synthesis Model, the Commission made the conscious decision not to consider the additional cost necessary to support a network that is capable of delivering very advanced services.”<sup>126/</sup> As a result, the Synthesis Model, and by default the MSM, are fundamentally incapable of modeling a network capable of providing UNEs that Verizon VA is obligated to offer, such as, ISDN, DDS, DS1, DS3, and dark fiber. (VZ-VA Ex. 109 at 21.)

Indeed, AT&T/WorldCom acknowledge that the MSM is capable of producing cost estimates for only 8% of the more than 160 UNEs that are at issue in this proceeding. (AT&T/WCom Ex. 14, Att. A; AT&T/WCom Ex. 12, Att. 1.) For example, AT&T/WorldCom recognize that the MSM cannot calculate the cost of 4-wire, DS1, and DS3 loops, stating that these costs had to be determined by Mr. Pitkin outside of the MSM “using inputs derived from the [MSM].” (AT&T/WCom Br. at 36; *see also* VZ-VA Ex. 109 at 21.) Such tinkering cannot compensate for the MSM’s inherent inability to itself model the costs for the full range of UNEs.

Moreover, while AT&T/WorldCom argue that Verizon VA has confused the particular application of the Synthesis Model with “the capabilities inherent in the Synthesis Model’s platform” (AT&T/WCom Br. at 37), they have not shown that the MSM platform is capable of producing reliable UNE cost estimates. To the contrary, the MSM’s underlying platform

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<sup>126/</sup> *Fifth Report and Order, In re Federal-State Joint Board on Universal Service, In re Forward-Looking Cost Mechanism for High Cost Support for Non-Rural LECs*, 13 FCC Rcd 21323, 21352 ¶ 70 (Oct. 28, 1998).

prevents it from accurately measuring the forward-looking costs that Verizon VA or, for that matter, any efficient carrier, would incur in providing the full range of UNEs required by the Commission. (VZ-VA Ex. 108 at 3, 11-12; VZ-VA Ex. 109 at 10-11.)

**3. Petitioners' Numerous Adjustments to the Synthesis Model Cause the MSM to Produce Lower, Not More Accurate, Costs.**

Petitioners assert that in designing the MSM, they made “appropriate adjustments” to the Synthesis Model to make it UNE-compliant. (AT&T/WCom Br. at 30.) Of course, many of those “adjustments” are algorithms, data sources, and input values that the Commission has expressly rejected, and that numerous state regulatory commissions have failed to adopt, because they are unreliable or inaccurate.<sup>127/</sup> (See, e.g., VZ-VA Br. at 145-47; VZ-VA Ex. 109 at 5-6.) As Verizon VA demonstrated in its initial brief (VZ-VA Br. at 132-67), AT&T/WorldCom’s various modifications were made based on only one objective: producing the lowest UNE rates possible for the limited number of UNEs accounted for by the MSM.

Moreover, the “adjustment” process to make the MSM a supposedly relevant model appears to be an ongoing one. Not only did AT&T/WorldCom make initial “adjustments” that allegedly render the MSM a better UNE costing tool than the Synthesis Model, but they then also were forced to “correct” a series of errors that Verizon VA identified throughout the course of

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<sup>127/</sup> Specifically, the Commission has explicitly rejected AT&T/WorldCom’s proposed coding changes relating to node selection criteria (*i.e.*, the so-called unmodified PRIM algorithm) (VZ-VA Ex. 109 at 67), and, among other things, has failed to adopt AT&T/WorldCom’s proposed input changes regarding untenable structure sharing inputs, erroneous plant mix assumptions, (*id.* at 20258-59), and understated DLC input values (*Tenth Report Order*, 20258-59, ¶¶ 236-38; 20261-62, ¶¶ 244, 247; 20275 ¶¶ 278-79). Notably, at the same time as Petitioners advance these rejected “adjustments,” they repeatedly argue that Mr. Murphy’s criticisms of the MSM should be dismissed because they have been rejected by the Commission. (AT&T/WCom Br. at 22, 30-36, 121.)

these proceedings. AT&T/WorldCom detail “approximately 20 inputs and algorithms” made to the MSM’s flawed Switching and Interoffice Module<sup>128/</sup>; describe no less than 14 input changes to the MSM defaults purportedly “to include Virginia-specific data and to reflect more realistic assumptions about the Verizon Virginia network . . . .” (AT&T/WCom Br. at 34); and acknowledge numerous alleged “fixes” to remedy defects such as the dropping of entire wire centers (Tr. at 4306-08), problems with sizing the SAI/FDI (Tr. at 4328-29), and the overstatement of the number of special access lines (Tr. at 4328.)

These “adjustments” and corrections do not transform the Synthesis Model into a proper UNE costing tool; if anything, they make things worse — in the end, they produce cost estimates that are far below any reasonable indicator of the cost that any carrier would incur to provide UNEs in a functioning network in Virginia, or anywhere else. As set forth in Verizon VA’s brief, when compared to other models and the current costs incurred by Verizon VA and other competitive carriers, the MSM produces cost estimates that simply have no relevance to the costs that are or could be associated with operating a local exchange network today or in any plausible forward-looking construct. (*See* VZ-VA Br. at 133-35; VZ-VA Ex. 109 at 4-6; VZ-VA Ex. 108 at 3-7.)

Petitioners argue that any differences between their current model and the results of other models, or the real world, are easily explained away. But their explanations fall short. First,

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<sup>128/</sup> (AT&T/WCom Br. at 36; *see also* AT&T/WCom Br. at 34 (admitting that the MSM did not flow through approximately 6% of the network operations expenses).). In fact, even Mr. Pitkin recognized that the MSM fails to flow through at least 13% of the network operations expenses, not 6% as claimed in AT&T/WorldCom’s initial brief. (*See* AT&T/WCom Ex. 14 at 72; AT&T/WCom Ex. 104.) Moreover, Mr. Pitkin did not “correct” this error on surrebuttal. As Dr. Tardiff explained, the actual shortfall was 25%, not 6%. (VZ-VA Ex. 162 at 17-18.)

they seek to dismiss the comparison between the MSM's outputs and the outputs of other models, in particular the HAI model, on the ground that the models used inputs from different years and different methodologies for determining customer locations. (*See* AT&T/WCom Br. at 41.) What Petitioners ignore is that, because both models are designed to estimate forward-looking costs, their results should be roughly similar, especially because loop costs have, if anything, been increased, not decreased. Instead, the loop costs produced by the two models differ substantially: the alleged loop costs in Virginia calculated in 1997 under the HAI model decreased by almost 50% over four years according to the MSM. (VZ-VA Ex. 108 at 5-6.)

Petitioners similarly do little to explain how the numbers produced by the MSM can be plausible given the significantly higher current costs of Verizon VA's existing network (or expended by CLECs building their own networks). Their general argument that current networks are embedded or inefficient (AT&T/WCom Br. at 42) are beside the point: the comparison with current costs is designed merely to show the large chasm between existing costs and those produced by the MSM — not to support recovery of such existing costs.<sup>129/</sup> That chasm takes on even more significance when one considers that the *lower* investment costs of the MSM are intended to cover a network with significantly *more* lines and *more* plant than exist in Verizon VA's current network. (VZ-VA Ex. 108 at 35-39; VZ-VA Ex. 154.)

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<sup>129/</sup> Although Petitioners seek to discredit the comparison by suggesting that Dr. Tardiff's estimate of existing costs includes ARMIS data relating to "various investments and costs that are not causally attributable to the provision of UNEs" (AT&T/WCom Br. at 43), they do not even identify the amount of such allegedly unrelated costs. In any event, the investments that AT&T/WorldCom question, such as DSLAMs, unquestionably constitute such a small percentage of the costs in ARMIS, that the effect would be de minimis.

**B. The MSM's Loop Module Platform Is Fundamentally Flawed and Produces Unrealistic and Unjustified UNE Loop Cost Estimates.**

The MSM's Loop Module platform relies upon erroneous methodologies and untenable engineering assumptions to produce substantially understated cost estimates for only a handful of the loop UNEs that Verizon VA is obligated to provide. Notwithstanding AT&T/WorldCom witness Mr. Pitkin's repeated efforts to correct a number of the Commission's "implementation errors" (AT&T/WCom Br. at 32; AT&T/WCom Ex. 1 at 9-10), the MSM's Loop Module platform remains unsuitable for estimating UNE costs.

