Petitioners have provided no answer that would justify the use of such an unsophisticated costing tool when assessing Verizon VA's forward-looking TELRIC switching costs.[109] Nor have they provided any compelling reasons for the Commission to overlook the various other flaws in the switching module raised by Verizon VA.

a) There Are Notable and Telling Differences between the Manner in Which the MSM and Verizon VA's Model Handle Peak Call Volumes.

AT&T/WorldCom's assertion that the MSM uses the "exact same process" as Verizon VA to handle peak period traffic, and that Verizon VA's criticism of the MSM is thus "baseless," is entirely misleading. (AT&T/WCom Br. at 20.) While the MSM starts with annual traffic, Verizon VA's model begins with the busy hour peak traffic. This difference is paramount. The MSM never accounts for the busy hour. Instead, it simply takes an average, uniform amount of usage and assumes that is the "peak traffic." (VZ-VA Ex. 109 at 50.) This so-called "peak" period usage, however, reflects only the company-wide average usage per line. (VZ-VA Ex. 109 at 50-53.) AT&T/WorldCom's attempt to equate the methodologies employed by the two models cannot disguise the fact that the MSM does not account for peak period usage.

As Verizon VA has explained, its cost studies accurately account for busy hour fluctuations by starting with designed busy hour usage for *each individual switch* in Verizon VA's network and then converting busy hour and average usage into a total annual MOU. The total traffic sensitive cost is then spread over the annual MOUs. Verizon VA's studies thus size

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[109] And, even while they criticize the SCIS model for dropping one million lines (AT&T/WCom Switching Br. at 1), Petitioners' own MSM not only dropped 600,000 lines (Tr. at 4302), but also failed to account for entire wire centers. (Tr. at 4303-08; VZ-VA Ex. 163 at 20.)

switches and produce a cost per MOU that accounts for busy hour usage accurately, which the MSM cannot. (VZ-VA Ex. 107 at 199; *see also* VZ-VA Ex. 109 at 50.)

b) The MSM Does Not Develop Appropriate Switch UNE Costs.

Despite AT&T/WorldCom's claims to the contrary, the Commission should certainly be concerned that the MSM cannot develop "the array of switching UNE costs . . . produced by Verizon VA's SCIS Model." (AT&T/WCom Br. at 20.) AT&T/WorldCom admit that they use the MSM to estimate the cost of only five switching UNEs.[110/] (Tr. at 5187; AT&T/WCom Ex. 14P, Att. A.) For *every other* switching UNE — of which there are over 50 — AT&T/WorldCom rely on their restatement of Verizon VA's cost studies. (*See* Tr. at 5195-98.) This model shortcoming is significant and in no way rectified by AT&T/WorldCom's erroneous assertion that many (but notably, not all) of these missing UNE cost estimates "relate to features and are already included in the [MSM's] costs." (AT&T/WCom Br. at 20.) Whether those costs are included in the MSM's costs misses the point. Any cost model adopted by this Commission should be able to discretely identify those individual UNE cost estimates.

c) The MSM's Use of Vintage Switching Investment Data Fails to Reflect Virginia-Specific Switching Costs.

Although AT&T/WorldCom concede that the MSM relies on outdated switching investment data, they nonetheless claim that this outdated, nationwide data is somehow "appropriate for use in this Virginia proceeding." (AT&T/WCom Switching Br. at 3.) But

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110/ AT&T/WorldCom use the MSM to estimate the costs of 4 end-office switching UNEs and 1 tandem switching UNE. (Tr. at 5187 (Pitts); AT&T/WCom Ex. 14P, Att. A.)

Petitioners' outdated switching data does not and cannot reflect current and forward-looking switching technology. The MSM's dated switch investment data, for example, simply does not account for the costs of the full range of technologies currently deployed in Verizon VA's network. As Verizon VA witness Mr. Murphy explained, the MSM's data inputs, some of which date back to 1983, do not include switches that reflect the most current technology, despite the fact that the MSM switching costs should be based on forward-looking, not outdated, switches. (VZ-VA Ex. 109 at 47.) While the MSM's switching data may have been acceptable for a universal service proceeding, where the goal was only to estimate the relative costs of the supported services, it is inappropriate here, where the model must discretely identify the costs of switching UNEs that reflect forward-looking technologies.

