charges can add significantly to the total cost that a new entrant will incur to use Verizon's unbundled network elements, making competitive entry using those elements uneconomic — even if the element prices themselves reflect sound economic principles.

Second, non-recurring charges for unbundled network elements are important because they are, in effect, entrance fees. Typically, the new entrant must pay non-recurring charges for unbundled network elements to Verizon before it can obtain the unbundled network elements it needs to offer service to an end user. These "entrance fees" increase the capital that a new entrant must invest up-front before it receives even a penny of revenue from its retail customer and therefore make entry more difficult. Thus, to create the conditions under which local competition can flourish non-recurring charges for unbundled network elements must not exceed the forward-looking, efficient level necessary to compensate Verizon for the costs that the new entrant truly causes Verizon to bear. Non-recurring charges for unbundled network elements are a sunk cost and thus create a barrier to entry.

Q. IN GENERAL, WHY DO SUNK COSTS CREATE BARRIERS TO ENTRY?

A. A sunk cost is a cost that, once incurred, a firm cannot recover if it ceases business. In essence, sunk costs are costs incurred for which the firm does not acquire some tangible asset that can be resold. Sunk costs create a barrier to entry

because they increase the new entrant's risk that it will not recover the cost from sales in the market.

Q. SPECIFICALLY, WHY DO NON-RECURRING CHARGES CREATE BARRIERS TO ENTRY?

A. Unlike recurring charges for unbundled network elements or recurring costs for a new entrant's own facilities, non-recurring charges are a sunk cost. A new entrant cannot obtain a refund or repayment for any or all of the non-recurring charges it pays Verizon, even if the new entrant loses the retail customer on whose behalf it incurred the non-recurring charge or goes out of business entirely.

In contrast, if a new entrant loses a retail customer that it had been serving using an unbundled loop, or exits the local exchange business entirely, the new entrant is no longer obligated to pay monthly recurring charges for the loop it no longer needs. Similarly, if the new entrant loses a retail customer that it had been serving using its own switch, it can use the freed-up switching capacity to serve a different retail customer or lease that capacity to another carrier. If the new entrant leaves the local exchange business entirely, it can sell its switch to another local exchange provider. As these examples illustrate, non-recurring charges for unbundled network elements and collocation create a greater risk of non-recovery of a new entrant's costs than do either recurring charges for unbundled network elements or recurring costs for a new entrant's own facilities.

The only way that a new entrant can be sure of recovering the full cost of the non-recurring charges it incurs on behalf of a retail customer is to impose an

1 up-front non-recurring charge on the retail customer that equals or exceeds the
2 non-recurring charge the new entrant had to pay Verizon to order the unbundled
3 network element or elements needed to serve that customer. This is easier said
4 than done. There are no non-recurring costs or non-recurring charges when an
5 existing customer of an incumbent local exchange carrier chooses to stay with that
6 incumbent. To persuade consumers to switch local exchange carriers, new
7 entrants may have to forego or minimize up-front charges, similar to the process
8 that has occurred in the interLATA markets with the Primary Interexchange
9 Carrier ("PIC") change charges. New entrants will have to try to recover any non-
10 recurring charges they must pay at least in part in the monthly recurring prices
11 that they charge their retail customers. The higher the non-recurring charges, the
12 less likely that a new entrant can recover those costs through a markup on
13 recurring prices over the average "life" of a customer, particularly given the
14 frequency of customer churn that one might reasonably expect in a newly
15 competitive market. This reality adds to the barrier to entry that non-recurring
16 charges create.

17 **Q. HOW DO NON-RECURRING CHARGES ASSOCIATED WITH A**
18 **CUSTOMER'S CHANGE OF SERVICE PROVIDER AFFECT THE**
19 **RELATIVE COMPETITIVE POSITIONS OF INCUMBENTS AND NEW**
20 **ENTRANTS?**

21 A. Because incumbent local exchange carriers such as Verizon start the competitive
22 era with virtually a 100% market share for local service, the difference in the
23 effect of non-recurring charges on the competitive positions of incumbents and

new entrants is enormous. At least initially, almost all non-recurring charges associated with customers switching service providers will fall on new entrants because all of their customers are "new." Thus, all of the increased risk associated with the sunk costs that non-recurring charges represent falls on new entrants. All other things being equal, the risk associated with non-recurring charges will increase the expected return that investors will demand to provide capital to new entrants. The higher the non-recurring charges, the greater the risk and the greater the increased cost of capital to new entrants.

This difference in capital costs makes competitive entry very difficult. Even if a new entrant is equally as efficient as Verizon in every other respect, a higher cost of capital means that the minimum price that a new entrant must charge retail customers to recover all of its costs will exceed the minimum fully compensatory price that Verizon can charge. Because new entrants generally must offer *lower* prices than Verizon to win customers, it is clear that non-recurring charges create a difficult bind for new entrants.

Verizon has every incentive to make non-recurring charges an even larger barrier to entry than they would otherwise be by exaggerating the level of non-recurring cost associated with the preordering, ordering, and provisioning of unbundled network elements.

1 **Q. HOW WOULD THE USE OF NON-RECURRING CHARGES TO ERECT**
2 **BARRIERS TO ENTRY AFFECT CONSUMERS?**

3 A. If Verizon is able to use non-recurring charges to create a substantial barrier to
4 entry, consumers will be the ultimate losers. Fewer firms will be able to enter the
5 local exchange market, if any enter at all. Those that do enter will have to charge
6 higher prices than they might otherwise have been able to charge. All of this
7 limits or prevents consumers from getting the benefits that were supposed to come
8 from opening up local exchange markets to competition by reducing the
9 downward pricing pressure that competition is expected to exert.