**1. The MSM's Misguided Use of DS0 Equivalents To Model High Capacity Special Access Services Produces Artificial Economies of Scale That Understate UNE Cost Estimates.**

Petitioners contend, and Verizon VA agrees, that it is important to "use a consistent standard to allocate shared costs" in the network across DS1 and DS3 services. (AT&T/WCom Br. at 124.) However, AT&T/WorldCom's use of DS0 equivalents to accomplish this task is fundamentally flawed.<sup>130/</sup> While AT&T/WorldCom contend that the MSM is "quite conservative in its use of DS0 equivalents" (AT&T/WCom Br. at 124, n.113), they have confused the appropriate use of DS0 equivalents to *allocate the costs* of capacity in a system with the inappropriate use of DS0 equivalents to *design a network* and calculate high-capacity UNE loop rates based on basic, 2-wire UNE loop rates. Although AT&T/WorldCom continue to ignore Verizon VA's principal arguments by claiming that concerns over the use of DS0

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<sup>130/</sup> The term "DS0 equivalent," borrowed from the convention in ARMIS for reporting of special access services, has no practical relevance in either network engineering or cost estimating. In the real world, technical equipment requirements and network investments are not functions of DS0 equivalents.

equivalents “relate[] only to cost allocation” (AT&T/WCom Br. at 125), the contrary is true: Verizon VA has repeatedly and specifically criticized AT&T/WorldCom’s use of DS0 equivalents of high-capacity demand to *size* the network in the MSM.

As AT&T/WorldCom admit, the MSM constructs “an individual loop for each DS0 equivalent.”<sup>131/</sup> (AT&T/WCom Br. at 124, n.113; VZ-VA Ex. 109 at 31-32.) Thus, for example, the MSM models high-capacity services as “equivalent” numbers of 2-wire POTS business lines (VZ-VA Ex. 109 at 29-31), building 24 ordinary loops for each DS1.<sup>132/</sup> Such an assumption is preposterous — DS1s are provisioned over *two* physical copper pairs (or over fiber). (Tr. at 4395 (Murphy); VZ-VA Ex. 109 at 31-32.) By thus overstating the number of loops, the MSM substantially overbuilds distribution plant — the single largest component of loop costs. (VZ-VA Ex. 109 at 20-22, 85.) This overstatement of loop plant in turn operates to significantly *understate* the costs of an individual 2-wire loop, because it results in unattainable economies of scale in the MSM’s hypothetical network. (VZ-VA Ex. 109 at 32.)

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<sup>131/</sup> The version of the MSM that Petitioners initially filed on direct included in its projected line counts DS0 equivalents for DS0, DS1, and DS3 special access services. Verizon VA recognizes that the version of the MSM filed on surrebuttal does not include DS0 equivalents for DS3 services, though Petitioners have not explained why they removed DS3 demand from their projected line counts. (Tr. at 4521.) Nevertheless, Verizon VA’s criticisms of the treatment of special access demand apply with equal force to the inclusion of DS0 equivalents for DS1 services.

<sup>132/</sup> AT&T/WorldCom wrongly claim that the ARMIS demand data reflects a smaller ratio of DS0s for each DS1 and DS3 service. However, the 8-to-1 ratio of DS0s per physical private line cited by AT&T/WorldCom (AT&T/WCom Br. at 125-26) includes DS0, DS1, and DS3 physical private lines. *See* FCC Report 43-08 Report Definition, Table III, Column Descriptions at 22-23 (Dec. 2000). Naturally, the inclusion of DS0 private lines in this data lowers the overall ratio of DS0s per physical line. However, this does not change the fact that the ARMIS demand data are developed using the ratios of 24 DS0s for each DS1 and 672 DS0s for each DS3.

AT&T/WorldCom's use of inconsistent DS0 equivalents to *price* high capacity UNE loops based on the basic 2-wire UNE loop rate is also incorrect. Although AT&T/WorldCom assume that each DS1 is "equivalent" to 24 business lines when calculating the number of physical loops to include in the MSM's hypothetical network, when calculating the *price* of a DS1 UNE loop, AT&T/WorldCom assume that the *cost* of a DS1 line is "equivalent" to the cost of only 4.3 loops. Thus, instead of multiplying the unit cost of a loop by 24 — a calculation that would appropriately account for all of the physical loops built into the MSM based on its use of DS0 equivalents — AT&T/WorldCom multiply the unit cost by only 4.3. Using Petitioners' internally inconsistent cost recovery multipliers, Verizon VA would never be able to recover the already understated loop costs produced by the MSM.<sup>133/</sup> (See VZ-VA Br. at 149 (explaining that under Petitioners' approach, Verizon VA would underrecover loop costs by \$8.7 million per month).)

Contrary to Petitioners' suggestion, the fact that Verizon VA uses DS0 equivalents in its own cost study to allocate the cost of fiber, poles, and conduit does nothing to bolster

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<sup>133/</sup> AT&T/WorldCom erroneously claim that Mr. Pitkin's 4.3 factor allows for a complete recovery of all the UNE costs produced by the MSM. (AT&T/WCom Br. at 126.) At the hearing, Mr. Pitkin's example assumed that there were 30 high-capacity special access services, with an average of 8 DS0s per-service, and that the MSM produced a cost of \$100 per DS0. Therefore, if the special access service price were 8 times the ordinary DS0 price, according to Mr. Pitkin's example, the special access services would recover the full cost assigned by the MSM. But, Mr. Pitkin's example is not consistent with his DS1 cost factor. His multiple of 8 DS0s per special access service would arise from a mixture of *DS0 and DS1* special access services (see AT&T/WCom Ex. 14 at Attachment D), in which approximately 21 of the 30 services were DS0s and the remaining 9 were DS1s  $(21 \times 1 + 9 \times 24)/30$  is approximately 8). Only by charging the voice grade price for each of the 21 DS0s and charging 24 times that for each of the 9 DS1s would Verizon VA be able to obtain an average price for special access lines that is 8 times higher than the ordinary voice grade price. But Mr. Pitkin in fact assumes that DS1s are only 4.3 times the voice grade price, producing a cost-recovery shortfall as a matter of simple arithmetic. (AT&T/WCom Ex. 1 at 26.)

AT&T/WorldCom's argument. (AT&T/WCom Br. at 125.) Verizon VA's cost studies use DS0 (or voice grade) equivalents solely to determine the portion of a shared facility's capacity costs that should be attributed to different services that use capacity on that facility. It is difficult to see how Petitioners can seriously contend that this lends any credence to their attempt to model high-capacity demand equivalents as though they were provisioned on ordinary copper distribution facilities or to their use of DS0 equivalents to determine UNE prices.

**2. The MSM's Customer Location Data Is Incapable of Identifying Any Actual Customers in Verizon VA's Service Area.**

AT&T/WorldCom concede that accurate demographic data is "critical to ascertain the proper forward-looking economic cost of the loop." (AT&T/WCom Br. at 8.) However, their suggestion that the MSM's demographic data is "precise" and able to "determine the location of *actual customers* throughout Verizon Virginia's service area" is simply not true. (AT&T/WCom Br. at 8 (emphasis added).) The customer location data on which the MSM relies has not been updated since 1997, with some data dating back to 1990. (VZ-VA Ex. 109 at 79, 118.) Accordingly, the surrogate customer locations and road segments used by the MSM do not reflect the current base (much less the 2002 projected base) of Verizon VA's customers. Furthermore, as the Commission noted in connection with customer location inputs in the Synthesis Model, "surrogate customer locations are uniformly distributed along the road segments [located within each Census Block] . . . Census Blocks that are not assigned to any current wire center have been assigned to the nearest known wire center."<sup>134/</sup> Thus, even if the

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<sup>134/</sup> *Tenth Report and Order* at 20177 ¶ 43; *see also* 20173-74, ¶ 36 ("We conclude below that we will use an algorithm based on the location of roads to create surrogate geocode data on

MSM's customer location data were more current, it still would not identify critical data such as the actual locations of households, wire center boundaries, and line counts by wire center. (VZ-VA Ex. 109 at 116-17; VZ-VA Ex. 108 at 10-11.)