AT&T/WorldCom err in claiming that the Commission's regression analysis takes into account changes in pricing, technology, features, and usage. (AT&T/WCom Switching Br. at 8.) The Commission's regression analysis can only account for these changes if they are represented *in the original data.* (*See, e.g.,* Tr. at 5334 (Tardiff).) Because the original data does not include all the relevant technologies and features, neither the cost estimates nor the cost trend produced by the Commission's regression analysis will magically allow the data to reflect today's conditions. (*See* VZ-VA Switching Br. at 20.) Indeed, the Commission specifically acknowledged that its regression analysis could not account for attributes such as minutes of use calls, digital line connections, vertical features, and differences between host and stand-alone switches.[111/]

111/ *Tenth Report and Order* at 20290 ¶ 318.

D. Access to OSS Costs

In their brief, AT&T/WorldCom hardly question Verizon VA's Access to OSS *costs*. Instead, they raise primarily only one argument: that Verizon VA is not entitled to *recover* the costs in the same way as it recovers all other UNE costs — through UNE rates assessed on the CLECs ordering the UNE. Because Petitioners clearly are wrong that this Commission may recognize Access to OSS as a UNE while simultaneously prohibiting the recovery of the associated costs, their entire argument fails. And none of the remaining scattered criticisms AT&T/WorldCom make concerning Verizon VA's Access to OSS expenditures are persuasive. Accordingly, the Commission should approve recovery of the forward-looking costs produced by Verizon VA's Access to OSS cost study.

1. One-time Development Costs

As Verizon VA has explained, the costs it incurred to develop Access to OSS were reasonable, efficient, and designed to provide CLECs with Access to OSS in the most forward-looking manner possible. Indeed, Verizon VA worked directly with the CLECs to develop the relevant system interfaces, which consist of the most forward-looking technology currently deployed. (*See* VZ-VA Ex. 107 at 247-48; VZ-VA Ex. 122 at 219.) Verizon VA had no incentive to develop its Access to OSS *inefficiently*, as it clearly did not and does not believe that any regulatory commission would approve the inclusion of inefficient expenditures in UNE rates.

AT&T/WorldCom argue that Verizon VA's Access to OSS development costs were "caused by the transition to the competitive environment" and hence may not be recovered by Verizon VA through UNE rates in the same way that *all* UNE costs are recovered. (AT&T/WCom Br. at 196.) As Verizon VA has demonstrated, however, this is completely

contrary to the law and to basic cost recovery principles. Once the Commission defined Access to OSS as a UNE, as it did in the *Local Competition Order*,[112] Commission rules and the Act itself *require* that the Access to OSS UNE be priced to permit Verizon to recover its costs. As the Commission itself determined, "the 1996 Act requires a requesting carrier to pay the costs of unbundling, and thus incumbent LECs *will be* fully compensated for any efforts they make to increase the *quality of access* or elements within their own network."[113]

It is unclear why Petitioners believe there is any room for argument; the Commission did not say that incumbents *might* be compensated for their UNE costs. AT&T/WorldCom nonetheless assert that, in this particular case, recovery should be prohibited because "new entrants incur costs for their own portion of the electronic gateway between their operation and Verizon's OSS." (AT&T/WCom Br. at 196.) But this argument could be extended equally to the costs of *any* UNE: for a CLEC to be able to make use of Verizon VA's switching UNE, for example, that CLEC may well expend its own resources on the necessary transport capacity "between [its] operation and Verizon's." (*See, e.g.*, Tr. at 3970-71 (Minion).) The exception Petitioners try to carve out would swallow the rule entirely. And it is, in any event, entirely irrelevant. The Commission did not suggest that the ILEC could recover its costs only where the CLEC has no costs. Rather, it correctly determined that the only valid, legal means of requiring incumbent LECs to provide CLECs with any UNE, including Access to OSS, would be to ensure that the ILECs' costs — at least their TELRIC costs — were recovered from the CLEC

112/ *See Local Competition Order* (finding that OSS "fall squarely within the definition of 'network element.'").