10 **VI. THE COMMISSION SHOULD APPLY A "REUSABILITY" TEST TO**
11 **DISTINGUISH BETWEEN RECURRING AND NON-RECURRING**
12 **COSTS.**

13 **Q. WHAT IS THE DISTINCTION BETWEEN THE FORWARD-LOOKING**
14 **LONG-RUN ECONOMIC COSTS THAT SHOULD BE RECOVERED IN**
15 **RECURRING PRICES AND THOSE THAT SHOULD BE RECOVERED**
16 **IN NRCS?**

17 A. The key distinguishing characteristic between the costs that should be recovered
18 in recurring charges and those that can be — but do not have to be — recovered in
19 NRCs is whether the cost, once incurred, is for facilities that can be reused to
20 provide service to a subsequent customer without change. If so, Verizon should
21 recover the cost through recurring charges, not NRCs.

22 Based on this test, no capital costs belong in the NRCs for unbundled
23 network elements. All capital items could be used to supply service to another
24 customer. This is true for plant dedicated to a given customer premises, such as

1 the drop and the Network Interface Device ("NID"), as well as plant that can be
2 used for many customers, such as general purpose computers and switches. This
3 test also excludes all of the labor used to install that plant, because once the plant
4 has been installed to serve one customer, another customer at the same customer
5 premises could reuse that plant at no additional cost for that plant.
6 This leaves the cost of performing the transaction as the costs that can be
7 recovered in NRCs for unbundled network elements. These are the costs of
8 actually performing the tasks of preordering, ordering, and provisioning.

9 **Q. DOES THE DEFINITION THAT "FACILITIES THAT CAN BE REUSED**
10 **TO PROVIDE SERVICE TO A SUBSEQUENT CUSTOMER WITHOUT**
11 **CHANGE" IMPLY THAT NOT ALL ONE-TIME ACTIVITIES, EVEN**
12 **THOSE ASSOCIATED WITH A PARTICULAR SERVICE ORDER, CAN**
13 **BE CONSIDERED NON-RECURRING COSTS?**

14 A. That is correct. Not all one-time activities, even those associated with a particular
15 service order, are properly considered non-recurring costs. Consider, for example,
16 the loop itself. Verizon might construct an entire new loop to provide service in
17 response to a service order request. That circumstance does not, however, change
18 the basic fact that the construction of the loop is properly treated as a recurring
19 cost. Proper identification of one-time costs is particularly important in a
20 competitive environment where more than one local exchange carrier (including
21 the incumbent) may use a particular facility at different points in that facility's
22 economic life. If the first telecommunications provider to use the facility bears all

the forward-looking costs of a one-time activity benefiting multiple users, then obviously the first user will be forced to pay more than its fair share.

Another loop-related one-time activity considered recurring is the physical cross connection at a feeder distribution interface ("FDI") of a loop's feeder and distribution plant. The reason this activity is recurring is that the connection remains in place when a service disconnects; Verizon can reuse that connection for a subsequent customer when that customer establishes new service to the disconnecting location. Hence, this one-time activity benefits all future users of a particular telecommunications facility and the costs of the activity are properly characterized as recurring.

Q. ARE THERE ANY OTHER REASONS FOR EXCLUDING THE COST OF BOTH CAPITAL ITEMS AND THE LABOR FOR INSTALLING THEM FROM NRCS?

A. Yes. If the Commission uses a methodology for developing recurring costs that is consistent with the approach reflected in the Synthesis Model, the costs that I have described in the previous two paragraphs are captured in the recurring cost estimates for unbundled network elements. Thus, including them again in NRCs would result in double recovery of the relevant costs. Given that the loop recurring cost captures the entire investment and expense for installing the entire loop, it is obvious double counting to recount as a non-recurring cost the cost of that field-work when Verizon establishes individual loops.

In a fully competitive environment, market discipline would prevent a supplier of telecommunications services from double-recovering its costs. During the transition to effective local competition and in the absence of such market discipline, it is essential that the Commission prohibit Verizon from incorporating the same costs in both its recurring and non-recurring prices. Furthermore, as a matter of economic principle, Verizon should reflect capital costs and field-work costs in its *recurring* cost studies, rather than its *non-recurring* cost studies. I understand that Verizon has in fact done so in the cost studies that it has previously submitted.

Q. WHAT WOULD BE THE EFFECT ON COMPETITION IF VERIZON RECOVERED CAPITAL AND OTHER RELATED COSTS THROUGH NRCS?

A. If Verizon recovered capital and other related costs in NRCs, this would enlarge the barrier to entry that NRCs inherently create. Verizon's proposed recovery of costs that should be more appropriately recovered in recurring prices through NRCs converts recurring costs that are not sunk costs for either the new entrant or Verizon into sunk costs for the new entrant, thereby greatly increasing the size of the barrier to entry. Transforming these costs into NRCs also would lessen the likelihood that a new entrant could fully recover these costs from its end users.

VII. THE NRCM PROVIDES AN APPROPRIATE, BUT CONSERVATIVELY HIGH, ESTIMATE OF THE COSTS OF THE TRANSACTIONAL FUNCTIONS OF PRE-ORDERING, ORDERING AND PROVISIONING.

Q. FOR WHAT FUNCTIONS DO INCUMBENT LOCAL EXCHANGE CARRIERS TYPICALLY IMPOSE NRCS?

A. Incumbent local exchange carriers have imposed NRCs on end users for what are essentially transactional costs. These are primarily one-time costs that do not include either labor costs for activities that recur regularly or capital costs.

Q. WHAT TRANSACTIONAL FUNCTIONS WILL YOU DISCUSS IN YOUR TESTIMONY?

A. I will discuss three transactional functions: pre-ordering, ordering, and provisioning in response to a request for service by an end user. Mr. Walsh discusses and defines each of these activities in his testimony. I do not address maintenance and repair because the costs for these functions are, in their entirety, regularly recurring functions that are, therefore, included in recurring costs for unbundled network elements and recovered in recurring charges for those elements.

Q. WHAT DOES IT MEAN TO SAY THAT NON-RECURRING COST FUNCTIONS SHOULD BE PRICED USING FORWARD-LOOKING LONG-RUN ECONOMIC COST?

