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WorldCom & AT&T v. Verizon
(Docket Nos. 00-218, and 00-251)

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
II-1	Should Verizon be required to reduce recurring rates for certain Unbundled Network Elements ("UNEs")?	See rationales for other issues, below.	See rationales for other issues, below.
II-1-a	What is the relevant economic standard for setting the prices of the unbundled network elements and interconnection that Verizon is required to provide CLECs?	I. **THE RELEVANT ECONOMIC STANDARD FOR MEASURING RECURRING COSTS.** The controlling economic and legal standard in this case is the standard of total element long run incremental costs ("TELRIC") established by the FCC in its 1996 *Local Competition Order*. TELRIC compliant costs are the costs that an efficient firm, unconstrained by any legacy of existing investment in obsolete or inefficiently sized assets, would incur to build, operate and maintain a local telephone network over the long run in a competitive market. TELRIC is the economically efficient forward-looking cost of supplying the total output of a	I. **THE TELRIC STANDARD** Pending review of the Commission's TELRIC rules by the Supreme Court, the standard for measuring recurring costs in this proceeding is of course TELRIC. That standard requires the measurement of the forward-looking, long-run costs of providing UNEs to CLECs using currently available technologies. ***The Goals of a Long-Run, Forward-Looking Cost Study:*** Properly determined forward-looking costs for UNEs should, in principle, reflect the costs that Verizon VA, acting

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		network element expected to be demanded in the incumbent carrier's market—plus a reasonable markup for common costs. *Local Competition Order* at ¶¶ 224-26, 249-50, 630, 672-740; 47 C.F.R. § 51.505(b)(1); Murray Direct, p. 6. The TELRIC standard forecloses the backward-looking cost approach traditionally used in regulating the prices of regulated monopolies, under which rates are designed to recover the historic, embedded or book costs of those monopolies. Backward-looking costs reflect past inefficiencies, older technologies, and inefficient operating practices that may survive in an incumbent telephone company's operations. Competitive markets do not permit recovery of such costs, and they are likewise properly excluded from the price of network elements. *Local Competition Order* ¶ 705; 47 C.F.R. § 51.505(d)(1). The FCC's cost standards also have a causation requirement: a cost may not be attributed to a network element unless "causally-related" to it in the sense of being necessary to provide it. *Local Competition Order* ¶¶ 675, 682, 691; 47 C.F.R. § 51.505(b). Finally, incumbent local exchange carriers bear the burden to "prove to the state commission that the rates for each element it offers do not exceed the forward-looking economic cost per unit of providing the element, using a cost study that complies with the methodology" set forth in the FCC's rules, 47 C.F.R. § 51.505(e); *see Local Competition Order,* ¶ 695. Apart from their reasonableness in absolute terms, prices for unbundled network elements should be non-discriminatory.	efficiently over time, expects to incur going forward. Failure to set UNE prices based on an accurate projection of the economic costs that the incumbent will incur would send misleading price signals to the entrant. In particular, prices set below the incumbent's costs will lead to inefficiently high consumption of UNEs by new entrants and deter efficient investment in alternative facilities. At the same time, prices based on an incumbent carrier's expected, forward-looking costs will be competitively nondiscriminatory because CLECs purchasing UNEs will incur the same forward-looking costs as the incumbent and will receive the benefit of Verizon VA's achievable efficiencies. Shelanski Direct at 5, 18-19; Gordon Direct at 7-9; Shelanski Rebuttal at 1-2. ***Efficient, Incremental Investment in New Technologies:*** A rational carrier will invest incrementally in new facilities throughout the life of the network instead of immediately replacing its network as a result of the development of new technology. Except in the most unusual circumstances, a firm will replace existing facilities with more advanced alternatives through a gradual process, reflecting the fact that it will often be less costly for the firm to operate existing equipment for some time before incurring the sunk costs of purchasing the new technology. In addition, the firm will want to limit its sunk investment in new equipment if it anticipates further technological change that will yield even more efficient facilities in the future. Thus, an efficient operator of an existing network will move forward incrementally with some mix of old and new equipment — a mix that takes into account the forward-looking economic value of the existing network and risk factors for changing technology and demand — as it expands and replaces its network. Indeed, AT&T/WorldCom concede that

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		In other words, the Commission should establish prices that prevent Verizon from leveraging its monopoly control over local exchange facilities and central office locations to gain a competitive advantage over new entrants. To ensure non-discrimination, prices for unbundled network elements should not exceed the costs that Verizon itself incurs for comparable uses of network functionalities. The central issue in this case is whether Verizon's compliance with these economic standards is to be real or only rhetorical. As in previous UNE litigation, Verizon has endorsed TELRIC in name while opposing it in application. Verizon derides the other participants' estimates of the long run costs of an efficient network—the benchmark actually specified by the FCC and the level to which prices converge over the long run in effectively competitive markets—as "fantasy" costs of a "hypothetical" "instantaneous" network. And Verizon witnesses Gordon, Shelanski and Tardiff would recast TELRIC as a measure of Verizon's "actual expected costs" or the costs of how Verizon's network is "actually deployed," thereby allowing Verizon to recover precisely what TELRIC excludes: embedded costs, short-run costs, uneconomic cost, and costs that are unattributable to UNEs. Even Verizon's own prior testimony in UNE litigation, and Verizon's recent briefs to the Supreme Court on review of the *Local Competition Order*, contradict Verizon's current effort to pass off these cost measures as legitimate versions of TELRIC. Murray Rebuttal, pp. 5-38. Verizon's rejoinder that firms in the "real world" do not replace their long-lived assets "instantaneously" completely misses the point. In the long run—the time horizon embodied in TELRIC—all assets are replaced. Even in the very short run, in	this approach by an existing carrier "may be entirely rational." Murray Rebuttal at 17. The long-run, forward-looking costs of an efficient firm will therefore reflect a mix of existing network facilities and new technology. Shelanski Direct at 6-17; Gordon Direct at 9-13.

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		competitive markets even the *mere existence* of more efficient technology depresses the economic value of an incumbent firm's existing facilities, to a degree that exactly offsets their higher operating costs (recurring and non-recurring). Murray Rebuttal, pp. 12-19, 50. Dr. Hausman and Shelanski's testimony that real options theory warrants a markup of UNE prices above TELRIC is an improper attempt to relitigate an issue resolved by the Commission in its 1996 *Local Competition Order*, and grossly mischaracterizes the prior writings of AT&T economists Prof. William Baumol and Dr. Richard Clarke. In fact, proper application of real options theory may warrant a *markdown* from TELRIC. Murray Surrebuttal, pp. 4-33.	
II-1-b	Which cost models or studies in this proceeding provide the best framework for estimating the recurring costs of network elements and interconnection provided by Verizon?	**II. <u>THE SYNTHESIS MODEL PROVIDES THE BEST ESTIMATE OF THE TELRIC OF UNES IN VIRGINIA</u>.** The Synthesis Model as it was filed in the AT&T/WorldCom Initial Filing on July 2, 2001 (the "Synthesis Model") is the best tool for estimating the TELRIC of providing unbundled network elements in Virginia. The Synthesis Model uses forward looking economic cost principles to calculate the economic costs that an efficient company would incur to provide basic telephone exchange service. The Commission has already concluded that the Synthesis Model "generates reasonably accurate estimates of forward-looking costs." Universal Service Proceeding, Tenth Report and Order, ¶ 21-22. Pitkin Direct, pp. 4-5;	**II. <u>VERIZON'S RECURRING COST MODEL COMPLIES WITH TELRIC</u>** Verizon VA's cost study methods comply with the most economically appropriate interpretation of TELRIC. In particular, to the extent possible under the Commission's TELRIC rules, the study methods reflect the efficiencies that Verizon VA can be expected to attain using currently available technologies and are designed to estimate long-run, forward-looking (rather than historical) costs. Rather than assuming its existing technology mix, Verizon VA generally estimated the technology mix that will be deployed on a going forward basis where it builds new facilities or replaces existing ones. Verizon VA determined what mix of technologies it would deploy in these situations taking account of technology and other trends over a three-year study period.

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		The Synthesis Model does not reward incumbent carriers for existing inefficiencies, but rather sends the correct economic signals for entry and investment. Murray Direct, pp. 13-15. The Synthesis Model represents the efforts by the FCC, an objective third party, to take the best aspects of various existing cost methodologies in developing a model for deriving costs for universal support. As part of a lengthy regulatory proceeding, the Synthesis Model has been subjected to rigorous review, spanning several years, from a wide variety of industry participants, including Verizon and its predecessor entities. Pitkin Direct, pp. 3-8; Pitkin Surrebuttal, pp. 6-9; 17-20. The Synthesis Model incorporates consistent long run incremental cost principles that apply both to the development of universal service and the determination of costs for unbundled network elements. The forward-looking economic cost criteria that the Commission applied in developing the Synthesis Model for universal service purposes are consistent with and largely identical to the forward-looking economic cost criteria that the Commission has adopted for unbundled network elements. In adopting its forward-looking cost methodology for universal service, the Commission specifically noted the desirability of using the same methodology and cost basis for both universal service support calculations and permanent prices for unbundled network elements. Pitkin Direct, pp. 2-3; Murray Direct. pp. 9-13. The Synthesis Model allows the development of costs for individual unbundled network elements with only minor changes that can be reviewed and tested using the Model's adjustable algorithms and inputs. Various modifications have been made	Then, it developed costs under the assumption that this mix is deployed *network-wide* (even though that will not in fact be the case by the end of the study period). In this sense, Verizon VA's model does use a "reconstructed local network." This approach is consistent with the Commission's mandate that TELRIC studies be based on the most efficient technology currently being deployed in the incumbent's network. *Local Competition Order* at 15848-49 ¶ 685. Shelanski Direct at 21-25; Gordon Direct at 5, 17-21, 32-33; Shelanski/Tardiff Surrebuttal at 18-23. At the same time, to better reflect attainable long-run efficiencies, Verizon VA estimates the costs that it believes it would incur to deploy and operate this forward-looking mix of technology incrementally over time. For example, although the switches assumed in Verizon VA's study reflect the latest available switching equipment that Verizon VA expects to deploy, Verizon VA does not attempt to estimate the cost of an instantaneous, one-time replacement of all of the switches in its network. Rather, Verizon VA's recurring cost study method is designed to capture the costs of *incrementally* deploying throughout its network the mix of switching technology that Verizon VA expects to deploy over the study period. This approach is completely forward-looking — *e.g.*, it assumes that the current most efficient plant is deployed throughout its network — yet it reflects a long-run and realistic approach to the deployment of that plant. It thus complies with the most economically appropriate way to implement the Commission's TELRIC concept. Shelanski Direct at 21-25; Gordon Direct at 5, 14-21; Shelanski/Tardiff Surrebuttal at 22-23. ***Verizon VA's Study Is Forward-Looking:*** Verizon