**3. The Modified Synthesis Model Ignores Standard Network Design Limitations by Modeling Copper Loops That Exceed 12,000 Feet.**

Petitioner contend that it is entirely appropriate for the MSM to utilize 18,000 foot copper loops, even though such loops fail to conform to widely-accepted network design limitations. Although, as Petitioners note, the Carrier Serving Area ("CSA") 12,000 foot constraint is not an "absolute ceiling" (AT&T/WCom Br. at 128), copper loops exceeding 12,000 feet are extremely rare and typically located in only a small number of rural, low-density serving areas. In the vast majority of instances, the real-world economic imperative to minimize distribution lengths relative to feeder lengths results in maximum distribution lengths that are well below 12,000 feet. (See VZ-VA Ex. 109 at 24.) The MSM ignores this constraint. In fact, it creates inefficiently large clusters that *require* longer distribution cables, thereby designing a network inconsistent with standard engineering practice and economically efficient outside plant design.

Petitioners argue that their approach is justified by the Commission's decision to ignore the CSA standard when developing the Synthesis Model to estimate the costs of providing certain narrowly defined services. (AT&T/WCom Br. at 127-29.) But the network that must be considered for UNE costing purposes must be capable of providing services and network elements that are not at issue in a universal service proceeding, such as those used in connection

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customer locations for the federal mechanism until a source of actual geocode data is identified and selected by the Commission.").

with advanced services. AT&T/WorldCom's assertion that copper loops up to 18,000 feet are capable of supporting advanced services is simply not true. (AT&T/WCom Br. at 128.) The CSA 12,000 foot loop limitation is the standard employed by the industry to accommodate all digital services. (VZ-VA Ex. 109 at 19; *see also* VZ-VA Ex. 19, Att. 2.) Any deviation from this standard could prevent the delivery of the many services currently offered over basic loops (*i.e.*, a modem speed greater than 28.8 kbs, ISDN, DDS).<sup>135/</sup> (VZ-VA Ex. 109 at 19.) Indeed, in prior proceedings, AT&T/WorldCom admitted that the MSM's 18,000 foot loop design cannot support high-capacity services.<sup>136/</sup>

Finally, although AT&T/WorldCom next suggest (wrongly) that Verizon VA has not identified a single loop modeled by the MSM that exceeds the 12,000 foot standard (AT&T/WCom Br. at 129), their own witnesses acknowledged the existence of such loops; indeed, Ms. Murray conceded that at least "a relatively small percentage of loops" constructed by the MSM exceed 12,000 feet. (Tr. at 3209; *see also* AT&T/WCom Ex. 18 at 3.)

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<sup>135/</sup> AT&T/WorldCom's argument that Verizon VA provisions high-speed services over loops that were "designed before the current CSA guidelines were in practice" (AT&T/WCom Br. at 129) is unavailing. The fact that a loop was deployed before the CSA standard was formalized does not necessarily mean that the loop exceeds 12,000 feet, and AT&T/WorldCom have not provided any evidence to the contrary.

<sup>136/</sup> *See, e.g., Fifth Report and Order* at 21351-52 ¶ 69 ("Although the HAI proponents [which included AT&T/WorldCom] admit that their plant design cannot support ADSL2 using a loop length of 18,000 feet, they argue that the higher speed of ADSL2 is not a component of basic service supported by universal service.").

**4. Contrary to AT&T/WorldCom's Claims, the MSM Consistently Creates an Inefficiently Small Number of Large Distribution Areas.**

AT&T/WorldCom make the patently unreasonable claim that the overly large distribution areas modeled by the MSM are somehow appropriate and may even be “advisable depending on the size of the [serving area interface (“SAI”)].” (AT&T/WCom Br. at 130.) In the real world, higher utilization and lower unit costs make *feeder* plant inherently more economically efficient than distribution plant; as a result, efficient outside plant design *maximizes the feeder* length and *minimizes the distribution* length in the network’s loop plant. (VZ-VA Ex. 109 at 24-26.)

The MSM ignores these fundamental network design parameters and consistently creates an inefficiently small number of large distribution areas, or “clusters.” As Mr. Pitkin testified, the MSM’s abstract algorithms create only 4,807 serving areas to serve the MSM’s 5.6 million DS0 equivalent “lines,” whereas Verizon VA’s actual network has over 11,500 distribution areas serving approximately 3.7 million narrowband lines. (VZ-VA Ex. 109 at 20; VZ-VA Ex. 142; AT&T/WCom Ex. 14, at Att. D.) This smaller number of distribution areas in turn requires relatively longer distribution lengths to connect customer locations to the serving area interfaces. Such results defy widely-accepted network engineering practices and sound economic principles.

Though Verizon VA recognizes that, as Petitioners argue, distribution areas are “flexible in the number of living units [they] can contain” (AT&T/WCom Br. at 130),<sup>137/</sup> Mr. Riolo’s suggestion that distribution areas commonly exceed 600 living units is simply not true. In practice, real-world engineering constraints typically produce SAIs, and hence distribution areas,

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<sup>137/</sup> For example, in some instances, like big apartment complexes, the number of living units can be much higher than 600, and in rural areas, very small distribution areas may be unavoidable.

that serve 200-600 living units.<sup>138/</sup> (VZ-VA Ex. 109 at 28.) The MSM's inefficient and unrealistic outside plant design, however, models a network in which 24.8% of the distribution areas exceed 600 living units. (VZ-VA Ex. 109 at 28; VZ-VA Ex. 142.) By consistently failing to reflect all of the added costs associated with the MSM's inefficient design of distribution plant and minimizing the length of feeder plant, AT&T/WorldCom understate distribution investment and create an inherently inefficient feeder architecture. (See VZ-VA Br. at 111, 144; VZ-VA Ex. 109 at 24-25.)

**5. AT&T/WorldCom's Misguided Attempt to Derive a 4-Wire Loop Cost from the MSM's Erroneous 2-Wire Loop Cost Estimate Produces Artificial Economies of Scale.**

AT&T/WorldCom's attempt to justify their incredibly understated 4-wire loop cost should be dismissed by the Commission. AT&T/WorldCom's cost estimate is premised on the faulty assumption that the MSM's 2-wire loop cost, and each of its components (the network interface device, concentration function, and feeder and distribution elements), are accurate.<sup>139/</sup> In fact, Verizon VA has demonstrated that the MSM lacks the ability to calculate these component costs with sufficient specificity and accuracy. (VZ-VA Ex. 109 at 38-40.)

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<sup>138/</sup> Moreover, AT&T/WorldCom provide no evidence that the MSM's clustering algorithm produces an efficient result. The Commission adopted the Synthesis Model's clustering algorithm based solely on its use in rural areas and acknowledged that that algorithm, designed to create the smallest number of large clusters, might not be efficient in high-density areas. (AT&T/WCom Ex. 23, Att. B at 5.)

<sup>139/</sup> Petitioners' claim that the MSM overstates 2-wire loop UNE costs (AT&T/WCom Br. at 168) is meritless. As explained above, the MSM's flawed assumption that high capacity special access DS0 equivalents are provisioned over 2-wire copper loops causes *all loop plant*, including DLC equipment, to be oversized, thereby understating its costs.

Moreover, AT&T/WorldCom fail to explain why they use one methodology to develop the cost of a 4-wire loop and another methodology to develop DS1 and DS3 loop UNE costs. (VZ-VA Ex. 109 at 38-39.) Unlike Petitioners' approach to determining 4-wire loop costs, their estimate of DS1 and DS3 loop costs completely abandons any effort to determine the costs of the particular components that would be used to provide the DS1 and DS3 services. (VZ-VA Ex. 109 at 39, 43.)

**C. The Inputs to the MSM's Loop Module Are Inappropriate and Unsupported.**

AT&T/WorldCom improperly adjust the Commission's default input values to further decrease the MSM's already understated loop UNE cost estimates, at times in the guise of injecting some minimal amount of state- and company-specific data into the Commission's universal service model. However, when the use of accurate, state- or company-specific data would *increase* the MSM's UNE loop cost estimates, AT&T/WorldCom predictably advocate the use of the Commission's nationwide default values or, worse yet, unsubstantiated values that cause the MSM to produce even lower costs. Even when Petitioners claim to use Virginia-specific inputs, their proposals tend to be based on distortions of Virginia- or Verizon-specific data and bear no relation to Verizon VA's experience operating a network in Virginia.