A. Prices for non-recurring functions that reflect forward-looking long-run economic cost should be based on the cost that Verizon would incur for these functions if it: (1) uses forward-looking OSS operated efficiently, (2) employs efficient work practices, (3) deploys a network architecture that is forward-looking (*i.e.*, that

matches the network architecture assumed to developed recurring costs), and (4) incurs reasonable labor costs. Mr. Walsh provides a detailed discussion of the capabilities of forward-looking OSS as they relate to non-recurring costs.

Q. WHAT DO YOU MEAN BY MAKING USE OF EFFICIENTLY OPERATED FORWARD-LOOKING OSS?

A. Forward-looking (and current) OSS are sufficiently sophisticated to allow Verizon to process a very high percentage of valid orders and to provision the necessary facilities automatically, without manual intervention. It is my understanding that the NRCM conservatively assumes only that Verizon maintains and operates its existing "legacy" systems to extract the level of efficiency that those systems are designed to deliver. Forward-looking standards exist that are expected to deliver even more sophisticated and efficient OSS performance than the legacy OSS assumed in the AT&T/WorldCom Non-Recurring Cost Model.

Essentially, Verizon today has a choice between (1) having efficient pre-ordering, ordering, and provisioning systems that operate a very high percentage of the time without manual intervention once the service order information has been entered into the system correctly, or (2) accepting a less efficient process and allowing a higher percentage of orders that "fallout"[11] of the mechanized process and must be handled manually. The second option would be

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[11] Mr. Walsh discusses the concept of order "fallout" in more detail.

more costly, because it requires many more personnel to provision services. Hence, a forward-looking economic cost analysis should reflect the costs associated with option one.

Q. HOW DOES FORWARD-LOOKING OSS AFFECT THE NON-RECURRING COST OF ORDER PROCESSING?

A. Provided that the data going in are accurate, the "flow-through" capabilities of forward-looking OSS eliminate the labor component associated with order processing (*i.e.,* costs associated with taking in and processing the data on a given order as opposed to costs associated with doing any specific requested work activity). The non-recurring, forward-looking long-run economic cost of the order processing component of the three transactional functions is therefore zero because the costs of the OSS themselves are included in recurring capital costs. Any significant level of fallout that might remain and require manual correction is attributable to an overall network management decision.

Q. DOES THE NON-RECURRING COST MODEL ASSUME THAT THE COST FOR ORDER PROCESSING IS ZERO?

A. No. In deference to the long-standing practice of charging for these functions in an up-front charge, the Non-Recurring Cost Model develops a non-recurring service order processing cost that reflects the labor might be required to manually correct what might be an efficient level of fallout for Verizon to maintain.

The fallout that Verizon handles manually should be minimal. As I noted above, it is economically efficient for Verizon to manage its OSS so that orders

can flow-through. Furthermore, Verizon can and should return the vast majority of input errors to the competitor originating the order via automated front-end edits. Competitors will directly bear most of any cost to process orders and correct fallout. Hence, the forward-looking cost that Verizon incurs for this function on the wholesale side of its operations should be significantly smaller than its retail operations costs.

Q. IF VERIZON'S OSS PERFORMANCE DOES NOT CORRESPOND TO A FORWARD-LOOKING OSS BECAUSE VERIZON'S EXISTING DATABASES ARE CONTAMINATED WITH INCORRECT DATA, SHOULD NEW ENTRANTS PAY FOR INCUMBENTS TO CLEAN UP THOSE DATABASES?

A. No. Cleaning up databases so that a high percentage of orders flow through is an activity that incumbents must undertake to maintain or improve their own competitive position. Moreover, this activity could bring very significant cost savings to Verizon. The need to clean up legacy databases is an example of past inefficiency. The Commission should not allow Verizon to impose the cost of such inefficiency on new entrants; indeed, to do so would be anti-competitive.

Q. WHY WOULD MAKING NEW ENTRANTS PAY TO CLEAN UP VERIZON'S DATABASES BE ANTI-COMPETITIVE?

A. Cleaning up its databases would help Verizon to attract and retain end users. In a competitive environment, incumbents would face strong market pressures for well-managed and maintained OSS because fallout increases the cost of providing service and also reduces the quality of service provided to customers. A company

operating in a competitive environment has market incentives to improve customer service and reduce costs. Maintaining efficient OSS allows Verizon to achieve these objectives.

For example, in the express shipping business, efficient OSS are (or were, until they became a standard business requirement) the competitive edge that allows customers to access FedEx's tracking system to determine the status and location of a package. This competitive benefit of efficient OSS pertains to retail operations, whether or not the company also has wholesale operations. In other words, where retail customers have a choice of service providers, competitors such as Verizon have a strong incentive to maintain OSS and databases efficiently because customers are very sensitive to service delays.

Making new entrants pay for this activity is asking new entrants to subsidize the improvement of Verizon's ability to compete with them.

Q. GIVEN THAT THE FORWARD-LOOKING COST OF ORDER PROCESSING IS ZERO, WHAT IS THE COST DRIVER FOR NRCS BASED ON FORWARD-LOOKING LONG-RUN ECONOMIC COSTS?

A. The cost driver for NRCs based on forward-looking long-run economic costs is the labor cost associated with manually performing any non-recurring task that is requested on the order. A typical non-recurring cost study consists of determining the tasks that are required to be performed manually, the amount of time it takes to perform the task, the frequency with which the task must be performed, and the cost per hour of the personnel who perform the task. If one assumes, as forward-

looking long-run economic cost principles require, that forward-looking OSS are operating optimally, manual activities for preordering, ordering, and provisioning should be very infrequent.

Q. TRADITIONALLY, INCUMBENTS HAVE CHARGED END USERS FOR BOTH CONNECTING AND DISCONNECTING SERVICE IN THE INITIAL NRC. SHOULD NEW ENTRANTS PAY FOR DISCONNECTING AT THE TIME THEY PAY FOR CONNECTION A NEW UNE?