113/ *Local Competition Order* at 15659-60 ¶ 314 (emphasis added); *see also* 47 U.S.C. § 252(d)(1).

purchaser. CLECs may incur costs, but they do so voluntarily in the hope of earning a profit and growing their businesses. Verizon VA, in contrast, incurs Access to OSS and other UNE costs because Congress and the Commission have required it to do so.

AT&T/WorldCom argue that recovery of Access to OSS costs should be denied because this would provide Verizon VA with "incentive to select the most efficient means" of providing the Access to OSS UNE.[114] (AT&T/WCom Br. at 196.) Of course, if Verizon VA were forced to bear all its own costs when it provided *any* UNE to CLECs, it obviously would take all steps it possibly could to stem the enormous financial losses it would suffer.[115] But neither Congress nor the Commission has even suggested that the Act permits such a result — one that unquestionably would constitute an unconstitutional taking. Nor could any generalized desire to encourage more efficient expenditures be a basis for blatantly flouting the clear dictate in the Act that UNE charges be "based on the cost . . . of providing the . . . network element."[116]

AT&T/WorldCom argue, finally, that if the Commission *does* allow any recovery of Access to OSS costs, it should be in the form of a surcharge on all Virginia telecommunications users. But this suggestion again falls short of complying with the Act's straightforward directive. Having determined that Access to OSS is a UNE, the Commission must allow Verizon

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[114] Of course, AT&T/WorldCom have provided no evidence that Verizon incurred OSS costs inefficiently, which undermines even further the relevance of their argument. In fact, Verizon VA has not incurred Access to OSS costs inefficiently and has no incentive to do so. Petitioners' startling suggestion that Verizon need not be concerned that regulatory commissions will scrutinize its Access to OSS costs (AT&T/WCom Br. at 197 n.174) is absurd on its face and belied by these proceedings.

[115] Forcing Verizon to bear Access to OSS costs in fact would have the perverse effect of providing incentives for CLECs to demand inefficient, unnecessary, and costly OSS modifications. (*See* VZ-VA Ex. 117 at 36-40.)

[116] 47 U.S.C. § 252(d)(1).

VA to recover the associated costs from the CLECs who use it — *i.e.*, the cost causers.[117] Any other result would not only be unlawful but economically inefficient. (*See* VZ-VA Ex. 117 at 39.) Although in other proceedings Verizon has acquiesced to proposals to recover Access to OSS costs through a surcharge on all end users as opposed to not recovering its costs at all (*see* Tr. at 3940-43 (Minion)), Verizon VA continues to maintain that such a surcharge is contrary to sections 251 and 252 and the Commission's decisions. Verizon customers already pay for OSS that are used for retail purposes. The CLECs' desire to avoid paying for the Access to OSS that *they* use does not justify imposing those costs on Verizon end users — or departing from a correct application of the Act.[118]

AT&T/WorldCom next vaguely allege that Verizon VA's Access to OSS costs are in some manner inappropriate, but they do not even attempt to portray this argument as more than an unfounded suspicion. They claim only that Verizon VA's Access to OSS cost study "*almost certainly* reflect" inappropriate costs and that the Commission "has no way to verify" that such speculations are false. (AT&T/WCom Br. at 197-98 (emphasis added).) There is nothing to their argument, such as it is, and the meager examples they provide — all in footnotes — to "support" their claim are unavailing.

First, contrary to Petitioners' contention, Access to OSS costs are not embedded simply because they were incurred prior to the inception of this proceeding. Access to OSS costs are not

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[117] *See AT&T Communications of the South Central States, Inc. v. Bell South Telecommunications, Inc.*, 20 F. Supp. 2d 1097, 1104-05 (E.D. Ky. 1998) (upholding Kentucky Commission decision imposing Access to OSS costs on CLEC because "AT&T is the cost causer, and it should be the one bearing all the costs").