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		to the FCC's original Synthesis Model to correct implementation errors relating to drop terminal dispersion and orientation, lot size and configuration, input variables, residual line allocation, node selection criteria, and overlapping microgrids. AT&T/WorldCom Initial Filing, Subsection A; Pitkin Direct, pp. 8-10; Riolo Direct, pp. 9-10. AT&T/WorldCom has also made various modifications to the FCC's original Synthesis Model to calculate the costs of UNEs. These modifications relate to use of Virginia-specific expense data, changes to common support services expenses and allocation of those expenses to UNEs, and use of an eight percent common overhead factor instead of the Commission's regression analysis. AT&T/WorldCom Initial Filing, subsection C; Pitkin Direct, pp. 14-17. In addition, AT&T/WorldCom used the Synthesis Model to develop costs for two-wire loops and used that result to estimate costs for four-wire loops, DS-1 loops, and DS-3 loops based on the two-wire rate. AT&T/WorldCom Initial Filing, pp. 10-12; Pitkin Direct, pp. 23-26; Pitkin Surrebuttal, pp. 31-32. The Synthesis Model is flexible and allows the use of state-specific inputs. The underlying Model algorithms employ state-specific customer demand, customer location and geological data to efficiently design plant and facilities on a geographically discrete basis. Furthermore, hundreds of inputs in the Synthesis Model can be modified, if necessary and appropriate, to reflect state-specific or company-specific characteristics. In this proceeding, AT&T/WorldCom have used updated, Virginia-specific line count and ARMIS expense data for demand and expenses and substituted Virginia-specific data, where appropriate, for national values. AT&T/WorldCom	VA's approach assumes a forward-looking mix of technology deployed network-wide. Moreover, its other inputs regarding network characteristics and input costs appropriately reflect Verizon VA's estimates of the costs it would experience if it were to deploy the forward-looking mix of technology over time. Verizon VA's study assumes that its *entire network* is replaced with the technology mix that will be deployed on a going forward basis where it builds new facilities or replaces existing ones. For example, the existing loop plant in Verizon VA's Virginia network consists overwhelmingly of copper. The forward-looking plant configuration in Verizon VA's model, however, is premised on Verizon VA's analysis that a mix of 17.7 % copper and 82.3 % fiber would be the most cost-efficient one for loops based on today's best technology. Shelanski Direct at 21-25; Gordon Direct at 17-25; Shelanski/Tardiff Surrebuttal at 25-40. Basing forward-looking costs on Verizon VA's expected investment and operating decisions is reasonable and efficient and does not amount to an embedded cost methodology. The costs of using existing network facilities going forward, where it is efficient to do so, are forward-looking costs. Moreover, Verizon VA's approach incorporates attainable efficiencies, particularly because it has now been operating under price caps in both the state and federal jurisdictions for a number of years. In addition, Verizon VA already faces steadily increasing competition, so its incentives to make the most efficient decisions possible will only increase. Thus, Verizon VA's technology choices going forward are subject to efficiency incentives, and it is those choices on which Verizon VA's studies are based. Similarly, Verizon VA's assumption that certain network characteristics, such as certain fill factors, are

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		Initial Filing, subsections B and D; Pitkin Direct, pp. 11-13; 18-23; Pitkin Surrebuttal, pp. 13-15, 62-71, 72-74; Riolo Direct, pp. 10-44. Verizon's criticisms of the general ability of the Synthesis Model to estimate the TELRIC of UNEs for Virginia are without merit. The Synthesis Model provides for sufficient spare for churn, demand fluctuations, and growth. Pitkin Surrebuttal, pp. 13-17; Riolo Surrebuttal, pp. 20-23. Verizon's comparison of the Synthesis Model's costs to Verizon's embedded costs or to other models fails to take account of the forward-looking nature of the Synthesis Model or seeks to compare data from different periods and different jurisdictions. *Id.*, pp. 21-31. Verizon's claim that the Synthesis Model does not appropriately handle peak traffic is wrong, as the Model uses the same approach as Verizon to handle peak traffic. Turner Direct, pp. 5-7; Turner Surrebuttal, pp. 4-7. Verizon's argument that the Synthesis Model underbuilds distribution facilities because it ignores vacant buildings has previously been rejected by the Commission and ignores the fact that the Synthesis Model customer location database does include locations that are vacant due to rental turnover or transfer. Pitkin Surrebuttal, pp. 41-43. **III. <u>VERIZON'S COST MODEL IS NOT BASED ON TELRIC</u>** In contrast to the Synthesis Model, Verizon's cost model is not a TELRIC model at all. Under TELRIC, network architecture is not constrained by the architecture that presently exists, as Verizon itself has acknowledged elsewhere, but rather is based on a reconstructed network. Murray Rebuttal, pp. 8-13.	unlikely to change significantly in the foreseeable future is eminently reasonable. Shelanski Direct at 6-7, 20; Gordon Direct at 14-17; Shelanski/Tardiff Surrebuttal at 25-26. ***Verizon VA's Study Models Long-Run Costs:*** A "long-run" cost study, while allowing for the possibility of varying all inputs, does *not*, as AT&T/WorldCom assume, require that all inputs in fact be varied and certainly not that they all be varied instantaneously today and then successively again every few years. A carrier such as Verizon VA seeking to minimize its costs over the long run would not "assume away" its existing facilities and instantaneously replace them all with today's best technologies. Before an existing input is varied, the firm must be able reasonably to predict *how* that input should be assumed to change in the model; *i.e.*, it must be able rationally to calculate what an input should vary *to*. And, in a dynamic industry like telecommunications, uncertainty about future market and technological conditions make it hazardous for a firm to assume that all of its current inputs should be varied to the technology that is the best currently available because of the risk that future changes in technology or demand conditions could render today's investments obsolete sooner than anticipated. Shelanski Direct at 8-21; Shelanski/Tardiff Surrebuttal at 7-9. Accordingly, a carrier minimizes its costs over the long run through incremental changes and investments, taking appropriate account of its existing facilities, and an efficient firm is likely to employ a number of technologies of differing vintages and characteristics throughout time. That is what a long-run cost study should capture. If the incumbent has made an efficient decision not to replace a network element (either

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		Verizon's cost model is not based on a reconstructed network but rather on the network it anticipates deploying over what it considers to be an "economically reasonable planning period" — i.e., the short run. Murray Rebuttal, p. 7. Verizon' calculates recurring costs in its Model based on the technological mix it will deploy over the next three years; Verizon calculates non-recurring costs based on the technological mix that will exist at the end of 3 years. Murray Rebuttal pp. 14-16. But the technology that Verizon will deploy over the next 3 years, *given its embedded base of facilities*, is not the same as the technology that would exist in a network constructed from scratch, or over the long run. Murray Rebuttal, pp. 16-17. And it is the technology that would be deployed in a reconstructed network that constrains the value of Verizon's existing plant. Murray Rebuttal, p. 18. The most straightforward way to measure that value is to determine the costs of a reconstructed network. *Id.* ¶ 18. Verizon's model is based on a survey of its embedded network conducted in the early 1990s and probably does not even accurately capture the costs of that plant. Rebuttal Cost Panel pp. 12-16. Certainly, Verizon's model does not realize meaningful efficiencies that would be available in a scorched node environment. *Id.* Verizon, for example, uses existing customer service area and distribution area boundaries. As a result, 15% of the distribution areas have fewer than 50 lines almost all of which will be served with 224-line capacity DLC equipment. Rebuttal Cost Panel, pp. 17-18; Murray Rebuttal, pp. 28-29. Moreover, Verizon does not even accurately count the number of lines in its existing network and thus does not take full advantage of economies of scale. Rebuttal Cost Panel, pp. 18-19.	today or over an economically reasonable future planning period), it has done so because the long-run costs of retaining the existing technology are *lower* on a forward-looking basis than the costs of replacing it with the new technology. It makes no sense, then, to further lower the incumbent's UNE prices to reflect any short-run cost efficiencies of the new technology that it has appropriately determined not to install. An efficient carrier does not necessarily switch just because the short-run costs of new technology are lower than those of existing technology. Thus, even if an instantaneous replacement model would produce lower short-run costs at this moment, it would likely waste valuable resources and lead to higher costs over time. Shelanski Direct at 8-21; Gordon Direct at 11-12; Shelanski Rebuttal at 5-8; Shelanski/Tardiff Surrebuttal at 7-11. Contrary to AT&T/WorldCom's contention, Verizon VA's use of a three-year planning period was entirely consistent with a long-run study. As noted above, the three-year planning period was simply used to determine the appropriate forward-looking mix of technologies; that mix was assumed to be deployed network-wide, even though that almost certainly will not have occurred by the end of the three years. Verizon VA's choice of a three-year period was eminently reasonable. Uncertainty concerning factors such as changes in technology and demand mean that an efficient firm, even while trying to make its cost study as long-run as possible, will be constrained to examine a finite period over which risk and uncertainty are efficiently managed and it can reasonably predict the mix of forward-looking technologies it expects to deploy. In fact, the Commission has explicitly stated that TELRIC estimates should be based on technology currently being deployed in the network. *See, e.g.*, *Local Competition Order* at 15848-49 ¶ 685; 47 C.F.R.