A. No. New entrants should not pay for disconnecting service at the time that they pay for connection of a new UNE. Requiring a new entrant to pay for disconnection at the time it orders a connection violates cost causation, as Verizon does not incur the costs of disconnection until or unless a facility is disconnected. Moreover, because the length of the period between connection and disconnection is uncertain, recovering disconnection costs through an up-front NRC raises needless "time value of money" issues. Indeed, to the extent that end users currently pay for both connections and disconnections at the time they order service, this practice is questionable because the facilities are often not physically disconnected when service is terminated. It is certainly the case that new entrants should not pay for disconnection unless and until they order the facilities to be disconnected. The NRCM appropriately reports separate connect and disconnect costs that provide the detail necessary to establish separate cost-based connect and disconnect charges.

VIII. THE NRCM APPROPRIATELY DOES NOT INCLUDE ANY COST FOR LOOP QUALIFICATION.

Q. WHAT IS LOOP QUALIFICATION?

A. Loop qualification is the process of identifying the characteristics of a given loop (such as loop length and the presence and location of potential DSL-inhibiting network components such as load coils, excessive bridged taps and repeaters) and determining the suitability of that loop for provisioning DSL-based services. The characteristics of a given loop determine whether the loop is usable at all for providing any type of DSL-based service, the modifications (if any) needed to "condition" the loop to provide DSL-based service and the type/speed of DSL-based service that may be offered over that loop, with or without "conditioning." These determinations are specific to the DSL technology and equipment that a particular carrier deploys; thus, a new entrant may be able to offer its DSL-based services over a loop that would not meet Verizon's technical specifications for DSL-based services and *vice versa.*

The carrier-specific nature of loop qualification has significant implications for the definition of the loop qualification activity for which competitors will pay Verizon. Verizon can only meaningfully perform the first step of the loop qualification activity—providing access to the relevant information on loop characteristics. The new entrant's own personnel must then use this loop characteristic information to determine the suitability of a given loop for provisioning that carrier's variants of DSL-based services.

Q. HAS THE COMMISSION AGREED THAT INCUMBENTS SHOULD PROVIDE DIRECT ACCESS TO THE DATA THAT COMPETITORS NEED TO DO THEIR OWN LOOP QUALIFICATION?

A. Yes. In its *UNE Remand Order*, the Commission states that incumbents must provide requesting carriers access to all available information relating to loop qualification for DSL-based services. The pertinent information includes, but is not limited to: "fiber optics or copper; the existence, location and type of any electronic or other equipment on the loop, including but not limited to, digital loop carrier or other remote concentration devices, feeder/distribution interfaces, bridge taps, load coils, pair-gain devices, disturbers in the same or adjacent binder groups; the loop length, including the length and location of each type of transmission media; the wire gauge(s) of the loop; and the electrical parameters of the loop, which may determine the suitability of the loop for various technologies."[12]

The clear purpose of this requirement is to compel incumbents to produce the information that will allow competitors to make their own determinations about the suitability of loops for the technologies that the competitors intend to deploy. This purpose is implicit in the finding that "under our existing rules, the relevant inquiry is not whether the retail arm of the incumbent has access to the underlying loop qualification information, but rather whether such information

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[12] 47 C.F.R. § 51.5; *UNE Remand Order* at ¶¶ 427-8.

exists anywhere within the incumbent's back office and can be accessed by any of the incumbent LEC's personnel."[13] If the Commission intended for Verizon or other incumbents to make the determination on behalf of new entrants, there would be no reason to require the incumbents to provide competitors with the information that "back office" personnel such as Verizon engineers use to perform a loop qualification analysis.

Q. HOW CAN THE COMMISSION SET A TELRIC-BASED PRICE FOR ACCESS TO LOOP MAKEUP INFORMATION?

A. The Commission can set a TELRIC-based price for access to loop makeup information by recognizing the efficient, long-run means for providing such information. In the long run, Verizon should make loop makeup information available directly to new entrants in an electronic format. In such a fully mechanized environment, the forward-looking cost of providing loop makeup information electronically should equal to the cost for supplying a few additional fields of data via Verizon's OSS, *e.g.,* the additional processor capacity time required for a few additional bits of data and the power required to process those bits. Given the current power and price for processors, it is unlikely that the cost for the additional capacity required to process loop characteristic data would even be measurable on a per-order basis. Therefore, the best estimate of the efficient,

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[13] *UNE Remand Order* at ¶ 430.

1 long-run cost for the electronic provision of loop makeup information, which new
2 entrants can in turn use to perform their own loop qualification assessment, is $0.

3 **Q. HAVE STATE REGULATORS FOUND THAT A $0 OR NEAR $0 PRICE**
4 **IS THE APPROPRIATE TELRIC-BASED RESULT FOR ACCESS TO**
5 **LOOP MAKEUP INFORMATION?**

6 A. Yes. State commissions have found that a $0 or near $0 price is the appropriate
7 TELRIC-based result for access to loop makeup information. The Texas Public
8 Utility Commission found that "SWBT should be fairly compensated for the real
9 time access to its OSS functionalities required" and established an interim
10 nonrecurring "dip charge" of $0.10 per loop for loop makeup information.[14]
11 Although it is an interim finding, the California Public Utilities Commission has
12 also found that Pacific Bell's forward-looking economic cost to provide loop
13 qualification should be insignificant (at or near $0).[15]

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[14] Public Utility Commission of Texas, Arbitration Award, Docket No. 20226 and 20272, November 30, 1999, at 102-103.

[15] California Public Utilities Commission, R.93-04-003/I.93-04-002, Interim Arbitration, Line Sharing Phase, Final Arbitrator's Report, May 26, 2000, Issue 31 at p. 91-2, as affirmed by the full Commission in D.00-09-074, Ordering Paragraph 1.

IX. THE NRCM APPROPRIATELY DOES NOT INCLUDE ANY COST FOR LOOP "CONDITIONING."

Q. WHAT IS LOOP "CONDITIONING"?

A. In the context of this arbitration, loop "conditioning" refers to modifications to embedded loop plant facilities to remove equipment or plant arrangements that would impede the transmission of DSL-based services.

Q. WHAT IS THE RELEVANT REGULATORY CONTEXT THAT THE COMMISSION SHOULD CONSIDER IN DEVELOPING POLICY RELATED TO LOOP "CONDITIONING"?