[118] Moreover, there are substantial questions about whether the Commission here has jurisdiction to impose a charge on all end users in Virginia. (*See* VZ-VA Ex. 122 at 226.)

costs of Verizon VA's legacy systems, but were incurred specifically to comply with the Commission's mandate. That Verizon VA complied in a timely rather than an untimely manner with that mandate is not reason to *deny* recovery of the associated costs. The costs when expended were forward-looking, as are the underlying systems and technology.

Second, AT&T/WorldCom inaccurately claim that the Access to OSS costs include costs of "systems that are redundant or obsolete." (AT&T/WCom Br. at 197.) But Access to OSS costs are the costs of developing and modifying software, which involves progressively building upon and refining earlier versions; software typically does not spring fully developed from whole cloth. (*See* Tr. at 3917-22 (Minion); *see also* VZ-VA Ex. 122 at 234-36.) If the costs of developing and improving software were denied, there would be little incentive for Verizon VA to further develop its Access to OSS. In any event, the Commission already has determined that incumbents are entitled to recover their costs of "increas[ing] the *quality of access* or elements within their own network."[119]

The only other allegations Petitioners raise consist of speculation that Access to OSS costs may include costs incurred to satisfy merger conditions or may be recovered in Verizon's recurring rates. (AT&T/WCom Br. at 197-98.) But they offer no examples to support either allegation — because there are none. The OSS costs associated with Verizon's merger orders were unrelated to Access to OSS,[120] and, as Verizon VA has explained (*see* VZ-VA Br. at 130-31), there simply is no double recovery of Access to OSS costs.

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[119] *Local Competition Order* at 15659-60 ¶ 314 (emphasis added).

[120] As Mr. Minion explained, the merger conditions merely required Verizon to develop uniform *interfaces*, not uniform OSS. (*See* Tr. at 3930-32.)

2. Ongoing Costs

AT&T/WorldCom object to Verizon VA's ongoing OSS costs based on the claim that not all components of those costs were "directly" estimated or because the identified costs were inflated. They argue that such alleged inaccuracy can be addressed only if direct recovery of ongoing Access to OSS costs is denied and Verizon VA is forced to recover the costs in its cost factors. (AT&T/WCom Br. at 198.) In fact, however, Verizon VA's estimate of ongoing OSS costs is entirely appropriate and reliable.

As Verizon VA has explained, ongoing costs include two kinds of costs: (1) annual capital and operating costs associated with computer hardware and (2) software maintenance costs. (*See* VZ-VA Ex. 107 at 283-84.) To assess its ongoing costs, Verizon directly estimated the annual capital and operating costs associated with computer hardware. (*See* VZ-VA Ex. 122 at 237-41.) AT&T/WorldCom argue that Verizon VA's estimate is overstated because Verizon failed to account for the fact that OSS computer costs have fallen over time. But this is incorrect. Although Verizon VA used 1996, 1997, and 1998 computer purchases, it treated those as if they had been transacted at 1999 price levels and thus applied the lowest computer hardware costs Verizon VA experienced during the relevant period to *all* expenditures during that period.[121/]

Verizon VA's ongoing Access to OSS software maintenance costs were calculated as a percentage (15%) of Access to OSS development costs. Contrary to Petitioners' claim that Verizon provided "virtually no support for this ratio," Verizon identified five independent

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[121/] Petitioners suggest that Verizon VA should have used computer prices from later years, as these are even lower. However, Verizon did not use 2001 or 2002 prices because the initial deployment of Access to OSS was completed before that time, and Verizon VA does not at this time anticipate the need for additional related computer hardware expenditures for several years. (*See* VZ-VA Ex. 122 at 244-45.)

industry sources, which Petitioners have not challenged, to support the 15% figure as an accurate estimate of the relationship between initial software development costs and ongoing maintenance costs. (*See* VZ-VA Ex. 107 at 288-93.) And while AT&T/WorldCom suggest here that the resulting costs are inflated because Verizon's "OSS development costs . . . are themselves inflated" (AT&T/WCom Br. at 198), as shown above, Petitioners have provided no support whatsoever for that allegation, and their related argument therefore must fail as well.