Though Petitioners argue that the MSM "calculates loop costs by determining how an efficient network would best be constructed" (AT&T/WCom Br. at 120), the "efficiency" they tout is divorced from any real-world network concern. The combination of inputs they propose would produce a network that no prudent local exchange carrier would or could ever build. Moreover, the modeled network could never provision all the UNEs and services that Verizon VA is obliged to offer, nor could it conform to the service quality obligations required by the Virginia Commission. (*See, e.g.*, VZ-VA Ex. 109 at 5-7; VZ-VA Ex. 108 at 4-7.)

**1. The MSM's Inflated Line Counts Produce Substantially Understated UNE Cost Estimates.**

As discussed above, Petitioners have dramatically overstated line counts in the MSM by improperly including DS0 equivalents of high-capacity demand and then using an improperly calculated 2002 forecast of this demand.<sup>140/</sup> AT&T/WorldCom's claim that their inflated line count forecasts are somehow appropriate, and result in substantially *overstated* costs, has no merit. (AT&T/WCom Br. at 121-23.) In fact, Petitioners' overstated line counts are one of the biggest contributors to the MSM's substantially *understated* UNE cost estimates. (See VZ-VA Ex. 108 at 30-31.) Although the total network investment produced by the MSM increases as a result of the inflated line counts, the per line investment *decreases* due to the incredible (but artificial) economies of scale reflected in the MSM's network — economies that no real-world carrier would or could ever enjoy. (See VZ-VA Br. at 151-54; *see also* VZ-VA Ex. 108 at 29-31.)

AT&T/WorldCom's use of inflated line count forecasts is not only conceptually flawed, but inconsistent with other data used in the model. Projecting line counts to year 2002 requires, at a minimum, that the MSM's 1997 customer location data be updated to account for increases in the number of *customer locations* to correspond to the significant increase in *lines*. Petitioners dismiss this proposition, asserting that the number of customer locations in the MSM's obsolete

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<sup>140/</sup> As Verizon VA witnesses Dr. Tardiff and Mr. Murphy demonstrated, AT&T/WorldCom's initial forecast of line counts was not only conceptually flawed, but was also the product of a misunderstanding of ARMIS reporting conventions. (VZ-VA Ex. 109 at 31; VZ-VA Ex. 108 at 29-31.) Though Mr. Pitkin's revised forecast was an improvement, it still suffered from the fundamental flaw of including high capacity DS0 equivalents in the line counts used to size the narrowband network. (VZ-VA Ex. 162 at 5-6.) Even after the revision, his forecast calls for the number of special access lines to increase by 50% and account for 34% of all lines by 2002. (AT&T/WCom Ex. 14 at Attachment D; *see also* Tr. at 4295-97.)

customer location database is *overstated*. (AT&T/WCom Br. at 123.) But 1997 customer location data by definition cannot account for the significant growth in customer locations that has occurred in the interim. (See VZ-VA Ex. 109 at 27-29, 118.) Moreover, the customer locations in the Synthesis Model (and the MSM) were specifically defined by the Commission to *exclude* unoccupied housing units, which makes it implausible that the customer location data could *possibly* be described as “overstated.” In fact, the MSM significantly understates the costs of building to unoccupied residential and business units.<sup>141/</sup> (See VZ-VA Ex. 109 at 6.)

**2. AT&T/WorldCom’s Structure Sharing Assumptions Bear No Relationship to the Limited Structure Sharing Opportunities in Virginia.**

AT&T/WorldCom propose changing the Commission’s default structure sharing inputs to reflect not Verizon VA’s expected structure sharing in Virginia, but significantly greater sharing opportunities that they posit for their hypothetical forward-looking network. In doing so, AT&T/WorldCom ignore Verizon VA’s extensive experience with structure sharing opportunities, notwithstanding that their own witness Ms. Murray acknowledged that Verizon VA’s experience clearly *is* relevant to determining forward-looking structure sharing

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<sup>141/</sup> AT&T/WorldCom’s other claims are simply red herrings. For example, they assert that the Commission has assumed that growth in lines has occurred at existing locations (AT&T/WCom Br. at 121-23); however, they fail to mention that this was only with respect to the federal universal service mechanism, and in that context, the line counts were limited to year-end 2000 data. The Commission did not conclude that the use of projected line counts is appropriate. Order and Order on Reconsideration, *Federal-State Joint Board on Universal Service*, 67 Fed R. 3118, 3122 ¶ 8 n.18 (rel. Dec. 18, 2001) (noting that “AT&T concedes that until the Commission adopts some method of projecting model line counts to the year for which support is provided, we should use the year-end line count data filed by carriers....”). The Commission also recognized that the use of 2000 line counts may cause the Synthesis Model to exclude certain costs for new customer locations. *Id.* ¶¶ 11-12.

opportunities. (Tr. at 3218-3219.) Indeed, as explained above, Petitioners themselves quote the Commission for the proposition that forward-looking structure sharing should reflect opportunities that were available when the plant at issue was built. (See AT&T/WCom Br. at 178.) But that position is inconsistent with Petitioners' grandiose assumptions that in the future, utilities and other third parties would be *more* willing to share structure than they have been in the past. Even Ms. Murray had trouble explaining why Petitioners' approach made any sense.<sup>142/</sup> (Tr. at 3222-23.)

For example, AT&T/WorldCom make the unrealistic assumption that underground and buried structure investment should be reduced by as much as 50% and 67%, respectively, to account for alleged pervasive sharing with third parties. (VZ-VA Ex. 109 at 96.) Moreover, AT&T/WorldCom assume that, relative to the Synthesis Model's default inputs, opportunities for aerial sharing will reduce an ILEC's pole structure costs by 10-25%, to the point where Verizon VA would pay for only 25% of the pole cost. (VZ-VA Ex. 109 at 97.) The basis for all these assumptions is nothing more than the unsubstantiated speculation of Mr. Riolo. But as explained above, it is completely unrealistic to think that *any* carrier could achieve the level of structure sharing that Mr. Riolo hypothesizes. Not surprisingly, then, these untenable structure

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<sup>142/</sup> AT&T/WorldCom are wrong in alleging that Verizon VA's criticisms are simply a complaint that the MSM's assumptions "do not mirror the degree of sharing that Verizon currently experiences on its embedded network." (AT&T/WCom Br. at 181.) Rather, Verizon VA is simply stating the obvious — no carrier operating in the real world would, or could, experience the level of sharing assumed by the MSM (on a current or forward-looking basis). In fact, because Verizon VA has been operating under price caps for a number of years, its current sharing levels reflect efficient decisions regarding sharing opportunities.

sharing inputs, which AT&T/WorldCom apparently hope to resurrect, have already been rejected by the Commission.<sup>143/</sup>

Furthermore, Petitioners do not dispute that the MSM fails to include sufficient investment in structure to accommodate the facilities of third parties with whom Verizon VA allegedly would share structure costs. (VZ-VA Ex. 109 at 95-96.) As Verizon VA explained, the MSM designs structure separately for loop feeder, loop distribution, and inter-office transport based solely on Verizon VA's demand; as such, the MSM does not account for the additional costs necessary to support other utilities' facilities in shared structures. Nor do Petitioners dispute that the degree of assumed structure sharing must reflect the Virginia-specific operating realities that would affect all possible users of the structure and impact opportunities for the attractiveness of sharing (*e.g.*, local ordinances, safety regulations, currently available technology, prices, etc.).<sup>144/</sup> (VZ-VA Ex. 109 at 96.)

Petitioners' assumption with respect to sharing between an ILEC's distribution and feeder facilities is equally unsupported. Petitioners propose a 40% reduction of the default input values for aerial, buried, and underground feeder based on the simplistic assumption that "[w]hen feeder and distribution follow the same route, the feeder and distribution facilities will and should use the same structure." (AT&T/WCom Br. at 180.) But as noted in Verizon VA's initial brief, Petitioners have provided no evidence that supports the proposed 40% reduction for the Virginia network. (*See* VZ-VA Br. at 156.) Moreover, the MSM's own plant mix assumes

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<sup>143/</sup> *Tenth Report and Order* at 20261-62 ¶¶ 244, 247.