A. Unbundled network elements such as DSL-capable loops are *not* offered in a competitive market. Instead, companies such as Verizon make these elements available to their competitors pursuant to regulatory and legal requirements intended to limit the effect of incumbency advantages on the outcome of local competition. New entrants cannot offer ubiquitous, or even widespread, service without using unbundled network elements. This reality gives incumbents such as Verizon tremendous potential leverage.

Verizon has no incentive to facilitate competitive entry by making the use of unbundled network elements easy or inexpensive. Quite the opposite. Absent the constraints that regulators place on it, Verizon might very well refuse to provide elements that enable competitors to offer advanced services (or other services) at all.

1 For example, no Verizon-affiliated incumbent voluntarily offered to make
2 available the elements required for competitors to develop line-sharing
3 arrangements prior to the Commission's mandate to do so. Through such tactics,
4 incumbents successfully obtained a significant head start in deploying this
5 efficient means of delivering DSL services, even though they may not have been
6 the first competitors that would otherwise have been ready to deliver a line-shared
7 DSL option to end users.

8 Similarly, through its advocacy of substantial nonrecurring charges for
9 DSL "conditioning," Verizon has successfully leveraged control of the loop to
10 constrain competitors from offering DSL services to customers that Verizon itself
11 is not ready to serve. In this fashion, Verizon can maintain control of where and
12 when DSL is available in a manner that coordinates with its own business plan —
13 to the ultimate harm of competition and consumers in Virginia (and elsewhere).

14 **Q. DOES THE NON-RECURRING COST MODEL INCLUDE COSTS FOR**
15 **LOOP "CONDITIONING"?**

16 A. No. The NRCM appropriately does not include non-recurring costs for loop
17 "conditioning" because prices based on costs that comply with forward looking
18 economic cost principles would not reflect an additional non-recurring cost for
19 DSL-related "conditioning."

Q. WHAT ASPECTS OF A FORWARD LOOKING ECONOMIC METHODOLOGY ARE MOST RELEVANT TO THE ISSUE OF LOOP "CONDITIONING"?

A. Two aspects of a forward-looking economic cost methodology are especially relevant to loop "conditioning." First, a forward-looking cost methodology, such as the TELRIC methodology, is almost totally divorced from the existing network configuration that Verizon (or any other carrier) deploys. Second, a forward-looking economic cost analysis of UNEs requires the minimization of *total* forward-looking costs, both recurring and non-recurring, which implies that the network configuration used to calculate both types of costs must be consistent.

Q. WHAT IS THE SIGNIFICANCE OF THE FIRST ASPECT OF THE METHODOLOGY THAT YOU IDENTIFIED IN YOUR PREVIOUS ANSWER?

A. A forward-looking economic cost analysis should capture the cost that the firm would incur to provide service to a given market in the future, without considering constraints imposed by the firm's past decisions. Thus, forward-looking economic cost is the cost that an efficient new entrant in that market would experience if the new entrant served the total quantity demanded.

The TELRIC methodology is not a pure forward-looking economic cost analysis in that the Commission ruled that cost studies for unbundled network elements should be "based on the use of the most efficient telecommunications

technology currently available and the lowest cost network configuration, *given the existing location of the incumbent LEC's wire centers*."[16] The Commission has found that prices for interconnection and unbundled network elements should be the one that produces the "lowest cost" of a "reconstructed local network" deploying "the most efficient technology for reasonably foreseeable capacity requirements" affirms that in all respects other than central office location the Commission requires a study that is forward looking.[17] In other words, the network design and technology assumptions in a forward-looking economic cost study should reflect the least-cost, most-efficient options currently available, not the attributes of Verizon's embedded plant. Hence, a proper forward-looking economic cost analysis will explicitly preclude the consideration of embedded costs (*i.e.*, costs "incurred in the past and that are recorded in the incumbent LEC's books of accounts").[18]

This TELRIC approach to network design is what is known as a "scorched node" methodology. The methodology assumes that customers remain in place at their existing locations and are connected to the existing central office locations. However, all existing, in-place local exchange carrier facilities are assumed

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16 47 C.F.R. § 51.505(b)(1), emphasis added.

17 *First Report and Order* at ¶ 685.

18 47 C.F.R. § 51.505(d).

1 away.[19] This "assuming away" of existing facilities is basic to the concept of
2 "long-run" cost analysis, which treats all costs as potentially variable and
3 avoidable.[20]

4 **Q. VERIZON IS ONLY REQUIRED TO PROVISION ITS ACTUAL,**
5 **EXISTING NETWORK. HOW DO YOU RECONCILE THIS**
6 **REQUIREMENT WITH YOUR INTERPRETATION OF THE TELRIC**
7 **METHODOLOGY?**

8 A. The TELRIC methodology relates only to the costing and pricing of unbundled
9 network elements, not to the physical provisioning of those elements. There is no
10 inherent contradiction in setting prices for access to the existing physical network
11 based on forward-looking economic costs. To the contrary, TELRIC-based
12 pricing of unbundled network elements mimics the outcome that would occur if
13 incumbents such as Verizon faced effective competition in the provision of
14 unbundled network elements.

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19 The TELRIC methodology differs from a "scorched earth" or greenfield approach to forward-looking costing in that the forward-looking network design is constrained to place central offices or "nodes" at the existing locations.

20 As the Commission is quite aware, there is nothing novel with this approach. For example, the TELRIC studies for unbundled loops that Verizon previously submitted throughout its operations reflected its view of a forward-looking network design with fiber feeder in many places where copper facilities exist today. Verizon's unbundled loop cost analysis did not include the cost of removing the existing copper feeder facilities; instead, it assumed away the existing facilities and studied only the cost of placing new, forward-looking facilities.