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		pp. 18-19. Verizon also incorrectly presumes that all of its past choices have been efficient. But even if Verizon's past choices were efficient when they were made, there is no reason to presume that choices made years ago reflect the efficiencies available in a reconstructed network. Moreover, there is no reason to presume that Verizon's past choices were efficient at the time they were made. For example, where Verizon believes it can pass costs on to CLECs, it has an incentive to overstate costs. Also, many of Verizon's choices were made prior to the advent of the alleged efficiency- inducing 'price cap' regulation. Murray Rebuttal, pp. 19-24. These criticisms apply even more to Verizon's calculation of non-recurring costs. Verizon's model for non-recurring costs is even less forward looking than its model for recurring costs; Verizon bases its non-recurring cost studies upon the network that it expects to be in place at the end of a three-year planning horizon. Murray Rebuttal, pp. 39-40. In addition to deviating significantly from a forward-looking model, use of a different modeling assumption for non-recurring costs than for recurring costs further distorts its cost results. Murray Rebuttal, pp. 41-49. Verizon's method in essence requires CLECs to pay to obtain the newest technology by incorporating costs for that technology in calculating recurring costs but then fails to let them take account of the advantages of that technology through lower non-recurring costs. Verizon cost model also is difficult and cumbersome to work with. Rebuttal Cost Panel, pp. 8-9; Baranowski Surrebuttal, pp. 2-3, 11.	§ 51.505(b)(1). Thus, it was entirely reasonable to determine the appropriate "long-run" technology mix based on the mix that Verizon VA expects to deploy over the next three years. Shelanski Direct at 28-29; Gordon Direct at 20-21; Shelanski/Tardiff Surrebuttal at 7-11, 23-24. ***Effect of New Technologies on Value of Existing Facilities.*** While AT&T/WorldCom attempt to make much of the proposition that the cost of new technologies may constrain the value of existing technologies, their argument overlooks several critical factors. *First*, even if the availability of new technology may constrain the value of the technology already in place, it does not follow that replacement of the old technology is warranted. The fact that new technology might constrain the value of the old technology does not mean that such value is so reduced as to make the old assets worthless and in need of replacement. Ms. Murray herself acknowledges that it is "entirely rational" for a carrier such as Verizon VA to replace facilities incrementally. Murray Rebuttal at 17. But that means incremental replacement must be lower-cost than the alternatives open to the firm, such as instantaneous replacement. The point is that, not having to start from scratch, Verizon has a lower-cost alternative to instantaneous, static optimization with the latest technology. *Second*, this same analysis holds true for any other real-world firm in a competitive market. Barring unusual circumstances, firms in a competitive market will provide service using a mix of technological vintages. No firm is likely to have the latest technologies deployed ubiquitously throughout its network, precisely because that generally would not be the cost-

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		Surrebuttal, pp. 2-3, 11.	minimizing strategy over the long run. The result is that prices in a competitive market will not, as AT&T/WorldCom assume, be instantaneously reduced to the costs of a hypothetical firm always having the most current technologies, ideally configured to serve existing demand. *Third*, any discussion of the effect of new technology on the value of the old must take into account the *full* cost of the new technology. But AT&T/WorldCom fail to account for how, once correct capital costs and depreciation are factored into their model, the hypothetical new network costs would relate to the costs of an efficient, real-world, forward-looking firm. If a market like that assumed by AT&T/WorldCom actually existed -- in which a hypothetical network with ideally efficient technologies could instantaneously sprout up at any time --the depreciation and capital costs of investments in new technologies would be extremely high, a fact that AT&T/WorldCom entirely ignore. Shelanski/Tardiff Surrebuttal at 12-14. **III. <u>AT&T/WORLDCOM'S MODEL IS ECONOMICALLY INCORRECT AND NOT REQUIRED BY TELRIC</u>** ***AT&T/WorldCom's Assumption of Repeated, Instantaneous, and Complete Network Replacement:*** The instantaneous, successive replacement model advocated by AT&T/WorldCom is neither economically correct nor required by an economically appropriate interpretation of TELRIC. AT&T/WorldCom contend that long-run, incremental costs should be modeled as if firms today, and repeatedly at defined intervals in the future, instantly replace their entire existing

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			networks with the latest technology without regard to whether the equipment they are replacing was bought last month or last century and regardless of the price of the new equipment or uncertainty about future changes in technology and demand. They expressly argue that the efficient rate of network replacement and expansion is "irrelevant" to the determination of the forward-looking costs on which UNE prices are based. Shelanski Rebuttal at 3-14; Shelanski/Tardiff Surrebuttal at 4-6, 15-18. As a result, the Modified Synthesis Model does not estimate the forward-looking costs that Verizon VA or any other efficient firm would incur, and its position is plainly at odds with economic principles and with the goal of long-run cost minimization. An economically correct cost study should not discard the entire existing network and proceed based on the assumption that the firm has instantaneously built a hypothetical, new network from scratch. Because it is more efficient (or "entirely rational" in Ms. Murray's words) for the incumbent to replace its network incrementally, making use of existing facilities that retain economic value even after the new technology becomes available, it makes no sense to force the incumbent to model its costs based on the full replacement assumption. Shelanski Direct at 6-20; Gordon Direct at 12-13; Shelanski Rebuttal at 3-14; Shelanski/Tardiff Surrebuttal at 4-6, 15-18. Nor can AT&T/WorldCom's view be justified on the basis of the unrealistic assumption that there will always be a carrier capable of instantaneous, ubiquitous deployment of new technology and network design. Murray Rebuttal at 18. In fact, this is not the case; in no real-world, capital-intensive market are

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			forward-looking costs driven immediately down to costs based on the assumption that the current least-cost technology could be deployed instantaneously throughout the network. Under this view, a real network would always be considered inefficient compared to the hypothetical ideal. This hypothetical ideal, however, does not translate into the real world, because at any point in time an efficient competitor will employ a mix of equipment and technologies for which it must recover costs. Verizon's study is completely forward-looking in that it "reconstructs" the network with a forward-looking technology mix, but it recognizes the fact that no real world firm deploying and operating a network built from components with long asset lives would ever build the entire network instantaneously. Because efficient firms add and replace network plant on an incremental rather than total basis, their long-run, forward-looking cost models should incorporate new technology only as existing plant loses economic value. Shelanski Direct at 6-17; Gordon Direct at 9-13; Shelanski/Tardiff Surrebuttal at 5-6. ***Depreciation Rates and Cost of Capital in a Replacement Model:*** The depreciation rates and cost of capital incorporated into Verizon VA's cost model are conservative inputs based on economically correct assumptions about the value of facilities used to provide UNEs on a forward-looking basis, thereby tending to understate costs. By contrast, the Modified Synthesis Model does not take account of the extremely high capital costs and depreciation rates that result from the risks inherent in their assumption of instantaneous and ubiquitous replacement. Shelanski Direct at 13-15, 27-28; Shelanski Rebuttal at 8-11. In deciding whether to replace its existing equipment

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			when a more efficient technology becomes available, a firm takes into account the risk that it might find itself too quickly having to write off the sunk costs of the new equipment when technology advances yet again. If the incumbent is assumed to be subject to entry at any time by an optimal, "best-available" network, then any new entrant will similarly have to assume that it, too, will be subject to such competition down the road. As a result, any model that assumes immediate replacement of installed plant the moment a more efficient technology comes along must allow for very short depreciation lives and correspondingly high costs of capital. Otherwise, the new entrant will be granted the equivalent of a free option, which will distort investment and entry decisions. Shelanski Direct at 9-16; Hausman Rebuttal at 9-11. Where technological change is frequent, depreciation lives under a total replacement model will be short and the rate of depreciation will be high in order for the firm fully to recover its investment during the allowable interval. In addition, such a model must account for economic depreciation resulting from any price decreases for elements. These issues have a particularly pronounced effect when a firm is subject to a regulatory process that periodically assumes the network is successively and instantaneously replaced with new technology. In that context, the firm will anticipate successive price reductions and have to adjust risk and depreciation accordingly. Shelanski Rebuttal at 8-11; Hausman Rebuttal at 5-20. Given the sunk costs at issue in building telecommunications networks, the capital costs under such a full-replacement rule would be, after the necessary risk and depreciation adjustments, two to three times the costs of capital