<sup>144/</sup> Indeed, even 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 Synthesis Model. *Tenth Report and Order* at 20252 ¶ 222, n. 465; VZ-VA Ex. 109 at 94-95.

that 70% of the feeder plant in the highest density zone is underground, while only 10% of the distribution plant is placed underground.<sup>145/</sup> (AT&T/WCom Ex. 23 at Att. G, 7-8.)

**3. AT&T/WorldCom's Adjustments to the Default Synthesis Model's Plant Mix Lack Any Nexus to Operating Realities.**

AT&T/WorldCom have made numerous adjustments to the Commission's default plant mix inputs, purportedly to reflect Virginia-specific plant mix data from ARMIS.<sup>146/</sup> (AT&T/WCom Br. at 171.) Petitioners' proposed adjustments have the effect of reducing costs by reducing the amount of underground and buried cable in most density zones. (VZ-VA Ex. 109 at 107-09.) As explained in Verizon VA's initial brief, these adjustments disregard the various factors that dictate cable placement in the real world. (VZ-VA Br. at 82-86, 157-59.) Moreover, these adjustments conflict with AT&T/WorldCom's own scorched-node theory of TELRIC by ignoring recent municipal requirements that new cables be placed underground (in conduit or trenches). (Tr. at 4417 (Murphy); VZ-VA Ex. 122 at 70.) Tellingly, the Commission has

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<sup>145/</sup> AT&T/WorldCom proposed a similar adjustment in the Georgia universal service proceeding, and the Georgia Public Service Commission rejected it. Order, *In Re: Docket No. 5825-U: Universal Access Fund Transition to Phase II Pursuant to O.C.G.A. § 46-5-167* at 48-49 (Dec. 19, 2000).

<sup>146/</sup> Petitioners' claim that Mr. Riolo's proposed structure mix inputs were obtained from ARMIS data is misleading. (AT&T/WCom Br. at 171.) ARMIS data does not distinguish among feeder, distribution, and transport cables, nor does it differentiate among density zones. Thus, it is unclear how Mr. Riolo's adjustment for each type of facility and zone could be based on ARMIS data. Moreover, Mr. Riolo has not demonstrated that his numerous adjustments to that data, when combined with his feeder-distribution and feeder-transport structure sharing assumptions, produce a network with the statewide sheath mix reflected in ARMIS. Thus, Mr. Riolo's proposed structure mix inputs amount to little more than an arbitrary manipulation of ARMIS data that bears no relationship to the "appropriate mix for each zone" (AT&T/WCom Br. at 171) within Verizon VA's network.

already rejected a plant mix proposal by AT&T that similarly understated the amount of underground placement.<sup>147/</sup>

**4. AT&T/WorldCom's Utilization and Fill Factors Are Unacceptably High and Fail to Build a Sufficient Amount of Distribution Plant.**

As explained in Verizon VA's initial brief and above (VZ-VA Br. at 159-60), the MSM's target fill factors do not provide sufficient spare capacity to account for critical factors such as administrative and maintenance needs, churn, demand fluctuations, and growth. (AT&T/WCom Br. at 145; VZ-VA Ex. 108 at 15-18.) AT&T/WorldCom's claims regarding the propriety of their various target fill factors are meritless. (AT&T/WCom Br. at 151-52, 157-160.) As Verizon VA has explained, the MSM's proposed target fill factors are unreasonably and implausibly high, and no explanation regarding *how* any carrier could plausibly or efficiently achieve such fill factors is ever provided. Nor do Petitioners ever account for what impact such high fill would have on network operations and service quality; they seem to believe that the levels of spare that exist in the current network could be drastically changed with apparently no impact whatsoever — as if the change could come about merely by wishing it were so. (*See* VZ-VA Br. at 103-04, 159-60; *see also* VZ-VA Ex. 109 at 84.) As a result, the MSM produces a network that would not operate efficiently given the real-world constraints under which Verizon VA provisions service. As noted above, Petitioners are unable to identify a single network that operates at its proposed fill levels (whether target or achieved) on a statewide basis. (Tr. at 4515.)

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<sup>147/</sup> *Tenth Report and Order* at 20258-59 ¶¶ 236-38.

Thus, for example, in using its target fill factors to build distribution facilities, the MSM ignores accepted planning standards and guidelines that allocate at least two distribution pairs to each residential subscriber location (VZ-VA Ex. 109 at 85-86), and that also account for vacant housing units when building loop plant. (VZ-VA Ex. 109 at 85.) These guidelines are based on decades of LEC experience serving inherently unpredictable demand as cost-effectively as possible. (Tr. at 4202-03 (Gansert).) A real-world carrier that simply ignored these engineering standards and real-world considerations in building a local exchange network could never operate efficiently or meet the Virginia Commission's service quality standards. (VZ-VA Ex. 109 at 86.)<sup>148/</sup> Similarly, the MSM's target fill for copper feeder cable ignores standard engineering guidelines that set aside 15% of total capacity for administrative and maintenance needs. (VZ-VA Ex. 109 at 87.) Moreover, the MSM fails to provide sufficient spare capacity to satisfy the 3 years of growth it assumes.<sup>149/</sup> As for fiber strand, Petitioners finally admit that the MSM employs 12-strand fiber ribbons, as Verizon VA has advocated (and which Mr. Riolo

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<sup>148/</sup> AT&T/WorldCom's claim that Verizon VA never proposed appropriate effective fill factors for use in the MSM is incorrect. (AT&T/WCom Br. at 151.) Verizon VA's witnesses described in detail the appropriate fill factors that an efficient, functional network must, and historically does have. Those are the "effective" fill factors that the MSM's network should produce as well.

<sup>149/</sup> AT&T/WorldCom's effective distribution fill is an average calculated by AT&T/WorldCom witness Mr. Pitkin — it is not a value produced by the MSM. In fact, in computing this effective fill, Mr. Pitkin mixed "apples and oranges" by using his year-end 2002 forecast of demand within the MSM to determine the total number of lines of capacity (*i.e.*, distribution cable terminating at an SAI) (denominator) and his estimate of mid-year 2001 demand to derive the number of working lines (numerator). (AT&T/WCom Ex. 14 at 14, n. 15.) Using the same year for the numerator (6.7 million lines) and denominator produces a distribution fill of 64%, not 52.5%. Based on Mr. Pitkin's static view of the network, by year-end 2004, the MSM's effective fill would approach 100%. (AT&T/WCom Ex. 14 at 14, n. 16 (reporting a *capacity* of 10.4 million lines in the MSM); VZ-VA Ex. 108 at 29 (reporting a projected *line count* of 10.2 million lines in the MSM).)

actually criticized at length on the stand). (AT&T/WCom Br. at 160; Tr. at 4507-08.) As explained above, this ribbon structure produces spare fiber stands within each ribbon. Nevertheless, spare ribbons are needed to facilitate maintenance and rearrangements (Tr. at 4506 (Gansert)), and Petitioners' proposed 100% target fill factor for fiber cable ignores this need.

**a) The Effect of the MSM's Inadequate Target Fill Factors Is Magnified by the MSM's Failure to Build to Vacant Housing Units.**

As noted above, the fact that AT&T/WorldCom use customer location data that fails to account for vacant housing units contributes to the MSM's significant understatement of costs. Although Petitioners claim that the MSM "includes sufficient capacity to provide service to vacant locations because its customer locations are based in part on a database used for mass mailings" (AT&T/WCom Br. at 145 n.135), they are unable to support this assertion.<sup>150/</sup> For example, AT&T/WorldCom never quantify the number of vacant housing units allegedly covered by the mailing list. In fact, while the 2000 Census Bureau statistics and ARMIS data for Virginia suggest that there are approximately 2.2 million housing units in Verizon VA's service territory, the MSM models only 1.8 million residential households.<sup>151/</sup>

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<sup>150/</sup> Moreover, AT&T/WorldCom's contention that the MSM builds to vacant housing units is undermined by the Commission's decision to exclude vacant households in the Synthesis Model. *Tenth Report and Order* at 20184-85 ¶¶ 58-59.