1 The market-clearing prices for goods and services sold in a competitive,
2 unregulated market reflect forward-looking economic costs, even though the firms
3 producing those goods and services employ processes and equipment of varying
4 vintages. A steel mill using out-of-date production methods must meet or beat the
5 prices of competing firms employing the most modern production technologies
6 and equipment, even if such pricing falls below the older mill's "actual" cost
7 (based on its existing equipment). Like all firms in competitive markets, this steel
8 mill must either lower its long-run costs to match more efficient rivals (*i.e.*,
9 achieve "actual" costs that equate to efficient, forward-looking costs) or exit the
10 market. Competitive markets offer no leeway for recovering "actual" costs that
11 exceed efficient, forward-looking costs. Thus, the prices established for
12 unbundled network elements in this arbitration can only mimic the prices that
13 would prevail in a competitive market if the Commission treats the costing and
14 pricing process as distinct from Verizon's provisioning process.

15 **Q. WHAT IS THE SIGNIFICANCE OF THE SECOND ASPECT OF THE**
16 **TELRIC METHODOLOGY THAT YOU IDENTIFIED PREVIOUSLY (*i.e.*,**
17 **TOTAL COST MINIMIZATION)?**

18 A. As the Commission describes in defining its TELRIC methodology, UNE studies
19 should reflect, "the forward-looking cost over the long run of *the total quantity of*
20 *the facilities and functions* that are directly attributable to, or reasonably

1 identifiable as incremental to, such element, calculated taking as a given the
2 incumbent LEC's provision of other elements."[21] To comply with this total cost
3 minimization requirement, a cost study must compute both recurring and non-
4 recurring costs based on the same network configuration. Failure to compute
5 recurring and non-recurring costs based on a consistent network design can lead to
6 a systematic bias, upward or downward, in the estimation of total forward-looking
7 costs. This bias occurs because alternative network designs reflect different
8 tradeoffs between the kinds of costs usually classified as recurring (capital costs
9 and costs for ongoing operations and maintenance) and those classified as non-
10 recurring (one-time, customer-specific costs caused by a particular service order).
11 The correct total cost calculation is the one that results from calculating
12 recurring and non-recurring costs based on the same network design. This
13 calculation provides the information necessary to determine, *e.g.*, the crossover
14 point at which it becomes more efficient to use fiber feeder and DLC, rather than
15 an all-copper loop design, and thereby facilitates cost minimization. A proper
16 analysis embodies the network design that produces the lowest total cost,
17 considering both the recurring and non-recurring costs for the total quantity of all
18 network elements that the incumbent will supply using that network.

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[21] 47 C.F.R. § 51.505(b), emphasis added.

Q. HAVE STATE REGULATORS RECOGNIZED THE IMPORTANCE OF USING A CONSISTENT NETWORK DESIGN TO CALCULATE RECURRING AND NONRECURRING COSTS FOR UNBUNDLED NETWORK ELEMENTS?

A. Yes. As examples, commissions in Massachusetts, Texas, and California have all endorsed the fundamental principle of using a consistent network design to calculate recurring and nonrecurring costs for unbundled network elements.

The Massachusetts Department of Telecommunications and Energy has found that:

> Our aim, as stated, is to maintain consistency between the assumptions used in the TELRIC recurring cost study and the NRC study....[22]

Similarly, a Texas Arbitration Award states that:

> [t]he Arbitrators find that the network design inconsistencies in the recurring and non-recurring cost studies do not result in correct xDSL costs and rates and consequently render the proposed charges invalid.[23]

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22 Massachusetts DTE, Consolidated Petitions of New England Telephone and Telegraph Company d/b/a Bell Atlantic Massachusetts, *et al.*, pursuant to Section 252(b) of the Telecommunications Act of 1996, for Arbitration of Interconnection Agreements between Bell Atlantic-Massachusetts and the aforementioned companies, DPU/DTE 96-73/74, 96-75, 96-80/81, 96-83, 96-94-Phase 4-L, October 14, 1999, at 19.

23 Public Utility Commission of Texas, Arbitration Award, Docket Nos. 20226 and 20272, November 30, 1999, at 96.

Consistent with this finding, the Arbitrators ordered Southwestern Bell Telephone to file new recurring and nonrecurring cost studies for xDSL-capable loops and line "conditioning" that are "based on the same network."[24]

This ruling is consistent with an earlier California decision on the nonrecurring costs for unbundled network elements, in which the California Public Utilities Commission found that:

> it makes little sense to model one type of network for unbundled elements and then assume a different network exists for ordering and provisioning the same unbundled elements. We will evaluate Pacific's [nonrecurring cost] model and parties' proposals using the forward looking network we have previously assumed.[25]

The California decision also provided a specific example of the type of double-recovery that could occur if the networks assumed for recurring and nonrecurring costs were not the same.

> In D.96-08-021 and D.98-02-106, we adopted Pacific's loop and access line costs based on a mix of copper and fiber. In the recurring phase of this proceeding, Pacific assumed a 52%/48% copper/fiber ratio. We think it would be both unfair and unreasonable to allow Pacific recurring cost recovery based on this ratio and then allow a different network mix in developing its nonrecurring costs. It would amount to allowing double recovery

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[24] *Id.* at 97.

[25] California Public Utilities Commission Decision 98-12-097, issued December 17, 1998, in Dockets R.97-04-003/I.93-04-002, at 34.

1 of NGDLC costs by overstating Pacific's nonrecurring cost
2 studies.[26]

3 The California Commission's concern regarding double-recovery of Next
4 Generation Digital Loop Carrier ("NGDLC") costs exactly parallels the concern I
5 will discuss below regarding Verizon's proposals in this arbitration to recover
6 forward-looking loop recurring costs and embedded or actual nonrecurring costs
7 for xDSL line "conditioning."

8 The decisions of these three commissions emphasize the importance of
9 using a consistent network design for calculating both recurring and nonrecurring
10 costs as an essential safeguard against double-recovery of costs.

11 **Q. WHY IS THIS AVOIDANCE OF DOUBLE-RECOVERY OF COSTS SO**
12 **IMPORTANT?**

13 A. First, the incumbents' double-recovery of costs equates to new entrants'
14 overpayment of costs. Excessive prices for unbundled network elements will
15 deter efficient entry, contrary to the goals of the TELRIC methodology.