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			for efficient, incremental network investment. To take account of the effect of sunk costs, the estimated TELRIC values in any instantaneous replacement model such as the Modified Synthesis Model (after being corrected to remedy all the other deficiencies) would need to be increased by factors on the order of 97% to 120%, depending on the particular element and the proportion of sunk costs to the total costs of providing the element. Hausman Rebuttal at 5-20. Verizon's proposed cost of capital and depreciation inputs are discussed in more detail below. **IV. <u>THE MODELS AND COSTING METHODOLOGIES</u>** ***The Verizon Cost Model Is Specifically Designed To Produce Forward-Looking Costs For Providing UNEs in Verizon's Virginia Service Area:*** The Verizon cost model develops installed investment costs by identifying the material investment for each class of plant and then calculating investment loading assumptions. Thereafter, annual expense cost factors are used to translate these installed material investment costs into the total forward-looking investment costs of providing individual UNEs. Capital and operating expense factors are calculated for each investment account, based on Verizon VA's expense information, adjusted to be forward-looking. VZ-VA Panel Direct at 16-21; 29-77 The model then applies these costs to the forward-looking network model proposed by Verizon VA based on aggressive, forward-looking assumptions regarding technology deployment. The forward-looking network construct is based on several components: the input of Verizon's engineers, who have real-world, concrete

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			experience working with and planning Verizon's network; a review and assessment of Verizon's deployment plans with respect to plant and technology used in the network; Verizon's models that are used to present forward-looking assessments of, for example, the most efficient fiber-copper breakpoint; and a review of existing network features -- such as wire center locations, distribution areas, and loop routes and structure, that are efficient, static, and unlikely to change in the future. Utilization factors that are used in spreading the UNE costs among the available units of capacity generally are based on engineering experience with certain forward-looking assumptions made to increase those factors (thereby lowering UNE costs) where appropriate. The forward-looking network studied by Verizon thus is one that would actually be capable of -- in fact, ideally suited to -- serving Verizon VA's customers. It would have state-of-the-art technology deployed in an efficient manner so as to maximize cost-effectiveness, while ensuring the ability to provide all services requested by both retail customers and CLECs, including unbundled stand-alone loops and DSL. The network would also capture certain real efficiencies of the incremental deployment that necessarily characterizes real networks -- reduced rights-of-way costs due to Verizon's longstanding presence in some areas, for example and access to certain streets that no longer would be accessible -- while simultaneously reflecting cost savings associated with aggressive deployment assumptions that in many cases far outstrip Verizon's current plans. VZ-VA Panel Direct at 22-28 and 78-232; VZ-VA Recurring Panel Surrebuttal at 59-103 and 148-207.

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			This network construct, Verizon's cost studies, and the overall model approach, constitute the only methodology that can (and does) accurately model forward-looking costs of providing UNEs. The approach uses real-world, testable data, and is the only model in these proceedings that utilizes Virginia-specific information and has the actual input of experienced engineers familiar with operating a local exchange network. No other model can appropriately estimate the forward-looking costs of providing UNEs in Virginia. VZ-VA Panel Direct at 1-365; VZ-VA Recurring Panel Surrebuttal at 1-251. ***The Modified Synthesis Model Was Designed Solely To Support the Federal Universal Service Program:*** The Modified Synthesis Model, on the other hand, is incapable of accurately estimating the costs of providing UNEs. It is simply a dressed-up version of the Synthesis Model, a model that was not designed, much less approved, by the Commission to estimate the costs of a particular company in a particular state. Rather, the Synthesis Model was developed for a high-level purpose – to allocate federal universal service funds among the states. As such, the Synthesis Model, and by default the Modified Synthesis Model, simply cannot conduct the type of detailed analysis required when estimating the costs of providing UNEs. Murphy Rebuttal at 4-7; Tardiff Rebuttal at 4-7. In developing the Model, the Commission narrowly defined the network and services that should be encompassed in federal universal service cost calculations, deliberately excluding non-supported services and UNEs not used by the supported services. In contrast, the Commission in its Local Competition Orders required carriers to provide UNEs that would support a much broader range of services. *See* 47 C.F.R.

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			§ 51.505(b). For example, rather than narrowly defining loops to those that provide a limited range of services for federal universal service purposes, the Commission's expanded definition of UNE loops requires support of dark fiber, ISDN, DDS, DS1, and DS3. However, the Synthesis Model, and by extension the Modified Synthesis Model create a limited network – one that cannot accommodate all of the required elements and services associated with a competitive environment. Murphy Rebuttal at 12-13; Tardiff Rebuttal at 14-15. In developing the Synthesis Model, the Commission also determined that it was not necessary for the federal cost model to estimate the costs of a particular carrier, concluding that it would be time-consuming and burdensome, in the federal universal service proceeding, to examine the data of each individual company in each jurisdiction. *In the Matter of Federal-State Joint Board on Univeral Service, et al.*, CC Docket Nos. 96-45 and 97-160, Tenth Report and Order, FCC 99-304 ¶ 162 (rel. Nov. 2, 1999 ("Tenth Report and Order"). Instead, the Commission adopted a national proxy model, populated with nationwide input values, as an expedient. The ability to estimate accurately the costs, or the relative cost differences between geographic areas, of a particular carrier in a particular state, however, is essential to modeling the costs in these proceedings. Murphy Rebuttal at 4, 10-14. Recognizing the potential for misuse, the Commission has cautioned parties against using the Synthesis Model for any purpose other than federal universal service support. *See* Tenth Report and Order ¶ 31, n. 416, repeatedly and unequivocally stating that the Synthesis Model should not be used for purposes

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			other than determining the relative cost differences among states. (See Tenth Report and Order ¶ 32; *Application of Verizon New England, Inc., Bell Atlantic Communications, Inc. (d/b/a Verizon Long Distance), et al.*, CC Docket No. 01-9, Memorandum Opinion and Order, FCC 01-130 (rel. April 16, 2001) ¶ 32. Murphy Rebuttal at 10-14; Tardiff Rebuttal at 7-13. ***The Modified Synthesis Model Uses Unrealistic and Erroneous Assumptions:*** The Model's numerous platform, engineering and input flaws produces an unrealistic network that could not support the level of customer demand, the types of services, and the service quality standards that Verizon or any efficient carrier in the real world must accommodate. Murphy Rebuttal at 5, 16-46. The Model assumes that a brand new, "fully functioning" network is built instantaneously and dropped into place at a single point in time – a static network that excludes, by design, many of the costs of a dynamic forward-looking network. As a result, the Model cannot efficiently accommodate predictable changes and rearrangements in demand, and thus is incapable of "serving" existing demand. A network that cannot respond efficiently to customer movement (i.e., "churn"), demand fluctuations, demand growth, and the need for network modification cannot serve a carrier's customers without an unacceptable risk of service disruption or unsatisfied customer requests. Tardiff Rebuttal at 14-15, 19-21. Moreover, the Modified Synthesis Model's fundamental assumptions do not reflect reality. The Model implicitly assumes that ILEC instantly sizes its plant to accommodate forecasted demand, utilizing ideally-sized facilities obtained at maximum volume discounts. Such an assumption is absurd. No matter how long-run the approach, real-world firms necessarily

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			make investment decisions without perfect knowledge of the future of technology or demand, but with the expectation that demand will grow and shift and that facilities will be relieved and replaced. The Model is wrong in assuming that these uncertainties can simply be eliminated. Tardiff Rebuttal at 18-19. ***The Modified Synthesis Model Produces Systematically Understated Costs:*** Even assuming that technological change and increased competition will make Verizon more efficient. The wide discrepancy between the cost estimates produced by the Modified Synthesis Model and real-world results makes clear that the Model is not capable of accurately estimating the cost of establishing and operating a network. For example, the Model estimates that a brand new network can be deployed throughout Virginia with the minimal investment of approximately $55 per-line, an estimate that is a fraction of the $3,000 per-line investment made by CLECs between 1997 and 2000. The Model's investment levels are *less than one-half* of Verizon's total investment. In fact, the Model estimates that the total investment required to re-build Verizon's entire Virginia network (and grow it by 30 percent) is only $3 billion. This is only $700 million more than Verizon spent on upgrades and expansions over the past four years (year-end 1996 to year-end 2000). The Model also produces expenses that are *one-third* of Verizon's current levels. Tardiff Rebuttal at 41-43. Moreover, the cost estimates of the Modified Synthesis Model are much lower than the costs produced by the original Synthesis Model. Tardiff Rebuttal at 30. In addition, the Modified Synthesis Model's use of

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			default values that are based on data of different vintages, without appropriate adjustments, is inappropriate for calculating TELRIC-compliant UNEs in Virginia. In particular, the Taylor Nelson Sofres ("TNS") (formerly "PNR Associates") customer location and demand data and the OSP cable and switching prices from the NRRI study utilize data of different vintages and cause the Modified Synthesis Model to produce significantly reduced cost estimates. In addition, the Modified Synthesis Model's low estimates are exacerbated by the fact that some Model default inputs were set at embedded levels and some of the relevant investments were simply ignored. Murphy Rebuttal at 79-83; Tardiff Rebuttal at 28-37. ***The Modified Synthesis Model Suffers from Lack of Validation:*** The documentation accompanying the Modified Synthesis Model fails to explain the Model's inner workings. The Model's numerous formulas, upon which the modules used in the Model are based, are vaguely explained, if at all, and supporting material is lacking. Moreover, the Model's input assumptions cannot be validated by AT&T's own experience. AT&T refuses to use its own cost information and engineering practices to support the assumptions in the Model. The Model thus has never been validated against real world results. Further, the Modified Synthesis Model utilizes an outdated source code, making validation extremely difficult. The source code for the feeder and distribution modules of the Modified Synthesis Model is written in Turbo Pascal, which has been discontinued by the manufacturer and is no longer commercially available in the U.S. and is compiled in various