<sup>151/</sup> The year 2000 Census Bureau statistics for Virginia indicate that there were more than 2.9 million housing units in Virginia, of which more than 205,000 were vacant. United States Census Bureau 2000 General Demographic Characteristics (Table DP-1). Since Verizon VA serves approximately 76% of the switched lines and residential lines in the state, according to ARMIS 43-08 and National Exchange Carrier Association reports, it is reasonable to assume that there are approximately 2.2 million housing units in Verizon VA's territory.

## 5. The MSM's DLC Input Values Are Significantly Understated.

Verizon VA has demonstrated that AT&T/WorldCom's proposed reductions to the Commission's default DLC inputs are unreasonable (VZ-VA Br. at 161-62), and Petitioners' attempt to rehabilitate those inputs falls short. As support for DLC input values that the Commission already has rejected,<sup>152/</sup> Petitioners now claim that the MSM's "DLC input values as a whole exceed the DLC costs in Verizon's own purchasing contract with Litespan." (AT&T/WCom Br. at 143.) This claim distorts the facts. AT&T/WorldCom's proposed DLC input values appear higher than the values contained in Verizon VA's Litespan contract only because the prices contained in Verizon VA's Litespan contract are *material-only* prices that include no installation costs. AT&T/WorldCom witness Mr. Riolo explained that in contrast, his proposed DLC investment inputs were intended to include both material *and* installation costs. (AT&T/WCom Ex. 6 at 19.) Thus, Petitioners' comparison is meaningless. AT&T/WorldCom's proposed DLC values — which are supported by nothing more than an alleged research report that AT&T/WorldCom neither describe nor disclose and by the unsubstantiated speculation of their consultant<sup>153/</sup> (VZ-VA Ex. 109 at 110) — must again be rejected.

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<sup>152/</sup> *Tenth Report and Order* at 20275 ¶¶ 278-279; *See also* VZ-VA Ex. 109 at 110.

<sup>153/</sup> AT&T/WorldCom revealed the name of the report, but never placed it on the record in these proceedings. Moreover, as Mr. Riolo indicated, he relied on this report only for his DLC line card costs, and thus all of his other erroneous DLC costs (*e.g.*, common equipment and site preparation) are based solely on his unsubstantiated opinion. (AT&T/WCom Ex. 6 at 15 n.11, AT&T/WCom Ex. 18 at 12 n.17.)

**6. AT&T/WorldCom Have Presented No New Arguments in Support of Their Reduction of the MSM's Road Factor.**

In its initial brief, Verizon VA demonstrated that Petitioners' proposed reduction of the MSM's road factor from 1.0 to 0.9 is inappropriate and unjustified. (VZ-VA Br. at 166-67.) Contrary to the Commission's instruction that any change in the road factor be based on an empirical, state-specific analysis (VZ-VA Ex. 109 at 103), AT&T/WorldCom attempt to justify their downward adjustment to the default road factor by pointing to an obscure study conducted in Kansas and the cost model BellSouth has proffered in other jurisdictions. Neither of these reflect Virginia-specific conditions or were made part of the record in this proceeding.<sup>154/</sup> (VZ-VA Ex. 109 at 102-03.) In short, AT&T/WorldCom's claim that their downward adjustment is needed "to correct for the Synthesis Model's use of surrogate customer location data that overstates dispersion" (AT&T/WCom Br. at 126) is unjustified and unsupported. The Commission was right to reject the adjustment before and should do so again here.<sup>155/</sup>

**7. The MSM Does Not Include Sufficient Costs for DS1 and DS3 Loop Electronics.**

Petitioners erroneously claim that the MSM "includes more than sufficient costs for the line cards needed for DS1 and DS3 service." (AT&T/WCom Br. at 167.) Once again, AT&T/WorldCom inappropriately compare their estimate of \$322 for an *installed* DS1 line card,

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<sup>154/</sup> In addition, the Kansas Order was based on the default version of the Synthesis Model, which did not include Mr. Pitkin's coding and input changes. Because those changes reduce the route distances produced by the Model, it is all the more inappropriate to reduce the road factor in this proceeding based on the Kansas Order. (VZ-VA Ex. 108 at 32.)

<sup>155/</sup> *Tenth Report and Order* at 20179 ¶ 46 ("In the absence of a reliable source of actual customer locations by which to compare the surrogate locations, it is impossible to substantiate AT&T and MCI's contention that the road surrogate algorithm overstates the dispersion of customer locations in comparison to actual locations."); *see also id.* at 20179, ¶ 46, n.110.

which includes *both* the central office and remote terminal ends, with Verizon VA's *material-only* cost of [BEGIN VERIZON PROPRIETARY] XXX [END VERIZON PROPRIETARY] which only includes *one* end. (AT&T/WCom Ex. 14 at 49.) In fact, AT&T/WorldCom witness Mr. Riolo acknowledged that the cost of a DS1 line card generally ranges from \$400 to \$500. (Tr. at 4532 (Riolo).) Absent the requisite investment for line cards at both the originating and terminating ends, the network modeled by the MSM would be incapable of providing DS1 and DS3 services.

Equally troublesome is the MSM's failure to build the fiber over which the DS1 and DS3 services are provisioned. AT&T/WorldCom acknowledge this modeling flaw, yet respond to Verizon VA's criticism with the spurious claim that "the fiber itself is very inexpensive and certainly *costs less than the copper* that the [MSM] does build." (AT&T/WCom Br. at 167 (emphasis added).) AT&T/WorldCom miss the point. The comparative cost of fiber is irrelevant because, as discussed above, treating the fiber-based, high capacity demand as millions of ordinary loops with fictitious *copper* distribution facilities models economies of scale that could not exist in a real network. Thus, the MSM's failure to model fiber for these services, and its erroneous assumption that high capacity services can be provisioned over copper facilities instead, only contributes to the MSM's understatement of costs.

#### **8. Petitioners' Pole and Drop Wire Investment Has No Basis in Reality.**

AT&T/WorldCom's claim that the MSM's pole investment is "more appropriate" than the value used in Verizon VA's cost study is meritless. (AT&T/WCom Br. at 183.) Their claim is based on the erroneous assumption that all poles throughout Verizon VA's entire network, would be instantaneously replaced. (AT&T/WCom Br. at 183-84.) As explained above, this assumption defies common sense. Even in a forward-looking environment, a carrier is not going

to be deploying poles only on new installations; rather, an efficient, forward-looking carrier's base of poles would reflect a mix of new installations and replacements. (Tr. at 4097 (Tardiff).)

AT&T/WorldCom also significantly understate the amount of drop cable that would be required in a fully-functioning, efficient network. (VZ-VA Ex. 109 at 104.) The MSM produces a drop length of only 27.3 feet – less than 53% of the average drop length produced using the Synthesis Model's default values, which are already significantly understated. (VZ-VA Ex. 109 at 105; VZ-VA Ex. 142.) Even in small, dense clusters, this is a ridiculously low drop length, drastically different from the drop lengths AT&T/WorldCom have advocated in other UNE proceedings.<sup>156/</sup> (VZ-VA Ex. 109 at 105.)

AT&T/WorldCom erroneously claim that the drop length produced by the MSM is actually 77.4 feet, rather than 27.3 feet. (AT&T/WCom Br. at 184.) To derive this estimate, AT&T/WorldCom divided the total drop length produced by the MSM by the number of drops or customer *locations*, instead of the number of *lines*, as Mr. Murphy has done. (AT&T/WCom Ex. 14P at 39-40.) This is clearly inappropriate. As *Telcordia* states, the national average drop length of 73 feet, referenced by Mr. Murphy and relied upon by AT&T/WorldCom in the development of the HAI Model, was derived on a per line (working pair) basis, not the per drop (or per customer location) basis Mr. Pitkin uses. (AT&T/WCom Ex. 122 at 12-8; VZ-VA Ex. 109 at 105.) Thus, AT&T/WorldCom's attempt to compare the MSM's average *per customer* drop length of 77.4 feet with the *Telcordia per line* drop length of 73 feet is highly misleading.

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<sup>156/</sup> In the ongoing Massachusetts UNE proceeding, AT&T/WorldCom advocate drop lengths ranging from 50 to 150 feet depending on the density zone. These differences cannot be explained or reconciled by simple reference to the geographical differences between the two states. (VZ-VA Ex. 109 at 105.)