16 Second, a "mix-and-match" approach to costing that permits double-
17 recovery gives the incumbents improper signals concerning when to modernize
18 their networks. A simple analogy explains this point. The decision to buy a new
19 car typically involves a tradeoff between the higher monthly loan or lease

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26 *Id.* at 70.

payment associated with the new vehicle versus the higher maintenance cost associated with an older vehicle. At some point, the operating cost of the older car becomes so high that it is more economic to dispose of the old vehicle and buy a new one, even if the previously owned car is fully paid off and there are no monthly payments whatsoever. Now suppose, however, that the owner of the older vehicle is guaranteed recovery of the actual cost of all repairs needed to keep the car running. The individual would never have any incentive to incur the cost of buying a new car, and would continue operating the old vehicle long after it ceased to be economically rational (from a societal perspective) to do so. Similarly, if the incumbents are reimbursed for the recurring cost of building a brand-new, modern network (akin to the monthly payment on a new car) *and* for the nonrecurring cost of maintaining and/or modifying their existing network to provide both voice and advanced services, they will have less incentive to invest in new, least-cost technology.

Prices that recover the total cost of building a new, fully modern network *and* selected additional costs associated with an older network design will always exceed TELRIC-based prices, which include only the total recurring and nonrecurring cost of providing service using the least-cost network configuration. Such prices also will always exceed the price that would prevail if unbundled network elements were provided in a competitive environment.

Q. WOULD A STAND-ALONE NON-RECURRING "CONDITIONING" CHARGE COMPORT WITH THE PRINCIPLES OF FORWARD-LOOKING COST ANALYSIS THAT YOU JUST DESCRIBED?

A. No. Stand-alone non-recurring "conditioning" charges are fundamentally inconsistent with forward-looking economic cost principles because such charges would not reflect an efficient, forward-looking network architecture. It is my understanding that the network engineering guidelines in place for the past two decades call for a loop architecture that does not deploy load coils, excessive bridged taps or repeaters (that inhibit the provision of advanced services such as ISDN and DSL-based services). Thus, the premise that Verizon must remove load coils, excessive bridged taps or repeaters to render a loop suitable for the provision of DSL-based services has no place in a non-recurring pricing proposal, much less one based on forward-looking costs.

As I explained above, the assumption of different network architectures in the recurring and non-recurring cost studies for the same network element violates the forward looking economic cost requirement for total cost minimization and creates a significant risk of double-counting. For example, the monthly recurring charge for basic unbundled loops should reflect the cost of a network that deploys fiber feeder and DLC for long loops. These monthly recurring charges will recover *all* costs for building a network without DSL inhibitors such as load coils and excessive bridged tap. Thus, every penny of cost included a stand-alone "conditioning" NRC would thus duplicate a function (the provision of a "conditioned" loop) already fully incorporated in Verizon's recurring cost.

1 Suppose two computer manufactures exist: "Manufacturer A," which
2 started in business in 1999 and has produced numerous 800 MHz computers at an
3 economic cost of $1,500 each, and "Manufacturer B," which started in business in
4 2000 producing 1 GHz computers at an economic cost of $1,200 each. To obtain
5 a 1 GHz processor chip and upgrade an existing 800 MHz machine costs
6 Manufacturer A an additional $400.
7 Further suppose that a new computer application is introduced in 2001 that
8 requires a 1 GHz computer system to function properly. A growing number of
9 customers want to use this application and will not buy a computer with less than
10 a 1 GHz processor. How can Manufacturer A attract business from these
11 customers? Manufacturer A would no doubt like to propose the following deal:
12 "I will provide a 1 GHz computer for a base price of $1,200 — the same market
13 price that Manufacturer B is charging for its 1 GHz computers. But, what I
14 actually have in stock are 800 MHz machines. So you will also need to pay my
15 $400 cost to upgrade my existing stock to support 1 GHz service. This $1,600
16 price is reasonable because the additional $400 is an actual cost that I will incur."
17 Manufacturer A's proposal would die a well-deserved death in a
18 competitive market. Customers would not be willing to pay more than the $1,200
19 price at which Manufacturer B can supply 1 GHz computers and recover its

1 forward-looking economic cost.[27] The only compensation that Manufacturer A
2 could reasonably expect to receive is the $1,200 market price to produce a new
3 computer with the 1 GHz capability. This would be the true forward-looking
4 economic cost to Manufacturer A as well, because the economic value of its 800
5 MHz machines would have fallen to $800, the difference between the market
6 value of a 1 GHz computer and the $400 cost that Manufacturer A incurs to
7 upgrade its 800 MHz to 1 GHz. The decrease in value of Manufacturer A's 800
8 MHz computers is an example of economic depreciation.

9 The seemingly absurd proposal by "Manufacturer A" is, however, a close
10 parallel to what Verizon is requesting in this arbitration and has heretofore
11 obtained in some jurisdictions: *i.e.*, it is a proposal to obtain full compensation
12 for the forward-looking costs of a fully modernized loop that meets market
13 requirements for a new advanced service plus additional compensation to bring its
14 stock on hand up to the service standards reflected in that market price. Absent
15 regulatory constraint, Verizon can sustain this type of uneconomic pricing scheme
16 because it still possesses market power.

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[27] This simplified example ignores many variables, such as the possibility that "Manufacturer B" would not be able to meet the entire demand for 1 GHz computers or that there is a "Manufacturer C" that started business in 2001 and can supply the entire market demand with computers that cost $1,000.