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
			".exe" files, making it virtually impossible to analyze. (*See* Borland Software Corporation's web page for Turbo Pascal at http://www.borland.com/pascal.) Tardiff Rebuttal at 13; 23-28; Murphy Rebuttal at 15.
II-1-c	What cost assumptions and inputs (e.g., cost of capital, depreciation lives, fill factors, switching equipment prices, network architecture, cable sizes, input units costs) should be used to estimate the recurring costs of network elements and interconnection provided by Verizon?	**The following cost assumptions and inputs should be used to estimate the recurring costs of network elements and interconnection provided by Verizon.** **IV. <u>COST OF CAPITAL</u>** The FCC should accept the weighted average cost of capital of 9.54% proposed by AT&T/WorldCom witness John Hirshleifer, not the 12.95% value proposed by Verizon witness James Vander Weide. As state commissions have found in virtually every state that has weighed the two competing approaches, Dr. Vander Weide's methodology produces grossly inflated results. Hirshleifer Direct; Hirshleifer Rebuttal; Hirshleifer Surrebuttal. The three main reasons are as follows: First, Dr. Vander Weide's one-stage DCF model makes the nonsensical assumption that the above-average short run growth in earnings projected for the companies in his DCF comparison group will persist in perpetuity. This error, the single largest cause of the difference in the two witnesses' results, alone inflates Dr. Vander Weide's cost of capital by more than two percentage points. By contrast, Mr. Hirshleifer's three-stage DCF model properly recognizes that earnings growth rates regress over time to the long run growth rate of the	**V. <u>COST OF CAPITAL</u>** ***Verizon VA's Proposed 12.95% Cost of Capital Complies with the Commission's Basic UNE Cost Principles:*** Verizon VA's proposed 12.95% cost of capital complies with the basic economic principles set forth by the Commission in the *Local Competition Order* that UNE costs must (1) be forward-looking economic costs; (2) approximate the rates the incumbent LEC would be able to charge in a competitive market for UNEs; and (3) provide correct economic signals for the investment decisions of both competitors and incumbent LECs. Verizon VA's proposed cost of capital is based on the market cost of debt, the market cost of equity, and the market value capital structures of firms that operate in competitive markets. Verizon VA's proposed cost of capital therefore approximates the capital costs the incumbent LEC would face in a competitive market for UNES. It also provides correct economic signals for the investment decisions of competitors and incumbent LECs because it approximates the capital costs incumbent LECs would incur in providing UNEs. Vander Weide Direct at 4-6. In contrast, AT&T/WorldCom's proposed 9.54% cost of capital is totally inconsistent with the Commission's UNE costing principles. First, AT&T/WorldCom's proposed cost of

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		economy. Hirshleifer Rebuttal, pp. 12-16; Hirshleifer Surrebuttal, pp. 2-17. Second, the DCF comparison group used by Mr. Hirshleifer, a group of holding companies with substantial local telephone operations, is far more representative of the risks of providing UNEs at wholesale than the diversified group of competitive businesses in the S&P industrial companies selected by Dr. Vander Weide. The business of supplying UNEs at wholesale in Virginia faces little competitive risk for the foreseeable future, a fact underscored by the recent wave of bankruptcies in the CLEC sector. Hirshleifer Rebuttal, pp. 17-31; Hirshleifer Surrebuttal at 24-35; Murray Surrebuttal at 13-17. Verizon's alternative claim that the dearth of local competition it actually faces in Virginia is irrelevant because the TELRIC standard requires state commissions to *assume*, regardless of the actual facts, that the business of supplying UNEs at wholesale will face intense competitive risks is a gross misreading of the *Local Competition Order*, and would ensure that virtually no UNE-based competition materializes. Hirshleifer Rebuttal, pp. 4-7; Hirshleifer Surrebuttal, pp. 17-24. Third, Dr. Vander Weide has assumed a capital structure that has an inefficiently large weighting of equity for the low-risk wholesale business of supplying unbundled network elements. Because of the low risk of the business of supplying UNEs at wholesale, an efficient firm would adopt a target debt/equity ratio approximating the 34.5%/65.5% ratio assumed by Mr. Hirshleifer, not the 75%/25% ratio assumed by Dr. Vander Weide. Hirshleifer Rebuttal, pp. 31-34; Hirshleifer Surrebuttal, pp. 53-60.	capital does not reflect forward-looking economic costs because it is based, at least in part, on the telecommunications companies book value capital structures. Forward-looking economic costs are necessarily based on market value capital structures. Second, AT&T/WorldCom's proposed cost of capital does not simulate the results of a competitive market because it is fundamentally based on the incorrect assumption that Verizon VA provides UNEs in a low-risk monopoly environment where no additional capital investments are required to provide UNEs. Hirshleifer Direct at 42; Hirshleifer Rebuttal at 23. There is simply no way that UNE prices can simulate the results of a competitive market if they reflect AT&T/WorldCom's proposed monopoly-based cost of capital. Third, AT&T/WorldCom's proposed cost of capital does not provide correct economic signals to UNE market participants because, when AT&T/WorldCom's monopoly cost of capital is combined with the extreme hypothetical competitive-market assumptions of its UNE cost model, the resulting UNE rates would be significantly less than the costs new entrants and incumbent LECs would incur in providing UNEs. ***Verizon VA's Proposed Cost Of Capital Is Consistent With The Underlying Assumptions Of Verizon VA's UNE Cost Model:*** Verizon VA's proposed cost of capital appropriately and conservatively considers the risk of the economic scenario captured by Verizon VA's UNE cost model. Verizon VA's cost of capital estimate is based on Verizon VA's forward-looking economic cost of providing UNEs, recognizing the replacement of the current network with new technology over a three-year planning horizon, the assumption that the technology mix at the end of the planning horizon will be the hypothetically most efficient mix network wide, and the economic reality that

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		Finally, Dr. Vander Weide's cost of capital estimates also fail the test of reasonableness provided by cost of capital estimates prepared in the business world outside the litigation context. The consensus of analyses by investment firms and other independent analysts in recent years, including those retained by Verizon's predecessors in the mergers that created the present company, supports a cost of capital in the range of only 8-10 percent. Dr. Vander Weide's contrived "tests of reasonableness," by contrast, to the extent that they make any economic sense, actually underscore the reasonableness of Mr. Hirshleifer's cost of capital estimates. Hirshleifer Rebuttal, pp. 60-81. **V. <u>DEPRECIATION LIVES</u>** The appropriate depreciation lives and future net salvage values to use determining the recurring costs of UNE are the projection lives last prescribed by the FCC for Verizon-VA. Those lives, which are set forth in Attachment 6 to the direct testimony of AT&T/WorldCom witness Richard Lee, provide the best measure of Verizon's forward-looking economic asset lives and salvage values. Neither competition nor technological change have rendered the FCC-prescribed projection lives obsolete. Indeed, the continued growth in Verizon's depreciation reserve percentages indicates that those lives are, if anything, too short. Lee Direct, pp. 1-15; Lee Rebuttal, pp. 12-15. Verizon's arguments for shorter lives are without substance. Neither Verizon's GAAP financial lives nor the asset lives of AT&T and other competing firms provide a relevant measure of forward-looking economic lives for UNE	demand forecasts are uncertain. An alternative scenario, such as proposed by AT&T/WorldCom, where an entirely new, perfectly sized local exchange network would be instantaneously built from scratch every few years using the most efficient technology available, involves a greater degree of risk and would require a higher estimate of the cost of capital. Vander Weide Direct at 28-35. In estimating Verizon VA's forward-looking cost of capital, Verizon VA accounted for the risk of investing in the facilities required to provide unbundled network elements in Virginia. This risk depends on operating leverage, the level of competition, rapidly changing technology, and the regulatory environment. Each of these factors contributes to the significant risk that Verizon VA faces in providing UNEs to its competitors. In addition, the fact that Verizon's competitors may choose at any time to discontinue purchasing UNEs from Verizon increases the risk of Verizon VA's forward-looking investment in facilities to provide UNEs. Vander Weide Direct at 35-43; Shelanski Direct at 30-31. In contrast, AT&T/WorldCom's cost of capital estimate is inconsistent with the underlying assumptions of AT&T/WorldCom's UNE cost model. AT&T/WorldCom assume a "low-risk monopoly" environment when estimating the cost of capital, at the same time that they assume a highly competitive market when estimating the investment and expense components of their cost model. In addition, AT&T/WorldCom base their UNE cost model on the extreme hypothetical assumptions that Verizon VA will: (1) instantaneously construct an entirely new telecommunications network that is perfectly sized to meet the total demand for telecommunications service;