E. Daily Usage File ("DUF") Costs

AT&T/WorldCom's criticism of Verizon VA's daily usage file ("DUF") costs centers on the fact that they are higher than the costs Verizon estimated nearly six years ago, before Verizon had any actual experience offering this optional service to CLECs. (AT&T/WCom Br. at 199.) As Verizon VA has explained in detail, the difference between the 1996 and the current estimates is the result of appropriate adjustments Verizon VA made to its initial estimates of DUF demand and expenses to reflect its experience providing DUF since 1996. (VZ-VA Ex. 122 at 212; Tr. at 3992 (Minion).) Demand for DUF, which reflect the fact that demand for DUF has been (and is expected to be) much lower than Verizon initially anticipated. Since many DUF costs are fixed, the DUF rates Verizon VA uses now are necessarily higher than those calculated in 1996 (and higher than rates in other jurisdictions that were based on the 1996 study). (VZ-VA Ex. 122 at 212.)

AT&T/WorldCom argue that Verizon VA's growth estimate for DUF is "implausibly low," comparing it to Verizon VA's predictions regarding the anticipated demand for UNE-P and resale. (AT&T/WCom Br. at 199-200.) But there is no reason to assume that the growth rates for UNE-P (or resale) and DUF are necessarily correlated; CLECs certainly can — and do — order one and not the other. DUF is an entirely optional service. Moreover, Verizon VA's

DUF growth forecast reflects the fact that, even if new CLECs might request DUF, the movement of even one large carrier that uses DUF from UNE-P to standalone UNE loops will significantly reduce DUF demand (since DUF is not used in connection with standalone UNE loops). (Tr. at 3992.)

Petitioners erroneously speculate that, if demand is less than expected, Verizon VA could decrease the central billing organization associated with DUF and resize it to reflect the decreased demand, thus reducing costs. (AT&T/WCom Br. at 200.) As Verizon VA has explained, however, certain costs associated with providing DUF are fixed and do not decrease with lower demand. Mr. Minion explained, for example, that DUF requires a product manager and certain minimal additional staff regardless of expected demand. (Tr. at 3998.) Verizon VA is *not* continuing to operate an unnecessarily large organization based on outdated demand assumptions and some vain hope that it might be able one day to recover those costs — that it in the meantime has had to carry — in a UNE proceeding.

Finally, AT&T/WorldCom are also wrong when they assert (also without any support) that Verizon VA's proposed DUF costs "would likely" result in double-recovery because these costs are included in Verizon VA's annual cost factors. (AT&T/WCom Br. at 199.) Verizon VA has carefully ensured that appropriate adjustments were made to the annual cost factors in order to avoid any double-counting of expenses, including DUF expenses. (VZ-VA Ex. 122 at 209-10; Tr. at 4007 (Minion).)

V. THE MODIFIED SYNTHESIS MODEL (MSM)

Petitioners' brief has done nothing to alleviate the primary shortcoming underlying their proposal to use the MSM in these proceedings: the MSM, which is based on a model constructed for universal service purposes, is *incapable* of accurately estimating Verizon VA's

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[122] — 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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122 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."[123]

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.[124]

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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[123] 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"*).

[124] 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."[125] 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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[125] 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."[126/] 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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126/ *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.[127] (*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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[127] 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[128]; 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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[128] (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.[129/] 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.)

[129/] 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.[130/] 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

130/ 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."[131] (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.[132] 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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[131] 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.

[132] 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.[133/] (*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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[133/] 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 x 1 + 9 x 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."[134/] Thus, even if the

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134/ *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).[135/] (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.[136/]

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.)

135/ 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.

136/ *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),[137/] 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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137/ 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.