1 **Q. COULD VERIZON'S IMPOSITION OF NONRECURRING**
2 **"CONDITIONING" CHARGES SURVIVE IN A COMPETITIVE**
3 **MARKET?**

4 A. No. As the example above illustrates, a firm operating in a competitive market
5 could not sustain such an approach. For example, imagine that competitors had
6 already built or could readily build networks with the same scope as Verizon's. If
7 Verizon's UNE loops were priced at forward-looking economic cost, that new
8 competitor would incur the equivalent of the forward-looking cost incorporated
9 into the existing UNE loop recurring costs to implement its network. Hence, to
10 earn a normal return, such a competitor would need to charge only the current
11 UNE loop price for loops that support DSL service. If such competitors existed or
12 could plausibly exist — as would be the case in a competitive market — Verizon
13 would be driven out of the market if it insisted on maintaining huge nonrecurring
14 charges to "condition" its loops in addition to the forward-looking recurring cost
15 of modern, DSL-capable loops.

16 To support the development of competitive forces that may eventually
17 control Verizon's pricing and to deliver the benefits of a competitive market to
18 Virginia as rapidly as possible, the Commission must require Verizon to deliver
19 its bottleneck elements to competitors at market prices, such as are reflected in
20 forward-looking economic cost analysis.

1 **Q. WHY ARE NONRECURRING "CONDITIONING" CHARGES**
2 **INCONSISTENT WITH FORWARD-LOOKING ECONOMIC COSTING**
3 **PRINCIPLES?**

4 A. As Mr. Riolo explains in greater detail, the network engineering guidelines in
5 place for more than two decades call for a loop architecture that does not deploy
6 load coils, excessive bridged taps or repeaters that inhibit the provision of
7 advanced services such as ISDN and DSL-based services. Because these features
8 that must be deconditioned to support DSL do not exist in a forward-looking
9 recurring cost analysis, it is inconsistent to include them in a nonrecurring cost
10 analysis. *Doing so violates basic costing requirements.*

11 Verizon's recurring charge for basic two-wire loops reflects the full
12 forward-looking economic cost of a network design that does not include
13 components such as load coils that interfere with DSL-based services. The
14 assumption of different network architectures in the recurring and nonrecurring
15 cost studies for the same network element violates both common sense and the
16 Commission requirement for total cost minimization. It also creates a significant
17 risk of double-counting costs.

18 **Q. IS IT YOUR CONTENTION THAT THIS COMMISSION HAS RULED**
19 **OUT THE POSSIBILITY OF ANY NON-RECURRING**
20 **"CONDITIONING" CHARGES?**

21 A. No. I am aware that this Commission has held open the possibility of allowing
22 incumbents such as Verizon Virginia to recover the costs of "conditioning"
23 through non-recurring charges. The pricing rules that the Commission adopted in

1 the *UNE Remand Order* make clear, however, that any non-recurring
2 "conditioning" charges must be based on forward-looking economic cost and
3 may not permit a carrier to recover more than total forward-looking economic
4 cost. Specifically, §§ 51.319(a)(3)(B) and (C) of the modified pricing rules state
5 that recovery of line "conditioning" costs must be "in accordance with the
6 Commission's forward-looking pricing principles promulgated pursuant to section
7 252(d)(1) of the Act" and "in compliance with rules governing nonrecurring costs
8 in § 51.507(e)." Section 51.507(e) reads that "[s]tate commissions may, where
9 reasonable, require incumbent LECs to recover nonrecurring costs through
10 recurring charges over a reasonable period of time. Nonrecurring charges shall be
11 allocated efficiently among requesting telecommunications carriers, and *shall not*
12 *permit an incumbent LEC to recover more than the total forward-looking*
13 *economic cost of providing the applicable element.*" (Emphasis added.)
14 To the best of my knowledge, the Commission has not issued any findings
15 concerning the appropriate level, if any, of non-recurring "conditioning" charges
16 based on forward-looking costs because the Commission has never before
17 reviewed the recurring and non-recurring UNE cost studies for a specific
18 incumbent local exchange carrier. This arbitration presents the Commission with
19 an opportunity to determine the appropriate level of non-recurring "conditioning"
20 charges in the context of actual forward-looking cost studies. For all of the
21 reasons that I have explained above, approval of any non-recurring "conditioning"
22 charges for Verizon Virginia would result in double-recovery of the forward-

1 looking costs for fully "conditioned" loops that Mr. Pitkin has calculated using
2 the Synthesis Model, as modified for use in this arbitration. Thus, in my opinion,
3 adoption of any positive non-recurring charge for "conditioning" would be
4 inconsistent with this Commission's prior determinations concerning the
5 application of forward-looking cost principles to both recurring and non-recurring
6 costs,

7 **Q. YOUR TESTIMONY DOES NOT ADDRESS PRICES FOR UNBUNDLED**
8 **NETWORK ELEMENTS RELATED TO LINE-SHARING OR LINE-**
9 **SPLITTING, OTHER THAN THE LOOP "CONDITIONING" AND**
10 **ACCESS TO LOOP MAKEUP INFORMATION ISSUES THAT APPLY**
11 **TO ALL DSL-CAPABLE LOOPS. HOW DO AT&T AND WORLDCOM**
12 **PROPOSE TO ADDRESS LINE-SHARING AND LINE-SPLITTING**
13 **PRICES?**

14 A. I understand that the New York collaborative is addressing line-sharing and line-
15 splitting configurations that would serve as a template for service offerings
16 throughout the Verizon region. Therefore, AT&T and WorldCom propose to
17 address other DSL-related pricing issues after the results of the New York
18 collaborative become available and there is greater certainty concerning the
19 options for which prices are required.

20 **Q. DOES THAT CONCLUDE YOUR TESTIMONY AT THIS TIME?**

21 A. Yes.

I, Terry L. Murray, hereby swear and affirm that the foregoing direct testimony was prepared by me or under my direct supervision or control and is true and accurate to the best of my knowledge and belief.

Signed:

Terry L. Murray
Witness

State of California :
County of Alameda :

I, Ann S. Kraynak do hereby swear and affirm that _____ Terry L. Murray appeared before me this 27 day of July, 2001.

ANN S. KRAYNAK
COMM #1251649
NOTARY PUBLIC-CALIFORNIA
COUNTY OF ALAMEDA
My Comm. Expires Feb 19, 2004

Signed:

Ann S Kraynak
Notary

Notary Qualification Expires: 2/19/04

[Stamp or Seal]