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		ratemaking. Likewise, the truncated lives sponsored during the past five years by TFI, a consultant for Verizon and other ILECs in UNE litigation, were rejected, and properly so, by virtually every state commission where Verizon proposed them during the first generation of UNE litigation, including the 1996-98 UNE proceeding before the Virginia State Corporation Commission. Lee Rebuttal, pp. 1-12. **VI. <u>SWITCHING EQUIPMENT PRICES</u>** The switch module of the Synthesis Model uses switch price inputs developed by the FCC that are reasonable. These national inputs are appropriate for use in this Virginia proceeding because the prices paid by Verizon and other ILECs are comparable for the same type and size of switch. Pitts Direct, pp. 4-5; Pitts Surrebuttal, pp. 5-7. The Synthesis Model appropriately develops costs for new switches and properly reflects new switch discounts. Rebuttal Cost Panel, pp. 97-104. By contrast, Verizon's cost study overstates switch costs by using the smaller "growth" discounts, *id.*, pp. 97-104, Murray Surrebuttal, pp. 41-44, by using erroneous assumptions about IDLC, Rebuttal Cost Panel, pp 105-07 and by misstating costs for feature port additives, *id.*, pp. 109-11. Moreover, Verizon proposes right-to-use fees that are inflated, *id.*, pp. 116-20, and engineering and installation factors that are overstated, *id.*, pp. 120-22. Switching UNE costs should reflect the general cost causation trends of switch engineering and purchasing. Much of the total cost of a switch is associated with memory and processors and is incurred at the time a switch is placed in	(2) use the current most efficient technology throughout its network; and (3) instantaneously reconstruct its network in several years when prices are re-set, again using the most efficient technology then available. Investors would certainly recognize the high risk of investing in a company constructing a telecommunications network under highly unrealistic and hypothetical assumptions of the AT&T/WorldCom model. Investors would also recognize that each time Verizon VA reconstructs its telecommunications network, it faces the considerable risk that its investment may not be recovered because the depreciation lives in the AT&T/WorldCom model are significantly longer than the expected time between each reconstruction of the telecommunications network. Yet AT&T/WorldCom fail to recognize the increased risks of their extreme hypothetical assumptions when estimating the cost of capital. UNE rates based on AT&T/WorldCom's inconsistent model assumptions would send incorrect economic signals to market participants because the cost it produces are significantly less than those that any real world carrier could achieve. Vander Weide Direct at 7-11; Vander Weide Rebuttal at 3-4; Vander Weide Surrebuttal at 2-3, 19-22; Tardiff Rebuttal at 55-57. ***Verizon VA's Proposed 75% Equity/25% Debt Market-Based Capital Structure Complies with the Commission's Forward-looking Economic Cost Principles:*** Verizon VA's proposed market-based capital structure is consistent with the Commission's principle that UNE rates should be based on forward-looking economic costs rather than on historical embedded costs. *Local Competition Order* at ¶ 705. Economists unanimously agree that the forward-looking economic cost of capital must be measured using market value capital structure weights. The average market value capital

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		operation. These "getting started" costs do not vary with usage or features. The majority of the cost of today's generation of digital switches is driven by ports – not by usage or features. Only a very small percentage of the overall investment in current digital switch technology is engineered based on peak period usage. Based on actual Verizon total switch investment, most costs are non-traffic sensitive and are allocable to the port rather than to MOU rate elements. Pitts Direct, pp. 6-8; Murray Direct, pp. 13-23; Rebuttal Cost Panel, pp. 112-16 & Att. 5; Pitkin Surrebuttal, p. 74. **VII. <u>NETWORK ARCHITECTURE</u>** ***Line Count*** – AT&T/WorldCom bases its line counts on estimated 2002 data, which is the midpoint of the three year period over which the UNE rates established in this proceeding are likely to remain in effect. In response to a change in the way Verizon reported special access lines in ARMIS, AT&T has reduced its special access line count and now conservatively estimates 2.1 million DS0 equivalents for 2002. This is significantly less than Verizon's forecast for 2002, which demonstrates the conservative nature of the estimate. Pitkin Direct, p. 11; Pitkin Surrebuttal, pp. 43-44, 72-73. ***IDLC*** –The least-cost forward-looking technology for loops is an integrated DLC ("IDLC") interface at the DS1 level for loops exceeding the fiber/copper threshold and provisioned with fiber feeder. AT&T/WorldCom inputs to the Synthesis Model provide for the use of IDLC where appropriate. By contrast, Verizon's cost study continues to rely on less efficient Universal DLC ("UDLC") for approximately 30% of those loops that use DLC. Rebuttal Cost Panel, pp. 20-23.	structures of both telecommunications companies and the S&P Industrials have consistently contained no more than 25% debt and no less than 75% equity in the last five years. Verizon VA's recommended market value capital structure, in fact, is conservative, because the market value capital structures of the telecommunications and industrial companies have contained significantly less than 25% debt, and significantly more than 75% equity on average over the last five years. Vander Weide Direct at 45. Contrary to the Commission's requirement that the cost of capital input in UNE cost studies be forward looking and market based, AT&T/WorldCom's cost of capital is backward looking and accounting based. Rather than relying on market-based estimates, AT&T/WorldCom estimate the debt and equity components of the weighted average cost of capital in part based on the accounting values of the debt and equity shown on the company's books. AT&T/WorldCom's accounting values of debt and equity clearly reflect the *historical costs* of telecommunications company assets. In addition to reflecting historical costs, AT&T/WorldCom's book value capital structure depends on arbitrary accounting conventions and is inherently backward looking. A book value capital structure cannot be used in a forward-looking estimate of the cost of capital. ***Verizon VA Utilizes an Appropriate Cost of Equity Proxy:*** In calculating its estimated cost of capital, Verizon VA recommends using the S&P Industrials as a cost of equity proxy for Verizon VA's investment in the facilities required to provide UNEs. The S&P Industrials are an appropriate proxy group for estimating the cost of equity because they are a large group of companies of average risk that operate in competitive markets.

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		loops that use DLC. Rebuttal Cost Panel, pp. 20-23. For IDLC lines, the least-cost forward-looking technology involves use of a GR-303 interface that requires substantially fewer facilities than the less efficient TR008 technology. AT&T/WorldCom inputs to the Synthesis Model provide for 100% use of GR-303. By contrast, Verizon's cost study assumes that only 10% of IDLC lines will use GR-303 technology, thereby increasing costs. Rebuttal Cost Panel, pp. 23-30. ***Utilization Factors*** -- As a general matter, Verizon substantially underestimates utilization by including significant excess capacity to account for growth in the network. Verizon thus forces present ratepayers to pay for capacity needed for future ratepayers – without compensating for this by including in its calculations the future revenue that will be generated by use of the spare capacity it has included. Moreover, Verizon reflects the highest possible level of spare capacity—and the lowest level of utilization—by failing to reflect the fact that over time spare capacity becomes used capacity as growth in demand occurs. Murray Rebuttal, pp. 32-33; Rebuttal Cost Panel, pp. 42-43; Murray Surrebuttal, pp. 37-40; Pitkin Surrebuttal, pp. 14-17. But even if spare capacity for growth is included, Verizon substantially underestimates utilization. Indeed, in AT&T and WorldCom's restatement of Verizon's model, they assumed spare capacity for growth (but also accounted for decreased unit costs caused by future growth by assuming a growth rate of 3% per year) and yet came up with utilization levels significantly higher than Verizon's figures. Moreover, the	Thus, they are consistent with the Commission's principle that UNE costs should replicate the conditions of a competitive market. Verizon VA also applied the DCF model to a group of telecommunications holding companies. The DCF results for the telecommunications companies were not significantly different from the results for the S&P Industrial group. Vander Weide Direct at 42-47; Vander Weide Rebuttal at 38-40. AT&T/WorldCom uses only a small group of four or five telecommunications holding companies for its risk proxy group. This group is simply too small to obtain a reliable estimate of the cost of equity. Furthermore, the companies, which are experiencing radical restructuring and profound regulatory, organizational, and technological change, likely do not satisfy the basic stability assumptions of the DCF model. Vander Weide Rebuttal at 37-38. ***Verizon VA's Proposed Cost of Equity Methodology Produces Results That Are Consistent with the Generally Accepted Relationship Between Risk and Return.*** Verizon VA's proposed 14.75% cost of equity is determined from the application of the traditional single-stage DCF model that the Commission has previously used to estimate the cost of equity for telecommunications operations. The single-stage DCF model produces results that are positively related to risk. For example, high-risk companies with high betas and high growth have higher DCF results than low-risk companies with low betas and low growth, while low-risk companies with high dividend yields have lower DCF results than high-risk companies with lower dividend yields. These results are consistent with general capital market expectations. Vander Weide Rebuttal at 71-75.

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		AT&T/WorldCom Synthesis Model itself includes spare capacity for growth to be extremely conservative. Pitkin Surrebuttal, pp. 13-15; Murray Surrebuttal, p. 37. Verizon's individual utilization factors are too low. Verizon assumes a **[Verizon Proprietary Begins]** __% **[Verizon Proprietary Ends]** distribution cable fill factor. This is far too low and even a 60% fill factor is conservative – the Synthesis Model uses an even more conservative effective fill factor of just 52.5%. Rebuttal Cost Panel, pp. 44-51; Pitkin Surrebuttal, p. 14. In a forward-looking network, a new entrant could construct its network efficiently with fewer than two pairs per household because it could take into account areas where demand has been stable for a long time. Moreover, there would be far fewer defective pairs in a reconstructed network. Rebuttal Cost Panel, pp. 45-46. Finally, if a pure engineering definition of fill factor were used, setting aside all other considerations, fill would be vastly above 60% -- 86% in an example provided by Verizon – simply because idle dedicated pairs, connect-through pairs and defective pairs would be counted as utilized pairs in standard engineering practice. Rebuttal Cost Panel, pp. 48-50. Verizon's utilization factor for fiber feeder of **[Verizon Proprietary Begins]** ___% **[Verizon Proprietary Ends]** is also far too low. The proper utilization should be 100%. Spare strands in a fiber ribbon can all be used to provide services such as DSL or high speed business services, or to upgrade the site or provide dark fiber. Rebuttal Cost Panel, pp. 52-54. Verizon's utilization factor for copper feeder is **[Verizon Proprietary Begins]** __% **[Verizon Proprietary Ends]** which is again too low. Verizon engineering guidelines call for 3-5	AT&T/WorldCom base their cost of equity estimate in part on the application of a three-stage DCF model that requires AT&T/WorldCom to arbitrarily specify a complicated pattern of declining investor growth expectations over three separate periods that are also arbitrarily specified by AT&T/WorldCom. Unlike Verizon VA's model, which produces DCF results that are positively related to risk, AT&T/WorldCom's complex three-stage DCF model produces results that are negatively related to risk. For example, AT&T/WorldCom's three-stage DCF model produces higher cost of equity estimates for electric and natural gas utilities than for industrial and telecommunications companies, which are generally considered to be more risky than the electric and gas utilities. In addition, AT&T/WorldCom's three-stage DCF model produces results that are negatively related to risk as measured by beta, growth, and dividend yield. For example, high-risk companies with high betas and high growth have lower DCF results than low-risk companies with low betas and low growth. In addition, low-risk companies with high dividend yields have higher three-stage DCF model results than high-risk companies with low dividend yields. The AT&T/WorldCom results are at odds with the general expectation that the required return should increase with risk. For this reason alone, the Commission should reject AT&T/WorldCom's three-stage DCF model. Vander Weide Rebuttal at 71-75. ***Verizon VA's Proposed Cost of Capital is Consistent with the Cost of Capital Verizon VA Uses to Make Network Investments.*** The best test of the reasonableness of Verizon VA's 12.95% cost of capital estimate is that Verizon VA also uses the same cost of capital in making real-world investment decisions. This test is especially important because Verizon VA