As Mr. Murphy explained, when calculated correctly on a per line basis, the average drop length produced by the MSM is approximately one-third of the national average. (VZ-VA Ex. 109 at 107.) Moreover, whether calculated on a per line or per location basis, neither the drop length nor the drop investment generated by the MSM changes when the line count is significantly increased or decreased — a result that is completely contrary to what one would expect to see in a real-world network. (Tr. at 4542-43 (Tardiff).)

**D. The MSM’s Misguided Approach to Estimating Expenses Does Not Produce Accurate Estimates of Verizon VA’s Forward-Looking Expenses.**

Apparently unwilling to confront Verizon VA’s numerous criticisms of the MSM’s expense calculations, AT&T/WorldCom instead attempt to side-step them, claiming that “Verizon presents few criticisms of the expense calculations in the [MSM].” (AT&T/WCom Br. at 106.) In fact, as set forth below, Verizon VA’s criticisms are numerous. Moreover, while Petitioners seek to rely on the fact that Verizon VA did not propose alternative expense inputs for use in the MSM, (AT&T/WCom Br. at 106), Verizon VA has made clear that the alternative methodology and the inputs it has used in these proceedings are far superior to those used in the MSM, thereby obviating any need to present alternative inputs to an inferior model.

**1. The MSM’s Corporate Overhead Factor Understates Forward-Looking Overhead Expenses.**

AT&T/WorldCom have tried to defend their use of an 8% corporate overhead factor as “extremely conservative” and similar to the factor used by Verizon VA. (AT&T/WCom Br. at 107.) But Petitioners’ approach and the application of their factor are conceptually flawed and inconsistent with the assignment of other common support services expenses (*e.g.*, network

operations), as well as with the Synthesis Model's logic, which includes these expenses as a dollar amount per unit of demand. (VZ-VA Ex. 109 at 75-76.)

AT&T/WorldCom calculate the 8% factor based on the ratio of overhead costs to all other costs, but then proceed to apply the factor to the MSM's estimate of all other *forward-looking* costs — a base of expenses that is inconsistent with the base from which the factor was developed. (VZ-VA Ex. 109 at 76.) Petitioners ignore the fact that it is not logical to assume that whenever, hypothetically, the cost of all network components are reduced by 50%, then the expenses to operate that network similarly would be reduced by 50%. By blindly reducing expenses through illogical application of their factor, Petitioners produce expenses that are a fraction of what Verizon VA needs to run its current network (VZ-VA Ex. 108 at 67-68), and similarly understate the forward-looking overhead expenses that would be required to support the UNE-related facilities and services provisioned by Verizon VA. (VZ-VA Ex. 109 at 76; VZ-VA Ex. 108 at 67-68.) Tellingly, while Verizon VA incurred corporate expenses (USOA Accounts 6710 and 6720) of about \$148 million in 2000, the MSM produces an estimate for these accounts that is about \$45 million — less than one-third of that amount. (VZ-VA Ex. 108 at 67-68.)

## **2. The MSM Fails to Flow Through Network Operations Expenses.**

Petitioners have conceded that the MSM's overly complicated process for assigning network operations expenses is flawed and that the MSM loses a portion of the network operations expenses. However, they have never recognized the full impact of the problem. Their initial brief continues to argue that the problem was limited to the failure to flow through 6% of the expenses to individual UNEs and argues that they have fixed this problem (AT&T/WCom Br. at 108-09), even though Mr. Pitkin has acknowledged that the problem

impacted at least 13% of the expenses. (AT&T/WCom Ex. 14 at 22; AT&T/WCom Ex. 104.) However, Dr. Tardiff has demonstrated that the MSM actually fails to flow through almost 25% of the total amount of network operations expenses, not 6% (or 13%) as AT&T/WorldCom claim. (VZ-VA Ex. 162 at 15.)

### **3. AT&T/WorldCom's Exclusion of Marketing Expenses Is Inappropriate and Unjustified.**

Petitioners' complete exclusion of all marketing expenses is illogical, and even Petitioners' own witnesses do not appear prepared to support this complete removal. Although AT&T/WorldCom exclude all marketing costs in their model, they implicitly concede that at least some marketing expenses are likely to be associated with the UNE wholesale business, finding themselves unable to say anything more categorical than that "few if any marketing expenses are associated with the wholesale customer." (AT&T/WCom Br. at 109.) At the hearing, Mr. Pitkin similarly was unable to support a categorical exclusion of marketing expenses, saying simply that "they certainly shouldn't all be included." (Tr. at 3862.)

Rather than determine an amount of marketing expenses that likely would be incurred in connection with the wholesale provision of UNEs, and which accordingly should be included in the MSM, AT&T/WorldCom simply excluded all such costs. (VZ-VA Ex. 109 at 69-70.) As a result, the MSM fails to account for many of the costs indubitably associated with UNE-related activities, such as product forecasting, product management, regulatory implementation, and other activities specifically devoted to assisting the wholesale market. (VZ-VA Ex. 109 at 69.) Verizon VA's approach, which uses current advertising expenses as a proxy and recognizes other appropriate marketing costs in its ACF, is far more legitimate.

**4. The MSM's Flawed Method of Calculating General Support Expenses Omits Essential Expenses.**

The MSM's 32% across-the-board reduction of general support expenses is a remnant of the Synthesis Model's universal service design and is inappropriate and unjustified in a UNE context. AT&T/WorldCom erroneously assume that the services excluded by the Commission for USF purposes (*i.e.*, special access and toll) should be excluded when calculating UNE costs. (AT&T/WCom Br. at 110; AT&T/WCom Ex. 1 at 15-16; AT&T/WCom Ex. 14 at 11-12.) However, these services are included in the demand volumes used to size the network, and thus should be used to determine the demand for support assets. (VZ-VA Ex. 108 at 63.) Petitioners' method of calculating general support expenses omits essential expenses, thereby producing unrealistic and substantially reduced UNE cost estimates.

Petitioners assert that a "far higher proportion of general support expenses should be excluded in calculating UNE costs than in calculating costs for USF purposes." (AT&T/WCom Br. at 110.) But they never provide any cogent or compelling explanation for why this should be so. Furthermore, Petitioners' failure to include any investment for the land required for General Support services facilities is flawed. (VZ-VA Br. at 170.) The Commission has recognized that the exclusion of such investment was erroneous. (*See* VZ-VA Ex. 108 at 82, 112.)

**5. The MSM's Maintenance Factor Ignores the Fact That Maintenance Costs Are Generally Unrelated to the Initial Investment.**

In seeking to defend the MSM's reduction in maintenance costs, AT&T/WorldCom claim Verizon VA has not recognized that "new equipment and a technology mix [with a] substantially increased use of fiber" would be cheaper to maintain. (AT&T/WCom Br. at 111.) But Verizon VA never took issue with this point. Verizon VA criticized and exposed the absurdity of AT&T/WorldCom's assumption that reductions in equipment costs, or investment, produce a

linear (or any) reduction in maintenance costs. (Tr. at 3778 (Tardiff); VZ-VA Ex. 108 at 60-61.) Verizon VA's criticism focused on the MSM's unyielding and unrealistic assumption that changes in the purchase price of equipment directly impact the subsequent cost of maintaining that equipment (*e.g.*, assuming that the cost of maintaining a car will decrease by 25% just because that car's purchase price is cut by one-quarter). (VZ-VA Ex. 108 at 59-60.) This approach, as explained in detail in the discussion of Verizon VA's ACF methodology, is nonsensical.

**6. The MSM's Use of Generalized, Nationwide Values for Various Expense Calculations Is Inappropriate and Unnecessary.**

Although AT&T/WorldCom tout the inclusion of Verizon VA-specific data in the MSM, when it comes to expense calculations, they rely principally on the generalized national data used in the Synthesis Model, thereby ignoring the available, and highly relevant, state- and company-specific data on the record in these proceedings. To suggest that these nationwide values somehow "more accurately reflect the costs that an efficient carrier would incur on a forward-looking basis" is simply absurd. (AT&T/WCom Br. at 112.) Indeed, in adopting the Synthesis Model's default nationwide values, the Commission made "no finding as to whether nationwide values would be appropriate for purposes other than determining federal universal service support."<sup>157/</sup> The preponderance of the Synthesis Model's inputs represents nationwide values that are derived from investment and expense calculations of different vintages and have no relevance to any of Verizon VA's operating realities. (VZ-VA Ex. 109 at 77-78.)