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		years of spare capacity to account for growth. With a growth rate of 3% a year, the average growth rate in Verizon's network, utilization would be well above 80% even immediately after relief of a feeder route. Thus, an 80% utilization route is conservative. Rebuttal Cost Panel, pp. 55-63. None of the reasons Verizon provides for a lower utilization rate is persuasive. Rebuttal Cost Panel, pp. 59-63. Verizon's utilization factor for RT plug-ins is **[Verizon Proprietary Begins]** __%**[Verizon Proprietary Ends]**, while the proper rate, even after accounting for growth and breakage, should be 98%; thus, the 90% figure used by AT&T/WorldCom is conservative. Because the cost of RT plug-ins is so high relative to the cost of installing plug-ins, engineering guidelines requires only enough spare capacity for 6 months of projected growth – or 1.5% spare capacity using a 3% growth rate, with breakage having only a minimal additional effect. Rebuttal Cost Panel, pp. 63-66; Riolo Direct, pp. 7-8, 37-38. Verizon assumes a utilization rate of **[Verizon Proprietary Begins]** __% **[Verizon Proprietary Ends]** for common electronics when an 80% figure would be more reasonable. The Synthesis Model conservatively uses fill factors that range from 70% to 82.5% depending on the density zone. Pitkin Surrebuttal, p. 54. Verizon incorrectly presumes that the utilization rate for common electronics will be the same as that for copper feeder – for which Verizon had in any event proposed a utilization rate that was too low. Verizon also presumes that the cost of common electronics will be apportioned only across 2-wire POTS loops, bases utilization rates on its existing boundaries for UAAs and DAs which are inefficient and often force use of an entire Litespan 2000 unit to serve a small number	has a strong incentive to use the correct cost of capital in making its forward-looking investment decisions. Vander Weide Rebuttal at 10, 61. In contrast, AT&T/WorldCom's 9.54% estimate of the cost of capital in this proceeding is significantly less than the 15.306% forward-looking cost of capital AT&T has used in its Total Incremental Cost Model. The 15.306% forward-looking cost of capital AT&T has used in its Total Incremental Cost Model is especially relevant in this proceeding because AT&T's Total Incremental Cost Model is a forward-looking economic model of the cost of making telecommunications investment decisions. Since AT&T also has a strong economic incentive to use the correct cost of capital in making real world investment decisions, the inconsistency between AT&T's current recommendation and its actual use of a 15.306% forward-looking cost of capital in its cost model is sufficient reason for the Commission to reject AT&T/WorldCom's 9.54% cost of capital estimate as being unjustifiably low. **VI. <u>DEPRECIATION LIVES</u>** ***Verizon VA's Proposed Depreciation Lives Are Supported by the Record:*** Verizon VA has proposed in this proceeding the same depreciation lives it uses for financial reporting purposes, which comply with Generally Accepted Accounting Principles ("GAAP"). Sovereign Direct at 3. These economic lives consider the decline in value of an asset from all causes, but most importantly, the impact of technological innovation and competition. Sovereign Direct at 5. Both technological innovation and competition are flourishing and will continue to flourish in Virginia. Sovereign Direct at 6-8;

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		of customers, and presumes that the smallest RT size is 224 lines when smaller units can be used where needed. Rebuttal Cost Panel, pp. 68-71. Verizon's **[Verizon Proprietary Begins]** __% **[Verizon Proprietary Ends]** utilization factor for conduit duct, ostensibly based on its embedded network, is far too low. Standard industry practice designates reservation of only one spare maintenance duct for an entire conduct section. Moreover, Verizon's cost model includes spare capacity through means other than a low conduit duct utilization factor. It includes one spare innerduct for every two in use; it also includes spare capacity through the application of cable utilization factors. Finally, utilization of fiber can be improved to accommodate additional demand by upgrading electronics at each end of the fiber strand without use of additional conduit space. Rebuttal Cost Panel, pp. 71-73. Thus, the only spare capacity needed is the provision of one maintenance spare per conduit section, which can be accounted for by adding $.72 per foot to Verizon's conduit cost, while using a 100% utilization factor. *Id.*, p. 73. Verizon overestimates port utilization. It relies on embedded fill factors and then inflates these fill factors by entering the fill factors into SCIS and then separately making outboard adjustments to the model. Rebuttal Cost Panel, p. 107. ***Maximum Loop Length*** - The Synthesis Model provides for a maximum loop length of 18,000 feet, which Verizon criticizes as exceeding the Carrier Serving Area loop design standard of 12,000 feet. The Commission has previously rejected Verizon's criticism, as the 18,000 foot standard does not prevent the provision of advanced services. Moreover, fewer	West Direct at 5 and Attachment A. Indeed, CLECs are increasingly developing and deploying alternative technologies that completely bypass the local loop. Sovereign at 6-7; Sovereign/Gansert Surrebuttal at 8-13. In developing its economic lives, Verizon VA considered various factors including (1) the retirement of assets; (2) industry benchmarking; and (3) the effects of evolving competitive markets. Sovereign Direct at 9. Asset retirement factors include regulatory requirements, changes in technology, and changes in demand. Sovereign Direct at 10. These factors were given nearly exclusive weight for the technology-driven accounts such as digital switching and circuit equipment. Sovereign Direct at 11-12. Benchmarking Verizon VA's proposed lives against its competitors and industry studies also demonstrates that Verizon VA's proposed lives are reasonable. Sovereign Direct at 12-16; Sovereign Surrebuttal at 17-19. AT&T/WorldCom's lengthy attack on one such industry study -- performed by TFI -- is a red herring; Verizon VA is not proposing TFI lives in this proceeding. Sovereign/Gansert Surrebuttal at 19-20. Verizon VA's proposed lives are appropriate. For example, Verizon VA's proposed digital switching life of 10 years is appropriate because it is the estimated average life of all of the switch components, including processors, data storage devices, and circuit packs. Digital switching is increasingly modular; its components function independently and are easily replaced as general computing technology improves. This results in shorter lives for many of the components. In addition, the economic life of digital switching is affected by the convergence of voice and data applications. There is increasing

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		than one percent of the loops constructed by the Synthesis Model exceed 12,000 feet. Riolo Surrebuttal, pp. 2-5; Pitkin Surrebuttal, pp. 32-33. ***Distribution Areas*** — The Synthesis Model creates some distribution areas ("DAs") with more than 600 living units. Verizon criticizes the Synthesis Model as creating an inefficient outside plant, but this criticism fails to reflect the flexibility inherent in sizing DAs or the advances in technology that have made DAs of more than 600 living units feasible and acceptable. Riolo Surrebuttal, pp. 5-9; Pitkin Surrebuttal, pp. 35.. ***Structure Sharing*** — The sharing of structure between feeder and distribution facilities offers opportunity for cost reduction and is particularly appropriate in a forward looking cost model that is not bound by the ILEC's embedded plant. Based on a Kansas Commission study and the structure sharing incorporated in BellSouth's Telecommunications Cost Model in proceedings in Florida and Louisiana, the Synthesis Model should be adjusted to reduce feeder structure costs by 40% to reflect this sharing. Riolo Direct, pp. 10-12. By contrast, Verizon inappropriately downplays the opportunities for structure sharing in its cost study. Rebuttal Cost Panel, pp. 76-78. Verizon's claim that AT&T/WorldCom overstate opportunities for structure sharing ignores the fact that distribution and feeder running along the same route will almost always use the same structure. Moreover, opportunities for sharing with other utilities are widespread, contrary to Verizon's claims. Riolo Surrebuttal, pp 15-19. ***Structure Mix*** — AT&T/WorldCom have proposed	demand for IP packet routing technology, and existing digital circuit switches are incapable of supporting these applications. Sovereign/Gansert Surrebuttal at 4-12. Verizon VA's proposed nine-year life for circuit equipment is appropriate for similar reasons. This equipment is increasingly modular, even more so than switching equipment. Packet switching technology and convergence of voice and data networks affects circuit equipment, since SONET transport systems are inefficient at transporting data. As a result, alternatives to SONET are being developed specifically for efficient data transmission. Sovereign/Gansert Surrebuttal at 13-15. Finally, Verizon VA's proposed 17-year life for metallic cable is appropriate and supported by the record. Verizon VA's competitors are building networks that seek to completely bypass Verizon VA's facilities. Copper technology is increasingly being replaced, and is simply no longer the technology of choice. Sovereign/Gansert Surrebuttal at 15-17. ***Regulatory-Prescribed Lives Should Not Be Adopted:*** AT&T/WorldCom propose depreciation lives that were prescribed by the Commission in 1993 and 1994, prior to the Telecommunications Act. These lives are sorely outdated and not based on forward-looking assumptions as required in this proceeding. Sovereign Direct at 18; Lacey Direct at 16; Tardiff Rebuttal at 55-57. The Commission has explicitly stated that regulatory-prescribed lives do not have to be used for UNE price setting purposes. Sovereign Rebuttal at 3-4. In fact, the Commission

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		structure mix percentages for distribution and feeder cable based on Verizon data. Riolo Direct, pp. 39-43. ***Road Distance Factor*** — The road distance factor is reduced from 1.0 to 0.9 to help correct for the original Synthesis Model's use of surrogate customer location data. Without this change, the model exaggerates dispersion and inflates the amount of cable and structure actually required to connect Verizon Virginia customers. Pitkin Direct, pp. 18-19; Riolo Surrebuttal, pp. 19-20. ***Cable Sizes*** Verizon uses cable sizes that are too small. Verizon's feeder cable size is based on the typical size of cable found within the UAA section based on the survey of its embedded plant taken in the early 1990s. Rebuttal Cost Panel, p. 13. Verizon develops the size of the cable needed based on the number of working lines within each wire center – without accounting for the additional lines needed as a result of fill factors that are less than 100%. Thus, for a wire center that will have 300 working lines but 600 actual lines (based on a 50% utilization factor), Verizon assumes use of 300-pair cable rather than 600-pair cable, which would be significantly less expensive per pair. Rebuttal Cost Panel at 38-40. ***Unit Costs*** As a general matter, in determining unit costs, Verizon uses inflation rates that are too high. Verizon determines unit costs based on the cost of equipment at the time it was installed	recently chose financial reporting lives over regulatory-prescribed lives for purposes of setting UNE rates in the SBC Oklahoma/Kansas 271 proceeding. Sovereign Direct at 20. Other state commissions have similarly rejected regulatory-prescribed lines in the UNE proceedings. Sovereign Rebuttal at 11-13. Importantly, since 1994, the Commission has significantly shortened its ranges of depreciation lives in 1995 and 1999. Sovereign Rebuttal at 5. The Commission's recent prescriptions have been at the short end of the Commission's ranges. AT&T/WorldCom's proposed lives account for none of these developments, and many of their proposed lives are *longer* than the longest life in the current Commission ranges. Sovereign Rebuttal at 8; Sovereign/Gansert Surrebuttal at 4. Contrary to AT&T/WorldCom's claims, Verizon VA's increasing depreciation reserve does not support the use of regulatory prescribed lives in this proceeding. Lacey Rebuttal at 2-10. Depreciation reserve grows as the age of assets increase and as the company changes its asset mix. Lacey Rebuttal at 3. Contrary to AT&T/WorldCom's claims, the fact that Verizon VA's depreciation reserve has increased does not demonstrate that the regulatory prescribed lives advocated by AT&T/WorldCom are forward-looking and appropriate for UNE price-setting. Lacey Rebuttal at 9. In short, regulatory prescribed lives that are based on information gathered prior to 1994 are not appropriate for this proceeding because they do not use TELRIC forward-looking principles and do not consider changing technology and the competitive market in Virginia. Sovereign Rebuttal at 10-11.

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		in its network adjusted to 1998 levels based on Verizon-specific indices and then adjusted to 2001 levels based on an outdated forecast. Rebuttal Cost Panel, p. 37. There is no reason to use Verizon specific indices in a forward-looking network; moreover, Verizon's projections from 1998 to 2001 are far too high. Industry-wide telephone plant indices are more accurate and contain more recent data. Rebuttal Cost Panel, pp. 37-38. Specific unit costs are also too low even setting aside the issue of inflation. The unit cost of cable is less than Verizon suggests. The cable costs used in Verizon's model do not appear to be actual cable costs but rather estimates. This is apparent from the fact that the price per foot is consistently 44.46% higher in 1998 than in 1997 across different cable sizes, which is very unlikely if actual cable costs were used. Rebuttal Cost Panel, p. 33. Moreover, the 44.6% change is radically above what would be expected as a result of inflation. Rebuttal Cost Panel, p. 34. In addition, the inputs Verizon uses for cable costs show the exact same incremental increase in the cost per foot of cable from 300 to 600 pair cable and from 600 to 900-pair cable for aerial, buried and underground plant. This is highly unlikely. Rebuttal Cost Panel, pp. 35-36. Verizon does not use the correct forward-looking cost of installed conduit. Verizon uses the average cost per foot between 1996 and 2000. This ignores the clear pattern of declining cost of conduit over time. Rebuttal Cost Panel, p. 40. Similarly, Verizon inflates the cost of poles by relying on its historical costs that do not account for economies of sequential installation and minimization of mobilization and demobilization that would occur in a forward-looking network.	competitive market in Virginia. Sovereign Rebuttal at 10-11. ***Verizon VA's Financial Lives Comply with GAAP, Are Unbiased, and Should Be Used in a Forward-Looking Study:*** GAAP lives should be used in a forward-looking study because they are based on the expected future period of economic benefit of assets to the company. Lacey Direct at 4. As Dr. Lacey explained, under GAAP principles, depreciation lives must be reliable and unbiased. Lacey Direct at 8-16. The depreciation lives that Verizon uses for its annual financial reports are the same as those that Verizon uses for its SEC filings. Lacey Direct at 13-14. Verizon VA's financial statements have been audited by Ernst & Young, LLP, which concluded that the depreciation lives used by Verizon VA in its financial reports comply with GAAP. Lacey Direct at 15-16. Contrary to AT&T/WorldCom's claims, Verizon VA's proposed depreciation lives are not biased due to the accounting principle of "conservatism." Lacey Surrebuttal at 2-8. The concept of conservatism has changed over the years and is often misunderstood. Lacey Surrebuttal at 3. Indeed, the language cited by AT&T/WorldCom witness Mr. Lee in support of his proposition was rescinded by the Financial Accounting Standards Board (FASB) in 1993. In order to prepare financial statements in compliance with GAAP today, the mandate of neutrality dictates that conservatism must *not* introduce bias into financial reporting. Lacey Surrebuttal at 5-6. Furthermore, as Dr. Lacey explains, Verizon VA has no incentive to use biased depreciation lives in its financial reports. Lacey Surrebuttal at 6.

Issue No.	STATEMENT OF ISSUE	AT&T/WCOM'S RATIONALE	VERIZON RATIONALE
		Rebuttal Cost Panel, p. 42. **Other Issues** **VIII. <u>TRANSPORT</u>** The Synthesis Model accurately determines the number of trunks necessary to provide interoffice transport in Verizon's network. Moreover, the Synthesis Model models the appropriate number of SONET rings and add/drop multiplexers. Turner Surrebuttal, pp. 3, 8-11. **IX.** ***Repair and Maintenance Expenses*** – Verizon does not sufficiently reduce maintenance and repair expenses to account for savings that would exist in a forward-looking network. In a forward-looking network, with all new plant, the number of defective pairs would be far lower than it is today. Currently, rather than fixing defective pairs, Verizon transfers working pairs without fixing the original problem. The number of defective pairs therefore grows over time. When Verizon eventually rehabilitates a particular area of plant, it typically realizes cost savings of 90%. 30% is therefore a conservative estimate of savings with new plant network-wide; Verizon's 5% reduction is far too low. Rebuttal Cost Panel, pp. 90-92. ***Y2K Expenses*** – Verizon bases forward-looking operating expenses on actual expenditures for 1999 without backing-out expenses for Y2K. Rebuttal Cost Panel, p. 92. ***Advertising Expenses*** – Verizon's cost study includes	**VII. <u>SWITCHING COST STUDIES AND INPUTS</u>** ***Verizon VA's Proposed Switching Costs Are Based on a Forward-Looking Network and Reasonable Assumptions:*** Verizon VA's proposed switching costs are based on an efficient forward-looking network and are supported by reasonable engineering assumptions. Verizon VA explained in detail how it calculated switching costs in its direct testimony. VZ-VA Panel Direct at 185-205; Verizon Cost Methodology and Costing Process Manual for Unbundled Network Elements (Attachment B to VZ-VA Panel Direct) at 17-19. Verizon VA derived the material investments for switching equipment by using the Switching System Cost Information System (SCIS), developed by Telcordia. SCIS allows the user to build a "model office," based on the user's specifications. To determine SCIS inputs, Verizon VA's engineering organization determined existing office parameters, and then forward-looking adjustments were made based on current growth trends. SCIS then generated model offices for each type of switching technology used in the Verizon VA network and calculated the unit and total switch investments for each of these switching technologies. VZ-VA Panel Direct at 185-186. **AT&T/WorldCom Modified Synthesis Model:** The switching module in the Modified Synthesis Model is fundamentally flawed and significantly understates UNE cost estimates for local switching, tandem switching, transport, operator services, and signaling. The Model's switching functionality is not forward-looking because it cannot handle all levels of traffic demands, as ordered by the Commission. Tenth