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<sup>157/</sup> *Tenth Report and Order* at 20172 ¶ 31.

Moreover, AT&T/WorldCom's claim that "[t]he use of nationwide values also generally avoids the need to verify the reasonableness of each company's data" is absolutely true. (AT&T/WCom Br. at 112.) But the whole point of a UNE proceeding is to determine the forward-looking TELRIC costs of a specific company provisioning UNEs in a specific state. Assuming away the need to calculate company-specific costs may make it easier for AT&T/WorldCom to achieve their fantastically low UNE cost estimates, but that approach has no place in a UNE costing analysis.

**7. The MSM Does Not Provide for a Sufficient Amount of MDF and Power Investment.**

The MSM fails to provide a sufficient amount of main distribution frame and power investment. AT&T/WorldCom's claim that Verizon VA's "MDF and power investments factor[s] are almost the same as those used in the [MSM]" (AT&T/WCom Br. at 20) is incorrect and represents another attempt by AT&T/WorldCom to trivialize the MSM's numerous infirmities. First, the MSM includes only \$8 in MDF and power costs per *switched* line. (VZ-VA Br. at 162-63; VZ-VA Switching Br. at 31 n.40.) As a result, the MSM fails to include power costs associated with non-switching equipment, such as circuit equipment. (See AT&T/WCom Ex. 23.) Second, as Verizon VA demonstrated, this number is taken from the universal cost proceeding and was developed by misinterpreting data provided by Technology Futures Inc. (VZ-VA Ex. 109 at 91-92.) The MSM therefore significantly understates power costs.

**VI. NON-RECURRING COSTS**

The support AT&T/WorldCom proffer in their brief for both their non-recurring cost model and their attacks on Verizon VA's model essentially boils down to the refrain that their

model is forward-looking because it assumes “mechanized processes,” while Verizon VA’s allegedly does not. But Petitioners cannot mask a critical failing: the utter absence of evidence in the record establishing that any currently available technologies or processes would enable Verizon VA to achieve the purported efficiencies they so blithely assume. Petitioners’ proposed work times similarly lack any foundation. They are based on nothing more than the unsubstantiated hypotheses of a few purported, paid experts. And finally, AT&T/WorldCom simply assume some non-recurring costs into oblivion, calling them recurring costs but then failing to account for them at all. By contrast, Verizon VA’s model is based on a statistically sound survey of workers who actually perform the relevant tasks to determine how long each task takes today, and it reflects realistic forward-looking adjustments to account for anticipated future mechanization and process improvements that may reduce the time needed to perform the activities or even the need to perform them at all. And Verizon VA’s model appropriately accounts for all non-recurring costs that Verizon VA will incur to process and provision CLEC orders.

The Commission should reject Petitioners’ apparent view that non-recurring costs are TELRIC-compliant only if they are based upon an entirely hypothetical — and in cases implausible — network construct and pure speculation concerning required work times. Instead, the Commission should adopt Verizon VA’s non-recurring cost model, which is based on a forward-looking network architecture that has at its root a functioning network design, reflects realistic service order and provisioning costs, and uses work times based on a statistically sound survey methodology that produces informed results. Finally, the Commission should adopt an approach that correctly distinguishes between recurring and non-recurring costs and ensures that

incumbents have an opportunity to recover the latter through non-recurring charges on the CLECs who cause such costs.

**A. Verizon VA's Model Is Based on Appropriately Forward-Looking Assumptions.**

AT&T/WorldCom contend that Verizon's non-recurring cost model uses an "embedded cost methodology" because it fails to reflect the use of forward-looking technologies and systems hypothesized by Petitioners. (AT&T/WCom Br. at 210.) But in making this argument, and in their "forward-looking" technology and OSS proposals, AT&T/WorldCom demonstrate a complete disregard for TELRIC's express mandate that costs be based on currently available technology, not purely hypothetical technology or systems that may develop — and may perform as hoped — at some unknown time in the future. Verizon VA's approach, which considers the use of technology, software, and systems that are available and capable of performing the required functions, is not only a more sensible approach to estimating forward-looking non-recurring costs — but the one that TELRIC requires.

**1. Technology Assumptions**

AT&T/WorldCom argue that Verizon VA's non-recurring model is not appropriately forward-looking because it fails to reflect the same forward-looking assumptions regarding the amount of IDLC feeder as in Verizon VA's recurring model (or more generally, that it simply fails to reflect enough IDLC at all). This argument is important to Petitioners because, in their view, more IDLC in the network would reduce non-recurring costs by eliminating the need for manual cross-connects at the central office for unbundled loops. (AT&T/WCom Br. at 203, 210-12.) But this argument is premised on Petitioners' assumption — now discredited many times over — that standalone loops can be electronically unbundled using IDLC (via a GR-303

interface). For reasons that have been set forth sufficiently above, in Verizon VA's initial brief, and in the testimony, it simply is not possible for Verizon VA to unbundle standalone loops for CLECs using the IDLC GR-303 interface using currently available or even foreseeable technology. (VZ-VA Br. at 89-93.) Instead, copper or UDLC must be used, with the result that manual cross-connects cannot be avoided.<sup>158/</sup>

In their brief, Petitioners suggest that Verizon VA's non-recurring rates nonetheless should provide CLECs with the cost advantages of IDLC because it is efficient for Verizon; any other result, they argue, would somehow be unfair. (AT&T/WCom Br. at 211-12.) But this argument fails on many levels. First, of course, where it is possible and efficient to provision loops using IDLC — specifically (and exclusively) in the case of UNE-P — Verizon VA does so. The UNE-P costs in Verizon VA's non-recurring cost model thus reflect the savings associated with the amount of IDLC that Verizon VA expects to have in place in its forward-looking network at the end of the three-year planning period. (VZ-VA Ex. 124 at 15-16.) Second, Petitioners conveniently forget — as they do in the case of OSS — that the statute gives Verizon VA the right to recover its TELRIC costs of providing UNEs.<sup>159/</sup> The statute does not limit Verizon VA to only a small portion of its costs in order to ameliorate technology limitations that make it impossible to provide Petitioners with something they desire.<sup>160/</sup>

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<sup>158/</sup> Petitioners' model eliminated cross-connects in the central office even for UDLC and copper by assuming 100% Dedicated Inside Plant. Verizon VA has established, and Petitioners have admitted, that no efficient real-world carrier would employ that practice (VZ-VA Br. at 199-200), and Petitioners do not even attempt to defend that assumption in their brief.

<sup>159/</sup> See 47 C.F.R. § 51.505.

<sup>160/</sup> Indeed, because the record establishes that unbundled standalone loops cannot be provisioned using IDLC, Verizon VA has even met the standard used by the New York administrative law judge that AT&T/WorldCom argue should be adopted here: Verizon has

## 2. OSS, Fallout, and Manual Handling

AT&T/WorldCom also seek to base non-recurring costs on hypothetical OSS that they allege would permit full automatic “flow through” of wholesale orders. Although they admit they have never observed such systems firsthand or known of any carriers who employ them to provision UNE orders (Tr. at 4662), they suggest that “flow-through systems” have developed over the last two decades such that what they envision *should* be possible. (AT&T/WCom Br. at 208.) Petitioners accordingly wish away the vast majority of errors that must be addressed manually. But while systems that have developed over the last two decades have greatly enhanced the ability of orders to flow through the system electronically, those systems do not permit — and will not permit in the foreseeable future — the level of near perfection assumed by AT&T/WorldCom. Orders designed to flow through the system will continue to fall out.

Furthermore, some orders are, and will continue to be, designed to be handled manually. Petitioners do not account in any way for cases where manual handling by design is either necessary or cost effective — even though their own witness, Mr. Walsh, conceded that automating all tasks would not be cost-efficient. (Tr. at 4658.) As Verizon VA previously has explained, despite advances in technology, there are some low-volume and complex tasks that continue to be more efficiently performed manually because the one-time cost of automating them would outweigh the costs of performing them manually over time. (*See* VZ-VA Ex. 116 at 10-11.)

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shown that it would be unreasonable to adjust Verizon’s rates to reflect IDLC connections for unbundled loops. (*See* AT&T/WCom Br. at 212.)